County of Los Alamos

1000 Central Avenue
Los Alamos, NM 87544

Agenda - Final

Board of Public Utilities

Jeff Johnson, Chair; Stephen McLin, Vice-chair; Paul Frederickson, Kathleen Taylor and Carrie Walker, Members
Tim Glasco, Ex Officio Member
Harry Burgess, Ex Officio Member
Christine Chandler, Council Liaison

Wednesday, January 17, 2018 | **5:30 PM** | **1000 Central Avenue Council Chambers**

REGULAR SESSION

Complete Board of Public Utilities agenda packets, past agendas, videos, legislation and minutes can be found online at http://losalamos.legistar.com/Calenar.aspx. Learn more about the Board of Public Utilities at http://www.losalamosnm.us/gov/bcc/utilitiesboard.

PUBLIC COMMENTS:

Please submit written comments to the Board at bpu@lacnm.us. Oral public comment is accepted during the two periods identified on the agenda and after initial board discussion on a business item, prior to accepting a main motion on an item. Oral comments should be limited to four minutes per person. Requests to make comments exceeding four minutes should be submitted to the Board in writing prior to the meeting. Individuals representing or making a combined statement for a large group may be allowed additional time at the discretion of the Board. Those making comments are encouraged to submit them in writing either during or after the meeting to be included in the minutes as attachments. Otherwise, oral public comments will be summarized in the minutes to give a brief succinct account of the overall substance of the person's comments.

1. CALL TO ORDER

2. PUBLIC COMMENT

This section of the agenda is reserved for comments from the public on Consent Agenda items or items that are not otherwise included in this agenda.

3. APPROVAL OF AGENDA

4. BUSINESS ITEM

At the request of the Board Chair prior to agenda publication, item 4.A. was moved from the normal Business section (Section 8) to be taken up prior to Section 5, Board Business (Section 5).

4.A. 10305-18 Future Energy Resources Implementation Plan Update

Presenters: Steve Cummins, Deputy Utilities Manager - Power Supply

PG. 1-5

5. BOARD BUSINESS

5.A. Chair's Report

5.B. Board Member Reports

5.C. Utilities Manager's Report

5.D. County Manager's Report

5.E. Council Liaison's Report

5.F. Environmental Sustainability Board Liaison's Report

5.G. General Board Business

5.G.1 10304-18 Complete 2017 Board of Public Utilities Annual Self-evaluation

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 6

5.G.2 10309-18 Approval of Board of Public Utilities Meeting Calendar for 2018

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 7-8

5.G.3 10310-18 Approval of Meeting Agenda Outline for 2018

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 9-10

5.G.4 10311-18 Schedule and Selection of Members to Attend Boards & Commissions Luncheons for 2018

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 11

5.G.5 10312-18 Appointment of Board Member to Audit Committee for 2018

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 12

5.G.6 10313-18 Affirmation of the Incorporated County of Los Alamos Open Meetings Resolution No. 18-01

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 13-20

5.G.7 10308-18 Election of Board of Public Utilities Chair and Vice-chair for 2018

Presenters: Jeff Johnson, Chair of the Board of Public Utilities

PG. 21-22

5.G.8 10303-18 Quarterly Update on Utility System - Water System

Presenters: Jack Richardson, Deputy Utilities Manager - GWS Services

PG 23-89

5.H. Approval of Board Expenses

5.I. Preview of Upcoming Agenda Items

5.I.1. 10298-18 Tickler File for the Next 3 Months

Presenters: Board of Public Utilities

PG. 90-92

6. PUBLIC HEARING(S)

There were no public hearings scheduled for this meeting.

7. CONSENT AGENDA

The following items are presented for Board approval under a single motion unless any item is withdrawn by a member for further Board consideration in the "Business" section of the agenda.

CONSENT MOTION -

I move that the Board of Public Utilities approve the items on the Consent Agenda as presented and that the motions in the staff reports be included in the minutes for the record.
OR
I move that the Board of Public Utilities approve the items on the Consent Agenda as amended and that the motions contained in the staff reports, be included in the minutes for the record.

7.A 10297-18 Approval of Board of Public Utilities Meeting Minutes

Presenters: Board of Public Utilities

PG. 93-100

7.B AGR0546-18 Approval of Services Agreement No. AGR18-17 with HPI, LLC in the amount of $312,195.00, plus Applicable Gross Receipts Tax, for the Purpose of Abiquiu Hydroelectric Plant Controls Upgrade

Presenters: James Alarid, Deputy Utilities Manager - Engineering

PG. 101-120

7.C AGR0547-18 Approval of Services Agreement No. AGR18-20 with Intellibind Technologies, LLC in the amount of $500,000.00, plus Applicable Gross Receipts Tax, for the Purpose of Electric SCADA Comprehensive Patch Management Services

Presenters: James Alarid, Deputy Utilities Manager - Engineering

PG. 121-132

8. BUSINESS

8.A AGR0545-18 Approval of Services Agreement No. AGR17-32 with Anixter Incorporated in the amount of $4,974,717.00**,** plus Applicable Gross Receipts Tax, for the Purpose of Advanced Metering Infrastructure (AMI) Equipment and Services

Presenters: Bob Westervelt, Deputy Utilities Manager - Finance/Admin

PG. 133-206

8.B 10307-18 Approval of the Long Range Water Supply Plan

Presenters: James Alarid, Deputy Utilities Manager - Engineering

PG. 207-359

8.C 10306-18 Transfer of Funds from the Gas Fund to the Wastewater Fund

Presenters: Tim Glasco, Utilities Manager

PG.360-364

9. STATUS REPORTS

9.A 10296-18 Status Reports

Presenters: Board of Public Utilities

PG. 365-378

10. PUBLIC COMMENT

This section of the agenda is reserved for comments from the public on any items.

11. ADJOURNMENT

If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing or meeting, please contact the County Human Resources Division at 662-8040 at least one week prior to the meeting or as soon as possible. Public documents, including the agenda and minutes can be provided in various accessible formats. Please contact the personnel in the Department of Public Utilities (505) 662-8132 if a summary or other type of accessible format is needed.

Los Alamos, NM 87544
www.losalamosnm.us

County of Los Alamos

Staff Report

January 17, 2018

Agenda No.:	4.A.
Index (Council Goals):	BCC - N/A
Presenters:	Steve Cummins, Deputy Utilities Manager - Power Supply
Legislative File:	**10305-18**

Title

Future Energy Resources Implementation Plan Update

Recommended Action

None

Staff Recommendation

None

Body

At the request of the Board, staff will present status updates on three recommendations from the Strategic Policy for Electrical Energy Resources and the Distributed Energy Resources and Rate Structures documents, addressing the feasibility of a community solar garden, dispatchable loads, energy storage, and generation assets.

Alternatives

N/A

Fiscal and Staff Impact

See attachment

Attachments

A - FER Implementation Plan Status Update

Title

Presenting status updates on three recommendations from the *Strategic Policy for Electrical Energy Resources* and the *Distributed Energy Resources and Rate Structures* documents, addressing the feasibility of a community solar garden, dispatchable loads, energy storage, and generation assets.

Recommended Action

No Action anticipated, for discussion

Staff Recommendation

No recommendation, however staff welcomes feedback from Utility Board members on the plan and schedule

Body

This agenda item addresses three recommendations from the *Strategic Policy for Electrical Energy Resources*, and the *Distributed Energy Resources and Rate Structures* documents, adopted by the Board of Public Utilities on January 2016:

1. "Evaluate the feasibility, including market interest, of a community solar garden if bandwidth or other limits are not being approached by individual installations.
2. "For large customers, require or encourage (via rates) that at least large loads be dispatchable. County government and the Department of Public Utilities can and should lead by example.
3. "For large DER [Distributed Energy Resource] producers, require or encourage (via rates) dispatchable storage and generation and Phase 2 or 3 inverters as they become available. The County government and the Department of Public Utilities can and should lead by example.

Community Solar Garden

In 2010, DPU began a demonstration project with the Japanese government to test the amount of PV (photovoltaic) solar penetration that could be added to a residential feeder while maintaining power quality using a battery system. A 1 MW (megawatt) PV array was installed at the closed landfill adjacent to Tech Area 3, with second 1 MW array planned for future installation.

In 2013 flooding damaged the landfill cap, allowing water to enter the underlying waste, and causing a significant increase in methane production. Installation of the second 1 MW array was necessarily delayed. Repairs to the cap were completed in 2017, and a gas extraction system to deal with the methane is planned to be installed in summer 2018. Installation of the second 1 MW array could begin as early as summer 2019. The landfill site is a preferred location for new solar because it already has an interconnection to the grid and is unsuitable for commercial or residential use.

Under the current Electric Coordination Agreement (ECA) between LAC and DOE-LANL, neither party can add generation resources to serve their individual load. The ECA, commonly referred to as the power pool, meets the power demands of both parties using approved resources as required by the ECA and the costs are shared equitably based on energy and demand. Any resources connected behind the meter for either party will shift the demand cost to the other party, violating the agreement.

If DPU actively promotes or coordinates a solar project behind the meter, staff recommends that it becomes a Pool asset whereby DOE-LANL takes a pro-rata ownership share, leaving DPU's share available to our customers under some predetermined model for a solar garden.

Adding the second MW at the landfill site as a pool asset could give the County approximately 400 kW (kilowatt) of capacity available to our customers to actively participate in a solar garden. The result of our 2016 solar garden survey showed an interest of approximately 300 kW depending on the final terms and condition of the project. Following the survey, the Chamber of Commerce informed DPU that there was some interest in the business community that was not captured in the survey.

Staff recommends pursuing the landfill site option for a community solar garden in accordance with the terms and condition of the ECA. Staff will continue to investigate alternate sites under the same terms and conditions.

Distributed Energy Resource Management System

The second and third recommendations being considered revolve around dispatchable loads, generation resources and storage. Staff proposed a Distributed Energy Resource Management System (DERMS) to accomplish this goal and to lead by example.

The initial primary driver for a DERM system was to replace the Micro EMS (prototype) used for the operation and management of the PV solar array and battery system constructed with the NEDO demonstration project. Being a prototype, support services are unavailable for continued operation and maintenance, which doesn't allow for future expansion.

With the implementation of DERMS software and the corresponding rate structures, DPU could also take advantage of the dispatchable loads and Energy Storage Systems (ESS) of our customers. Large loads and distributed ESS can be used as virtual power plants by shedding load as needed without disrupting business or building comfort levels giving our Power System Operators more flexibility when matching the generation resources to the demand.

Time of use rates may influence our customer's behavior on when to use electricity or DPU could have an incentive program for ESS being dispatched at the utility discretion based on some predetermined requirements. A good example of this could be the state of charge of an electric vehicle that could potentially be dispatched at the utility discretion or even the customer discretion in the future.

DPU attempted to partner on two different occasions with OATI for a grant from the DOE for implementation of a DERMS and Building Energy Management System (BEMS). DPU and OATI were given an opportunity to present to the selection committee in Washington DC with the Department of Energy for the funding opportunity.

DPU's goal with this demonstration project was to have the implementation fees covered by the grant money and also give an opportunity for the County facilities staff along with DPU's Power System Operators to gain some experience with these proposed systems.

Both grant applications were rejected, leaving the cost of implementation with DPU and facilities.

Alternatives

Alternatives for Community Solar Garden

1. Alternative sites are being considered which would support a pool asset:
    - DP Road A-16 land transfer cleaned up for commercial zoning
    - DOE-LANL property identified in the NREL report

2. Other smaller sites that may be considered for a standalone community solar garden:
   - DP Road A-9 Affordable Housing with covered parking considered in the design may accommodate roof top solar if located on the south side of the apartments.
   - Neighborhood Association sites (e.g. Pajarito Acres in White Rock)
   - Public Schools property
3. In support of the strategic policies adopted by the BPU, "the County and the Department of Public Utilities can and should lead by example."
   - Staff proposes that DPU consider supporting a demonstration project using covered parking solar panels located at the Municipal building. This site will be very visible to the community and it's estimated that we could reduce the Municipal building demand by 25%.
   - Public Property centrally located downtown doubling as a Demonstration

Alternatives for Distributed Energy Resource Management System

One alternative is to move forward with the implementation now with the County Facilities commitment to participate through the learning curving period, giving ample time for Operators to become familiar with the system prior to rolling it out to our customers.

Fiscal and Staff Impact

Fiscal and Staff Impact for Community Solar Garden

1. With a Pool-approved resource and the size of the project being considered the fiscal impacts would be relatively minor and blended with the other generation resources.
2. Developing a solar garden for the community, the cost could be fully recovered from the participants depending on the terms and condition of the agreements.
3. A demonstration project could apply for grant money to help subsidize the structure with the remaining cost borne by the customer.

Staff Impacts for the strategic Policy initiatives have been included in staff regular work hours.

Fiscal and Staff Impact for Distributed Energy Resource Management System

The following table is an estimate for the implementation of a DERM system along with monthly and annual recurring costs. The table also shows the potential savings the first year of operation.

	Implementation Cost	Monthly-Recurring	Annual Fee-Recurring
DERMS BASE	$ 95,000.00	$ 5,000.00	$ 60,000.00
GRID Control Base	$ 20,000.00	$ 1,500.00	$ 18,000.00
GridPort- with Celluar	$ 1,250.00	$ 7.00	$ 84.00
GridPort-BEMS	$ 250.00		$ -
Intergration Service 125 hours	$ 25,000.00		$ -
Trane	$ 86,290.00		$ -
	$ 227,790.00	$ 6,507.00	$ 78,084.00
Voltage Saving	**Total System**	**WR Share**	**Potential Savings-Annual**
Conservation Voltage Reductio	111,136	0.3333	$ 37,041.63
BEMS Savings Potential	**Demand- MW**	**Demand $/MW**	**Potential Savings-Annual**
Peak-55 Kw Minimum Range	0.055	$ 15,512.50	$ 10,238.25
Peak-110 KW Maximum Range	0.11	$ 15,512.50	$ 20,476.50

Note that the two rows stating savings potential represent a range from a low of $10,238 to a high of $20,476. Current estimated net operating cost is approximately $30k per year with an initial implementation cost of $227,790.00. Based on these estimates, staff recommends waiting at least two years then evaluating the community's uptake of electric vehicles and distributed roof-top PV systems.

Based on lessons learned from the NEDO demonstration project, it is anticipated that a significant amount of time will be required for operations and maintenance personnel to train and develop proficiency with the DERM software interface and the building hardware and software necessary for controlling the air-conditioning units.

Attachments

The following is a link to the DERMS that was used to develop the economic analysis above:

https://www.oati.com/Solution/Smart-Energy/distributed-energy-resource-management

County of Los Alamos

Staff Report

January 17, 2018

Agenda No.:	5.G.1
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10304-18**

Title

Complete 2017 Board of Public Utilities Annual Self-evaluation

Recommended Action

None at the time of agenda publication. Placeholder for any possible follow-up action resulting from the January 16th special meeting.

Staff Recommendation

None

Body

On January 16th, the Board will conduct its annual self-evaluation at a special meeting. This agenda item is a placeholder should the Board wish to continue discussion or take any action as a follow-up to the special meeting.

Alternatives

None

Fiscal and Staff Impact

None

Attachments

None

County of Los Alamos

Staff Report

January 17, 2018

Los Alamos, NM 87544
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Agenda No.:	5.G.2
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10309-18**

Title

Approval of Board of Public Utilities Meeting Calendar for 2018

Recommended Action

I move the Board of Public Utilities approve the proposed Board meeting calendar for 2018.

Staff Recommendation

Staff recommends that the Board of Public Utilities approved the proposed BPU Meeting Calendar for 2018.

Body

In accordance with Incorporated County of Los Alamos Resolution No. 18-01 regarding Open Meetings, notice of regular meetings of all county boards, commissions and policymaking bodies shall be given ten days in advance of the meeting date. **Each County board, commission and policymaking body may adopt a schedule of its regular meetings for the present calendar year or the balance thereof.** For purposes of paragraph 5 of the Resolution (regarding notice requirements), **notice of all regular meetings contained in such schedule is met if a copy of the schedule is posted and provided to the media as provided for in paragraph 5**; provided, however, that every County board, commission or policymaking body must still post and provide to the media a copy of the agenda prior to each regularly scheduled meeting as required under the Resolution.

Alternatives

The Board could choose not to approve a calendar for 2018 at this time or could make changes.

Fiscal and Staff Impact

None

Attachments

A - Proposed Board of Public Utilities Meeting Calendar for 2018

2018 Los Alamos County Board of Public Utilities Meeting Calendar

DRAFT 1/17/2018

BPU Meeting Dates

Unless otherwise advertised, the Board of Public Utilities (BPU) **meets the third Wednesday of every month at 5:30PM at the Municipal Building 1000 Central Ave. Council Chambers** ***Changes will be noted in red.**

Special meetings are scheduled as needed and may not be held in Chambers. They are not included on this calendar.

Agendas and special meeting notices are published at least 72 hours prior to meetings. If you would like to be added to the distribution to receive e-mail notices of BPU meetings, please e-mail jaime.kephart@lacnm.us

Email comments to the BPU bpu@lacnm.us

If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing or meeting, please contact the County Human Resources Division at 505-662-8040 at least one week prior to the meeting or as soon as possible.

Public documents, including the agenda and minutes, can be provided in various accessible formats. Please contact the personnel in the Department of Public Utilities at 505-662-8132 if a summary or other type of accessible format is needed.

January

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	(17)	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

February

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	(21)	22	23	24
25	26	27	28			

March

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	(21)	22	23	24
25	26	27	28	29	30	31

April

S	M	T	W	T	F	S
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8	9	10	11	12	13	14
15	16	17	(18)	19	20	21
22	23	24	25	26	27	28
29	30					

May

S	M	T	W	T	F	S
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13	14	15	**16**	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

LOCATION: TBD

June

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	(20)	21	22	23
24	25	26	27	28	29	30

July

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	(18)	19	20	21
22	23	24	25	26	27	28
29	30	31				

August

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
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19	20	21	22	23	24	25
26	27	28	29	30	31	

September

S	M	T	W	T	F	S
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16	17	18	(19)	20	21	22
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30						

October

S	M	T	W	T	F	S
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7	8	9	10	11	12	13
14	15	16	**17**	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

LOCATION: BCC Rm 110

November

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	(21)	22	23	24
25	26	27	28	29	30	

December

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	(19)	20	21	22
23	24	25	26	27	28	29
30	31					

January 2018

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	(16)	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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losalamos.legistar.com/Calendar.aspx

To view meetings live online, visit the web-site above and click on the **"Live Proceedings"** tab just prior to the meeting.

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DEPT OF PUBLIC UTILITIES
LOS ALAMOS COUNTY NEW MEXICO
Electricity, Water, Gas & Wastewater Services

1000 Central Ave, Suite 130
Los Alamos, NM 87544

505.662.8333
Fax 505.662.8005
www.losalamosnm.us/utilities
dpu@lacnm.us

Agenda No.:	5.G.3
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10310-18**

Title

Approval of Meeting Agenda Outline for 2018

Recommended Action

I move that the Board of Public Utilities approve the meeting agenda outline for 2018 as presented.

Staff Recommendation

None

Body

Section 3.3 of the Board of Public Utilities Policies and Procedures Manual outlines an annual calendar of BPU activities. Annually at the January meeting, the Board is to review and approve the standard meeting agenda outline in section 3.4 of the PPM.

MEETING AGENDA OUTLINE FOR 2018

1. Call to Order
2. Public Comment (on consent agenda items and items not otherwise listed on the agenda)
3. Approval of Agenda
4. Board Business
a. Chair's report
b. Board Member Reports
c. Utilities Manager's Report
d. County Administrator's Report
e. Council Liaison's Report
f. Environmental Sustainability Board Liaison's Report
g. General Board Business
h. Approval of Board Expenses
i. Preview of Upcoming Agenda Items
i.1. Tickler File for the Next 3 Months
5. Public Hearings (Any BPU action will be in the Public Hearings section of the agenda.)
6. Consent Agenda
a. Approval of Minutes
7. Business

8. Status Reports

a. Electric Distribution Reliability Report

b. Accounts Receivable Report

c. Safety Incident Report

d. Project Status Reports

9. Public Comment (on any item)

10. Adjournment

Alternatives

The Board could choose to modify the template.

Fiscal and Staff Impact

None

Attachments

None

Agenda No.:	5.G.4
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10311-18**

Title
Schedule and Selection of Members to Attend Boards & Commissions Luncheons for 2018

Recommended Action
None

Staff Recommendation
Staff recommends that Board members volunteer to represent the Board of Public Utilities at each luncheon.

Body
Regular County Boards & Commissions luncheons are scheduled to give these groups an opportunity to work with one another and with Council representatives. Only one representative from each board or commission is asked to attend. Lunch and drinks are provided and each representative is asked to give a brief written update for their group. **These usually occur every other month, 11:30AM-1:00PM, in Council Chambers. The dates scheduled for 2018 are:**

Thursday, January 18
Thursday, March 15
Thursday, May 17
Thursday, September 20
Thursday, November 15

Board members should volunteer to represent the Board of Public Utilities at each luncheon.

Alternatives
The Board could choose not to assign members to attend the luncheons at this time.

Fiscal and Staff Impact
None

Attachments
None

Agenda No.:	5.G.5
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10312-18**

Title

Appointment of Board Member to Audit Committee for 2018

Recommended Action

None

Staff Recommendation

Staff recommends that the Board of Public Utilities appoint a member to serve on the County Audit Committee for 2018.

Body

Mr. McLin served as the Board of Public Utilities representative on the County Audit Committee for 2016 and 2017. A new member should be appointed to serve on this committee for 2018.

Alternatives

The Board could choose not to appoint a member for this committee at this time.

Fiscal and Staff Impact

None

Attachments

None

County of Los Alamos

Staff Report

January 17, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:	5.G.6
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10313-18**

Title

Affirmation of the Incorporated County of Los Alamos Open Meetings Resolution No. 18-01

Recommended Action

I move that the Board of Public Utilities affirm Incorporated County Of Los Alamos Resolution No. 18-01; A Resolution Establishing Minimum Standards Of Reasonable Notice To The Public For All Meetings Of The Council, The County Indigent Hospital And County Health Care Board And Of All County Boards, Commissions And Policymaking Bodies

Staff Recommendation

Staff recommends that the Board of Public Utilities affirm Incorporated County Of Los Alamos Resolution No. 18-01; A Resolution Establishing Minimum Standards Of Reasonable Notice To The Public For All Meetings Of The Council, The County Indigent Hospital And County Health Care Board And Of All County Boards, Commissions And Policymaking Bodies.

Body

At the first County Council meeting of a new calendar year, Council passes an Open Meetings resolution that establishes minimum standards of reasonable notice to the public for all meetings of County boards, commissions, and policy making bodies. After the resolution is passed, the Board of Public Utilities reviews the resolution at the next regularly scheduled meeting and affirms the standards.

Board of Public Utilities Policies & Procedures Manual

Section 2.12.c Open Meetings Policy

"Each January the County Council passes and the BPU will affirm a resolution establishing minimum standards of reasonable notice to the public for all meetings of the council, the county indigent hospital and county health care board and of all county boards, commissions, and policy-making bodies."

Alternatives

None

Fiscal and Staff Impact

None

Attachments

A - Resolution No. 18-01

INCORPORATED COUNTY OF LOS ALAMOS RESOLUTION NO. 17-21

A RESOLUTION ESTABLISHING MINIMUM STANDARDS OF REASONABLE NOTICE TO THE PUBLIC FOR ALL MEETINGS OF THE COUNCIL, THE COUNTY INDIGENT HOSPITAL AND COUNTY HEALTH CARE BOARD AND OF ALL STANDING COUNTY BOARDS, COMMISSIONS AND POLICYMAKING BODIES

WHEREAS, the Council wishes to establish minimum standards of reasonable notice to the public for meetings of the Council, including its meetings as the County Indigent Hospital and County Health Care Board, and all standing County boards, commissions and policymaking bodies listed in Schedule "A;" and

WHEREAS, the democratic ideal is best served by a well-informed public, and sunshine laws generally require that public business be conducted in full public view, that the actions of public bodies be taken openly, and that the deliberations of public bodies be open to the public; and

WHEREAS, the Open Meetings Act states that, except as may be otherwise provided in the Constitution or the provisions of the Open Meetings Act, all meetings of a quorum of members of any board, council, commission, administrative adjudicatory body or other policymaking body held for the purpose of formulating public policy, discussing public business or for the purpose of taking any action within the authority of or the delegated authority of such body, are declared to be public meetings open to the public at all times [Section 10-15-1B NMSA 1978]; and

WHEREAS, when it is difficult or impossible for a member to attend a meeting in person, the member may participate by means of a conference telephone or similar communications equipment [Section 10-15-1C NMSA 1978]; and

WHEREAS, any meetings subject to the Open Meetings Act at which the discussion or adoption of any proposed resolution, rule, regulation or formal action occurs shall be held only after reasonable notice to the public [Section 10-15-1D NMSA 1978]; and

WHEREAS, the Open Meetings Act requires the Council of the Incorporated County of Los Alamos to determine annually what constitutes reasonable notice of its public meetings and those of all County boards, commissions and policymaking bodies [Section 10-15-1D NMSA 1978]; and

WHEREAS, the Council wishes to establish the minimum standards of reasonable notice to the public for all public meetings of the Council and for all public meetings of all County boards, commissions and policymaking bodies for the year 2018 and until a new resolution concerning public meetings is adopted.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Incorporated County of Los Alamos that:

1. All meetings of the Council, including its meetings as the County Indigent Hospital and County Health Care Board, shall be held at the time and place indicated in the meeting notice. All meetings of the Council shall be held on the dates specified in the schedule attached to this Resolution as Schedule "B" unless notice is otherwise provided seventy-two (72) hours in

advance of the meeting date. An agenda for all regular meetings of the Council shall be available at least seventy-two (72) hours prior to the meeting from personnel in the Office of the County Manager. All agendas shall be posted on the County's web site provided the web site is operational during the period seventy-two (72) hours prior to the meeting.

2. Notice of regular meetings of all County boards, commissions and policymaking bodies listed on Schedule "A" shall be given no less than ten (10) days in advance of the meeting date. The notice may include an agenda for the meeting or indicate how a copy of the agenda may be obtained. An agenda shall be available at least seventy-two (72) hours prior to the meeting. All meetings of each standing County board, commission or policymaking body, and any committee or subcommittee of such body charged with making a policy recommendation, shall be held at the time and at the place indicated in the meeting notice. Each County board, commission and policymaking body may adopt a schedule of its regular meetings for the present calendar year or the balance thereof. Such schedule shall contain the date, time, and place of each regular meeting. For purposes of paragraph 5 of this Resolution, notice of all regular meetings contained in such schedule is met if a copy of the schedule is posted and provided to the media as provided for in paragraph 5 of this Resolution; provided, however, that every County board, commission or policymaking body must still post and provide to the media a copy of the agenda prior to each regularly scheduled meeting as required under this Resolution. All agendas shall be posted on the County's web site provided the web site is operational during the period seventy-two (72) hours prior to the meeting.

3. Special meetings may be called by the Chair or a majority of the members of the Council, including its meetings as the County Indigent Hospital and County Health Care Board, or respective County board, commission or policymaking body listed in Schedule "A," upon seventy-two (72) hours' notice. The notice shall include an agenda for the meeting or information to indicate how a copy of the agenda may be obtained. An agenda for the meeting shall be available to the public and posted on the County's web site at least seventy-two (72) hours before any special meeting.

4. Emergency meetings may only be called under unforeseen circumstances which demand immediate action to protect the health, safety and property of citizens or to protect the public body from substantial financial loss. The Council, including its meetings as the County Indigent Hospital and County Health Care Board, and all County boards, commissions and policymaking bodies listed in Schedule "A" shall avoid emergency meetings whenever possible. Emergency meetings may be called by the Chair or a majority of the members of the Council or respective County board, commission or policymaking body listed on Schedule "A," upon twenty-four (24) hours' notice, unless threat of personal injury or property damage requires less notice. The notice for all emergency meetings shall include an agenda for the meeting or information on how the public may obtain a copy of the agenda, which shall be posted on the County's web site as soon as is practicable after the agenda is created.

5. For the purposes of regular meetings described in paragraphs 1 and 2 of this Resolution, notice requirements are met if notice of the date, time, and place is posted in a conspicuous place in the vicinity of the front door of the Municipal Building located at 1000 Central Avenue, Los Alamos, New Mexico and visible from the exterior of the building, as well as being posted on the County's web site. Copies of the notice shall be provided to those broadcast stations licensed by the Federal Communications Commission and newspapers of general circulation which have made a written request for notice of public meetings for the coming calendar year. Only one such written request shall be required for each calendar year.

6. For the purposes of special meetings described in paragraph 3 of this Resolution, notice requirements are met if notice of the date, time, place and agenda is posted in a conspicuous place in the vicinity of the front door of the Municipal Building at 1000 Central Avenue, Los Alamos, New Mexico and visible from the exterior, as well as being posted on the County's web site. Copies of the notice shall be provided to those broadcast stations licensed by the Federal Communications Commission and newspapers of general circulation which have made a written request for notice of public meetings for the coming calendar year. Only one such written request shall be required for each calendar year.

7. For the purposes of emergency meetings described in paragraph 4 of this Resolution, notice requirements are met if notice of the date, time, place and agenda is posted in a conspicuous place in the vicinity of the front door of the Municipal Building at 1000 Central Avenue, Los Alamos, New Mexico and visible from the exterior and posted on the County's web site as soon as is practicable. Copies of the notice shall be provided to those broadcast stations licensed by the Federal Communications Commission and newspapers of general circulation which have made a written request for notice of public meetings for the coming calendar year. Only one such written request shall be required for each calendar year.

8. In addition to the information specified above, all notices shall include the following language:

> "If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing of the meeting, please contact the County Human Resources Department at 662-8040 at least one (1) week prior to the meeting or as soon as possible. Public documents, including the agenda and minutes, can be provided in various accessible formats. Please contact the personnel in the Office of the County Manager at 663-1750, if a summary or other type of accessible format is needed."

9. The Council, including when meeting as the County Indigent Hospital and County Health Care Board, and all County boards, commissions and policymaking bodies listed on Schedule "A" may close a meeting to the public only if authorized by the Open Meetings Act [Section 10-15-1H NMSA 1978]:

(a) If any meeting is closed during an open meeting, such closure shall be approved by a majority vote of a quorum of the Council, including when meeting as the County Indigent Hospital and County Health Care Board, or respective County board, commission or policymaking body, as applicable, taken during the open meeting. The authority for the closure and the subjects to be discussed shall be stated with reasonable specificity in the motion for closure and the vote on closure of each individual member shall be recorded in the minutes. Only those subjects specified in the motion may be discussed in the closed meeting.

(b) If the decision to hold a closed meeting is made when the Council, including when meeting as the County Indigent Hospital and County Health Care Board, a County board, commission or policymaking body is not in an open meeting, the closed meeting shall not be held until public notice, appropriate under the circumstances, stating the specific provision of law authorizing the closed meeting and the subjects to be discussed with reasonable specificity is given to the members and to the general public.

(c) Following completion of any closed meeting, the minutes of the open meeting that was closed, or the minutes of the next open meeting if the closed meeting was separately scheduled, shall state whether the matters discussed in the closed meeting were limited only to those specified in the motion or notice for closure.

(d) Except as provided in the Open Meetings Act, any action taken as a result of discussions in a closed meeting shall be made by a vote of the Council, including when meeting as the County Indigent Hospital and County Health Care Board, or respective County board, commission or policymaking body, in an open public meeting [Section 10-15-1H NMSA 1978].

10. Any member may participate by means of a conference telephone, video communication, or similar communications equipment when it is difficult or impossible for a member to attend a meeting in person, provided that each member participating by other means can be identified when speaking, all participants are able to hear each other at the same time and members of the public meeting attending the meeting are able to hear any member of the public body who speaks during the meeting.

PASSED AND ADOPTED this 5th day of December, 2017.

COUNCIL OF THE INCORPORATED COUNTY OF LOS ALAMOS

David Izraelevitz, Council Chair

ATTEST:

Naomi D. Maestas
Los Alamos County Clerk by

SCHEDULE "A"

COUNTY BOARDS, COMMISSIONS AND POLICYMAKING BODIES

Art in Public Places Board
Board of Adjustment (formerly Variance Board)
Board of Public Utilities
Environmental Sustainability Board
Fuller Lodge/Historic Districts Advisory Board
Labor Management Relations Board
Library Board
Lodgers' Tax Advisory Board
Parks and Recreation Board
Personnel Board
Planning and Zoning Commission
Transportation Board
Valuation Protests Board

2018 Los Alamos County Council Calendar

LOS ALAMOS

Regular meetings will be held in Council Chambers in the Municipal Building at 1000 Central Avenue or at Fire Station 3, 129 State Road 4 in White Rock. Tuesday meetings start at 6:00 PM. Work Sessions are held at Fire Station No. 3, 129 State Road 4 in White Rock. Special meetings are scheduled as needed.

NMAC Legislative Conf.
1/15-18
Santa Fe

2018 State Legislative Session
1/16 - Opening Day
2/15 - Session Ends

NMML Municipal Day
2/2 Santa Fe

Washington, DC CONFERENCES

NACO legislative Conference
3/3 - 3/7
Washington D.C.

NLC Congressional City Conference
3/11 - 3/14
Washington D.C.

LAPS Spring Break
3/26 - 3/30

NACO Western Interstate Conf. (WIC)
5/23 - 5/25
Sun Valley, ID

NMAC Annual Conference
6/19 - 6/22
Socorro County

NACO Annual Conf.
7/13 - 7/16
Nashville, TN

NMML Annual Conf.
8/29-31
Roswell

NLC City Summit
11/7 - 11/10
Los Angeles, CA

January

S	M	T	W	T	F	S	
	1	2	3	4	5	6	
7	8	9	10	11	12	13	LA
14	15	16	17	18	19	20	Martin Luther King Jr. Day
21	22	23	24	25	26	27	LA/PCS
28	29	30	31				LA

February

S	M	T	W	T	F	S	
				1	2	3	
4	5	6	7	8	9	10	WR
11	12	13	14	15	16	17	LA
18	19	20	21	22	23	24	Presidents' Day
25	26	27	28				LA

March

S	M	T	W	T	F	S	
				1	2	3	
4	5	6	7	8	9	10	LA
11	12	13	14	15	16	17	WR
18	19	20	21	22	23	24	LA
25	26	27	28	29	30	31	

April

S	M	T	W	T	F	S	
1	2	3	4	5	6	7	LA
8	9	10	11	12	13	14	Easter 4/1
15	16	17	18	19	20	21	LA
22	23	24	25	26	27	28	LA
29	30						

May

S	M	T	W	T	F	S	
		1	2	3	4	5	LA
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	WR
20	21	22	23	24	25	26	WR
27	28	29	30	31			Memorial Day

June

S	M	T	W	T	F	S	
					1	2	
3	4	5	6	7	8	9	Primary Election Day
10	11	12	13	14	15	16	LA
17	18	19	20	21	22	23	WR
24	25	26	27	28	29	30	LA

July

S	M	T	W	T	F	S	
1	2	3	4	5	6	7	Independence Day
8	9	10	11	12	13	14	LA
15	16	17	18	19	20	21	
22	23	24	25	26	27	28	WR
29	30	31					LA

August

S	M	T	W	T	F	S	
			1	2	3	4	
5	6	7	8	9	10	11	LA
12	13	14	15	16	17	18	
19	20	21	22	23	24	25	WR
26	27	28	29	30	31		LA

September

S	M	T	W	T	F	S	
						1	
2	3	4	5	6	7	8	Labor Day/LA
9	10	11	12	13	14	15	WR
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	LA
30							

October

S	M	T	W	T	F	S	
	1	2	3	4	5	6	LA
7	8	9	10	11	12	13	
14	15	16	17	18	19	20	WR
21	22	23	24	25	26	27	
28	29	30	31				WR

November

S	M	T	W	T	F	S	
				1	2	3	
4	5	6	7	8	9	10	General Election Day
11	12	13	14	15	16	17	LA/Veteran's Day
18	19	20	21	22	23	24	Thanksgiving and day after
25	26	27	28	29	30		LA

December

S	M	T	W	T	F	S	
						1	
2	3	4	5	6	7	8	LA
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	LA
23	24	25	26	27	28	29	Christmas Day
30	31						

January 2019

S	M	T	W	T	F	S	
		1	2	3	4	5	
6	7	8	9	10	11	12	LA
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	LA/PCS
27	28	29	30	31			LA

- Council Regular Meeting
- Council Work Session
- Holidays
- Budget Hearings
- Strategic Planning
- B&C Luncheons

Agenda No.:	5.G.7
Index (Council Goals):	BCC - N/A
Presenters:	Jeff Johnson, Chair of the Board of Public Utilities
Legislative File:	**10308-18**

Title
Election of Board of Public Utilities Chair and Vice-chair for 2018

Recommended Action
The board should elect a Chair and Vice-chair using the method agreed upon at the January 20th, 2018 meeting.

Staff Recommendation
Staff recommends that a Chair and Vice-chair of the Board of Public Utilities be elected for 2018 in accordance with LAC Ordinance Sec. 40-41.

Body
The Board of Public Utilities shall annually elect its chair and such officers as it desires from among its members. The election shall occur at a regular meeting in January of each year. (LAC Ordinance Sec. 40-41. Board of public utilities - Organization.)

Procedure Agreed Upon by General Consensus for the January 2018 Elections:

First use the following steps to elect a new Chair, and then repeat the process for the Vice-chair. After the Vice-chair is elected, the previous Chair continues to conduct the meeting. The outgoing Chair will continue to Chair the remainder of the January meeting through its conclusion, with the incoming Chair assuming Chair responsibilities immediately following conclusion of the January meeting.

1. The current Chair says “nominations are now in order for the office of Chair of the Board of Public Utilities”

2. Any member, including the chair, can nominate one person. After each nomination, the current Chair states that “[NAME] is nominated by Member [NAME]. Are there any further nominations?”

3. When it appears that there are no further nominations, the current Chair will ask once more for any final nominations. If there is no further response, the Chair will then declare the nomination closed.

4. Have a roll call vote for the Chair position.

5. If no one receives a majority of the votes and more than two nominations received votes, drop

the nomination that received the fewest number of votes and the nominations that receive no votes and go back to step 4.

6. If there are only two nominations and the vote is a tie, try a second roll call vote. If that also results in a tie, the current Chair chooses between the two nominees.

7. If the person elected declines the position, go back to step 1 with the provision that said elected person may not be nominated again.

Alternatives

None - The Board is required by Ordinance to elect a chair and vice-chair annually in January.

Fiscal and Staff Impact

None

Attachments

None

County of Los Alamos

Staff Report

January 17, 2018

Agenda No.:	5.G.8
Index (Council Goals):	BCC - N/A
Presenters:	Jack Richardson, Deputy Utilities Manager - GWS Services
Legislative File:	**10303-18**

Title
Quarterly Update on Utility System - Water System

Recommended Action
No recommendation, for information only.

Staff Recommendation
None

Body
The Board has requested a quarterly system assessment on a different utility each quarter. This quarter, Jack Richardson, Deputy Utilities Manager for Gas, Water and Sewer, will present an update on the water system.

Alternatives
None

Fiscal and Staff Impact
None

Attachments
A - Water System Presentation

Quarterly Update to BPU Water Systems (DW, WP & NP)

By: Jack Richardson, PE

Deputy Utility Manager – Gas, Water, Sewer (GWS)

BPU Meeting – January 17, 2018

1

Water Distribution Pipeline

Eastern Area Corroded 6” Steel Corroded Pipeline with Leak

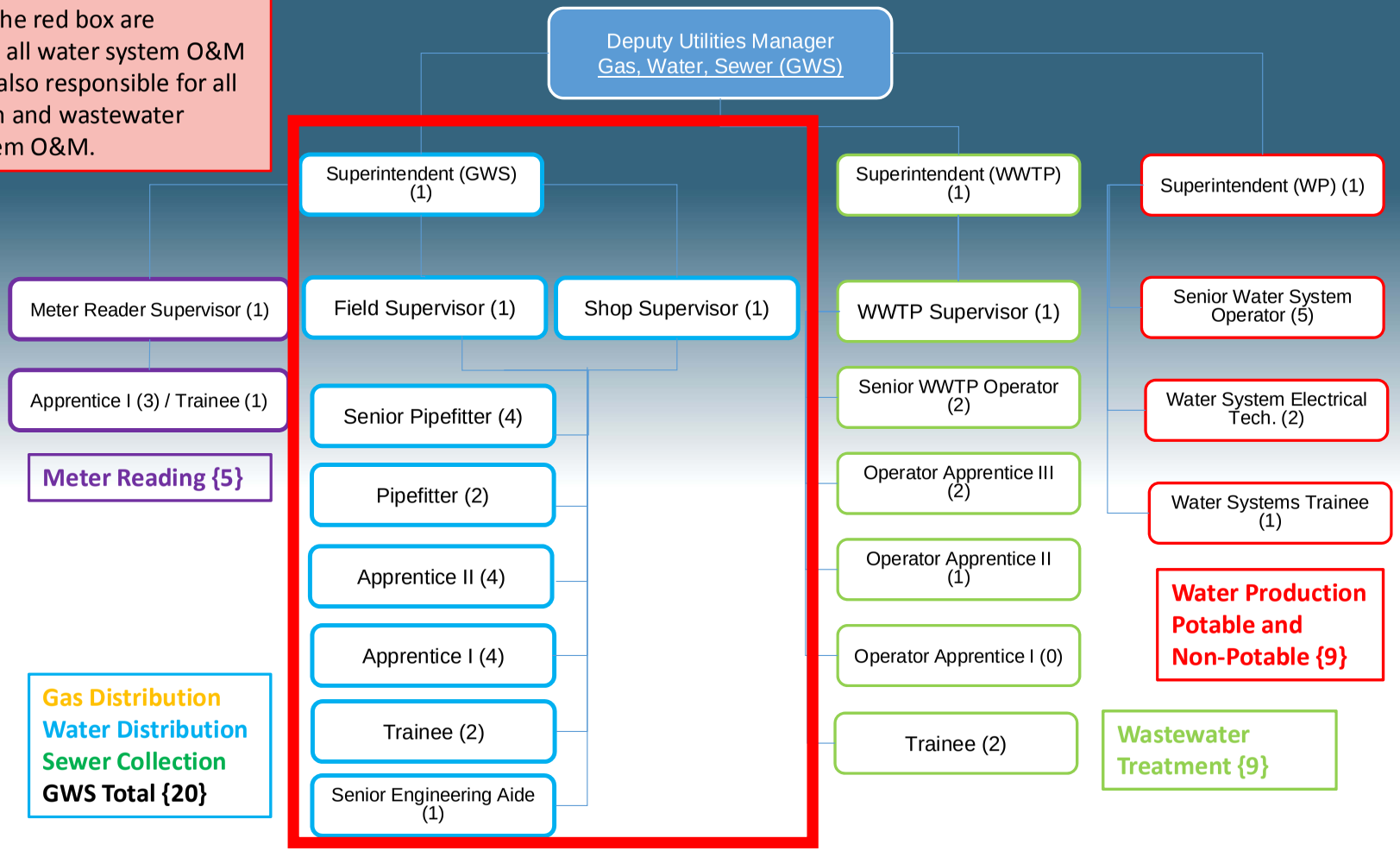
Water Production Pipeline

Eastern Area & Down Town Area

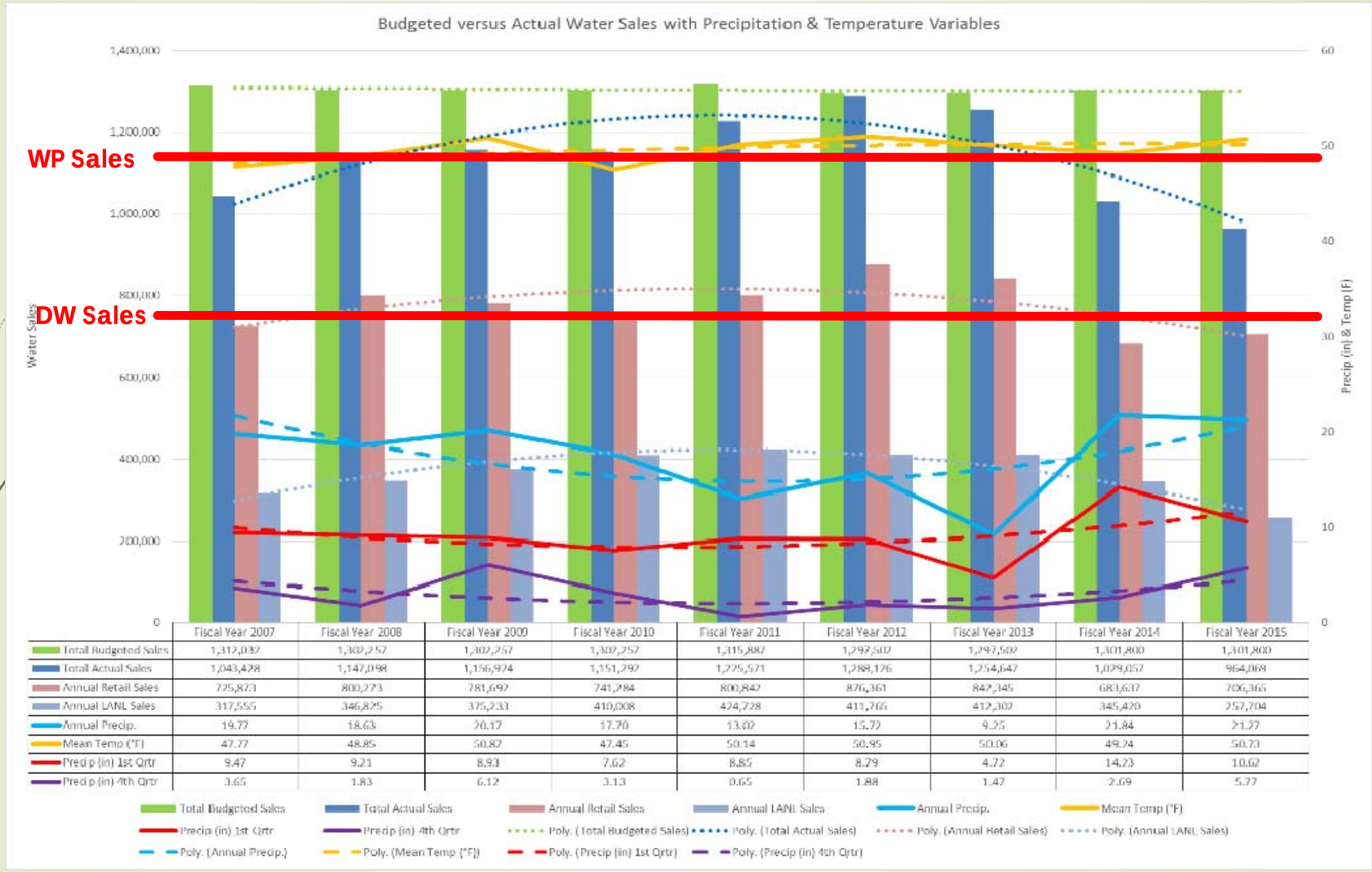
Corroded Coupling Example

GWS ORGANIZATIONAL STRUCTURE

These folks in the red box are responsible for all water system O&M – but they are also responsible for all gas distribution and wastewater collection system O&M.

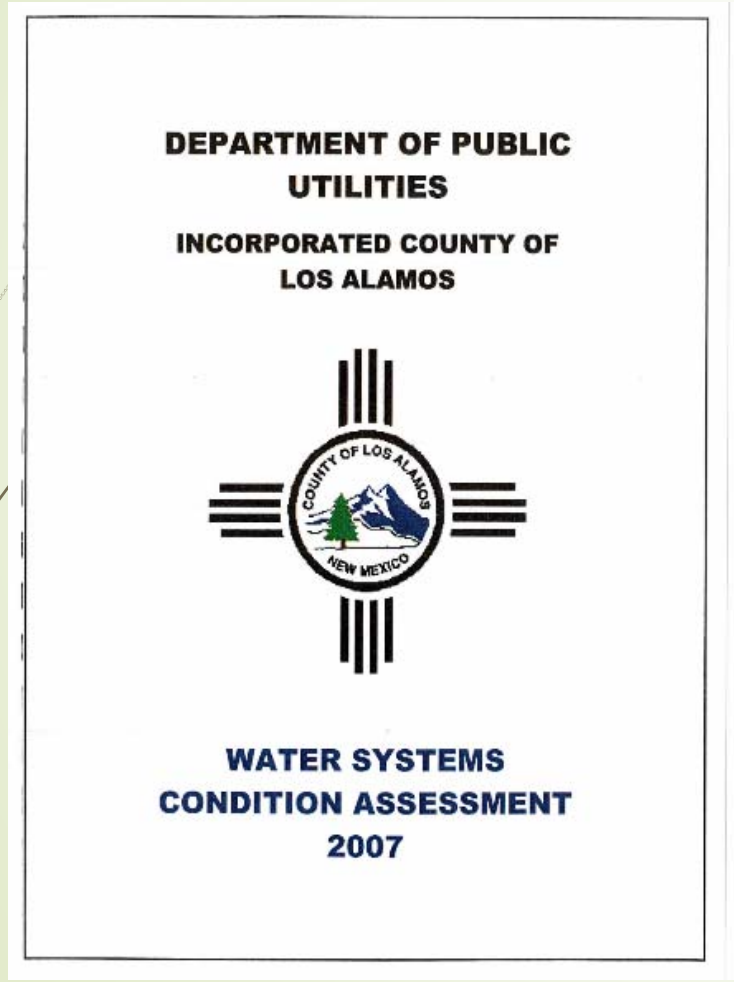


Budget vs Actual Water Sales w/ Precip. & Temp.



	Fiscal Year 2007	Fiscal Year 2008	Fiscal Year 2009	Fiscal Year 2010	Fiscal Year 2011	Fiscal Year 2012	Fiscal Year 2013	Fiscal Year 2014	Fiscal Year 2015
Total Budgeted Sales	1,312,037	1,302,257	1,302,257	1,302,257	1,315,887	1,292,502	1,297,502	1,301,800	1,301,800
Total Actual Sales	1,043,428	1,147,098	1,156,924	1,151,292	1,225,571	1,288,126	1,254,647	1,039,057	964,069
Annual Retail Sales	725,873	800,273	781,692	741,284	800,842	876,361	842,145	683,637	706,365
Annual LANL Sales	317,555	346,825	375,233	410,008	424,728	411,765	412,502	345,420	257,704
Annual Precip.	19.77	18.63	20.17	17.70	13.02	15.72	9.55	21.84	21.37
Mean Temp (°F)	47.77	48.85	50.87	47.45	50.14	50.95	50.06	49.24	50.73
Precip (in) 1st Qrtr	9.47	9.21	8.93	7.62	8.85	8.29	4.72	14.23	10.62
Precip (in) 4th Qrtr	3.65	1.83	6.12	3.13	0.65	1.88	1.47	2.69	5.77

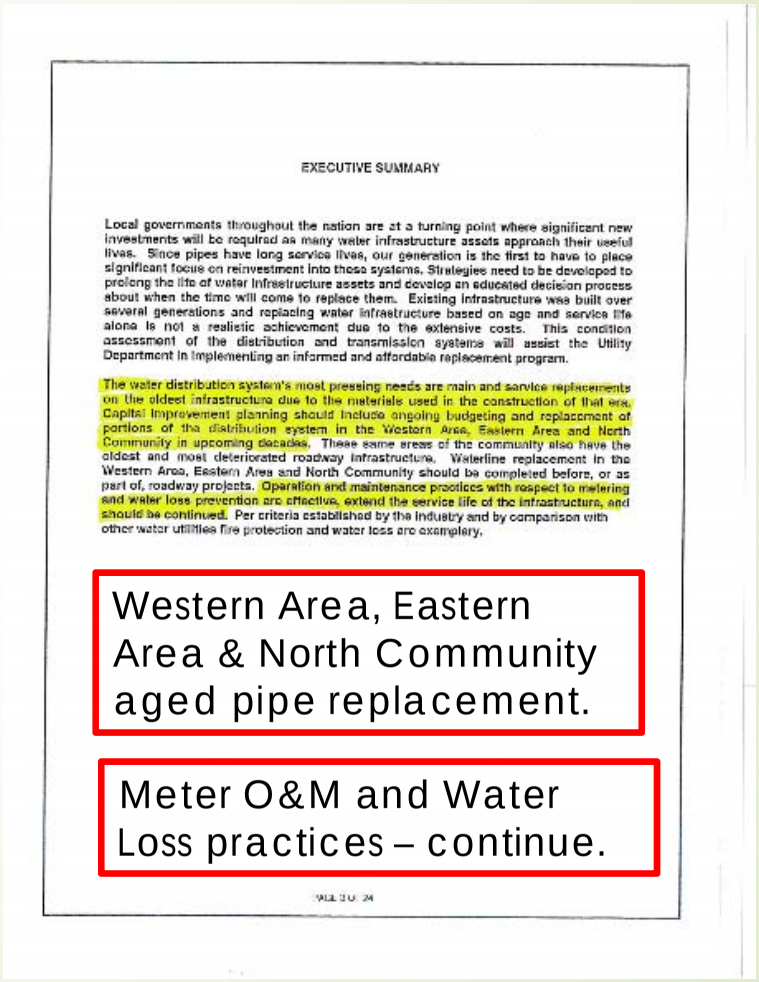
2007 Study – Executive Summary



DEPARTMENT OF PUBLIC UTILITIES

INCORPORATED COUNTY OF LOS ALAMOS

WATER SYSTEMS CONDITION ASSESSMENT 2007



EXECUTIVE SUMMARY

Local governments throughout the nation are at a turning point where significant new investments will be required as many water infrastructure assets approach their useful lives. Since pipes have long service lives, our generation is the first to have to place significant focus on reinvestment into those systems. Strategies need to be developed to prolong the life of water infrastructure assets and develop an educated decision process about when the time will come to replace them. Existing infrastructure was built over several generations and replacing water infrastructure based on age and service life alone is not a realistic achievement due to the extensive costs. This condition assessment of the distribution and transmission systems will assist the Utility Department in implementing an informed and affordable replacement program.

The water distribution system's most pressing needs are main and service replacements on the oldest infrastructure due to the materials used in the construction of that era. Capital improvement planning should include ongoing budgeting and replacement of portions of the distribution system in the Western Area, Eastern Area and North Community in upcoming decades. These same areas of the community also have the oldest and most deteriorated roadway infrastructure. Waterline replacement in the Western Area, Eastern Area and North Community should be completed before, or as part of, roadway projects. Operation and maintenance practices with respect to metering and water loss prevention are effective, extend the service life of the infrastructure, and should be continued. Per criteria established by the industry and by comparison with other water utilities fire protection and water loss are exemplary.

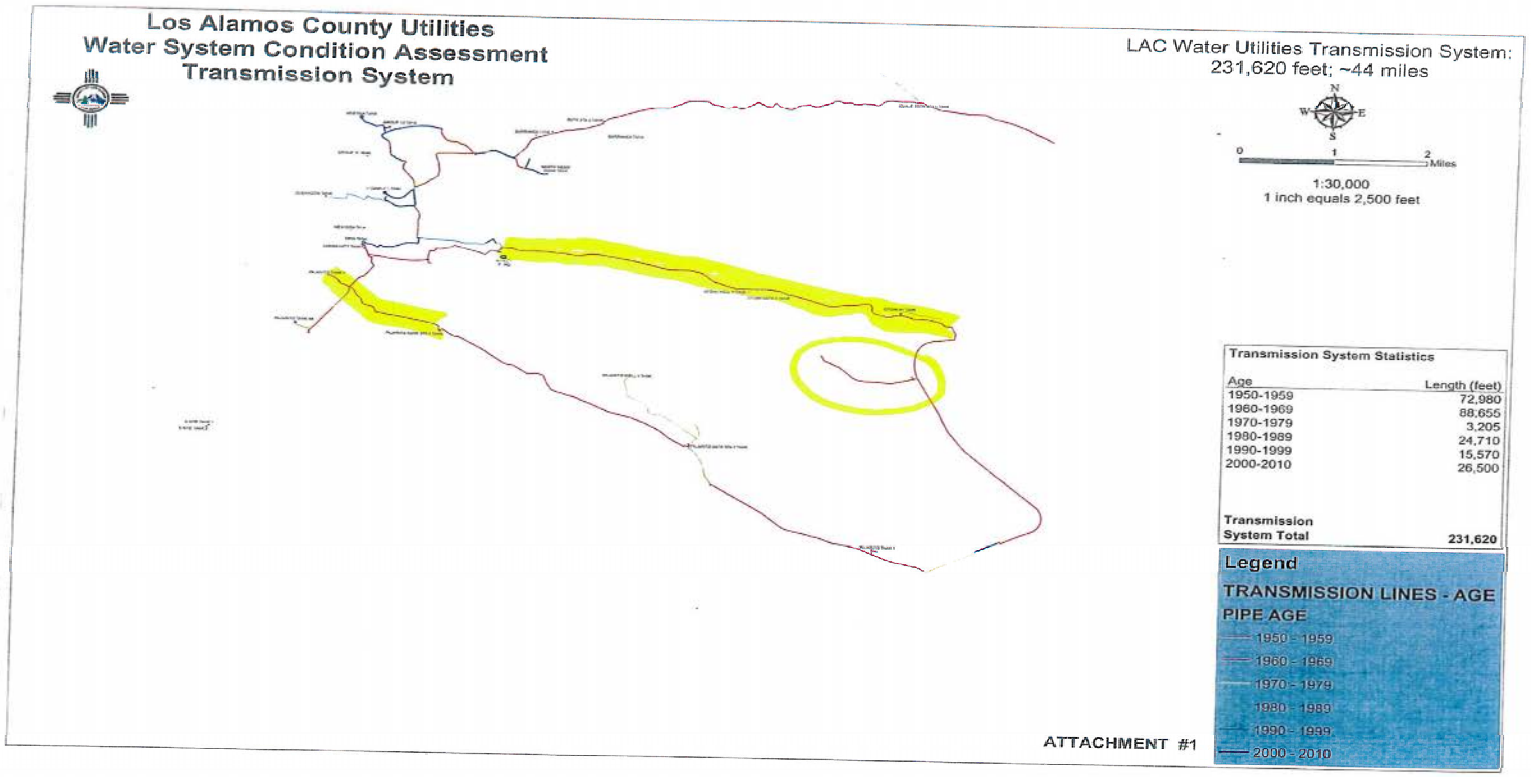
Western Area, Eastern Area & North Community aged pipe replacement.

Meter O&M and Water Loss practices – continue.

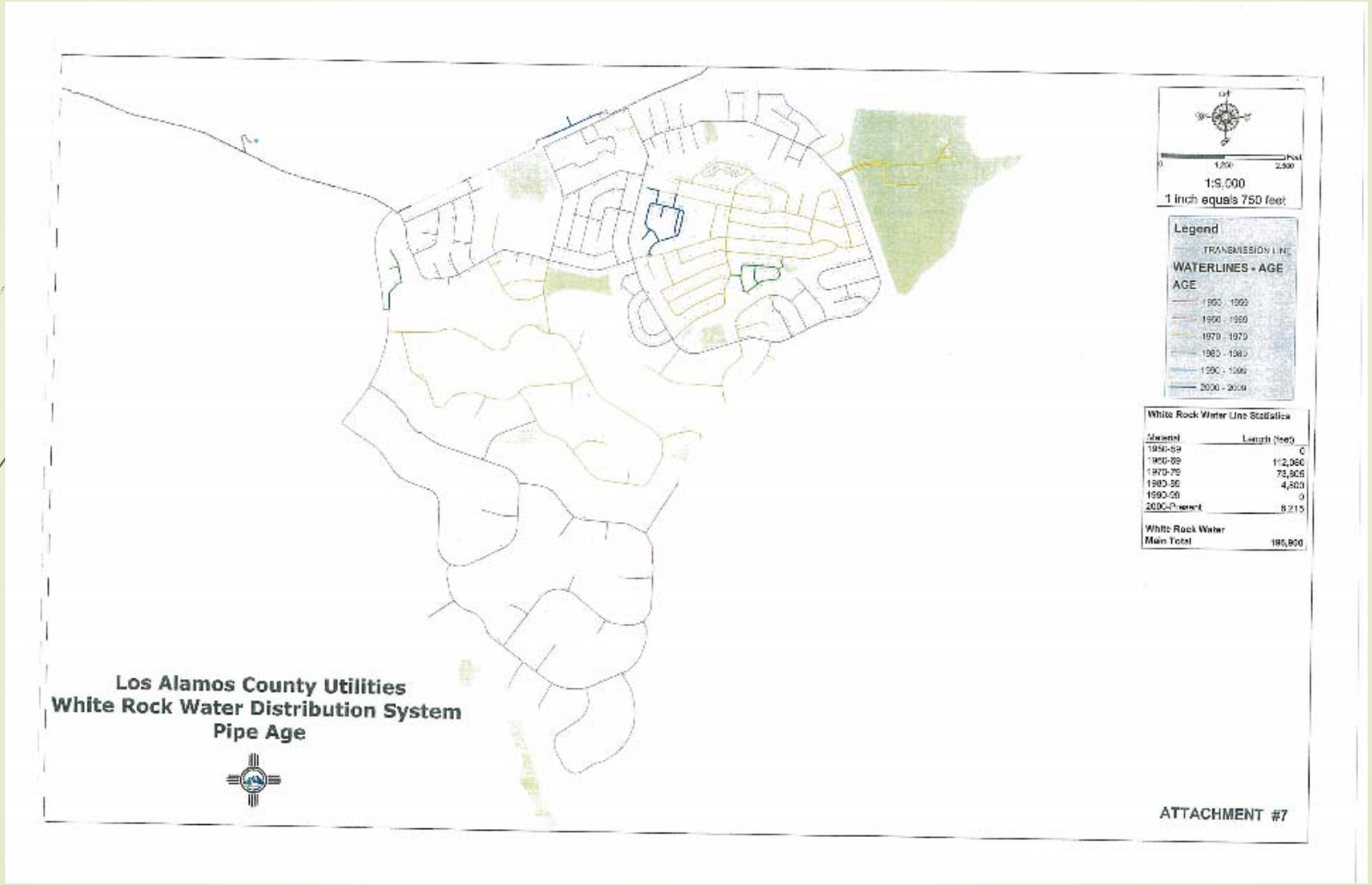
Water System 2007 Condition Assessment Discussion Points

- **Water Production Pipelines are shown on slide 6**
- Yellow Highlighted Linear Pipelines are WP pipelines scheduled for R&R within the 10-Year CIP Plan.
- R&R (Repair or Replacement) – Current thinking is that modern pipeline repair systems have been developed to the point where they are less intrusive and more cost efficient. These rehabilitation approaches will be given a thorough investigation before any pipeline replacement activities are planned.
- Circled Highlighted Pipeline was originally included in the 10-Year CIP Plan but has been deferred indefinitely due to the potential Chromium Plume contamination at Pajarito Well # 3.
- Planned pipeline R&R projects are on pipelines constructed in the 1950-1969 time frame (49 to 58 year old pipe).
- Not all 1950-1969 pipelines are planned for R&R. Only the pipelines of this age that have known deficiencies based on historic repetitive leaks and visual inspection condition assessments.
- **Town Site Water Distribution Pipelines are shown on slide 7**
- Yellow Highlighted Linear Pipelines are DW pipelines scheduled for R&R starting within the 10-Year CIP Plan and finishing within the proposed 20-Year CIP Plan.
- Circled Highlighted Pipeline has already been replaced over the past few years as a component of the multiple year CIP road improvement CIP effort by in coordination with Public Works.
- Planned pipeline R&R projects are on the same era (49 to 58 year old) pipe with known deficiencies.
- **White Rock Water Distribution Pipelines are shown on slide 8**
- No 1950-1959 time frame (58 years old) pipelines exist in the White Rock area. A majority of the pipe in White Rock is 1960-1969 era, but this pipe was installed under a better construction regime (better inspection of installation materials and methods). There are relatively few known serious deficiencies in the water distribution system throughout the White Rock area that would call for large scale R&R efforts.

Los Alamos County Water Production Pipelines



White Rock Water Distribution Pipelines



2007 Condition Assessment Accomplishments – 1 of 2

2007 Condition Assessment Pipeline Replacement Accomplishment Highlights (DW)

- Western Area Residential Water Pipelines
  - 1950's era pipelines replaced in coordination with a series of Public Works street improvement projects. Corroded cast iron mains and galvanized steel delivery lines replaced with new ductile iron and flexible plastic lines.
  - Replacement required due to age and deteriorated condition mostly due to inadequate construction techniques (lack of bedding on rock trench bottom and large rock fragments backfilled directly on pipe).

2007 Condition Assessment Pipeline Replacement Future Planning (DW & WP)

- Near term 10-Year and long term 20-Year CIP plans call for major R&R (repair & replacement) of older pipelines in North Community and Eastern Area. Enhanced GIS based asset management tools with improved emphasis on visual condition assessment will allow for targeted replacement while allowing older but still good condition pipelines to remain in service.

2007 Condition Assessment Meter Replacements & Leak Prevention Highlights & Future Planning (DW)

- Meter Replacements.
  - Starting in 2008 DPU has met it's goal of replacing 350 water meters per year.
  - 2016 – 2021 expedited meter replacement occurring to improve accuracy and AMI compatibility.
- Annual Leak Detection Surveys.
  - Starting in 2005 DPU has contracted out a water pipeline leak detection effort. Approximately 15% of all three water systems pipelines (DW, WP & NP) are surveyed each year.

2007 Condition Assessment Accomplishments - 2 of 2

- **2007 Condition Assessment Aged Large Meter Set Replacement Accomplishment Highlights (DW, WP & NP)**
  - All large meters serving the major NP customers have been replaced with new meters that have a SCADA monitoring, and sometimes control, component. (FY17 & FY18)
  - Tsankowi Water Production Point of Service meter has been replaced. (FY17)
  - An annual program of high use and large meter checks has been instituted.
- **2007 Condition Assessment Well & Booster Station Motor Control Equipment Accomplishment Highlights (WP)**
  - Replacement of all antiquated, and no longer supported, motor control centers & equipment. (FY19 last)
  - Replacement of 20+ year old SCADA equipment: remote radio transmitting units; master radios & computer stations. (FY17 through FY19)
  - **Non-2007 Condition Assessment NP System Improvement Accomplishment Highlights (NP)**
  - Completed the first ever NP System Master Plan in 2013.
  - Renovated the NP system to add 500,000 gallons of storage available to serve the Golf Course and other North Mesa NP customers with gravity flow service. This allowed the elimination of irrigation pump stations at the Golf Course, North Mesa Ball & Soccer Fields and the Los Alamos Middle School service.
  - Modified the NP pipeline between Bayo Canyon and North Mesa to be underground and protected from winter freezing damage. This allows irrigation by NP customers during dry winter periods (2017/2018 winter).

Ongoing Strategy for Operating and Maintaining the Water Systems

- **INPUT #1 - Condition Assessment (Latest = 2007)**
- Provided a 2007 condition assessment of the water distribution & production systems. Significant items highlighted included:
  - Pipeline Age & Condition – Extensive old and corroded steel pipe
  - PRV Stations (Pressure Reducing Valve Stations) – Needing minor R&R
  - Fire Flows & System Hydraulics – Generally Good (North Mesa pipeline upsizing – included in 10-Year CIP)
  - Meters (Condition and Proper Size) – Large service customer regulator & meter age, condition and proper size
  - Water Loss – 2004 through 2006 average = 8.8% versus 2013 through 2017 average = 12.42%
    - Probable difference in source numbers and methodology and increasing deterioration of some pipelines with leakage
- **INPUT #2 - Asset Management Team (AMT) Program**
- Two teams (Water Distribution & Water Production/NP System) efforts consist of front line supervisors (with daily input from field crews), engineering and finance & admin staff to programmatically address O&M and capital replacement requirements and system upgrade opportunities
- Identify and prioritize portions of the water systems that need attention in order to provide safe and reliable service to our customers
- AMT program features quarterly meetings plus one additional pre-annual AMT Governance Team meeting
- **OUTPUT - Bi-Annual Budget / Annual Budget Update & Revision / Quarterly System Condition Assessment (Field & Financial)**
- AMT's analyze the water systems in order to recommend O&M and CIP improvements that are used to develop the annual budget (O&M and CIP)to meet all water systems requirements
- AMT's revised schedules will allow the review of financial statements at quarterly meetings to monitor progress and the relationship between expenditures and accomplishments. AMT's are responsible to recommend revisions to any existing plan or program in response to actual conditions in the field as conditions change.

Examples of Operation & Maintenance Program Efficiency – 1 of 2

- **Eliminating One FTE in Water Production (FY15)**
- Long term employee was not replaced after retirement in FY 2015
  - Reduces the number of FTE's in WP from 10 to 9
  - Loss of FTE is coincident with a significant increase in activity on the NP water system. Remaining personnel responsible to complete all duties
- **Enhanced PRV Station O&M in Water Distribution (& Water Production – inc. NP)**
- Pressure Reducing Valve Station field inspection forms are being upgraded so that asset management condition assessment information will be collected annually and placed into a digital file related to the GIS
- GWS staff have recommended multiple approaches to the renewed emphasis on O&M, in lieu of full CIP replacement. Suggestions that have been or will be implemented:
  - Add air venting pipes to vaults where possible (not under a street). Replace non-venting vault covers with vented covers for in street stations.
  - Purchase mobile sand blasting and mobile paint equipment set ups to R&R PRV vault piping and valves. Replace corroded fasteners with new SS fasteners. This effort should minimize the number of PRV stations that require full replacement and minimize the PRV portion of the CIP plan.
- **Incorporating GIS More as an O&M Tool in Addition to Being the Standard Mapping Tool**
- Will provide for easier and quicker access to water system documentation by adding field form data to the GIS data sets either by attaching scanned images of the field forms or inputting the field form data into a GIS data set
- Will provide for easy access to records during preparation for AMT meetings – thereby reducing time and perceived record keeping weaknesses
- Enhanced field forms for all infrastructure (not just PRVs) matched to upgraded GIS data sets are being developed, tested and implemented
- GIS water system O&M tool initiation is scheduled for late in FY 2018

Examples of Operation & Maintenance Program Efficiency – 2 of 2

- **Reprogramming Automatic Control System in Water Production**
  - Completed and operational for the Pajarito Line (PW2, PW4, PW5, PB1, PB2, PB3, Pajarito Tanks 4 & 4A and related PW & PB tanks)
  - Provides for automatic operation to keep the system full and running smoothly. Requires some additional programming to incorporate peak power signal reading and control to avoid peak power electric demand charges on occasion
  - Additional storage required on the Otowi Line & Guaje Line before full automatic control can be established at those locations (long term CIP planned projects)
- **Reprogramming Automatic Control System in Non Potable Water System**
  - Completed and operational for the new North Mesa Portion (Bayo BS, NM BS, Bayo, Middle School & Group 12 Tanks)
  - Provides for automatic operation to keep the system full and running smoothly. Includes additional metering and flow control equipment and programming at the Golf Course and North Mesa Ball Fields (two largest users) to avoid over use of water or emptying of the tank
- **Improved Communication, Understanding and Cooperation with LAFD**
  - Revised fire hydrant testing policy so that LAFD coordinates with GWS to provide for DPU operation of water valves and hydrants during hydrant testing to minimize water hammer damage to existing pipelines

Water Production Well Water Quality Monitoring Discussion

- **DOE and DPU Current Monitoring Schedule is Quarterly for All DPU Water Production Wells**
  - This has been the historic schedule for monitoring for many years
  - If the known chromium plume reaches the DOE monitoring wells immediately up gradient of the nearest DPU production well (PW3 – or PM3) then monitoring is expected to be increased to monthly
  - National EPA standards for chromium are an allowable 100 PPB (parts per billion). New Mexico State standards are 50 PPB. If chromium is found in the DPU production well, above historic background levels of 2 to 6 PPB, then a future decision as to when PW3 is taken off line will occur.
- **DPU's Well Insurance**
  - DPU has maintained an insurance policy since taking over ownership of the water production system from DOE that ensures that any DPU production well that must be taken off line due to DOE contamination will either be replaced in kind or have a treatment system installed that removes any contaminant to below relevant drinking w3ater standards.
- **Otowi Well No. 2**
  - The DPU is currently developing the first new production well in the system since taking ownership of the water production system. This well is anticipated to be equivalent in capacity to the existing PW3 well.
- **Otowi Booster No. 1 Replacement**
  - The DPU has included this project in the near term (10-Year) CIP Plan. The existing OB1 station is connected to a completely deteriorated pipeline that leaks onto NM Hwy 502 between the "Y" intersection and the top of the hill.
  - It has been deferred until the OW2 well has been completed and the capacity of OW2 is known. The capacity of this replacement booster station will be sized to accommodate both the new OW2 and the existing OW1 wells allowing for the existing OW1 well to be put into service.
  - This booster station will allow for water from OW2 to directly serve either the White Rock community or the Town Site Down Town area; boosting flexibility and redundancy in the overall system.

Otowi Well No. 2

- **Schedule**

- Well Site Construction & Surface Casing: November 14th through December 15th (complete)
- Main Well Drilling, Casing, Testing, Surveying: January 11th through March 23rd (contractual)
- Design of Well House, Pump, Motor and Motor Driver Equipment: March 23rd through June 30th
- Construction of Well House, Setting Pump & Motor and Motor Driver Service: June 30th through November 24th (estimated)

- **Costs**

- Well (Drilled, Tested, Complete): $3,000,000 (budget)
- Well House & Equipment: $1,500,000 (budget)

- **Well Discussion Highlights**

- Located per original system planning documents dated circa 1990's. OW2 is the third of four potential wells proposed for the "Otowi Well Field".
- Planned for natural gas engine generator equipment motor driver with electric power grid backup. Able to pump when grid is down or when grid is at peak power; avoiding peak power demand charges or inconvenient shut downs to avoid peak power demand charges.
- If anticipated quantity is accomplished; able to serve as a water source in the event PW3 well becomes contaminated by the chromium plume.

Otowi Well No. 2 – Site Panorama

Otowi Well No. 2 – Site Access Off LA Canyon Road

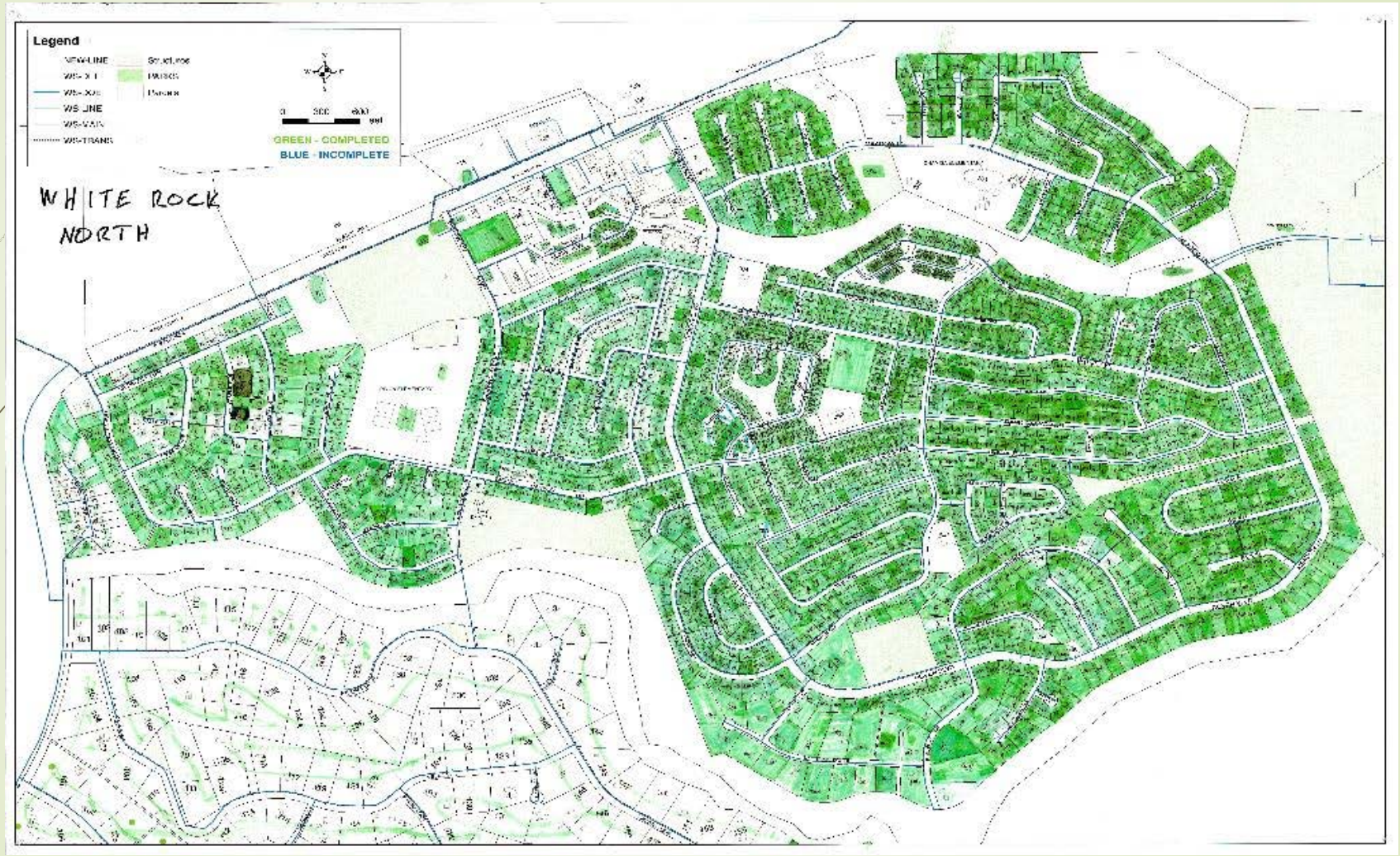
Otowi Well No. 2 – Drill Stem Pipe

Otowi Well No. 2 – Drill Bits

Water Meter Change Out Program Discussion Points

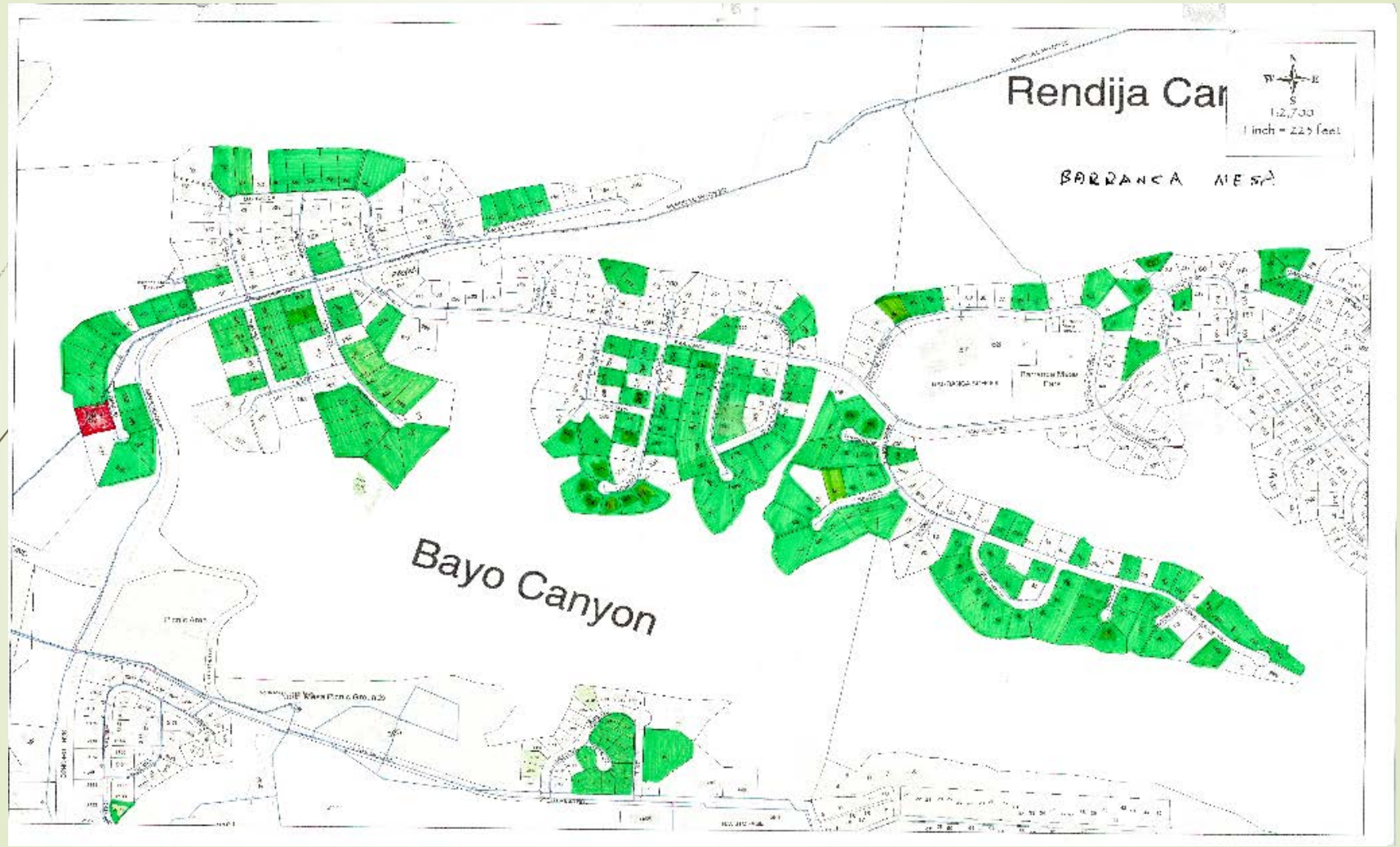
- **Historic Water Meter Change Outs**
- Typical minimum expected life of a water meter is 20 years. (battery related)
- Average number of water meters in the water distribution system at any one time is 7,050.
- 7,050 / 20 Years = 352.50. DPU has recently had an annual goal of 350 water meter change outs per year. This was decided as the appropriate approach to maintain adequately functional water meters throughout the system.
- **Current Temporary Accelerated Water Meter Change Out Program**
- Recent improvements to the new style of water meter being installed have significantly improved the accuracy at low flows. Newer style water meters also have improved compatibility with modern AMI (Automated Metering Infrastructure) systems. A significant portion of the existing water meters being replaced throughout the system are near or at the end of their expected life and would have been replaced anyway.
- Installation of all new meters during the temporary accelerated program will provide multiple benefits:
  - Improve meter reading accuracy and lower the unaccounted for water loss percentage.
  - Standardize the water meters throughout the system thereby improving efficiencies for AMI incorporation and GWS O&M.
  - Provide the opportunity/incentive to complete R&R maintenance activities on related meter service appurtenances (shut off valves, leaking connections, meter cans and/or lids, etc.)
- Temporary Accelerated Program is expected to run from FY2016 through FY2021.
- **Cost / Benefit of the Temporary Accelerated Water Meter Change Out Program**
- Costs for the accelerated program are expected to average approximately $300,000 per year over historic costs.
- Meter reading costs are expected to decrease by approximately $165,000 per year through labor reductions due to the implementation of AMI.
- $1,800,000 / $165,000 = 11 years to break even before savings on meter reading begins to accumulate.

Water Meter Change Out Program – White Rock North

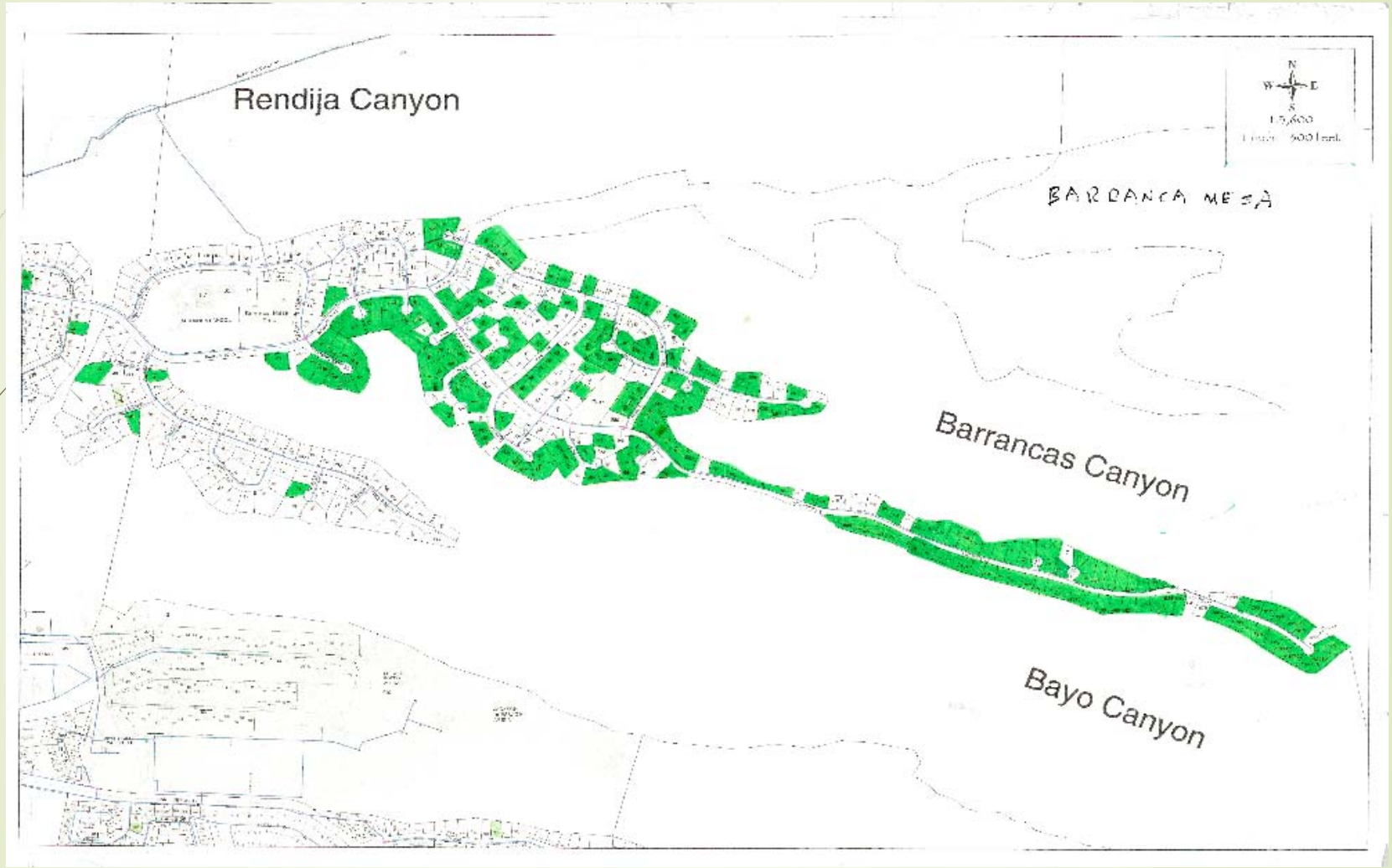


Water Meter Change Out Program – White Rock South

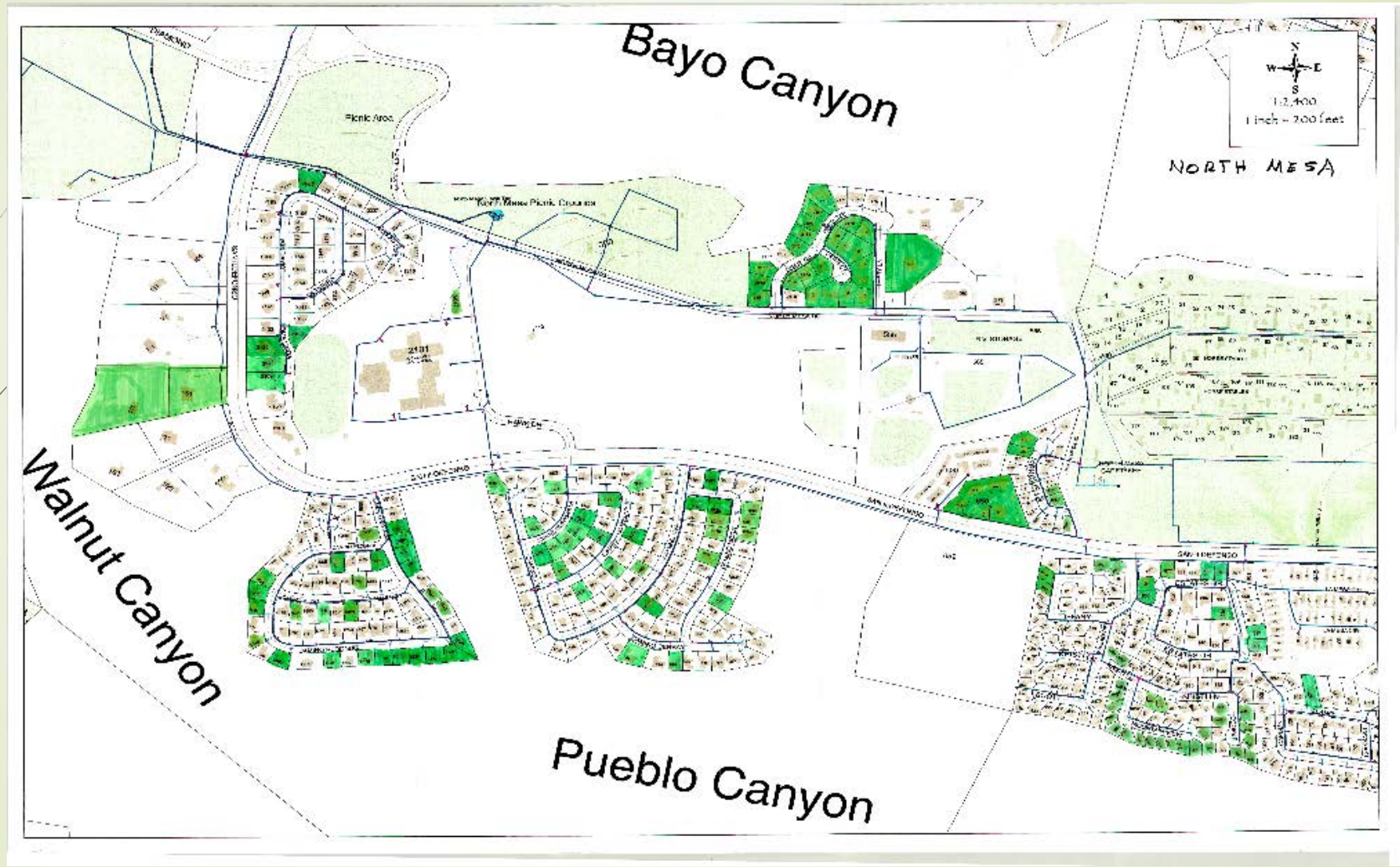
Water Meter Change Out Program – Barranca Mesa West



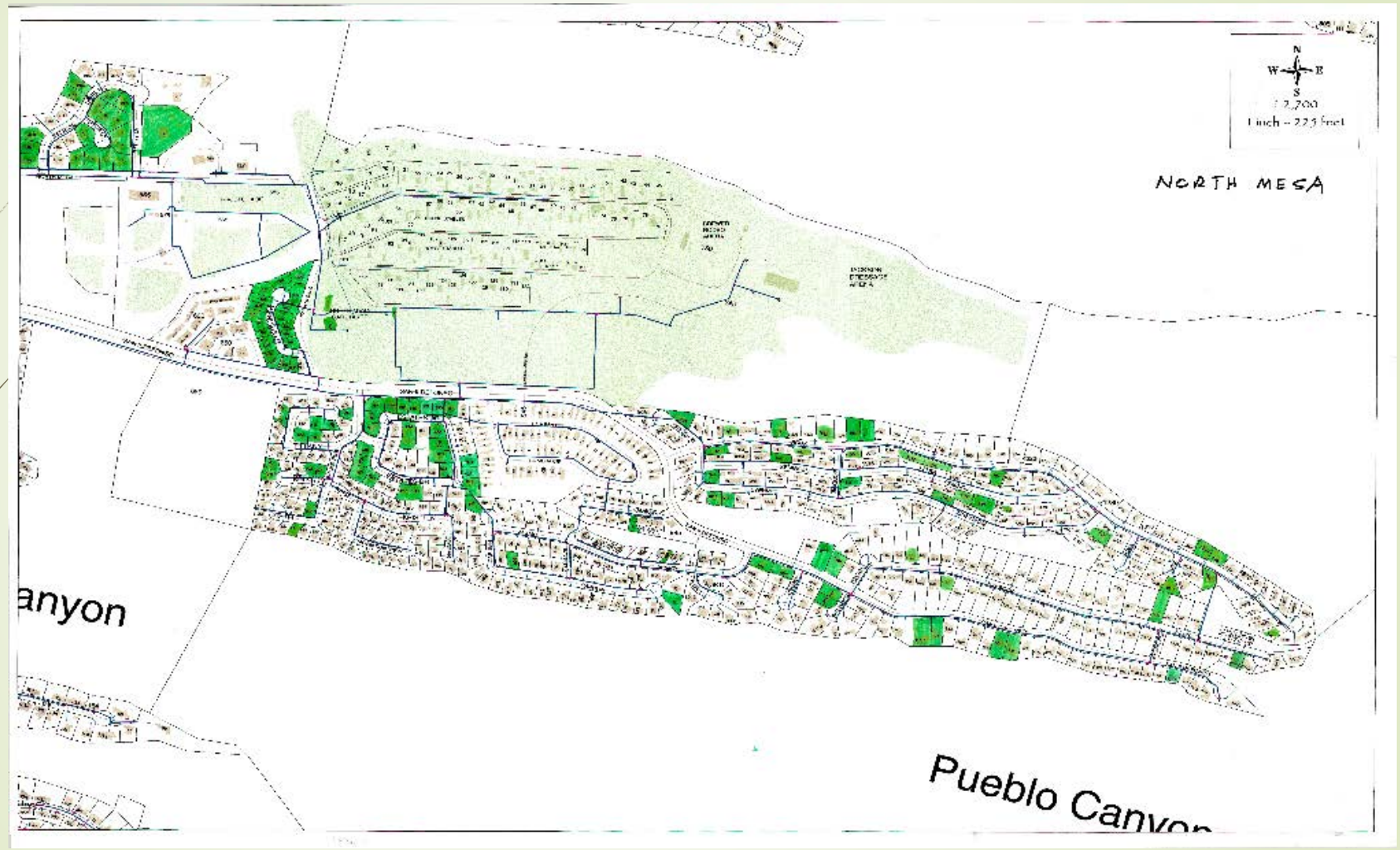
Water Meter Change Out Program – Barranca Mesa East



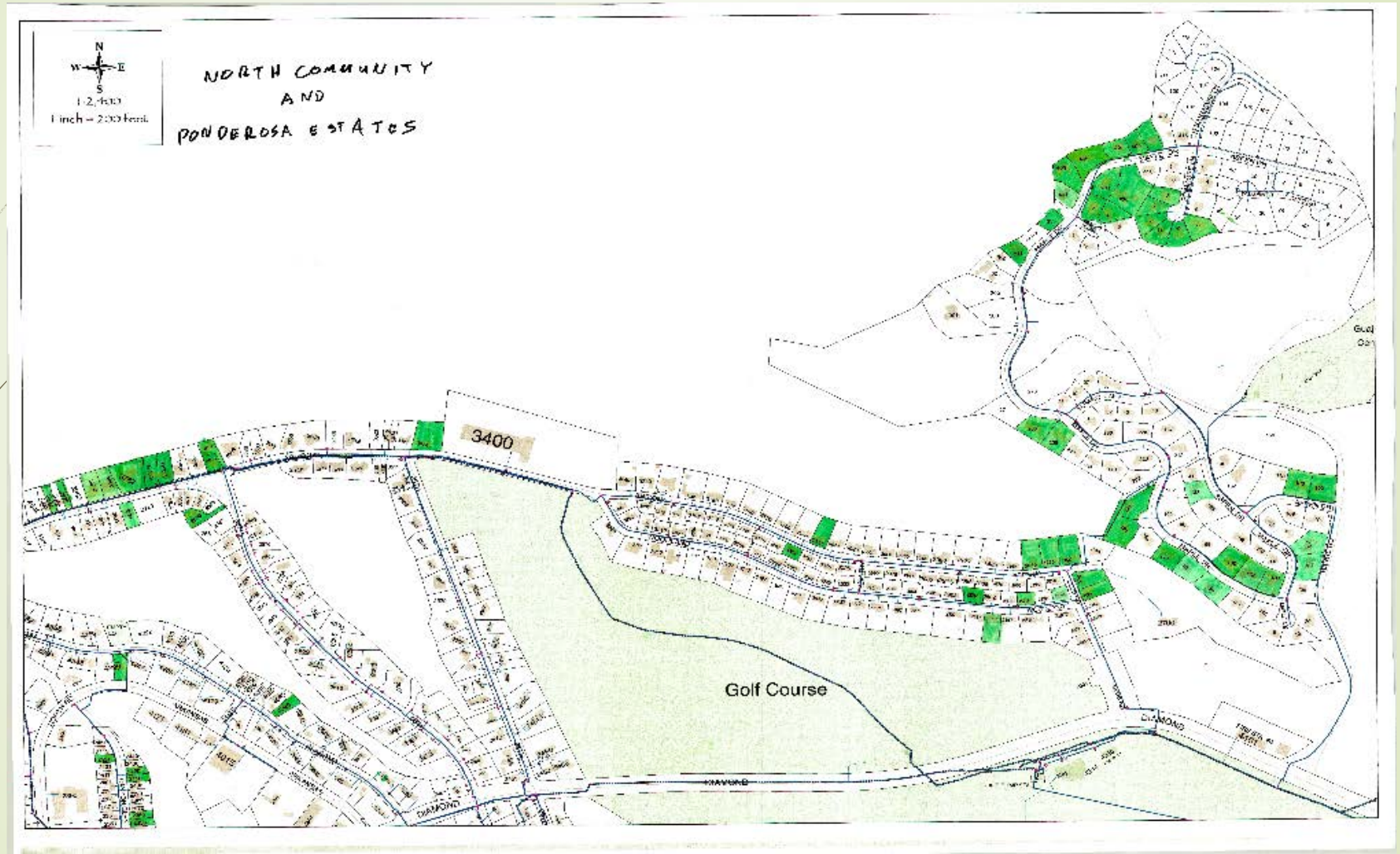
Water Meter Change Out Program – North Mesa West



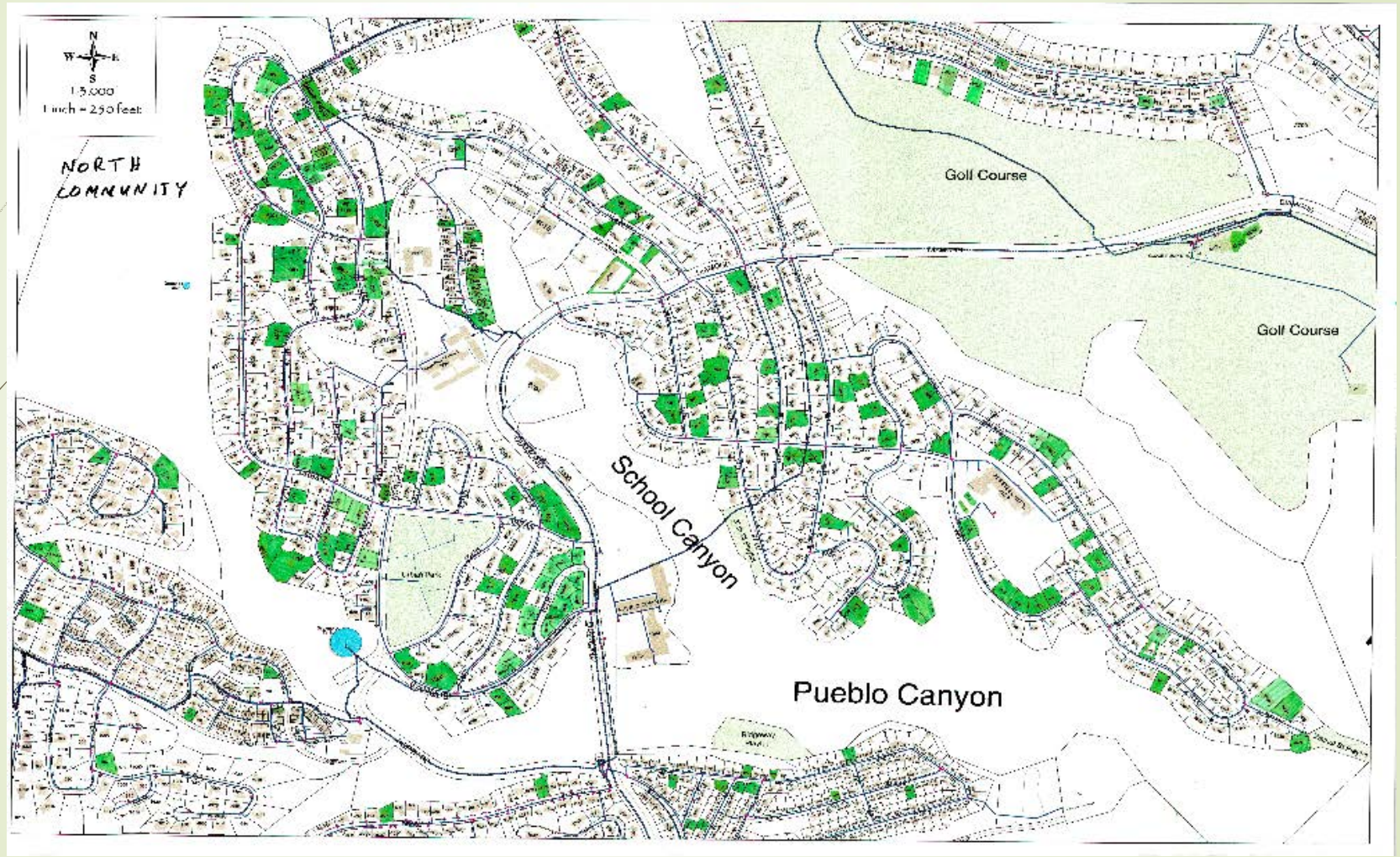
Water Meter Change Out Program – North Mesa East



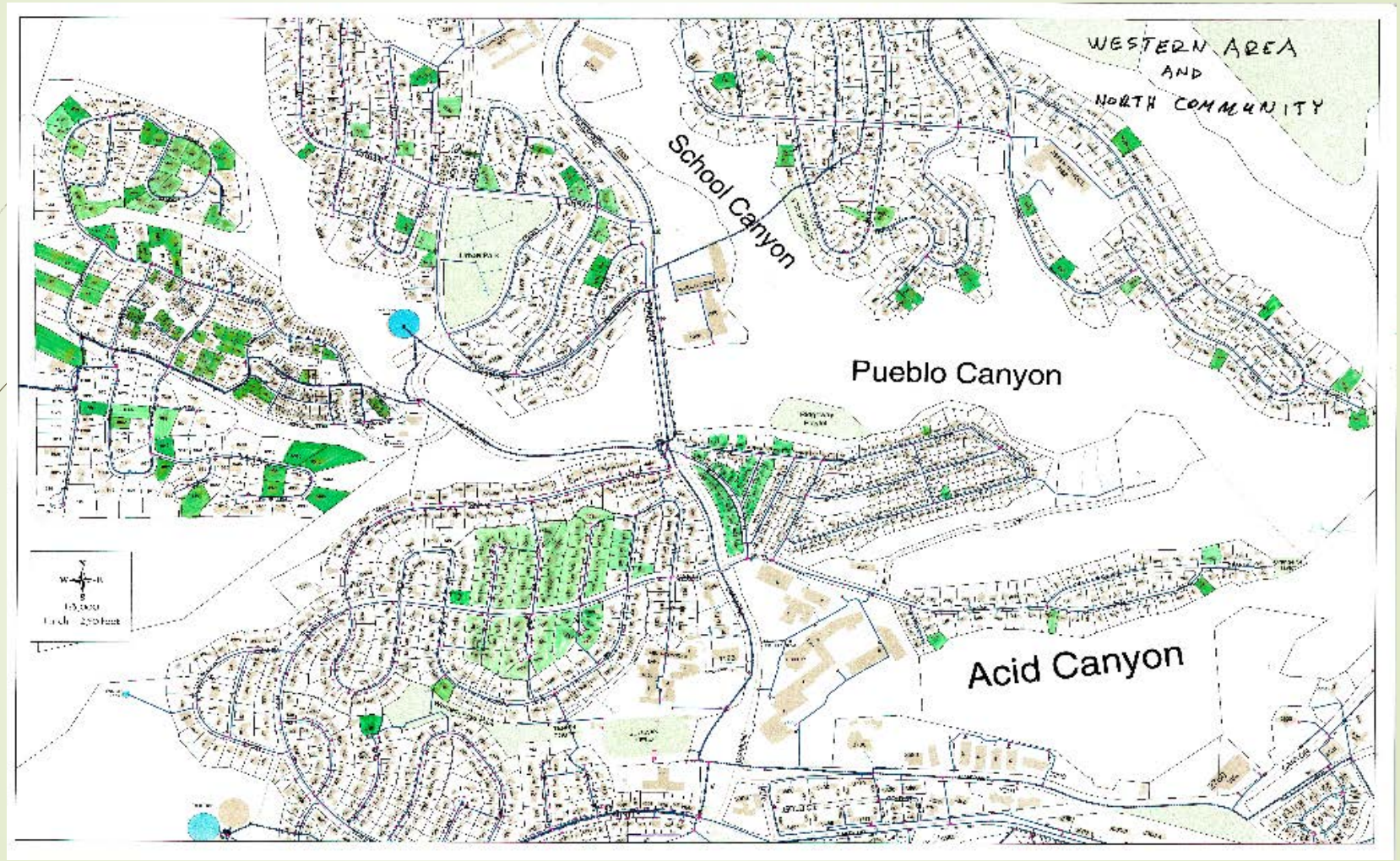
Water Meter Change Out Program – North Community & Ponderosa Estates



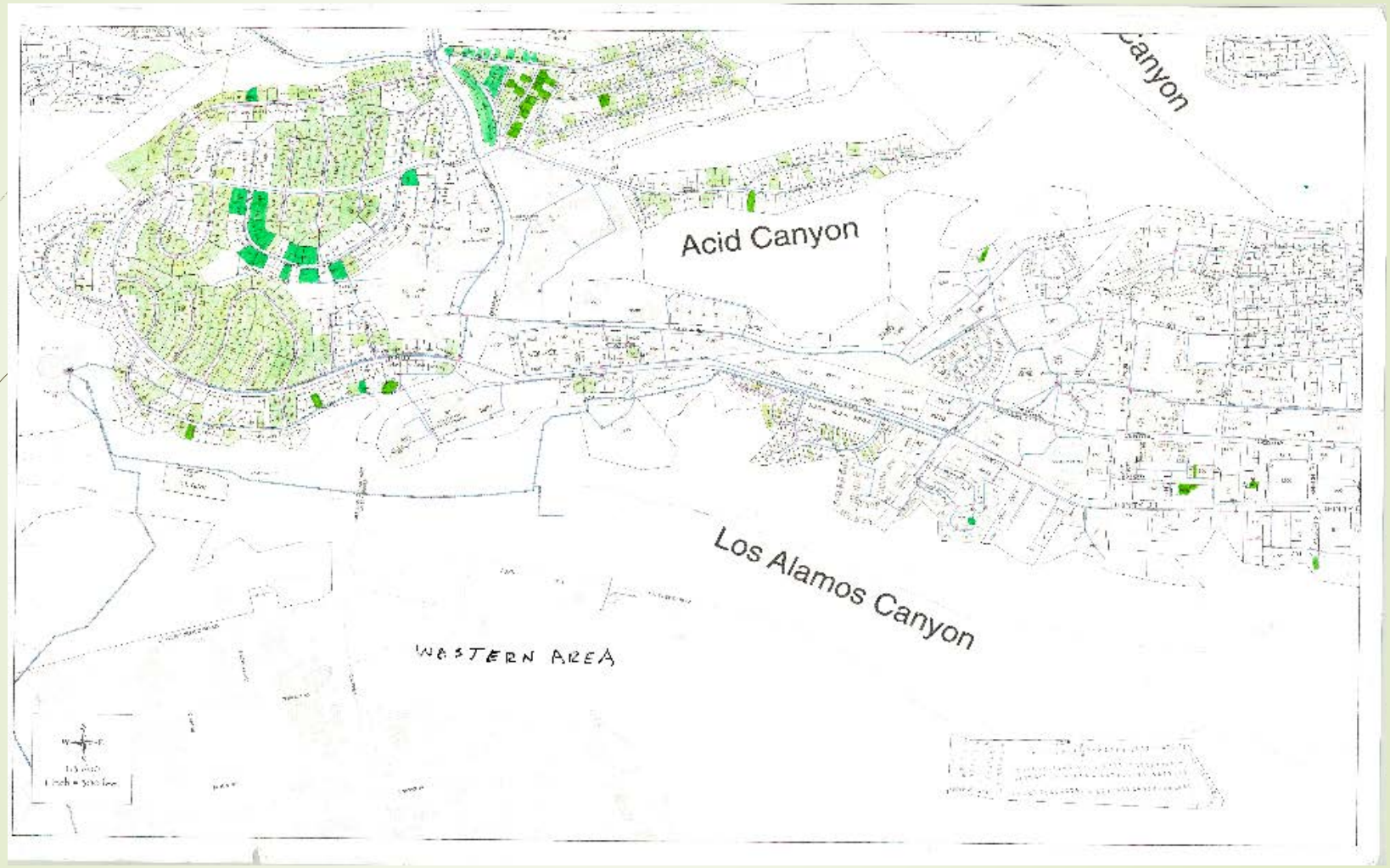
Water Meter Change Out Program – North Community



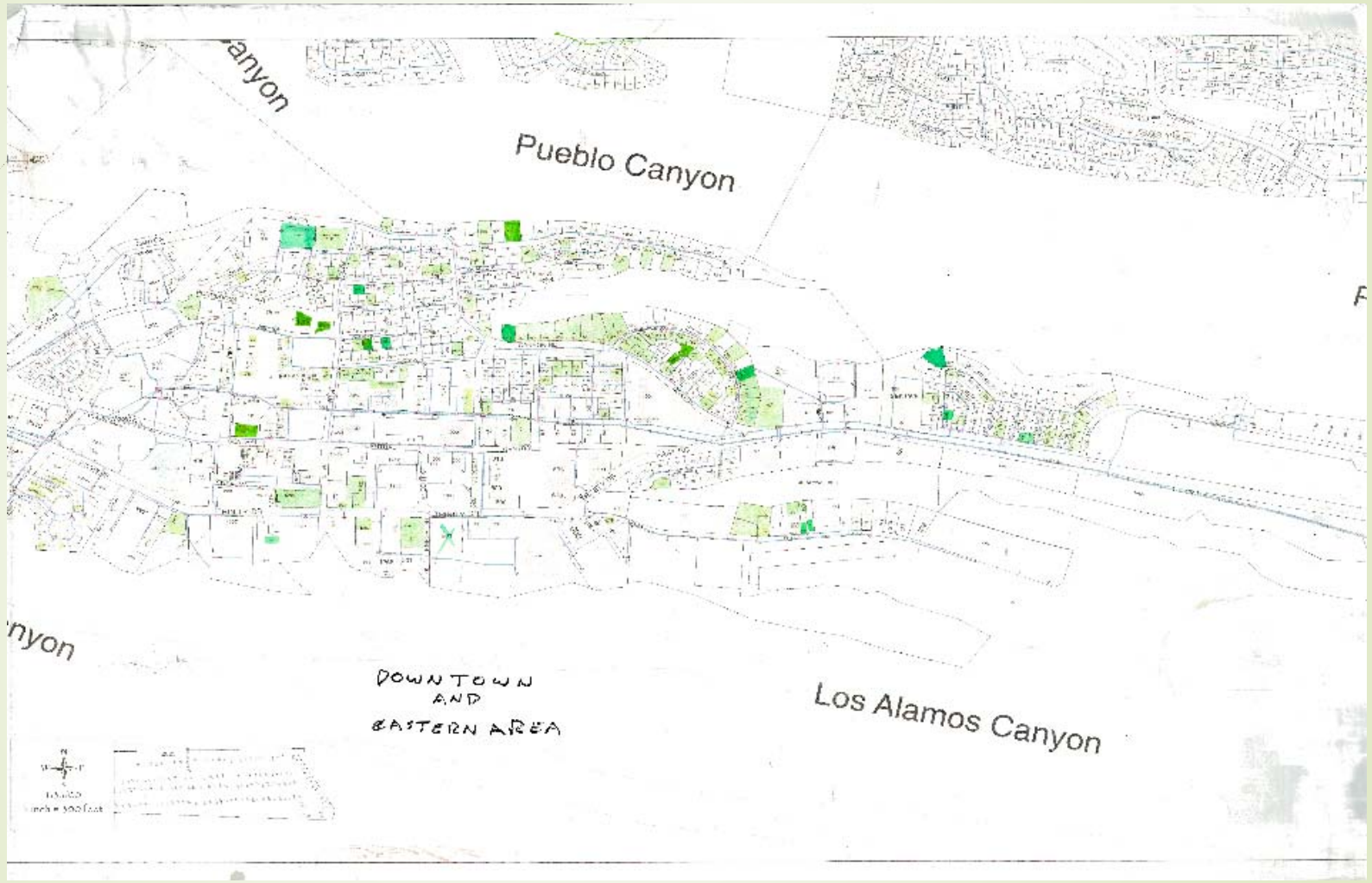
Water Meter Change Out Program – Western Area & North Community



Water Meter Change Out Program – Western Area



Water Meter Change Out Program – Down Town & Eastern Area



Water System CIP Planning Considerations : 1 of 3

- **Renewed Emphasis on O&M Type R&R Rather Than Large Scale CIP Replacement Projects (WP, DW & NP)**
- Critical Infrastructure receives a higher risk factor and a higher probability of large scale replacement
  - Risk Factors and Existing Condition Assessments are being developed with the enhanced GIS Condition Assessment System
  - Enhanced GIS Condition Assessment System will assist the DPU in developing future CIP plans
  - Enhanced GIS Condition Assessment System will also assist the DPU in analyzing and reporting system values: Installed Cost; Present Worth (depreciated net book value); Full Replacement Cost. This will enable better coordination and tracking of system value with the Office of Management & Budget.
- NM 502 CIP Projects have been added back into the FY19 & FY20 Updates to the 20-Year Financial Analysis of the Water System used to develop proposed water rates over the 20-Year planning period
  - NM DOT's third attempt at soliciting bids for this project resulted in No Bids. The previous two attempts resulted in the low bidder being significantly over the project's estimated costs.
  - NM DOT may cancel or significantly modify the original NM 502 Project. This Project included gas, water distribution, water production, wastewater collection, electric distribution and communications conduit portions totaling $2.42 million. DPU is in the process of requesting our pre-paid contribution for utilities be returned expeditiously in the event of cancellation
  - The gas and water system portions are critical to the efficient operations of the respective systems and have known deficiencies. Even if the DOT NM 502 Project is cancelled, DPU proposes to complete these projects independently

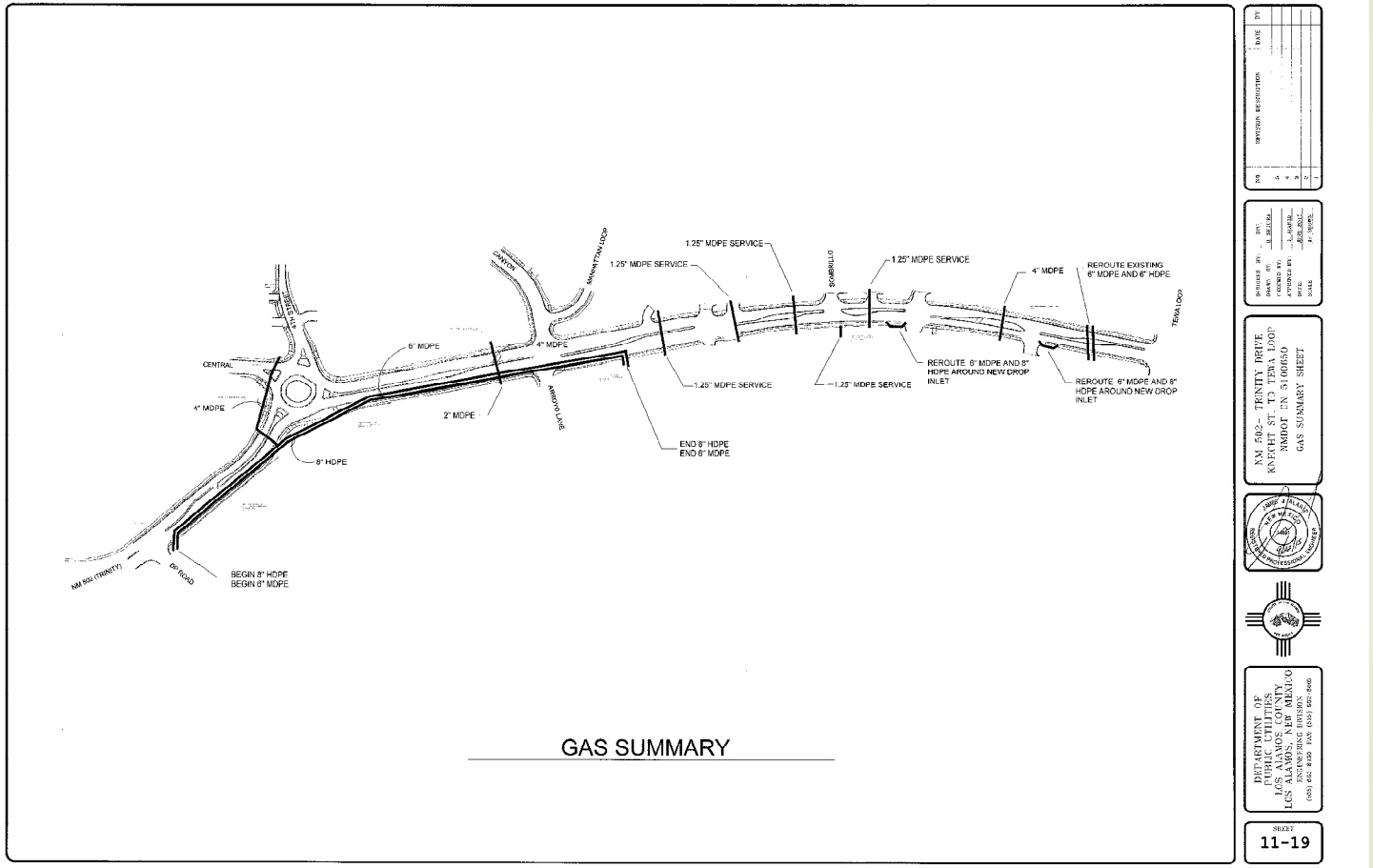
Proposed Risk Assessment Matrix

RISK MATRIX	Hazard Effect / Consequence				
Risk Type	Insignificant	Minor	Moderate	Major	Catastrophic
	1	2	3	4	5
Harm To People (Safety - Health)	No injury or health risk	First aid case - exposure to minor health risk	Medical treatment case - exposure to major health risk	Serious injuries requiring medical treatment - reversible impact on health	Fatality or loss of quality of life - irriversible impact on health
Environmental Impact	No environmental harm	Minimal environmental harm - easily remediable	Material environmental harm - remediable short term	Serious environmental harm - remediable with major effort and expense	Major environmental harm - remediable for restoration not possible - only mitigation
Business Impact - Material or Financial Loss	No business disruption - no material or financial loss	Brief business disruption - minor material or financial loss	Partial shutdown - moderate material or financial loss	Partial loss of operation - major material or financial loss	Substantial or total loss of operation - significant material or financial loss
Legal & Regulatory	None to low level legal issue	Minor legal issue or breach of law - non-compliance	Serious breach of law - investigation & report to authorities - prosecution and/or moderate penalty possible	Major breach of law - considerable prosecution and penalties	Very considerable penalties and prosecutions - multiple law suits and jail terms possible
Impact on Reputation - Social - Community	Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	National impact - national public concern	International impact - international public concern

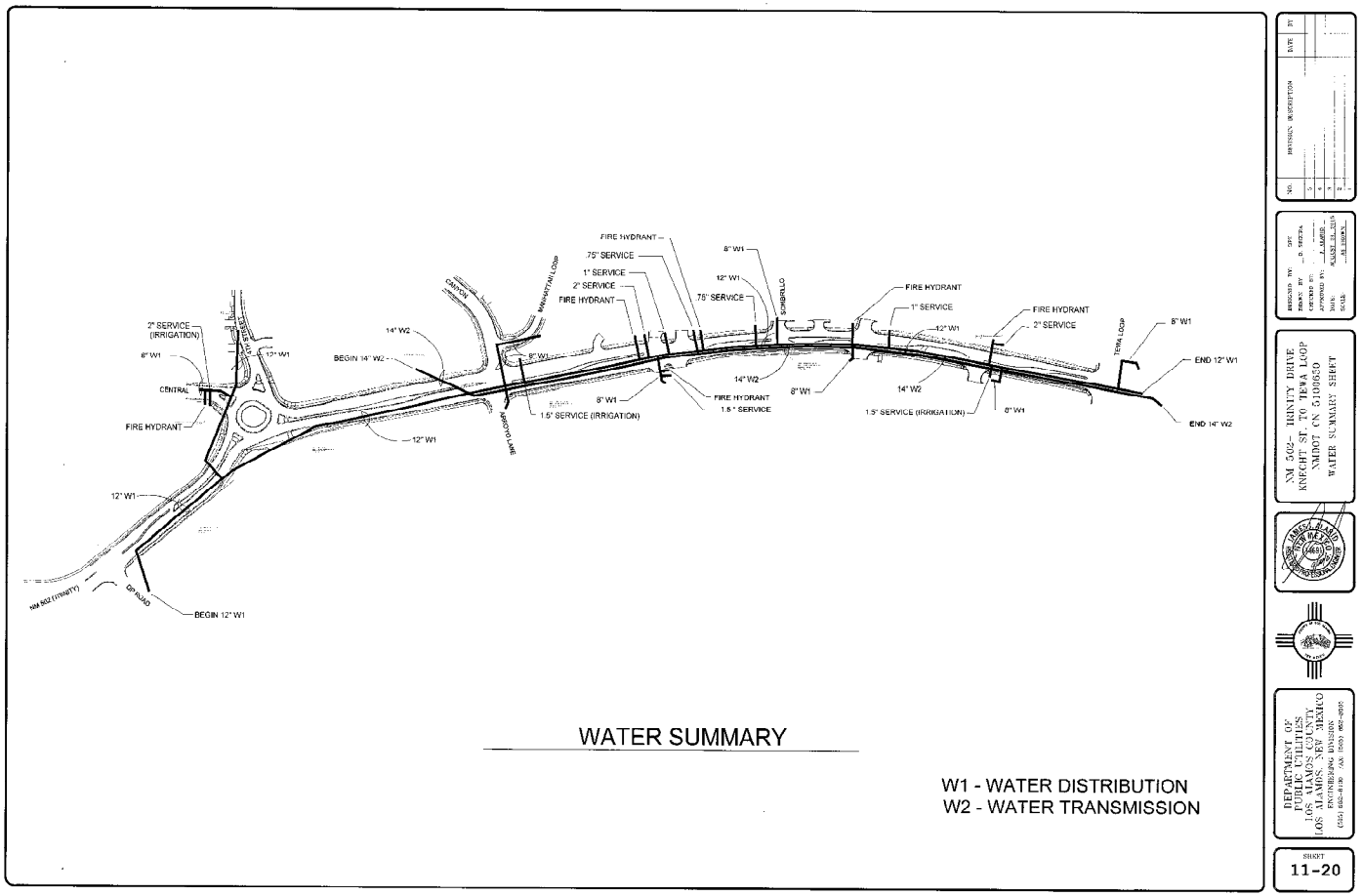
Likelihood		Examples / Events	Risk Factor				
Almost Certain	5	Frequent occurrence - one or more times per year - likely to reoccur within 1 year - almost certain - (1 in 10)	2	3	4	5	5
Likely	4	Infrequent occurrence - less than once per year - likely to reoccur within 5 years - likely - (1 in 100)	2	2	3	5	5
Possible	3	At least one occurrence has happened at some time - could reoccur within 10 years - possible - (1 in 1,000)	1	2	3	4	5
Unlikely	2	At least one occurrence has happened at some time - could happen within 20 years - unlikely - (1 in 10,000)	1	1	2	3	4
Rare	1	Occurrence has never been known to occur - highly unlikely it will occur within 20 years - rare - (1 in 100,000)	1	1	2	2	3

Risk Factor	Risk Level	Guidelines for Risk Matrix
5	Extreme	Eliminate, avoid, implement specific action plans & procedures to manage & monitor. Immediate action required.
4	High	Proactively manage. Prioritised action required.
3	Medium	Actively manage. Planned action required.
2	Low	Monitor and manage as appropriate. Actioned by routine procedures.
1	Virtually None	Routine monitoring. No action required.

NM 502 Project - Gas Distribution Pipelines



NM 502 Project - Water Distribution Pipelines



WATER SUMMARY

W1 - WATER DISTRIBUTION
W2 - WATER TRANSMISSION

NM 502 – TRINITY DRIVE
KNIGHT ST. TO TEWA LOOP
NMDOT CN 5100650
WATER SUMMARY SHEET

DEPARTMENT OF PUBLIC UTILITIES
LOS ALAMOS COUNTY
LOS ALAMOS, NEW MEXICO

SHEET
11-20

Water Systems CIP Planning Considerations : 2 of 3

- **Renewed Emphasis on Sustainable Cash Flows and Cash Balances Meeting Financial Policy Goals (WP, DW & NP)**
  - **Financial Policy Goals have been established.**
    - **Financial Policy Goals will drive the proposed rate setting discussions into the future.**
    - **The overarching goal is to reliably provide safe drinking water with excellent customer service. One of the main goals is also to establish and maintain adequate cash balance reserves in each of the Water Fund sub-funds: Water Production & Water Distribution (including the NP Water System) independently respective to each sub-fund.**
- **Enhanced PRV Station O&M Program (mostly DW but some WP & NP)**
  - **Original CIP project was to replace virtually all PRV valves and piping inside existing PRV stations. Many valves exhibit advanced corrosion due to lack of air venting and very moist environment.**
    - **Cost of CIP projects was reduced from an original estimate of $3,000,000 to replace 40 PRV stations to a current $2,100,000 to replace 28 PRV stations over 20 years.**
    - **Success of the proposed PRV station O&M program may allow for additional savings on PRV station replacements**
    - **New equipment is being purchased to facilitate the new O&M program in FY18 (sand blast & paint mobile equipment)**
- **Deferral of One Major Well/Booster Station Replacement Project from the 20-Year CIP Plan (WP)**
  - **Original CIP plan, developed for the 20-year planning period, included the early year's new well (OW2 - FY18 & FY19) and the existing booster station replacement (OB1 - FY21). It also included an additional replacement well would be required for the already failed Guaje Well No. 1A. It further included two additional replacement wells based on the assumption that two existing wells would fail in the next 20 years.**
    - **In order to lower the total projected CIP costs for the water systems, one of the major well projects has now been deferred to beyond the existing 20-year planning period. The new OW2 well and OB1 booster station (allowing OW1 To come on line) is anticipated to enable production coverage in the more than one of the currently active older existing wells fails within the next 20 years.**

DPU Financial Policy for Cash Reserves

In Each Utilities Sub Fund:

- 180-Days of Budgeted O&M Expenditures Recommended – or – 90-Days Minimum Floor
- Debt Service Reserve (Sufficient to Fund All Debt Service for the Following Year
- Contingency Reserve (Only One Occurrence in any Single Year)
  - WP = $750,000 Replace a Well House or Booster Station
  - DW = $750,000 Replace a Water Tank
  - NP = $750,000 Replace a Water Tank or Booster Station
- Retirement/Reclamation Reserve (Only One Occurrence in any Single Year)
  - WP = $150,000 Abandon a Well House or Water Tank or Booster Station
  - DW = $150,000 Abandon a Water Tank
  - NP = $150,000 Abandon a Water Tank or Booster Station
- Cash Balance and Cost / Risk Sharing Between Water System Groups
  - DW and WP Group's Budget for Contingency and Retirement/Reclamation Reserves are Split 50/50
  - NP is Embedded Within WP so NP Reserves are Considered Covered by WP Reserve
- Actual (or Annuitized) CIP Program Expenditures for the Following Year – or – The System's Annual Depreciation Plus 2.5% (whichever is greater) – Future Discussion is Warranted
  - WP = $1,350,000 Compared to $1,500,000 (H) & $750,000 (F)
  - DW = $575,000 Compared to $750,000 (H) & $500,000 (F)
  - NP = Not Calc'd Compared to $210,000 (F) {From NP Master Plan}

Water Systems CIP Planning Considerations : 3 of 3

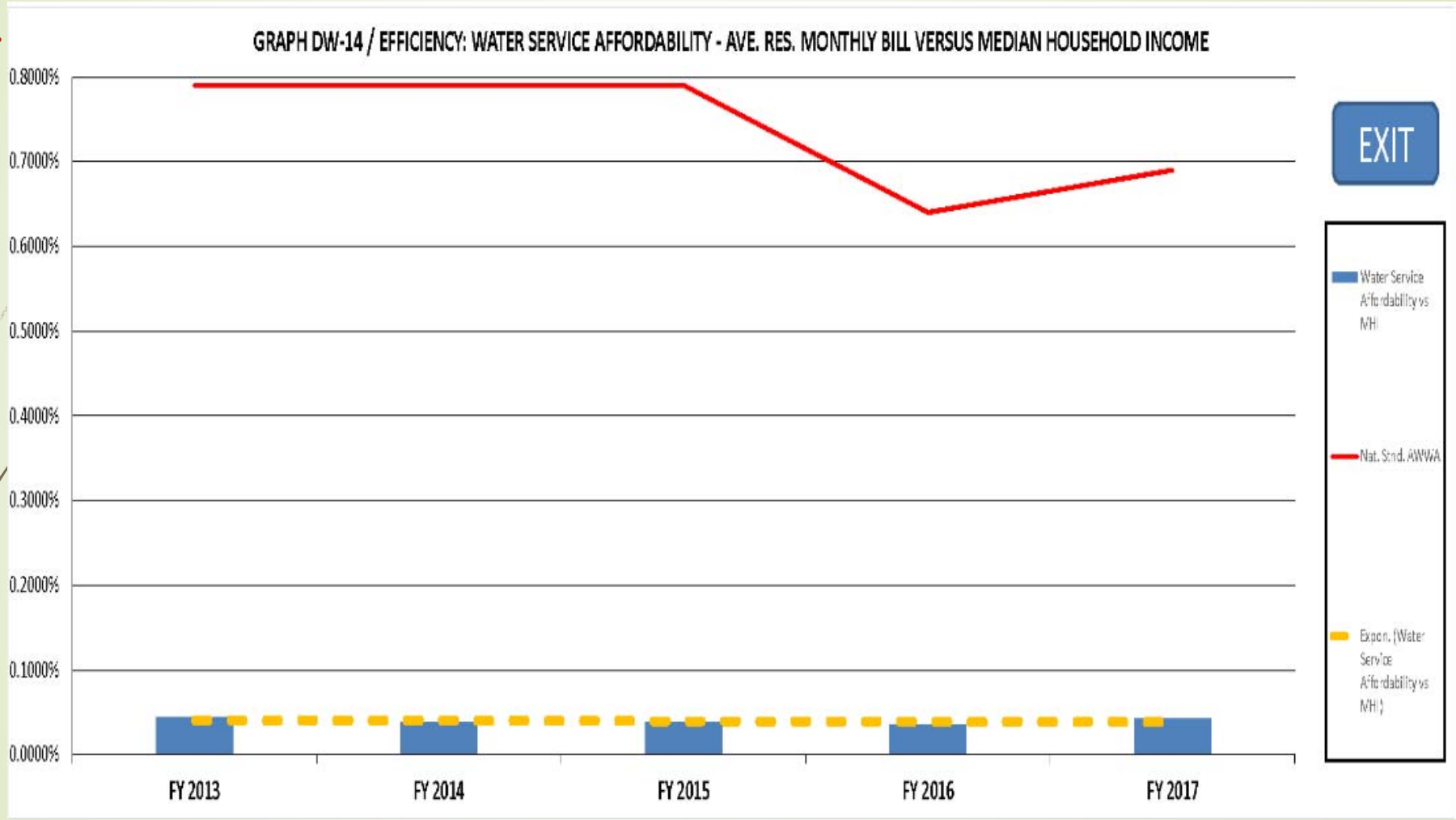
- **General Reduction in Proposed Annual Expenditures Through Deferral of Major Projects in the 20-Year CIP Plan (WP & DW)**

- The original CIP plan, developed for the 20-year planning period, has been revised significantly.
  - Previous points of consideration have been discussed regarding well and booster station replacement deferrals and revisions to the PRV station program.
  - Other projects were re-evaluated to consider if continued O&M activities such as repairs of pipelines with some acceptable number of breaks could be continued in lieu of full pipeline replacement. It is anticipated that the enhanced asset management system being developed for FY18 will help DPU determine the appropriate level of O&M activity versus CIP activity required on a pipeline by pipeline basis.
  - CIP projects that are currently felt to be required, despite any level of effort for O&M activity, have been spaced out throughout the 20-year planning period in order to keep annual CIP expenditures for CIP as consistent year over year as practicable.

Measures/Targets/Benchmarks for Tracking Water Distribution System O&M

- ❖ **PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (all)**
- ► **Percent of LA County Residential Rate Compared to Neighboring Community's Rates – Based on 6,000 Gals per Month (%)**
- ► **Water Service Affordability – Based on Ave Res Monthly Bill per Median Household Income (%)**
- ► **O&M Expenditures per Account ($/ All Accounts)**
- ► **Total Gallons Sold to Distribution (MG)**
- ► **Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)**
- ► **Unaccounted for Water Loss (%)**
- ❖ **SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (representative only, not all)**
- ► **Damages per 1,000 Locate Tickets (#/1,000 Tickets)**
- ► **Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)**
- ► **System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)**
- ❖ **PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS**
- ► **Performance Measures with known national standards for system comparison are in GREEN (Typically AWWA standards)**
- ► **Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in Magenta**
- ► **Performance Measures with both a DPU Strategic Plan or Conservation Plan Goal and a national standard comparable goal are in Cyan**
- ► **Measures are collected and reviewed monthly via a 12 month moving average graph. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison. Full implementation scheduled for late FY 2018**

Water Distribution – Primary Key Organizational Performance Measure



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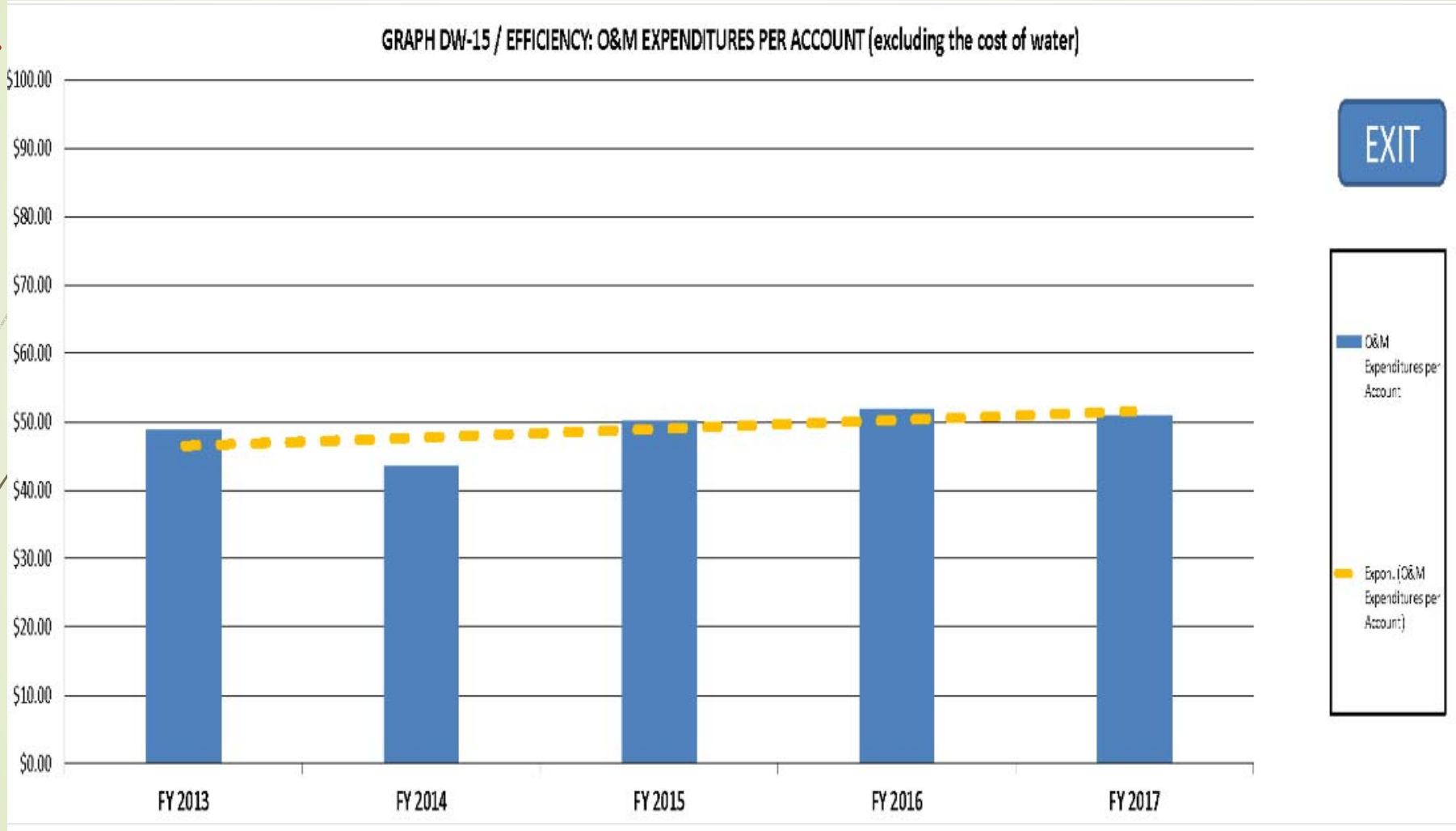

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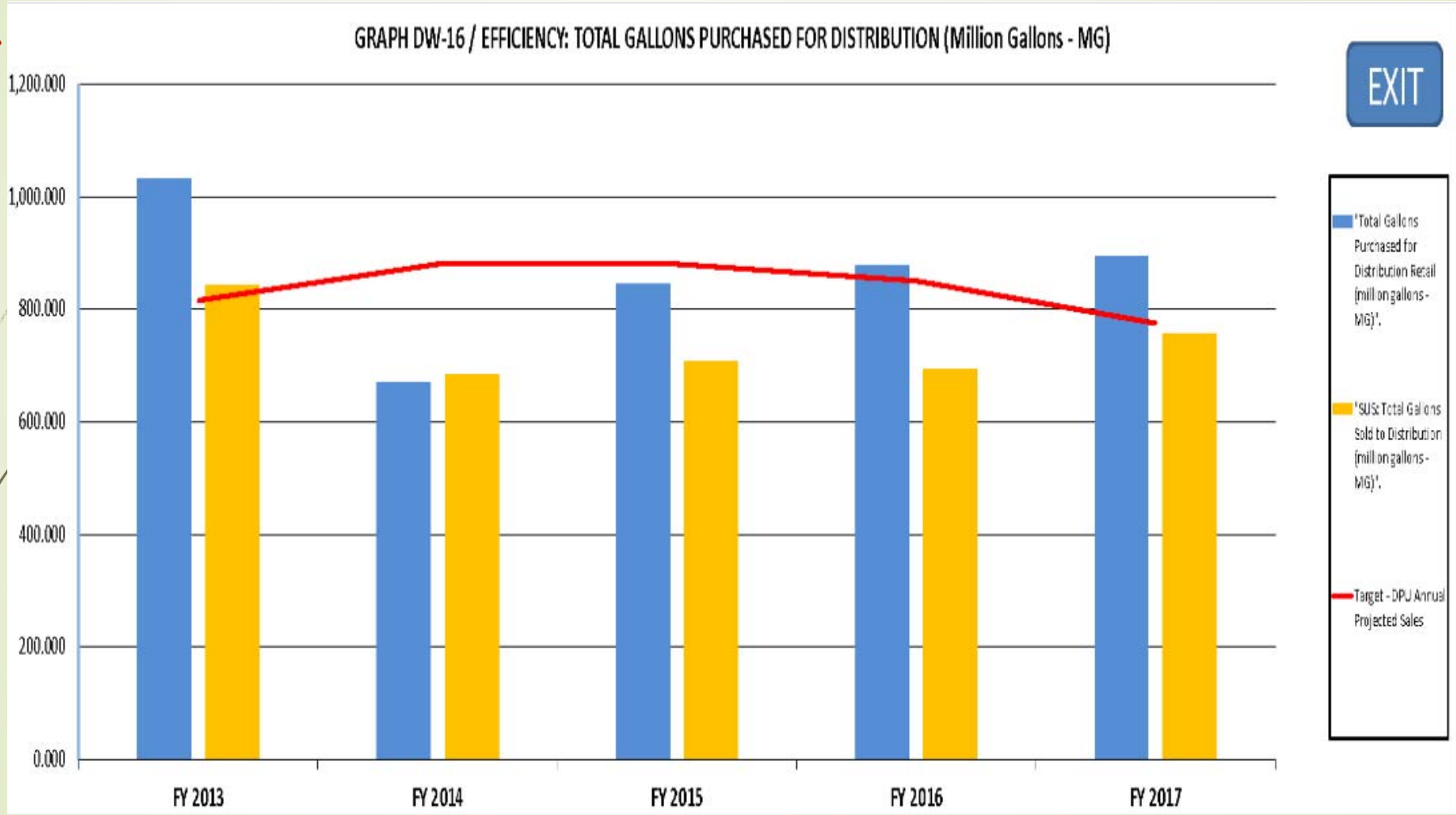

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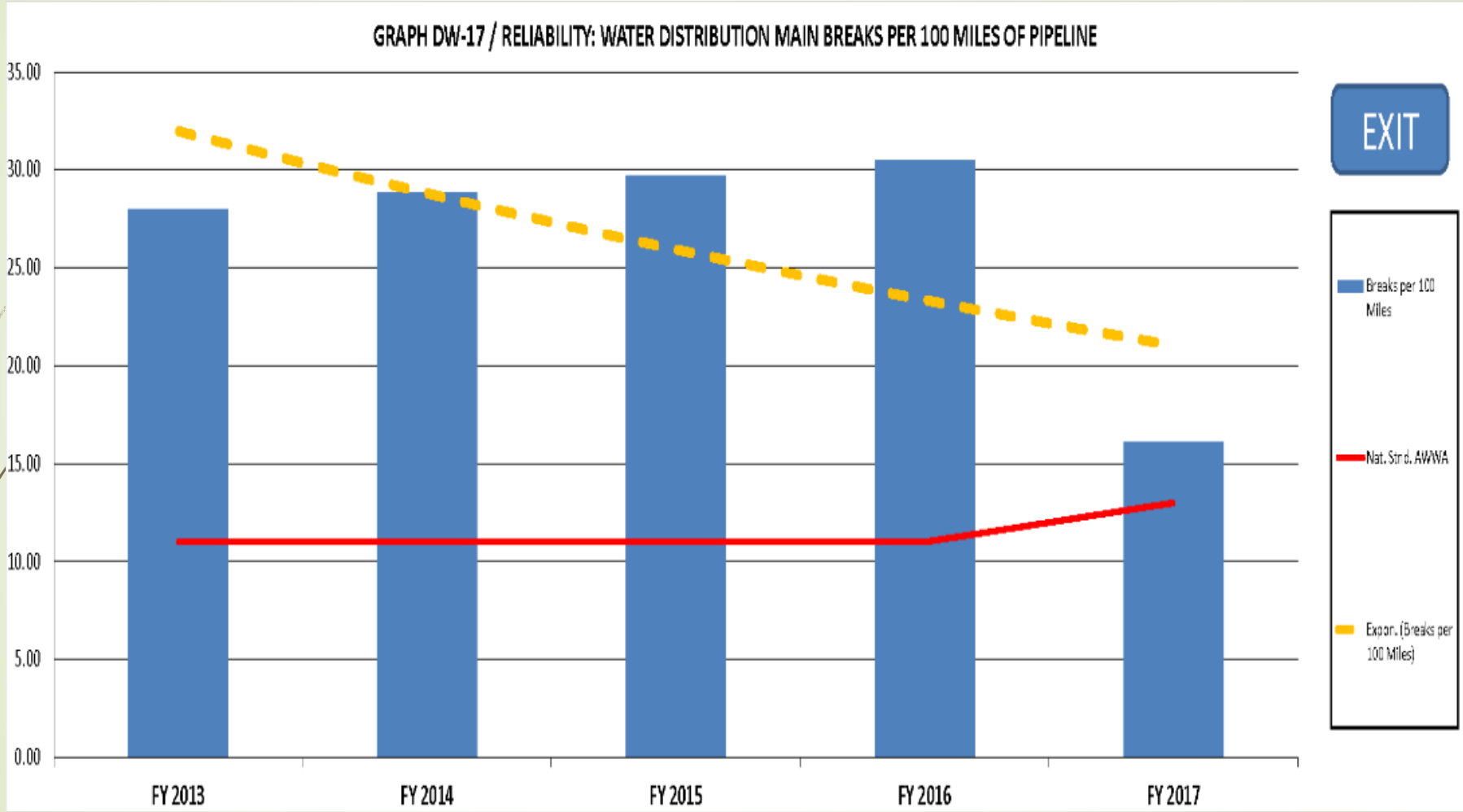
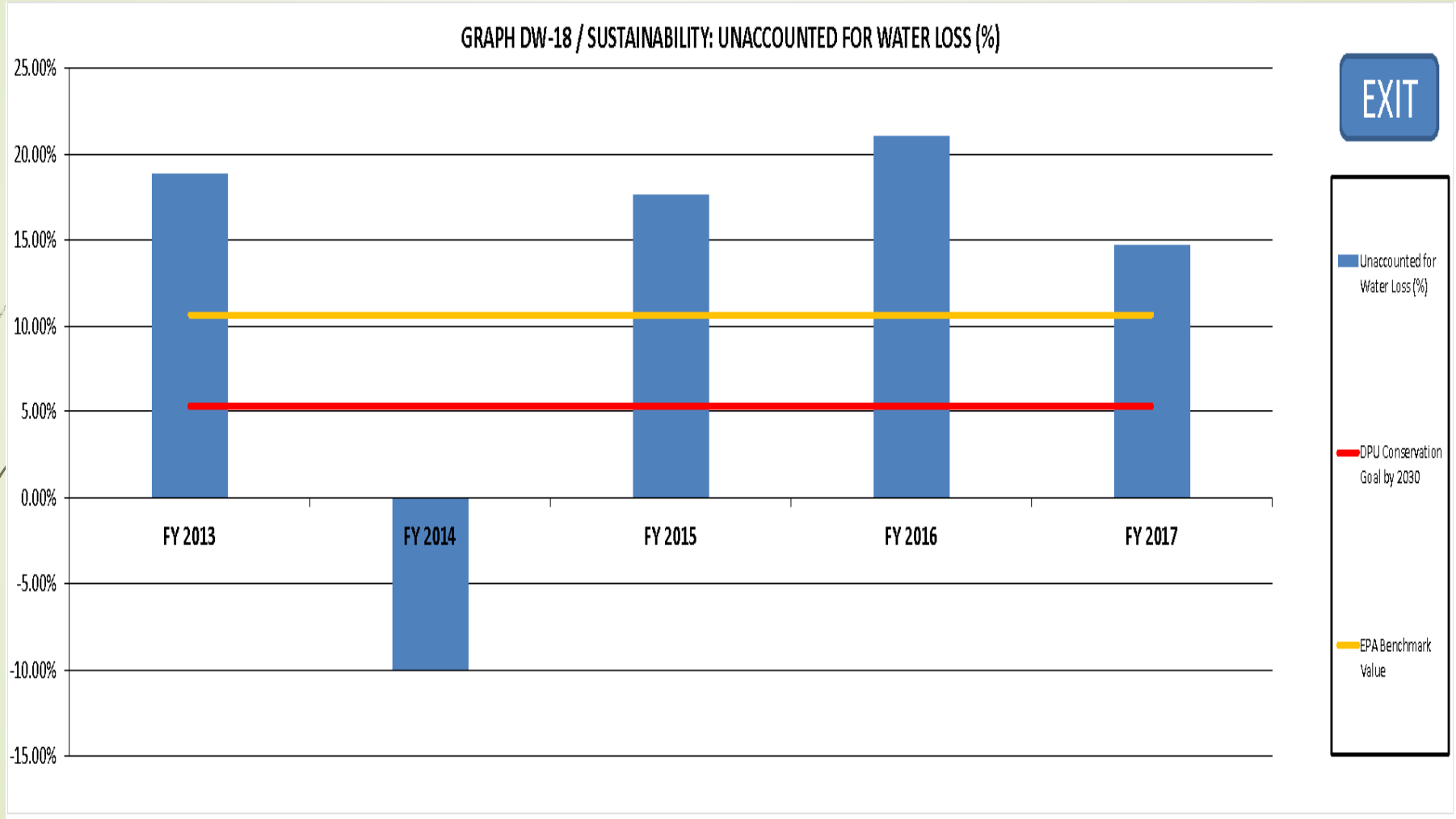
Water Distribution – Primary Key Organizational Performance Measure



Water Distribution – Primary Key Organizational Performance Measure



Measures/Targets/Benchmarks for Tracking Water Production System O&M

- ❖ **PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (all)**
- ► **Percent of Days in Full Compliance (%)**
- ► **O&M Expenditures per Kgal ($/Kgal) – Total for both Potable & Non Potable Systems**
- ► **Total Potable Water Produced (MG)**
- ► **Total Non Potable Water Produced & Distributed (MG)**
- ► **Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)**
- ► **Energy Consumption per Million Gallons Potable Water Produced (kWh/MG)**
- ► **Gallons per Capita Daily Water Produced (GPCD)**
- ❖ **SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (representative only, not all)**
- ► **Damages per 1,000 Locate Tickets (#/1,000 Tickets)**
- ► **Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)**
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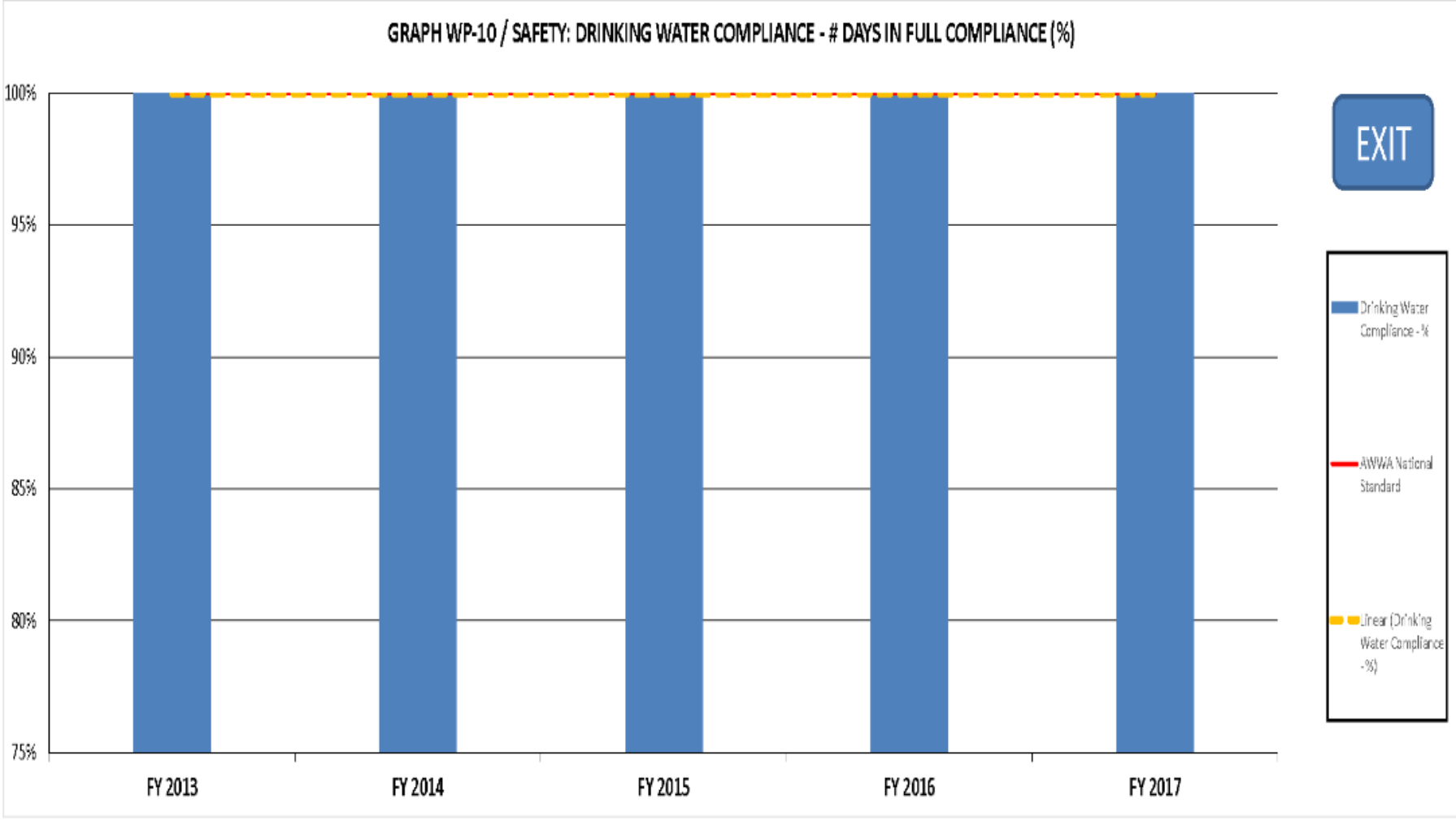
Water Production – Primary Key Organizational Performance Measure



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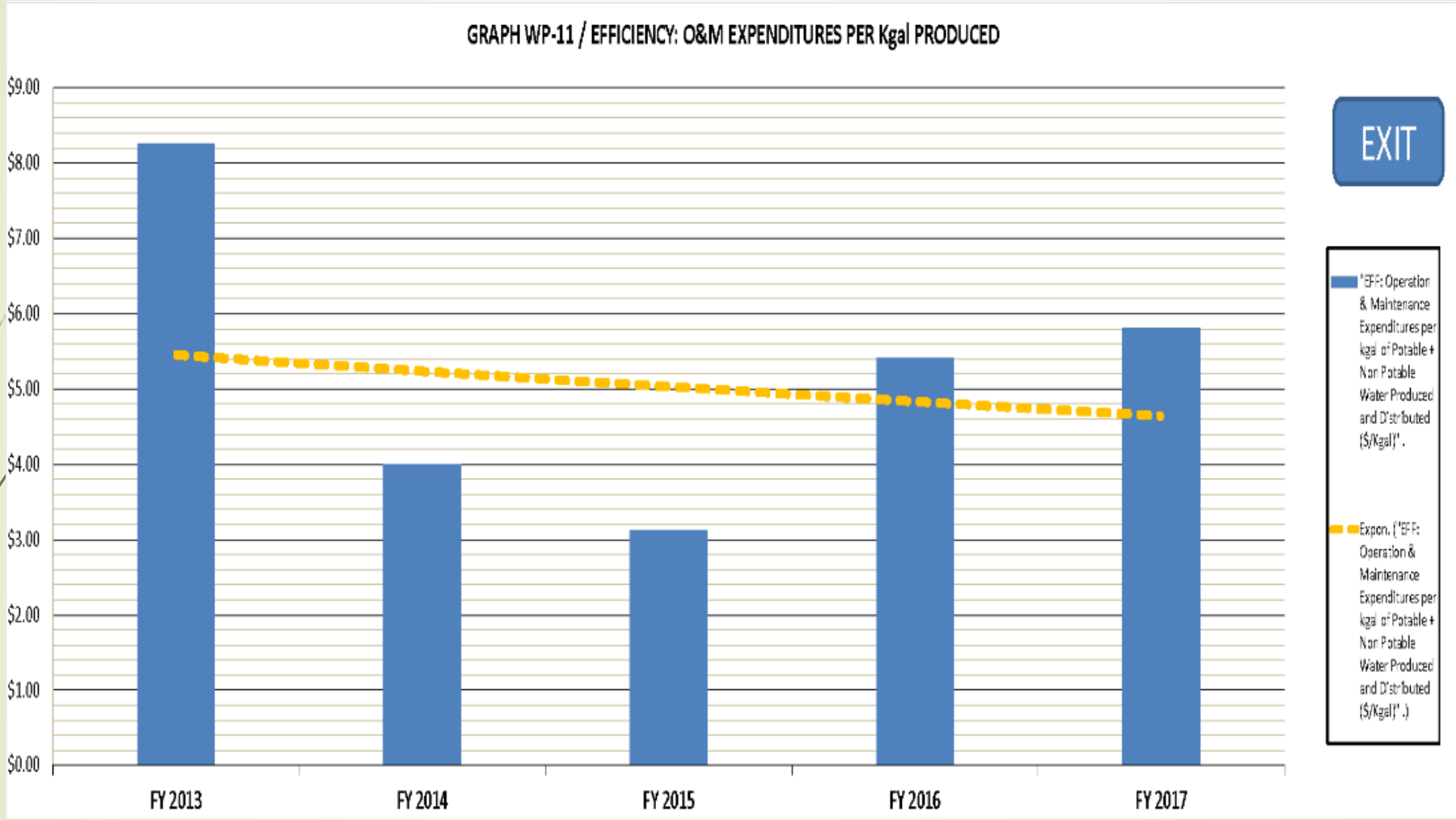
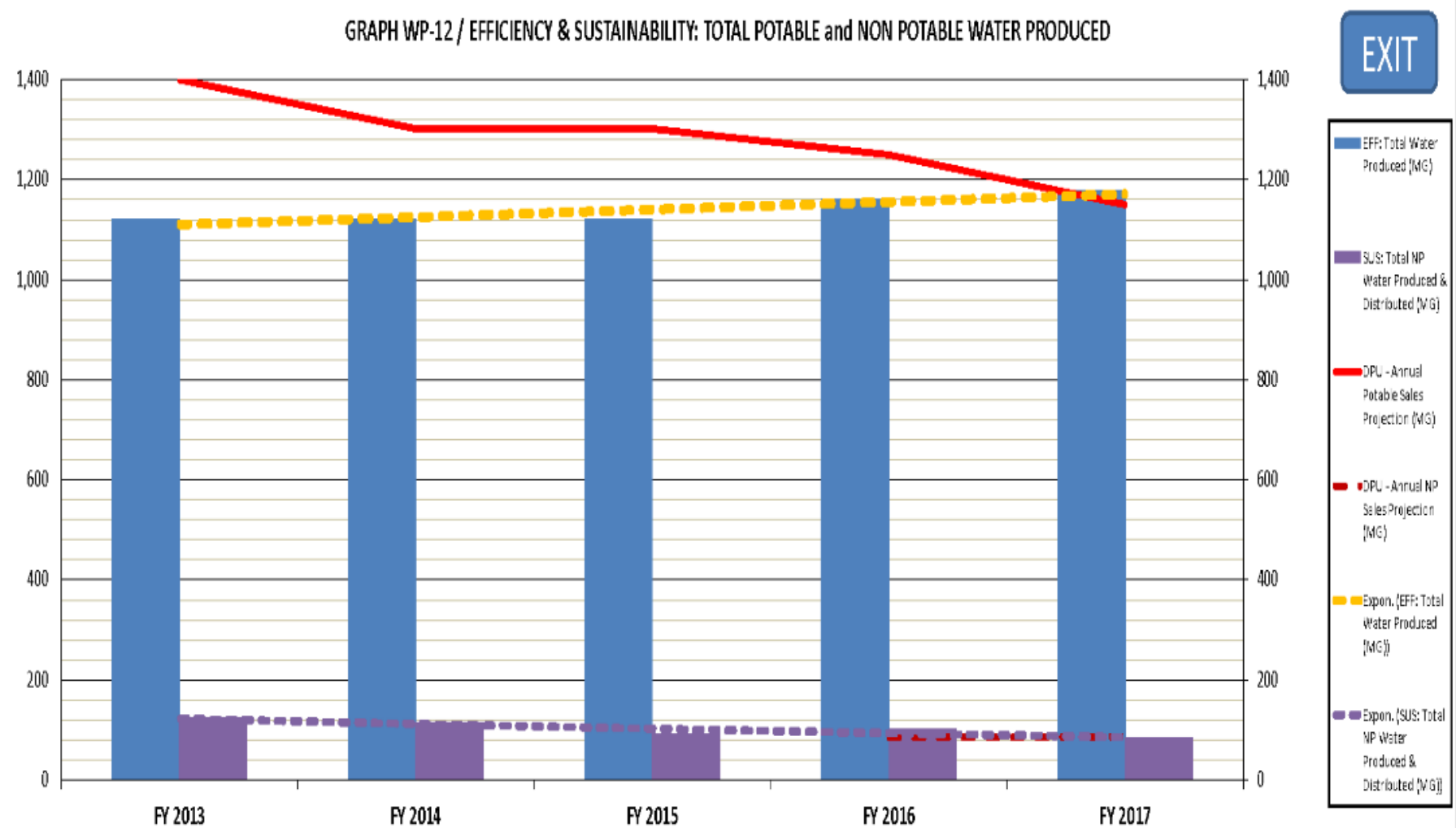
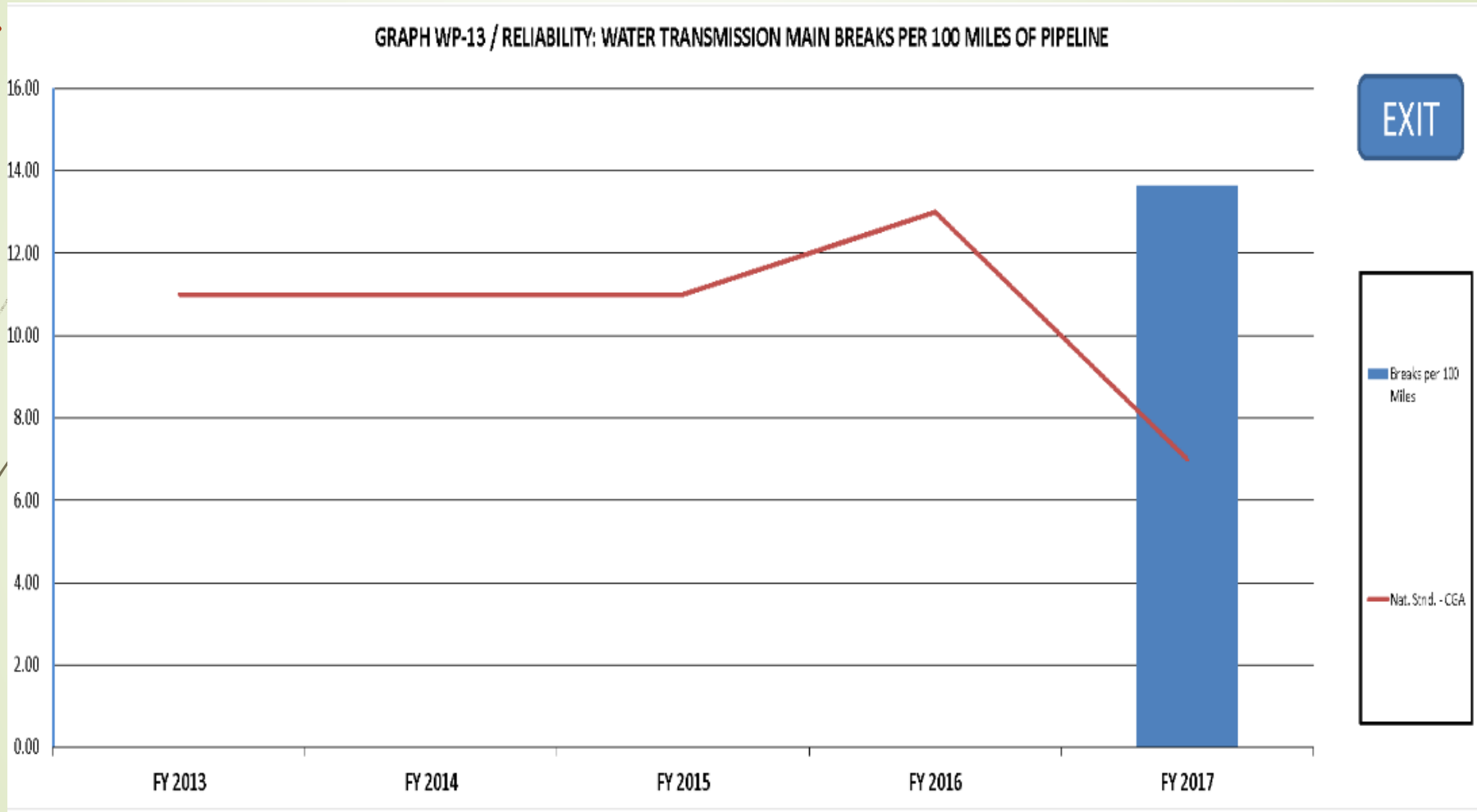


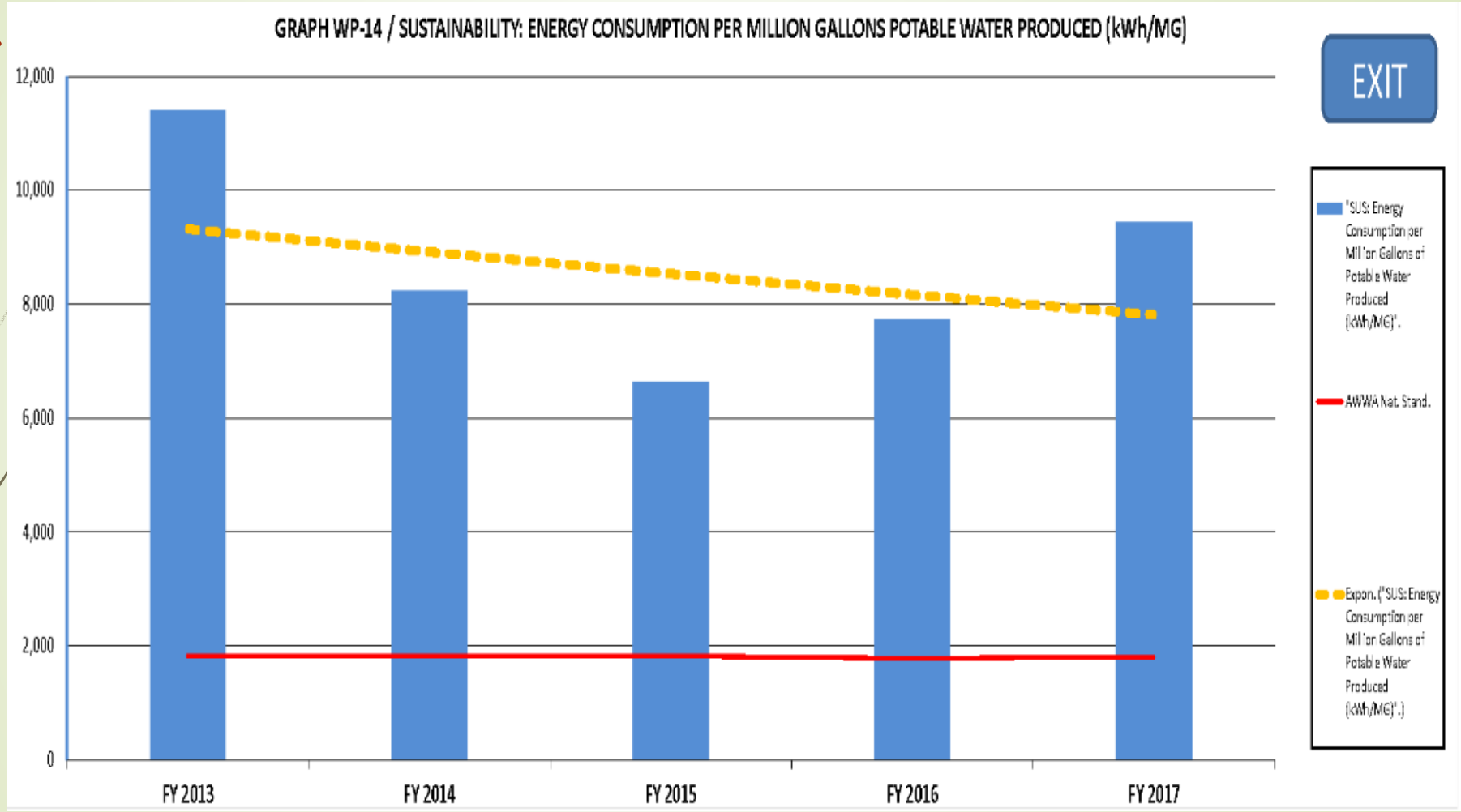
Water Production – Primary Key Organizational Performance Measure



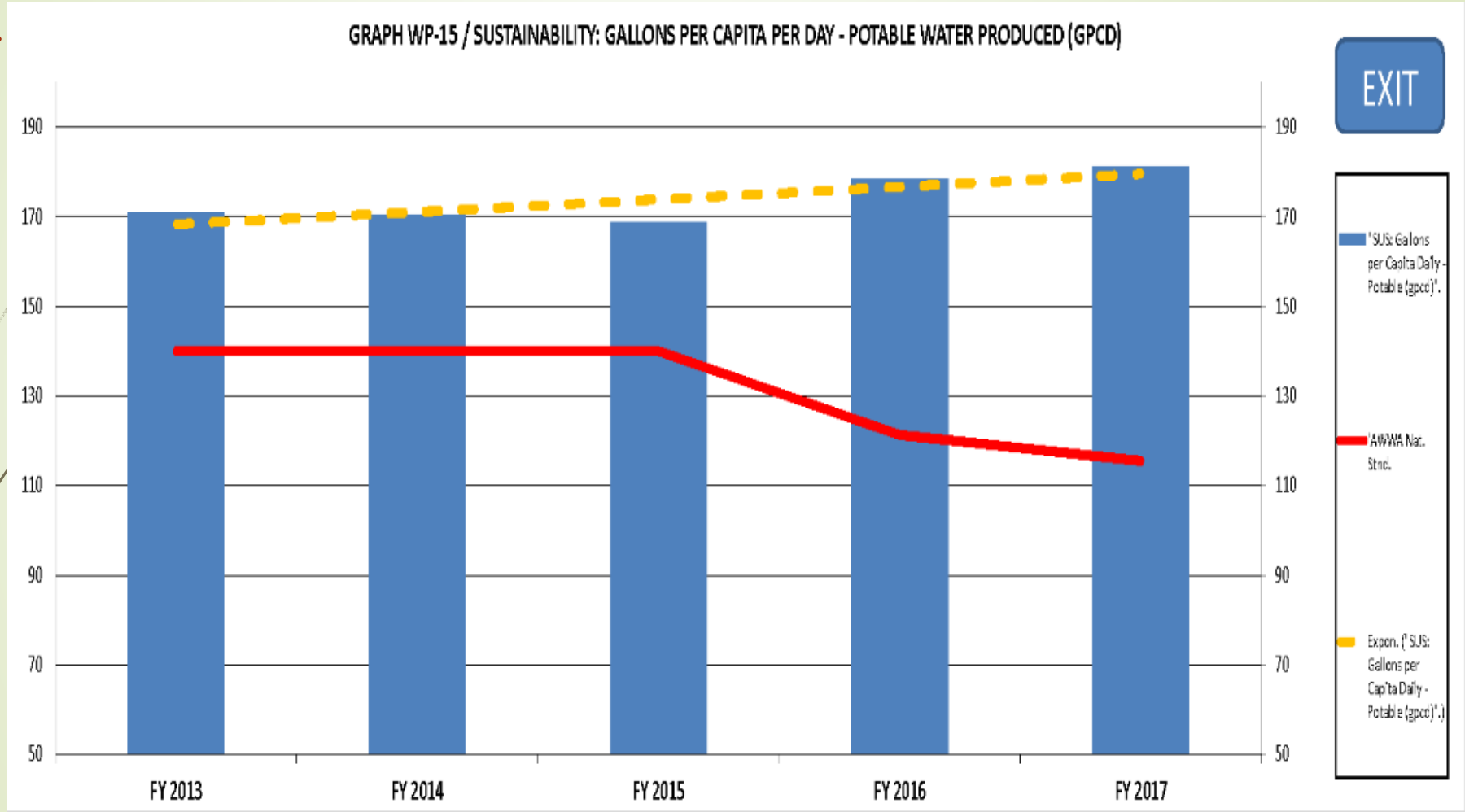
Water Production – Primary Key Organizational Performance Measure



Water Production – Primary Key Organizational Performance Measure



Water Production – Primary Key Organizational Performance Measure



Measures/Targets/Benchmarks for Tracking Non Potable Water System O&M

- **PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (all)**
- **Percent of Days in Full Compliance (%)**
- **O&M Expenditures per Kgal ($/Kgal) – Only for Non Potable System**
- **Total Non Potable Water Produced & Distributed (MG)**
- **Main Pipeline Breaks per 100 Miles of Pipeline (#/100 miles)**
- **Gallons per Capita Daily Water Produced (GPCD) – Only for Non Potable System**
- **SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (representative only, not all)**
- **Damages per 1,000 Locate Tickets (#/1,000 Tickets)**
- **Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)**
- **System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)**
- **PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS**
- **There are no known national standards Performance Measures for NP system comparison**
- **Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in Magenta**
- **Measures are collected and reviewed monthly via a 12 month moving average graph. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison. Full implementation scheduled for late FY 2018**

- UNDER DEVELOPMENT
- THANK YOU FOR YOUR PATIENCE

Water System Rates

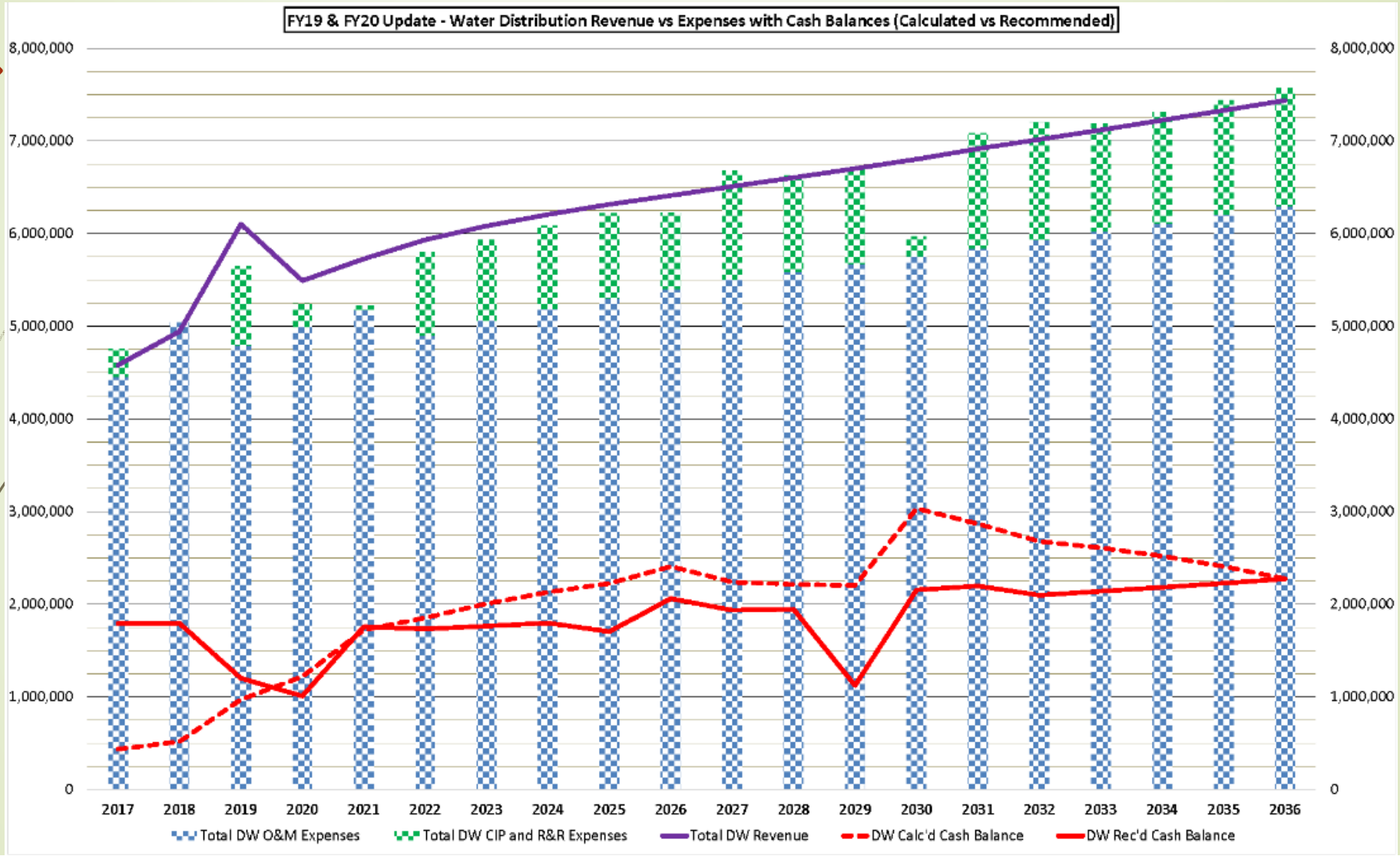
- **Rates Proposed to Meet Long Range (10 & 20 Year) O&M and CIP System Needs**

- Financial Policy sets a goal for annual cash balance reserves to meet key criteria.
- Short term goal of rate setting is to maintain necessary and acceptable levels of both O&M and CIP expenditures while stabilizing cash balance reserves in both water system sub-funds (Water Production & Water Distribution) that meet DPU financial policy goals.
- Current status has the relatively high Water Production sub-fund cash balance reserves that off set the low Water Distribution sub-fund cash balance reserves – leaving the full Water Fund in adequate financial condition.

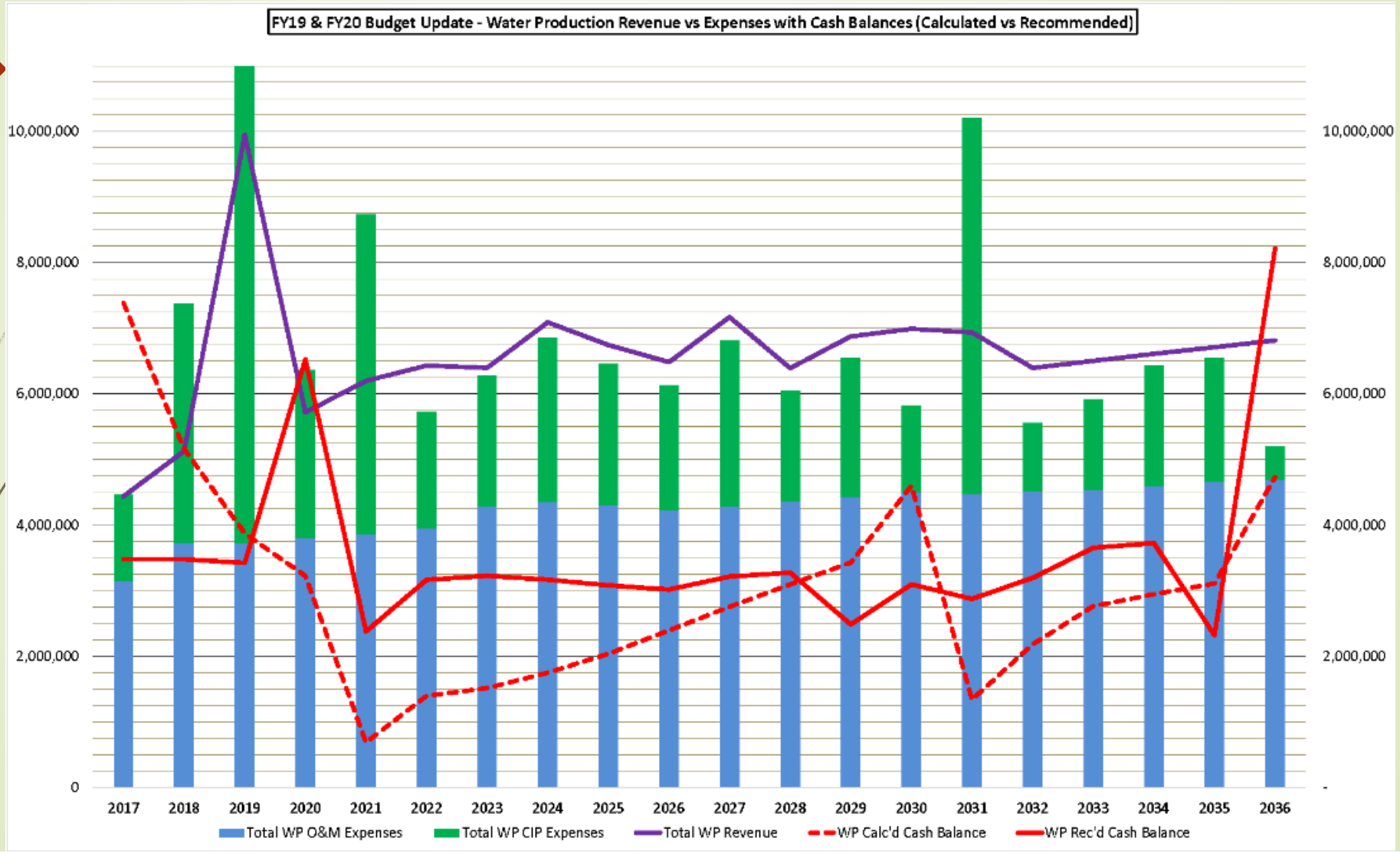
- **Bi-Annual Budget with 10 & 20 Year Forecast & Annual Budget Review & Revision Highlights**

- AMT annual presentation is the basis for development of each FY budget.
- Renewed emphasis on annual O&M programs (PRV O&M Program, Leak Detection and Pipeline Repair, Large Service Meter Checks, Shut Off Valve Exercise and Repair).
- The historic period of aggressive CIP projects is over. This historic period's CIP expenditures have brought the water systems closer to the goal of being up to an acceptably modern condition. The historic practice of automatically replacing water lines in conjunction with other County projects (Streets or Facilities) is being reduced.
- A 20-Year Forecast Financial Model for the water systems that includes all proposed O&M and CIP projects is developed/updated every year for long range planning, budgeting, financial policy compliance and rate assessment purposes.

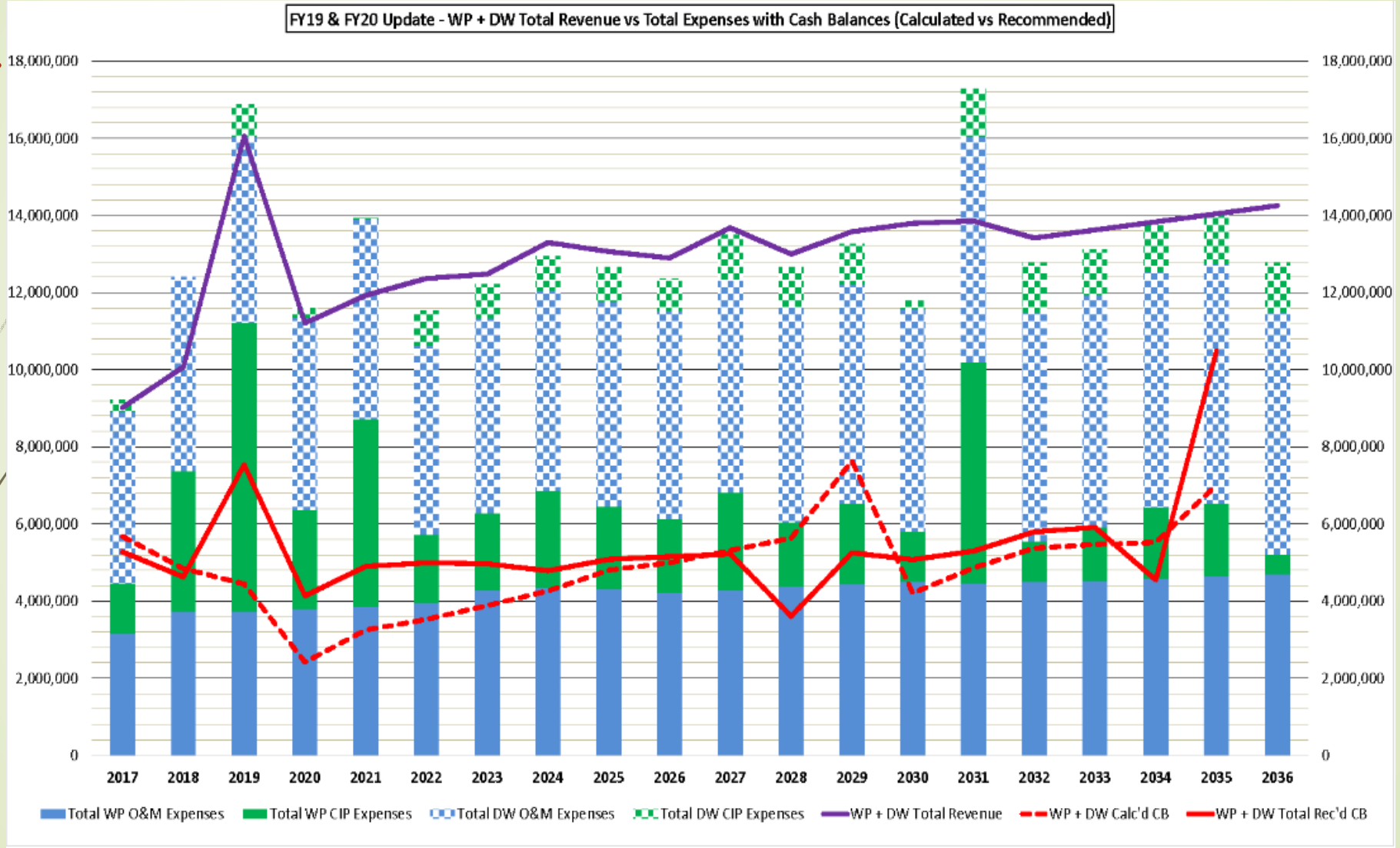
Water Distribution / 20-Year Revenue – Expenditure - Cash Balance Graph



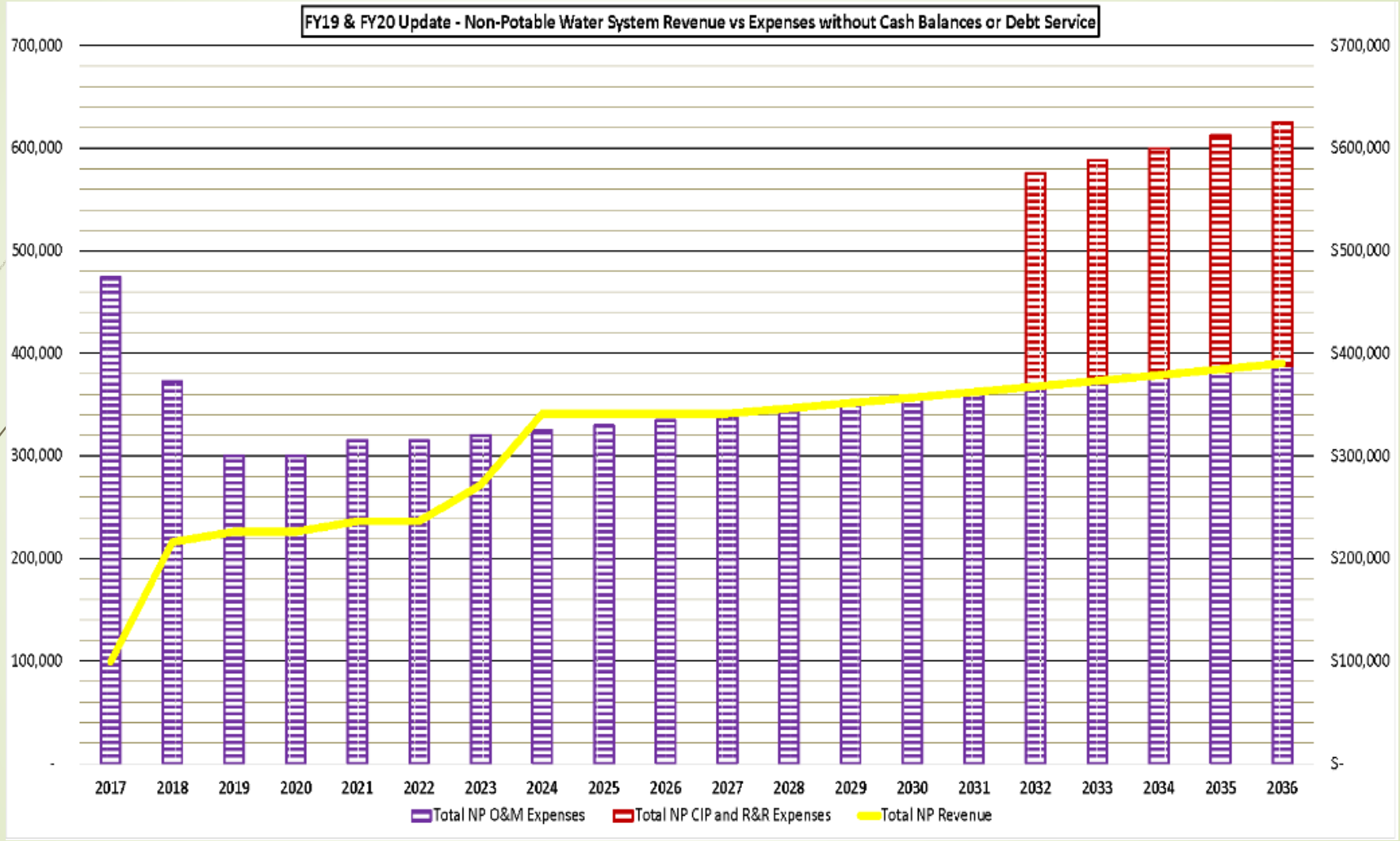
Water Production / 20-Year Revenue – Expenditure - Cash Balance Graph



Total Water Fund (WP + DW) / 20-Year Revenue – Expenditure - Cash Balance Graph



Non Potable Water System / 20-Year Revenue – Expenditure - Cash Balance Graph



FORECAST SUMMARY OF RATES INCREASES PER YEAR FOR WATER DISTRIBUTION & WATER PRODUCTION & NON-POTABLE WATER SYSTEM - ALTERNATES TEN, TWENTY, THIRTY & FORTY (PLUS FIFTY)																					
Alternative	*20-Year Average Annual Rate Increase*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*2032*	*2033*	*2034*	*2035*	*2036*
Ten - WP	2.94%	10.00%	10.00%	10.00%	4.85%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Ten - DW	3.18%	10.00%	10.00%	10.00%	9.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Ten - NP	9.44%	0.00%	117.00%	10.00%	10.00%	10.00%	10.00%	10.00%	3.75%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Twenty - WP	3.38%	10.00%	5.00%	5.00%	5.00%	5.00%	5.00%	4.50%	3.75%	3.75%	2.50%	2.50%	2.50%	2.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Twenty - DW	3.05%	10.00%	5.00%	5.00%	5.00%	5.00%	4.50%	3.00%	3.00%	3.00%	2.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Twenty - NP	9.39%	0.00%	117.00%	6.00%	6.00%	6.00%	5.50%	5.00%	5.00%	5.00%	4.50%	4.00%	4.00%	4.00%	3.50%	3.00%	2.50%	2.00%	1.75%	1.50%	1.50%
Thirty - WP	4.06%	10.00%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%
Thirty - DW	3.68%	10.00%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%	3.35%
Thirty - NP	9.38%	0.00%	117.00%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%	3.92%
Forty - WP	3.26%	10.00%	8.00%	6.75%	5.50%	5.00% ~~4.50%~~	4.50% ~~4.00%~~	4.00% ~~3.25%~~	3.00%	2.50%	2.25%	2.00%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Forty - DW	2.99%	10.00%	8.00%	6.25%	4.50% ~~5.00%~~	4.25%	3.50%	2.50%	2.00%	1.75%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Forty - NP	9.40%	0.00%	117.00%	0.00% ~~8.00%~~	0.00% ~~7.00%~~	0.00% ~~6.50%~~	0.00% ~~6.25%~~	0.00% ~~6.00%~~	0.00% ~~5.50%~~	0.00% ~~5.00%~~	0.00% ~~4.50%~~	0.00% ~~4.00%~~	1.50% ~~3.50%~~	1.50% ~~3.00%~~	1.50% ~~2.25%~~	1.50% ~~2.00%~~	1.50%	1.50%	1.50%	1.50%	1.50%
Fifty - WP	3.15%	10.00%	26.05%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Fifty - DW	2.93%	10.00%	21.66%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%
Fifty - NP	9.87%	0.00%	117.00%	55.00%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%	1.50%

FORECAST SUMMARY OF RATES PER KGAL PER YEAR FOR WATER DISTRIBUTION & WATER PRODUCTION & NON-POTABLE WATER SYSTEM - ALTERNATES TEN, TWENTY, THIRTY & FORTY (PLUS FIFTY)

Alternative	*20-Year Average Rate*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*2032*	*2033*	*2034*	*2035*	*2036*
Ten - WP	$4.56	$3.17	$3.49	$3.84	$4.20	$4.27	$4.33	$4.40	$4.46	$4.53	$4.60	$4.67	$4.74	$4.81	$4.88	$4.95	$5.03	$5.10	$5.18	$5.26	$5.34
Ten - DW	$6.38	$4.61	$5.07	$5.58	$5.85	$5.94	$6.02	$6.11	$6.21	$6.30	$6.39	$6.49	$6.59	$6.69	$6.79	$6.89	$6.99	$7.10	$7.20	$7.31	$7.42
Ten - NP	$4.00	$1.15	$2.50	$2.75	$3.03	$3.33	$3.66	$4.03	$4.18	$4.24	$4.30	$4.37	$4.43	$4.50	$4.57	$4.64	$4.71	$4.78	$4.85	$4.92	$4.99
Twenty - WP	$4.58	$3.17	$3.33	$3.50	$3.67	$3.86	$4.05	$4.23	$4.39	$4.56	$4.67	$4.79	$4.91	$5.03	$5.10	$5.18	$5.26	$5.34	$5.42	$5.50	$5.58
Twenty - DW	$6.39	$4.61	$4.84	$5.08	$5.34	$5.60	$5.85	$6.03	$6.21	$6.40	$6.56	$6.66	$6.76	$6.86	$6.96	$7.06	$7.17	$7.28	$7.39	$7.50	$7.61
Twenty - NP	$3.75	$1.15	$2.50	$2.65	$2.81	$2.98	$3.14	$3.30	$3.46	$3.64	$3.80	$3.95	$4.11	$4.27	$4.42	$4.56	$4.67	$4.76	$4.85	$4.92	$4.99
Thirty - WP	$4.60	$3.17	$3.29	$3.42	$3.54	$3.68	$3.81	$3.96	$4.11	$4.26	$4.42	$4.59	$4.76	$4.94	$5.12	$5.31	$5.51	$5.72	$5.93	$6.16	$6.39
Thirty - DW	$6.42	$4.61	$4.76	$4.92	$5.09	$5.26	$5.43	$5.62	$5.80	$6.00	$6.20	$6.41	$6.62	$6.84	$7.07	$7.31	$7.56	$7.81	$8.07	$8.34	$8.62
Thirty - NP	$3.49	$1.15	$2.50	$2.60	$2.70	$2.81	$2.92	$3.03	$3.15	$3.27	$3.40	$3.53	$3.67	$3.82	$3.97	$4.12	$4.28	$4.45	$4.63	$4.81	$4.99
Forty - WP	$4.57	$3.17	$3.43	$3.66	$3.86	~~$4.03~~ $4.05	~~$4.20~~ $4.24	~~$4.33~~ $4.40	~~$4.46~~ $4.54	~~$4.57~~ $4.65	~~$4.68~~ $4.75	~~$4.77~~ $4.85	~~$4.84~~ $4.92	~~$4.91~~ $5.00	~~$4.99~~ $5.07	~~$5.06~~ $5.15	~~$5.14~~ $5.22	~~$5.21~~ $5.30	~~$5.29~~ $5.38	~~$5.37~~ $5.46	~~$5.45~~ $5.55
Forty - DW	$6.39	$4.61	$4.98	$5.29	~~$5.55~~ $5.53	~~$5.79~~ $5.76	~~$5.99~~ $5.96	~~$6.14~~ $6.11	~~$6.26~~ $6.23	~~$6.37~~ $6.34	~~$6.47~~ $6.44	~~$6.57~~ $6.54	~~$6.67~~ $6.63	~~$6.77~~ $6.73	~~$6.87~~ $6.83	~~$6.97~~ $6.94	~~$7.07~~ $7.04	~~$7.18~~ $7.15	~~$7.29~~ $7.25	~~$7.40~~ $7.36	~~$7.51~~ $7.47
Forty - NP	$3.85	$1.15	$2.50	~~$2.70~~ $2.50	~~$2.89~~ $2.50	~~$3.08~~ $2.50	~~$3.27~~ $2.50	~~$3.47~~ $2.50	~~$3.66~~ $2.50	~~$3.84~~ $2.50	~~$4.01~~ $2.50	~~$4.17~~ $2.50	~~$4.32~~ $2.54	~~$4.45~~ $2.58	~~$4.55~~ $2.61	~~$4.64~~ $2.65	~~$4.71~~ $2.69	~~$4.78~~ $2.73	~~$4.85~~ $2.77	~~$4.92~~ $2.82	~~$5.00~~ $2.86
Fifty - WP	$4.52	$3.17	$4.00	$4.06	$4.12	$4.18	$4.25	$4.31	$4.37	$4.44	$4.51	$4.57	$4.64	$4.71	$4.78	$4.85	$4.93	$5.00	$5.08	$5.15	$5.23
Fifty - DW	$6.34	$4.61	$5.61	$5.69	$5.78	$5.86	$5.95	$6.04	$6.13	$6.22	$6.32	$6.41	$6.51	$6.61	$6.70	$6.80	$6.91	$7.01	$7.12	$7.22	$7.33
Fifty - NP	$4.15	$1.15	$2.50	$3.88	$3.93	$3.99	$4.05	$4.11	$4.17	$4.24	$4.30	$4.37	$4.43	$4.50	$4.56	$4.63	$4.70	$4.77	$4.84	$4.92	$4.99

DW Sub-Fund Summary – January 2018 Water Distribution Physical Condition Assessment – 1 of 3

- The current physical condition of the water distribution system overall is fair to good – with significant known portions in poor condition.
- The known portions in poor condition are pipelines that have been in the ground for 50 to 60 years. In addition, it is known, through visual inspection, that much of this known deficient older pipe was construction using sub-standard construction methods.
- There are both short range (10-Year) and long range (20-Year) CIP plans to complete full replacement of all known deficient pipelines.
- After full completion of the long range CIP plan, the water distribution system should be considered to meet acceptable modern standards for material safety and capacity conditions such that future CIP projects could be considered to be typical R&R or O&M program efficiency enhancement projects.
- **The increased emphasis on enhanced O&M activities – as opposed to continuous major CIP project completion – is being implemented and progress is expected in FY18. Toward the end of FY 2018, when the first phase of the GIS upgrade project has been completed, the enhanced O&M programs of the water distribution system will take another significant step forward.**

WP Sub-Fund Summary – January 2018 Water Production Physical Condition Assessment – 2 of 3

- The current physical condition of the water production system overall is good – with limited known portions in poor condition.
- The known portions in poor condition are pipelines that have been in the ground for 50 to 60 years. In addition, it is known, through visual inspection, that much of this known deficient older pipe was construction using sub-standard construction methods.
- The 12 existing wells ages span between 30 and 50 years; with an expected life of 50 years. The short and long range CIP plan for the water production system includes regular significant expenditures for well replacement.
- There are both short range (10-Year) and long range (20-Year) CIP plans to complete full replacement of all known deficient pipelines.
- After full completion of the long range CIP plan, the water production system should be considered to meet acceptable modern standards for material safety and capacity conditions such that future CIP projects could be considered to be typical R&R or O&M program efficiency enhancement projects.
- The increased emphasis on enhanced O&M activities – as opposed to continuous major CIP project completion – is being implemented and progress is expected in FY18. Toward the end of FY 2018, when the first phase of the GIS upgrade project has been completed, the enhanced O&M programs of the water production system will take another significant step forward.

NP Sub-Fund Summary – January 2018 Non Potable Water Physical Condition Assessment – 3 of 3

- The current physical condition of the NP water system overall is good – with limited known portions in very poor condition and some significant portions in new/excellent condition.
- The very poor infrastructure is the irrigation pump station at Overlook Park. This facility is over 30 years old, is situated outside exposed to the weather, and has received limited maintenance due to conflicting responsibilities between DPU and Parks. With the increased NP water rate comes the clarification that full responsibility for O&M now rests with DPU.
- The LA Reservoir pipeline replacement project is currently under construction. This project will allow for the use of LA Reservoir water to again flow into the NP system – starting with the 2018 irrigation season.
- Recent new construction includes new meters and SCADA at major users; additional 0.5 million gallons of storage with gravity flow and new pipelines to and from the new storage.
- The long range CIP plan for the NP system is totally contingent upon receiving grant/low interest loan funding from the State. CIP planning is expected to emphasize system expansion through the end of the short term plan with long term CIP projects being typical R&R or O&M program efficiency enhancement projects.
- The NP system infrastructure is also included in the increased emphasis on enhanced O&M activities. Toward the end of FY 2018, when the first phase of the GIS upgrade project has been completed, the enhanced O&M programs of the NP system will take another significant step forward.

DW Sub-Fund Summary – January 2018 Water Distribution Financial Condition Assessment – 1 of 3

- The current financial condition of the water distribution system is fair.
- The existing cash balance reserves of the water distribution system are below the requirements of the financial policy adopted by the Board of Public Utilities – as a separate and independent sub-fund. This is due in large part to previous years of optimistic projections of water sales (water revenues) while concurrently being aggressive in completing CIP projects to replace known deficient pipelines and PRV stations.
- The development of long range forecast models, combined with a renewed emphasis on O&M activities to reduce necessary CIP full replacement projects and the deferral of some required CIP projects to minimize early year cash flow expenditures, provides the platform for annual review of retail water rates to enable the water distribution sub-fund to meet all operational and financial goals into the future.
- All of the aforementioned programs and program expenditures are related to maintaining and operating the water distribution system in an efficient and effective manner. Furthermore, these costs need to be shared equitably by all customers which benefit from the use of all of the water systems: Water Distribution, Water Production & Non Potable Water System.
- The previous discussions on retail water rates appear to be on target with the current O&M and CIP planning. The retail water rates proposed in late 2016/early 2017, with a slight adjustment down for FY2020 (5.00% to 4.50%), continue to be recommended for implementation through the next 5 to 6 years in order to stabilize the DW sub-fund.

WP Sub-Fund Summary – January 2018 Water Production Financial Condition Assessment – 2 of 3

- The current financial condition of the water production system is good.
- The existing cash balance reserves of the water production system are above the requirements of the financial policy adopted by the Board of Public Utilities – as a separate and independent sub-fund. This is due in large part to previous years of adequate wholesale water rates and revenues while concurrently building a cash balance reserve adequate to fund some well replacement projects.
- The development of long range forecast models, combined with a renewed emphasis on O&M activities to reduce necessary CIP full replacement projects and the deferral of one anticipated well replacement CIP project to minimize later year cash flow expenditures, provides the platform for annual review of wholesale water rates to enable the water production sub-fund to meet all operational and financial goals into the future.
- All of the aforementioned programs and program expenditures are related to maintaining and operating the water production system in an efficient and effective manner. Furthermore, these costs need to be shared equitably by all customers which benefit from the use of all of the water systems: Water Distribution, Water Production & Non Potable Water System.
- The previous discussions on wholesale water rates appear to be mostly on target with the current O&M and CIP planning. The wholesale water rates proposed in late 2016/early 2017, adjusted up for FY21-FY23 (.50%/.50%/.75%), continue to be recommended for implementation through the next 5 to 6 years in order to maintain the WP sub-fund stability.

NP Sub-Fund Summary – January 2018 NP Water System Financial Condition Assessment – 3 of 3

- The current financial condition of the non potable water system system is poor.
- The finances of the NP system have historically been imbedded within the Water Production sub-fund. The NP water rates were set based on a best estimate with limited knowledge of actual costs attributable to the NP system available. It had been suspected for a while that the WP sub-fund had subsidized the NP system; therefore attempts to differentiate NP costs from WP costs began in FY2016.
- The 2013 NP System Master Plan analysis of the financial condition of the NP system as an independent system verified that subsidy; and recommended an NP water rate increase of 117% (from $1.15 per Kgal to $2.50 per Kgal). The FY2018 proposed rate increase, despite being advertised up to two years in advance, appeared to cause significant consternation among the NP system users; however, after detailed analyses using data from the more detailed cost differentiation started in 2016, it was shown that the NP water rate increase was justified.
- The proposed NP water rates shown within this presentation only capture projected O&M costs (no R&R CIP funds are being accumulated). NP rates are presumed to be held constant at the current $2.50 per Kgal for the next 9 years – then beginning an annual inflationary climb by 1.50% per year. This would end the WP subsidy of the NP system by FY2024 – but only if the NP system continues to expand with increased sales as proposed. If the NP system is not expanded such that sales and revenues increase, then an NP water rate increase would be justified in order to at least cover O&M of the system.

Full Water Fund Summary – January 2018 Combined DW, WP & NP Water Systems Financial Condition Assessment – 3 of 3

- The current overall financial condition of the entire Water Fund that includes both sub-funds of Water Distribution and Water Production (including the NP Water System) is good.
- The existing cash balance reserves of the Water Fund meet the requirements of the financial policy adopted by the Board of Public Utilities, as a combined set of independent sub-funds, for FY17 & FY18. This is due in large part to the current excess cash balance reserves within the Water Production sub-fund balancing the minimal cash balance reserves currently within the Water Distribution sub-fund.
- The NP System finances are relatively small and do not significantly affect the annual cash flow or cash balance of the Water Fund.
- Two major WP CIP projects (OW2 in FY18/19 & OB1 in FY21) will cause a temporary dip in the Water Fund cash balance below the financial policy goal. However, the Water Fund cash balance will return to financial policy goal levels within the short range planning period.
- The proposed water rates for each sub-fund (DW retail, WP wholesale & NP), shown within this presentation as modified and as previously discussed, are projected to meet all operational and financial goals of the Water Fund while simultaneously both improving and rebalancing the cash flow and cash balance reserve funds for each independent sub-fund such that the financial policy goals for each sub-fund are met within the short range planning period.

Agenda No.:	5.I.1.
Index (Council Goals):	BCC - N/A
Presenters:	Board of Public Utilities
Legislative File:	**10298-18**

Title

Tickler File for the Next 3 Months

Attachments

A - Tickler File for the Next 3 Months

County of Los Alamos

Tickler

Los Alamos, NM 87544
www.losalamosnm.us

Criteria: Agenda Begin Date: 2/1/2018, Agenda End Date: 4/30/2018, Matter Bodies: Board of Public Utiliti

File Number	Title	
Agenda Date: 02/21/2018		
10315-18	**Briefing/Report (Dept, BCC) - No action requested**	**04G General Board Business**
	Review of Department of Public Utilities Quarterly Report	
	Department Name: DPU	**Length of Presentation:** Apx. 10 Min.
	Drop Dead Date:	**Sponsors:** Tim Glasco, Utilities Manager
10316-18	**Briefing/Report (Dept, BCC) - No action requested**	**07 Business**
	(TENTATIVE) FER Implementation - Discussion Regarding Rate Ordinance - Unbundled Rate Structure	
	Department Name: DPU	**Length of Presentation:** Apx. 30 Min.
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin
10314-18	**Budget Item**	**07 Business**
	Department of Public Utilities FY2019 & FY2020 Budget Presentation	
	Department Name: DPU	**Length of Presentation:** Apx. 60 Min.
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin
10299-18	**Briefing/Report (Dept,BCC) - Action Requested**	**Consent**
	Approval to Establish San Juan Generating Station Reclamation Agreement Trust Fund	
	Department Name: DPU	**Length of Presentation:** N/A
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin
Agenda Date: 03/21/2018		
10318-18	**Report**	**04G General Board Business**
	Quarterly Conservation Program Update	
	Department Name: DPU	**Length of Presentation:** Apx. 5 Min.
	Drop Dead Date:	**Sponsors:** James Alarid, Deputy Utilities Manager - Engineering
CO0528-18	**Code Ordinance**	**05 Public Hearings**
	(TENTATIVE) FER Implementation - Public Hearing for Rate Ordinance - Unbundled Rate Structure	
	Department Name: DPU	**Length of Presentation:** Apx. 30 Min.
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin

File Number	Title	
AGR0548-18	**General Services Agreement**	**06 Consent**

Approval of Services Agreement No. AGR__-____ with [vendor] in the amount of $[amount], plus Applicable Gross Receipts Tax, for the Purpose of White Rock Substation 15KV Retrofit & Upgrade Project

Department Name: DPU
Length of Presentation: N/A
Drop Dead Date:
Sponsors: Rafael De LaTorre, Deputy Utilities Manager - Electric Distribution

10317-18 **Budget Item** **07 Business**

Approval of Department of Public Utilities FY2019 & FY2020 Budget

Department Name: DPU
Length of Presentation: Apx. 60 Min.
Drop Dead Date:
Sponsors: Bob Westervelt, Deputy Utilities Manager - Finance/Admin

Agenda Date: 04/18/2018

10301-18 **Briefing/Report (Dept, BCC) - No action requested** **04G General Board Business**

Quarterly Update on Utility System - System TBD

Department Name: DPU
Length of Presentation: Apx. 30 Min.
Drop Dead Date:
Sponsors: Tim Glasco, Utilities Manager

10302-18 **Briefing/Report (Dept, BCC) - No action requested** **04G General Board Business**

Briefing from County Manager on the County Strategic Objectives

Department Name: DPU
Length of Presentation:
Drop Dead Date:
Sponsors: Harry Burgess, County Manager

County of Los Alamos

Staff Report

January 17, 2018

Agenda No.:	7.A
Index (Council Goals):	BCC - N/A
Presenters:	Board of Public Utilities
Legislative File:	**10297-18**

Title

Approval of Board of Public Utilities Meeting Minutes

Recommended Action

I move that the Board of Public Utilities approve the meeting minutes of December 11th, 2017 as presented.

Body

REQUESTED REVISIONS TO THE DRAFT MINUTES

Draft minutes are sent to members after each meeting for their review. Members may then send changes to be incorporated prior to final approval of the minutes at the next regular meeting. No changes were requested.

Attachments

A - Draft BPU Regular Session Minutes - December 11th, 2017

County of Los Alamos
Minutes
Board of Public Utilities

1000 Central Avenue
Los Alamos, NM 87544

Jeff Johnson, Chair; Stephen McLin, Vice-chair; Paul Frederickson, Kathleen Taylor and Carrie Walker, Members
Tim Glasco, Ex Officio Member
Harry Burgess, Ex Officio Member
Susan O'Leary, Council Liaison

Monday, December 11, 2017 | **5:30 PM** | **1000 Central Avenue Council Chambers**

REGULAR SESSION

1. CALL TO ORDER

The regular meeting of the Incorporated County of Los Alamos Board of Public Utilities was held on Monday, December 11th at 5:30 p.m. at 1000 Central Ave., Council Chambers. Board Chair, Jeff Johnson, called the meeting to order at 5:31 p.m.

Mr. Frederickson and Ms. Walker attended via teleconference.

Present 5 - **Board Member Johnson, Board Member McLin, Board Member Taylor, Board Member Glasco and Board Member Burgess**

Remote 2 - **Board Member Frederickson and Board Member Walker**

2. PUBLIC COMMENT

Mr. Johnson opened the floor for public comment on items on the Consent Agenda and for those not otherwise included on the agenda. There were no comments.

3. APPROVAL OF AGENDA

****

Ms. Taylor moved that the agenda be approved as presented. The motion passed by the following vote:

****

Yes: 5 - **Board Member Johnson, Board Member McLin, Board Member Frederickson, Board Member Taylor and Board Member Walker**

4. BOARD BUSINESS

4.A. Chair's Report

Mr. Johnson reported on the following items:

1) Next month, the Board votes for a new chair and vice-chair. He asked the rest of the Board if there was anyone who wanted to be chair or vice-chair. No members expressed a particularly strong desire to hold either position, but Ms. Walker was open to being

vice-chair. Mr. McLin is willing to participate as needed, but reminded the Board that his term expires at the end of June. Mr. Johnson asked the Board to think about it before the next meeting.

4.B. Board Member Reports

Board members reported on the following items:

1) Mr. McLin - Mr. McLin attended the Boards and Commissions luncheon on November 16th. Libby Carlsten is the County coordinator for Boards and Commissions. They meet quarterly. These lunches are opportunities for Boards and Commissions throughout the County to exchange progress and discuss things they have been working on. Mr. McLin submitted to Ms. Carlsten a one page summary that he presented to the group on things the BPU has been working on. Ms. Carlsten includes those in the minutes of the luncheon if anyone is interested.

2) Mr. McLin - Mr. McLin was the Board representative on the County Audit Committee. The final report was due to be filed on or around December 7th. He thinks it will be posted online eventually. He doesn't think there were any problems with it. The County, in the past, has done extremely well on these audits.

4.C. Utilities Manager's Report

Mr. Glasco provided a written report, which is included in the minutes as an attachment.

4.D. County Manager's Report

Mr. Burgess reported on the following items:

1) Last Thursday, the County had a ribbon cutting for the 20th Street extension project. Although a contractor did all the work, Utilities Department staff were involved in design, tie-in, inspection and anything related to the utilities infrastructure. As a result of this project, there will be six new lots ready for sale as part of that subdivision.

2) The County is pursuing a number of different housing opportunities. The A19 site in White Rock and the A13 (the old LASO) site will involve some utility extensions, for which the general County is intending to pay, and will require some interface with Utilities.

3) At the next Council meeting, staff is proposing the introduction of an ordinance regarding an affordable housing project on DP Road. Along with some other future projects in that area, the affordable housing project would require extension of utilities down DP Road.

4) Last Tuesday night, Council approved four Capital Improvement Projects. They have the same utility needs similar to numbers 2 and 3 above, especially around the aquatic center where certain sewer lines may need to be relocated. Additionally, there is an irrigation project at the golf course coming up. The general County will be interfacing with Utilities quite a bit as each project proceeds.

4.E. Council Liaison's Report

Ms. Susan O'Leary was absent. No report was given.

4.F. Environmental Sustainability Board Liaison's Report

Ms. Susan Barns was absent. No report was given.

4.G. General Board Business

4.G.1 9705-17 Quarterly Conservation Program Update

Presenters: James Alarid

Deputy Utility Manager of Engineering Mr. James Alarid presented this item. The following is the substance of the item being considered.

Upon approval of the Energy and Water Conservation Plan in March 2015, the Board requested that staff provide quarterly updates on the Conservation Program and on progress towards the goals and actions identified in the plan.

The Board discussed this item and requested clarification where necessary.

The following actions were identified for follow-up:

1) Mr. Alarid will send an e-mail to the Board with a summary of and some pictures related to conservation efforts.

4.G.2 10000-17 Placeholder for Discussion Related to the 2017 Board of Public Utilities Annual Self-evaluation

Presenters: Jeff Johnson

Board Chair Mr. Jeff Johnson presented this item. The following is the substance of the item being considered.

Due to scheduling conflicts, the Board will be unable to have a special meeting to conduct their self-evaluation in December. This item was added to the agenda as a placeholder should the Board wish to discuss the self-evaluation during the regular December meeting.

The Board discussed this item and requested clarification where necessary.

The following actions were identified for follow-up:

1) A special meeting will be scheduled for January to conduct the self-evaluation.

4.H. Approval of Board Expenses

There were no expenses.

4.I. Preview of Upcoming Agenda Items

4.I.1 10168-17 Tickler File for the Next 3 Months

Presenters: Board of Public Utilities

In addition to the items already listed in the tickler provided in the agenda packet, the following items were identified for the tickler for upcoming meetings:

1) 01/17/018 - Transfer of Funds from the Gas Fund to the Wastewater Fund. (Timothy Glasco)

5. PUBLIC HEARING(S)

There were no public hearings scheduled for this meeting.

6. CONSENT AGENDA

****

Mr. McLin moved that the Board of Public Utilities approve the items on the Consent Agenda as presented and that the motions contained in the staff reports be included in the minutes for the record. The motion passed by the following vote:

****

Yes: 5 - Board Member Johnson, Board Member McLin, Board Member Frederickson, Board Member Taylor and Board Member Walker

6.A 10166-17 Approval of Board of Public Utilities Meeting Minutes

Presenters: Board of Public Utilities

I move that the Board of Public Utilities approve the meeting minutes of November 15th, 2017 as presented.

7. BUSINESS

7.A 9975-17 Approval of Fourth Revised Network Integration Transmission Service Agreement (NITSA) and Fourth Revised Network Operating Agreement (NOA) between Los Alamos County and Public Service Company of New Mexico

Presenters: Steve Cummins

Deputy Utility Manager of Power Supply Mr. Steve Cummins presented this item. The following is the substance of the item being considered.

Public Service Company of New Mexico (PNM) provides transmission facilities to deliver power from the various generation resources owned by Los Alamos County, including all market purchases. Los Alamos County entered into a Network Integrated Transmission Service Agreement (NITSA) and a Network Operating Agreement (NOA) with PNM in 2002, which was last revised in 2012 and approved by Board and Council. Electricity generated at power plants moves through a complex network of electricity substations, power lines, and distribution transformers before it reaches customers. The actual operation of the electric system is managed by entities called Balancing Authorities. PNM is the Balancing Authority for New Mexico. Balancing Authorities maintain appropriate operating conditions for the electric system by ensuring that a sufficient supply of electricity is available to serve expected demand. Balancing Authorities are responsible for maintaining operating conditions under mandatory reliability standards issued by the North American Electric Reliability Corporation (NERC) and approved by the U.S. Federal Energy Regulatory Commission (FERC). These operators monitor the grid to identify potential problems before a situation becomes critical. Balancing Authorities provide numerous services, but primarily provide scheduling, system control and dispatch, reactive supply and voltage control from generation sources, regulation and frequency response, and energy imbalance and reliability re-dispatch services. Mr. Cummins presented to the Board the four substantive changes to the County's agreements with

PNM.

The Board discussed this item and requested clarification where necessary.

****

Mr. McLin moved that the Board of Public Utilities approve, in a form acceptable to the County Attorney, the Fourth Revised Network Integration Transmission Service Agreement and Fourth Revised Network Operating Agreement between Los Alamos County and Public Service Company of New Mexico and forward to County Council for approval. The motion passed by the following vote:

****

Yes: 5 - Board Member Johnson, Board Member McLin, Board Member Frederickson, Board Member Taylor and Board Member Walker

8. STATUS REPORTS

8.A 10167-17 Status Reports

Presenters: Department of Public Utilities

The following informational status reports were provided to the Board in the agenda packet and were discussed:

1) Electric Reliability Update
2) Accounts Receivables Report
3) Safety Report

9. PUBLIC COMMENT

Mr. Johnson opened the floor for public comment on any items. There were no comments.

10. ADJOURNMENT

The meeting adjourned at 6:23 p.m.

****

APPROVAL

_____

Board of Public Utilities Chair Name

_____

Board of Public Utilities Chair Signature

_____

Date Approved by the Board

ATTACHMENT
OFFICER REPORTS
SUBMITTED AT THE MEETING

MANAGER'S REPORT

December 11, 2017

1. We received an inquiry from NMED/OSHA concerning the line contact accident. There is no investigation, nor was it a citation, just an inquiry into what we have done to prevent a reoccurrence.

2. The major power outage that occurred on November 24 in the townsite was caused by a failure of one of two feeders from LANL to LAC. The repairs were made by LANL and were completed on December 1. The SAIDI went from 21 minutes to 2 hours and 5 minutes because of that outage.

3. I will be traveling to Salt Lake City on December 18th through the 20th to attend the annual UAMPS meeting. At that meeting it is anticipated that the Budget and Plan of Finance as well as the Power Sales Contract for the CFPP will be adopted by the Project Manager Committee. We will be bringing those agreements back for a series of public meeting and joint Board/Council meetings before presenting them for adoption in March, 2018.

4. Together with LANL, we presented information related to the chromium contamination plume to the organization Voices of Los Alamos on November 27th. A County Councilor requested a similar presentation to Council, so we will be presenting together with Mr. Doug Hintze of the DOE/EM office on January 9, 2018. Our emphasis will be on the safety of our drinking water and the plan in case contamination begins to show up in a well.

5. The annual DPU employee Christmas Part will be held at Fuller Lodge on December 15. Members of the Board a cordially invited to attend and meet DPU staff.

Agenda No.:	7.B
Index (Council Goals):	BCC - N/A
Presenters:	James Alarid, Deputy Utilities Manager - Engineering
Legislative File:	**AGR0546-18**

Title
Approval of Services Agreement No. AGR18-17 with HPI, LLC in the amount of $312,195.00, plus Applicable Gross Receipts Tax, for the Purpose of Abiquiu Hydroelectric Plant Controls Upgrade

Recommended Action
I move that the Board of Public Utilities approve Services Agreement No. AGR 18-17 with HPI. LLC in the amount of $312,195.00 and a contingency in the amount of $62,000.00, for a total of $374,195.00, plus applicable gross receipts tax, for the Purpose of the Abiquiu Hydroelectric Plant Controls Upgrade Project, and forward to Council for approval.

Staff Recommendation
Staff recommends that the Board approve as presented.

Body
The existing controls system at the Abiquiu Hydroelectric Plant is comprised of a 2005 vintage system on the two original units and a 2010 vintage component on the third unit installed for the new low-flow turbine. At the time the low-flow turbine was installed the control system was set up on a designated process logic controller (PLC) and integrated into the existing control scheme. This was due to the older version of the operating software was no longer supported nor compatible with the version marketed in 2010. The project will include upgrading the PLCs on all three units, upgrade operating software to the current version, replace existing hardware that is at the end of its service life and implement some improvements in the controls scheme for more efficient and reliable operation. Three proposals were received and HPI, LLC was both the highest evaluated proposal and the lowest cost.

Alternatives
If the project is not approved staff will immediately solicit for these services again due to the need for the upgrade.

Fiscal and Staff Impact
$375,000 has been budgeted in the fiscal year 2018 budget. Hydroelectric Plant staff will heavily involved in the project to provide the operational insight necesasary to for a successful upgrade.

Attachments
A - AGR18-17

LOS ALAMOS

INCORPORATED COUNTY OF LOS ALAMOS
SERVICES AGREEMENT

This **SERVICES AGREEMENT** ("Agreement") is entered into by and between the **Incorporated County of Los Alamos**, an incorporated county of the State of New Mexico ("County"), and **HPI, LLC**, a Texas limited liability corporation ("Contractor" or "HPI"), to be effective for all purposes December 20, 2017.

WHEREAS, the County Purchasing Agent determined in writing that the use of competitive sealed bidding was either not practical or not advantageous to County for procurement of the Services and County issued Request for Proposals No. 18-17 ("RFP") on October 8, 2017, requesting proposals for the Abiquiu Hydroelectric Plant Controls Upgrade, as described in the RFP; and

WHEREAS, Contractor timely responded to the RFP by submitting a response and Proposal dated November 14, 2017 ("Contractor's Response"); and

WHEREAS, based on the evaluation factors set out in the RFP, Contractor was the successful Offeror for the services listed in the RFP; and

WHEREAS, the Department of Public Utilities approved this Agreement at a public meeting held on January 17, 2018, and County Council approved this Agreement at a public meeting held on January 30, 2018; and

WHEREAS, Contractor will provide the Services, as described below, to County.

NOW, THEREFORE, for and in consideration of the premises and the covenants contained herein, County and Contractor hereby agree as follows:

SECTION A. SERVICES:

1. Turnkey Project and Project General Scope. Contractor agrees and understands that the work to be performed is a turnkey project. The work to be performed by Contractor shall be completed in accordance with the RFP (adopted by reference hereto) and proposal to RFP 18-17, HPI Proposal No. 17-4934 adopted and included by reference herein, and Addendum to HPI proposal dated December 2017 adopted and included by reference herein, is based on performing control system upgrades on the two (2) identical 400RPM, 6.9MW, 4.16kV vertical Francis Hydro-Turbines generator units (Units #1 and Unit #2) and the one (1) INDAR 514RPM, 3.1MW, 4.16kV generator driven by an Andritz horizontal Francis turbine (Unit #3) (hereafter "Project" or "Work"). All three (3) units are located at the Abiquiu Hydroelectric Power Plant in Abiquiu, New Mexico ("facility" or "Project Site").

2. Site Visit. Prior to project commencement, Contractor will conduct one (1) to two (2) day detailed site survey to determine what specific work will be performed and to verify and accumulate all necessary site and facility information. At this time, the Contractor will introduce to County the HPI engineering team assigned to the Project. This visit is estimated to last 1-2 days.

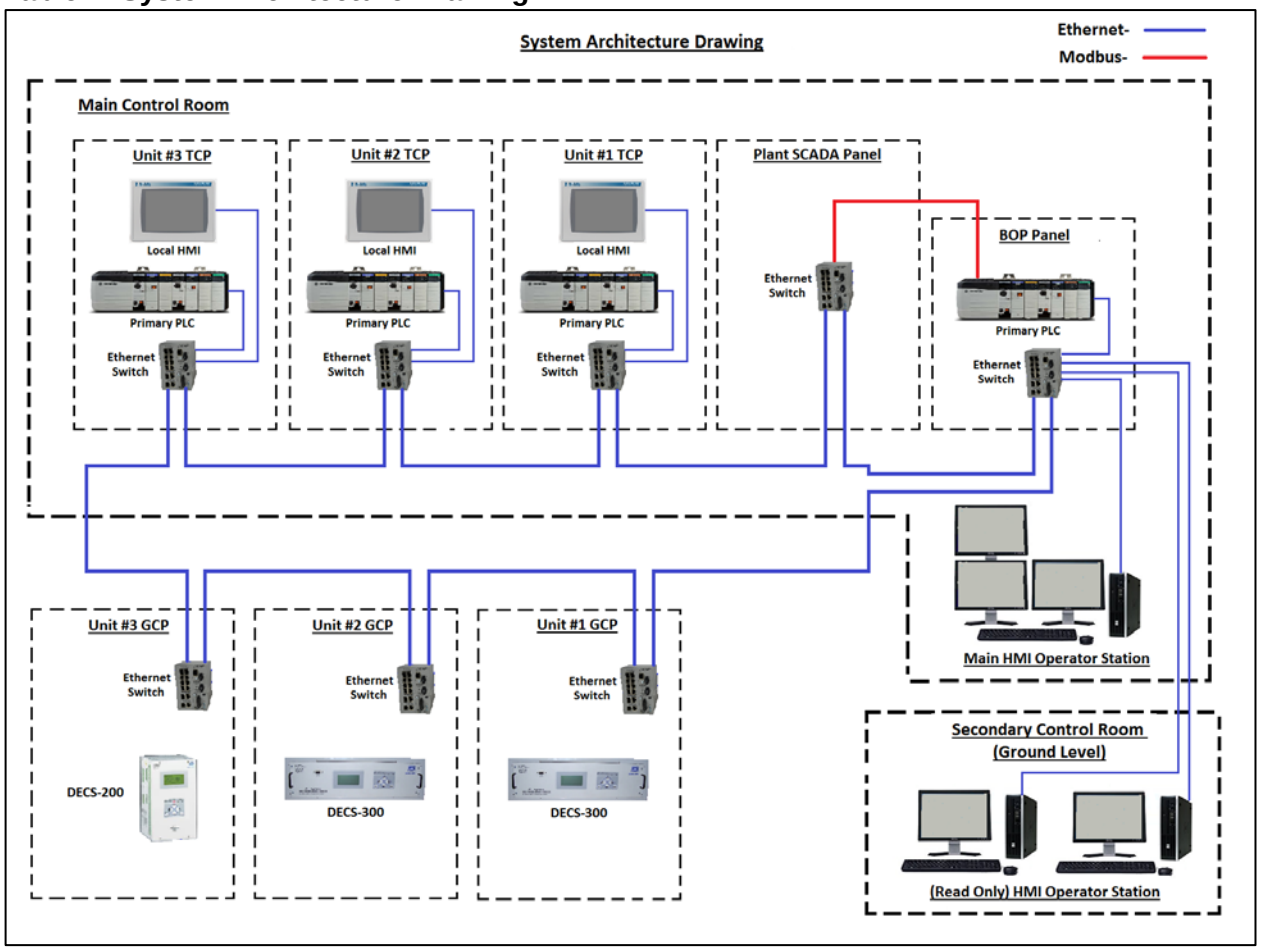
3. System Architecture.

a. HPI will implement a ring topology Ethernet communication network between all systems as seen in the Table 1. The ring topology shall allow for the system to function correctly with the failure of one node or a lost connection between two nodes giving the system a redundant communication feature. Table 1 below shows the HPI system architecture for the complete turnkey system network design of the existing layout with the new AB PLC system incorporated.

b. HPI will use a separate unit dedicated PLC for each Hydro system that all communicate to each other on the same network. If there is a PLC failure in one unit the system(s) will allow the other units will still be able to be started and run.

c. There will be a total of seven (7) separate work stations for this Project:
   1) Unit #1 Panel Mounted HMI will operate all three units
   2) Unit #2 Panel Mounted HMI will operate all three units
   3) Unit #3 Panel Mounted HMI will operate all three units
   4) The Main Operator station will have three monitors to allow the operator to view and have full functionality on all three (3) units HMI operator stations simultaneously. The PLC programming development software will also be accessible on this PC. The HMI development software will also reside on this PC. This computer will also house the data collection and archiving software (Historian) and back that data up to an external hardrive.
   5) Read-Only Operator Station #1. This computer will have read-only HMI's for all three (3) units available. The Operator will not have any access to control the systems
   6) Read-Only Operator Station #2. This computer will have read-only HMI's for all three (3) units available. The Operator will not have any access to control the systems
   7) Remote Laptop computer. This PC will have the PLC programming development software installed to allow the operator to access the PLC Logic locally at any of the units.

Table 1. System Architecture Drawing.



4. Manufacture and Design. All design and manufacturing for the new control systems will be done at HPI facilities and will be built and tested by HPI to perform pursuant to this Agreement and in accordance with the RFP. Throughout the design and engineering stages of the Project, the HPI control panel drawings will be delivered to the County's Project Manager for verification and approval. The initial design will be agreed upon before starting the panel manufacturing. All panel drawings will be completed at the HPI Houston facility by the HPI design department using AutoCAD design software. HPI design, fabrication, testing and performance of the system shall be in accordance with all necessary industry standards and codes where applicable, such as IEEE, ANSI, NFPA, IEC, UL, NEMA and NEC.

5. PLC.
   a. HPI will use and install an AB 1756 ControlLogix PLC's for the primary system control on all units and the BOP controls. All field I/O will be brought into the I/O PLC cards through disconnect terminal blocks from the existing field cabling, this allows individual isolation to field instrumentation. All PLC cards will be rack mountable in the AB control chassis. Contractor will reuse, where possible, the existing PLC cards and chassis in the new system. To modernize the control systems HPI will replace all ControlNet communications and replace the system with Ethernet communications modules. Each PLC control system will be unit specific, but it is understood Unit 1 & 2 are identical systems.

b. HPI will reuse the following items in the system upgrade as they will be supported for a minimum of 10 years from the date of the Project: AB PLC Chassis'; AB 24VDC Redundant Power Supplies; 1756-OB16E Digital Output Modules; 1756-IB16 Digital Input Modules; and 1756-OF4 Analog Output Modules.

c. The new PLC system will incorporate a minimum of 10% spare channels per I/O type and the PLC racks will incorporate a minimum three (3) spare slot capacity. This will allow for any future growth or development the system.

d. The replacement PLC will be compatible to communicate with the existing Plant SCADA system. The BOP PLC unit will include a Prosoft Modbus communication module that will be mounted inside the chassis. As provided in the RFP and the Proposal, and herein, updating the existing facility SCADA system and equipment is not part of the scope of work for this Project.

e. HPI will incorporate an AB 1756HP-TIME module into the new system and will provide and connect a GPS antenna to this module. This will allow for time synchronization across all hardware onsite as requested in the RFP. The 1756HP-TIME module will be the master time of all times throughout the balance of plant.

6. Human Machine Interface (HMI).
   a. HPI will create human machine interfaces ("HMI") for the AB PanelView Plus 7 screens for each unit using FactoryTalk View Machine Edition. HPI will also create identical HMI's in FactoryTalk View Site Edition for the main operator station PC and for the read-only operator PC's. Using Site Edition for the main HMI will give the facility operator the functionality for storing data and First-In-First-Out capabilities as requested in the RFP without having to purchase an Historian Server which will greatly reduce the cost of the system upgrade.

   b. HPI has designed, developed, and will use a high-performance HMI to greatly improve facility HMI functionality, operations, alarm identification, navigation, and operator focus. The high-performance HMI will primarily use grey-scale across its all its screen and only uses colors on alarms/shutdowns and highly important information or if otherwise specified by a customer. The layout of each screen will be also arranged with the most information displayed on the primary screen and less crucial information available in a pop-up like function. See Proposal Section 5.4 for examples of the Contractor's HMI examples.

   c. All HMI screen layout and functionality will be approved by the County during the engineering design phase of the project and will be fully tested during the Functional Acceptance Test ("FAT").

7. Software.
   a. All existing tag names will be reused by Contractor in the new HMI and PLC code. Any new device tags that will need to be added will coincide with the existing format and will be confirmed by County. During the programming stage of the Project, Contractor will work closely with the County project team to ensure the transition from the existing logic to the new logic meets the County's expectations and programming standards.

   b. The new control system to be provided by Contractor will have the most recent versions of the following software licenses:
      1) RSLogix 5000 Development License for the remote laptop
      2) Rockwell FactoryTalk View Site Edition Display License (QTY-3)
      3) Rockwell FactoryTalk HMI Development Software (QTY-3)
      4) Historian??
         a) Main Operator Station

b) Read-Only Operator Station #1
c) Read-Only Operator Station #2

5) Rockwell FactoryTalk View Machine Edition Display License (QTY 3)
   a) Included with the AB PanelView Plus 7 HMI's
6) Microsoft Office™ for all new HPI supplied PC's and Laptop

c. Contractor shall purchase all software and obtain all licenses necessary for use for software. Prior to accepting any software license or terms on behalf of the County, Contractor must receive written authorization to accept the license in the name of the County.

d. All PLC programming will be ladder logic, tag-based control logic and will be developed and submitted to County for review and approval during the engineering and design phase of the project. Upon completion of each unit, the PLC and HMI programs will be provided to County.

8. Functionality.

a. The overall process functionality of the new controls system will remain mostly unchanged except for additional features added by the introduction of modern field devices, PLC equipment, and HMI functionality. HPI will also incorporate all the additional following features below and as were outlined in the RFP. HPI will work closely with the County plant operators to ensure the new system meets all County specifications and operational sequence requirements and upgrades.

b. The Contractor installed controls will be capable of controlling the turbine generator in the following governing modes:
   1) Speed Control
   2) Gate Position Control
   3) Flow Control
   4) Power Factor and VAR Control

c. Contractor installed controls will also be capable of controlling the additional plant valves that are capable of releasing water into the river in the following operator modes:
   1) PRV#1 and #2
      a) Normal Gate Control
      b) Emergency Flow & Gate Control
   2) 18" Bypass Valve
      a) Normal Gate Control

d. HPI will also install, address, and implement the following actions as outlined in the RFP.

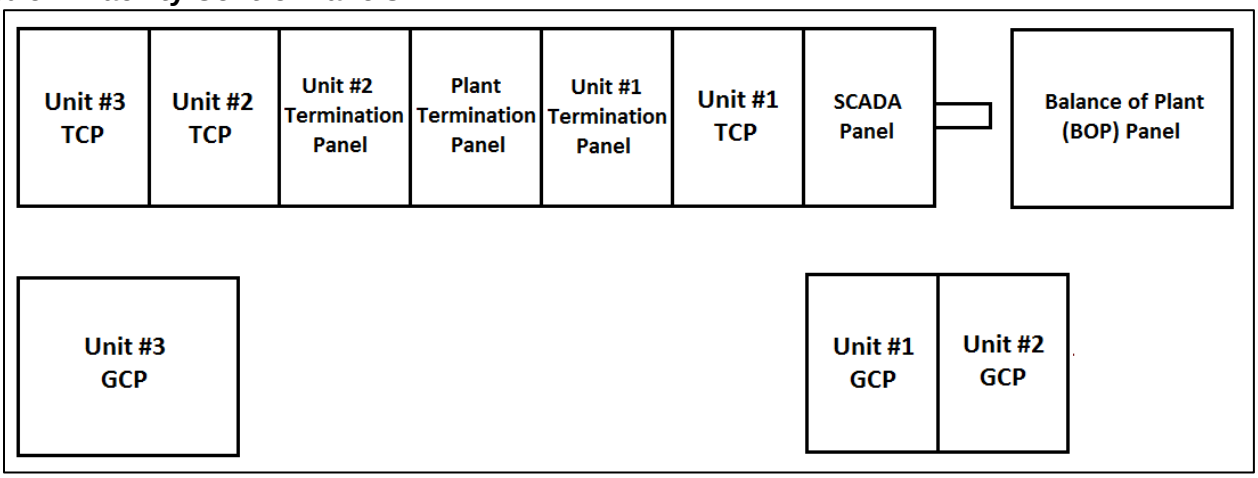
   1) HPI will also include the ability to open the field selectable PRV to required settings immediately upon a trip of Unit #3.
   2) HPI will look into the existing code and correct or add the programming to ensure that upon a trip of the last unit online will trip both reactors offline.
   3) HPI will address the issue of creating a station trip upon a Basement Flooding alarm.
   4) Unit #3 needs to be correctly wired to the existing 86TT bypass switch
   5) HPI has investigated the use of the existing Winter Kennedy method for flow calculations and whether a new method should be implemented. There is a new calibration equation for this flow system that HPI will incorporate into the PLC logic update. Upon request HPI can supply more information about the new equation that will be implemented and tested into the new system.

9. Control Panels.

b. HPI will upgrade each of the below listed panels in Table 2 so there is commonality across all panels in the facility. In each panel HPI will replace the interconnections with disconnect terminal blocks, and replace the existing relays and circuit breakers with new improved models. This will allow for easier maintenance and having common spare parts to replace any future faulty components.

b. The new back-panels will be supplied by HPI and will be fully wired and tested at HPI's Houston facilities, with the minimum number of inter-panel connections, reducing installation time and maximizing the testing carried out during the FAT. The following diagram shows how each panel will referenced throughout this Agreement and the below will outline the proposed scope of work for each units' Turbine Control Panel ("TCP") which includes the AB PLC racks, and Generator Control Panel ("GCP") which includes the Basler DECS systems.

Table 2. Facility Control Panels.



9.1. Unit #1 and #2 TCP's.

a. HPI will supply new HPI manufactured subpanels to replace the existing side panels within the Unit #1 and #2 TCPs. All control and monitoring equipment located on the front of the panels will reused except the existing panel mounted HMI which will be replaced with an AB PanelView Plus 7 HMI. HPI will replace all obsolete and discontinued PLC equipment with the new AB ControlLogix direct replacement. All new PLC cards will be prewired before being shipped to the facility and will be fully tested during the FAT. HPI will reuse the following PLC equipment:
   1) AB Power Supplies
   2) AB PLC Chassis
   3) AB 1756-OB16E Digital Output Card
   4) AB 1756-IB16 Digital Input Cards
   5) 1756-OF4 Analog Output Modules

b. All existing field cables will be reused so HPI will connect all existing field wiring to the new HPI terminal blocks in the same panel arrangement that currently exists. Any wire tags that are missing or difficult to read will be replaced during the installation.

9.2 Unit #3 TCP and GCP. The Unit #3 panels as provided in Table 2 are in newer and better condition so HPI does not foresee as much time required in tidying these panels. HPI will replace the AB Interface Modules ("IFM") shown in the following picture with disconnect terminal blocks in both the Unit #3 panels. HPI will replace these modules for failsafe reasons. If the IFM fails then the entire I/O module will lose communications and shutdown the unit. By separating the individual I/O inputs into terminal blocks the system will have more specific troubleshooting capabilities. This will also separate the primary and secondary alarmed signals, removing the capability of a system shutdown on an IFM fault. HPI will also replace the relays, circuit breakers and existing terminal blocks with the same parts HPI will use throughout the control panel upgrades for system commonality.

9.3 SCADA Panel. HPI will not be replacing any equipment in the existing SCADA panel. The new systems will communicate directly with the SCADA data via Ethernet and Modbus communications.

9.4 BOP Panel.

a. HPI will reuse the back subpanel and the majority of the equipment in the BOP panel. HPI will replace all obsolete and discontinued PLC equipment with the new AB ControlLogix direct replacement. All new PLC cards will be prewired before being shipped and fully tested during the FAT. HPI will reuse the following PLC equipment:
   1) AB Power Supplies
   2) AB PLC Chassis
   3) AB 1756-OB16E Digital Output Card
   4) AB 1756-IB16 Digital Input Cards
   5) 1756-OF4 Analog Output Modules

b. HPI will supply a new larger AB Stratix Ethernet switch to replace the existing N-Tron switch. HPI will also replace the terminal block and relays to give commonality on panel equipment across all systems. The HPI installation technician will also tidy all the cable and wiring within the panel to HPI's high standard of panel manufacturing by installing Panduit where required and looming groups of wire together.

9.5 Termination Panels.

a. HPI will replace the terminal block and relays to give commonality on panel equipment across all systems. The HPI installation technician will also tidy all the cable and wiring within the panels to HPI's high standard of panel manufacturing by installing Panduit where required and looming groups of wire together.

b. The overall majority of equipment located on the front of these cabinets will not be replaced but will be incorporated into the new control system and functionality. The exception to this will be the analog clock which Contractor will replace with a new digital clock (supplied and installed) that will use the Global Clock that will be synchronized across all PLC systems.

9.6 Unit #1 and #2 GCP's. HPI will not make any changes to the Unit #1 and Unit #2 GCP's. As HPI identified and per the Addendum, the Basler RDP-300 Remote Display Panel RDP-300 is now obsolete and discontinued. HPI will create a screen on the new HMI applications to display the DECS-300 data for each unit. HPI will tidy any cable bundles in these panels if required.

9.7. Panel Standards. HPI will pre-assemble the panels at the HPI Houston office facility. All control panel fabrications will be built in accordance to UL508 and UL689 quality programs. HPI will ship the new sub-panels built to HPI's standards to the Facility. While onsite Contractor will also tidy and improve the overall condition of the existing cabinets and on-site panels.

a. Wiring, Terminations and Tags. The new HPI control system design will reuse all the field device tag numbers that are in the existing units. HPI will replace any missing or unreadable wire tags with new ones. No more than two 14 AWG wires shall be terminated per side of a terminal block. All terminal blocks will be clearly numbered matching the HPI Panel Layout Drawings.

b. Interposing Relays. Due to the inductive nature and current requirements of some field devices, interposing relays will be provided as final drivers. The relays include LED indication and are capable of switching to a maximum of 16A @ 250VAC. These relays will replace the current ones existing on site.

c. Overspeed Detection System. To monitor the turbine overspeed protection HPI will use the Dynalco SST-7400D-I Digital Speed Switch. The Speed Probes will wire directly to this new module. The SST-7400D-I includes the following features:

1) PC- Programmable
2) Local Display Included
3) Keypad Programmable
4) Four (4) standard relays with Isolated RPM Input
5) 50 m Sec relay response time
6) 4-20mA Output (Sourced)
7) Din Rail Mountable

d. Watchdog Timer. Contractor will ensure that the installed PLC has multiple layers of fault detection, to detect faults both externally within the instrumentation and internally either within the PLC hardware or within the software routines. Should a critical fault be detected the PLC shall generate a trip which will cause the unit to shut down and the ESD loop de-energized. As a back-up to this process, an independent watchdog timer will mounted within the panel. The watchdog timer is periodically pulsed by the PLC. Should the PLC detect a critical fault or the PLC software should lock-up (very unlikely events) the pulsing of the timer will stop and the timer will time-out, shutting down the unit.

e. Field Cabling. All existing field cabling will be reused in the installation of the new system. HPI will run new Ethernet cables where required for the ring topology and new operating stations outlined in the HPI proposed architecture drawing. It assumed HPI will use existing cable tray and conduit for the new communication cables.

10. Critical Spare Parts. HPI will provide critical spare parts for the new control systems installed by Contractor for 24 months of operation. HPI will supply one (1) of each of the AB PLC cards (including the L71 controller) for immediate replacement upon an unlikely PLC failure. The price for the PLC spare parts is provided in Exhibit #.

11. PID Loop Control. HPI will re-program and tune all PID Loops throughout the entire system for all three (3) Units. HPI implement the PID functional block provided by AB into our ladder logic programming. This block is widely used and tested control function and allows for simple implementation and smoother tuning on the control loop. It also uses a common block across all systems for simpler commissioning and maintenance. All PID loops will be able to be calibrated and tuned through the new HMI applications if the operator has signed at the correct security level.

12. Obsolete RTD's.
    a. Pursuant to the pre-bid meeting, site walk, and the released RFP Addendums there are only two (2) existing RTD's that have failed and which will be replaced by Contractor. These are:

1) Unit 1 Turbine Guide Bearing Temperature
2) Unit 3 Drive End Bearing #2

b. HPI will supply the new RTD's and install them at the same location. The RTD's will then be brought directly into the new PLC RTD cards. During the testing and commissioning of the systems, the RTD's on all units will be tested for correct performance and scaling.

13. Omega Pressure Transducers. HPI will replace the existing Unit #1 and Unit #2 Omega Pressure Transducers located on the spiral case and draft tubes. After consulting with the supplier HPI have selected the Endress + Hauser PMP21 absolute and gauge pressure transmitter as the replacement part. HPI will install these four (4) new transmitters and use the current field cable to bring the 4-20mA control signal back to PLC's.

14. Tempsonics Position Feedback Transducer. HPI will replace the existing PRV#1 position feedback transducer with the customer supplied Tempsonics transducer. HPI will install, test and calibrate the new transducer using the existing field cable to bring the signal back into the control system PLC.

15. Replacement Field Devices. HPI will calibrate all field devices and electrical-based transducers on all units during the testing and commissioning phase of the project. HPI has designed the new control system so all current field devices will continue to work and communicate to the new PLC's. HPI will identify and report that all devices will achieve reliable and industry accepted standards. Any devices that need replacing will be reported to County to discuss further action.

16. Documentation.
    a. Within thirty (30) days or earlier, County will submit to Contractor all available plant and facility diagrams, specifications, drawings, etc. Documents will be provided by County to Contractor in AutoCAD format where available.
    b. As per the Project, HPI will submit four (4) original copies and electronic PDF of the following documentation within sixty (60) days of contract award. Contractor will then supply final versions of this documentation fifteen (15) days prior to the start of the construction phase of the Project including, but not limited to:
        1) Logic Drawings
        2) FAT Procedure(s)
        3) Bill of Material (BOM)
        4) Panel Arrangement Drawings; and
        5) Preliminary Project Schedule

    c. Contractor will also provide the following documentation in hard copy and .PDF: 1) Functional Design Specification (FDS); 2) FAT Procedure(s); 3) Commissioning & Installation Procedure; 4) Operations & Maintenance Manuals (Four (4) copies); 5) As Built Panel Drawings; and 6) Spare Parts List.

17. Factory Acceptance Test (FAT).
    a. The control systems will be hardware tested by HPI at its Houston facility following completion of the panel and system build. The new control system will be connected to a HPI testing simulator and Factory Acceptance Testing will be carried out to prove the correct operation of the system and software. Following the successful completion of this testing, the County Project Manager or designated representative will be invited to attend a maximum five (5) day witness test of the operation of the system. The County Project Manager will be given two weeks written notice of the date and location the FAT.

b. The FAT will be carried out by Contractor pursuant to an approved test procedure and will use HPI's state of the art custom made simulator testing equipment. Such testing shall allow HPI to simulate all field devices to a full test of the panels, HMI, and PLC sequencing. At a minimum, the following, at a minimum, shall be performed during the FAT by Contractor and will be outlined in more detail in the HPI FAT Procedure document:
   1) Check all hardware to verify that all materials have been supplied and configured per project requirements
   2) Point-to-point wire testing
   3) Full power test
   4) Full I/O simulation test of all analog and digital signals, confirming PLC addresses
   5) Simulation of all sequencing
   6) Simulation of protection
   7) Full HMI test checking graphic displays and functionality. All HMI designs will be preapproved by County during the engineering and design stage of the project.
   8) Verify alarms and shutdowns
   9) Verify communication network and addressing
   10) Simulation of Modbus (SCADA) communications if possible.

d. Following completion of the test the equipment will be delivered to site in preparation for installation.

18. Installation and Commissioning. HPI will provide an experienced Installation Engineering Team to perform the installation of the control system at the Project Site. Once installed, the HPI Installation Engineering Team will perform all necessary tests to ensure that the system has been installed correctly. HPI will then provide an experienced Commissioning Engineer to perform the re-commissioning of the system. All installation and commissioning activities will be carried out against an approved procedure as to be agreed upon by Contractor and County prior to final installation. The *Installation and Commissioning Manual* to be supplied by HPI to County will detail the procedures involved.

19. HPI Standard Working Hours. The standard working day for the HPI Personnel will be seven (7) days a week, typically not exceeding eleven (12) hours including one (1) hour for lunch. Public Holidays will NOT be observed by the HPI Personnel. The HPI Engineer will be expecting to work on any statutory holidays and it will be necessary for the customer to: 1) Make arrangements for access to site, and that the necessary personnel are available for work on that day; and 2) Inform the HPI Project Manager if the unit is unavailable, and make arrangements for standby time charges (if necessary).

20. Safety Orientation. All parties involved must be aware of general "industry-standard" safety procedures and any customer specific safety procedures. Prior to starting any work, all parties involved will discuss and decide on all safety responsibilities for site work. HPI personnel performing the site work shall be qualified and capable of conducting the work in a safe manner and with complete knowledge of the hazards involved. If more specific safety training is required then County will be responsible for providing a safety orientation for all HPI employees working on site.

21. County Responsibilities.
   a. The County will be responsible for the following tasks:
      1) Preparation of any necessary site work permits.
      2) Briefing the HPI personnel on site specific safety regulations to ensure a safe working environment at all times.
      3) The work area is unobstructed and access to the control panel will not be impeded by other activities or by other craftsman on site.

4) Allocation of a site supervisor to provide liaison between CLA and HPI.

b. The HPI Installation Engineer will brief the County site supervisor at the end of each day on the intended tasks and permit requirements for the following day and any possible customer manpower requirements. Installation Engineer will also submit a Service Report sheet on a weekly basis for approval signature by the onsite Supervisor. Any additional manpower required for specific tasks, such as disposal of redundant equipment, will be made known on an as required basis at the end of work briefing with the supplied supervisor.

c. Installation Equipment Required. HPI will supply all necessary installation tooling and materials for running cables, installing instrumentation, tubing and termination of signals to the panels and junction boxes. The installation equipment required as a minimum, shall be as follows:
   1) All OSHA mandated safety equipment as outlined in the technical specifications
   2) OSHA approved devices for site Lock-Out Tag-Out (LOTO)
   3) All necessary hand tools, cutters, cable cutters, power tools, and measurement instruments etc., which will be required to complete the installation
   4) Facilities and equipment for the uncrating and transportation within the plant site of the HPI supplied equipment.

Demolition and Installation Procedures. HPI will follow, at minimum, the general listing and demolition and installation steps as provided in its Proposal, Section 11.5.

22. Project Schedule.
   a. Following the effective date of the Agreement, defined as the date of the last signature to the Agreement, Contractor shall begin all work and effort to ensure that the Project will be **completed and tested by May 11, 2018**. HPI has evaluated all contingency and related concerns and agrees that it will have no issues meeting this deadline.

   b. Following the Effective Date of the Agreement, Contractor will put together a detailed project schedule to send to the County's Project Manager for approval. HPI will then send the selected installation and engineering team to perform the site survey of the existing systems and have a kick-off meeting with the County as provided above.

   c. HPI estimates that it will send three (3) installation technicians and one (1) installation supervisor to perform the demolition, installation and cold-loop testing of the system following the FAT. HPI may also assign one (1) installation technician and (1) senior control system engineer to perform the hot-loop testing and the commissioning of the systems.

23. Training.
   a. HPI will provide a minimum of four (4) days on-site operations and maintenance training course for up to six (6) County employees or representatives. The content of the course will be agreed upon with the County in advance and will be tailored to meet the County's specific requirements.

   b. A course will be held during the commissioning and testing phase and will cover, but not be limited to, the following:
   Overview of retrofitted control system

      1) Detailed review of all functional differences to the old system
      2) Examine the program logic and sequences for new automation.
      3) Review of the new HMI screens and functionality
      4) Overview of calibration of new equipment, processor, field devices and transmitters
      5) Maintenance practices
      6) System troubleshooting

c. As part of the training, HPI will review with County staff all alarms and trips including required actions and reset procedures. The training will also include hands-on training at the facilities control panel(s). Training manuals for all course participants will be provided and will detail all course material and references.

24. Warranty. HPI will provide a one (1) year warranty on all parts, labor, equipment, and systems furnished from the date of acceptance of the work by the County Project Manager. HPI will offer both onsite and telephone assistance to County during the term of the Warranty. The County may, through separate purchase orders or agreements, request additional onsite services and maintenance after the Warranty period.

25. Shipping and Handling. As the products and services to be provided by HPI are unique and specialized, HPI is and will be responsible for the shipping, packing, and handling. If authorized by HPI, the County will sign for receipt of any items at its facility and will store the item or product until installation, however County accepts no responsibility for damages caused during shipping or while stored on County property, except for willful or negligent actions thereof.

26. Deliverables.

a. Contractor will submit four original copies of the following documentation within 60 days of contract award. Contractor will then supply final versions of this documentation 15 days prior to the start of the construction phase of the project (four (4) hardcopy and in .pdf form):
   1) Logic Drawings
   2) Schematics
   3) Bill of Material
   4) Panel Arrangement Drawings
   5) Preliminary Project Schedule

b. Contractor will also provide the following documentation (four (4) copies and in .pdf form):
   1) Functional Design Specifications (30 day after commissioning)
   2) Factory Acceptance Test Procedure (14 day prior to testing)
   3) Commissioning and Installation Procedure (14 days prior to commissioning)
   4) Operations and Maintenance Manuals (30 day after commissioning)
   5) As-Built Panel Drawings (30 day after commissioning)
   6) As-Built Control Drawings (30 day after commissioning)
   7) Spare Parts List (30 day after commissioning)

c. Spare parts identified in proposal (30 day after commissioning).

SECTION B. TERM: The term of this Agreement shall commence January 30, 2018 and shall continue through May 11, 2018, unless sooner terminated, as provided herein. The parties may by mutual written agreement extend the Agreement for an addition four (4) one-year terms.

SECTION C. COMPENSATION:

1. **Amount of Compensation**. County shall pay compensation for performance of the Services in an amount not to exceed THREE HUNDRED TWELVE THOUSAND ONE HUNDRED NINETY-FIVE DOLLARS ($312,195.00), which amount does not include applicable New Mexico gross receipts taxes ("NMGRT"). Compensation shall be paid in accordance with the Compensation Rate Schedule set out in **Exhibit A**, attached hereto and made a part hereof for all purposes.
2. **Invoices**. Contractor shall submit itemized invoices to County's Project Manager showing amount of compensation due, amount of any NMGRT, and total amount payable per the project schedule

identified below. Payment of undisputed amounts shall be due and payable thirty (30) days after County's receipt of the invoice.

3. Payment Schedule:

Milestone	%
Contract Award	15
Issue of Design	15
Acceptance of BOM	30
Delivery of All Equipment	30
Completion of Commissioning	10

SECTION D. TAXES: Contractor shall be solely responsible for timely and correctly billing, collecting and remitting to appropriate State department all NMGRT levied on the amounts payable under this Agreement.

SECTION E. STATUS OF CONTRACTOR, STAFF, AND PERSONNEL: This Agreement calls for the performance of services by Contractor as an independent contractor. Contractor is not an agent or employee of County and will not be considered an employee of County for any purpose. Contractor, its agents or employees shall make no representation that they are County employees, nor shall they create the appearance of being employees by using a job or position title on a name plate, business cards, or in any other manner, bearing County's name or logo. Neither Contractor nor any employee of Contractor shall be entitled to any benefits or compensation other than the compensation specified herein. Contractor shall have no authority to bind County to any agreement, contract, duty or obligation. Contractor shall make no representations that are intended to, or create the appearance of, binding County to any agreement, contract, duty, or obligation. Contractor shall have full power to continue any outside employment or business, to employ and discharge its employees or associates as it deems appropriate without interference from County; provided, however, that Contractor shall at all times during the term of this Agreement maintain the ability to perform the obligations in a professional, timely and reliable manner.

SECTION F. STANDARD OF PERFORMANCE: Contractor agrees and represents that it has and will maintain the personnel, experience and knowledge necessary to qualify it for the particular duties to be performed under this Agreement. Contractor shall perform the Services described herein in accordance with a standard that meets the industry standard of care for performance of the Services.

SECTION G. DELIVERABLES AND USE OF DOCUMENTS: All deliverables required under this Agreement, including material, products, reports, policies, procedures, software improvements, databases, and any other products and processes, whether in written or electronic form, shall remain the exclusive property of and shall inure to the benefit of County as works for hire; Contractor shall not use, sell, disclose, or obtain any other compensation for such works for hire. In addition, Contractor may not, with regard to all work, work product, deliverables or works for hire required by this Agreement, apply for, in its name or otherwise, any copyright, patent or other property right and acknowledges that any such property right created or developed remains the exclusive right of County. Contractor shall not use deliverables in any manner for any other purpose without the express written consent of County.

SECTION H. EMPLOYEES AND SUB-CONTRACTORS: Contractor shall be solely responsible for payment of wages, salary or benefits to any and all employees or contractors retained by Contractor in the performance of the Services. Contractor agrees to indemnify, defend and hold harmless County for any and all claims that may arise from Contractor's relationship to its employees and subcontractors.

SECTION I. INSURANCE: Contractor shall obtain and maintain insurance of the types and in the amounts set out below throughout the term of this Agreement with an insurer acceptable to County. Contractor shall assure that all subcontractors maintain like insurance. Compliance with the terms and conditions of this Section is a condition precedent to County's obligation to pay compensation for the Services and Contractor shall not provide any Services under this Agreement unless and until Contractor has met the requirements of this Section. County requires Certificates of Insurance or other evidence acceptable to County that Contractor has met its obligation to obtain and maintain insurance and to assure that subcontractors maintain like insurance. Should any of the policies described below be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions. General Liability Insurance and Automobile Liability Insurance shall name County as an additional insured.

1. **General Liability Insurance:** ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence; TWO MILLION DOLLARS ($2,000,000.00) aggregate.
2. **Workers' Compensation:** In an amount as may be required by law. County may immediately terminate this Agreement if Contractor fails to comply with the Worker's Compensation Act and applicable rules when required to do so.
3. **Automobile Liability Insurance for Contractor and its Employees:** ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence; TWO MILLION DOLLARS ($2,000,000.00) aggregate on any owned, and/or non-owned motor vehicles used in performing Services under this Agreement.

SECTION J. RECORDS: Contractor shall maintain, throughout the term of this Agreement and for a period of six (6) years thereafter, records that indicate the date, time, and nature of the services rendered. Contractor shall make available, for inspection by County, all records, books of account, memoranda, and other documents pertaining to County at any reasonable time upon request.

SECTION K. APPLICABLE LAW: Contractor shall abide by all applicable federal, state and local laws, regulations, and policies and shall perform the Services in accordance with all applicable laws, regulations, and policies during the term of this Agreement. In any lawsuit or legal dispute arising from the operation of this Agreement, Contractor agrees that the laws of the State of New Mexico shall govern. Venue shall be in the First Judicial District Court of New Mexico in Los Alamos County, New Mexico.

SECTION L. NON-DISCRIMINATION: During the term of this Agreement, Contractor shall not discriminate against any employee or applicant for an employment position to be used in the performance of the obligations of Contractor under this Agreement, with regard to race, color, religion, sex, age, ethnicity, national origin, sexual orientation or gender identity, disability or veteran status.

SECTION M. INDEMNITY: Contractor shall indemnify, hold harmless and defend County, its Council members, employees, agents and representatives, from and against all liabilities, damages, claims, demands, actions (legal or equitable), and costs and expenses, including without limitation attorneys' fees, of any kind or nature, arising from Contractor's performance hereunder or breach hereof and the performance of Contractor's employees, agents, representatives and subcontractors.

SECTION N. FORCE MAJEURE: Neither County nor Contractor shall be liable for any delay in the performance of this Agreement, nor for any other breach, nor for any loss or damage arising from uncontrollable forces such as fire, theft, storm, war, or any other force majeure that could not have been reasonably avoided by exercise of due diligence.

SECTION O. NON-ASSIGNMENT: Contractor may not assign this Agreement or any privileges or obligations herein without the prior written consent of County.

SECTION P. LICENSES: Contractor shall maintain all required licenses including, without limitation, all necessary professional and business licenses, throughout the term of this Agreement. Contractor shall require and shall assure that all of Contractor's employees and subcontractors maintain all required licenses including, without limitation, all necessary professional and business licenses.

SECTION Q. PROHIBITED INTERESTS: Contractor agrees that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its services hereunder. Contractor further agrees that it will not employ any person having such an interest to perform services under this Agreement. No County Council member or other elected official of County, or manager or employee of County shall solicit, demand, accept or agree to accept a gratuity or offer of employment contrary to Section 31-282 of the Los Alamos County Code.

SECTION R. TERMINATION:

1. **Generally**. County may terminate this Agreement with or without cause upon ten (10) days prior written notice to Contractor. Upon such termination, Contractor shall be paid for Services actually completed to the satisfaction of County at the rate set out in Section C. Contractor shall render a final report of the Services performed to the date of termination and shall turn over to County originals of all materials prepared pursuant to this Agreement.
2. **Funding**. This Agreement shall terminate without further action by County on the first day of any County fiscal year for which funds to pay compensation hereunder are not appropriated by County Council. County shall make reasonable efforts to give Contractor at least ninety (90) days advance notice that funds have not been and are not expected to be appropriated for that purpose.

SECTION S. NOTICE: Any notices required under this Agreement shall be made in writing, postage prepaid to the following addresses, and shall be deemed given upon hand delivery, verified delivery by telecopy (followed by copy sent by United States Mail), or three (3) days after deposit in the United States Mail:

County:
Deputy Utility Manager for Engineering
Incorporated County of Los Alamos
1000 Central Avenue, Suite 130
Los Alamos, New Mexico 87544

Contractor:
Thomas A. Levitz Executive Vice President
HPI, LL
15503 West Hardy Road
Houston, Texas 77060

SECTION T. INVALIDITY OF PRIOR AGREEMENTS: This Agreement supersedes all prior contracts or agreements, either oral or written, that may exist between the parties with reference to the services described herein and expresses the entire agreement and understanding between the parties with reference to said services. It cannot be modified or changed by any oral promise made by any person, officer, or employee, nor shall any written modification of it be binding on County until approved in writing by both County and Contractor.

SECTION U. CAMPAIGN CONTRIBUTION DISCLOSURE FORM: A Campaign Contribution Disclosure Form was submitted as part of the Contractor's Response and is incorporated herein by reference for all purposes. This Section acknowledges compliance with Chapter 81 of the Laws of 2006 of the State of New Mexico.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date(s) set forth opposite the signatures of their authorized representatives to be effective for all purposes on the date first written above.

ATTEST

_____

NAOMI D. MAESTAS
COUNTY CLERK

INCORPORATED COUNTY OF LOS ALAMOS

BY:_____

TIMOTHY GLASCO, PE **DATE**
UTILITIES MANAGER

Approved as to form:

_____

J. ALVIN LEAPHART
COUNTY ATTORNEY

HPI, LLC, A TEXAS LIMITED LIABILITY CORPORATION

BY:_____

THOMAS A. LEVITZ **DATE**
EXECUTIVE VICE PRESIDENT

Exhibit A
Compensation Rate Schedule
AGR18-17

No.	DESCRIPTION	PRICE USD
1	Control System Upgrades and Improvements for the Hydro-Turbine Units #1, #2, and #3	$291,600.00
2	Critical Spare Parts	$12,485.00
3	HMI application to run any of the three units	$3,510.00
4	Supply and Install Rockwell FactoryTalk View Studio development software for HMIs	$4,600.00
	TOTAL	**$312,195.00**

Agenda No.:	7.C
Index (Council Goals):	BCC - N/A
Presenters:	James Alarid, Deputy Utilities Manager - Engineering
Legislative File:	**AGR0547-18**

Title
Approval of Services Agreement No. AGR18-20 with Intellibind Technologies, LLC in the amount of $500,000.00, plus Applicable Gross Receipts Tax, for the Purpose of Electric SCADA Comprehensive Patch Management Services

Recommended Action
I move that the Board of Public Utilities approve Services Agreement No. AGR18-20 with Intellibind Technologies, LLC in the amount of $500,000.00, plus applicable gross receipts tax, for the purpose of Electric SCADA Comprehensive Patch Management Services, in a form acceptable to the county attorney, and forward to Council for approval.

Staff Recommendation
Staff recommends that the Board approve as presented.

Body
In July of 2016 new cyber security regulations, North American Electric Reliability Corporation Critical Infrastructure Protection Version 5 (CIP-5), were implemented that apply to the operators of electric transmission lines. The Los Alamos Power Pool comprised of DOE/LANL and Los Alamos County share responsibilities in operating "pool assets". LANL/DOE owns approximately 21 miles of transmission line, triggering the CIP-5 regulations, and the DPU owns and operates the electric Supervisory Controls and Data Acquisition (SCADA) system supporting the pool's electric infrastructure. The CIP-5 regulations apply to the DPU SCADA system.

After operating a year under the new regulations it was apparent that the demands of meeting the compliance requirements was beyond the level of staffing available. The task of investigating software upgrades, identifying security related upgrades and applying these upgrades to dozens of devices under the strict regulatory guidelines is referred to as Patching. Our SCADA Technician is consumed by the patching effort and operational SCADA work has been stacking up. These services to have a contractor provide all aspects of the patching will balance the workload. On average the contractor will work two weeks per month on patching the SCADA system. One week offsite and one week on site.

In December 2017 the first regulatory audit was performed for compliance with CIP Version 5. We received 7 findings related to cyber security deficiencies. The nature of the findings were not flagrant, but this did re-emphasize the need for qualified subject matter expert support to meet

compliance with CIP version 5. Intellibind's strength is their experience and depth of qualified personnel supporting electric utilities to meet CIP Version 5 compliance.

Three proposals were received and the County's evaluation team found Intellibind to be the best qualified to provide these services.

Alternatives

There is no alternative to hiring outside services to meet the cyber security requirements imposed by the recent regulatory requirements and operational requirements .

Fiscal and Staff Impact

The cost of these services will be paid 20% by DPU and 80% by the DOE/LANL.

Attachments

A - AGR18-20

LOS ALAMOS

INCORPORATED COUNTY OF LOS ALAMOS
SERVICES AGREEMENT

This **SERVICES AGREEMENT** ("Agreement") is entered into by and between the **Incorporated County of Los Alamos**, an incorporated county of the State of New Mexico ("County"), and **Intellibind Technologies, LLC**, a Nevada limited liability corporation ("Contractor"), to be effective for all purposes January 31, 2018.

WHEREAS, the County Purchasing Agent determined in writing that the use of competitive sealed bidding was either not practical or not advantageous to County for procurement of the Services and County issued Request for Proposals No. 18-20 (the "RFP") on October 29, 2017, requesting proposals for Critical Infrastructure Protection ("CIP") Version 5 Comprehensive Patch Management Services, as described in the; and

WHEREAS, Contractor timely responded to the RFP by submitting a response dated November 30, 2017 ("Contractor's Response"); and

WHEREAS, based on the evaluation factors set out in the RFP, Contractor was the successful Offeror for the services listed in the RFP; and

WHEREAS, the County Council approved this Agreement at a public meeting held on January 30, 2018; and

WHEREAS, Contractor will provide the Services, as described below, to County.

NOW, THEREFORE, for and in consideration of the premises and the covenants contained herein, County and Contractor agree as follows:

SECTION A. SERVICES:

1. **Scope of Work:**
   a. **Purpose.** The purpose of this agreement is for Contractor to provide to County professional services to include the monthly patch assessment and monthly installation of device patches and updates on the Incorporated County of Los Alamos, Department of Public Utilities owned Electric Supervisory Control and Data Acquisition (SCADA) System. Contractor deliverables are provided below in bracketed bold text.
   b. Contractor agrees and understands that the work to be performed shall be completed in accordance with RFP 18-20, and Contractor's proposal (incorporated herein by reference). The Services shall include patching the various devices associated with the Incorporated County of Los Alamos Department of Public Utilities ("DPU") owned Electric Supervisory Control and Data Acquisition System ("SCADA") system located at the primary and back-up power operation centers. Contractor shall be responsible for all aspects of patch management of the SCADA system, shall comply with applicable Critical Infrastructure Protection Version 5 ("CIP 5") requirements in performance of such work, shall comply with applicable County and Los Alamos

National Laboratory CIP procedures, and shall prepare all required evidence required by applicable CIP regulations.

2. Project Kickoff:

a. Contractor shall meet with the County team in Los Alamos, and perform all administrative tasks required to gain access to systems and facilities, which shall include required CIP training and Personnel Risks Assessments ("PRA"s). Contractor shall retain dates for these activities and ensure that required updates to training (every 15 months) and PRA (every 7 years) are met to maintain access.
b. Contractor shall review the scope on Cyber Assets, associated baselines and patch sources. If anomalies are discovered, Contractor shall discuss with County personnel to adjust and eliminate the anomalies. County shall provide any current Open Enforcement Actions ("OEA") and mitigation plans in place that affect the Contractor's Services.
c. Contractor shall use the knowledge gained from participating in Western Electricity Coordinating Council ("WECC") CIP audits and in performing CIP audits when validating the information.
d. Contractor shall receive training on systems, such as Change Management, that will be used when performing required tasks.
e. It is understood that Cyber Assets means cyber assets identified under the CIP program including BES Cyber Assets, Protected Cyber Assets ("PCA"s), Electronic Access Control and Monitoring devices ("EACM"s) and devices that are part of any CIP Physical Access Control system ("PAC"s).

3. Monthly Patch Management Tracking

a. Contractor shall review all changes to the baselines for all assets that have occurred since the last assessment and determine whether the patch source list must be modified to add new patch sources. Contractor shall provide to County within 7_days of the review and assessment a Baseline Review Report. **(Deliverable: Baseline Review Report.).**
b. Contractor shall add new patch sources where required, or provide its recommendation or explanation of alternative patches or software to make the System compliant with current regulations. Contractor shall provide a detailed report detailing the current software and installed or necessary software patches to County including, where or if applicable, the Contractor's proposed alternative patches, recommendations, or proposed System alternatives. **(Deliverable: Current Patch Source List).**
c. For each System patch source, Contractor shall review all patches for applicability since the last review of the patch source. A patch shall be determined to be applicable if:

    i. It applies to devices on the Cyber Asset Inventory; and
    ii. Is a security related patch.

d. Contractor shall electronically maintain a master workbook with a separate tab for each patch source. Each patch source shall show the review date for that patch source and the list of applicable patches reviewed on that date. Other information shall be maintained as identified in the RFP Monthly Patch Assessment section, item 5a to 5f. **(Deliverable: Updated patch assessment workbook showing all patch sources reviewed and the applicable patches identified.).**
e. Contractor shall contact the cyber asset owners to plan appropriate dates and times to install the identified security patches. Where the planned installation dates exceed or approach the 35-day limit for installation, Contractor shall provide to County a dated mitigation plan identifying the planned dates for installation. Contractor planned patching shall occur first to off-line Systems first, then back-up power operation center Systems, and finally the primary operation center Systems. **(Deliverable: Installation plan for each patch/cyber asset, mitigation plans where appropriate.).**
f. Contractor shall initiate change orders in the County change management system using the dates agreed with the cyber asset owners or the dates documented in any mitigation plan. Contractor will provide a copy of all completed change orders for each group of patches or group of assets as appropriate, ensuring all required patches are applied **(Deliverable: Completed change orders for each group of patches or group of assets as appropriate, ensuring all required patches are applied.).**
g. Summary of Monthly Deliverables, Monthly Patch Tracking:

   i. Baseline Review Report;
   ii. Current Patch Source List;
   iii. Updated patch assessment workbook showing all patch sources reviewed and the applicable patches identified;
   iv. Installation plan for each patch/cyber asset, mitigation plans where appropriate; and
   v. Completed change orders for each group of patches or group of assets as appropriate, ensuring all required patches are applied.

4. Monthly Patch Installation:

a. Contractor shall coordinate with County staff when patching devices. Contractor shall follow the patch agreed schedule documented in the change management work order.
b. Contractor shall install security patches associated with approved change orders for the timeframe/schedule being implemented in accordance with the county approved change order.
c. When patching systems, Contractor shall use, complete, and provide a copy to the County of the standard validation plan worksheet to document the CIP-005 and CIP-007 controls that may be affected by the specific change. Network accessible ports will always be the minimum control validated. **(Deliverable: Validation plan sheet for CIP-005 and CIP-007 controls).**
d. Contractor shall use tools agreed upon in a pre-change baseline report with County staff to document the baseline prior to the change. This may take the form of command output, data retained in tools or text files of configurations, such as Cisco configurations or similar. These shall be used in performing required validations and

for determining the updates to baselines. **(Deliverable: Documentation of pre-change baselines.).**

e. Contractor shall validate and provide a complete report to County of each patch as being a legitimate patch from the patch or Cyber Asset source or manufacturer as required pursuant to the new North American Electric Reliability Corporation ("NERC") Supply Chain Management requirements. **(Deliverable: Worksheets validating that patches to be applied are genuine patches from the vendor)**

f. Contractor shall install the patches associated with each change order and update the change documentation as appropriate. **(Deliverable: Updated change order.).**

g. Contractor shall perform the controls validation required for change management and documented in the Validation plan sheet for CIP-005 and CIP-007 controls. Contractor shall provide to County the Validation results for CIP-005 and CIP-007 controls. **(Deliverable: Validation results for CIP-005 and CIP-007 controls.).**

h. Contractor shall validate completion of the change order with County staff and close out the change order. On completion, Contractor shall provide to County all change documentation and closeouts. **(Deliverable: Change documentation completed and closed out change order.).**

i. Contractor shall update the baselines immediately upon completion of the change or while the change is in progress. The security patch update baseline will be updated at a minimum. **(Deliverable: Updated Baselines.).**

j. In addition to logging in the change management system, Contractor shall maintain a patch implementation log showing cyber assets patched, the patches applied, dates of assessment and application, whether a mitigation plan was used, and any other necessary comments. **(Deliverable: Patch Implementation Log.).**

k. Summary of Deliverables, Patch Installation:

   i. Validation plan sheet for CIP-005 and CIP-007 controls;
   ii. Documentation of pre-change baselines;
   iii. Worksheets validating that patches to be applied are genuine patches from the vendor;
   iv. Updated change order;
   v. Validation results for CIP-005 and CIP-007 controls;
   vi. Change documentation completed and closed out change order;
   vii. Updated Baselines; and
   viii. Patch Implementation Log.

5. Monthly Reporting:

a. In addition to the deliverables above, Contractor shall provide to the County's Project Manager a monthly summary of activities including number of patch sources monitored, number of applicable patches identified, patches applied, patches outstanding, mitigation plans in progress. County and Contractor shall agree on other data that may be supplied in the monthly summary report.

b. Using the monthly deliverables outlines in the Patch Management Tracking Section and Patch Installation Section, Contractor shall meet the requirements to "provide a comprehensive monthly report to County demonstrating patching activities, including

but not limited to WinAudit files where applicable and screen captures for the prior month. Reports shall contain all required content, to the level of detail required to demonstrate compliance with all SCADA patching required by CIP Version 5 regulations." **(Deliverable: Monthly patch management activity summary report.)**

6. **North American Electric Reliability Corporation (NERC) Audit Support:**

   a. Contractor shall maintain documentation of patch assessments and patching performed for the County on an ongoing basis that is "audit ready." For example, each patch source shall clearly show that no assessment interval exceeds thirty-five (35) days. Contractor shall show through the worksheets that patch sources were updated as required by changes to the baselines (new cyber assets, new applications, and new vendors).
   b. Contractor shall write the Reliability Standards Audit Worksheet (RSAW) narratives and shall create direct, complete RSAWs and associated evidence. As related to CIP-007-6 R2, RSAWs and evidence prepared by Contractor shall result in NERC auditors determination of "No Data Requests", indicative of meeting compliance with applicable CIP standards.
   c. Contractor shall make personnel available, in Los Alamos and offsite, during CIP compliance audits performed by NERC for data requests and interviews as Subject Matter Experts ("SME"s). Contractor's personnel will be CIP enforcement auditors experienced in CIP compliance audits.

SECTION B. TERM: The term of this Agreement shall commence January 31, 2018 and shall continue through January 31, 2020, unless sooner terminated, as provided herein. At County's sole option the Agreement may be renewed for up to three (3) consecutive one-year periods, unless sooner terminated, as provided therein.

SECTION C. COMPENSATION:

1. **Amount of Compensation**. County shall pay compensation for performance of the Services in an amount not to exceed FIVE HUNDRED THOUSAND DOLLARS ($500,000.00), which amount does not include applicable New Mexico gross receipts taxes ("NMGRT"), but does include compensation for reimbursable expenses. Compensation shall be paid in accordance with the rate schedule set out in Exhibit "A," attached hereto and made a part hereof for all purposes.
2. **Monthly Invoices**. Contractor shall submit itemized monthly invoices to County's Project Manager showing amount of compensation due, amount of any NMGRT, and total amount payable. Payment of undisputed amounts shall be due and payable thirty (30) days after County's receipt of the invoice.

SECTION D. TAXES: Contractor shall be solely responsible for timely and correctly billing, collecting and remitting all NMGRT levied on the amounts payable under this Agreement.

SECTION E. STATUS OF CONTRACTOR, STAFF, AND PERSONNEL: This Agreement calls for the performance of services by Contractor as an independent contractor. Contractor is not an agent or employee of County and will not be considered an employee of County for any purpose.

Contractor, its agents or employees shall make no representation that they are County employees, nor shall they create the appearance of being employees by using a job or position title on a name plate, business cards, or in any other manner, bearing County's name or logo. Neither Contractor nor any employee of Contractor shall be entitled to any benefits or compensation other than the compensation specified herein. Contractor shall have no authority to bind County to any agreement, contract, duty or obligation. Contractor shall make no representations that are intended to, or create the appearance of, binding County to any agreement, contract, duty, or obligation. Contractor shall have full power to continue any outside employment or business, to employ and discharge its employees or associates as it deems appropriate without interference from County; provided, however, that Contractor shall at all times during the term of this Agreement maintain the ability to perform the obligations in a professional, timely and reliable manner.

SECTION F. STANDARD OF PERFORMANCE: Contractor agrees and represents that it has and will maintain the personnel, experience and knowledge necessary to qualify it for the particular duties to be performed under this Agreement. Contractor shall perform the Services described herein in accordance with a standard that meets the industry standard of care for performance of the Services.

SECTION G. DELIVERABLES AND USE OF DOCUMENTS: All deliverables required under this Agreement, including material, products, reports, policies, procedures, software improvements, databases, and any other products and processes, whether in written or electronic form, shall remain the exclusive property of and shall inure to the benefit of County as works for hire; Contractor shall not use, sell, disclose, or obtain any other compensation for such works for hire. In addition, Contractor may not, with regard to all work, work product, deliverables or works for hire required by this Agreement, apply for, in its name or otherwise, any copyright, patent or other property right and acknowledges that any such property right created or developed remains the exclusive right of County. Contractor shall not use deliverables in any manner for any other purpose without the express written consent of County.

SECTION H. EMPLOYEES AND SUB-CONTRACTORS: Contractor shall be solely responsible for payment of wages, salary or benefits to any and all employees or contractors retained by Contractor in the performance of the Services. Contractor agrees to indemnify, defend and hold harmless County for any and all claims that may arise from Contractor's relationship to its employees and subcontractors.

SECTION I. INSURANCE: Contractor shall obtain and maintain insurance of the types and in the amounts set out below throughout the term of this Agreement with an insurer acceptable to County. Contractor shall assure that all subcontractors maintain like insurance. Compliance with the terms and conditions of this Section is a condition precedent to County's obligation to pay compensation for the Services and Contractor shall not provide any Services under this Agreement unless and until Contractor has met the requirements of this Section. County requires Certificates of Insurance or other evidence acceptable to County that Contractor has met its obligation to obtain and maintain insurance and to assure that subcontractors maintain like insurance. Should any of the policies described below be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions. General Liability Insurance and Automobile Liability Insurance shall name County as an additional insured.

1. **General Liability Insurance:** ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence; TWO MILLION DOLLARS ($2,000,000.00) aggregate.

2. **Workers' Compensation:** In an amount as may be required by law. County may immediately terminate this Agreement if Contractor fails to comply with the Worker's Compensation Act and applicable rules when required to do so.
3. **Automobile Liability Insurance for Contractor and its Employees:** ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence; TWO MILLION DOLLARS ($2,000,000.00) aggregate on any owned, and/or non-owned motor vehicles used in performing Services under this Agreement.

SECTION J. RECORDS: Contractor shall maintain, throughout the term of this Agreement and for a period of six (6) years thereafter, records that indicate the date, time, and nature of the services rendered. Contractor shall make available, for inspection by County, all records, books of account, memoranda, and other documents pertaining to County at any reasonable time upon request.

SECTION K. APPLICABLE LAW: Contractor shall abide by all applicable federal, state and local laws, regulations, and policies and shall perform the Services in accordance with all applicable laws, regulations, and policies during the term of this Agreement. In any lawsuit or legal dispute arising from the operation of this Agreement, Contractor agrees that the laws of the State of New Mexico shall govern. Venue shall be in the First Judicial District Court of New Mexico in Los Alamos County, New Mexico.

SECTION L. NON-DISCRIMINATION: During the term of this Agreement, Contractor shall not discriminate against any employee or applicant for an employment position to be used in the performance of the obligations of Contractor under this Agreement, with regard to race, color, religion, sex, age, ethnicity, national origin, sexual orientation or gender identity, disability or veteran status.

SECTION M. INDEMNITY: Contractor shall indemnify, hold harmless and defend County, its Council members, employees, agents and representatives, from and against all liabilities, damages, claims, demands, actions (legal or equitable), and costs and expenses, including without limitation attorneys' fees, of any kind or nature, arising from Contractor's performance hereunder or breach hereof and the performance of Contractor's employees, agents, representatives and subcontractors.

SECTION N. FORCE MAJEURE: Neither County nor Contractor shall be liable for any delay in the performance of this Agreement, nor for any other breach, nor for any loss or damage arising from uncontrollable forces such as fire, theft, storm, war, or any other force majeure that could not have been reasonably avoided by exercise of due diligence.

SECTION O. NON-ASSIGNMENT: Contractor may not assign this Agreement or any privileges or obligations herein without the prior written consent of County.

SECTION P. LICENSES: Contractor shall maintain all required licenses including, without limitation, all necessary professional and business licenses, throughout the term of this Agreement. Contractor shall require and shall assure that all of Contractor's employees and subcontractors maintain all required licenses including, without limitation, all necessary professional and business licenses.

SECTION Q. PROHIBITED INTERESTS: Contractor agrees that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with

the performance of its services hereunder. Contractor further agrees that it will not employ any person having such an interest to perform services under this Agreement. No County Council member or other elected official of County, or manager or employee of County shall solicit, demand, accept or agree to accept a gratuity or offer of employment contrary to Section 31-282 of the Los Alamos County Code.

SECTION R. TERMINATION:

1. **Generally**. County may terminate this Agreement with or without cause upon ten (10) days prior written notice to Contractor. Upon such termination, Contractor shall be paid for Services actually completed to the satisfaction of County at the rate set out in Section C. Contractor shall render a final report of the Services performed to the date of termination and shall turn over to County originals of all materials prepared pursuant to this Agreement.
2. **Funding**. This Agreement shall terminate without further action by County on the first day of any County fiscal year for which funds to pay compensation hereunder are not appropriated by County Council. County shall make reasonable efforts to give Contractor at least ninety (90) days advance notice that funds have not been and are not expected to be appropriated for that purpose.

SECTION S. NOTICE: Any notices required under this Agreement shall be made in writing, postage prepaid to the following addresses, and shall be deemed given upon hand delivery, verified delivery by telecopy (followed by copy sent by United States Mail), or three (3) days after deposit in the United States Mail:

County:
Deputy Utilities Manager
Incorporated County of Los Alamos
1000 Central Avenue, Suite 130
Los Alamos, New Mexico 87544

Contractor:
Bill Addington, CEO
Intellibind Technologies, LLC
14520 Wunderlich Drive
Houston, Texas 77069

SECTION T. INVALIDITY OF PRIOR AGREEMENTS: This Agreement supersedes all prior contracts or agreements, either oral or written, that may exist between the parties with reference to the services described herein and expresses the entire agreement and understanding between the parties with reference to said services. It cannot be modified or changed by any oral promise made by any person, officer, or employee, nor shall any written modification of it be binding on County until approved in writing by both County and Contractor.

SECTION U. CAMPAIGN CONTRIBUTION DISCLOSURE FORM: A Campaign Contribution Disclosure Form was submitted as part of the Contractor's Response and is incorporated herein by reference for all purposes. This Section acknowledges compliance with Chapter 81 of the Laws of 2006 of the State of New Mexico.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date(s) set forth opposite the signatures of their authorized representatives to be effective for all purposes on the date first written above.

ATTEST

_____

NAOMI D. MAESTAS
COUNTY CLERK

INCORPORATED COUNTY OF LOS ALAMOS

BY:_____

TIMOTHY A. GLASCO, PE **DATE**
UTILITIES MANAGER

Approved as to form:

_____

J. ALVIN LEAPHART
COUNTY ATTORNEY

INTELLIBIND TECHNOLOGIES, LLC, A NEVADA LIMITED LIABILITY CORPORATION

BY:_____

BILL ADDINGTON **DATE**
CEO

Exhibit “A”
Compensation Rate Schedule
AGR18-20

Hourly Rate Schedule in US Dollars ($) per sixty (60) minute hour:

Job Title	Rate Year 1	Rate Year 2	Rate Year 3	Rate Year 4
CIP Project Lead	210	210	220	220
CIP Compliance Support	210	210	220	220
System Analyst	190	190	200	200
QA Support/Documentation	140	140	150	150

Contractor shall not charge for travel time where it will cause hours to exceed forty (40) hours per week onsite.

Reimbursables:

1. Flights paid at cost.

2. Lodging, meals and incidentals paid at current Federal GSA daily rates for Los Alamos, New Mexico (https://www.gsa.gov/travel/plan-book/per-diem-rates/per-diem-rates-lookup).

3. Car rental at Thirty-Five Dollars ($35.00) per day, (no additional charges for airport parking or mileage).

The above are the only allowed reimbursables for the Agreement Services.

County of Los Alamos
Staff Report
January 17, 2018

Los Alamos, NM 87544
www.losalamosnm.us

Agenda No.:	8.A
Index (Council Goals):	BCC - N/A
Presenters:	Bob Westervelt, Deputy Utilities Manager - Finance/Admin
Legislative File:	**AGR0545-18**

Title
Approval of Services Agreement No. AGR17-32 with Anixter Incorporated in the amount of $4,974,717.00, plus Applicable Gross Receipts Tax, for the Purpose of Advanced Metering Infrastructure (AMI) Equipment and Services

Recommended Action
I move that the Board of Public Utilities approve Services Agreement AGR17-32 with Anixter Incorporated in the amount of $4,974,717.00, plus applicable gross receipts tax, and forward to Council for approval. I further move that the Board approve budget revision 2018-07 to properly distribute existing budget authority between the Water, Gas, and Electric funds according to the final project plan, and forward to Council for approval.

Staff Recommendation
Staff recommends that the Board approve as presented.

Body
This contract is for equipment, supplies, installation, software, and project management services for implementation of a system wide advanced metering infrastructure (AMI). The system will provide accurate, near real time read capability for electric, water, and gas services for DPU customers.

BACKGROUND: DPU began considering implementation of AMI several years ago as the capabilities of the available systems improved in response to the development of more complex pricing models which began to emerge, primarily in the electric industry, in the early 2000s. The DPU conducted a pilot deployment as part of the NEDO Project in 2012 through 2014. While the project was limited in scope and distribution, the Department did learn and realize the impact advanced metering could have on our systems and business model, and made the strategic decision to explore the business case for system wide deployment. In 2015 the Department engaged Power Systems Engineering, a consulting firm specializing in electric grid modernization and utilities metering systems, to conduct a business case analysis for full implementation of advanced metering in all of the metered services (electric, gas, and water), system wide. The study identified both economic benefits and non-economic benefits, both of which have been considered in the decision to move forward. Only considering the economic

benefits, the analysis indicated a fourteen-year payback for a representative system. Excerpts from the PSE report are included as attachment C to this staff report.

In 2016 the DPU issued RFP 2016-2031 for system wide deployment of Advance Metering Infrastructure. This was in about the same time as the County's ERP project was being competed and moving forward, and in order to better coordinate the two projects the decision was made to postpone the AMI project, so that RFP was cancelled. We reissued the RFP in late 2016 as a multi-step procurement.

PROJECT OBJECTIVES: System wide deployment of advanced metering offers many benefits to customers of the DPU.

- More accurate metering. While some customers may see increases in their bills, this is a result of more accurate metering. It is important to remember that any consumption that is not metered simply adds to the "socialized cost of doing business". More accurate metering yields the result that those customers using the metered commodities pay for them, rather than some portion of their consumption being spread to all customers.
- Reduced Meter reading costs. The five-person crew of meter readers, plus equipment and vehicles, will no longer be required. The department has been working with affected personnel to transition them into other vacancies as they materialize. We also anticipate that one or two "metering technicians" will be required to manage the metering system, but the net result is anticipated reduction of staffing by three to four FTE's upon full system implementation.
- Reduced billing costs. Again, because of the constraints of manually reading meters, the billing is required to be handled in 22 separate read cycles. The billing staff runs billing essentially every business day of the month. With full deployment of advanced metering, we will be able to establish more efficient billing schedules.
- Reduced costs for turn on/turn offs, move in/move outs, rereads, and other account management issues. For example, when a customer comes in with a question about their readings, the customer service representative can "ping" the meter real time, right then and there, and get an accurate reading to correct or confirm the billing in question. This functionality has been in place in the pilot project deployment area for two years or more, and has proven to be extremely useful and reliable for resolving billing disputes or errors.
- Two way communications. The system provides for true two-way communications, so customers can be notified of service events or issues by way of an in-home display, SMS message, or mobile app.
- Real time leak detection and notification. All three meters can be set to monitor and detect potential leaks. If consumption is registered constantly for a defined period of time, notice can automatically be generated to the Utility or the customer advising them of a possible leak. This can save customers thousands of dollars in consumption and potential damages, compared to not being aware of the abnormal consumption until their next regular read and billing cycle.
- Customers can also monitor their consumption and realize savings by managing their consumption real time. If you only get your consumption information in monthly totals and only once per month, it is harder to recognize and take advantage of incremental

opportunities for savings.

- Functionality of the Smart Customer Mobile app, is realized. We implemented the customer mobile application last year, but with only limited functionality, as many of the capabilities and features require real time, or at least incremental reads, to be fully realized.
- Improved outage management. Through advanced metering, the Utility can be notified of actual or impending outages, and may be able correct the situation, often before customers are even aware that an event was occurring. Engineers can also monitor the system and determine the exact scope of an outage, and can monitor restoration efforts.
- Advanced rate design. There are many exciting rate options that can improve system reliability, reduce costs system wide, and save individual customers money, all facilitated by the advanced metering's measurement of incremental consumption. For example, demand response programs can be initiated, allowing customers to choose to shift their consumption to lower cost non-peak periods.
- Account management is improved. For example, Account Prepay can be enabled, allowing a customer to pay in advance, and notifying that customer as available funds reach predetermined thresholds. This allows the customer to make real time decisions as to whether to curtail consumption. This is especially helpful to households that have trouble keeping up with their bills.

SELECTION PROCESS: Award was through a multi-step competitive process. Power Systems Engineering remained under contract to assist with the procurement, and provided consulting expertise on requirements definition, scoring criteria and weighting, coordination of offeror inquiries, and evaluation of proposals. Step one invited proposals from qualified offerors in response to a defined set of requirements and scoring criteria. Eight proposals were received and reviewed. The top three, based on the criteria specified in the Step One Solicitation, were invited to participate in Step Two, which included additional specified written responses and an on-site product demonstration, following a defined demonstration script. Anexter was selected based on criteria specified in the step two solicitation.

PRIVACY OR HEALTH CONCERNS: In some areas of the US, citizens have expressed concern over having "smart meters" installed at their properties. The concern most often expressed relates to having RF transmissions in close proximity to the customer's domicile and any potential subsequent health impacts. This health concern has been studied and the extremely low power of the RF transmission from meters has not been shown to have any adverse health effects. The other most common concern heard relates to the potential for loss of privacy should someone be able to access the data from a customer's meter. All AMI systems that would be considered have extremely advanced data encryption and security protocols. No instance has yet, to our knowledge, occurred where anyone has hacked into a smart meter data transmission and used the information for nefarious purposes. More information on these issues and links to relevant and credible studies are posted on the DPU website.

Alternatives

If the Board does not approve this service agreement the DPU will continue metering and billing

with existing meters and processes and would seek other, potentially less effective methods to realize the cost savings and service and reliability enhancements the project provides.

Fiscal and Staff Impact

The project involves an initial cash outlay of approximately $4.9M and continuing annual operating costs of approximately $100k. It is anticipated that the meter reading function, currently a crew of five FTE's, will be eliminated, but would be replaced by a Metering Technician function of one or two FTE's. With reductions in system loses due to more accurate metering, reduction in account costs due to the ability to service meters and accounts remotely rather than having to dispatch a crew, and improved outage and restoration management, the expected fiscal payback (economic breakeven point) for the system is fourteen years. There are also significant operational benefits that do not have direct fiscal or staffing impacts, as discussed in the Body of this report.

Attachments

A - Services Agreement AGR17-32 and Exhibits as noted therein
B - Budget revision 2018-07 - Advanced Metering Infrastructure
C - Excerpts from Business Case Study performed August 2015
D - Nexgrid Solution Overview

LOS ALAMOS

INCORPORATED COUNTY OF LOS ALAMOS
SERVICES AGREEMENT

This **SERVICES AGREEMENT** ("Agreement"), effective as of January 31, 2018 (the "Effective Date") is entered into by and between the **Incorporated County of Los Alamos**, an incorporated county of the State of New Mexico ("County"), and **Anixter Inc**., a Delaware corporation ("Contractor"), authorized to do business in the State of New Mexico, referred to herein each as "Party" or collectively as "Parties."

WHEREAS, the County Purchasing Agent determined in writing that the use of competitive sealed bidding was either not practical or not advantageous to County for procurement of the Services and County issued Request for Proposals No. 17-32 ("RFP") on January 25, 2017, requesting proposals for Advanced Metering Infrastructure ("AMI"), as described in the RFP; and

WHEREAS, Contractor timely responded to the RFP by submitting a response dated March 14, 2017 ("Contractor's Response"); and

WHEREAS, based on the evaluation factors set out in the RFP, Contractor was the successful Offeror for the services listed in the RFP; and

WHEREAS, the Board of Public Utilities approved this Agreement at a public meeting held on January 17, 2018; and

WHEREAS, the County Council approved this Agreement at a public meeting held on January 30, 2018; and

WHEREAS, Contractor shall provide the Services, as described below, to County.

NOW, THEREFORE, for and in consideration of the premises and the covenants contained herein, County and Contractor agree as follows:

SECTION A. SERVICES:

1. **Purpose**. The purpose of this Agreement between the Parties is for Contractor to procure, deliver install and make functional in accordance with the requirements set forth herein (collectively, the "Services") the public utility metering parts, supplies, equipment ("AMI Equipment") and Software (as defined herein) necessary to allow County to remotely monitor and collect County utility customer billing information for gas, water and electric services through the use of the AMI Equipment ("Project"). The combination of AMI Equipment, Software and Services that will be acquired hereunder by County from Contractor and any required third parties shall collectively be referred to as the "System." The Project is to automate the reading of gas, water, and electric meters throughout the utility system pursuant to the parameters provided in the RFP and as proposed and accepted by County in the Contractor's proposal ("Proposal"). The Project is divided into several key stages which begins with a Pilot Test installation and testing of Contractor's supplied parts and services. Once the pilot phase of the installation is completed, tested,

and approved by County, County shall then issue to Contractor, authorization to proceed with installation of the remaining metering parts, supplies and installation services. The specific Project related deliverables, schedules, deadlines, and mutual responsibilities of the Parties are more fully provided below. **IT IS SPECIFICALLY UNDERSTOOD AND AGREED BY THE PARTIES THAT THIS IS A PERFORMANCE AGREEMENT AND THAT CONTRACTOR OR ITS SUPPLIER SHALL BE RESPONSIBLE FOR ANY AND ALL SERVICES, SOFTWARE, SUPPORT, AND EQUIPMENT NECESSARY TO DELIVER TO COUNTY A FULLY FUNCTIONAL AND OPERATIONAL ADVANCED METERING INFRASTRUCTURE ("AMI") PROJECT, SUBJECT TO ONLY THE EXPRESSED LIMITATIONS IDENTIFIED IN CONTRACTOR'S PROPOSAL, INCORPORATED BY REFERENCE HERE, AND THIS AGREEMENT.** The Agreement and exhibits, where attached hereto or included by reference ("Contract Documents") are complementary; what is required by one is as binding as if required by all. It is the intent of Agreement to describe a functionally complete project to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to County. Any required repairs or replacements of Meter Bases shall be the responsibility of County. Any electrical work required to energize Nexgrid network equipment (e.g. transformer, cable drop) shall be the responsibility of County. Any maintenance or repairs required of water and gas meters and pits/cans shall be the responsibility of County.

2. **Project Schedule and Implementation.** As provided in the Request for Proposal and Response to the Proposal by Contractor, both incorporated by reference herein, **Exhibit "A"** is the target schedule, order, and estimated general length of work to be performed ("Services") by Contractor for the Project. The Project's detailed listing of Services and AMI Equipment to be provided by Contractor to County pursuant to this Agreement, including the agreed upon costs for each of the AMI Equipment and Services, are attached hereto and included herein as **Exhibit "B."** The respective controlling duties, obligations, and responsibilities of County and Contractor ("Responsibility Matrix") is attached hereto as **Exhibit "C."**

   a. **Phase 1. Equipment Purchase, Installation, Pilot Test, and Full Implementation.** As provided in the RFP (including required operating and performance goals) and Contractor's Proposal, included herein by reference, Contractor shall schedule a Project Kick-Off meeting onsite with County within thirty (30) days of the effective date of this Agreement, or as may be mutually agreed by the Parties. During the Kick-off meeting, Contractor shall, while onsite, provide to County Project staff a proposed Project schedule, including dates and activities, including delivery of any necessary Pilot/Phase 1, meters, relays, modules, etc. The proposed Project schedule shall be in general conformity to **Exhibit "A"** using the Services and AMI Equipment outlined in **Exhibit "B."**

   b. After receiving input from County staff, within thirty (30) days from the onsite meeting, or as may be agreed to in writing by the Contractor and County's Project Manager, Contractor shall then deliver to County a final and detailed Project Implementation plan ("Project Plan"). Contractor shall only proceed with the Project Plan at the written authorization from the County's designated Project Manager.

c. The proposed and final approved Project Plan shall include all required County revisions and requirements of this Agreement, the RFP, and Contractor Proposal. The Project plan shall also include a map of the coverage area for the Project.

3. **Software Licensing & Support Services.** As part of the Project, Contractor's supplier, Nexgrid, LLC ("Nexgrid"), shall license to County the use of proprietary enterprise and end-user software ("Software") through a Software License Agreement and provide Software support and maintenance through a Professional Services and Support Agreement, both between Nexgrid and County. Attached hereto as **Exhibit "D"** is Contractor's agent ("Nexgrid") executed Software License Agreement ("Licensing Agreement"). Contractor further agrees and warrants that any Software it or its supplier provides, including network components, shall perform according to the RFP and Proposal. Contractor further agrees and warrants that:

   a. The Software fully meets the functionality requirements as provided in County's RFP and Contractor's Response.

   b. Contractor shall directly bill County for the one-time License fee(s) and is responsible for remitting fees to Nexgrid or agent for the Software.

   c. Contractor agrees that in case of a breach, dispute, or cancellation by and between Nexgrid and County of the License Agreement, Contractor shall within thirty (30) days of receiving written notice by County, provide a commercially available product of equal or same use and value to County for the remainder of the Term of the Agreement.

   d. Any replacement software provided to County by Contractor shall meet the required RFP and Proposal parameters.

   e. Contractor, in providing any replacement Software, shall provide at no cost to County, all costs in downloading, replacing, transferring, recoding, reformatting, or uploading any County data to the new Software.

   f. Contractor specifically agrees that it shall fully indemnify County for any action arising from a dispute by and between Nexgrid and County, but such indemnity shall not cover any claim arising from County's breach of any copyright, license, or similar negligent act of and in the use of the Licensed Software.

4. **General Project Terms and Conditions**.

   a. **Metering and Modules**. Contractor, through its suppliers, shall provide all AMI Equipment ordered by County for automated meter reading, remote administration, and outage management of the gas, water, and electric systems in Los Alamos for Phase 1-Pilot. Phase 1-Pilot will require Contractor to install the Project AMI equipment and meters at a minimum of approximately 330 homes in the White Rock area as provided in the RFP, Section 3, Deployment Plan.

   b. Contractor or its supplier, shall develop and make operational, EDS clusters, ecoOne and intelaHome provisioning, and ensure MultiSpeak/Data exchange is enabled and operational.

   c. Contractor shall be responsible for the shipping, receiving, delivery and storage of the Project meters, modules, parts, and supplies during Phase 1 and Phase 2 of the Project. All new meters and equipment/AMI modules shall be warehoused, stored, and delivered at the sole costs and responsibility of Contractor. County shall provide limited "staging" and/or storage of delivered equipment as needed for immediate as needed within one

(1) week deployment. Any County meters, parts, components, or system items removed or replaced as part of the Project by Contractor or their suppliers, employees, or subcontractors shall be returned to County for storage and final disposal at County's expense in accordance with State and local laws, policies, and regulations.

d. Contractor shall be responsible for ensuring that any installation crew(s) are properly licensed for the Services being performed. Electric meter change outs will be according to the change out process described in the Proposal.

e. As provided in the Responsibility Matrix attached hereto as **Exhibit "C,"** County shall install the various network emitters, repeaters, and other network parts (*i.e.*, ecoNet gateways) on street lights where suitable mounts are available and shall install mounts and gateways at other County locations as determined necessary by Contractor to achieve coverage commitments specified in proposal. County understands and agrees, however, that Contractor's pricing is on an "all or none" basis and will not be reduced to account for any partial installation by County of such emitters, repeaters or other network parts. If during the course of the project additional quantities of network equipment installations are identified as required, said installations will be performed by County or by Anixter at commercially reasonable pricing to be negotiated at that time.

f. Contractor or its supplier shall provide onsite training to County staff on the installation, System maintenance and management, remote/real time operation, customer interface, and all System functionality described in Proposal and subsequent on-site demonstration.

g. Time for Performance.

   i. Contractor shall use commercially reasonable efforts to perform the Services and complete the Project within the times set forth on **Exhibits "A"** and herein. County understands and agrees that the ability of Contractor to make such deliveries and provide such Service within such times is dependent upon the timely issuance of purchase orders by County (if required) and the timely performance of County's obligations hereunder, and County agrees that it shall use commercially reasonable efforts to cause County personnel to perform their respective obligations in a timely fashion and to reasonably cooperate with Contractor.

   ii. Neither Party shall be liable to the other for failure or delay in performance of a required obligation if such failure or delay is caused by an act or omission of the other Party or a third party, or is due to acts or events within the reasonable control of that Party.

   iii. Neither Party shall be liable to the other for failure or delay in performance of a required obligation if such failure or delay is caused by unavoidable delays in shipment, delivery or taking receipt of any items sold hereunder, including delays caused by Contractor's suppliers, or loss or damage thereto, acts of God, acts of the other Party, acts of civil, regulatory or military authority, U.S. Governmental restrictions or embargoes, war, terrorism, riot, fires, strikes, flood, epidemics, quarantine, restrictions, default or unavoidable delay by supplier, unavoidable delays in transportation or uncontrollable difficulties in obtaining necessary materials, labor or manufacturing facilities due to such causes, or any other cause beyond a Party's reasonable control. In the event of such occurrence, performance shall be suspended to the extent made necessary by such forces, and the time for performance shall be extended by a period equal to the time of delay. Upon the occurrence of such an event the Party whose performance is adversely affected shall promptly notify the other Party

of the nature and extent of the occurrence and the anticipated period of delay in performance.

h. **RIGHT TO USE SYSTEM NOT YET ACCEPTED:** During the testing period, County shall have the right to use System that has been installed even if not yet accepted by County. Use of the System shall not result in any waiver of any County rights under this Agreement. The use of the System is primarily conducted as a System Acceptance Test ("SAT") prior to the Final System Acceptance. If the System is in productive use for more than nine (9) months, it shall be deemed accepted.

i. **RIGHT TO USE ACCEPTED SYSTEM:** County shall have the right to use, modify, and adapt the System in any manner it desires as long as it is in accordance with the terms and conditions of this Agreement or the supplier's software license agreement.

j. **INSTALLATION AND PRODUCT WARRANTIES:**

i. **Warranty for Nexgrid Products.** The warranty for any purchased Nexgrid devices, equipment, or products in performance of this Agreement shall be in accordance with the terms and conditions of the Nexgrid Warranty attached hereto as **Exhibit E-1**. The warranty for any Aclara meters purchased in performance of this Agreement shall be in accordance with **Exhibit E-2**.

ii. **Contractor Installation Services.** With respect to Services to be performed by Anixter under this Agreement, Anixter warrants that the Services shall be performed in a professional, competent and workmanlike manner by Anixter Personnel appropriately qualified and trained to perform such Services. County acknowledges and agrees that, in performing the Services, Anixter will rely upon the accuracy and completeness of the information and data provided by County and that Anixter's performance is dependent on County's provision of complete and accurate information and data. County acknowledges and agrees that any work performed by County or directed to be performed by County outside of standard Anixter processes, County bears responsibility. County acknowledges and agrees that in the event it follows any suggestions, advice or recommendation, it does so at its own risk. County agrees that Anixter will not be liable for any damage or loss (including but not limited to, any obligation of Anixter arising from tort or strict product liability claims or for loss of use, revenue or profits, or consequential damages) suffered by County or any third party, directly or indirectly, due to any suggestion, advice, or recommendation provided by Anixter. In the event of a breach of the foregoing warranties relating to Services occurs within three (3) months from date service performed, Anixter shall, at its sole cost and expense and as County's sole and exclusive remedy, re-perform such Services. Notwithstanding the foregoing, Anixter shall charge County standard rates for all Services required as a result of defective Materials or other warranty claims against the manufacturer. Anixter excludes and disclaims all other express and implied warranties with respect to services.

iii. **Other Product and Equipment Warranties.** Contractor will assign and/or transfer to County, where applicable and allowed by law, any warranties for any products, equipment, or services it receives in the purchase of a product, service, or equipment related in the performance of this Agreement. Warranties related to the licensing and use of the Nexgrid software and Nexgrid's Professional Services and Support shall be in accordance with the terms and conditions of the agreements found in **Exhibit D**.

iv. The warranties herein are exclusive and in lieu of, and Contractor disclaims and County waives, all other warranties of merchantability, fitness for a particular purpose and of any other type, whether express or implied, arising by law (statutory or otherwise). In the event disclaimer of warranty statements are disallowed in the governing jurisdiction, such express or implied warranties shall be limited in duration to the applicable warranty period (or the minimum period required by the applicable law).

v. Contractor warrants that the Services shall be performed and the System provided in a professional, competent and workmanlike manner by Contractor personnel appropriately qualified and trained to perform such Services in accordance with a standard that meets the industry standard of care for performance of the Services. Contractor warrants that the Services and the System shall comply with and have been produced, processed, delivered, and sold in conformity with all applicable federal, state, and local laws and administrative regulations and orders. The foregoing warranties shall survive inspection, testing, delivery, installation, and payment and shall run in favor of the County and its successors and assigns.

vi. Contractor shall deliver to County all Original Equipment Manufacturer ("OEM") warranty documentation prior to receiving final payment for AMI Equipment and Services provided hereunder. All warranties begin on date set forth in the warranty documentation or as provided herein.

k. **SYSTEM LIFE EXPECTANCY:** Subject to a valid Professional Services and Support Agreement between County and Contractor recommended supplier of Software, the Services, AMI Equipment, and Software purchased from Contractor shall be supported for a minimum of ten (10) years from the date of Final System Acceptance, said term being the **Life Expectancy**. Contractor shall make available spare parts of equal or similar performance or specification for all AMI Equipment ordered under this Agreement and corrections for any Software ordered for the Life Expectancy of the AMI Equipment and Software, starting from the date of Final System Acceptance, using commercially reasonable efforts to the extent allowed by applicable laws and regulations.

l. **DEPLOYMENT PLAN:**

i. The deployment shall occur in two (2) phases. Phase I shall mean initial deployment as defined in the RFP. Phase I shall end on the date of Final Pilot System Acceptance as defined herein. Phase II shall commence upon the completion of Phase I and shall mean deployment within the remaining service territory of County not covered in Phase I. The Parties shall work together to develop the deployment plan and schedule at a project kick-off meeting as provided above.

ii. Contractor before undertaking any part of the Services, shall review and carefully study and compare any pertinent documents, figures, schedule or related schedules and shall immediately report to the County any conflict, error, ambiguity, or discrepancy the Contractor finds or has knowledge of and shall obtain a written interpretation or clarification from County before proceeding with any Services.

m. **EQUIPMENT FORECASTS:** Within thirty (30) days after the Effective Date of this Agreement, Contractor shall supply County a written forecast of total anticipated AMI Equipment needs by month. Any changes to the AMI Equipment forecast should also be furnished to Contractor. Failure to provide an accurate forecast, within reason, may negate the stated AMI Equipment lead times and may for cause extend delivery of product to County.

n. **CANCELLATION AND MODIFICATIONS:** In addition to the cancelation provisions above, County may, without penalty, cancel or reduce an AMI Equipment order on written notice to Contractor no later than sixteen (16) weeks prior to scheduled delivery of the AMI Equipment order. County may not cancel or modify an AMI Equipment order within sixteen (16) weeks prior to delivery. Notwithstanding the foregoing, cancellation charges do not apply to Software or support services.

o. **MAJOR METER/MODULE FAILURE:** All major meter/module failures shall be handled in accordance with warranties outlined in Section A.4.j. above, and responsibility matrix.

p. **COVERAGE COMMITMENT.**

   i. Subject to the County's "backbone" system performing as required for the System to perform in accordance with the requirements of this Agreement, Contractor agrees to satisfy the Coverage Commitment as defined in **Exhibit "F"** for the duration of the Coverage Commitment Term as set forth in **Exhibit "F."**

q. **METER/MODULE REPLACEMENT FOR ZERO CONSUMPTION AND NON-ASSOCIATING METERS.** Shall be handled in accordance with warranties outlined in Section A.4.j. above, and responsibility matrix.

r. **ZERO CONSUMPTION (ZERO USAGE) METERS.** Shall be handled in accordance with warranties outlined in Section A.4.j. above, and responsibility matrix.

s. **NON-ASSOCIATING METERS.** Shall be handled in accordance with warranties outlined in Section A.4.j. above, and responsibility matrix.

t. **TESTS AND INSPECTIONS.** The AMI Equipment furnished pursuant to the Specifications shall be in compliance with all of the standard commercial inspections and tests normally performed by Contractor and its subcontractors or other contractors. Contractor shall furnish County with such certified information and test certificates as are normally made available to customers of Contractor's AMI division and other manufacturers of equipment specified within. County or its supplier has the right to witness all factory and/or site tests and inspections. County shall not be required to accept any AMI Equipment until the equipment has undergone and successfully met such tests and inspections.

u. **SYSTEM ACCEPTANCE TEST.** The term "Final System Acceptance" means County has, within nine (9) months of installation, accepted the Services provided by Contractor after County has performed a System Acceptance Test.

   Contractor and County shall complete a System Acceptance Test ("SAT") to validate the successful completion of the initial deployment of System by Contractor, in accordance with the requirements specified in this Agreement and the Functional Testing and System Acceptance Testing Criteria set forth in the attached **Exhibit "G."**

   If all testing meets the "pass" criteria as set forth in **Exhibit "G,"** the SAT will be considered successful. Final System Acceptance, as that term is used herein, shall occur on the date County indicates in writing its acceptance of satisfactory completion of the SAT, which acceptance shall be provided within ten (10) days of the successful completion of the SAT.

   In the event pass criteria cannot be met or a defined functionality requirement cannot be remedied as part of the testing, Contractor shall notify County in writing as soon as is practicable and suggest alternate remedies to resolve the problem without further costs to County.

For purposes of testing load control functionality, Contractor shall make load control software available at no cost to County for a minimum of six (6) months following Phase I deployment.

SECTION B. TERM: The term of this Agreement shall commence on the Effective Date of the Agreement and shall continue for four (4) years from the Effective Date, unless sooner terminated, as provided herein. The Agreement may be renewed by written mutual agreement for up to three (3) consecutive one-year periods.

SECTION C. COMPENSATION:

1. **Amount of Compensation**. County agrees to purchase the listed AMI Equipment, Software and Services as set forth in **Exhibit "B"** from Contractor upon submittal of detailed Project invoices and **in the amount not to exceed** FOUR MILLION NINE HUNDRED SEVENTY-FOUR THOUSAND SEVEN HUNDRED SEVENTEEN DOLLARS ($4,974,717.00), which amount does not include applicable New Mexico gross receipts taxes ("NMGRT"). Compensation shall be paid in accordance with the rate schedule set out in **Exhibit "B,"** attached hereto and made a part hereof for all purposes.
2. **Invoices**. Where applicable, Contractor shall submit itemized invoices to County's Project Manager showing amount of compensation due, amount of any NMGRT, and total amount payable. Payment of undisputed amounts shall be due and payable thirty (30) days after County's receipt of the invoice.
3. **Sub-Contractor Compensation.** Contractor is solely responsible for payment of all sub-contractors, and vendors.
4. **Additional Payment Terms and Conditions.** Contractor shall issue invoices to County for all amounts owed to Contractor hereunder. Invoices: (i) for Services shall be issued upon completion of the Services included on the invoice; and (ii) for the AMI Equipment and Software shall be issued upon shipment.
   a. Invoicing and payment shall be commensurate with retainage as shown in the table below provided, however, that Contractor may provide a bond in lieu of retainage. Written authorization shall be required from County before Services commence. The "Milestone Description" as stated below in the Milestone Schedule is provided as a summary only; this entire Agreement provides the detail of what comprises deliverables for each Milestone.

Table 1. Milestone Payment Schedule

Milestone	Description	Payment
Phase I*	Initial Deployment Area	75% of all monthly invoices for items related to Phase I* deployment area. (County shall exercise a 25% retainage on all invoices)
SAT	Successful completion of the System Acceptance Test (SAT) for the Phase I Initial deployment area.	Payment of retainage withheld to date.
Phase II	Full Deployment	After successful completion of the SAT for Phase I, and starting with the Phase II full deployment, Contractor may invoice 100% of the proposed cost on a monthly basis for all equipment and

		items associated with the Phase II deployment area according to a mutually accepted schedule. County shall not exercise withholding during Phase II.

*Phase I shall include, but not be limited to:

i. Project design meeting; receipt of standard System documentation and training manuals covering the scope of this Agreement; review and approval of County's coverage area and design drawings for the initial deployment area; receipt of proof of insurance.

ii. Configuration of System server and hardware components and delivery of configured Software and hardware to County; training on use of the System.

iii. Delivery of Phase I base stations, collectors, repeaters, load management end devices, gateways, electric meters and/or modules as determined prior to Agreement signing.

iv. Completion of onsite support and training covering equipment installation, meter/module, inspection of work and training installation, System training including support on report generation.

b. County shall pay Contractor no later than thirty (30) days from receipt of each accurate statement with a late fee of one and one-half percent (1.5%) of the invoiced amount if not paid within the thirty (30) day period.

c. After delivery and inspection at destination, County shall be responsible for any loss, theft, physical damage, or abuse that affects the operation of the System and occurs while System is in the control of County.

d. Notwithstanding any other provision in this Agreement to the contrary, County may withhold any or all payment or payments for Services provided it reasonably believes is necessary to protect County against loss on account of: 1) Defective workmanship and materials that is not remedied by Contractor within the timeframe set forth in Section A.4.j. above, or 2) Failure of Contractor to make payments promptly to subcontractors or contractors for AMI Equipment, Software, or Services.

e. Unless otherwise provided for in this Agreement, all prices for Work and Equipment are firm and fixed.

SECTION D. TAXES: Contractor shall be solely responsible for timely and correctly billing, collecting and remitting all NMGRT levied on the amounts payable under this Agreement. Any tax or other governmental charge upon the provision of Services, or the production, sale, shipment, transfer, consumption, or use of the AMI Equipment or Software, which Contractor is required to pay or collect from County shall be paid by County to Contractor at the time of invoice payment, unless County furnishes Contractor with exemption certificates acceptable to taxing authorities.

SECTION E. STATUS OF CONTRACTOR, STAFF, AND PERSONNEL: This Agreement calls for the performance of Services by Contractor as an independent contractor. Contractor is not a supplier or employee of County and will not be considered an employee of County for any purpose. Contractor, its suppliers or employees shall make no representation that they are County employees, nor shall they create the appearance of being employees by using a job or position title on a name plate, business cards, or in any other manner, bearing the County's name or logo. Neither Contractor nor any employee of Contractor shall be entitled to any benefits or

compensation other than the compensation specified herein. Contractor shall have no authority to bind County to any agreement, contract, duty or obligation. Contractor shall make no representations that are intended to, or create the appearance of, binding County to any agreement, contract, duty, or obligation. Contractor shall have full power to continue any outside employment or business, to employ and discharge its employees or associates as it deems appropriate without interference from County; provided, however, that Contractor shall at all times during the term of this Agreement maintain the ability to perform the obligations in a professional, timely and reliable manner.

SECTION F. STANDARD OF PERFORMANCE: Contractor agrees and represents that it has and will maintain the personnel, experience and knowledge necessary to qualify it for the particular duties to be performed under this Agreement. Contractor shall perform the Services described herein in accordance with a standard that meets the industry standard of care for performance of the Services.

SECTION G. DELIVERABLES AND USE OF DOCUMENTS: All deliverables procured or produced specifically for County under this Agreement and identified in writing as "works for hire" by Contractor prior to delivery to County, including material, products, reports, policies, procedures, software improvements, databases, and any other products and processes, whether in written or electronic form, shall become the exclusive property of and shall inure to the benefit of County as works for hire; Contractor shall not use, sell, disclose, or obtain any other compensation for such works for hire. In addition, Contractor may not, with regard to all work, work product, deliverables or works for hire required by this Agreement, apply for, in its name or otherwise, any copyright, patent or other property right and acknowledges that any such property right created or developed remains the exclusive right of County. Contractor shall not use deliverables in any manner for any other purpose without the express written consent of the County.

SECTION H. EMPLOYEES AND SUB-CONTRACTORS: Contractor shall be solely responsible for payment of wages, salary or benefits to any and all employees or contractors retained by Contractor in the performance of the Services. Contractor agrees to indemnify, defend and hold harmless County for any and all claims that may arise from Contractor's relationship to its employees and subcontractors.

SECTION I. INSURANCE: Contractor shall obtain and maintain insurance of the types and in the amounts set out below throughout the term of this Agreement with an insurer having an A.M. Best rating of A- VII or better. Contractor shall assure that any subcontractors providing Services maintain like insurance. Compliance with the terms and conditions of this Section is a condition precedent to County's obligation to pay compensation for the Services and Contractor shall not provide any Services under this Agreement unless and until Contractor has met the requirements of this Section. County requires Certificates of Insurance or other evidence acceptable to County that Contractor has met its obligation to obtain and maintain insurance and to assure that subcontractors maintain like insurance. General Liability Insurance and Automobile Liability Insurance shall include County as an additional insured.

1. **General Liability Insurance:** ONE MILLION DOLLARS ($1,000,000.00) per occurrence; TWO MILLION DOLLARS ($2,000,000.00) aggregate.
2. **Workers' Compensation:** In an amount as may be required by law. County may immediately terminate this Agreement if Contractor fails to comply with the Worker's Compensation Act and applicable rules when required to do so.

3. **Automobile Liability Insurance for Contractor and its Employees:** An amount equal to the minimum required by state law on any owned, and/or non-owned motor vehicles used in performing Services under this Agreement.
4. **Professional Liability Insurance:** ONE MILLION DOLLARS ($1,000,000.00) per claim or per occurrence.

Prior to any Work under this Agreement, Contractor shall provide a copy of a Certificate of Insurance evidencing the insurance coverage required herein. Failure of County to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of County to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance. County does not represent that insurance coverage and limits established in this Agreement necessarily will be adequate to protect Contractor or its suppliers. The insurance and insurance limits required herein shall also not be deemed as a limitation on Contractor's liability under the indemnities granted to County in the Contract Documents.

SECTION J. RECORDS: Contractor shall maintain, throughout the term of this Agreement and for a period of three (3) years thereafter, records that indicate the date, time, and nature of the Services rendered. With thirty (30) days prior written notice, Contractor shall make available, for inspection by County, all records, books of account, memoranda, and other documents pertaining to County and required to confirm Contractor's compliance with this Agreement.

SECTION K. APPLICABLE LAW: Contractor shall abide by all applicable federal, state and local laws, regulations, and policies and shall perform the Services in accordance with all applicable laws, regulations, and policies during the term of this Agreement. In any lawsuit or legal dispute arising from the operation of this Agreement, Contractor agrees that the laws of the State of New Mexico shall govern. Venue shall be in the First Judicial District Court of New Mexico in Los Alamos County, New Mexico.

SECTION L. NON-DISCRIMINATION: During the term of this Agreement, Contractor shall not discriminate against any employee or applicant for an employment position to be used in the performance of the obligations of Contractor under this Agreement, with regard to race, color, religion, sex, age, ethnicity, national origin, sexual orientation or gender identity, disability or veteran status.

SECTION M. INDEMNITY AND LIMITATION OF LIABLITY: Contractor shall indemnify, hold harmless and defend County, its Council members, employees, agents and representatives, from and against all third party liabilities, damages, claims, demands, actions (legal or equitable), and costs and expenses, including without limitation reasonable attorneys' fees, of any kind or nature, to the extent arising from Contractor's negligent performance or willful misconduct hereunder or breach hereof and the performance of Contractor's employees, agents, representatives and subcontractors.

SECTION N. NON-ASSIGNMENT: Neither Party may assign this Agreement or any privileges or obligations herein without the prior written consent of the other Party, which will not be unreasonably withheld, conditioned, or delayed.

SECTION O. LICENSES: Contractor shall maintain all required licenses including, without limitation, all necessary professional and business licenses, throughout the term of this Agreement. Contractor shall require and shall assure that all of Contractor's employees and

subcontractors maintain all required licenses including, without limitation, all necessary professional and business licenses.

SECTION P. PROHIBITED INTERESTS: Contractor agrees that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its services hereunder. Contractor further agrees that it will not knowingly employ any person having such an interest to perform services under this Agreement. No County Council member or other elected official of County, or manager or employee of County shall solicit, demand, accept or agree to accept a gratuity or offer of employment contrary to Section 31-282 of the Los Alamos County Code.

SECTION Q. TERMINATION:

1. **Generally**. In addition to any other provision herein, County may terminate this Agreement without cause upon sixty (60) days prior written notice to Contractor. Upon receipt of such notice, Contractor, shall use commercially reasonable efforts to stop all Services hereunder and shall promptly take steps to cancel existing orders, contracts and subcontracts relating to the Services. Upon such termination, Contractor, shall be paid for:
   a. the contract price due Contractor for the Services performed and the AMI Equipment and Software delivered;
   b. the contract price for AMI Equipment manufactured but not delivered prior to the effective date of termination if such AMI Equipment are non-cancelable non-returnable or any and all cancellation and similar charges incurred by Contractor if the orders are cancelable; and
   c. Contractor shall render a final report of the Services performed to the date of termination and shall turn over to County originals of all materials prepared or parts already purchased but not installed pursuant to this Agreement.
2. **Funding**. This Agreement shall terminate without further action by County on the first day of any County fiscal year for which funds to pay compensation hereunder are not appropriated by the County Council. County shall make reasonable efforts to give Contractor at least ninety (90) days advance notice that funds have not been and are not expected to be appropriated for that purpose.

SECTION R. NOTICE: Any notices required under this Agreement shall be made in writing, postage prepaid to the following addresses, and shall be deemed given upon hand delivery, verified delivery by telecopy (followed by copy sent by United States Mail), or three (3) days after deposit in the United States Mail:

County:
Deputy Utility Manager-Administration
Incorporated County of Los Alamos
1000 Central Avenue, Suite 130
Los Alamos, New Mexico 87544

With a copy to:
Incorporated County of Los Alamos
County Attorney's Office
1000 Central Avenue, Suite 350
Los Alamos, New Mexico 87544

Contractor:
Scott Ockerhausen
Anixter Inc.
915 Maple Grove Drive, Suite 200
Fredericksburg, Virginia 22407

With a copy to:
Anixter Inc.
2301 Patriot Blvd
Glenview, IL 60062
Attn: Legal Dept.

SECTION S. INVALIDITY OF PRIOR AGREEMENTS: This Agreement supersedes all prior contracts or agreements, either oral or written, that may exist between the Parties with reference to the services described herein and expresses the entire agreement and understanding between the Parties with reference to said services. It cannot be modified or changed by any oral promise made by any person, officer, or employee, nor shall any written modification of it be binding on County until approved in writing by both County and Contractor.

SECTION T. CAMPAIGN CONTRIBUTION DISCLOSURE FORM: A Campaign Contribution Disclosure Form was submitted as part of the Contractor's Response and is incorporated herein by reference for all purposes. This Section acknowledges compliance with Chapter 81 of the Laws of 2006 of the State of New Mexico.

IN WITNESS WHEREOF, the Parties have executed this Agreement on the date(s) set forth opposite the signatures of their authorized representatives to be effective for all purposes on the date first written above.

ATTEST

_____

NAOMI D. MAESTAS
COUNTY CLERK

INCORPORATED COUNTY OF LOS ALAMOS

BY:_____

TIMOTHY A. GLASCO, PE **DATE**
UTILITIES MANAGER

Approved as to form:

_____

J. ALVIN LEAPHART
COUNTY ATTORNEY

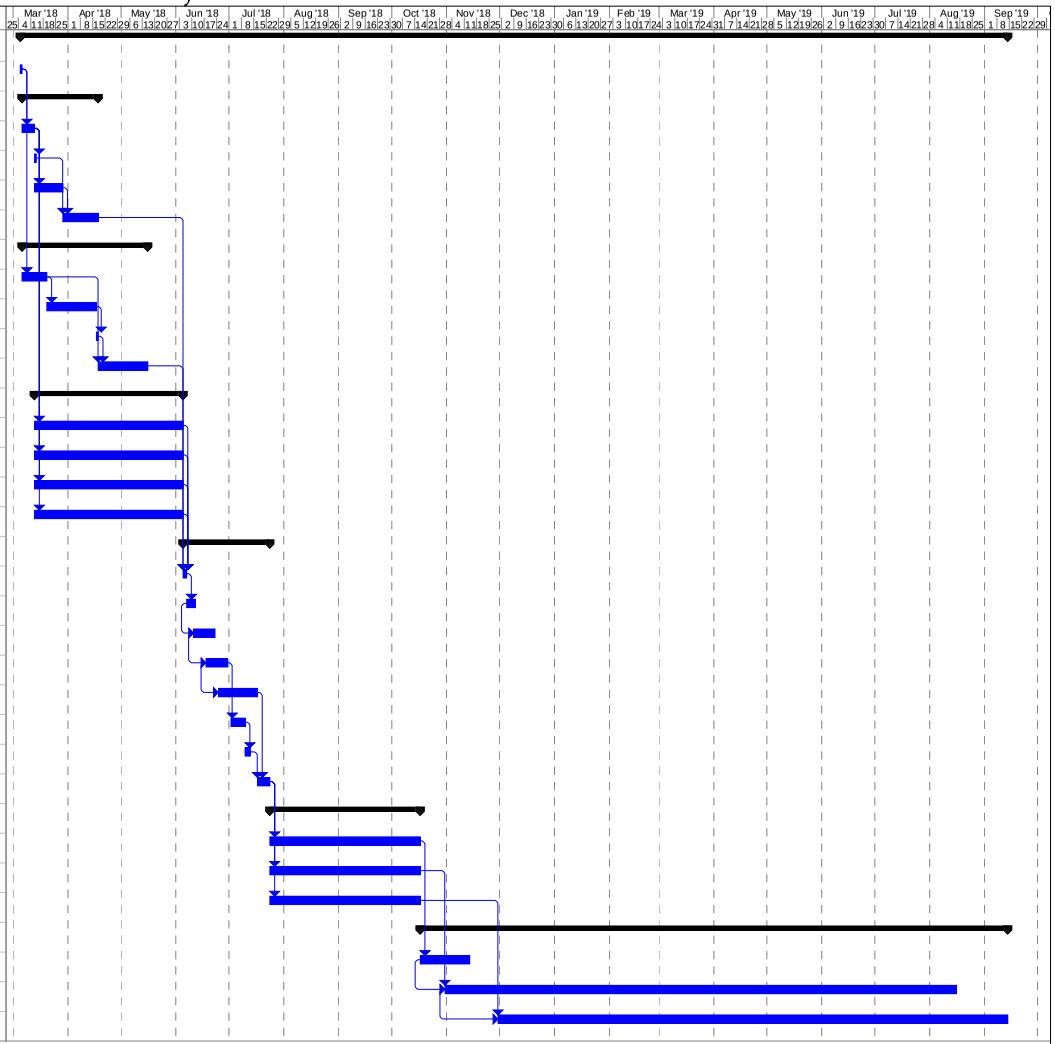
ANIXTER INC. A DELAWARE CORPORATION

BY:_____

SCOTT OCKERHAUSEN **DATE**
VICE PRESIDENT, SMART GRID METERING & SERVICES

Exhibit A: Los Alamos Project Plan

ID	Task Name	Duration	Start	Finish	Resource Names	Predecessors	Successors
1	**Planning, Equipment Delivery**	**390 days**	**Mon 3/5/18**	**Fri 9/13/19**			
2	Project Start	1 day	Mon 3/5/18	Mon 3/5/18	Anixter,Nexgrid,Los Alamos		4,9
3	**Procurement / Ordering - Phase I**	**31 days**	**Tue 3/6/18**	**Tue 4/17/18**			
4	Issue Purchase Order for Phase I Materials & Services	5 days	Tue 3/6/18	Mon 3/12/18	Los Alamos	2	6,5,14,15,16,17
5	Kickoff Meeting	1 day	Tue 3/13/18	Tue 3/13/18	Anixter,Los Alamos,Nexgrid	4	7
6	Determine Backbone Locations	12 days	Tue 3/13/18	Wed 3/28/18	Nexgrid,Los Alamos	4	7
7	Preliminary Network Infrastructure Design	14 days	Thu 3/29/18	Tue 4/17/18	Nexgrid	6,5	19
8	**Backhaul Configuration**	**51 days**	**Tue 3/6/18**	**Tue 5/15/18**			
9	Internet Connectivity & Firewall	10 days	Tue 3/6/18	Mon 3/19/18	Anixter,Nexgrid,Los Alamos	2	10,12
10	EDS Cluster Commissioning and Provisioning	20 days	Tue 3/20/18	Mon 4/16/18	Anixter,Nexgrid	9	11
11	ecoOne & intelaHome Provisioning	1 day	Tue 4/17/18	Tue 4/17/18	Anixter,Nexgrid	10	12
12	Data Acquisition & Import from Los Alamos	20 days	Wed 4/18/18	Tue 5/15/18	Anixter,Nexgrid,Los Alamos	11,9	19
13	**Equipment Delivery - Phase I**	**60 days**	**Tue 3/13/18**	**Mon 6/4/18**			
14	ecoNet Delivery	12 wks	Tue 3/13/18	Mon 6/4/18	Anixter,Nexgrid	4	19
15	Electric Meter Delivery	12 wks	Tue 3/13/18	Mon 6/4/18	Anixter,Nexgrid	4	19
16	Water Meter Module Delivery	12 wks	Tue 3/13/18	Mon 6/4/18	Anixter,Nexgrid	4	19
17	Gas Meter Module Delivery	12 wks	Tue 3/13/18	Mon 6/4/18	Anixter,Nexgrid	4	19
18	**Deployment - Phase I**	**34 days**	**Tue 6/5/18**	**Mon 7/23/18**			
19	Basic System Training & Initial Installation	2 days	Tue 6/5/18	Wed 6/6/18	Anixter,Nexgrid,Los Alamos	15,16,17,14,7,12	20
20	Deploy Network Infrastructure	3 days	Thu 6/7/18	Mon 6/11/18	Los Alamos	19	21SS+2 days
21	Deploy Electric Meters	2 wks	Mon 6/11/18	Fri 6/22/18	Anixter,Los Alamos	20SS+2 days	22SS+5 days
22	Deploy Water & Gas Meter Modules	2 wks	Mon 6/18/18	Fri 6/29/18	Anixter,Los Alamos	21SS+5 days	24,23SS+5 days
23	Billing Integration Testing	15 days	Mon 6/25/18	Mon 7/16/18	Nexgrid,Los Alamos	22SS+5 days	26
24	Network Remediation & Installation	5 days	Mon 7/2/18	Mon 7/9/18	Nexgrid,Los Alamos,Anixter	22	25
25	System Training	3 days	Tue 7/10/18	Thu 7/12/18	Anixter,Nexgrid,Los Alamos	24	26
26	System Acceptance	5 days	Tue 7/17/18	Mon 7/23/18	Anixter,Nexgrid,Los Alamos	25,23	28,29,30
27	**Procurement & Delivery - Phase II**	**60 days**	**Tue 7/24/18**	**Tue 10/16/18**			
28	ecoNet Delivery	12 wks	Tue 7/24/18	Tue 10/16/18	Anixter,Nexgrid	26	32
29	Electric Meter Delivery	12 wks	Tue 7/24/18	Tue 10/16/18	Anixter,Nexgrid	26	33
30	Water & Gas Meter Module Delivery	12 wks	Tue 7/24/18	Tue 10/16/18	Anixter,Nexgrid	26	34
31	**Deployment - Phase II**	**230 days**	**Wed 10/17/18**	**Fri 9/13/19**			
32	Deploy Network Infrastructure	4 wks	Wed 10/17/18	Tue 11/13/18	Los Alamos	28	33SS+10 days
33	Deploy Electric Meters	40 wks	Wed 10/31/18	Thu 8/15/19	Anixter,Los Alamos	32SS+10 days,29	34SS+20 days
34	Deploy Water & Gas Meter Modules	40 wks	Fri 11/30/18	Fri 9/13/19	Anixter,Los Alamos	33SS+20 days,30	



The schedule contained herein shall be considered a “target schedule” for reference purposes, that can be modified based on the actual status of the project.

Task

Summary

EXHIBIT B. ANIXTER SUPPLIED PARTS AND COSTS [AMI EQUIPMENT]

INCORPORATED COUNTY OF LOS ALAMOS SERVICES AGREEMENT

Between Anixter Inc. and the Incorporated County of Los Alamos

ANIXTER	**Exhibit B**
	Materials & Services, Quantities, Prices, and Notes

Pricing: Los Alamos County Phase 1 and Full Deployment

1. **General Pricing Notes Applicable to All Sections**

Note 1: Customer is responsible for all shipping and receiving charges from POO Fredericksburg, VA, not to exceed $1,700.00 for Phase I and $38,470.00 for Phase II full deployment.

Note 2: Service hours and customary expenses will be billed as incurred on a monthly basis.

Note 3: All Nexgrid products include a 10 year limited warranty, all other hardware carries manufacturer's standard warranty.

Note 3: The prices quoted below are applicable only to a firm, non-cancelable Purchase Order received within the Effective Period for the Products.

Note 4: All Engineering and Design Services are included in the price.

Note 5: Customer shall be responsible for all standard and customary travel related expenses and per Diem, not to exceed $12,000.00.

Note 6: Contractor will be responsible for invoicing all applicable taxes and fees to Customer, and remitting same with proper filings to taxing or regulatory authorities.

Note 7: Pricing for Monthly and Annually recurring fees assumes a 7-year term.

2. **AMI Software / Servers and Hosting Fees**

AMI Software / Servers and Hosting Fees					
Description	**Cat #**	**Qty**	**Unit Price**	**Total ($USD)**	**Billing Schedule / Notes**
Annual Hosting Fee[1]	N/A	203,938	$1.00	$203,938.00	$1.00 per Managed Device per year Invoiced monthly on a pro-rated basis for 2018, and annually thereafter Quantity listed is forecasted total over 7 years
EDOS Server License	EDOS	1	$20,000.00	$20,000.00	Billed 50% upon successful installation of servers, and 50% upon commencement of Phase II
EDS Database Server License	EDDB	1	$20,000.00	$20,000.00	Billed 50% upon successful installation of servers, and 50% upon commencement of Phase II
VPN Router Gateway	ECOLINK	1	$1,000.00	$1,000.00	Billed upon delivery
Professional Services and Support Agreement Annual Fee[1,2]	PSSA	174,804	$2.50	$437,010.00	$2.50 per Managed Device per year Quantity listed is forecasted total over 7 years (2018 is included in Setup fee)
Project Management	N/A	1	$25,000.00	$25,000.00	Billed upon initiation of work
Setup: ecoOne/Intelehome Activation	N/A	1	$22,500.00	$22,500.00	Billed upon successful installation of servers
System Training	N/A	32	$150.00	$4,800.00	Billed upon completion of training
MDM and Customer Portal Software	N/A	1	$0.00	$0.00	Included at no charge.
			Total:	**$734,248.00**	

Note 1: PSSA & Hosting Fees will be charged directly from Nexgrid to Los Alamos County.
Note 2: PSSA Fee will not be charged until December 2018 for 2019.

3. Equipment Phase I

Meters and Communications Modules				
Item	**Cat #**	**Qty**	**Price / Unit ($USD)**	**Total ($USD)**
Electric Meters and Modules				
I210+ 2S CL200 No RD 240V O V2 AMI-ready includes Nexgrid MIM	TBD	315	$107.00	$33,705.00
Water Communication Modules				
Intelameter Water Pan Lid Mountable Communication Module (Water Meter not included)	intelaMeter H20	315	$95.00	$29,925.00
Gas Communication Modules				
intelaMeterGas Communication Module (Gas Meter not included)	intelaMeter GAS	315	$98.00	$30,870.00
Riotronics (Pulse Counter and new Gas register index)	TBD	315	$45.00	$14,175.00
			Total	**$108,675.00**

Network Infrastructure Equipment & Tools				
Item	**Cat #**	**Qty**	**Price / Unit ($USD)**	**Total ($USD)**
Cellular ecoNet Gateways	TBD	1	$1,250.00	$1,250.00
Annual Cellular Service Fee[1]	N/A	7	$150.00	$1050.00
ecoSwitch SL	TBD	16	$136.00	$2,176.00
ecoNet SL Mounting Kit	TBD	16	$49.00	$784.00
ecoOne Mobile Handheld Device with Bar Code Scanner, GPS and Software	ecoOne Handheld	1	$6,000	$6,000.00
			Total	**$11,260.00**

Note 1: Cellular Service Fee Pricing is valid for Phase I equipment only and only if determined needed.

4. Equipment Phase II Full Deployment

Meters and Communications Modules				
Item	**Cat #**	**Qty**	**Price / Unit ($USD)**	**Total ($USD)**
I210+ 1S CL100 No RD 240V O V2 AMI-ready includes Nexgrid MIM	TBD	32	$147.00	$4,704.00
I210+ 2S CL200 No RD O V2 AMI-ready includes Nexgrid MIM	TBD	9,555	$107.00	$1,022,385.00
I210+ 2S CL320 O V2 AMI-ready includes Nexgrid MIM	TBD	5	$147.00	$735.00
I210+ 3S CL20 240V O V2 AMI-ready includes Nexgrid MIM	TBD	32	$147.00	$4,704.00
I210+ 4S CL20 240V O V2 AMI-ready includes Nexgrid MIM	TBD	32	$147.00	$4,704.00
KV2c EPS 45S CL20 120-480V AMI-ready includes Nexgrid MIM	TBD	5	$270.00	$1,350.00

Meters and Communications Modules				
Item	**Cat #**	**Qty**	**Price / Unit ($USD)**	**Total ($USD)**
KV2c EPS 9S CL20 120-480V AMI-ready includes Nexgrid MIM	TBD	120	$240.00	$28,800.00
KV2c EPS 12S CL200 120-480V AMI-ready includes Nexgrid MIM	TBD	322	$240.00	$77,280.00
KV2c EPS 16S CL200 120-480V AMI-ready includes Nexgrid MIM	TBD	223	$240.00	$53,520.00
Remote Disconnect adder (I210+ 1S and 2S CL200 Only) (1)	N/A	300	$54.00	$16,200.00
Single Phase demand and TOU adder	TBD	130	$30.00	$3,900.00
Polyphase demand and TOU adder	TBD	644	$28.00	$18,032.00
Polyphase reactive metering adder	TBD	644	$68.00	$43,792.00
Water Communication Modules				
Intelameter Water Pan Lid Mountable Communication Module	intelaMeter H20	7361	$95.00	$699,295.00
Gas Communication Modules				
intelaMeterGas Communication Module (Gas Meter not included)	intelaMeter GAS	7862	$98.00	$770,476.00
Riotronics (Pulse Counter and new Gas register index)	TBD	7862	$45.00	$353,790.00
			Total	**$3,103,667.00**

Note 1: Remote disconnect adder is $54.00/unit for quantities 1 – 300 or all quantities over 50% deployment; $59.00/unit for quantities 301 units up to 50% deployment.

Network Infrastructure Equipment & Tools				
Item	**Cat #**	**Qty**	**Price / Unit ($USD)**	**Total ($USD)**
ecoNet SL Communication Gateway	ecoNet SL	263	$420.00	$110,460.00
ecoSwitch SL	ecoSwitch	79	$128.00	$10,112.00
Point to Multi-Point Wireless Cluster	N/A	3	$2,800.00	$8,400.00
Wireless Directional Radio	N/A	26	$340.00	$8,840.00
ecoNet SL Mounting Kit	ENSLMK	42	$49.00	$2,058.00
ecoNet SL High Gain Antenna	HGA	84	$57.00	$4,788.00
ecoNet SL High Gain Antenna Bracket	HGAB	84	$47.00	$3,948.00
ecoOne Mobile Handheld Device with Bar Code Scanner, GPS and Software	ecoOne Handheld	5	$6,000	$30,000.00
			Total	**$178,606.00**

5. Services

Anixter Installation Services[1]				
Item	Catalog Number	Qty	Price / Unit ($USD)	Total ($USD)
Installation of Single Phase Meters with Nexgrid Modules	N/A	9,652	$15.25	$147,193.00
Installation of residential gas modules	N/A	7,581	$32.50	$246,382.50
Installation of commercial gas modules	N/A	281	$32.50	$9,132.50
Installation of residential water modules	N/A	6408	$39.20	$251,193.60
Installation of commercial water modules	N/A	952	$39.20	$37,318.40
			Total	**$691,220.00**

Grand Total: $4,827,676.00

Subtotal Year 1: $4,215,862.00
Annual Subtotal Years 2 – 7: $101,969.00
(quantity 29,134 @ $2.50 + $1.00 each. See section 2)

Exhibit C: Responsibility Matrix

The following table was submitted as Attachment VII: Responsibility Matrix, as a part of Anixter's Response to Los Alamos RFP NO: 17-32, and is incorporated to the agreement herein as Exhibit C, modified from the original submission as mutually agreed by the parties.

This table shows the division of responsibilities between Los Alamos County Department of Public Utilities and Anixter (Supplier). For all tasks, it shall be assumed that the responsibile party will lead, while the other party will assist or support.

#	Description	Supplier Responsibility	Los Alamos	Comply		Supplier Comments
				Yes	No	
1	Configure, install, and test the AMI hardware and software (the "Master System") and deliver the combined hardware and software to the Purchaser's office.	X		X		
2	Provide meters, modules, and metering transport equipment for deployment. Ship equipment to Purchaser's designated locations.	X		X		
3	Train Purchaser's personnel and Contractors on how to properly install the equipment and use and navigate the Master System for all defined software functionality.	X		X		
4	Install all Electric Residential Meters and Gas Modules.	X		X		Any required repairs or replacements of Meter Bases shall be the responsibility of Los Alamos. Any maintenance or repairs required of gas meters and cans shall be the responsibility of County.
5	Install meters/modules and/or retrofit designated three-phase meters with Supplier's provided AMI transponders in the field.		X	X		
6	Install meters/modules and/or retrofit designated water services with Supplier's provided AMI transponders in the field.	X	X	X		Any maintenance or repairs required of water meters and pits/cans shall be the responsibility of County.
7	Provide training and education to Purchaser personnel or designated representatives, for installation of all hardware and operation of Supplier's System.	X		X		
8	Provide ongoing project and technical support as mutually agreed in future discussions and as set forth in Contract documents.	X		X		
9	Complete System Acceptance Testing (SAT) at Purchaser's site.	X	X	X		
10	Ensure that all defined AMI system functionality performs according to compliance statements provided in Supplier's RFP response, including submitted product brochures, requirements documents, critical questions and other information presented by the Supplier RFP, and that said functionality is tested as part of the SAT.	X		X		
11	Install collectors, repeaters, base station equipment or other AMI transport equipment for Phase I (Initial Deployment Area) (*Please clarify per equipment type in "Supplier Comments" Column I .*)		X	X		Los Alamos to install per discussions. Any electrical work required to energize Nexgrid network equipment (e.g. transformer, cable drop) shall be the responsibility of Los Alamos.

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The following table was submitted as Attachment VII: Responsibility Matrix, as a part of Anixter's Response to Los Alamos RFP NO: 17-32, and is incorporated to the agreement herein as Exhibit C, modified from the original submission as mutually agreed by the parties.
This table shows the division of responsibilities between Los Alamos County Department of Public Utilities and Anixter (Supplier). For all tasks, it shall be assumed that the responsibile party will lead, while the other party will assist or support.

#	Description	Supplier Responsibility	Los Alamos	Comply		Supplier Comments
				Yes	No	
12	Complete detailed wireless collector system design and install Supplier-provided AMI transport equipment.	X	X	X		Anixter to provide AMI transport equipment system design; Los Alamos to provide install. Any electrical work required to energize Nexgrid network equipment (e.g. transformer, cable drop) shall be the responsibility of Los Alamos.
13	Meet Coverage Commitment for five (5) years from the date that 95% of electric AMI meters are installed and have associated with the AMI master system.	X		X		
14	For the tower based AMI vendors, provide towers or poles and install cabling and install antennas to the tower/pole structure.		X			N/A: System does not require tower-based assets.
15	Transport (and cost of transport) for any AMI collector, antenna, cabinets, or other collector/base station equipment to the field location where the installation will be completed.		X	X		Anixter will ship equipment to the address specified by Los Alamos. Los Alamos to transport equipment to field location when ready for install.
16	Connect Master System in Purchaser's main office to the third-party communications system.		X	X		
17	Provision an adequate communication circuit between each AMI take-out point containing Supplier-provided equipment to Purchaser's data center where Supplier-provided Master System is located.		X	X		
18	Provide support to the Purchaser upon request as the AMI Master System is integrated to the Purchaser's software systems as listed in the RFP (e.g. CIS, OMS, MDMS) including support for MultiSpeak Use Cases and Methods lists in the RFP and attachments as well as direct ODBC connectivity to Supplier's databases as required.	X		X		This item includes supporting MultiSpeak or flat-file exchange for billing purposes; and MultiSpeak for all other integrations unless otherwise negotiated.
19	Provide software integration services between the AMI and other systems. Please comment on assumed vendor responsibilities for integration to systems such as an OMS, CIS, etc.	X	X	X		
20	Support MultiSpeak methods and web service communications as defined in the RFP.	X		X		

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EXHIBIT D-1

NEXGIRD SOFTWARE LICENSE AND SUPPORT AGREEMENT

SOFTWARE LICENSE AGREEMENT

THIS AGREEMENT made this the_____day of January, 2018 by and between **Nexgrid, LLC**, a Virginia corporation ("Nexgrid"), with an address of 915 Maple Grove Drive, Suite 200, Fredericksburg, Virginia 22407, and the **Incorporated County of Los Alamos**, an incorporated corporate political subdivision of the State of New Mexico, ("LICENSEE"), with an address of 1000 Central Avenue, Los Alamos, New Mexico 87544.

PURPOSE: THIS SOFTWARE LICENSE AGREEMENT ("AGREEMENT") GOVERNS THE PURCHASE AND ONGOING USE OF NEXGRID'S SOFTWARE PRODUCTS. THIS AGREEMENT SUPERSEDES ANY ONLINE NEXGRID TERMS OF USE, WARRANTY, AND/OR PRIVACY POLICY REQUIRED TO USE THE PRODUCT. IN CASE OF CONFLICT BETWEEN THIS AND ANY NEXGRID ONLINE NEXGRID USE AGREEMENT OR USE POLICY, THE PARTIES HEREIN SPECIFICALLY AGREE THIS AGREEMENT SHALL CONTROL.

1. DEFINITIONS

"**Affiliate**" means any entity which directly or indirectly controls, is controlled by, or is under common control with the subject entity. "Control," for purposes of this definition, means direct or indirect ownership or control of interests of the subject entity.

"**EDS**" means Energy Data Server. A server responsible for the management and operation of Nexgrid's smart grid devices. Additionally, the EDS includes a database component that stores all energy read and communication data.

"Managed Devices" means all communicating devices installed on the network that can be managed and/or monitored using the Nexgrid ecoOne or intelaHome portals. Examples include but are not limited to electric, water and gas modules, thermostats, street light sensors, load control switches, capacitor bank controllers, ecoNet Gateways, and repeaters.

"**Malicious Code**" means viruses, worms, time bombs, Trojan horses and other harmful code, files, scripts, agents or programs.

"**Professional Services and Support Agreement**" means the agreement You entered into with Us governing the services and support of the Software.

"**Software**" means the Nexgrid Software and all online web-based applications and platforms provided by Us via http://www.myecoone.com and/or http://intelahome.com, including associated offline components but excluding Third Party Applications. Software licensed to Licensee shall include but not be limited to Managed Device firmware, ecoOne, and intelaHome including any and all programs, code, system software, applications to make functional Nexgrid or related products such as, but not limited to, ecoNet SL, ecoOne, ecoStat, ecoSwitch, EDS Server and Firewall, intelaHome, intelaMeters Electric,

intelaMeters Water, and other related and system integral parts.

"**System**" means all communicating devices, servers and cloud based portals that make up the metering network and system. Components include ecoNets, intelaMeters, ecoSwitches, ecoStats, Energy Data Server, ecoOne, and intelaHome.

"**Third-Party Applications**" means online, web-based applications and offline software products that are provided by third parties, interoperate with the Software, and are identified as third- party applications.

"**User Guide**" means the online user guide for the Software, accessible via http://www.myecoone.com under the customer support section as updated from time to time .

"**Users**" means individuals who are authorized by You to use the Software, for whom subscriptions have been purchased, and who have been supplied user identifications and passwords by You (or by Us at Your request). Users may include but are not limited to Your customers, employees, consultants, contractors and agents; or third parties with which You transact business.

"**We**," "**Us**" or "**Our**" means Nexgrid, LLC the company with whom you are contracting.

"**You**" or "**Your**" means the Licensee company or other legal entity for which you are accepting this Agreement and Affiliates of that company or entity. "Your Data" means all electronic data or information submitted by You to the Software.

2. COMPETITION

You may not access the Software if You are Our direct competitor, except with Our prior written consent. In addition, You may not access the Software for purposes of monitoring the availability, performance or functionality, or for any other benchmarking or competitive purposes.

3. GRANT OF LICENSE

3.1 GRANT OF LICENSE. We grant You the following non-exclusive, non-assignable and non-transferable rights provided You agree to and comply with all terms and conditions of this Agreement and conditions below:

a. **Use.** You may use the Software on your computer (or computers if the Software is sold to you for use on multiple computers). You do not have the right to distribute the Software. You agree to only use the Software as expressly permitted herein.
b. **Reservation of Rights.** The Software is licensed, not sold, to you by Us. Nexgrid owns all right, title and interest in and to the Software and reserves all rights not expressly granted to you in this Agreement.

3.2. License Key. The Software requires a license key that is issued at the issuance of the License. The License Key shall remain valid while the License remains valid under this agreement. We will issue to Licensee a valid Energy Data Server (EDS) license key unique to any purchased EDS.

4. USE OF THE SOFTWARE

4.1. Your Responsibilities. You shall (i) be responsible for Users' compliance with this Agreement, (ii) be solely responsible for the accuracy, quality, integrity and legality of Your Data and of the means by which You acquired Your Data, (iii) use commercially reasonable efforts to prevent unauthorized access to or use of the Software, and notify Us promptly of any such unauthorized access or use, and (iv) use the Software only in accordance with the User Guide and applicable laws and government regulations. You shall not (a) make the Software available to anyone other than Users, (b) sell, resell, rent or lease the Software, (c) knowingly use the Software to store or transmit infringing, libelous, or otherwise unlawful or tortuous material, or to store or transmit material in violation of third-party privacy rights, (d) knowingly use the Software to store or transmit Malicious Code, (e) knowingly interfere with or disrupt the integrity or performance of the Software or third-party data contained therein, or (f) knowingly attempt to gain unauthorized access to the Software or their related systems or networks.

4.2. Usage Limitations. Software may be subject to usage limitations, such as, for example, limits on disk storage space, on the number of API calls You are permitted to make against Our application programming interface. Any such limitations are specified in Nexgrid's API User Guide. Licensee shall use all best efforts to comply with Nexgrid's usage limitation. Nexgrid must notify Licensee of any usage concerns and the specific limitation or usage allowance to which Licensee is exceeding. The Parties will attempt to resolve any usage concern within 30 days. If usage concerns are not adequately resolved between Nexgrid and/or Licensee, the Parties may mutually Terminate this agreement.

4.3 Upgrades. To use a Software identified by Us as an upgrade, you must first be licensed for the original Software identified by Us as eligible for the upgrade. After upgrading, you may no longer use the original Software that formed the basis for your upgrade eligibility and the upgraded software shall be deemed the "Software ". If upgrades cause material unknown or undetermined system errors, conflicts, or problems, as determined by Nexgrid, Licensee may elect, where reasonably possible, to revert to the prior Software version until Licensee and Nexgrid, or their agent, can mutually resolve any installation conflicts, errors, or problems.

4.4 Additional Software. This Agreement applies to updates or supplements to the original Software provided by Us unless We provide other terms along with the update or supplement. Licensee shall be able to review and approve any terms or conditions that materially change or alter this agreement. If the parties are unable to agree on any change to the terms or conditions of this agreement, the parties may then elect to continue under the prior terms and conditions or unilaterally cancel the agreement – ending the License.

5. THIRD-PARTY PROVIDERS

5.1. Third-Party Products and Software. Notwithstanding the terms and conditions of this Agreement, all Third-Party Applications, are licensed to you subject to the terms and conditions of the software license agreement accompanying such Third-Party Applications whether in the form of a discrete agreement, shrink wrap license or electronic license terms accepted at time of download. Use of the Third-Party Applications by you shall be governed entirely by the terms and conditions of such license.

5.2 Third-Party Applications and Your Data. If You install or enable Third-Party Applications for use with Software, You acknowledge that We may allow providers of those Third-Party Applications to access Your Data as required for the interoperation of such Third-Party Applications with the Software. We shall not be responsible for any disclosure, modification or deletion of Your Data resulting from any such access by Third-Party Application providers unless the Third-party application was required to be installed by Nexgrid. The Software shall allow You to restrict such access by restricting Users from installing or enabling such Third-Party Applications for use with the Software.

6. CUSTOM INTEGRATION OR MODIFICATION

6.1. If you elect to have any customized integration or modification using the Nexgrid Web Services API, MultiSpeak, Flat File or XML; Nexgrid will maintain exclusive rights to all intellectual property including but not limited to end user documentation and modifications to Software.

7. PROPRIETARY RIGHTS

7.1. Reservation of Rights. Subject to the limited rights expressly granted hereunder, We reserve all rights, title and interest in and to the Software, including all related intellectual property rights. No rights are granted to You hereunder other than as expressly set forth herein.

7.2. Restrictions. You shall not (i) knowingly permit any third party to access the Software except as permitted herein, (ii) create derivative works based on the Software, (iii) copy, frame or mirror any part or content of the Software, other than copying or framing on Your own intranets or otherwise for Your own internal business purposes, (iv) reverse engineer the Software, or (v) access the Software in order to (a) build a competitive product or service, or (b) copy any features, functions or graphics of the Software. Unauthorized knowingly copying of the Software or failure to comply with the restrictions in this Agreement (or other breach of the license herein) will result in automatic termination of this Agreement.

7.3. Ownership of Your Data. As between Us and You, You exclusively own all rights, title and interest in and to all of Your Data.

7.4. Federal Government End Use Provisions. We provide the Software, including related software and technology, for ultimate federal government end use solely in accordance with the following: Government technical data and software rights related to the Software include only those rights customarily provided to the public as defined in this Agreement. This customary commercial license is provided in accordance with FAR 12.211 (Technical Data) and FAR 12.212 (Software) and, for Department of Defense transactions, DFAR 252.227-7015 (Technical Data – Commercial Items) and DFAR 227.7202-3 (Rights in Commercial Computer Software or Computer Software Documentation). If a government agency has a need for rights not conveyed under these terms, it must negotiate with Us to determine if there are acceptable terms for transferring such rights, and a mutually acceptable written addendum specifically conveying such rights must be included in any applicable contract or agreement.

8. CONFIDENTIALITY

8.1. Definition of Confidential Information. As used herein, "Confidential Information" means all confidential information disclosed by a party ("Disclosing Party") to the other party ("Receiving Party"), whether orally or in writing, that is designated as confidential or that reasonably should be understood to be confidential given the nature of the information and the circumstances of disclosure. Your Confidential Information shall include Your Data; Our Confidential Information shall include the Software and associated documentation. However, Confidential Information (other than Your Data) shall not include any information that (i) is or becomes generally known to the public without breach of any obligation owed to the Disclosing Party, (ii) was known to the Receiving Party prior to its disclosure by the Disclosing Party without breach of any obligation owed to the Disclosing Party, (iii) is received from a third party without breach of any obligation owed to the Disclosing Party, or (iv) was independently developed by the Receiving Party.

8.2. Protection of Confidential Information. Nexgrid understands and agrees that Licensee is a local government public body and is subject to the New Mexico Inspection of Public Records Act, NMSA 1978, §§ 14-2-1 through 14-2-12 ("Records Act"). As such, Licensee is required to disclose non-protected public documents when requested. Pursuant to the Records Act, Licensee's only duty under this agreement is to provide reasonable notice to Nexgrid of any properly submitted public information request for non-protected Confidential records. Nexgrid, is solely responsible for taking any further action to limit, protect, or halt Licensee's required disclosure. Nexgrid understands that such action to protect its confidential information must be taken within the Record Act's required response period of 15-days from the date of the request.

8.3. Except as otherwise provided herein, the Disclosing Party and the Receiving Party shall use the same degree of care that it uses to protect the confidentiality of its own Confidential Information of like kind (but in no event less than reasonable care) not to disclose or use any Confidential Information of the Disclosing Party for any purpose outside the scope of this Agreement, and the Receiving Party shall limit access to Confidential Information of the Disclosing Party to those of its employees, contractors and agents who need such access for purposes consistent with this Agreement.

8.4. Protection of Your Data. Without limiting the above, We shall maintain appropriate administrative, physical, and technical safeguards for protection of the security, confidentiality and integrity of Your Data. We shall not (a) modify Your Data, (b) disclose Your Data except as compelled by law in accordance with Section 8.4 (Compelled Disclosure) or as expressly permitted in writing by You or as provided herein, or (c) access Your Data except to provide the Software or prevent or address service or technical problems, or at Your request in connection with customer support matters.

8.5. Compelled Disclosure. The Receiving Party may disclose Confidential Information of the Disclosing Party if it is compelled by law to do so, provided the Receiving Party gives the Disclosing Party prior notice, where timely possible, of such compelled disclosure (to the extent legally permitted) and reasonable assistance, at the Disclosing Party's cost, if the Disclosing Party wishes to contest the disclosure.

9. WARRANTIES AND DISCLAIMERS

9.1. Our Warranties. We warrant that (i) the Software shall perform materially in accordance with the product User Guides and the functionality of the Software will not be materially changed, decreased, or altered during the term of the License. In the event of a claim by You under this warranty, Nexgrid shall have the option to either repair or replace the Software. In the event that Nexgrid fails to repair or replace the Software within a reasonable period, Your exclusive remedy shall be as provided in Section 12.2 (Termination for Cause).

9.2. Mutual Warranties. Each party represents and warrants that (i) it has the legal power to enter into this Agreement, and (ii) it will not intentionally, knowingly, or willfully transmit to the other party any Malicious Code (except for Malicious Code previously transmitted to the warranting party by the other party).

9.3. Disclaimer. EXCEPT AS EXPRESSLY PROVIDED HEREIN, NEITHER PARTY MAKES ANY WARRANTIES OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, AND EACH PARTY SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW.

10. INDEMNIFICATION

10.1. Indemnification by Us. We shall defend You against any claim, demand, suit, or proceeding ("Claim") made or brought against You by a third party alleging that the use of the Software as permitted hereunder infringes or misappropriates the intellectual property rights of a third party, and shall indemnify You for any damages finally awarded against, and for reasonable attorney's fees incurred by You in connection with any such Claim; provided, that You (a) promptly give Us written notice of the Claim; (b) give Us sole control of the defense and settlement of the Claim (provided that We may not settle any Claim unless the settlement unconditionally releases You of all liability); and (c) provide to Us all reasonable assistance, at Our expense.

11. LIMITATION OF LIABILITY

11.1. Limitation of Liability. IN NO EVENT SHALL EITHER PARTY'S AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT, WHETHER IN CONTRACT, TORT OR UNDER ANY OTHER THEORY OF LIABILITY, EXCEED THE TOTAL AMOUNT PAID BY YOU UNDER THE PROFESSIONAL SERVICES AND SUPPORT AGREEMENT OR, WITH RESPECT TO ANY SINGLE INCIDENT, THE LESSER OF $500,000 OR THE AMOUNT PAID BY YOU UNDER THE PROFESSIONAL SERVICES AND SUPPORT AGREEMENT IN THE 12 MONTHS PRECEDING THE INCIDENT.

11.2. Exclusion of Consequential and Related Damages. IN NO EVENT SHALL EITHER PARTY HAVE ANY LIABILITY TO THE OTHER PARTY FOR ANY LOST PROFITS OR REVENUES OR FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, COVER OR PUNITIVE DAMAGES HOWEVER CAUSED, WHETHER

IN CONTRACT, TORT OR UNDER ANY OTHER THEORY OF LIABILITY, AND WHETHER OR NOT THE PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE FOREGOING DISCLAIMER SHALL NOT APPLY TO THE EXTENT PROHIBITED BY APPLICABLE LAW.

12. TERM AND TERMINATION

12.1. Term. This License Agreement is effective unless terminated pursuant to this Section. This Agreement will also co-terminate with termination of the Professional Services and Support Agreement.

12.2. Termination for Cause. You or Us may terminate this Agreement for the following: (i) upon 30 days written notice to the other party of a material breach if such breach remains uncured at the expiration of such period, (ii) if the other party becomes the subject of a petition in bankruptcy or any other proceeding relating to insolvency, receivership, liquidation or assignment for the benefit of creditors; (iii) Licensee may cancel this Agreement at any time with or without cause, with thirty-days' notice but shall pay to Nexgrid any amounts then due under the Software License Agreement or Professional Support Services Agreement; or (iv) failure of Licensee to obtain continuing funding from the governing body.

12.3. Return of Your Data. Upon request by You made within 180-days after the effective date of termination of the License, We will provide to You for download a file of Your Data in comma separated value (.csv) format along with attachments in their native format. After such 180-day period, We shall have no obligation to maintain or provide any of Your Data and shall thereafter, unless legally prohibited, delete all of Your Data in Our systems or otherwise in Our possession or under Our control.

12.4. Surviving Provisions. 7 (Proprietary Rights), 8 (Confidentiality), 9.3 (Disclaimer), 10 (Mutual Indemnification), 11 (Limitation of Liability), 12.3 (Return of Your Data), 13 (Governing Law and Jurisdiction) and 14 (General Provisions) shall survive any termination or expiration of this Agreement.

13. GOVERNING LAW AND JURISDICTION

13.1. General. The English language version of this Agreement, if it shall have been translated into any other language, shall be the controlling version of this Agreement. This Agreement shall be governed by and constituted in accordance with the laws of the Commonwealth of Virginia. In cases brought by Nexgrid, each of the parties hereto, to the extent permitted by law, hereby consents to the personal jurisdiction of the state and federal courts located in Spotsylvania County, Commonwealth of Virginia, and to the use of the English language, for the adjudication of any claim or controversy arising under this Agreement. In cases brought by the Licensee, the customer, each of the parties hereto, to the extent permitted by law, hereby consents to the personal jurisdiction of the state and federal courts in New Mexico with venue to be in the First Judicial District Court, Los Alamos, and to the use of the English language, for the adjudication of any claim or controversy arising under this Agreement.

13.2. Manner of Giving Notice. Except as otherwise specified in this Agreement, all notices, permissions and approvals hereunder shall be in writing and shall be deemed to have been given upon: (i) personal delivery, (ii) the second business day after mailing, (iii) the second business day

after sending by confirmed facsimile, or (iv) the first business day after sending by email (provided email shall not be sufficient for notices of termination or an indemnifiable claim). Notices to You shall be addressed to the system administrator designated by You for Your Software account.

13.3. Agreement to Governing Law and Jurisdiction. Each party agrees to the applicable governing law above without regard to choice or conflicts of law rules, and to the exclusive jurisdiction of the applicable courts above.

13.4. Waiver of Jury Trial. Each party hereby waives any right to jury trial in connection with any action or litigation in any way arising out of or related to this Agreement.

14. GENERAL PROVISIONS

14.1. Export Compliance. Each party shall comply with the export laws and regulations of the United States and other applicable jurisdictions in providing and using the Software. Without limiting the foregoing, (i) each party represents that it is not named on any U.S. government list of persons or entities prohibited from receiving exports, and (ii) You shall not permit Users to access or use Software in violation of any U.S. export embargo, prohibition or restriction.

14.2. Relationship of the Parties. The parties are independent contractors. This Agreement does not create a partnership, franchise, joint venture, agency, fiduciary, or employment relationship between the parties.

14.3. No Third-Party Beneficiaries. There are no third-party beneficiaries to this Agreement, however Nexgrid agrees that Anixter, Inc. is the contracting agent to the County for installation and operation of the advanced metering infrastructure project.

14.4. Waiver and Cumulative Remedies. No failure or delay by either party in exercising any right under this Agreement shall constitute a waiver of that right. Other than as expressly stated herein, the remedies provided herein are in addition to, and not exclusive of, any other remedies of a party at law or in equity.

14.5. Severability. If any provision of this Agreement is held by a court of competent jurisdiction to be contrary to law, the provision shall be modified by the court and interpreted so as best to accomplish the objectives of the original provision to the fullest extent permitted by law, and the remaining provisions of this Agreement shall remain in effect.

14.6. Assignment. Neither party may assign any of its rights or obligations hereunder, whether by operation of law or otherwise, without the prior written consent of the other party (not to be unreasonably withheld). Notwithstanding the foregoing, either party may assign this Agreement in its entirety, without consent of the other party, to its Affiliate or in connection with a merger, acquisition, corporate reorganization, or sale of all or substantially all of its assets not involving a direct competitor of the other party. A party's sole remedy for any purported assignment by the other party in breach of this paragraph shall be, at the non-assigning party's election, termination of this Agreement upon written

notice to the assigning party Subject to the foregoing. This Agreement shall bind and inure to the benefit of the parties, their respective successors and permitted assigns.

14.7. Entire Agreement. This Software License Agreement, including all exhibits and addenda hereto, constitutes the entire license agreement between the parties and supersedes all prior and contemporaneous agreements, proposals or representations, written or oral, concerning its subject matter including but not limited to any Nexgrid online Terms and Use Conditions, Privacy Policy, or Warranty provisions. No modification, amendment, or waiver of any provision of this Agreement shall be effective, unless in writing, and either signed or accepted electronically by the party against whom the modification, amendment or waiver is to be asserted. However, to the extent of any conflict or inconsistency between the provisions in the body of this Agreement and any exhibit or addendum hereto, the terms of such exhibit or addendum shall prevail. Notwithstanding any language to the contrary therein, no terms or conditions stated in your purchase order, use of any online system, or other order documentation shall be incorporated into or form any part of this Agreement, and all such terms or conditions shall be null and void.

This Agreement and its exhibits contain the entire understanding and agreement between the parties respecting the subject matter hereof. This Agreement may not be supplemented, modified, amended, released or discharged except by an instrument in writing signed by each party's duly authorized representative. All captions and headings in this Agreement are for purposes of convenience only and shall not affect the construction or interpretation of any of its provisions. Any waiver by either party of any default or breach hereunder shall not constitute a waiver of any provision of this Agreement or of any subsequent default or breach of the same or a different kind.

Nexgrid, LLC

By: _ Name _____

Title: _ Date: _____

Licensee

By: _ Name _____

Title: _ Date: _____

PROFESSIONAL SERVICES AND SUPPORT AGREEMENT

This Professional Services and Support Agreement ("Agreement") is made as of the _____ day of January, 2018 by and between **Nexgrid, LLC**, a Virginia corporation "Nexgrid", with an address of 915 Maple Grove Dr., Suite 200, Fredericksburg, VA 22407, and the **Incorporated County of Los Alamos**, an incorporated county of the State of New Mexico ("Customer").

PREAMBLE
THIS PROFESSIONAL SERVICES AND SUPPORT AGREEMENT ("AGREEMENT") GOVERNS THE ONGOING SERVICE AND SUPPORT OF NEXGRID'S SOFTWARE PRODUCTS AS PROPOSED BY NEXGRID AND ANIXTER IN RESPONSE TO A REQUEST FOR PROPOSALS (RFP) AND ANIXTER AND NEXGRID'S MUTUAL PROPOSAL FOR SERVICES (PROPOSAL) TO CUSTOMER. NEXGRID HAS PARTNERED WITH ANIXTER, INC. FOR INSTALLATION OF NEXGRID PRODUCTS AND SOFTWARE ON COUNTY INFRASTRUCTURE AND SYSTEMS. ANIXTER, INC. AND NEXGRID (TOGETHER "CONTRACTORS") MUTUALLY AGREED AND WARRANTED THAT NEXGRID'S PRODUCTS AND SOFTWARE INSTALLED BY ANIXTER, INC. WOULD COMPLY WITH THE COUNTY'S RFP. SYSTEM AND PROJECT REQUIREMENTS. THE RFP AND CONTRACTOR'S PROPOSAL IS HEREBY INCLUDED BY REFERENCE.

1. DEFINITIONS

"**Affiliate**" means any entity which directly or indirectly controls, is controlled by, or is under common control with the subject entity. "Control," for purposes of this definition, means direct or indirect ownership or control of interests of the subject entity.

"**EDS**" means Energy Data Server. A Linux based server responsible for the management and operation of Nexgrid's smart grid devices. Additionally, the EDS includes a database component that stores all energy read and communication data.

"**Managed Devices**" means all communicating devices installed on the network that can be managed and/or monitored using the Nexgrid ecoOne or intelaHome portals. Examples include but are not limited to electric, water and gas modules, thermostats, street light sensors, load control switches, capacitor bank controllers, ecoNet Gateways, and repeaters.

"**Order Form**" means the ordering documents for purchases hereunder, including addenda thereto, that are entered into between You and Us from time to time. Order Forms shall be deemed incorporated herein by reference.

"**Software**" means the Nexgrid Software and all online web-based applications and platforms provided by Us via http://www.myecoone.com and/or http://intelahome.com, including associated offline components but excluding Third Party Applications. Software licensed to Licensee shall include but not be limited to Managed Device firmware, ecoOne, and intelaHome including any and all programs, code, system software, applications to make functional Nexgrid or related products such as, but not limited to, ecoNet SL, ecoOne, ecoStat, ecoSwitch, EDS Server and Firewall, intelaHome, intelaMeters Electric, intelaMeters Water, and other related and system integral parts.

"**Software License Agreement"** means the agreement You entered into with Us governing the use of Nexgrid's Software products.

"**System**" means all communicating devices, servers and cloud based portals that make up the metering network and system. Components include ecoNets, intelaMeters, ecoSwitches, ecoStats, Energy Data Server, ecoOne, and intelaHome.

"**Third-Party Applications**" means online, web-based applications and offline software products that are provided by third parties, interoperate with the Software, and are identified as third-party applications.

"**User Guide**" means the online user guide for the Software, accessible via http://www.myecoone.com under the customer support section as updated from time to.

"**Users**" means individuals who are authorized by You to use the Software, for whom subscriptions have been purchased, and who have been supplied user identifications and passwords by You (or by Us at Your request). Users may include but are not limited to Your customers, employees, consultants, contractors and agents; or third parties with which You transact business.

"**We**," "**Us**" or "**Our**" means Nexgrid, LLC the company who you are contracting with.

"**You**" or "**Your**" means the Customer or other legal entity for which you are accepting this Agreement and Affiliates of that company or entity. "Your Data" means all electronic data or information submitted by You to the Software.

2. USE OF THE SOFTWARE

2.1. Our Responsibilities. During the Term of this Agreement, we shall: (i) provide to You and your Users support for the System at no additional charge, (ii) use commercially reasonable efforts to make the System available 24 hours a day, 7 days a week, except for: (a) planned downtime (of which We shall give at least 8 hours notice via the Software and which We shall schedule to the extent practicable during the weekend hours from 6:00 p.m. Eastern Standard Time Friday to 3:00 a.m. Eastern Standard Time Monday), or (b) any unavailability caused by circumstances beyond Our reasonable control, including without limitation, acts of God, acts of government, flood, fire, earthquakes, civil unrest, acts of terror, strikes or other labor problems (other than those involving Our employees), or Internet Service Provider failures or delays, and (iii) provide the Software only in accordance with applicable laws and government regulations.

2.2. Coverage Commitment. We shall provide the coverage commitment as outlined in Appendix A of this agreement.

3. SUPPORT

3.1. TECHNICAL SUPPORT

(a) Access to Toll-Free Telephone Technical Support. Provided You have a current license and paid the applicable fees, Nexgrid will during its normal business hours of 8:00 a.m. to 6:00 p.m., Eastern Standard Time, Monday through Friday (except holidays) make a member of its technical support staff available by telephone to Your system administrator to assist You in the standard business use of the Software. Your system administrator will be responsible for the daily maintenance of the Software

per the User Guide, and will provide the first line technical support of the Software to Your customers. Telephone Technical Support includes assistance relating to any fixes and workarounds as well as minor modifications to reports available from ecoOne or EDS software.

(b) Support for Network and Managed Devices. Support services shall also cover support to any Project related network parts and system managed devices including but not limited to ecoNet Multi-Mesh network part, intelaMeters, ecoSwitches, ecoStats, Energy Data Server, ecoOne, intelaHome, or related parts, components, firmware, or software for the term of this Agreement. Support for non-project related networked Customer devices such as, but not limited to, thermostats, street light sensors, load control switches, or capacitor bank controllers or other item not installed as part of the project shall be outside Contractor support services, however the Parties may agree to additional support service(s) through an additional agreement or purchase order.

3.2. Remote monitoring. We will provide: (i) high level monitoring during normal business hours of 8:00 a.m. to 6:00 p.m., Eastern Standard Time, Monday through Friday (except holidays) including the performance of ecoOne and intelaHome cloud based servers and their connectivity to the Energy Data Server(s), (ii)quarterly status reports, and (iii) recommendations and adjustments to You to improve the performance of the System. Remote monitoring requires a network connection between the EDS servers and ecoOne cloud servers.

3.3. On-Site Support. We will provide, when necessary, on-site support of the System. On-site support shall be provided at a discounted rate which is stipulated in Appendix B. You would be responsible for all travel fees and standard per diem expenses to be based on the General Services Administration published rates.

3.4. Nexgrid Product Support. All Nexgrid products supported by this PSSA are warranted in accordance with the terms and provisions of the attached Warranty.

4. FEES AND PAYMENTS

4.1. Annual Subscription Fee. The annual System support fee is provided in Appendix C and will be invoiced annually in advance. The fee is based on the number of Managed Devices at the end of each calendar year with an annual minimal fee if $5,000.00 US. Quarterly prorated invoices will be sent to reflect any new Managed Devices added to the system beyond the annual renewal. Any additional ordered and agreed upon in writing custom integration services, which are not included in the annual fee, will be charged on a current account basis. If this Agreement is cancelled or terminated at any time during the Term, any unused portion (defined as fees and charges for any services past the Termination date) shall be returned to County within 90 days of the Termination.

Nexgrid is entitled to adjust the support fees and annual subscription fee at the annual renewal period of each year, but shall not exceed the combined Consumer Price Index yearly increase. Nexgrid shall provide 30-day advance notice of its intent to increase the annual fee(s) for the next annual Term. If selected, the extended term option provides a guaranteed Managed Device rate for a period of 3, 5, or 10 years. Any fees paid for the Extended Terms shall be made pursuant to Section 14 of this Agreement.

You shall pay all fees specified in this Agreement and any later authorized and issued Order Forms hereunder. Except as otherwise specified herein or in an Order Form, (i) fees are quoted and payable in United States dollars (ii) fees are based on System purchased and not actual usage. Managed Device totals are based on quarterly periods that end on the last day of March, June, September, and December Months and the annual renewal ends on December 31 unless otherwise specified in this agreement.

4.2. Invoicing and Payment. You agree to pay Us for the initial subscription term and any renewal subscription term(s) as set forth in Section 9.2 (Term of Subscriptions). Such charges shall be made in advance, either annually or in accordance with any different billing frequency stated in this Agreement. We will invoice You in advance unless otherwise stated in the Order Form, invoiced charges are due net 30 days from the invoice date. You are responsible for maintaining complete and accurate billing and contact information in the Software.

4.3. Overdue Charges. If any charges are not received from You by the due date, then at Our discretion, (a) such charges may accrue late interest at the rate of 1.5% of the outstanding balance per month, or the maximum rate permitted by law, whichever is lower, from the date such payment was due until the date paid, and/or (b) We may condition future subscription renewals and Order Forms on payment terms shorter than those specified in Section 5.2 (Invoicing and Payment).

4.4. Suspension of Service. If any amount owing by You under this or any other agreement for the subscription is 60 or more days overdue, We may, without limiting Our other rights and remedies, suspend all services and access to the Software until such amounts are paid in full.

4.5. Payment Disputes. We shall not exercise Our rights under Section 5.3 (Overdue Charges) or 5.4 (Suspension of Service) if the applicable charges are under reasonable and good-faith dispute and You are cooperating diligently to resolve the dispute. The parties agree to work together in good faith to resolve any disputes.

4.6. Taxes. Unless otherwise stated, Our fees do not include any taxes, levies, duties or similar governmental assessments of any nature, including but not limited to value-added, sales, use or withholding taxes, assessable by any local, state, provincial, federal or foreign jurisdiction (collectively, " Taxes"). We are responsible for paying all Taxes

associated with Your purchases hereunder. If We have the legal obligation to pay or collect Taxes for which You are responsible under this paragraph, the appropriate amount shall be invoiced to and paid by You, unless You provide Us with a valid tax exemption certificate authorized by the appropriate taxing authority. For clarity, We are solely responsible for taxes assessable against Us based on Our income, property and employees.

5. SYSTEM & PROFESSIONAL SUPPORT SERVICE EXCLUSIONS

5.1. Unless otherwise agreed to in writing by Nexgrid, this Agreement does not cover or include the following:

(a) Support of a Managed Device which has been modified or repaired other than by Nexgrid except those authorized by Nexgrid;

(b) Making specification changes or performing services connected with the relocation of a Managed Device unless specified by Us;

(c) Modification or replacement of a Managed Device, repair of damage, or increase in service time caused by failure to continually provide a suitable operational environment with all facilities prescribed by the applicable documentation; including, but not limited to, the failure to provide or the failure of adequate electrical power or temperature environment;

(d) Modification or replacement of a Managed Device, repair of damage, or increase in service time caused by the use of the Managed Device for other than the purposes for which it is authorized or not in accordance with the Materials operating guidelines;

(e) Modification or replacement of a Managed Device, repair of damage, or increase in service time caused by:

- accident

- natural or man-made disaster which shall include but not be limited to fire, water, wind, and lightning
- shipping and/or receiving
- neglect or misuse
- integration and/or support of any third-party hardware or software not authorized or allowed by Us.

(f) Modification or replacement of a Managed Device, or increase in service time caused by the use of the Managed Device in combination with other products or materials not furnished by Nexgrid or in combination with other Managed Device or materials furnished by, but not combined by, Nexgrid;

(g) Backing up or restoring programs and/or data;

(h) Keying, importing, converting or manipulation of data; and

(i) Installation of the Managed Device unless installed by authorized entity such as Anixter, Inc. or their designated sub-contractor.

5.2. At Your request and in Nexgrid's sole discretion, Nexgrid may perform any of the foregoing services on a billable Special Service basis or as part of a separate professional services agreement. You agree that any services rendered pursuant to Your request for service which is determined by Nexgrid to have been caused by a problem set forth above will be considered a "Special Service".

6. WARRANTIES AND DISCLAIMERS

6.1. Our Warranties. We warrant We have and will maintain the personnel, experience and knowledge necessary to qualify US for the particular support services to be performed under this Agreement. We shall perform the Services described herein in accordance with a standard that meets the industry standard of care for performance of the Services. The warranty for the Support Services shall be for 1 year from the date the services are rendered and shall be materially in accordance with this Agreement, the

RFP, and Proposal. Your exclusive remedy, unless otherwise provided or allowed by law, shall be as provided in Section 9.3 (Termination for Cause) and/or Section 9.4 (Refund or Payment upon Termination) below.

6.2. Mutual Warranties. Each party represents and warrants that (i) it has the legal power to enter into this Agreement, and (ii) it will not transmit to the other party any Malicious Code (except for Malicious Code previously transmitted to the warranting party by the other party).

6.3. Disclaimer. EXCEPT AS EXPRESSLY PROVIDED HEREIN, NEITHER PARTY MAKES ANY WARRANTIES OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, AND EACH PARTY SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW.

7. LIMITATION OF LIABILITY

7.1. Limitation of Liability. IN NO EVENT SHALL EITHER PARTY'S AGGREGATE LIABILITY ARISING OUT OF OR RELATED TO THIS AGREEMENT, WHETHER IN CONTRACT, TORT OR UNDER ANY OTHER THEORY OF LIABILITY, EXCEED THE TOTAL AMOUNT PAID BY YOU HEREUNDER OR, WITH RESPECT TO ANY SINGLE INCIDENT, THE LESSER OF $500,000 OR THE AMOUNT PAID BY YOU HEREUNDER IN THE 12 MONTHS PRECEDING THE INCIDENT. THE FOREGOING SHALL NOT LIMIT YOUR PAYMENT OBLIGATIONS UNDER SECTION 5 (FEES AND PAYMENT FOR SOFTWARE).

7.2. Exclusion of Consequential and Related Damages. IN NO EVENT SHALL EITHER PARTY HAVE ANY LIABILITY TO THE OTHER PARTY FOR ANY LOST PROFITS OR REVENUES OR FOR ANY INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, COVER OR PUNITIVE DAMAGES HOWEVER CAUSED, WHETHER IN CONTRACT, TORT OR UNDER ANY OTHER THEORY OF LIABILITY, AND WHETHER OR NOT THE PARTY HAS BEEN ADVISED OF THE

POSSIBILITY OF SUCH DAMAGES. THE FOREGOING DISCLAIMER SHALL NOT APPLY TO THE EXTENT PROHIBITED BY APPLICABLE LAW.

8. TERM AND TERMINATION

8.1. Term of Agreement. This Agreement commences on the date You accept it and continues until all annual subscriptions granted in accordance with this Agreement have expired or been terminated.

8.2. Term of Purchased User Subscriptions. Subscriptions purchased by You commence on the start date specified in the applicable Order Form and continue for the subscription term specified therein. Except as otherwise specified in the applicable Order Form, all annual subscriptions shall automatically renew for additional periods equal to the expiring subscription term or one year (whichever is shorter), unless either party gives the other notice of non-renewal at least 30 days before the end of the relevant subscription term. The per-unit Managed Device pricing during any such renewal term shall be the same as that during the prior term unless We have given You written notice of a pricing increase at least 30 days before the end of such prior term, in which case the pricing increase shall be effective upon renewal and thereafter.

8.3. Termination for Cause. You or Us may terminate this Agreement for the following: (i) upon 30 days written notice to the other party of a material breach if such breach remains uncured at the expiration of such period, (ii) if the other party becomes the subject of a petition in bankruptcy or any other proceeding relating to insolvency, receivership, liquidation or assignment for the benefit of creditors; (iii) Licensee may cancel this Agreement at any time with or without for convenience with thirty-days' notice but shall pay to Nexgrid any amounts then due under the Software License Agreement or Professional Support Services Agreement; or (iv) failure of Licensee to obtain continuing funding from the governing body. A party may terminate this

Agreement for cause: (i) upon 30 days written notice to the other party of a material breach if such breach remains uncured at the expiration of such period, or (ii) if the other party becomes the subject of a petition in bankruptcy or any other proceeding relating to insolvency, receivership, liquidation or assignment for the benefit of creditors.

8.4. Refund or Payment upon Termination. Upon any termination for cause by You, We shall refund You any prepaid fees covering the remainder of the term of all subscriptions after the effective date of termination. Upon any termination for cause by Us, You shall pay any unpaid fees covering the remainder of the term of all Order Forms after the effective date of termination, if allowed by State of New Mexico law. In no event shall any termination relieve You of the obligation to pay any fees payable to Us for the period prior to the effective date of termination.

8.5. Surviving Provisions. Section 5 (Fees and Payment for Software), 7.3 (Disclaimer), 8 (Limitation of Liability), 9.4 (Refund or Payment upon Termination), 10 (Who You Are Contracting With, Notices, Governing Law and Jurisdiction) and 11 (General Provisions) shall survive any termination or expiration of this Agreement.

9. GOVERNING LAW AND JURISDICTION

9.1. General. The English language version of this Agreement, if it shall have been translated into any other language, shall be the controlling version of this Agreement. This Agreement shall be governed by and constituted in accordance with the laws of the State of New Mexico. Each of the parties hereto hereby consents to the personal jurisdiction of the state and federal courts located in New Mexico with the venue to be in the First Judicial District Court, Los Alamos and to the use of the English language, for the adjudication of any claim or controversy arising under this Agreement.

9.2. Manner of Giving Notice. Except as otherwise specified in this Agreement, all notices, permissions and approvals hereunder shall be in writing and shall be deemed to have been given upon: (i) personal delivery, (ii) the second business day after mailing, (iii) the second business day after sending by confirmed facsimile, or (iv) the first business day after sending by email (provided email shall not be sufficient for notices of termination or an indemnifiable claim). Notices to You shall be addressed to the system administrator designated by You for Your relevant Software account, and in the case of billing-related notices, to the relevant billing contact designated by You.

9.3. Agreement to Governing Law and Jurisdiction. Each party agrees to the applicable governing law above without regard to choice or conflicts of law rules, and to the exclusive jurisdiction of the applicable courts above.

9.4. Waiver of Jury Trial. Each party hereby waives any right to jury trial in connection with any action or litigation in any way arising out of or related to this Agreement.

10. GENERAL PROVISIONS

10.1. Export Compliance. Each party shall comply with the export laws and regulations of the United States and other applicable jurisdictions in providing and using the Software. Without limiting the foregoing, (i) each party represents that it is not named on any U.S. government list of persons or entities prohibited from receiving exports, and (ii) You shall not permit Users to access or use Software in violation of any U.S. export embargo, prohibition or restriction.

10.2. Relationship of the Parties. The parties are independent contractors. This Agreement does not create a partnership, franchise, joint venture, agency, fiduciary, or employment relationship between the parties.

10.3. **No Third-Party Beneficiaries**. There are no third-party beneficiaries to this Agreement.

10.4. **Waiver and Cumulative Remedies**. No failure or delay by either party in exercising any right under this Agreement shall constitute a waiver of that right. Other than as expressly stated herein, the remedies provided herein are in addition to, and not exclusive of, any other remedies of a party at law or in equity.

10.5. **Severability**. If any provision of this Agreement is held by a court of competent jurisdiction to be contrary to law, the provision shall be modified by the court and interpreted so as best to accomplish the objectives of the original provision to the fullest extent permitted by law, and the remaining provisions of this Agreement shall remain in effect.

10.6. **Attorney Fees**. Attorney fees due to either party in any action arising from this Agreement shall be in accordance with State or federal law.

10.7. **Assignment**. Neither party may assign any of its rights or obligations hereunder, whether by operation of law or otherwise, without the prior written consent of the other party (not to be unreasonably withheld). Notwithstanding the foregoing, either party may assign this Agreement in its entirety (including all Order Forms), without consent of the other party, to its Affiliate or in connection with a merger, acquisition, corporate reorganization, or sale of all or substantially all of its assets not involving a direct competitor of the other party. A party's sole remedy for any purported assignment by the other party in breach of this paragraph shall be, at the non-assigning party's election, termination of this Agreement upon written notice to the assigning party. In the event of such a termination, We shall refund to You any prepaid fees covering the remainder of the term of all subscriptions after the effective date of

termination. Subject to the foregoing, this Agreement shall bind and inure to the benefit of the parties, their respective successors and permitted assigns.

10.8. **Entire Agreement**. This Professional Services and Support Agreement (PSSA), including all exhibits and addenda hereto, constitutes the entire PSSA between the parties and supersedes all prior and contemporaneous agreements, proposals or representations, written or oral, concerning its subject matter including but not limited to any Nexgrid online Terms and Use Conditions, Privacy Policy, or Warranty provisions. No modification, amendment, or waiver of any provision of this Agreement shall be effective, unless in writing, and either signed or accepted electronically by the party against whom the modification, amendment or waiver is to be asserted. However, to the extent of any conflict or inconsistency between the provisions in the body of this Agreement and any exhibit or addendum hereto, the terms of such exhibit or addendum shall prevail. Notwithstanding any language to the contrary therein, no terms or conditions stated in your purchase order, use of any online system, or other order documentation shall be incorporated into or form any part of this Agreement, and all such terms or conditions shall be null and void..

This Agreement may not be supplemented, modified, amended, released or discharged except by an instrument in writing signed by each party's duly authorized representative. All captions and headings in this Agreement are for purposes of convenience only and shall not affect the construction or interpretation of any of its provisions. Any waiver by either party of any default or breach hereunder shall not constitute a waiver of any provision of this Agreement or of any subsequent default or breach of the same or a different kind.

11. EXTENDED TERM

11.1. **Extended Term Option**. Selecting an extended term option guarantees a fixed Annual Managed Device rate for the overall term of the Agreement. The Managed

Device fee is guaranteed not to escalate during the selected term. If no extended term is selected, this agreement will default to the standard annual renewal.

11.2. Extended Term Early Termination. If you have selected an extended term option and this agreement is terminated prior to the selected term as defined in section 9, you will be charged the difference between the current standard annual subscription fee on the date of termination minus the extended term option rate paid.

11.3. Extended term subscriptions (fixed fee).

- ☐ 3-year Extended Term Licensing
- ☐ 5-year Extended Term Licensing
- ☑ 7-year Extended Term Licensing
- ☐ 10-year Extended Term Licensing

IN WITNESS WHEREOF, the parties have caused their duly authorized representatives to execute this agreement.

Nexgrid, LLC

By: _____ Name _____

Title: _____ Date: _____

The Incorporated County of Los Alamos

By: _____ Name _____

Title: Timothy Glasco, Utility Director Date: _____

APPENDIX A

COVERAGE COMMITMENT.

i. Subject to the availability of the County's "backbone" system Nexgrid agrees to satisfy this Coverage Commitment.

ii. Nexgrid agrees to satisfy the Coverage Commitment as defined herein for the duration of the Coverage Commitment Term. Coverage Commitment shall mean reaching ninety-nine and one-half percent (99.5%) of the installed base of active electric meters via on-request read twenty four (24) hours per day and seven (7) days a week in all weather conditions, excluding non-reporting meter/modules found to be in failure due to County-side problems (such as meter tampering, a damaged meter, a damaged transformer, or other County-related or non-AMI related problem), and except for a Force Majeure event. One hundred percent (100%) of meters must be read within a three (3) day billing cycle. Coverage Commitment Term shall mean five (5) years from the date that ninety-five percent (95%) of electric automated meters and modules are installed and have associated with the automated master system.

iii. In the event the Coverage Commitment is not met, the costs of the additional equipment including additional ecoNet Gateways, ecoSwitch SL repeaters and associated brackets and mounting kits will be the responsibility of Nexgrid

APPENDIX B

Maintenance and Support Fees:

Managed Device Annual Fee	**$2.50 per managed device or a minimum $5,000.00 (the greater of the two)**
Software Developer	**$150. Hour**
On-Site Support Engineer	**$150. Hour**

Last updated: January 4, 2018

APPENDIX C

Limited Product Warranty Agreement and Notices

Nexgrid, LLC

CAREFULLY READ THE TERMS AND CONDITIONS OF THIS AGREEMENT BEFORE INSTALLING ANY PRODUCT. THE USE OF ANY NEXGRID PRODUCTS INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THE TERMS AND CONDITIONS OF THIS AGREEMENT, PROMPTLY RETURN THE PRODUCT UNOPENED TO NEXGRID.

Warranty. For a period of ten (10) years from the date of the authorized purchase of the Products from Nexgrid by Customer, as defined below, Nexgrid warrants to Customer only that Product(s), as defined below, shipped under this Agreement, will: (i) be newly manufactured or warranted as equivalent to new, and (ii) be free from defects in material and workmanship. For the purpose of this Agreement, "Customer" is defined as the authorized purchaser of the Products from Nexgrid, which is and includes the Incorporated County of Los Alamos, and the term does not include any assignee or subsequent purchaser from an authorized Customer, or any other third party. For the purposes of this Agreement, "Product(s)" is defined as the hardware shipped to Customer by Nexgrid, including the software components of the hardware. For the purposes of this Agreement, "Products" shall not include the intelaHome and ecoOne applications. "Products" shall not include third party solutions including but not limited to electric meters, water meters, gas meters and thermostats.

Exclusions from Warranty. Nexgrid shall have no obligation under this Warranty or otherwise for correcting, curing, or otherwise remedying any nonconformity or defect with respect to the condition or operation of any system of which the Product was a part including but not limited to, the effective non-compliance of all or part of any system of which the Product was a part under applicable FCC or other governmental regulations.

No License; Intellectual Property of Nexgrid and Others. Except as expressly provided, nothing within any of the Products shall be construed as conferring any license under any of the Nexgrid's or any third party's intellectual property rights, whether by estoppel, implication, waiver, or otherwise. Without limiting the generality of the foregoing, you acknowledge and agree that the Products provided are protected by copyright, trademark, patent, or other proprietary rights of Nexgrid and its affiliates, licensors, and service providers. Except as expressly provided to the contrary, you agree not to modify, alter, or deface any of the trademarks, service marks, or other intellectual property made available by Nexgrid in connection with the Products. You agree not to hold yourself out as in any way sponsored by, affiliated with, or endorsed by Nexgrid, any of Nexgrid's' affiliates, or any of Nexgrid's' service providers. You agree not to use any of the trademarks or service marks or other content accessible from Nexgrid of any purpose other than the purpose for which such content is made available to Customers of Nexgrid. You agree not to adapt, translate, modify, decompile, disassemble, or reverse engineer the Products and services or any software or programs used in connection with the Nexgrid Products.

Remedy. For a period of ten years (10) from the date of the authorized purchase by Customer, Nexgrid warrants Products to be free from defects in materials and workmanship. Specifically,

Nexgrid will repair or replace, at its discretion, qualified Nexgrid products at no cost during the first two (2) years of the Warranty, and at prorated price discounts during the last eight (8) years of the Warranty. Nexgrid will apply these prorated price discounts to Product list prices in effect at the time of Product return and according to the following prorated price discount schedule:
Years 3 through 4: 50% discount straight line proration
Years 5 through 6: 35% discount straight line proration
Years 7 through 10: 25% discount straight line proration

Customer's exclusive remedy, for any breach of the Warranty, including any cause of action arising in contract, tort, strict liability or otherwise, or for any defect or nonconformity of a Product shall be the replacement by Nexgrid of any defective Product returned to Nexgrid by Customer with identical or comparable Product or components, or at the option of Nexgrid the repair and return of the defective Product to Customer within 30 days of receipt of the defective Product by Nexgrid; provided however that Customer returns the defective Product with a Return Material Authorization (RMA) questionnaire and obtains an RMA number from Nexgrid; and further provided that all returns shall be properly packaged for shipping purposes. Any Product returned to Nexgrid without prior authorization for its return or proper packaging may be refused at the option of Nexgrid. For products under warranty, Nexgrid shall pay all shipping cost to return the Product to Nexgrid. Any Product returned to Nexgrid that upon inspection by Nexgrid is deemed to be functioning properly (e.g., not under Warranty) will be returned to the Customer who will be charged a diagnostic fee of $30.00 for each Product plus the costs of shipping. The Customer will also be charged a return shipping and handling fee of $9.00 for each non-defective Product returned to the Customer.

Replacement. In the event a returned Product cannot be repaired or is no longer commercially available Nexgrid shall apply a credit to the available replacement product equal to the prorated price discounts to the replacement Product list prices in effect at the time of Product return. The credits are listed below:
Years 1 through 2: 100% credit
Years 3 through 4: 50% credit straight line proration
Years 5 through 6: 35% credit straight line proration
Years 7 through 10: 25% credit straight line proration

Exclusions from Warranty. Nexgrid shall have no obligation under this Warranty or otherwise for correcting, curing, or otherwise remedying any nonconformity or defect with respect to the condition or operation of any system of which the Product was a part.

Supervision. Except as otherwise expressly provided herein, or as may be otherwise agreed upon through a separate Professional Services and Support Agreement (PSSA), Nexgrid shall not be responsible for technical support of users other than the Customer.

Limitations of Warranty. THE FOREGOING WARRANTY AND REMEDIES ARE EXCLUSIVE AND MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR OTHERWISE, INCLUDING WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (INCLUDING BANDWIDTH PERFORMANCE). NEXGRID DOES NOT ASSUME OR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH ITS PRODUCTS.

Disclaimer. EXCEPT AS SETFORTH ABOVE, NEXGRID DISCLAIMS ANY AND ALL PROMISES, REPRESENTATIONS, AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR USE WITH RESPECT TO

THE PRODUCTS. BY WAY OF ILLUSTRATION THIS EXCLUSION INCLUDES BUT IS NOT LIMITED TO CONDITION, LATENT AND HIDDEN DEFECTS, AND ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE (INCLUDING BANDWIDTH PERFORMANCE) AND WITH RESPECT TO THE NATURE AND QUALITY OF ANY OTHER PERFORMANCE BY NEXGRID HEREUNDER. DUE TO ABSENCE OF CERTAIN APPLICABLE REGULATORY STANDARDS OR GUIDELINES (COLLECTIVELY "REGULATORY STANDARDS"), THERE CAN BE NO ASSURANCE THAT SUCH REGULATORY STANDARDS WILL BE DEFINED OR ENACTED OR IN THE EVENT ANY REGULATORY STANDARDS ARE ENACTED, THE PRODUCT WILL BE FOUND COMPLIANT THEREWITH OR THAT THE PRODUCT'S PERFORMANCE WILL NOT BE ADVERSELY AFFECTED.

IN NO EVENT SHALL NEXGRID BE LIABLE TO CUSTOMER AND/OR END USERS FOR ANY INCIDENTAL, SPECIAL, INDIRECT, EXEMPLARY, OR CONSEQUENTIAL LOSS OR DAMAGES, INCLUDING BUT NOT LIMITED TO, LOSS OF BUSINESS, MANPOWER, LABOR COSTS, PROFIT, REVENUE AND/OR DATA WHETHER ARISING FROM BREACH OF CONTRACT, TORT STRICT LIABILITY OR OTHERWISE OR ANY CLAIMS OR DEMANDS BROUGHT AGAINST ONE PARTY BY ANY OTHER PARTY OR OTHERWISE, EVEN IF THE PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH CLAIMS OR DEMANDS.

Limited License. Nexgrid grants Customer the right to use Nexgrid Software included with the hardware so long as Customer uses the program together with the hardware, or servicing such hardware and are authorized to do so by Nexgrid; provided, however, that distribution of the Nexgrid Software and all encryption programs and feature activation software supplied to Customer (collectively, the "Software"), and other printed materials accompanying the Software ("Documentation") shall be accomplished per this Agreement or by separate License Agreement with Nexgrid.

Software is owned by Nexgrid and its suppliers and is protected by United States and international copyright laws and international trade provisions. Customer must treat the Software like any other copyrighted material. Customer acknowledges that no title to the intellectual property in the Software is transferred to Customer, and Customer will not acquire any rights to the Software except as expressly set forth herein.

Customer agrees not to attempt, and to use reasonable efforts to prevent Customer's employees and contractors from attempting to copy, modify, distribute, reverse engineer, disassemble, decompile, or make any attempt to discover the source code of the Software, including encryption programs and feature activation software, except to the extent that such prohibition is restricted by applicable law.

THE WARRANTIES PROVIDED HEREIN ARE PROVIDED BY NEXGRID AND NOT NEXGRID'S SUPPLIERS. CUSTOMER ACKNOWLEDGES THAT THE NEXGRID PRODUCTS MAY INCLUDE ENCRYPTION TECHNOLOGY, FOR WHICH EXPORT CONTROLS HAVE BEEN IMPOSED BY THE UNITED STATES AND FOREIGN GOVERNMENT ENTITIES.

In exercising its rights under this Agreement, Customer shall not export or re-export the Nexgrid Products in violation of export control, law or regulation imposed on the Nexgrid Products by the United States or any other country or organization or nations within whose jurisdiction Customer operates or does business.

If this Software is to be acquired by the U.S. Government, the Software and related Documentation is commercial computer software and commercial computer software

documentation developed exclusively at private expense, and (i) if acquired by or on behalf of a civilian agency, shall be subject to the terms of this computer software license as specified in 48 C.F.R. 12.212 of the Federal Acquisition Regulations and its successors; and (ii) if acquired by or on behalf of Products of the Department of Defense ("DOD") shall be subject to the terms of this commercial computer software license as specified in 48 C.F.R. 227.7202-2, DOD FAR Supplement.

Termination. This Agreement is effective until terminated. Customer may terminate this warranty at any time. This Agreement also will terminate if Customer does not comply with any terms or conditions of this Agreement. This Agreement will also terminate with the termination of the Nexgrid Professional Services and Support Agreement.

Federal Communication Commission (FCC). This device complies with Part 15 of the FCC Rules and Regulations. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses, and can radiate radio-frequency energy and may cause harmful interference to radio communications. If this equipment does cause harmful interference, which can be determined by turning the equipment on and off, the user/operator is encouraged to correct the interference by one or more of the following measures:

- Increase the separation between the affected equipment and the Product;
- Enable the notch protocol;
- Decrease the Product power level;
- Remove or turn-off the Product.

Important Notes:

1. Intentional or unintentional changes or modifications must not be made unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.
2. If the operator chooses to operate the Product above the maximum setting recommended for reasonable assurance of compliance with Part 15 emissions limits, it is recommended that the operator perform emissions testing to demonstrate the Product in-situ remains in compliance at the higher power level.
3. Nexgrid makes no guarantee that the system will operate at lower power levels, with or without frequency notches, if upon reducing power levels and or implementing notch schemes the system is unstable we recommend that network design be modified to include additional repeaters, reduce cell coverage area among other strategies.

EXHIBIT E-1
NEXGRID WARRANTY

Limited Product Warranty Agreement and Notices

Nexgrid, LLC

CAREFULLY READ THE TERMS AND CONDITIONS OF THIS AGREEMENT BEFORE INSTALLING ANY PRODUCT. THE USE OF ANY NEXGRID PRODUCTS INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THE TERMS AND CONDITIONS OF THIS AGREEMENT, PROMPTLY RETURN THE PRODUCT UNOPENED TO NEXGRID.

Warranty. For a period of ten (10) years from the date of the authorized purchase of the Products from Nexgrid by Customer, as defined below, Nexgrid warrants to Customer only that Product(s), as defined below, shipped under this Agreement, will: (i) be newly manufactured or warranted as equivalent to new, and (ii) be free from defects in material and workmanship. For the purpose of this Agreement, "Customer" is defined as the authorized purchaser of the Products from Nexgrid, which is and includes the Incorporated County of Los Alamos, and the term does not include any assignee or subsequent purchaser from an authorized Customer, or any other third party. For the purposes of this Agreement, "Product(s)" is defined as the hardware shipped to Customer by Nexgrid, including the software components of the hardware. For the purposes of this Agreement, "Products" shall not include the intelaHome and ecoOne applications. "Products" shall not include third party solutions including but not limited to electric meters, water meters, gas meters and thermostats.

Exclusions from Warranty. Nexgrid shall have no obligation under this Warranty or otherwise for correcting, curing, or otherwise remedying any nonconformity or defect with respect to the condition or operation of any system of which the Product was a part including but not limited to, the effective non-compliance of all or part of any system of which the Product was a part under applicable FCC or other governmental regulations.

No License; Intellectual Property of Nexgrid and Others. Except as expressly provided, nothing within any of the Products shall be construed as conferring any license under any of the Nexgrid's or any third party's intellectual property rights, whether by estoppel, implication, waiver, or otherwise. Without limiting the generality of the foregoing, you acknowledge and agree that the Products provided are protected by copyright, trademark, patent, or other proprietary rights of Nexgrid and its affiliates, licensors, and service providers. Except as expressly provided to the contrary, you agree not to modify, alter, or deface any of the trademarks, service marks, or other intellectual property made available by Nexgrid in connection with the Products. You agree not to hold yourself out as in any way sponsored by, affiliated with, or endorsed by Nexgrid, any of Nexgrid's' affiliates, or any of Nexgrid's' service providers. You agree not to use any of the trademarks or service marks or other content accessible from Nexgrid of any purpose other than the purpose for which such content is made available to Customers of Nexgrid. You agree not to adapt, translate, modify, decompile, disassemble, or reverse engineer the Products and services or any software or programs used in connection with the Nexgrid Products.

Remedy. For a period of ten years (10) from the date of the authorized purchase by Customer, Nexgrid warrants Products to be free from defects in materials and workmanship. Specifically, Nexgrid will repair or replace, at its discretion, qualified Nexgrid products at no cost during the first two (2) years of the Warranty, and at prorated price discounts during the last eight (8) years of the Warranty. Nexgrid will apply these prorated price discounts to Product list prices in effect at the time of Product return and according to the following prorated price discount schedule:
Years 3 through 4: 50% discount straight line proration

Years 5 through 6: 35% discount straight line proration
Years 7 through 10: 25% discount straight line proration

Customer's exclusive remedy, for any breach of the Warranty, including any cause of action arising in contract, tort, strict liability or otherwise, or for any defect or nonconformity of a Product shall be the replacement by Nexgrid of any defective Product returned to Nexgrid by Customer with identical or comparable Product or components, or at the option of Nexgrid the repair and return of the defective Product to Customer within 30 days of receipt of the defective Product by Nexgrid; provided however that Customer returns the defective Product with a Return Material Authorization (RMA) questionnaire and obtains an RMA number from Nexgrid; and further provided that all returns shall be properly packaged for shipping purposes. Any Product returned to Nexgrid without prior authorization for its return or proper packaging may be refused at the option of Nexgrid. For products under warranty, Nexgrid shall pay all shipping cost to return the Product to Nexgrid. Any Product returned to Nexgrid that upon inspection by Nexgrid is deemed to be functioning properly (e.g., not under Warranty) will be returned to the Customer who will be charged a diagnostic fee of $30.00 for each Product plus the costs of shipping. The Customer will also be charged a return shipping and handling fee of $9.00 for each non-defective Product returned to the Customer.

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Years 1 through 2: 100% credit
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Years 5 through 6: 35% credit straight line proration
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Exclusions from Warranty. Nexgrid shall have no obligation under this Warranty or otherwise for correcting, curing, or otherwise remedying any nonconformity or defect with respect to the condition or operation of any system of which the Product was a part.

Supervision. Except as otherwise expressly provided herein, or as may be otherwise agreed upon through a separate Professional Services and Support Agreement (PSSA), Nexgrid shall not be responsible for technical support of users other than the Customer.

Limitations of Warranty. THE FOREGOING WARRANTY AND REMEDIES ARE EXCLUSIVE AND MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR OTHERWISE, INCLUDING WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (INCLUDING BANDWIDTH PERFORMANCE). NEXGRID DOES NOT ASSUME OR AUTHORIZE ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH ITS PRODUCTS.

Disclaimer. EXCEPT AS SETFORTH ABOVE, NEXGRID DISCLAIMS ANY AND ALL PROMISES, REPRESENTATIONS, AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR USE WITH RESPECT TO THE PRODUCTS. BY WAY OF ILLUSTRATION THIS EXCLUSION INCLUDES BUT IS NOT LIMITED TO CONDITION, LATENT AND HIDDEN DEFECTS, AND ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR USE (INCLUDING BANDWIDTH PERFORMANCE) AND WITH RESPECT TO THE NATURE AND QUALITY OF ANY OTHER PERFORMANCE BY NEXGRID HEREUNDER. DUE TO ABSENCE OF CERTAIN APPLICABLE REGULATORY STANDARDS OR GUIDELINES (COLLECTIVELY "REGULATORY STANDARDS"), THERE CAN BE NO ASSURANCE THAT SUCH REGULATORY STANDARDS WILL BE DEFINED OR ENACTED OR IN THE EVENT ANY REGULATORY STANDARDS ARE ENACTED, THE

PRODUCT WILL BE FOUND COMPLIANT THEREWITH OR THAT THE PRODUCT'S PERFORMANCE WILL NOT BE ADVERSELY AFFECTED.

IN NO EVENT SHALL NEXGRID BE LIABLE TO CUSTOMER AND/OR END USERS FOR ANY INCIDENTAL, SPECIAL, INDIRECT, EXEMPLARY, OR CONSEQUENTIAL LOSS OR DAMAGES, INCLUDING BUT NOT LIMITED TO, LOSS OF BUSINESS, MANPOWER, LABOR COSTS, PROFIT, REVENUE AND/OR DATA WHETHER ARISING FROM BREACH OF CONTRACT, TORT STRICT LIABILITY OR OTHERWISE OR ANY CLAIMS OR DEMANDS BROUGHT AGAINST ONE PARTY BY ANY OTHER PARTY OR OTHERWISE, EVEN IF THE PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH CLAIMS OR DEMANDS.

Limited License. Nexgrid grants Customer the right to use Nexgrid Software included with the hardware so long as Customer uses the program together with the hardware, or servicing such hardware and are authorized to do so by Nexgrid; provided, however, that distribution of the Nexgrid Software and all encryption programs and feature activation software supplied to Customer (collectively, the "Software"), and other printed materials accompanying the Software ("Documentation") shall be accomplished per this Agreement or by separate License Agreement with Nexgrid.

Software is owned by Nexgrid and its suppliers and is protected by United States and international copyright laws and international trade provisions. Customer must treat the Software like any other copyrighted material. Customer acknowledges that no title to the intellectual property in the Software is transferred to Customer, and Customer will not acquire any rights to the Software except as expressly set forth herein.

Customer agrees not to attempt, and to use reasonable efforts to prevent Customer's employees and contractors from attempting to copy, modify, distribute, reverse engineer, disassemble, decompile, or make any attempt to discover the source code of the Software, including encryption programs and feature activation software, except to the extent that such prohibition is restricted by applicable law.

THE WARRANTIES PROVIDED HEREIN ARE PROVIDED BY NEXGRID AND NOT NEXGRID'S SUPPLIERS. CUSTOMER ACKNOWLEDGES THAT THE NEXGRID PRODUCTS MAY INCLUDE ENCRYPTION TECHNOLOGY, FOR WHICH EXPORT CONTROLS HAVE BEEN IMPOSED BY THE UNITED STATES AND FOREIGN GOVERNMENT ENTITIES.

In exercising its rights under this Agreement, Customer shall not export or re-export the Nexgrid Products in violation of export control, law or regulation imposed on the Nexgrid Products by the United States or any other country or organization or nations within whose jurisdiction Customer operates or does business.

If this Software is to be acquired by the U.S. Government, the Software and related Documentation is commercial computer software and commercial computer software documentation developed exclusively at private expense, and (i) if acquired by or on behalf of a civilian agency, shall be subject to the terms of this computer software license as specified in 48 C.F.R. 12.212 of the Federal Acquisition Regulations and its successors; and (ii) if acquired by or on behalf of Products of the Department of Defense ("DOD") shall be subject to the terms of this commercial computer software license as specified in 48 C.F.R. 227.7202-2, DOD FAR Supplement.

Termination. This Agreement is effective until terminated. Customer may terminate this warranty at any time. This Agreement also will terminate if Customer does not comply with any terms or conditions of this Agreement. This Agreement will also terminate with the termination of the Nexgrid Professional Services and Support Agreement.

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This equipment has been tested and found to comply with the limits pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses, and can radiate radio-frequency energy and may cause harmful interference to radio communications. If this equipment does cause harmful interference, which can be determined by turning the equipment on and off, the user/operator is encouraged to correct the interference by one or more of the following measures:

- Increase the separation between the affected equipment and the Product;
- Enable the notch protocol;
- Decrease the Product power level;
- Remove or turn-off the Product.

Important Notes:

1. Intentional or unintentional changes or modifications must not be made unless under the express consent of the party responsible for compliance. Any such modifications could void the user's authority to operate the equipment and will void the manufacturer's warranty.
2. If the operator chooses to operate the Product above the maximum setting recommended for reasonable assurance of compliance with Part 15 emissions limits, it is recommended that the operator perform emissions testing to demonstrate the Product in-situ remains in compliance at the higher power level.
3. Nexgrid makes no guarantee that the system will operate at lower power levels, with or without frequency notches, if upon reducing power levels and or implementing notch schemes the system is unstable we recommend that network design be modified to include additional repeaters, reduce cell coverage area among other strategies.

EXHIBIT E-2
ACLARA WARRANTIES

Aclara Hardware Warranties

- Aclara Meters Equipment Warranty

Aclara Meters LLC (Aclara Meters) Equipment Warranty

Seller warrants that Products shall be delivered free from defects in material, workmanship and title and that Services shall be performed in a competent, diligent manner in accordance with any mutually agreed specifications.

The warranty for Products shall expire one (1) year from first use or eighteen (18) months from delivery, whichever occurs first, except that software is warranted for ninety (90) days from delivery. The warranty for Services shall expire one (1) year after performance of the Service, except that software-related Services are warranted for ninety (90) days.

If Products or Services do not meet the above warranties, Buyer shall promptly notify Seller in writing prior to expiration of the warranty period. Seller shall (i) at its option, repair or replace defective Products and (ii) re-perform defective Services. If despite Seller's reasonable efforts, a non-conforming Product cannot be repaired or replaced, or non-conforming Services cannot be re-performed, Seller shall refund or credit monies paid by Buyer for such non-conforming Products and Services. Warranty repair, replacement or re-performance by Seller shall not extend or renew the applicable warranty period. Buyer shall obtain Seller's agreement on the specifications of any tests it plans to conduct to determine whether a non-conformance exists.

Buyer shall bear the costs of access for Seller's remedial warranty efforts (including removal and replacement of systems, structures or other parts of Buyer's facility), de-installation, decontamination, re-installation and transportation of defective Products to Seller and back to Buyer.

The warranties and remedies are conditioned upon (a) proper storage, installation, use, operation, and maintenance of Products, (b) Buyer keeping accurate and complete records of operation and maintenance during the warranty period and providing Seller access to those records, and (c) modification or repair of Products or Services only as authorized by Seller in writing. Failure to meet any such conditions renders the warranty null and void. Seller is not responsible for normal wear and tear.

This Article 5 provides the exclusive remedies for all claims based on failure of or defect in Products or Services, regardless of when the failure or defect arises, and whether a claim, however described, is based on contract, warranty, indemnity, tort/extra-contractual liability (including negligence), strict liability or otherwise. The warranties provided in this Article 5 are exclusive and are in lieu of all other warranties, conditions and guarantees whether written, oral, implied or statutory.

NO IMPLIED OR STATUTORY WARRANTY, OR WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE APPLIES.

EXHIBIT F. COVERAGE COMMITMENT

Subject to the availability of the County's "backbone" system Contractor agrees to satisfy this Coverage Commitment.

Contractor agrees to satisfy the Coverage Commitment as defined herein for the duration of the Coverage Commitment Term. Coverage Commitment shall mean reaching ninety-nine and one-half percent (99.5%) of the installed base of active electric meters via on-request read twenty four (24) hours per day and seven (7) days a week in all weather conditions, excluding non-reporting meter/modules found to be in failure due to County-side problems (such as meter tampering, a damaged meter, a damaged transformer, or other County-related or non-AMI related problem), and except for a Force Majeure event. One hundred percent (100%) of meters must be read within a three (3) day billing cycle. Coverage Commitment Term shall mean five (5) years from the date that ninety-five percent (95%) of electric automated meters and modules are installed and have associated with the automated master system.

In the event the Coverage Commitment is not met, the costs of the additional equipment including additional ecoNet Gateways, ecoSwitch SL repeaters and associated brackets and mounting kits will be the responsibility of Contractor.

EXHIBIT G. SYSTEM AND FINAL ACCEPTANCE TESTING

The following has been submitted to Nexgrid

- ☐ Hard or soft copy maps marked with existing backbone locations
- ☐ Hard or soft copy maps marked with designated smart grid end devices areas
- ☐ Secured static public IP address
- ☐ Sample billing file and documentation
- ☐ Fully completed Questionnaire

Nexgrid Has Submitted

- ☐ Initial Map with Gateways (ecoNets) Locations

Phase 1-2 SignOff

- ☐ Phase 1 summary call has been conducted
- ☐ Project plan has been submitted and signed off
- ☐ Kick Off Meeting has been conducted

Delivery & Deployment

EDS & ecoOne

- ☐ EDS Cluster has been installed
- ☐ Utility administrator users has been setup in ecoOne
- ☐ Network monitor and control is accessible on ecoOne

Hardware Delivery

- ☐ Agreed upon Hardware Quantities for project phase has been delivered

Installation, Read & Control

- ☐ Access Points (backboned ecoNets) has been installed
- ☐ Access Points (backboned ecoNets) are visible and controllable via ecoOne
- ☐ Option: (if exists in design) Repeaters have been installed
- ☐ Option: (if exists in design) Repeaters are visible and controllable via ecoOne
- ☐ Over ____% of end devices agreed to be installed at this phase have been installed
- ☐ Over ____% of the installed end devices are visible via ecoOne
- ☐ Over ____% of the installed end device meter reads are available in ecoOne reports
- ☐ Option: over ____% of installed Street Lights are functioning according to their set schedule
- ☐ Option: over ____% of installed Load Control devices are functioning according to their set schedule

Data & Billing

- ☐ Billing Process is working well and signed off
- ☐ Option: (if exists) ecoOne has completely synced assets data from 3rd party system
- ☐ Option: continues pre-defined schedule sync process is running for data integrity

Signatures

Nexgrid	Customer

Budget Revision 2018-07 Advanced Metering Infrastructure (AMI)

	Fund/Dept	Brass Org	Revenue (decrease)	Expenditures (decrease)	Transfers In(Out)	Fund Balance (decrease)
1	Utilites - Electric Production	511-855111	$ -	$ (2,474,717)	$ -	
1	Utilites - Electric Distribution	512-852291	$ -	$ (631,176)	$ -	
1	Utilites - Gas	531-853391	$ -	$ 1,770,779	$ -	
1	Utilites - Water Distribution	541-854491	$ -	$ 1,335,115	$ -	

Description: The purpose of this budget revision is to move budget spending authority between subfunds based on the allocation for the AMI project. The total cost of the AMI project is $4,974,717. Revenue bonds issued in 2014 funded $2.5 million of this project which was carried over from FY2017 into FY2018 for Electric Distribution. Additionally, Electric Production carried over an additional $2.5 million budget authority into FY2018 from FY2017 operational savings. The total cost, including contingency, for the AMI project of $4,974,717 is being split between Electric Distribution ($1,868,824), Gas ($1,770,779) and Water Distribution ($1,335,115).

Fiscal Impact: There is no impact on the Joint Utilities Fund. This budget revision moves spending authority only between subfunds of the Joint Utilities Fund.

Power System Engineering, Inc.

Los Alamos Department of Public Utilities (DPU)

Draft AMI Economic Study

Los Alamos County
where discoveries are made...

Sarah Pink and Kyle Kopczyk

Power System Engineering, Inc.
www.powersystem.org

August 26, 2015

Power System Engineering, Inc.

Why is Los Alamos Interested in AMI?

$ Tangible benefits in model
(Economic benefits visible in PSE business case)

↑ Intangible benefits
(Not visible in the PSE business case)

Interest Areas	Stakeholder Benefits: Customer Service	Rates Impact	Power Quality	Reliability	Conservation
Operations and labor efficiencies	$ ↑	↑			
End of line voltage readings			↑		
Improved outage identification and restoration management				$ ↑	
Web portal access to account	$ ↑				↑
Time of use billing (PTR, CPP, others)	↑	↑			↑
Prepaid metering	↑				↑
Additional load control (future)					↑

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Power System Engineering, Inc.

Scenario Quick Comparison

Variable Component	Scenario 1	Scenario 2	Scenario 3
AMI Technology	Tower (Similar to Tantalus)	RF Mesh (Similar to L+G)	RF Mesh (Similar to L+G)
MDMS	Yes	Yes	Yes
# of AMI Meters/Modules Deployed	24,593	24,593	24,593
Deployment Time	1 Year	1 Year	1 Year
Meter Acc. Increase	1.9%	1.9%	1.9%
Assumed Meter Acc.	98%	98%	98%
Residential Disconnects	10%	10%	100%

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Los Alamos County

AMI Scenario 2

Variable Component	Scenario 2
AMI Technology	RF Mesh (Similar to L+G)
MDMS	Yes
# of AMI Meters/Modules Deployed	24,593
Deployment Time	1 Year
Meter Acc. Increase	1.9%
Assumed Meter Acc.	98%
Residential Disconnects	10%

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AMI Scenario 2: Costs/Benefits

15 Year Net Present Value (nearest $100k)	**$ 300,000**
Internal Rate of Return	**11.0%**
Discounted Breakeven Year	**14**

Total Benefits

Benefit Category	15 Yr PV	Benefit per Meter	% of Total Benefit
Avoided Meter Replacement and Present Meter Reading System Costs	$ 1,636,000	$ 66.51	30%
Meter Accuracy Savings	$ 1,407,000	$ 57.19	26%
Reduction in Connects/Disconnects/Off-cycle Read Costs	$ 1,133,000	$ 46.08	21%
Meter Reading Savings - On-Cycle	$ 447,000	$ 18.16	8%
Water Loss Reduction	$ 337,000	$ 13.69	6%
High Bill and Estimate Call Savings & Works Comp Reduction	$ 248,000	$ 10.10	5%
Theft Protection	$ 189,000	$ 7.68	3%
Outage Management (No lights calls, crew optimization)	$ 62,000	$ 2.51	1%
Peak Time Rebate	$ 0	$ -	0%
Cash flow - reduced short term interest	$ 0	$ -	0%
Benefits Total	**$ 5,458,000**	**$ 221.93**	**100%**

Total Capital Costs

Capital Cost Category	15 Yr PV	CC Per Meter	% of Total CC
AMI Meters/Modules	$ 2,439,000	$ 99.17	53%
3rd Party Meter Installation Including Socket Repairs	$ 1,056,000	$ 42.93	23%
AMI Infrastructure	$ 784,000	$ 31.89	17%
Meter Data Management System	$ 123,000	$ 4.98	3%
AMI Software	$ 78,000	$ 3.19	2%
3rd Party Integration and Project Management	$ 98,000	$ 3.99	2%
Backhaul Communications Allocation	$ 7,000	$ 0.30	0%
Direct Load Control Devices	$ 0	$ -	0%
Total Operating and Maintenance Cost	**$ 4,585,000**	**$ 186.44**	**100%**

O&M Cost Category	O&M Cost	% of Total O&M Cost
AMI Network Operations	$ 0	0%
Recurring Communications Costs	$ 6,000	1%
AMI Vendor Recurring Fees	$ 235,000	39%
MDMS Vendor Recurring Fees	$ 366,000	60%
Tower Lease Recurring Fees	$ 0	0%
AMI Field Area Network FTE Costs	$ 0	0%
	$ 607,000	**100%**

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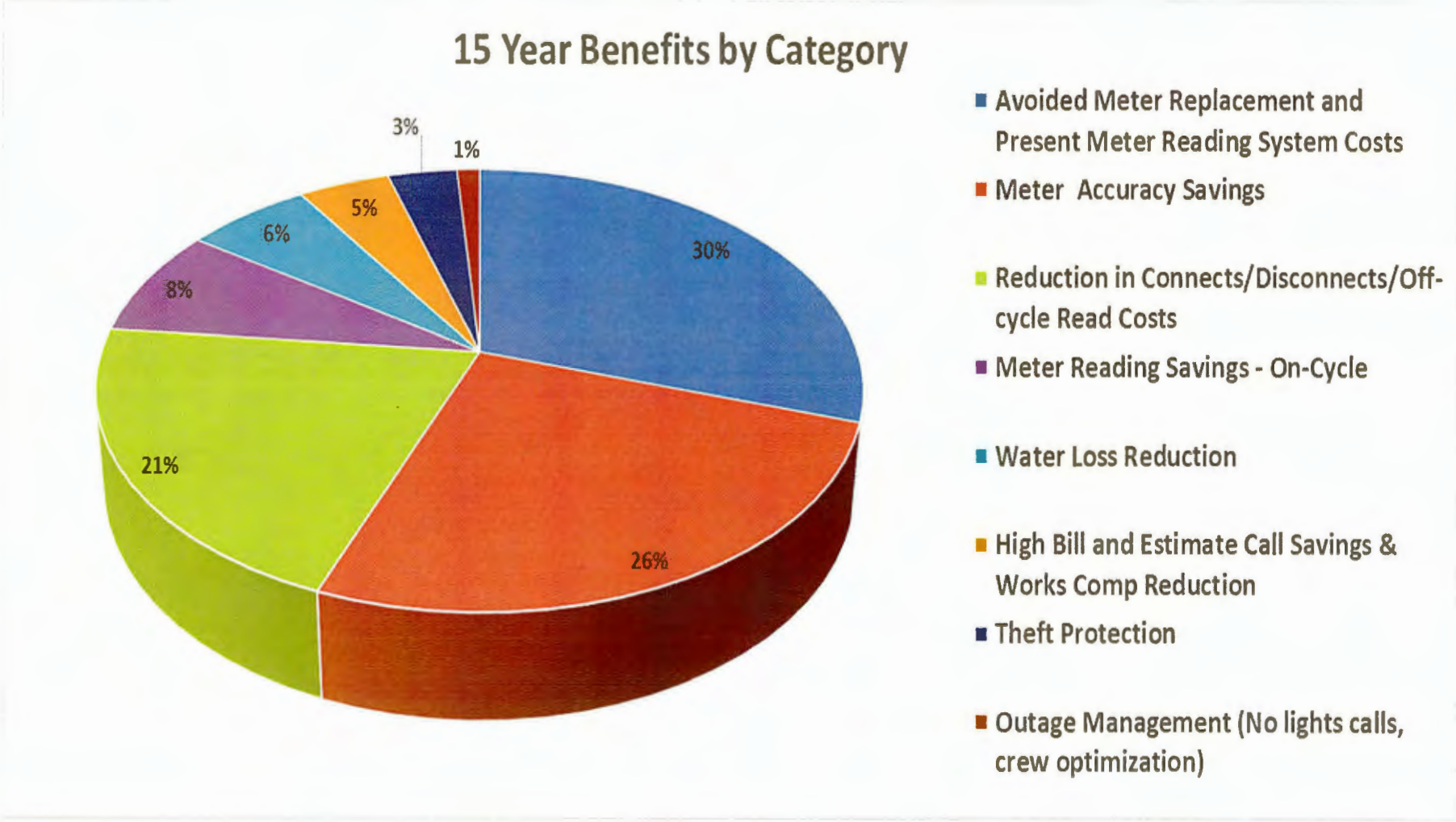
AMI Scenario 2: Benefits



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PSE Business Case Comments

- Other benefits available after or with AMI:
  - Pre-paid metering
    - Increased cash flow, can be useful for short term rentals, and habitual late payments
    - Disconnect collar and web presentment tool needed
  - Meter Data Management System (MDMS)
    - Validate, Estimate, and Edit (VEE)
    - Web Presentment or Customer Portal
    - Data Analytics (Line Loss Studies, Transformer Loading, Etc.)
    - Operational Maintenance (Blinks, Outages, Transformer Loading, Etc.)
    - Billing (Time Of Use, Peak Time Rebates, Etc.)
  - Web Portal
    - Can be in an MDM, but 3rd party vendors also do this well
    - Increased customer engagement
    - Display general outage information
    - Account usage updates, billing, and customer programs

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PSE Business Case Comments

- Other benefits available after or with AMI:
  - Increased Safety for Meter Readers and Field Personnel
  - Enables Net Metering
    - Ability to add reverse usage for customer generation programs
  - Enhanced Customer Service
    - Better outage information
    - On-Demand meter readings
    - High-Bill complaint resolution or reduction (can be reduced further with web presentment)
    - High and low voltage complaint resolution
    - Move-in/Move-out
    - Consumption on inactive meters reduced
  - Water leak detect (if supported)
  - Gas pressure monitoring (if supported)

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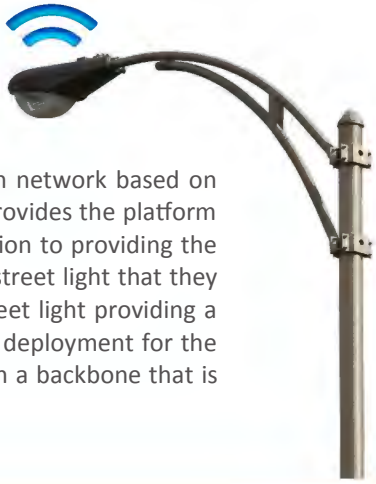
Solution Overview

Turnkey standards-based end-to-end smart grid

Nexgrid's full suite of products include smart grid network infrastructure, software, and intelligent devices necessary for seamless electric, water and gas metering, street light management, load control, outage and restoration management, disconnects/re-connects, smart home, two-way messaging and real-time pricing.

Communication Infrastructure

Nexgrid's ecoNet™ SL utilizes street lights to create a robust wireless mesh network based on IEEE 802.11 and 802.15.4 protocols. This broadband based infrastructure provides the platform for multiple devices that utilize the same communication method. In addition to providing the broadband smart grid infrastructure, ecoNet SL's manage and monitor the street light that they are attached to. The ecoNet SL monitors current and light levels of the street light providing a street light management system for the utility. The wide array of uses and deployment for the ecoNet SL means that the network can plug-and-play with future devices on a backbone that is based on the most stable technology standards available today.



Intelligent Devices

Devices include:

- Load Control switch
- Thermostat
- Street light control module
- HAN display
- Smart home devices

Features include:

- Over-the-air upgradeable
- Wireless real-time communication
- Remote management and control
- Device monitoring
- Self provisioning

intelaMetering (Electric, Water, Gas)

Electric metering features include:

- Wireless real-time communication
- Net-Metering (Received/Delivered registers)
- Instantaneous outage reporting
- Tamper and disconnect alerting
- On board memory (120 days)
- Over-the-air upgradable
- Remote disconnect/reconnect

Water / Gas metering features include:

- Wireless communication
- Instantaneous tamper alerting
- Leak and disconnect alerting
- Over-the-air upgradable

915 Maple Grove Drive Suite 200 Fredericksburg, VA 22407 888-556-0911 www.nexgrid.net

innovative smart grid solutions

Enterprise Management Software

ecoOne Energy Management System

Meter Data Management

- Water, gas and electric metering
- Asset mapping and monitoring
- Paginated reporting
- Live meter reads
- Customer portal management

Load Management

- Load event scheduling and status
- Asset mapping
- Paginated reporting
- Remote management and control
- Historical event graphing

Street Light Management

- Streetlight control and scheduling
- Maintenance reporting
- Asset mapping
- Remote management and control
- Integrated public safety alerting

Outage Management

- Home, transformer, circuit, and substation outage reporting
- Asset outage mapping
- Paginated reporting
- Alerts to email and SMS
- Historical outage data

Network Management

- Monitoring of all smart grid
- Asset mapping
- Paginated reporting
- Live status reporting
- Alerts to email and SMS

Customer Portal

intelahome™

intelaHome® is a simple to use web-based portal designed for consumers to manage and monitor their home and/or office's energy and smart home products. In addition, it is a powerful energy auditing system that provides real-time information regarding electric, water, and gas usage. For the first time, customers can control costs and conserve energy through an online management tool that is as easy to use as online banking.

Energy Data Head-End Cluster (EDS)

Nexgrid's EDS is an advanced data management system manager for smart grid solutions, enabling utilities to retrieve accurate and historical information about the status, security, and performance of the end devices.

- Minimizes future obsolescence: compatible with industry leaders and standards groups to assure support for a wide range of future devices
- Supports open system industry standards for integration to third party software: XML, SOAP, Web Services, MultiSpeak and CIM
- Automatic data recovery advisor, automatic backups, snapback capable, hot failover with automatic direction to the standby site within seconds
- Provides continuous discovery for Level 2–Level 3, faults, device configuration and management, auditing health and performance, remote firmware upgrades, security, and device interoperability
- Network management: Monitors network health, performance and security; performs preventative measures to the WAN and LAN
- Multi-utility service management: Offers management applications for Smart Metering (electric, gas, water), Grid Modernization, Demand Response (ZigBee, 802.11n), as well as future smart grid applications

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nexgrid innovative smart grid solutions

County of Los Alamos

Staff Report

January 17, 2018

Agenda No.:	8.B
Index (Council Goals):	BCC - N/A
Presenters:	James Alarid, Deputy Utilities Manager - Engineering
Legislative File:	**10307-18**

Title

Approval of the Long Range Water Supply Plan

Recommended Action

I move that the Board of Public Utilities approve the revised Long Range Water Supply Plan and forward to Council for approval.

Staff Recommendation

Staff recommends that the Board approve as presented.

Body

DPU contracted with Daniel B. Stephens & Associates, Inc. (DBS&A) to revise the Long-Range Water Supply Plan. Using the original format and data from the Council-adopted 2006 Long-Range Water Supply Plan as a starting point, DBS&A updated the Plan to:

- Reflect current population and water demand projections,
- Evaluate potential climate change impacts, and
- Assess various water supply options, including the timing for development of the County's San Juan-Chama water rights.

The revised Long-Range Water Supply Plan was presented in a series of meetings with the public, Utility Board and Council in 2017. The current version of the plan incorporates input received from public comment received, Council recommendations and inclusion of 2015 and 2016 water use data. This plan revision was presented to the community in a public meeting held on November 13, 2017. No public input was received during the public meeting.

The recommendations made by Council are described in the following motion from the March 21, 2017 meeting; **"correct the wording concerning LACWU which should be Incorporated County of Los Alamos and to revise the wording regarding use of San Juan Chama water rights to make clear that is a last contingency and where the actual well to be drilled is at a location to be determined in the future."** These recommendations have been incorporated as follows:

- The use of the acronyn LACWU (Los Alamos County Water Utility) has been replaced with Department of Public Utilities (DPU) or Incorporated County of Los Alamos (County) as appropriate.
- Recommendation to initiate an Environment Assessment for development of the San Juan-Chama water development has been removed (page 100)
- A new recommendation added to update the water demand analysis in a few years to re-evaluate whether and/or when a San Juan Chama Water supply project will be needed (page 100)

- The plan states that alternatives to developing a San Juan-Chama Water project shall be revisited and further studied prior to a project moving forward (pages 5 & 43)
- To emphasize conservation and system efficiency as an alternative to developing new supply as means to meet future demands, a new conservation recommendation to "work to minimize system water loss" and "perform annual water audits" has been added (page 102)
- Uncertainty of the quantity of County water rights due to expiration of DOE/LANL water rights lease and DOE/LANL commitment of water rights towards groundwater remediation efforts, have delayed the finalization of the plan, which was originally scheduled in 2015. All of the analysis, figures and water audit have been revised to include 2015 and 2016 water data. This was required as the Office of the State Engineer would not accept a plan without current data.

In December of 2017 the new ski hill owner, Pajarito Recreation LP, made a presentation to the County Council. As part of the presentation, Pajarito Recreation LP stressed the importance of snow making to create a sustainable ski operation, and has committed to share cost with the County to install a new potable water pipeline to Pajarito Mountain to supplement the existing drinking water supply, fire protection and snow making. DPU is managing a contract to design and create the environmental documents for the proposed pipeline. Based on the information presented by Pajarito Recreation LP the demand from this line extension will be primarily for snow making in the near future. Details of the planned expansion and operation of the snow making effort were not known at the time of this plan revision, therefore the plan does not address this new demand on the County's system. Based solely on the pumping capacity of the new water system it will take 28 days of continuous pumping to fill the 10 million-gallon (30.7 acre-feet) snow making pond. Snow making could take place anytime between November and March depending on environmental conditions and the pond could be filled multiple times each year.

Alternatives

Should the Utility Board not approve the Long Range Water Supply Plan, the County continues to meet statutory requirements with the 2006 plan on file with the Office of the State Engineer.

Fiscal and Staff Impact

The plan is funded by the water production budget.

Attachments

A - Long Range Water Plan
B - Power Point Presentation

Long-Range Water Supply Plan
Los Alamos County

Prepared for **Los Alamos County**
Department of Public Utilities

October 2017

Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

Table of Contents

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1. Introduction

The Los Alamos County Department of Public Utilities (DPU) supplies water for Los Alamos, White Rock, Los Alamos National Laboratory (LANL), and Bandelier National Monument. To prepare for the future water supply needs of these communities, the DPU developed a long-range water supply plan that was published in 2006 (DBS&A, 2006). This document updates that plan to incorporate more recent data and developments relevant to water resources management. The objective of this plan is to evaluate projected demands in relation to available supply, while considering water quality and water rights risks to the supply, to ultimately ensure that both a viable physical supply and associated water rights are in place as needed to meet future demands.

In addition to providing a plan for a sustainable future water supply, a long-range water plan that covers at least 40 years addresses several regulatory requirements regarding water rights and water conservation. In particular, a water plan allows certain organizations, including Counties, to set aside water for use in the future. Section 72-1-9(B) of the New Mexico Water Code allows covered entities such as Los Alamos County to legally appropriate and preserve water that they cannot currently use but will need in the future to meet projected water requirements for the service area based on projected growth and other factors. Counties are specifically exempt from forfeiture of unused water rights if those rights have been appropriated for the implementation of a water development plan or for preservation of water supplies (NMSA 72-12-8 (F)). These provisions are the same for both surface water and groundwater (NMSA 72-5-28(C)).

The New Mexico Office of the State Engineer (OSE) requirements set out in statute NMSA 1978 Section 72-14-3.2 call for conservation planning by any public supply system with diversions of at least 500 acre-feet annually for domestic, commercial, industrial, or government customers for other than agricultural purposes. Covered entities must develop, adopt, and submit to the OSE a comprehensive water conservation plan, including a drought management plan, as a prerequisite for applying for funding from key state funding agencies. The Water Trust Board requires funding applicants to provide verification from the OSE that all of its statutory and regulatory requirements have been met, and the OSE is requiring that Water Trust Board

funding applicants have a conservation plan that was prepared in accordance with New Mexico's *Water Conservation Planning Guide for Public Water Suppliers* (NMOSE, 2013). The U.S. Bureau of Reclamation (USBR) also requires a conservation plan for diversion of San Juan-Chama Project water.

The DPU published an *Energy and Water Conservation Plan* in 2013 (LADPU, 2013a) and updated it in 2015 (LADPU, 2015), and prepares reports annually discussing the County's progress toward the goals established in that plan. This long-range water supply plan summarizes the water conservation goals established by the *Energy and Water Conservation Plan* and provides an update on its implementation and recommendations.

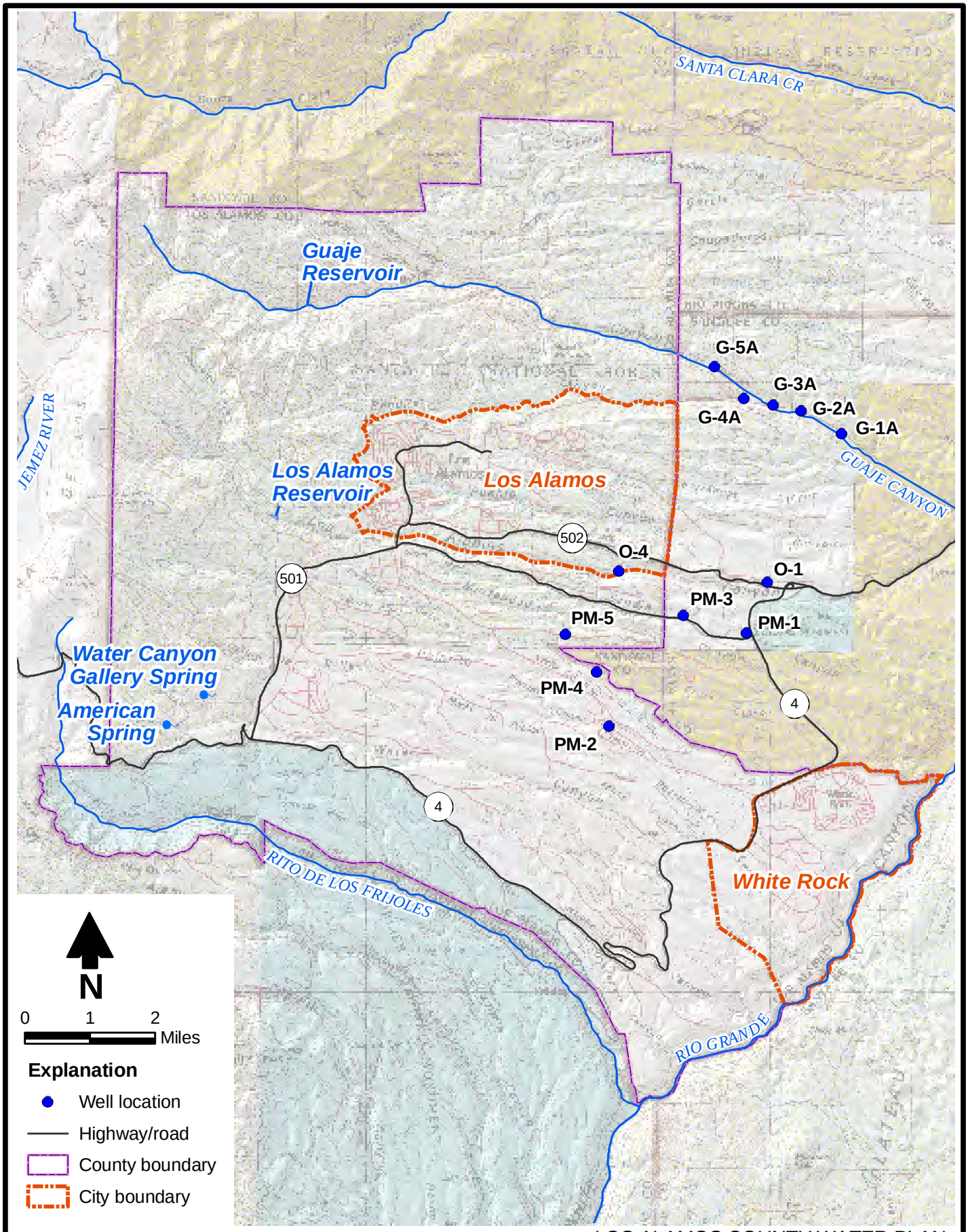
For this long-range water supply plan, the DPU retained Daniel B. Stephens & Associates, Inc. (DBS&A) to update the 2006 plan with current data and analyses. The remainder of this water plan presents the results of the summarized and updated information including an overview of the water system (Section 2), water supply and water rights (Sections 3 and 4), current and projected demand and supply-demand gaps (Sections 5 and 6), risks due to climate change (Section 7), water conservation (Section 8), and actions the Incorporated County of Los Alamos (County) may undertake to plan for a sustainable future water supply (Section 9).

2. Overview of Los Alamos County Water System

The Los Alamos Boys Ranch, a school for teenage boys started in 1918, was the original settlement in the area that is now Los Alamos County. The sole source of water for the school was surface water from Los Alamos Reservoir in Los Alamos Canyon (Figure 2-1). The water was piped from the reservoir and stored in a redwood water tank near the school. During World War II, Los Alamos was selected as the site for the secret Project Y, because the steep canyons and mesa tops provided a secure location for the project. The Los Alamos Laboratory (as it was then called) came into existence in early 1943 for the single purpose of Project Y: to design and build an atomic bomb (LANL, 2006). Los Alamos Boys Ranch closed in early 1943 and the Laboratory became the only establishment. In 1949, Los Alamos County was created from parts of Sandoval and Santa Fe Counties.

When the Laboratory took over the water system in 1943, they continued to use Los Alamos Reservoir, but also piped in water from a spring gallery in Guaje Canyon. In 1947, a dam was built in Guaje Canyon and water from the resulting Guaje Reservoir was used for water supply (Figure 2-1). In addition, American Spring and several springs in Water Canyon were tapped and piped into the water system. The Los Alamos well field was drilled in 1946 on San Ildefonso Pueblo property, thereby increasing the supply to meet the growing demands of the Laboratory and its residents. By 1989, groundwater from the Los Alamos, Guaje, Pajarito, and Otowi well fields supplied all of the potable demands for Los Alamos.

The Los Alamos well field was plugged and abandoned in 1992 because the wells had reached the end of their useful life. Also in the 1990s, six of the seven wells in the Guaje well field were retired, and four replacement wells were drilled and tapped into the existing piping and booster stations. Los Alamos Reservoir continued to be used to water parks, but the Cerro Grande fire in 2000, Las Conchas fire in 2011, and subsequent flooding in 2012, 2013, and 2014 damaged the reservoir and the diversion system. The DPU has been working on a water line replacement project in order to bring the reservoir back online. The reservoir has been dredged and the DPU will be installing a new pipeline from the reservoir into town in order to connect to the existing non-potable infrastructure (Meyers, 2016). The DPU recently completed a few other non-potable projects, including installing booster pumps and pipelines to push non-potable water to the Group 12 tank, which has been renovated. This allows gravity feed of the non-potable water to all current users, including the golf course and ball fields (Alarid, 2017).



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LOS ALAMOS COUNTY WATER PLAN

Water Supply

Daniel B. Stephens & Associates, Inc.

04/27/2006

JN WR05.0168

Figure 2-1

The DPU began operating the water system in September 1998; however, ownership of the water system and water rights was not transferred from the U.S. Department of Energy (DOE) to the County until September 2001 (ownership of 70 percent of the water rights was transferred to Los Alamos County and DOE retained the other 30 percent). The DPU provides water service to the residents of Los Alamos and White Rock, LANL, and Bandelier National Monument. The County has a contract to supply DOE with the water required by LANL with no limitations. This contract will expire in 2019 (LANL demands have been projected beyond 2019 under the assumption that a new contract will be negotiated).

The County has a contract with the USBR for water from the San Juan-Chama Project, which brings water from the San Juan Basin (Colorado River Basin) to Heron Reservoir on the Rio Chama (the Rio Grande Basin). Releases from Heron Reservoir flow down the Rio Chama to the Rio Grande. In the *San Juan-Chama Water Supply Project Final Preliminary Engineering Report,* the recommended alternative for the County to obtain and treat San Juan-Chama Project water for distribution was to construct up to three groundwater wells in the White Rock area and install pumps and a pipeline to connect the new wells to the Pajarito Booster Station (CDM Smith, 2012); however, the alternatives will be revisited after the long-range water supply plan update is complete. The diversion rights of San Juan-Chama Project water could alternatively be used to offset impacts of pumping (as the City of Santa Fe has done since 1972), as further discussed in Sections 4.3.2 and 6.

With the abandonment of the Los Alamos well field and six wells in the Guaje well field, the water system is currently supplied by the 12 wells shown in Figure 2-1 and listed in Table 2-1. These wells, with depths up to 3,000 feet below ground surface (ft bgs) and water levels ranging from approximately 250 to 1,200 ft bgs, all draw on the regional aquifer beneath the Pajarito Plateau.

Two new applications have been filed recently:

- The County filed an application for an additional point of diversion on April 28, 2016. The new well will be called Otowi Well 2 and will be drilled to supplement the system's existing production wells in anticipation of declining production rates from existing wells that are nearing the end of their service life (Alarid, 2016). The new well will be drilled during the fall and winter of 2017-2018 under an exploratory permit (Alarid, 2017).

Table 2-1. Active Wells in the Los Alamos Water Supply System

Well Field	Well Name	Date Completed	Completion Depth (feet)	Coordinates (feet)		Initial Depth to Water
				x	Y	
Guaje	G-1A	Oct-54	1,519	1,655,241	1,784,353	250
	G-2A	Mar-98	1,980	1,651,974	1,786,166	318
	G-3A	May-98	1,980	1,649,662	1,786,585	408
	G-4A	Apr-98	1,980	1,647,318	1,787,113	452
	G-5A	Jun-98	1,980	1,644,877	1,789,636	551
Otowi	O-1 [a]	Aug-90	2,497	1,649,396	1,772,232	673
	O-4	Mar-90	2,595	1,637,337	1,772,995	780
Pajarito	PM-1	Feb-65	2,499	1,647,734	1,768,112	722
	PM-2	Jul-65	2,300	1,636,698	1,760,406	823
	PM-3	Nov-66	2,552	1,642,590	1,769,530	740
	PM-4	Aug-81	2,874	1,635,623	1,764,740	1,060
	PM-5	Sep-82	3,092	1,632,110	1,767,790	1,208

Source: Koch and Rogers, 2003

[a] Well is currently not being used to supply drinking water.

- In May 2016, an application for permit to change an existing water right was filed jointly by DOE and the County in support of the chromium plume control interim measure and chromium plume center characterization project (U.S. DOE and LADPU, 2016), and emergency authorization was received on September 10, 2016 (NMOSE, 2016).

The addition of new points of diversion under these applications will not increase the appropriation of water above the existing permitted water rights.

Wastewater is treated at two facilities: the White Rock wastewater treatment plant (WWTP) and the Los Alamos WWTP. Both of these WWTPs have treated effluent reuse lines that are used for irrigation of turf. Two former WWTPs—the East Road, abandoned and demolished in the mid-1960s, and the Pueblo, abandoned in 1993—also had effluent reuse systems, both of which supplied the golf course.

The DPU operates a non-potable water system, using treated wastewater effluent to irrigate several areas in Los Alamos and White Rock and using stormwater runoff for fire protection and snow making at the Pajarito Mountain Ski Area (Forsgren & Associates, 2013). The system has three separate components:

- *Los Alamos Townsite:* Reuse is used to irrigate four sites in Los Alamos (Los Alamos County Golf Course, Los Alamos Middle School, North Mesa Ball Fields, and North Mesa Soccer Fields) and to feed the wetlands located downgradient of the Los Alamos wastewater treatment facility. A volume of 180,000 gallons per day is needed to keep the wetlands healthy. LANL is currently receiving reuse water for the wetlands from the DPU at no charge because surplus reuse water is available.

- *White Rock:* Reuse is used to irrigate Overlook Park.

- *Pajarito Mountain Ski Area:* Captured stormwater is used for fire protection and snow making.

A Los Alamos County non-potable water system master plan was completed in 2013, to evaluate the efficiency of the existing non-potable water system, make recommendations for how to improve the system's efficiency, determine if additional development of non-potable water use is economically feasible, and identify and evaluate sites that could potentially be served (Forsgren & Associates, 2013), most of which currently use potable water for irrigation. The plan identified a total of 25 sites (5 existing and 20 new) suitable for service by the Los Alamos Townsite non-potable water system and 6 sites (1 existing and 5 new) for the White Rock non-potable water system. Bringing the additional sites online would increase the annual average system demands from 152.8 to 206.5 million gallons per year for the Los Alamos Townsite system and from 18.9 to 41.2 million gallons per year for the White Rock system (Forsgren & Associates, 2013).

3. Hydrologic Overview and Risks to Water Supply

The County's public drinking water supply is supplied by groundwater, with surface water supplying a small amount of non-potable use. This section describes the hydrogeologic conditions pertinent to the Los Alamos groundwater supply (Section 3.1) and includes an assessment of potential risks to the groundwater supply due to depletion or contamination of the aquifer (Section 3.2). The County water rights (groundwater and surface water) are discussed in Section 4.

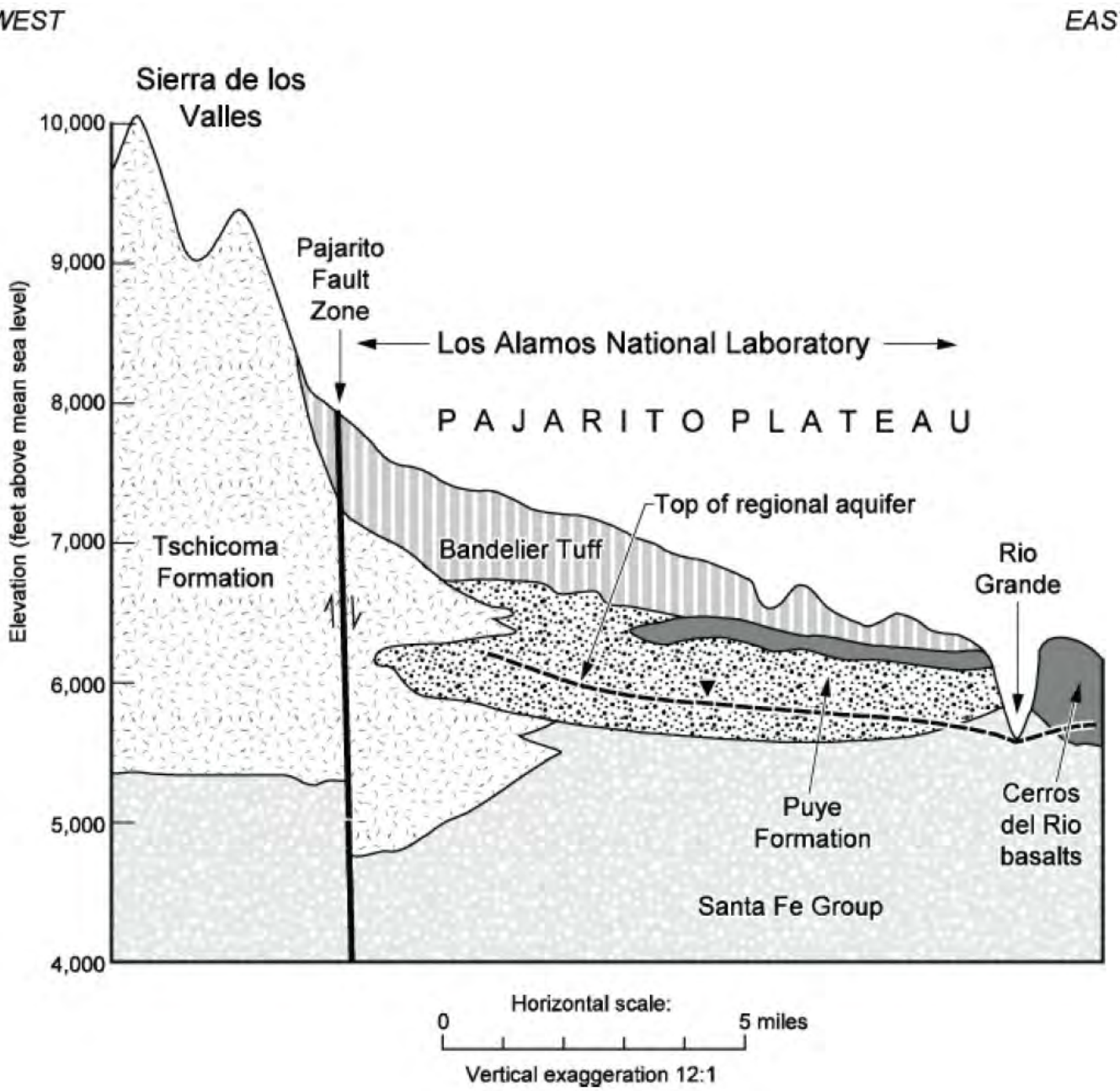
3.1 Hydrogeology

Los Alamos County is situated on the Pajarito Plateau within the western side of the Española Basin. The Pajarito Plateau extends eastward from the Sierra de los Valles, the eastern range of the Jemez Mountains. On the western part of the Pajarito Plateau, the Bandelier Tuff overlaps the Tschicoma Formation, which consists of older volcanics that form the Jemez Mountains. In the central Pajarito Plateau and near the Rio Grande, the Bandelier Tuff is underlain by the Puye Formation. The Cerros del Rio basalts interfinger with the Puye Formation conglomerate along the river and extend beneath the Bandelier Tuff to the west. These formations overlie the sediments of the Santa Fe Group, which extend across the basin between LANL and the Sangre de Cristo Mountains and are more than 3,300 ft thick (LANL, 2014a). A cross section of the area is shown on Figure 3-1.

The hydrogeologic framework within Los Alamos County consists of three distinct aquifer systems (LANL, 2014a):

- Shallow perched groundwater in alluvial deposits along canyon bottoms
- Intermediate-depth perched groundwater
- Deeper regional aquifer, which extends through the neighboring Española Basin

A block diagram depicting a conceptual model of the hydrogeology of the Los Alamos area that illustrates the general configuration of these aquifer systems is shown in Figure 3-2.



Source: LANL, 2014b

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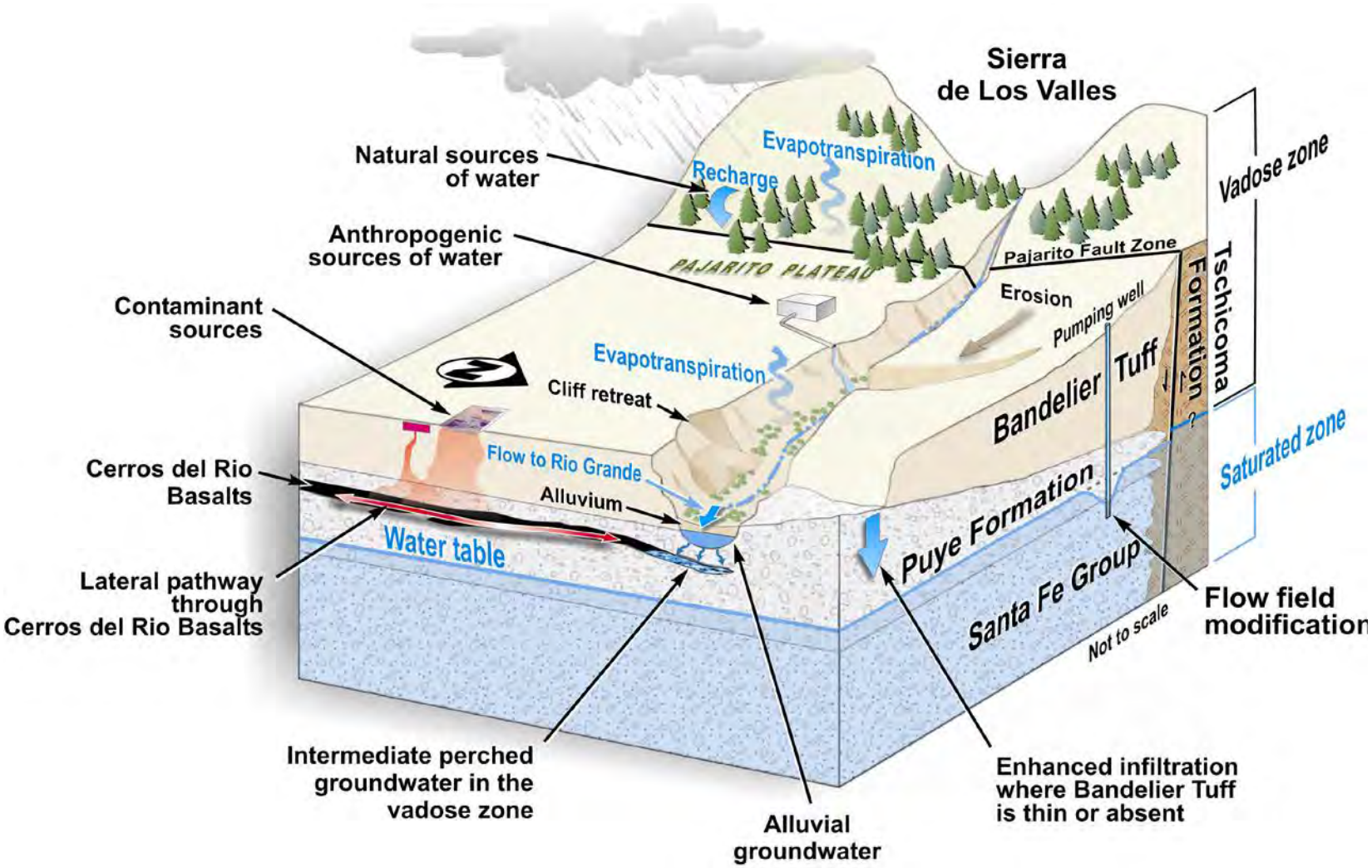
LOS ALAMOS COUNTY WATER PLAN
Cross Section



Source: LANL, 2005

Figure 3-2

LOS ALAMOS COUNTY WATER PLAN

Conceptual Hydrogeologic Model of the Los Alamos County Area

Alluvial aquifers occur within axial fluvial deposits located along canyon bottoms and have a limited saturated thickness and variable lateral extent, depending on the presence of intermittent surface flow or anthropogenic discharges from wastewater treatment outfalls. Hydrologic investigations of alluvial aquifers have been conducted in Los Alamos Canyon, Pueblo Canyon, Mortandad Canyon, Pajarito Canyon, Sandia Canyon, Cañon de Valle, and Water Canyon. Though their limited extent precludes any utility for beneficial use, these aquifers provide an important pathway for contaminant migration.

Intermediate-depth perched aquifers are widely distributed across the northern, western, and central parts of the Pajarito Plateau beneath Los Alamos Canyon, Pueblo Canyon, Sandia Canyon, Mortandad Canyon, and Cañon de Valle. These perched zones usually occur in the Puye Formation fanglomerates, the Cerros del Rio Basalt, and units of the Bandelier Tuff, and are typically associated with low-permeability layers such as unfractured basalt flows and fine-grained zones. Saturated thicknesses range from about 3 to 420 feet, but lateral extents are sometimes poorly defined (LANL, 2005). Depths to the intermediate perched groundwater vary. For example, the depth to intermediate-perched groundwater is approximately 120 feet in Pueblo Canyon, 450 feet in Sandia Canyon, and 500 to 750 feet in Mortandad Canyon (LANL, 2014a). Though the exact extent of these aquifers is not well defined, it is clear that they are generally small enough that their potential for beneficial use is limited. However, they provide an important pathway for contaminant migration through the vadose zone.

The regional aquifer occurs primarily within the poorly to semi-consolidated basin-fill sediments of the Santa Fe Group. The total thickness of the Santa Fe Group beneath the Pajarito Plateau is poorly defined. The deepest well on the plateau (PM-5), with a depth of 3,110 feet, does not fully penetrate the base of the basin-fill sediments. Estimates of the total thickness of these sediments range from 6,650 feet in the central basin to as much as 9,000 to 10,000 feet in the central and western parts of the basin (Broxton and Vaniman, 2005).

The regional aquifer extends into the overlying Puye Formation fanglomerate beneath parts of the Pajarito Plateau. Other geologic units encompassed by the regional aquifer beneath parts of the county include fractured volcanic rocks of the Tschicoma Formation (western part) and the Cerros del Rio Basalt (eastern part), as well as localized occurrences of older basalts.

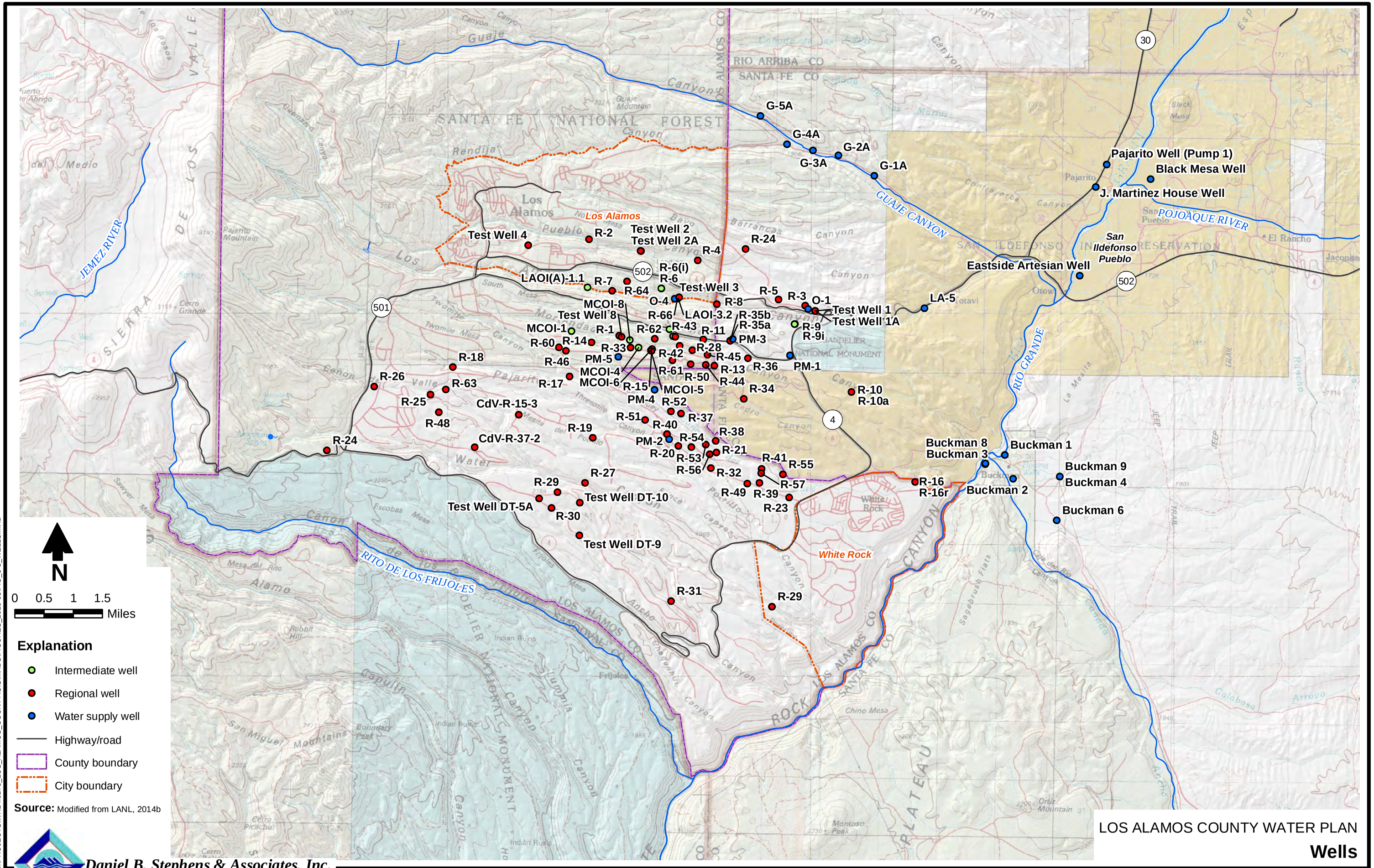
The regional aquifer water table occurs at a depth of 1,200 feet along the western edge of the plateau and 600 feet along the eastern edge. In the central part of the plateau, the regional aquifer lies about 1,000 feet beneath the mesa tops. The regional aquifer is the only aquifer in the area capable of serving as a municipal water supply (LANL, 2014a).

Well locations and types are shown in Figure 3-3, and the potentiometric surface contours and extrapolated flow directions in the regional aquifer are shown in Figure 3-4. Water in the regional aquifer generally flows east or southeast (LANL, 2015c). As discussed in Section 2, the County's production wells have water levels that range between approximately 250 and 1,200 feet below ground surface (ft bgs). Water in the regional aquifer is under artesian conditions beneath the eastern part of the Pajarito Plateau near the Rio Grande and under phreatic conditions beneath most of the Pajarito Plateau (Purtymun and Johansen, 1974). The upper portion of the regional aquifer beneath the Laboratory discharges into the Rio Grande through springs in White Rock Canyon (LANL, 2014a).

Groundwater modeling studies indicate that underflow of groundwater from the Sierra de los Valles west of Los Alamos is the main source of regional aquifer recharge (LANL, 2014a). Alluvial groundwater is also a source of recharge to the regional aquifer, as well as to the intermediate perched saturated zones (thereby providing potential downward pathways for contaminants released at the surface to eventually reach the regional aquifer).

A number of studies have estimated recharge to the regional aquifer for the Española Basin and for the Pajarito Plateau (Table 3-1). Recharge varies in relation to precipitation, which in Los Alamos County is elevation-dependent and ranges between about 13 and 20 inches annually (Newman and Robinson, 2005). Keating et al. (2005) determined that significant recharge occurs primarily above the 2,195-meter (7,200-foot) elevation. At lower elevations, recharge occurs primarily in canyons and arroyos; recharge on mesas is minimal to non-existent (Anderholm, 1994; Birdsell et al., 2005). Kwicklis et al. (2005) estimated that 23 percent of total recharge to the regional aquifer beneath the plateau is from streamflow loss.

In addition to the recharge estimates, Table 3-1 includes an estimate of discharge to the Rio Grande (determined from inverse modeling using streamflow data and transient head data), which approximates aquifer recharge before significant pumping began.



N

0 0.5 1 1.5 Miles

Explanation

- Intermediate well
- Regional well
- Water supply well
- Highway/road
- County boundary
- City boundary

Source: Modified from LANL, 2014b

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LOS ALAMOS COUNTY WATER PLAN

Wells

Figure 3-3

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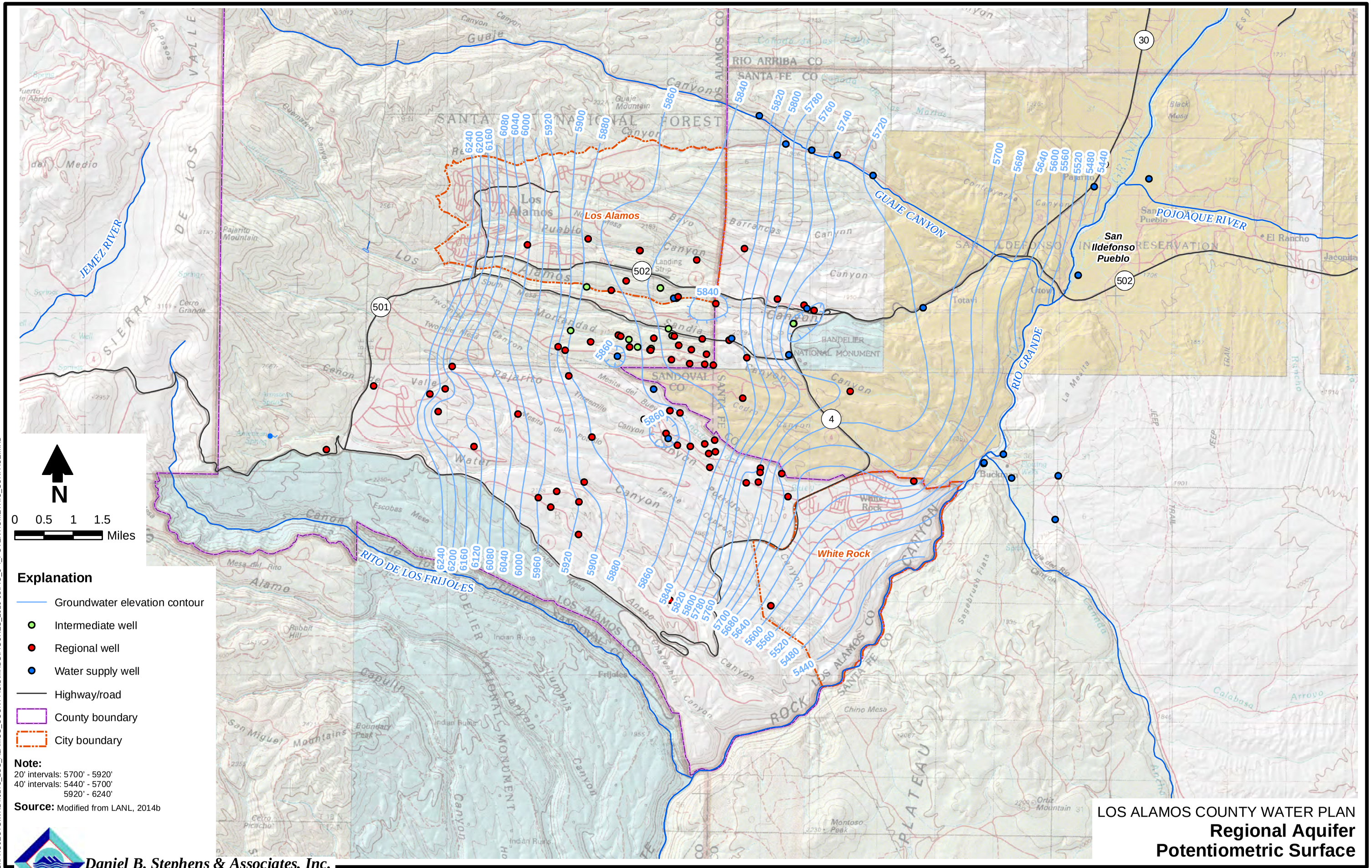

LOS ALAMOS COUNTY WATER PLAN

Regional Aquifer Potentiometric Surface

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Figure 3-4

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Table 3-1. Regional Aquifer Recharge Estimates

Category	Rate (ac-ft/yr)	Source
Pajarito Plateau recharge	8,596	Kwicklis et al., 2005
	4,912	McLin et al., 1996
	4,298 to 5,526	Griggs and Hem, 1964
	8,084	Hearne, 1985
Lateral inflow from Jemez Mountains	7,445	McAda and Wasiolek, 1988
Discharge to Rio Grande from Pajarito Plateau and Sierra de los Valles	6,473	Keating et al., 2003

3.2 Aquifer Depletion Risk

To evaluate risks of water supply depletion, available water level data from numerous wells screened in the regional aquifer were used to plot hydrographs illustrating historical water level behavior in the regional aquifer. Locations of these wells are shown in Figure 3-3. Long-term supply well data, consisting of annual average non-pumping water levels for the Guaje well field (since 1950) and the Pajarito well field (since 1965), are shown in Figures 3-5 and 3-6 respectively. More recent (since 1990) but sporadic data are available for the Otowi well field (Figure 3-7).

Table 3-2 summarizes the net changes and average water level declines indicated by these data. Long-term data from the Pajarito and Guaje well fields indicate an average water level decline of about 1.1 and 3.5 feet per year (ft/yr), respectively; the average decline in the Otowi well field is about 0.8 ft/yr. Substantial declines have occurred in the abandoned Guaje wells, ranging from about 0.2 to 2.5 feet, and averaging about 1.3 ft/yr. Declining water levels indicate that groundwater withdrawals exceed recharge.

LANL also monitors water levels in regional wells. Previous analysis of those data indicated that responses were mixed but that water levels in most regional wells were also steadily declining (DBS&A, 2006). Though the average rate of decline appears modest on an annual basis, one supply well has experienced a total water level decline of approximately 85 feet since 1998, and water levels in four of the active production wells have declined by more than 50 feet (Table 3-2).

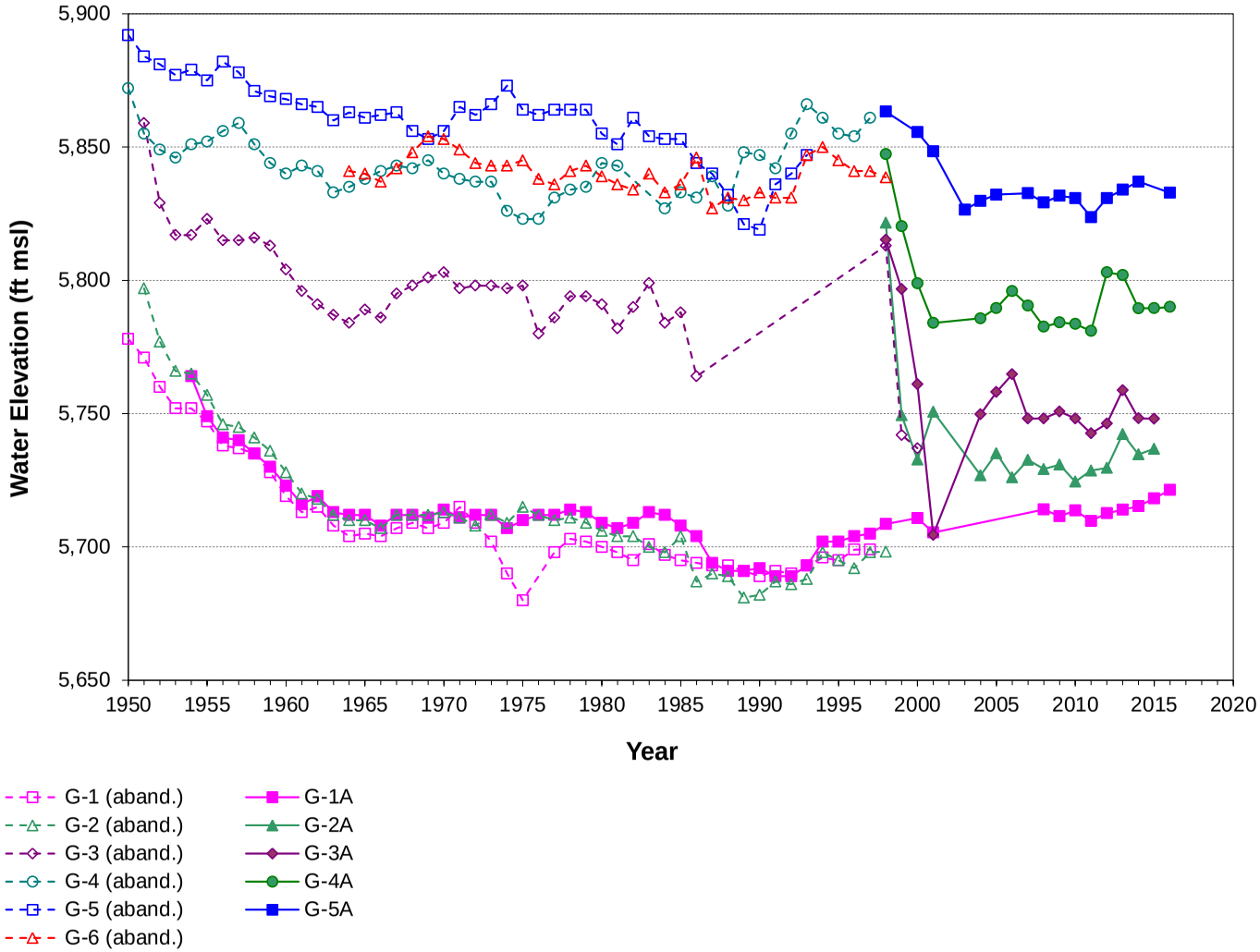

Figure 3-5

LOS ALAMOS COUNTY WATER PLAN

Average Annual Non-Pumping Water Levels
Guaje Well Field

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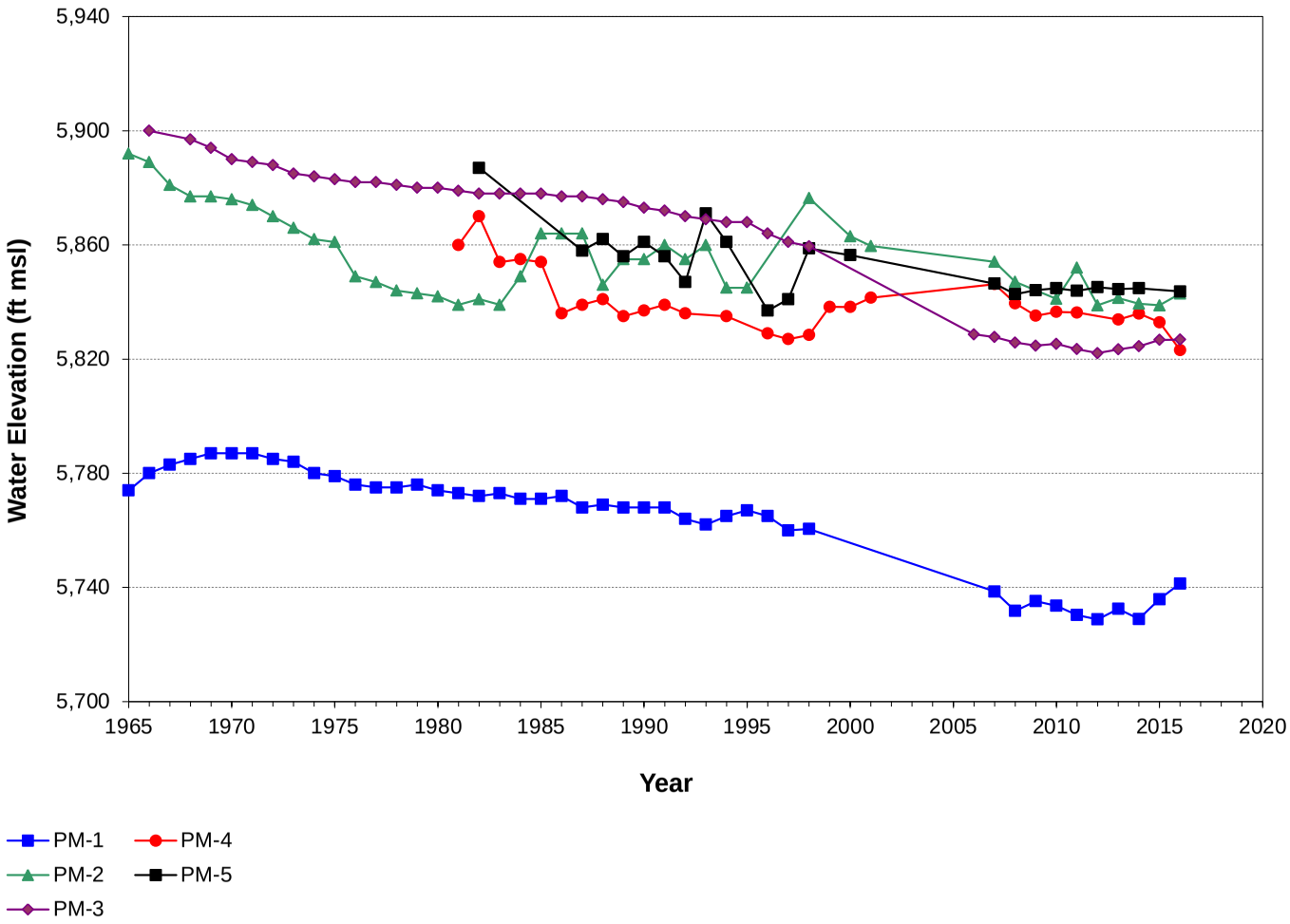

LOS ALAMOS COUNTY WATER PLAN

Average Annual Non-Pumping Water Levels
Pajarito Well Field

Figure 3-6

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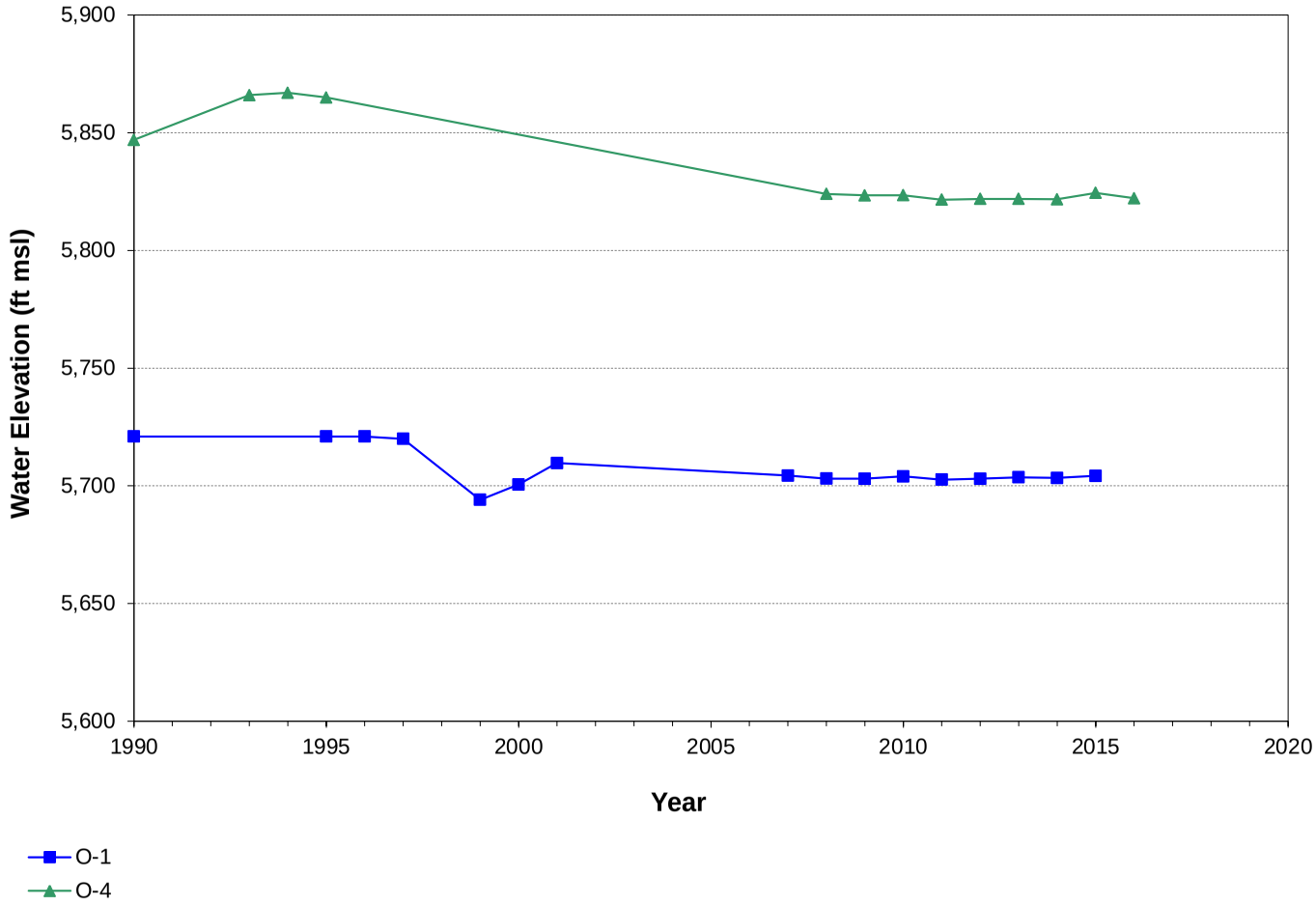

LOS ALAMOS COUNTY WATER PLAN

Average Annual Non-Pumping Water Levels
Otowi Well Field

Figure 3-7

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9/8/16

Table 3-2. Average Supply Well Water Level Declines

Well	Well Depth (ft)	Year	Average Water Level (ft msl)	Water Level Change (ft)	Years of Record	Average Decline (ft/yr)
PM-1	2,499	1965	5,774.0	–32.6	51	–0.64
		2016	5,741.4			
PM-2	2,300	1965	5,892.0	–49.1	51	–0.96
		2016	5,842.9			
PM-3	2,552	1966	5,900.0	–73.2	50	–1.46
		2016	5,826.8			
PM-4	2,874	1981	5,860.0	–36.8	35	–1.05
		2016	5,823.2			
PM-5	3,092	1982	5,887.0	–43.3	34	–1.27
		2016	5,843.7			
Pajarito Well Field Average (1965-2016)						**–1.08**
O-1	2,497	1990	5,721.0	–16.7	25	–0.67
		2015	5,704.3			
O-4	2,595	1990	5,847.0	–24.8	26	–0.95
		2016	5,822.2			
Otowi Well Field Average (1990-2016)						**–0.81**
G-1A	1,519	1954	5,764.0	–42.6	62	–0.69
		2016	5,721.4			
G-2A	1,980	1998	5,821.6	–84.8	17	–4.99
		2015	5,736.8			
G-3A	1,980	1998	5,815.2	–67.1	17	–3.95
		2015	5,748.1			
G-4A	1,980	1998	5,847.3	–57.3	18	–3.18
		2016	5,790.0			
G-5A	1,980	1998	5,863.3	–30.4	18	–1.69
		2016	5,832.8			
Guaje Well Field Average (1954-2016)						**–3.45**
G-1 (aband.)	2,000	1950	5,778.0	–79.0	47	–1.68
		1997	5,699.0			
G-2 (aband.)	1,980	1951	5,797.0	–98.8	47	–2.10
		1998	5,698.2			
G-3 (aband.)	1,800	1951	5,859.0	–122.0	49	–2.49
		2000	5,737.0			
G-4 (aband.)	1,940	1951	5,872.0	–11.0	47	–0.23
		1998	5,861.0			
G-5 (aband.)	1,850	1951	5,892.0	–45.0	43	–1.05
		1994	5,847.0			
G-6 (aband.)	1,530	1964	5,850.0	–11.4	34	–0.34
		1998	5,838.6			
Guaje Well Field Abandoned Wells Average (1950-1998)						**–1.32**

ft = feet ft msl = feet above mean sea level ft/yr = feet per year aband. = abandoned

Using water level data, Rogers et al. (1996) estimated the volume of groundwater depletion from supply well production between 1949 and 1993 to be between 4.0×10^{10} and 6.0×10^{10} gallons (123,000 and 184,000 acre-feet), compared to total pumping withdrawals of 5.7×10^{10} gallons (175,000 acre-feet) during the same period. This analysis implies that recharge to the regional aquifer during this period was negligible and that production well pumping was essentially mining the aquifer. However, the recovery of water levels in wells that were not pumped for extended periods was cited by McLin et al. (1996) as evidence that recharge has occurred. Water levels can recover without recharge as the cone of depression that develops during pumping re-equilibrates, however, and it should be noted that the recharge estimates presented in Table 3-1 are on the same order as pumping withdrawals.

Even if net recharge is negligible, considering a demonstrated saturated thickness of at least 1,900 feet penetrated in supply well PM-5 and potentially as much as 10,000 feet of Santa Fe Group sediments underlying the plateau (Section 3.1), a continuation of the observed rates of decline does not represent a substantial imminent or foreseeable risk to the water supply. Barring potential water quality issues, continued pumping of the regional aquifer at current rates is likely to be sustainable for hundreds of years. LANL's Española Basin and Pajarito Plateau Regional Flow Model predicts that water levels will continue to decline at the same rate (with the same production rates) and that this rate can be sustained for hundreds of years (Keating, 2006). However, the water is expected to be of poorer quality as wells begin to draw from greater depths, and pumping costs will increase.

3.3 Contamination Risk

To evaluate the potential for the County water system to produce water quality that meets all drinking water standards, this section (1) identifies sources of contaminants in the Los Alamos area, (2) summarizes existing knowledge of contaminant transport pathways and velocities, and (3) summarizes the concentrations and extent of chromium, perchlorate, and other contaminants in groundwater.

3.3.1 Sources of Contamination

Since the early 1940s, a wide array of chemicals have been released into the canyons of the Pajarito Plateau from various LANL operations. These releases have occurred through effluent discharges from wastewater treatment facilities and other miscellaneous sources, such as sanitary septic systems, cooling towers, and runoff from firing sites and other LANL facilities. Figure 3-8 shows the locations of industrial outfall sites at LANL.

The presence of contaminants in groundwater in Los Alamos County is primarily associated with areas where effluent discharges have led to enhanced infiltration. Since the 1940s, liquid effluent discharge by LANL has affected the shallow perched alluvial groundwater that lies beneath the floor of a few canyons, and has also affected intermediate-perched zones and the regional aquifer (LANL, 2014a). The major effluent discharges include:

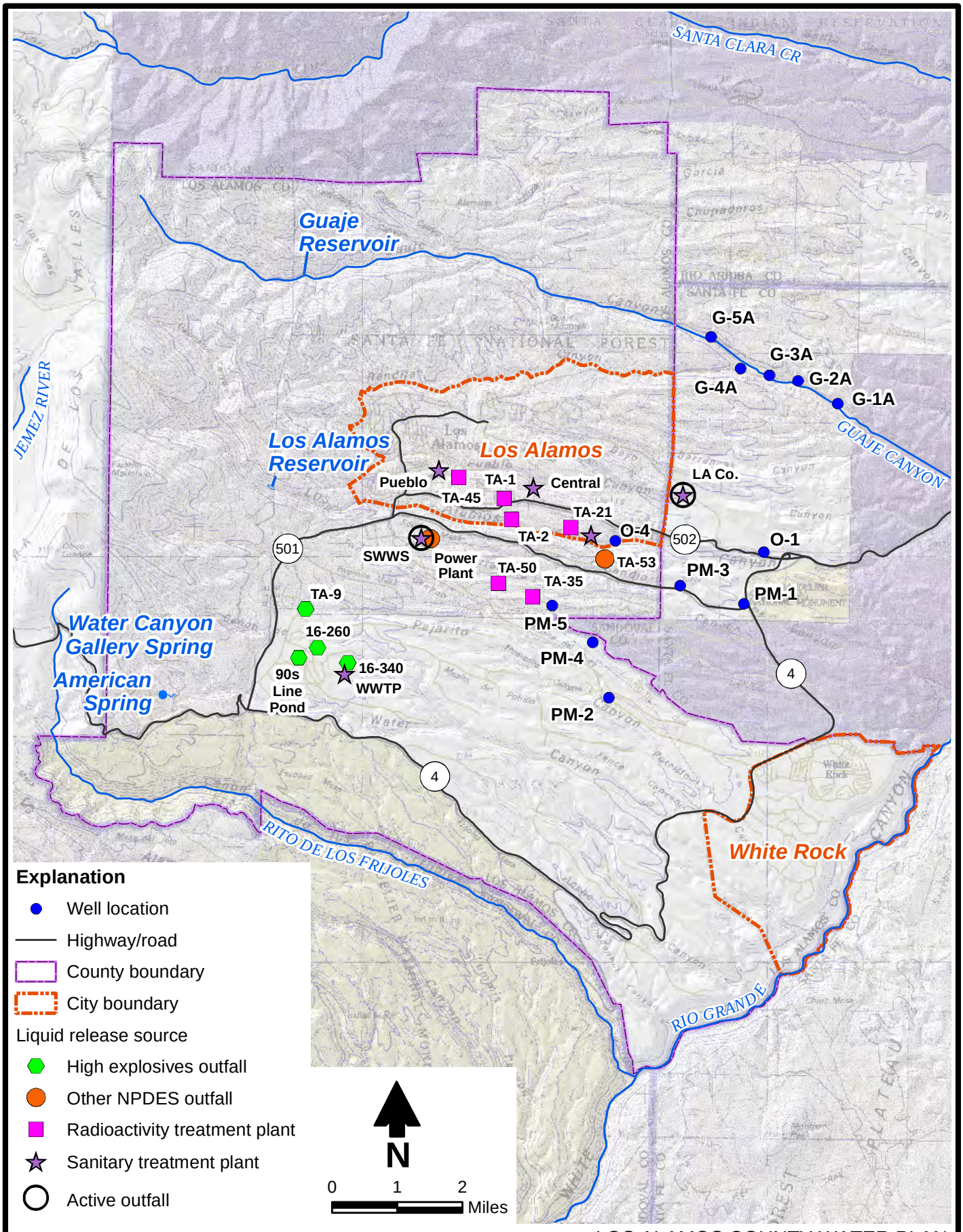
- Mortandad Canyon, Pueblo Canyon from its tributary Acid Canyon, and Los Alamos Canyon from its tributary DP Canyon received liquid radioactive effluents during past decades (LANL, 2015c).

- Sandia Canyon has received discharges of power plant cooling water and water from LANL's Sanitary Wastewater Systems Consolidation (SWSC) Plant.

- Water Canyon and its tributary Cañon de Valle have received effluents produced by high explosives processing and experimentation (LANL, 1993a, 1993b).

- Over the years, Los Alamos County has operated several sanitary wastewater treatment plants (WWTPs) in Pueblo Canyon (LANL, 1981). The Los Alamos and White Rock WWTPs are currently operating. LANL has also operated numerous sanitary treatment plants.

- From 1956 through 1976, up to 160,000 pounds of hexavalent chromium were released from cooling towers at a LANL power plant. The chromium was commonly used in industry at the time as a corrosion inhibitor (LANL, 2014b).



Source: LANL, 2014b, Figure 5-4

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LOS ALAMOS COUNTY WATER PLAN

Major Industrial Outfall Sites

Figure 3-8

Since the early 1990s, LANL has significantly reduced both the number of industrial outfalls and the volume of water discharged. The quality of the remaining discharges has been improved through treatment process improvements so that they meet applicable standards (LANL, 2014a).

Los Alamos groundwater monitoring has defined two areas of notable contamination: RDX contamination beneath Technical Area 16 and chromium contamination beneath Sandia and Mortandad Canyons (LANL, 2015c).

3.3.2 Contaminant Transport Pathways and Velocities

Numerous pathways for potential contaminant transport are present throughout the Pajarito Plateau. Transport modes for contaminants from the surface to the regional aquifer vary according to the hydrogeologic setting and include:

- Matrix flow through nonwelded and poorly welded tuffs (mesa tops and dry canyons)
- Fracture flow through welded tuffs (mountain front and Pajarito Fault zone)
- Fracture and matrix flow through dense and brecciated basalts (Cerros del Rio basalt outcrop at low-head weir and perched intermediate aquifers)
- Infiltration from wet canyons (portions of Los Alamos Canyon, Pueblo Canyon, Mortandad Canyon, Sandia Canyon, and Cañon de Valle)

Transport velocities are highly variable throughout the plateau. Infiltration beneath dry canyons and mesa tops is estimated to be very low, resulting in travel times to the regional aquifer of several hundred to thousands of years (Birdsell et al., 2005). On the other hand, fracture flow through fractured tuffs or basalts is likely to be comparatively rapid in many locations. Although they vary spatially, groundwater velocities are typically on the order of 30 feet per year (LANL, 2016).

Another possible contaminant transport pathway is potential cross contamination between perched aquifers and the regional aquifer during well drilling, primarily when open borehole conditions are maintained over an extended period of time. Well drilling by LANL has incorporated procedures to minimize this risk, such as sealing off zones of saturation above the

regional aquifer prior to advancing the borehole to the regional aquifer. Data do not indicate any cases of cross contamination in the monitoring network; however, future drilling should include the procedures that are in place to minimize the risk of cross contamination.

The chemical properties of each contaminant control the degree to which they move into the subsurface. Reactive chemicals have a tendency for adsorption (adhesion of dissolved molecules to the surfaces of solids), limiting their movement in groundwater, while conservative or non-reactive chemicals tend to move readily in groundwater. Examples of these two types of contaminants that have been released from LANL facilities are:

- Non-reactive contaminants include chromium, tritium, nitrate, perchlorate, and RDX (a component of explosives, also known as cyclotrimethylenetrinitramine, cyclonite, hexogen, and T4). These chemicals are highly mobile and are observed in groundwater within perched intermediate zones and the regional aquifer beneath several canyons, including Cañon de Valle, Los Alamos Canyon, Mortandad Canyon, Pueblo Canyon, and Sandia Canyon (LANL, 2005).

- Reactive contaminants include strontium-90, americium-241, cesium-137, plutonium-238, -239, and -240 (LANL, 2005). These contaminants have been detected in the alluvial system but are not observed in the intermediate and regional aquifers.

3.4 Extent of Contamination and Risk to Water Supply

To evaluate the risk of contamination to the County's water supply, this section summarizes existing contaminant levels in the regional aquifer (Section 3.4.1) and provides additional detail on perchlorate, hexavalent chromium, and other contaminants (Sections 3.4.2 through 3.4.4).

3.4.1 Summary of Contamination in Groundwater

Monitoring of production wells is conducted by the DPU as part of routine monitoring and compliance with the U.S. Safe Drinking Water Act, and monitoring is also conducted by LANL. Recent monitoring and reporting indicates that all drinking water produced by the County's water system meets federal and state drinking water standards. Drinking water wells in the Los Alamos area have not been impacted by LANL discharges with one exception: well Otowi-1

(O-1) in Pueblo Canyon, where perchlorate has been detected below the 2012 LANL Compliance Order on Consent screening level of 4-micrograms per liter (µg/L) (the 2016 LANL Compliance Order on Consent does not include a screening level for perchlorate and the perchlorate standard that will apply going forward is a New Mexico Environment Department (NMED) tap water screening level of 13.8 µg/L). Concentrations of perchlorate in this well are continuing to decline (LANL, 2016). Tritium has also been detected at low levels in well O-1. This well is not being used to supply drinking water due to water leaks in the transmission line, but the DPU plans to put it back online in the future after this pipeline has been replaced.

Table 3-3 summarizes groundwater contaminants that were detected in the regional aquifer in 2015. These data were downloaded from the LANL and NMED Intellus New Mexico web site (LANL and NMED, 2016). Data for well O-1 has been included on Table 3-3, although there were no standard exceedances for samples collected from this well.

The alluvial and intermediate-perched groundwater bodies are separated from the regional aquifer by hundreds of feet of unsaturated rock and sediments, so recharge from the shallow groundwater occurs slowly. As a result, less contamination reaches the regional aquifer than is found in the shallow perched groundwater (LANL, 2014a). Where contaminants are found at depth, the setting is either a canyon where alluvial groundwater is usually present or a location beneath canyons where large amounts of liquid effluent have been discharged. This section focuses mainly on contamination that has been detected in the regional aquifer, since it is the source of the County water supply.

Discussion of the extent and concentrations of specific contaminants follows.

3.4.2 Perchlorate Contamination

Perchlorate is used as an energetics booster or oxidant in solid propellant for rockets and missiles. An official standard for this chemical has not been established. A screening level for perchlorate of 4 µg/L was set in the LANL Compliance Order on Consent issued by NMED on March 1, 2005 and revised on April 20, 2012 (NMED, 2012); however, a new LANL Compliance Order on Consent was issued in 2016 and it does not include a screening level for perchlorate (NMED, 2016). The perchlorate standard that will apply going forward is an NMED tap water screening level of 13.8 µg/L (NMED, 2014).

Table 3-3. Groundwater Contaminants in the Regional Aquifer in 2015

Chemical	Location	Concentration [a] (µg/L [b])		Trends
		Result	Screening Level	
Regional Aquifer (LANL and NMED, 2016)				
Perchlorate	Mortandad Canyon	**≤ 99.4**	4 [c] 13.8 [d]	
Hexavalent chromium	Sandia Canyon	**≤ 386** (2014)	50 [e]	Flat trend in the center of the plume (monitoring wells R-42 and R-28) and gradually increasing trend along the edge of the plume (monitoring wells R-45 screen 1, R-43 screen 1, and R-50 screen 1).
	Mortandad Canyon	**≤ 915**	50 [e]	
Los Alamos County Water Supply Wells (LANL and NMED, 2016)				
Tritium	Well O-1	2.373 pCi/L	20,000 pCi/L [f]	Results have declined since 2004, when there was a detection of 58 pCi/L.
Perchlorate	Well O-1	0.515	4 [c] 13.8 [d]	Results variable, but declining since 2008; concentrations ≤ 3 µg/L since 2001.

[a] **Bold** text indicates standard exceedances.

[b] Unless otherwise noted

[c] 2012 LANL Compliance Order on Consent screening level (NMED, 2012)

[d] NMED tap water screening level (NMED, 2014)

[e] NMWQCC Groundwater Standards for Human Health (20.6.2.3103)

[f] The EPA has established an MCL of 4 millirem per year for beta particle and photon radioactivity from man-made radionuclides in drinking water. The average concentration of tritium that is assumed to yield 4 millirem per year is 20,000 pCi/L. If other radionuclides that emit beta particles and photon radioactivity are present in addition to tritium, the sum of the annual dose from all the radionuclides shall not exceed 4 millirem per year (U.S. EPA, 2002).

µg/L = Micrograms per liter
≤ = Less than or equal to
pCi/L = PicoCuries per liter

Perchlorate contamination is present in groundwater beneath Mortandad Canyon (LANL, 2016). In 2015, perchlorate concentrations exceeded 4 µg/L in samples collected from 8 monitoring wells, one of which (R-15) is completed in the regional aquifer (LANL, 2016). The concentrations detected in 2015 in the regional aquifer well R-15 ranged between 7.22 and 9.05 µg/L (LANL and NMED, 2016). The 4-µg/L screening level was the standard in effect in 2015, but with the higher standard being applied in the future, the number of standard exceedances is expected to decrease (any similar concentrations detected in the future will not exceed the 13.8-µg/L screening level). The two monitoring wells with the highest detected concentrations of perchlorate in 2015 were MCOI-5 and MCOI-6 (LANL and NMED, 2016), and these wells are completed in the perched-intermediate aquifer (LANL, 2016). The concentrations detected in these wells in 2015 ranged between 61.1 and 99.4 µg/L (LANL and NMED, 2016).

3.4.3 Hexavalent Chromium

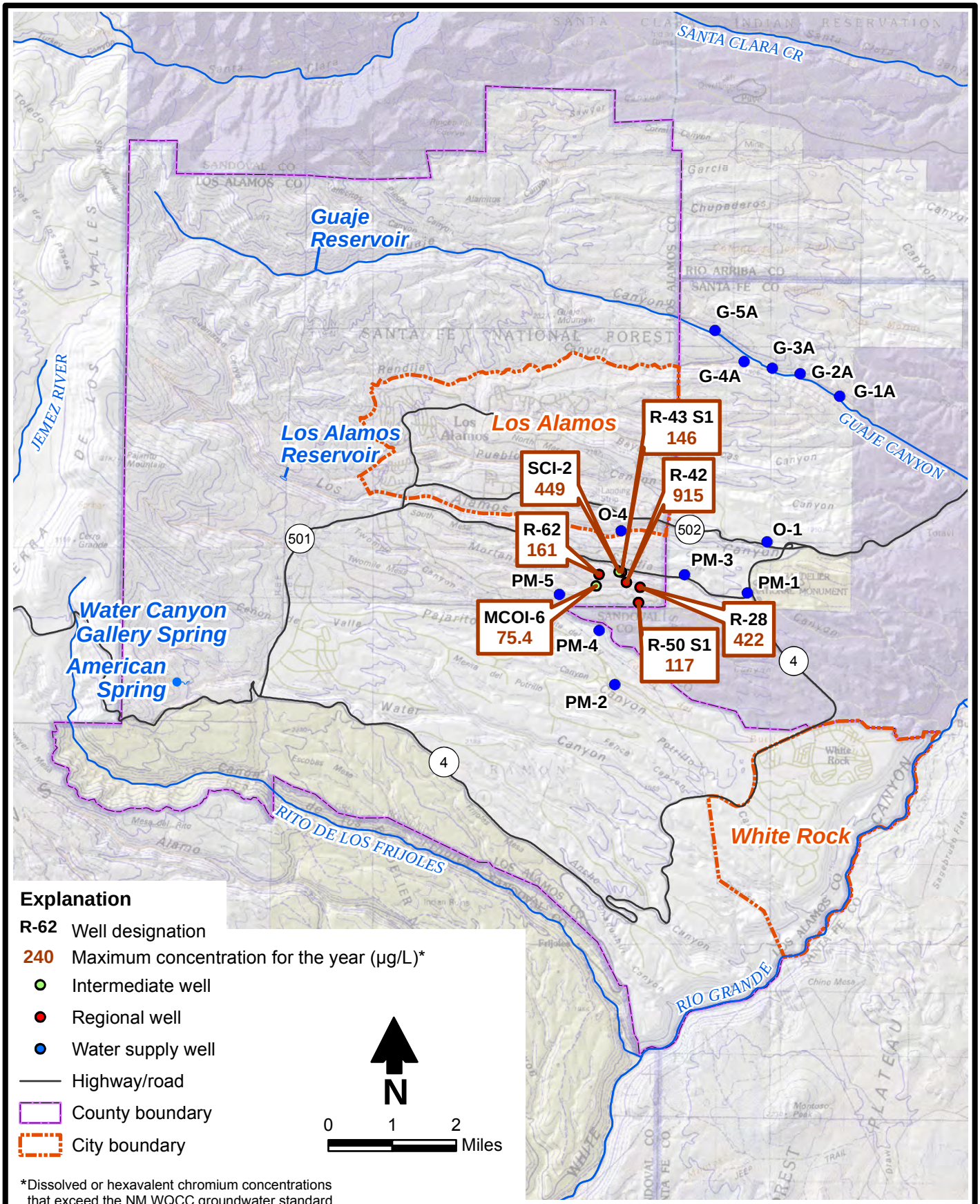
Most contaminants that have been detected in groundwater beneath LANL have concentrations that are largely below regulatory standards; however, a hexavalent chromium plume is present in the regional aquifer. Chromium can be present in either the Cr^{+3} (trivalent chromium) or Cr^{+6} (hexavalent chromium) species. Cr^{+3} is an essential nutrient for humans and occurs naturally in many foods; Cr^{+6} causes various health effects. The U.S. Environmental Protection Agency (U.S. EPA) is currently reviewing data from a 2008 long-term animal study by the Department of Health and Human Service's National Toxicology Program, which concluded that hexavalent chromium may be a human carcinogen if ingested (U.S. EPA, 2015a).

The primary source of chromium in groundwater beneath LANL is blowdown of potassium dichromate from the TA-03 power plant cooling tower that occurred from 1956 to 1972. LANL's conceptual model hypothesizes that chromium originated from releases into Sandia Canyon and may have migrated along lateral pathways to locations beneath Mortandad Canyon. For this reason, perched-intermediate and regional wells beneath Mortandad Canyon are monitored. Other contamination beneath Sandia and Mortandad Canyons may be associated with Mortandad Canyon sources. These sources and the migration pathways are described in the *Investigation Report for Sandia Canyon* (LANL, 2009) and *Phase II Investigation Report for Sandia Canyon* (LANL, 2012).

As discussed in the original long-range water supply plan (DBS&A, 2006), several exceedances of the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard for human health of 50 µg/L for chromium were observed in samples collected in 2005 from monitoring well R-28. Since the 2006 water plan was completed, the areal extent and concentrations within the plume have been better defined. The chromium plume is located in an area of approximately 1 mile by 0.5 mile and within the top 50 feet of the regional aquifer (LANL, 2016). Data for monitoring wells where there were chromium concentration exceedances of the NMWQCC groundwater quality standard for human health in 2015 are shown on Figure 3-9.

In 2015, hexavalent chromium concentrations exceeded the NMWQCC groundwater quality standard in five regional aquifer monitoring wells—R-28, R-42, R-62, R-50 Screen 1, and R-43 Screen 1 (Figure 3-9)—and the highest concentrations of hexavalent chromium detected in the plume are near monitoring wells R-42 and R-28. Two intermediate wells (SCI-2 and MCOI-6) also had hexavalent chromium concentrations above the standard (LANL, 2016). The monitoring wells located in the center of the plume (R-42 and R-28) show a relatively flat trend in the hexavalent chromium concentrations, while monitoring wells along the edge of the plume (R-45 Screen 1, R-43 Screen 1, and R-50 Screen 1) show gradually increasing hexavalent chromium concentrations (LANL, 2016). The production well that is located closest to the hexavalent chromium plume is PM-3, which is located about ½ mile from R-28 (Figure 3-9). Hexavalent chromium detections in monitoring wells R-35a and R-35b (located adjacent to PM-3 and screened deep in the upper louvered section of PM-3 and at the water table, respectively) are at background levels (Katzman, 2016). Well PM-3 could become contaminated in the future, depending on the direction of groundwater flow and on the interim measures being implemented by LANL (discussed below) to control plume migration (LANL, 2015b).

The screened interval in monitoring well R-28 is from 934 to 958 feet deep, extending only 69 feet into the top of the regional aquifer, while PM-3 is screened at much greater depths (from 956 to 2,532 feet), therefore producing water from a much larger section of the aquifer. If the chromium plume were to reach PM-3 yet be confined to a shallow segment near the top of the aquifer, the concentration is likely to be highly diluted as a result of pumping from an interval of more than 1,500 feet. Nevertheless, the presence of hexavalent chromium near the well represents a risk that should be carefully monitored. During 2015, the NMED DOE Oversight



Explanation

- **R-62** Well designation
- **240** Maximum concentration for the year (µg/L)*
- Intermediate well
- Regional well
- Water supply well
- Highway/road
- County boundary
- City boundary

*Dissolved or hexavalent chromium concentrations that exceed the NM WQCC groundwater standard of 50 µg/L for human health.

Source: LANL, 2016

LOS ALAMOS COUNTY WATER PLAN

Monitoring Wells with 2015 Chromium Concentration Exceedances

Daniel B. Stephens & Associates, Inc.

11/1/2016 JN WR14.0178 Figure 3-9

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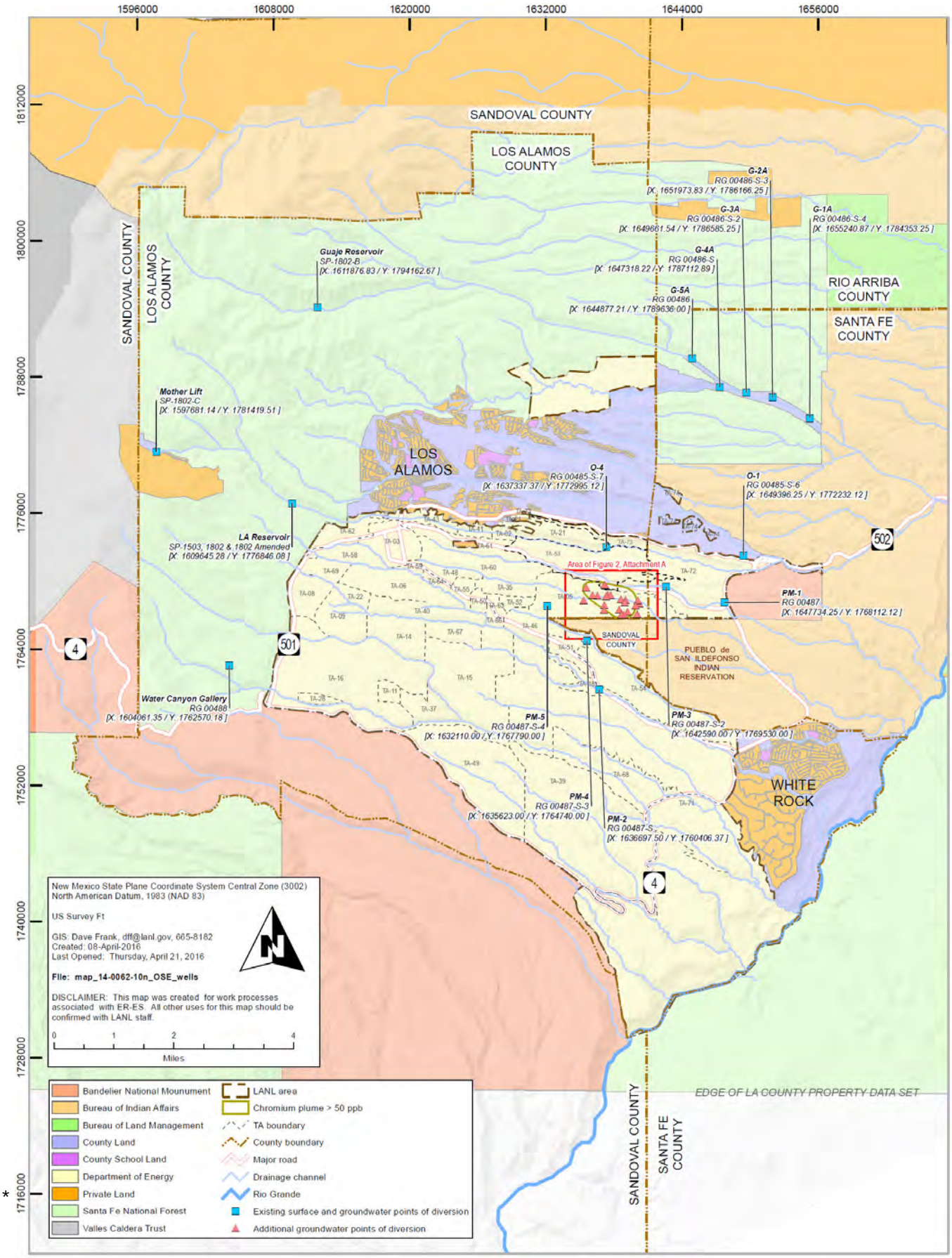
Bureau coordinated with the NMED Drinking Water Bureau on a scope of work for a potential project to assess the vulnerability of the water supply wells to contamination; however, due to grant timing and State contracting limitations, the project has been put on hold (Yanicak, 2016). In the event that any of the production wells are impacted by hexavalent chromium, the DPU maintains an insurance policy to fund and implement corrective actions, as needed.

The May 2015 Interim Measures Work Plan (LANL, 2015a) presents LANL's approach for controlling movement of chromium-contaminated groundwater along the downgradient portions of the plume. LANL plans to extract contaminated groundwater, treat it at the surface using ion exchange, and reinject it into the aquifer, with project implementation beginning in 2016 (LANL, 2016). In an October 2015 letter, NMED approved the LANL work plan and set due dates for the interim measure task work plans (NMED, 2015b). Figure 3-10a shows the chromium interim measure project area in relation to the rest of the County, and Figure 3-10b shows the existing and planned extraction, injection, and monitoring wells, and provides an approximate areal extent of the hexavalent chromium-contaminated groundwater that exceeds the 50-µg/L NMWQCC groundwater standard for human health (U.S. DOE and LADPU, 2016). The work plan also provides a general description of the planned treatment system, including two ion exchange vessels for treatment and redundancy (LANL, 2015b).

In addition, LANL is conducting work under the July 2015 *Work Plan for Chromium Plume Center Characterization* to further investigate the aquifer in the center of the chromium plume and to further characterize the nature and extent of the contamination in order to identify remedial alternatives for the chromium plume (LANL, 2015b). Objectives include investigating the feasibility of chromium source removal, further characterizing the aquifer—including heterogeneity and dual porosity—in order to evaluate the potential for in situ remedial strategies, studying the hydrologic and geochemical conditions that occur near the proposed injection wells, and characterizing the infiltration beneath the shallow alluvial groundwater in Sandia Canyon (LANL, 2015b). The LANL chromium plume center characterization work plan details planned LANL activities, including extraction well installation, pumping, and sampling, aquifer tracer tests and a field cross-hole trace study, an injection well study, and characterization of infiltration in Sandia Canyon (LANL, 2015b).



S:\PROJECTS\WR14.0178_LOS_ALAMOS_COUNTY\GIS\MXDS\FIGURES_2016-08\FIG_3-10A_PODS.MXD

Source: U.S. DOE and LACWU, 2016

LOS ALAMOS COUNTY WATER PLAN

Points of Diversion

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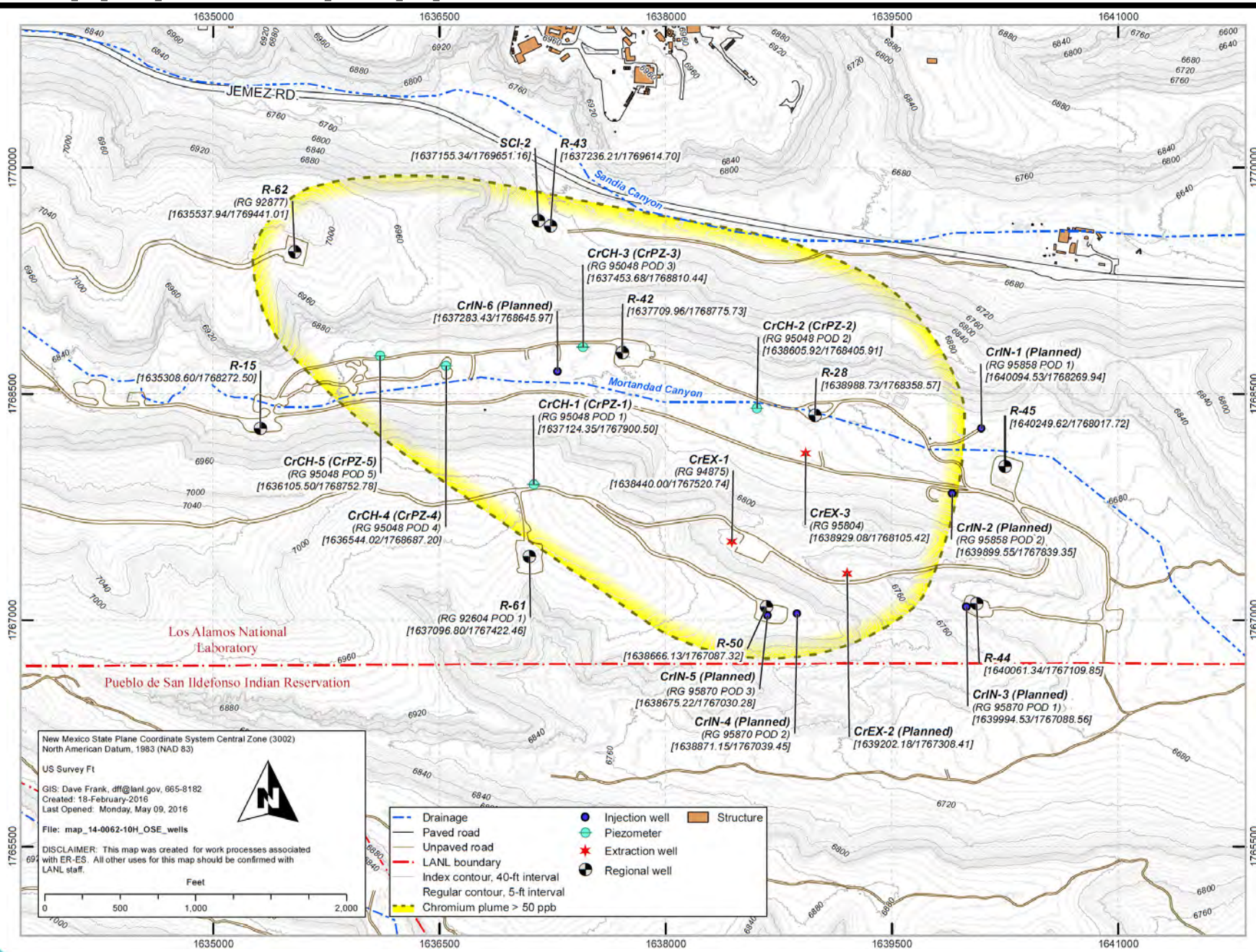
Figure 3-10a

S:\PROJECTS\WR14.0178_LOS_ALAMOS_COUNTY\GIS\MXDS\FIGURES_2016-08\FIG_3-10B_PODS.MXD



Source: U.S. DOE and LACWU, 2016

LOS ALAMOS COUNTY WATER PLAN

Points of Diversion

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JN WR14.0178

Figure 3-10b

LANL plans to work with the DPU to ensure that the interim measure pumping does not interfere with the water supply pumping and to continue to monitor water quality in the monitoring and water supply wells (LANL, 2014c). In addition, LANL will prepare a corrective measures evaluation report that proposes the final remedy for the chromium plume (LANL, 2015b).

3.4.4 Other Contaminants in Groundwater

A number of additional contaminants have been detected in groundwater, including nitrate, RDX, tritium, trichloroethene, and radioactive contaminants. These contaminants are discussed briefly in the sections that follow.

3.4.4.1 Nitrate

Nitrate (NO_3 as nitrogen) has been detected in the regional aquifer at concentrations of up to 6.1 milligrams per liter (mg/L) in monitoring wells R-43 S1 and R-11 in Sandia Canyon and R-42 in Mortandad Canyon (the U.S. EPA national primary drinking water standard and NMWQCC groundwater standard for human health are both 10 mg/L). Nitrate (as N) concentrations are also elevated (> 2 mg/L) in samples from regional aquifer monitoring wells R-36 in Sandia Canyon and R-15, R-28, and R-45 in Mortandad Canyon (LANL, 2014a).

3.4.4.2 RDX

RDX, a component of explosives, has been detected in groundwater. An official standard for this chemical has not been established; however, the EPA's tap water screening level for RDX is 0.70 µg/L (U.S. EPA, 2016). LANL indicated that EPA is using a target risk of E–6 for RDX (0.70×10^{-6} µg/L), and that NMED requires LANL to use a target risk of E–5 (Katzman, 2015). The RDX standard used by LANL is 7.0 µg/L (NMED, 2015a).

RDX is monitored by LANL, and RDX concentrations exceed LANL's 7.0-µg/L standard at two springs (Burning Ground Spring and Martin Spring), one alluvial well (CdV-16-02659), and three intermediate-perched zone wells (CdV-16-4ip S1, CdV-16-2(i)r, and CdV-16-1(i)) near TA-16 in the Water Canyon watershed (LANL, 2015c). RDX is also persistently detected in regional aquifer monitoring wells R-18 and R-63 at concentrations that are below the standard. In 2015, the maximum concentrations detected were 1.66 µg/L in R-63 and 2.86 µg/L in R-18. The concentrations in R-63 have been relatively steady since this well was installed in 2011, with the

exception of the first few samples following well construction. Detected concentrations in R-18 show an increasing trend since the well was completed in 2006 (LANL, 2016).

3.4.4.3 Trichloroethene and Tetrachloroethene

Chlorinated solvents are present in the groundwater near TA-16 (LANL, 2015c). Trichloroethene (TCE) was detected in Pajarito Canyon regional aquifer monitoring well R-20 S2 beginning in late 2008 and continued to be detected in every sampling event through 2011. In 2015, TCE was not detected in R-20 S2 (LANL and NMED, 2016). In 2014, tetrachloroethene (PCE) and TCE were detected in alluvial well FLC-16-25280 at concentrations above the U.S. EPA national primary drinking water standards of 5 µg/L (LANL and NMED, 2016).

3.4.4.4 Radioactive Contaminants

Radioactive effluent was discharged into Los Alamos Canyon during the earliest Manhattan Project operations at TA-01 (1942 through 1945) and from nuclear reactors at TA-02 (until 1993). Liquid and solid radioactive wastes were also discharged in Los Alamos Canyon from TA-21, and radionuclides and metals were discharged from the sanitary sewage lagoons and cooling towers at the Los Alamos Neutron Science Center at TA-53. Compared with past decades, little radioactivity is now found in groundwater samples. In 2013, strontium-90 was detected in shallow alluvial wells in DP and Los Alamos Canyons, at concentrations of up to 17 picoCuries per liter (pCi/L) (LANL, 2014a). The U.S. EPA has established a national primary drinking water standard of 4 millirem per year (mrem/yr) for beta particle and photon radioactivity from man-made radionuclides in drinking water (including strontium-90, which emits beta particles during radioactive decay). Based on conversions provided by the U.S. Department of Commerce Bureau of Standards, the derived concentration of 8 pCi/L is equivalent to a dose of 4 mrem/yr for strontium-90 (U.S. Department of Commerce, 1959; U.S. EPA, 2015b). Samples collected from alluvial well LAO-3a continue to exceed the standard. In 2015, the strontium-90 concentration in this well was 12.4 pCi/L (LANL and NMED, 2016).

Tritium activities in groundwater peaked in the early 1980s and have since declined. Tritium was detected in water supply well O-1 at an activity of 2.373 pCi/L in 2015 (LANL and NMED, 2016). In the intermediate zone monitor wells MCOI-5 and MCOI-6, tritium was detected in

2015 at activities of 3,140 and 2,940 pCi/L, respectively. The U.S. EPA's dose-based drinking water standard for tritium is 4 mrem/yr, based on a maximum contaminant level of 20,000 pCi/L (U.S. EPA, 2002).

3.5 Surface Water Supply

Though most of the County's water supply is from groundwater, there are two sources of surface water supply:

- The Los Alamos Canyon reservoir has provided non-potable water supplies to schools, parks, and a golf course. The reservoir filled with debris following the 2000 Cerro Grande Fire, and the area was further impacted by the 2011 Los Conchas fire and subsequent flooding. The debris was cleared and reservoir repair and reconstruction was completed in the spring of 2013, but a flood in September 2013 filled the reservoir with silt again. The reservoir has been dredged and the DPU plans to install a new pipeline from the reservoir into town in order to connect to the existing non-potable infrastructure (Meyers, 2016).

- The County has the potential to use Rio Grande surface water from the San Juan-Chama Project in the future, though a diversion structure has not yet been constructed. Bringing the San Juan-Chama Project water online would diversify the water supply geographically and also in terms of water rights (using surface water rights from the Colorado River Basin in addition to native groundwater from the Rio Grande Basin), helping the County to mitigate any future effects due to contamination of existing wells and/or climate change. Details of a potential San Juan-Chama Project diversion and County water rights are discussed in Section 4.

Since surface water currently supplies only non-potable supplies, surface water contamination is not a primary issue for drinking water quality. However, careful management of stormwater runoff, particularly in areas impacted by fire, is an important water resource management issue for Los Alamos County, as discussed in Section 7. Surface water quality will become more of an issue if and when a project to use San Juan-Chama Project water comes online.

4. Water Rights

In addition to having sufficient physical supply, the County needs to have the legal rights to use the water. New Mexico water law is founded on the principle that all water in New Mexico belongs to the State of New Mexico, which thus has the sole authority to grant or recognize rights to use that water. Two further tenets, both based on New Mexico Constitution Article XVI, Section 2, are that (1) water rights "are subject to appropriation for beneficial use, in accordance with the laws of the state" and (2) "priority of appropriation shall give the better right."

- The concept underlying the principle of prior appropriation is that the first person to use water for a beneficial purpose has a prior right to use that water against subsequent appropriators. Water rights acquired through this system of prior appropriation are a type of property right and may be sold or leased.

- The essential basis of water right ownership is beneficial use. The principle of beneficial use is that a water right arises out of a use that is productive or beneficial, such as agricultural, municipal, industrial, and domestic uses, among others.

The State Engineer, through the OSE, administers water rights for the State of New Mexico:

- To actively manage groundwater resources in New Mexico, the State Engineer has the authority, as set forth in the Water Code, to delineate groundwater basins that require a permit for groundwater withdrawals. Such a permit specifies (1) how much water a user can withdraw in any given year, (2) the location and type of well that will be used to withdraw the water, and (3) the use to which the water will be put. Many water right permits have special conditions that further define the use and quantity of water allowed under the permit.

- Like groundwater, the diversion of water from New Mexico's surface waters requires either a declaration, permit, license, or court decree to divert the water. Surface water appropriations follow the same standards as groundwater rights in that a transfer or lease cannot impair existing water rights and must not be contrary to public welfare or conservation (NMSA 72-5-23, 72-12-3(D)).

Many of New Mexico's surface waters are governed by interstate compacts that require set amounts of water to be delivered to specified delivery points. The Interstate Stream Commission (ISC), an adjunct commission to the OSE, has responsibility for ensuring that specific rivers in New Mexico meet their obligations under their respective interstate compacts.

4.1 Water Rights

The County has existing water rights from a variety of sources, including water rights from the Rio Grande surface water and underground water basins and rights to use 1,200 acre-feet of water from the San Juan-Chama Project. The U.S. DOE also owns Rio Grande underground water basin rights. These rights are discussed in Sections 4.1.1 and 4.1.2, respectively.

4.1.1 Rio Grande Surface Water and Groundwater Rights

As discussed in Section 2, the County's Rio Grande water rights were originally owned by the U.S. DOE. In 2001, 70 percent ownership was transferred to the County, and DOE retained 30 percent ownership. Table 4-1 summarizes these permitted, licensed, and declared water rights.

Table 4-1. Summary of Water Rights

Permit Number	Water Source	Priority Date	Quantity of Water Originally Appropriated (ac-ft/yr)
RG-485 through RG-496-Comb-S-4 [a]	Groundwater	1948-1951	5,329
RG-485 through RG-496-Comb-S-5 [b]	Groundwater	1948-1951	50
1503,1802, and 1802-amended [c]	Surface water	March 14, 1922	168.1
Evaporation loss	Surface water	NA	(5.8)
		Total water rights	5,541.3 [d]

Source: Southwest Water Consultants, Inc., 1999

[a] Permitted August 31, 1965 from numerous underground water right declarations filed on March 5, 1957 and amended in 1965. These declarations identified actual use of 3,966 acre-feet in 1964, a capacity of 6,579 ac-ft/yr, and an OSE feasible diversion of 5,329 ac-ft/yr. Dates that water was put to beneficial use vary.

[b] Subsequent declarations added an additional 50 acre-feet and new points of diversion.

[c] The amendment to Permit 1802 raised the storage capacity from 6.66 acre-feet to 28.33 acre-feet.

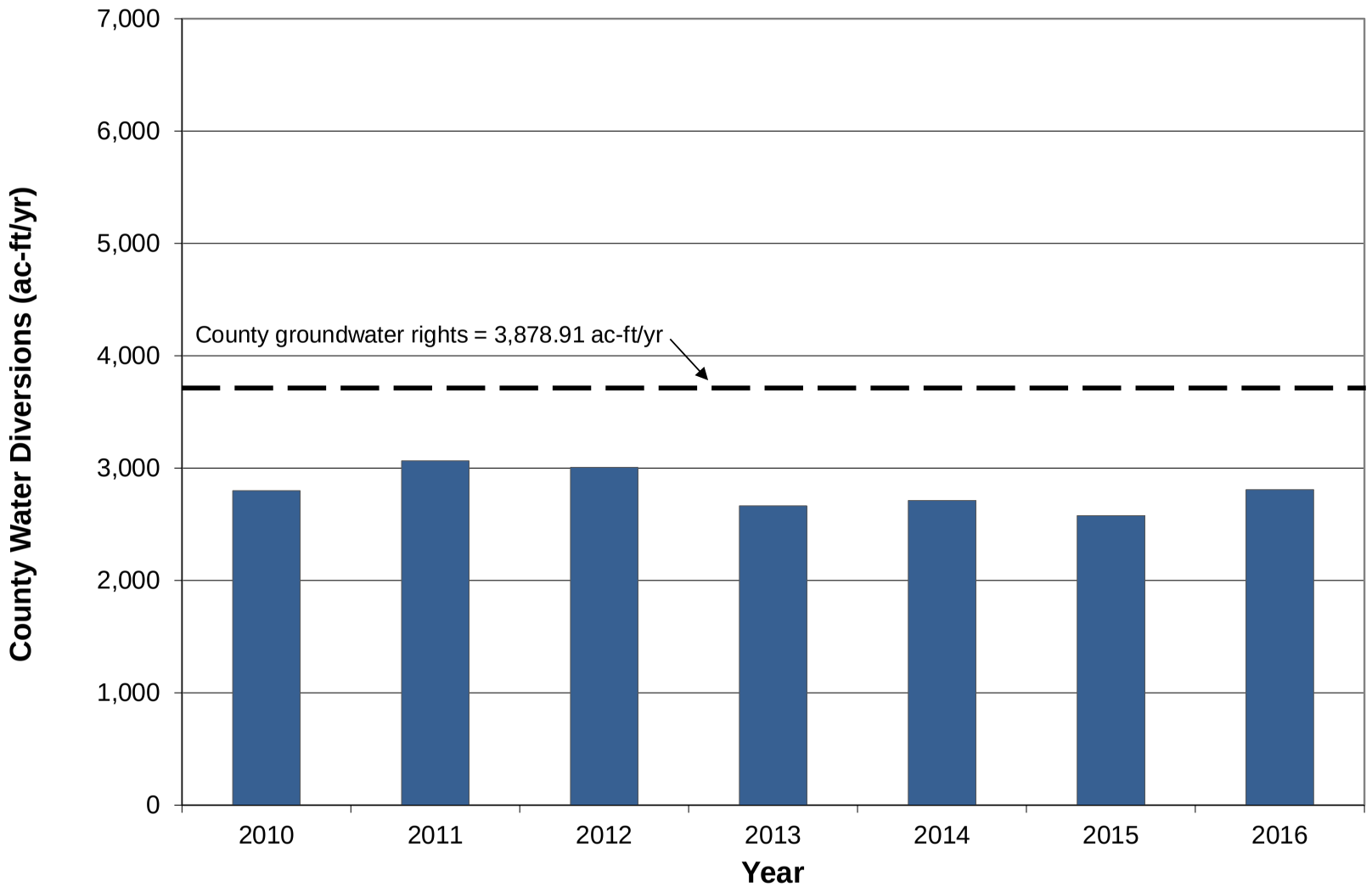
[d] Of the total 5,541.3 ac-ft/yr under the 1975 combined permit, the County owns 70 percent (3,878.91 ac-ft/yr) and DOE owns 30 percent (1,662.39 ac-ft/yr).

The rights outlined in Table 4-1 are based on a permit application filed by U.S. Energy Research on May 29, 1975 to combine a series of previously licensed and declared water rights. That

application requested a total right of 5,547.1 ac-ft/yr for municipal, industrial, and related purposes that could be diverted from any combination of permitted points of diversion. The OSE approved the application on October 30, 1975 with the exception of subtracting 5.8 ac-ft/yr for evaporation losses at Los Alamos Reservoir. Figure 4-1 shows the DPU water diversions for 2010 to 2015 (these volumes were calculated by subtracting LANL demands from total diversions), and Figure 4-2 shows the LANL water use volumes for the same period, in comparison to their respective groundwater rights. Figure 4-3 shows the DPU water diversions and LANL water use volume, along with the water rights for both entities. The County has an extension of time for putting their rights to beneficial use that will expire on September 30, 2017. A request for a three-year extension of time was submitted on August 25, 2017 (Alarid, 2017).

The County (which is the sole water provider for LANL) leased the DOE-owned water rights from 2001 to 2011, when the lease expired. In May 2016, an application for permit to change an existing water right was filed jointly by DOE and the County in support of the chromium plume control interim measure and chromium plume center characterization project (U.S. DOE and LADPU, 2016). In addition, a Request for Emergency Authorization associated with the joint application was submitted, and emergency authorization was received on September 10, 2016 (NMOSE, 2016). The application and emergency authorization request were filed jointly because of the nature of the existing permitted rights between the DOE and the County (U.S. DOE and LADPU, 2016).

The application requests a change in purpose of use for groundwater to add groundwater remediation and additional groundwater points of diversion (PODs) to be used for control and future characterization of hexavalent chromium-contaminated groundwater at LANL (U.S. DOE and LADPU, 2016). The application calls for 24 additional PODs (3 extraction wells, 6 injection wells, and 15 monitoring wells). The volume of water for this application is 679 ac-ft/yr (U.S. DOE and LADPU, 2016), and LANL also plans to file for return credits from the OSE. Operation of the additional PODs will not impair or increase the appropriation of water above the existing permitted water rights between DOE and the County (5,541.3 ac-ft/yr total) (U.S. DOE and LADPU, 2016). On September 10, 2016, the OSE approved the request for Emergency Authorization and issued Emergency Authorization, RG-00485 et al. (NMOSE, 2016). The County continues to negotiate a new lease with DOE for the full 1,662.39 ac-ft/yr, for use by all customers, including LANL and the chromium interim measure (Meyers, 2016).



Note: These values were obtained by subtracting the LANL water demands from the total diversions.

Figure 4-1

LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos County 2010 Through 2016

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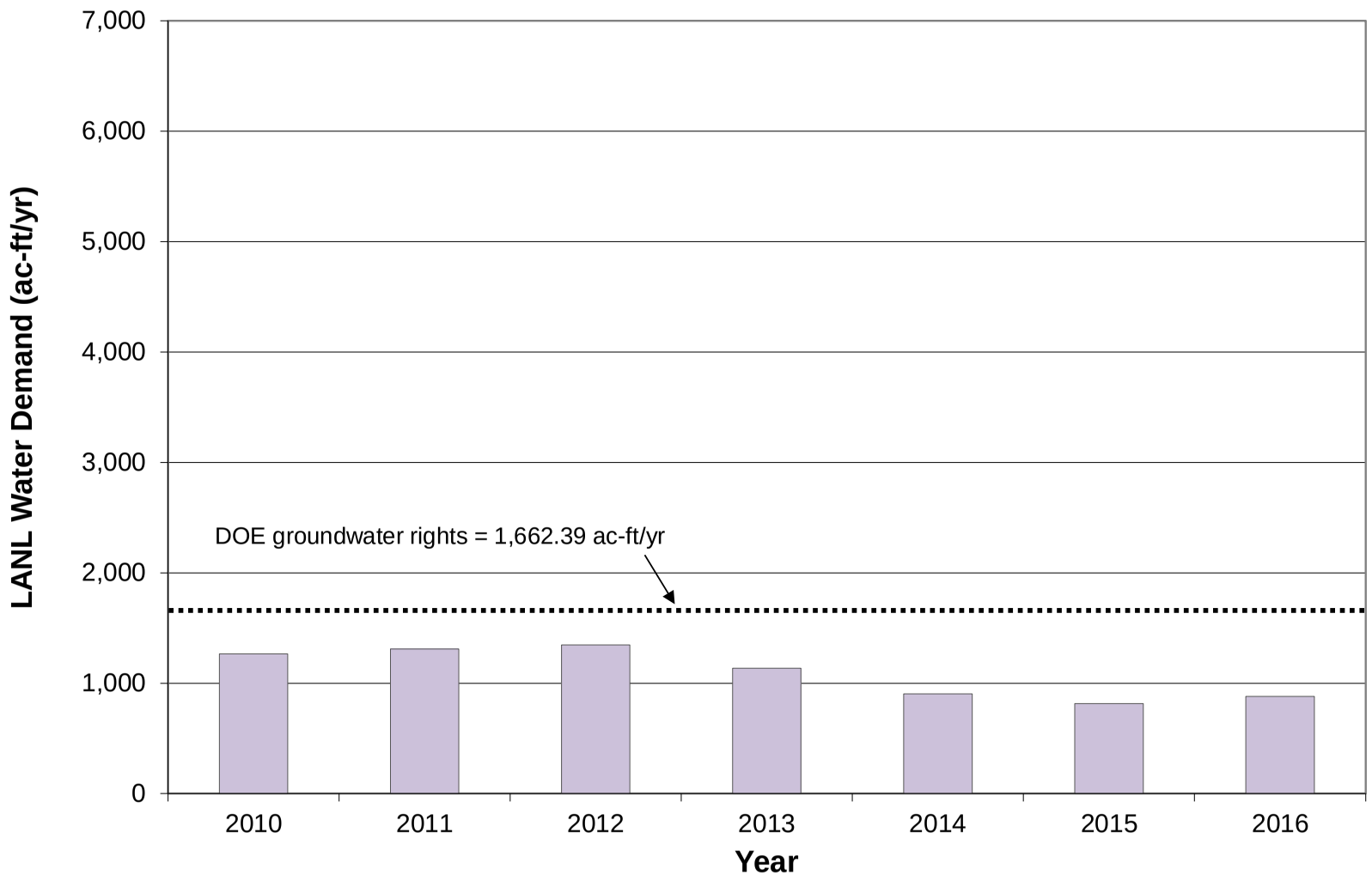
9/7/17



Notes: 1. The groundwater supply being used for the LANL chromium interim measure project has not been subtracted from DOE's total water rights.
2. See Section 4.1.1 for a discussion of water rights ownership and leasing.

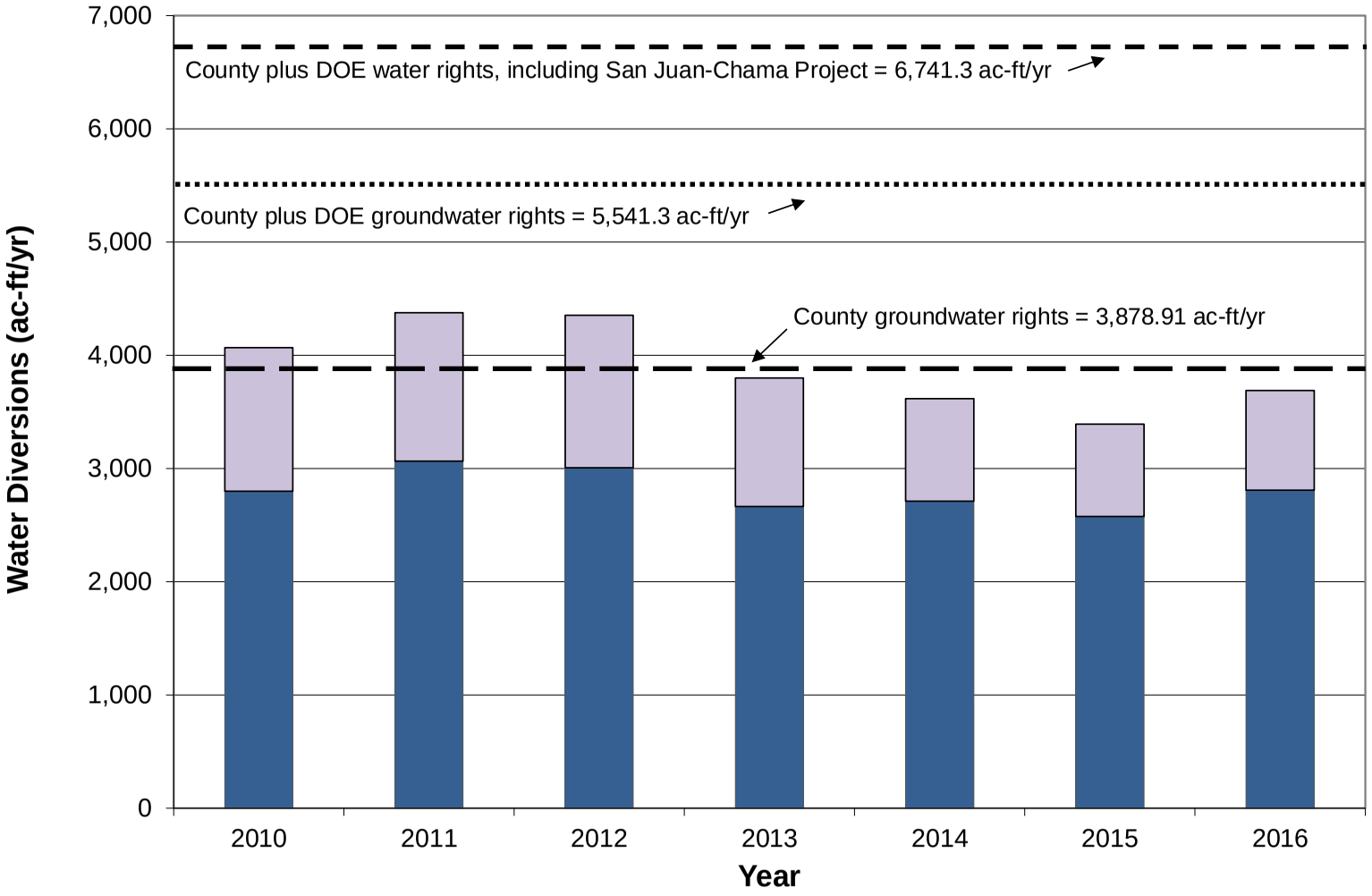
LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos National Laboratory 2010 Through 2016

Figure 4-2

Daniel B. Stephens & Associates, Inc.

9/7/17



Notes:
1. The groundwater supply being used for the LANL chromium interim measure project has not been subtracted from DOE's total water rights.
2. See Section 4.1.1 for a discussion of water rights ownership and leasing.

LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos County and Los Alamos National Laboratory, 2010 Through 2016

Figure 4-3

In 2006, the OSE approved a 30-ac-ft/yr surface water diversion from Los Alamos Canyon for snowmaking, which is included in the existing total water rights volume of 5,541.3 ac-ft/yr. The purpose of use was changed from municipal and industrial to municipal, industrial, recreational, and snowmaking.

4.1.2 San Juan-Chama Surface Water Rights

Implementation of a project to use San Juan-Chama Project water would help to diversify the Los Alamos County water supply, both geographically and from a water rights perspective. The San Juan-Chama Project surface water originates in the Colorado River Basin and provides a source of supply that is geographically separate from the regional aquifer near Los Alamos. This geographic separation would be a benefit should there be expanded water quality contamination issues in the local groundwater in the future. Additionally, as a federal project, San Juan-Chama Project water contracts are not subject to OSE priority issues, although they may be subject to water rights administration (discussed in Section 4.3.1 and 4.3.2). The San Juan-Chama Project water rights may also be subject to shortage sharing on a pro rata basis among all contractors in drought years, as discussed in Section 4.3.3. Even with some drought vulnerability, having a separate source of supply could help to provide back-up supply if contamination or water rights issues affect the use of the regional aquifer.

Los Alamos County has contracted water rights with the U.S. Department of the Interior Bureau of Reclamation for 1,200 acre-feet of San Juan-Chama Project surface water, which flows into the Rio Grande through a series of tunnels, conveyance channels, and reservoirs. Los Alamos County's San Juan-Chama contract was converted from a service contract to a repayment contract in October 2006, and the County completed repayment of the contract (Los Alamos County's share of the San Juan-Chama Water Project construction costs) in December 2015. Under the current contract, remaining payments are for operation, maintenance, and replacement costs only (San Juan-Chama Project Contract No. 05-WC-40-560).

A final preliminary engineering report (PER) was completed for the County's San Juan-Chama Project water supply project in September 2012. The PER evaluated five alternatives for diverting, treating, and conveying the San Juan-Chama Project water and recommended the alternative that called for the installation of three wells in White Rock (CDM Smith, 2012).

Under this alternative, groundwater that would have naturally discharged to the river would be pumped, and the San Juan-Chama Project water would replace the pumped groundwater in the river (CDM Smith, 2012). This alternative would not require treatment above disinfection, and the proposed well locations would allow for connection to the water system at an existing booster station (CDM Smith, 2012). The Los Alamos County Council advised that further study of alternatives and an environmental assessment be completed before the project moves forward (LADPU, 2014).

An environmental assessment would provide an opportunity to re-evaluate specifics of the project design in light of environmental and public concerns. In July 2014, the Utilities Manager recommended delaying further action on a potential San Juan-Chama Project diversion until the 40-year water plan update has been completed (LADPU, 2014). Through the environmental assessment and further planning processes, the County will need to consider the benefits of the separate San Juan-Chama Project water supply in relation to costs and other concerns, and to determine when and if to construct a project that would bring this water online.

4.2 Water Rights Administration

As part of the planning process, it is important to view the County's water rights in the larger context of the administrative and other legal considerations that could affect the County's ability to use and divert its water rights in any given year. This section discusses the administrative policies currently or potentially affecting the County's water rights; Section 4.3 assesses the potential risks to those water rights.

4.2.1 Rio Grande Compact

Water in the Rio Grande is governed by the Rio Grande Compact, an agreement entered into by New Mexico, Texas, and Colorado in 1939 and approved by the United States Congress and the State of New Mexico (NMSA 72-15-23). The Compact applies to the use of surface water of the Rio Grande, from its headwaters in Colorado to Fort Quitman, Texas, by each of the three states. Each upstream state is required to make a surface water delivery to its downstream neighbor. The volumes of water required to be delivered to New Mexico and Texas are calculated based on upstream flows, and an annual accounting is conducted to determine each

state's actual deliveries in relation to that delivery obligation and the resulting credits or debits (over- or under-deliveries), which are carried over from year to year.

New Mexico's Compact delivery requirements are based on an inflow-outflow schedule where inflow is measured at the Rio Grande at Otowi Bridge near San Ildefonso, NM gage (Otowi gage) east of Los Alamos. Because of the Otowi gage's role in determining delivery amounts, the State Engineer has a long-standing administrative practice of not permitting a change in point of diversion from one side of the gage to the other, whether by sale or by lease (Cartron et al., 2002). This requirement places a significant restriction on the water rights market, and coupled with the fact that few pre-1907 water rights are available for purchase, means that purchasing water rights, whether for municipal use or offsets (Section 4.2.4), will be a significant challenge. Additionally, even if a willing seller can be identified, water rights transfers on the Rio Grande are routinely protested and can require expenditure of significant technical and legal fees.

4.2.2 Protection of Senior Water Rights

As discussed above, the State of New Mexico adheres to the prior appropriation system for water rights administration. This approach is based on a "first in time, first in right" concept, whereby the water right holder with a priority date senior to other rights can exercise that right to the detriment of a right with a junior priority date. When senior water right holders are unable to fully exercise their right due to diversions by junior water right holders, they can make a priority call on a river (including stream-connected groundwater rights). This call, which would be administered by the OSE, would require junior users to cease pumping or diverting so that the senior rights could be fulfilled.

To date, priority call-based administration has rarely happened; however, most rivers and connected groundwater basins are over-appropriated. Even though the Rio Grande Basin has not been adjudicated (a legal process that establishes the amounts and priority dates of all surface water and groundwater rights in a stream system), the County's water rights are junior to a significant number of downstream senior water rights, such as the Middle Rio Grande Conservancy District, that could be impacted by additional depletions upstream. With additional growth and other pressures, such as endangered species requirements, active administrative

protection of senior water rights in groundwater basins and rivers is likely to become more frequent over the 40-year planning horizon.

4.2.3 Active Water Resource Management

In an effort to develop more flexible tools for administering water rights in New Mexico, the OSE adopted Active Water Resource Management (AWRM) regulations (NMAC 19.25.13.1 to 13.49) in December 2004. The AWRM legislation creates an administrative framework within which the OSE will establish water master districts, appoint water masters for those districts, and develop district-specific water rights administration regulations.

The OSE has established seven priority basins for AWRM (NMOSE, 2004a), including the Lower Rio Grande. Over time, the OSE may extend the AWRM program to the Upper Rio Grande and develop regulations that will address administration of water rights, although the regulations will not become final until the Rio Grande Basin has been adjudicated (NMOSE, 2004b). In the Pecos River and connected groundwater basins, the OSE has developed AWRM regulations that clearly lay out several approaches to priority administration, all of which allow for curtailment of junior water rights to protect senior water rights.

4.2.4 Rio Grande Offset Requirements

In accordance with statutory authority and case law, the OSE manages the Rio Grande surface water and groundwater basins conjunctively and considers Rio Grande surface water to have been fully appropriated as of the year 1939 (the year the Rio Grande Compact was signed) (NMOSE, 2000). This means that the OSE recognizes the groundwater-surface water connection and conditions permits so that new groundwater appropriations will not increase surface water depletions and thereby affect senior water right holders. Specifically, the OSE requires applicants for groundwater rights to purchase and retire valid water rights in an amount equivalent to the effect the groundwater withdrawals will have on the river.

Previously, the OSE did not require applicants to immediately begin purchasing and retiring water rights. However, current policy, which was upheld in a case involving the City of Rio Rancho, specifies that offsets must be in place to counteract the effect of pumping on the river.

A phased acquisition of the offsets is possible, especially if the applicant is not planning to immediately pump up to the full permitted amount; however, offsets for impacts must be in place by the time those impacts affect the river (i.e., increase depletion).

The OSE has further clarified this policy, stating that offset rights may be valid only for pre-1907 rights, a pre-1907 surface water right previously transferred into a well, or an existing groundwater right with a priority date older than May 31, 1939, the date of the Rio Grande Compact (NMOSE, 2006). This policy limits the number of water rights that could be considered for offset requirements.

4.2.5 Rio Grande Declared Underground Water Basin

The Rio Grande Underground Water Basin covers 26,209 square miles along the Rio Grande in the center of the state. Although specific administrative criteria exist for the area near the river in the Middle Rio Grande (the reach from Cochiti to Socorro) (NMOSE, 2000), the OSE has no unique administrative criteria for the portion of the Rio Grande Basin near Los Alamos County. The OSE evaluates applications for water rights in this reach, including a change in point of diversion or place and purpose of use of water rights, to determine whether the granting of the application will impair existing water rights or be detrimental to the public welfare or contrary to the conservation of water.

4.3 Risks to Los Alamos County Water Rights

Although the County owns a specific volume of water rights, the legal right to divert and use those rights in any given year can be affected by the rights of other water rights holders and even as a result of interstate compacts or other agreements governing interstate waters. These risks are discussed in the following subsections.

4.3.1 Protection of Senior Water Rights

As discussed in Section 4.2.2, the County could potentially be subject to limitation of its water rights in order to protect senior water rights. A significant yet unquantified number of the water rights on the Rio Grande are senior to those of the County. In the event that the OSE begins

administering priorities based on a call or based on AWRM regulations, the County could be required to limit its use or to use some of its San Juan-Chama Project water to mitigate the effects of its diversions on senior water right holders. Until the OSE conducts a hydrographic survey and adjudicates the Rio Grande Basin, however, it is impossible to quantitatively evaluate the County's susceptibility to curtailment of its water rights under priority administration.

4.3.2 Rio Grande Offset Requirements

Even without a priority call, the OSE could potentially require the County to offset its current pumping to avoid impairment of pre-1939 senior water rights holders. For example, should the County submit an application to change the POD or purpose and place of use of a water right, the OSE would evaluate that application with respect to impairment, public welfare, and conservation. Because the County's use of its water rights increases depletions on the Rio Grande, thereby impacting senior water rights holders, the OSE could require offsets due to impairment even though the existing permits have no offset requirement. As discussed in Sections 4.2.4 and 6, the County could satisfy those offset requirements by using San Juan-Chama Project water as offset rights or by purchasing water rights. However, willing sellers of pre-1907 water rights are difficult to find, and many municipalities have encountered difficulties in identifying water rights to purchase.

The County might also be able to reduce the number of offset water rights the OSE would require by applying to the OSE for return flow credit for the treated wastewater effluent it returns to the Rio Grande. Credit for return flow to the aquifer is also possible. Both types must be demonstrated in a return flow plan subject to OSE approval (NMOSE, 2000, Section 3).

4.3.3 Navajo Water Rights Settlement Provisions

The original legislation authorizing the San Juan-Chama Project includes provisions for sharing shortages among beneficiaries of the project (76 Stat. 96, PL 87-483). The Northwestern New Mexico Rural Water Projects Act (123 Stat. 1372, PL 111-11) was enacted on March 30, 2009, and Section 10402 amends Public Law 87-483, providing additional detail about shortage sharing. The Navajo Water Rights Settlement, which was approved in August 2013, defines

flows and other requirements in a manner that could result in shortages to the San Juan-Chama Project. These shortages would likely be shared on a pro rata basis among all contractors. Although conditions giving rise to shortage sharing may be rare, implementation of the act could nonetheless reduce the quantity of San Juan-Chama Project water available to contractors in some years. Predicted changes in San Juan-Chama Project water allocations resulting from climate change are discussed in Section 7.

4.4 Acquisition of New Water Rights to Meet Future Demand

As discussed in Section 6, the County could be required to obtain additional water rights to meet future water demand, or to move points of diversion for existing rights if contamination affects supply wells (Section 3). As the Rio Grande basin is considered to be fully appropriated, the County would have to purchase water rights to meet future needs, which may not be feasible given water market limitations. The County should consider maximizing use of its existing water rights through conservation or reuse and through maximizing return flow credits.

4.5 Los Alamos National Laboratory

In September 2009, the County signed an agreement with DOE to provide water service to LANL for the period October 1, 2009 through September 30, 2019, and the County will be the sole water provider for LANL at least through the term of this agreement. The contract indicates that DOE will provide support to the County for implementing use of San Juan-Chama Project water. The contract also identifies other terms of service such as meter testing, access to wells for hydrologic monitoring, water storage for firefighting, and water rates. Estimated quantities of water to be provided to LANL range from 412,000,000 gallons (1,264 acre-feet) in 2010 to 572,000,000 gallons (1,743 acre-feet) in 2019. The contract recognized that predicting future water needs for LANL is difficult and included provisions for notification if the future water needs were expected to increase by more than 50,000,000 gallons (153 acre-feet) per year. The agreement also includes a curtailment plan with provisions to reduce water use during times of shortage. LANL provided a 10-year water demand forecast (fiscal year 2017 through fiscal year 2027) in support of this plan update, with values ranging between 254,600,000 gallons (781 acre-feet) and 490,500,000 gallons (1,505 acre-feet) (Begay, 2017) (Section 5).

5. Water Demand

In order to assess the County's projected future demand for water, this section discusses current and historical water uses (Sections 5.1 and 5.2) and demographic and economic trends (Section 5.3). Based on this information, projected future water demands for the region are presented in Section 5.4.

5.1 Historical Use

Groundwater and surface water have supplied the community of Los Alamos for 60 years. Figure 5-1 and Table 5-1 show the metered diversion amounts from wells and surface water from 1947 through 2016. Table 5-2 shows water diversions and population by decade from 1950 through 2010.

Between 1950 and 2000, population increased in Los Alamos County, and since 2000, the population has decreased by approximately 2 percent (Table 5-2). Diversions also increased between 1950 and 1990, due to increased population, and decreased between 1990 and 2010, partially due to water conservation efforts.

Diversions fluctuate significantly from year to year due in part to fluctuating levels of precipitation (Figure 5-2). For instance, in 2012 precipitation was 8.76 inches, and total system demand was 156 gallons per capita per day (gpcd). In 2016, precipitation was 16.4 inches, and total system demand was 144 gpcd.

Demand from the LANL's operations also impacts the magnitude of diversions. Figure 5-3 shows the monthly variation in water use in 2016, with an annual diversion for LANL of 27 percent and 73 percent for the County. While demand in summer months triples for the County due to outdoor watering, the monthly range in water use by LANL varies less. In 2016, LANL used the greatest volume of water in November.

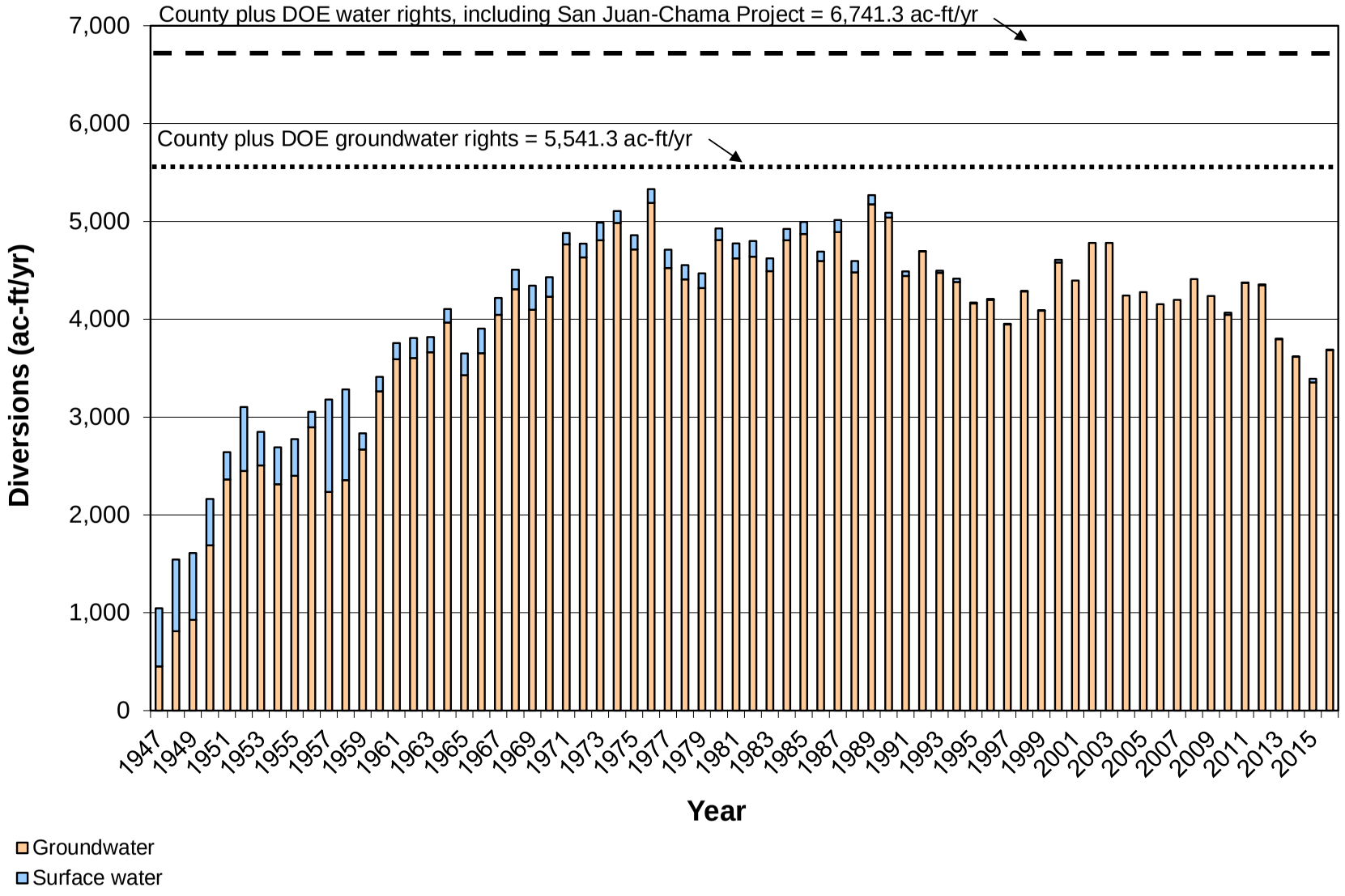


Figure 5-1

LOS ALAMOS COUNTY WATER PLAN

Historical Los Alamos County Water Diversions

Daniel B. Stephens & Associates, Inc.

9/7/17

Table 5-1. Annual Diversions from Groundwater and Surface Water
Los Alamos County, 1947-2016
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Year	Annual Diversions (million gallons per year [a])										
	Groundwater					Surface Water					
	Los Alamos Well Field	Guaje Well Field	Pajarito Well Field	Otowi Well Field	Total	Water Canyon Gallery Spring	Los Alamos Reservoir	Guaje Reservoir	Camp May	Total	Total
1947	147	—	—	—	147	84	21.7	87.8	—	193.5	341
1948	264	—	—	—	264	97	21.9	119.8	—	238.7	503
1949	302	—	—	—	302	92	14.7	116.1	—	222.8	525
1950	547	3	—	—	550	54	20.6	79.9	—	154.5	705
1951	702	68	—	—	770	39	10.5	41	—	90.5	861
1952	448	350	—	—	798	48	33.6	131	—	212.6	1,011
1953	444	372	—	—	816	39	14.8	58	—	111.8	928
1954	380	374	—	—	754	40	16.9	66	—	122.9	877
1955	407	375	—	—	782	33	18.1	71	—	122.1	904
1956	437	506	—	—	943	23	4.8	24	—	51.8	995
1957	350	378	—	—	728	40	54.8	213	—	307.8	1,036
1958	372	395	—	—	767	60	49.4	193	—	302.4	1,069
1959	391	478	—	—	869	54	—	0	—	54	923
1960	530	533	—	—	1,063	48	—	—	—	48	1,111
1961	546	624	—	—	1,170	54	—	—	—	54	1,224
1962	577	597	—	—	1,174	67	—	—	—	67	1,241
1963	539	654	—	—	1,193	51	—	—	—	51	1,244
1964	627	665	—	—	1,292	45	—	—	—	45	1,337
1965	447	571	99	—	1,117	72	—	—	—	72	1,189
1966	450	613	127	—	1,190	82	—	—	—	82	1,272
1967	373	464	481	—	1,318	56	—	—	—	56	1,374
1968	345	474	584	—	1,403	65	—	—	—	65	1,468

Sources: Koch & Rogers, 2003 (1947-1998)
LADPU (1999-2015)

[a] 1 million gallons = 3.07 acre-feet

— = Not applicable (not yet installed or no longer used)

Table 5-1. Annual Diversions from Groundwater and Surface Water
Los Alamos County, 1947-2016
Page 2 of 4

Year	Annual Diversions (million gallons per year [a])										
	Groundwater					Surface Water					
	Los Alamos Well Field	Guaje Well Field	Pajarito Well Field	Otowi Well Field	Total	Water Canyon Gallery Spring	Los Alamos Reservoir	Guaje Reservoir	Camp May	Total	Total
1969	331	435	569	—	1,335	80	—	—	—	80	1,415
1970	360	423	595	—	1,378	65	—	—	—	65	1,443
1971	412	484	657	—	1,553	37	—	—	—	37	1,590
1972	380	467	662	—	1,509	40	—	5.8	—	45.8	1,555
1973	406	475	685	—	1,566	49	—	9.7	—	58.7	1,625
1974	369	453	802	—	1,624	35	—	4.9	—	39.9	1,664
1975	356	431	749	—	1,536	42	—	5.3	—	47.3	1,583
1976	343	531	817	—	1,691	41	—	4.4	—	45.4	1,736
1977	345	515	614	—	1,474	57	—	4.1	—	61.1	1,535
1978	302	444	690	—	1,436	45	—	2.8	—	47.8	1,484
1979	289	456	662	—	1,407	44	1.3	3.7	—	49	1,456
1980	339	485	743	—	1,567	32	2.3	4.7	—	39	1,606
1981	336	469	701	—	1,506	45	2.1	2.7	—	49.8	1,556
1982	317	422	773	—	1,512	46	2.8	3.4	—	52.2	1,564
1983	221	338	904	—	1,463	38	1.4	3.4	—	42.8	1,506
1984	326	460	780	—	1,566	34	1.3	3	—	38.3	1,604
1985	290	456	841	—	1,587	37	0.9	2.8	—	40.7	1,628
1986	179	460	858	—	1,497	28	1.5	2.4	—	31.9	1,529
1987	217	485	892	—	1,594	34	3.2	2.8	—	40	1,634
1988	158	477	824	—	1,459	34.5	1.4	2.4	—	38.3	1,497
1989	219	506	961	—	1,686	23	3.3	4.6	—	30.9	1,717
1990	187	532	923	—	1,642	9.3	4.6	2.2	—	16.1	1,658

Sources: Koch & Rogers, 2003 (1947-1998)
LADPU (1999-2015)

[a] 1 million gallons = 3.07 acre-feet

— = Not applicable (not yet installed or no longer used)

Table 5-1. Annual Diversions from Groundwater and Surface Water
Los Alamos County, 1947-2016
Page 3 of 4

Year	Annual Diversions (million gallons per year [a])										
	Groundwater					Surface Water					
	Los Alamos Well Field	Guaje Well Field	Pajarito Well Field	Otowi Well Field	Total	Water Canyon Gallery Spring	Los Alamos Reservoir	Guaje Reservoir	Camp May	Total	Total
1991	125	502	820	—	1,447	12	2.4	1.5	—	15.9	1,463
1992	13	472	1,044	—	1,529	0.1	0	0	—	0.1	1,529
1993	—	298	876	284	1,458	6.4	0.5	0	—	6.9	1,465
1994	—	179	1,042	206	1,427	11.6	0	0	—	11.6	1,439
1995	—	230	1,126	0	1,356	1.6	1.6	0	—	3.2	1,359
1996	—	269	889	210	1,368	0	2.6	0	—	2.6	1,371
1997	—	272	798	216	1,286	0	2.4	0	—	2.4	1,288
1998	—	148	941	307	1,396	0	1.6	0	—	1.6	1,398
1999	—	323	800	209	1,331	0	2	0	—	2	1,333
2000	—	417	902	174	1,492	0	9.3	0	—	9.3	1,501
2001	—	269	785	389	1,443	0	0	0	—	0	1,443
2002	—	405	855	297	1,557	0	0	0	—	0	1,557
2003	—	430	855	273	1,558	0	0	0	—	0	1,558
2004	—	370	800	212	1,382	0	0	0	—	0	1,382
2005	—	303	814	276	1,393	0	0	0	—	0	1,393
2006	—	358	690	305	1,353	0	0	0	—	0	1,353
2007	—	373	750	245	1,368	0	0	0	—	0	1,368
2008	—	382	806	249	1,437	0	0	0	—	0	1,437
2009	—	389	680	312	1,381	0	0	0	—	0	1,381
2010	—	399	695	224	1,318	0	0	0	7.2	7.2	1,325
2011	—	364	767	294	1,425	0	0	0	0.6	0.6	1,426
2012	—	380	741	296	1,417	0	0	0	1.9	1.9	1,419

Sources: Koch & Rogers, 2003 (1947-1998)
LADPU (1999-2015)

[a] 1 million gallons = 3.07 acre-feet

— = Not applicable (not yet installed or no longer used)

Table 5-1. Annual Diversions from Groundwater and Surface Water
Los Alamos County, 1947-2016
Page 4 of 4

Year	Annual Diversions (million gallons per year [a])										
	Groundwater					Surface Water					
	Los Alamos Well Field	Guaje Well Field	Pajarito Well Field	Otowi Well Field	Total	Water Canyon Gallery Spring	Los Alamos Reservoir	Guaje Reservoir	Camp May	Total	Total
2013	—	290	689	258	1,237	0	0	0	1.3	1.3	1,238
2014	—	351	650	177	1,178	0	0	0	0.4	0.4	1,178
2015	—	298	647	148	1,093	0	0	0	12.3	12.3	1,105
2016	—	294	685	221	1,200	0	0	0	2.1	2.1	1,202

Sources: Koch & Rogers, 2003 (1947-1998)
LADPU (1999-2016)

[a] 1 million gallons = 3.07 acre-feet

— = Not applicable (not yet installed or no longer used)

Table 5-2. Historical Diversions and Population for Los Alamos County 1950-2010

Year	Diversions (ac-ft/yr)			Population [a]	10-Year Growth Rate [b]
	Groundwater	Surface Water	Total		
1950	1,688	474	2,162	10,476	—
1960	3,262	147	3,410	13,037	24.4
1970	4,229	199	4,429	15,198	16.6
1980	4,809	120	4,929	17,599	15.8
1990	5,039	49	5,089	18,115	3.2
2000	4,580	29	4,608	18,343	1.0
2010	4,045	22	4,067	17,950	–2.1

[a] Source: U.S. Census Bureau, 1995, 2006, 2010
[b] Population growth over preceding decade

ac-ft/yr = Acre-feet per year
— = Not applicable

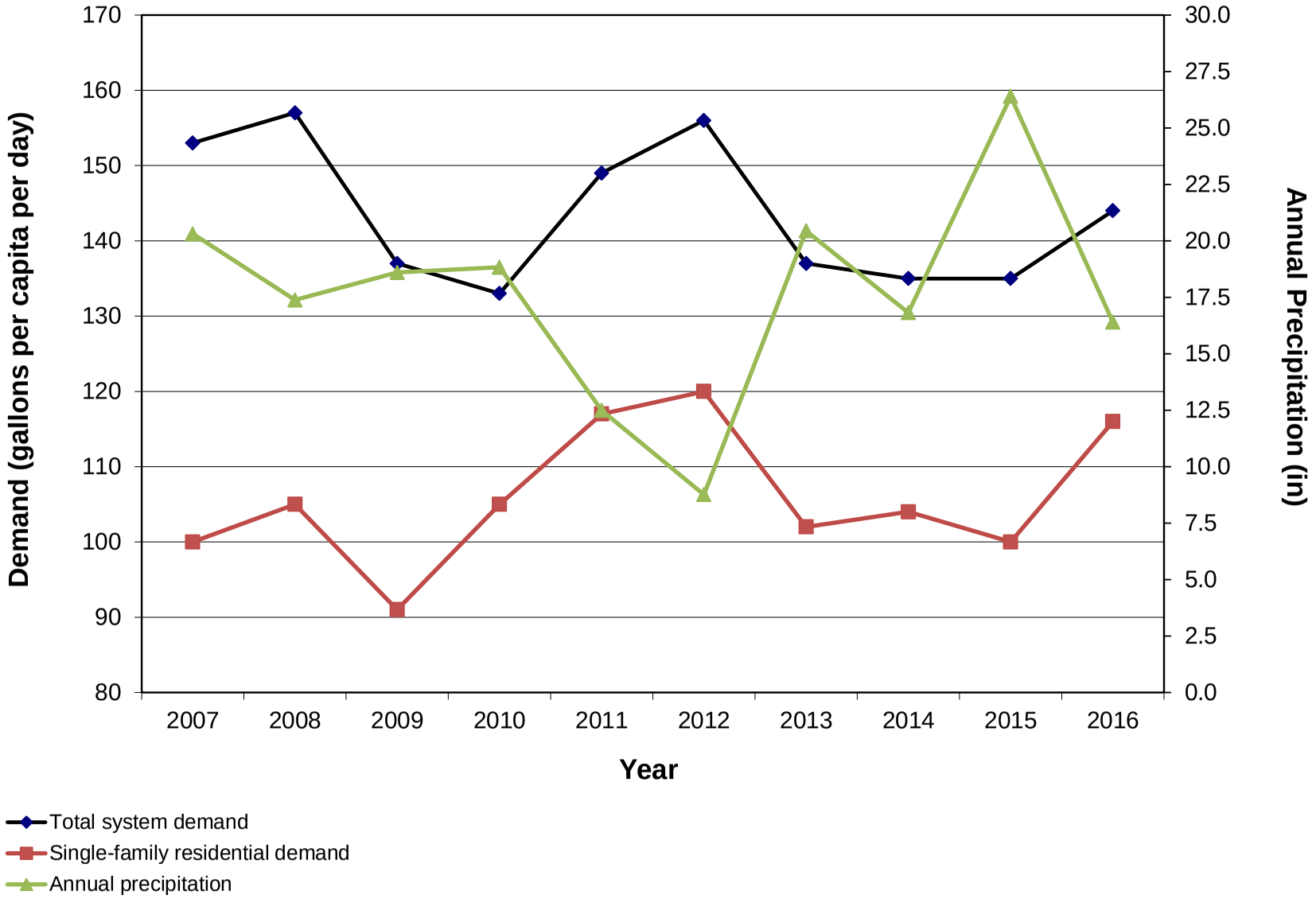


Figure 5-2

LOS ALAMOS COUNTY WATER PLAN

Per Capita Demand and Precipitation in Los Alamos County, 2007-2016

Daniel B. Stephens & Associates, Inc.

9/7/17

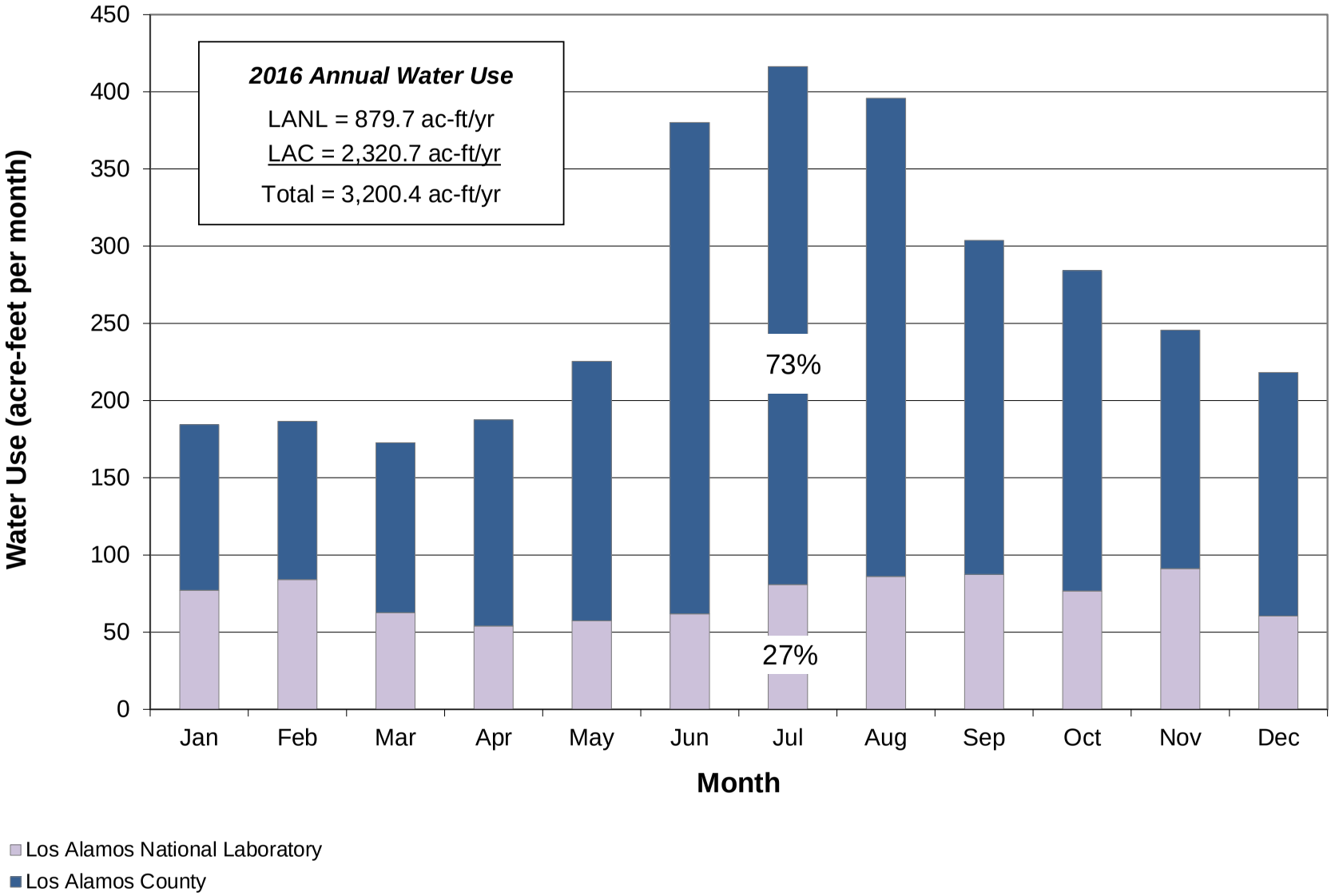


Figure 5-3

LOS ALAMOS COUNTY WATER PLAN

Monthly Water Use by Los Alamos County and Los Alamos National Laboratory in 2016

The DPU has been using the GPCD (gallons per capita per day) calculator developed by the OSE to calculate per capita use since 2007. This allows the County to evaluate water use apart from the bulk water sales to LANL. The per capita values calculated for the total water system demand and by sector for 2007 through 2016 are presented on Table 5-3. Since 2007, total system water demand has ranged between 133 and 157 gallons per day. For the single-family residential sector, per capita demand has ranged between 91 and 120 gallons per day.

Table 5-3. Los Alamos County Daily Per Capita Demand, 2007-2016

Year	Per Capita Demand (gpcd)			
	Sector			
	Single-Family Residential [a]	Multi-Family Residential [a]	Industrial, Commercial, and Institutional	Annual System Total
2007	100	55	32	153
2008	105	55	29	157
2009	91	51	26	137
2010	105	53	29	133
2011	117	59	31	149
2012	120	60	31	156
2013	102	56	22	137
2014	104	54	23	135
2015	100	48	24	135
2016	116	53	25	144

Sources:: Los Alamos County (2007-2013 data)
LADPU, 2015 (2014 data)
Alarid, 2017 (2015-2016 data)

[a] = Based on sector (not total) population

gpcd = Gallons per capita per day

5.2 Current Water Use

The total population served by the DPU includes the 17,950 residents estimated to live within Los Alamos County in 2010, primarily in the communities of White Rock and Los Alamos.

Table 5-4 shows the monthly and annual billing data by sector for 2010 through 2016. The total system water demand supplied by DPU (excluding LANL sales) was 144 gallons per day in 2016. In 2016, the per capita demand for the single-family residential sector was 116 gallons per day (Table 5-3). As shown in Figure 5-3, water use increases in the summer months for landscape watering.

Table 5-4. Billing Records by Sector, 2010-2016
Page 1 of 3

Month	Billing Data (gallons)				
	Single-Family Residential	Multi-Family Residential	Industrial, Commercial, and Institutional	Los Alamos National Laboratory	Total
2010					
January	18,752,000	8,024,000	9,104,000	27,669,780	63,549,780
February	15,770,000	7,433,000	7,799,000	31,723,200	62,725,200
March	21,188,000	8,360,000	10,450,000	47,397,810	87,395,810
April	13,929,000	9,019,000	6,432,000	19,740,800	49,120,800
May	42,197,000	9,868,000	18,551,000	50,069,470	120,685,470
June	77,716,000	15,101,000	27,480,000	27,979,260	148,276,260
July	69,237,000	15,132,000	25,641,000	41,127,820	151,137,820
August	55,788,000	11,015,000	25,345,000	39,362,040	131,510,040
September	47,968,000	13,423,000	21,939,000	32,726,930	116,056,930
October	51,155,000	10,220,000	22,262,000	30,883,230	114,520,230
November	26,682,000	7,499,000	9,698,000	30,988,209	74,867,209
December	24,830,000	8,641,000	9,943,000	33,087,840	76,501,840
Total	465,212,000	123,735,000	194,644,000	412,756,389	1,196,347,389
2011					
January	19,011,000	8,290,000	7,881,000	30,941,680	66,123,680
February	16,908,000	7,558,000	7,201,000	32,069,010	63,736,010
March	23,571,000	9,499,000	6,768,000	31,559,390	71,397,390
April	27,385,000	9,634,000	7,613,000	32,417,950	77,049,950
May	50,605,000	12,940,000	18,041,000	41,797,130	123,383,130
June	64,440,000	16,456,000	30,624,000	47,764,100	159,284,100
July	101,524,000	19,854,000	29,846,000	41,386,960	192,610,960
August	77,689,000	14,812,000	40,891,000	39,369,280	172,761,280
September	48,319,000	11,611,000	23,745,000	34,507,460	118,182,460
October	37,970,000	10,142,000	18,087,000	31,195,970	97,394,970
November	25,065,000	8,216,000	9,923,000	32,784,870	75,988,870
December	19,800,000	8,600,000	9,024,000	30,914,740	68,338,740
Total	512,287,000	137,612,000	209,644,000	426,708,540	1,286,251,540
2012					
January	18,147,000	8,299,000	10,593,833	33,976,790	71,016,623
February	14,030,000	8,073,000	7,076,400	31,111,040	60,290,440
March	23,042,000	8,067,000	9,187,400	30,945,380	71,241,780
April	22,091,000	8,719,000	8,954,700	30,361,480	70,126,180
May	57,004,000	12,862,000	18,249,900	35,650,090	123,765,990
June	78,009,000	18,041,000	30,796,500	39,560,560	166,407,060
July	82,714,000	16,927,000	29,577,700	41,969,120	171,187,820

Table 5-4. Billing Records by Sector, 2010-2016
Page 2 of 3

Month	Billing Data (gallons)				
	Single-Family Residential	Multi-Family Residential	Industrial, Commercial, and Institutional	Los Alamos National Laboratory	Total
2012 (cont.)					
August	68,750,000	15,062,000	27,941,000	44,359,720	156,112,720
September	55,520,000	12,787,000	22,721,700	41,365,310	132,394,010
October	53,003,000	10,517,000	19,666,183	43,986,330	127,172,513
November	29,417,800	9,102,000	11,291,717	31,005,310	80,816,827
December	22,877,590	8,181,000	8,067,200	34,763,240	73,889,030
Total	524,605,390	136,637,000	204,124,233	439,054,370	1,304,420,993
2013					
January	20,496,000	7,974,000	11,195,000	34,157,620	73,822,620
February	16,225,000	7,681,000	6,861,000	29,673,620	60,440,620
March	16,579,000	8,887,000	5,947,000	30,484,280	61,897,280
April	28,921,000	8,942,000	6,842,000	25,629,270	70,334,270
May	51,390,000	13,204,000	13,745,000	26,420,100	104,759,100
June	76,121,000	16,515,000	20,696,000	28,455,360	141,787,360
July	71,977,000	13,641,000	22,750,000	36,036,030	144,404,030
August	52,219,000	12,688,000	17,920,000	35,773,540	118,600,540
September	48,435,000	12,201,000	19,144,000	31,803,760	111,583,760
October	35,013,000	8,710,000	12,683,000	30,889,410	87,295,410
November	20,597,000	7,141,000	7,706,000	30,907,190	66,351,190
December	15,939,000	8,099,000	5,703,000	29,549,140	59,290,140
Total	453,912,000	125,683,000	151,192,000	369,779,320	1,100,566,320
2014					
January	18,284,000	7,392,000	7,070,000	27,111,050	59,857,050
February	15,516,000	7,159,000	5,201,000	21,960,230	49,836,230
March	18,537,000	7,145,000	5,323,000	23,225,500	54,230,500
April	21,927,000	9,044,000	7,550,000	25,888,920	64,409,920
May	40,100,000	11,090,000	15,510,000	25,202,260	91,902,260
June	58,293,000	13,459,000	19,464,000	27,072,730	118,288,730
July	64,336,000	14,653,000	23,832,000	22,706,380	125,527,380
August	50,511,000	9,968,000	15,201,000	21,943,590	97,623,590
September	55,548,000	12,674,000	19,231,000	21,759,250	109,212,250
October	67,465,000	10,317,000	16,561,000	26,957,850	121,300,850
November	22,535,000	7,762,000	8,767,000	27,556,690	66,620,690
December	24,325,000	7,653,000	7,978,000	23,331,140	63,287,140
Total	457,377,000	118,316,000	151,688,000	294,715,590	1,022,096,590

Table 5-4. Billing Records by Sector, 2010-2016
Page 3 of 3

Month	Billing Data (gallons)				
	Single-Family Residential	Multi-Family Residential	Industrial, Commercial, and Institutional	Los Alamos National Laboratory	Total
2015					
January	18,403,570	8,220,800	6,757,990	26,171,490	59,553,850
February	14,877,600	6,179,000	5,407,479	17,246,620	43,710,699
March	16,133,700	7,133,300	6,401,700	18,442,090	48,110,790
April	22,074,600	7,786,100	9,556,600	17,205,510	56,622,810
May	30,609,300	8,806,100	14,576,391	17,378,210	71,370,001
June	55,658,420	10,263,300	18,194,264	17,004,930	101,120,914
July	51,318,980	11,423,700	19,425,160	31,891,120	114,058,960
August	40,413,330	9,562,400	13,966,707	14,443,150	78,385,587
September	48,407,030	11,413,369	20,191,581	26,247,120	106,259,100
October	50,709,951	10,188,972	18,210,788	28,905,780	108,015,491
November	23,676,649	6,913,362	9,130,233	25,658,300	65,378,544
December	27,276,540	8,039,800	6,992,101	24,953,020	67,261,461
Total	399,559,670	105,930,203	148,810,994	265,547,340	919,848,207
2016					
January	21,331,841	7,411,140	6,200,586	25,133,820	60,077,387
February	20,026,030	7,149,504	6,246,610	27,368,200	60,790,344
March	21,942,347	7,348,068	6,539,019	20,431,210	56,260,644
April	28,104,987	8,211,570	7,168,181	17,601,790	61,086,528
May	34,213,237	9,441,190	11,087,000	18,697,580	73,439,007
June	64,951,680	14,537,700	24,164,880	20,181,160	123,835,420
July	67,322,000	16,383,000	25,662,000	26,313,000	135,680,000
August	68,344,000	11,475,000	21,137,000	28,035,000	128,991,000
September	43,345,000	11,225,000	15,923,000	28,500,000	98,993,000
October	41,870,000	8,891,000	16,848,000	24,974,000	92,583,000
November	30,902,000	8,431,000	10,968,000	29,727,000	80,028,000
December	34,704,000	8,278,000	8,419,000	19,693,000	71,094,000
Total	477,057,122	118,782,172	160,363,276	286,655,760	1,042,858,330

In 2016, single-family residential water use accounted for 45.7 percent of DPU water use (excluding LANL), and multi-family residential water use accounted for 11.4 percent of DPU water use. Industrial, commercial, and institutional water use accounted for 15.4 percent of the DPU's water use, with LANL sales accounting for 27.5 percent of the billed totals (Figure 5-4).

Indoor watering is estimated as the average water demand for December, January, and February. Comparing the average summer (June, July, and August) and winter demands for the single-family residential sector in 2016, approximately 62 percent of the average summer demand was used outdoors, with the remaining 38 percent used indoors. Comparing the average summer and winter demands for the multi-family residential sector in 2016, approximately 46 percent of the average summer demand was used outdoors and 54 percent was used indoors.

For more than 70 years, Los Alamos County has used treated wastewater to irrigate turf for a golf course and parks during summer months. The golf course built in Los Alamos in the 1940s has never been irrigated with anything but effluent. As discussed in Section 2, the DPU has a non-potable water system that uses treated wastewater effluent for irrigation of several areas in Los Alamos and White Rock, for fire protection, and for snow making at the Pajarito Mountain Ski Area. Table 5-5 shows the monthly volume of treated effluent that was reused in 2010 through 2016; approximately 112 million gallons was reused in 2016.

5.3 AWWA Water Audit

The American Water Works Association (AWWA) is the industry source for guidance on audits and has published *Water Audits and Loss Control Programs: Manual of Water Supply Practices M36* (AWWA, 2016). The AWWA water audit methodology was established in 2000 with the goal of accounting for all water that is produced and minimizing both physical and paper losses (AWWA, 2003). A water audit of the Los Alamos County system was completed for calendar year 2016 to estimate revenue versus non-revenue water and to distinguish real and apparent losses using the water accounting technique based on the AWWA Water Balance Model, shown on Figure 5-5.

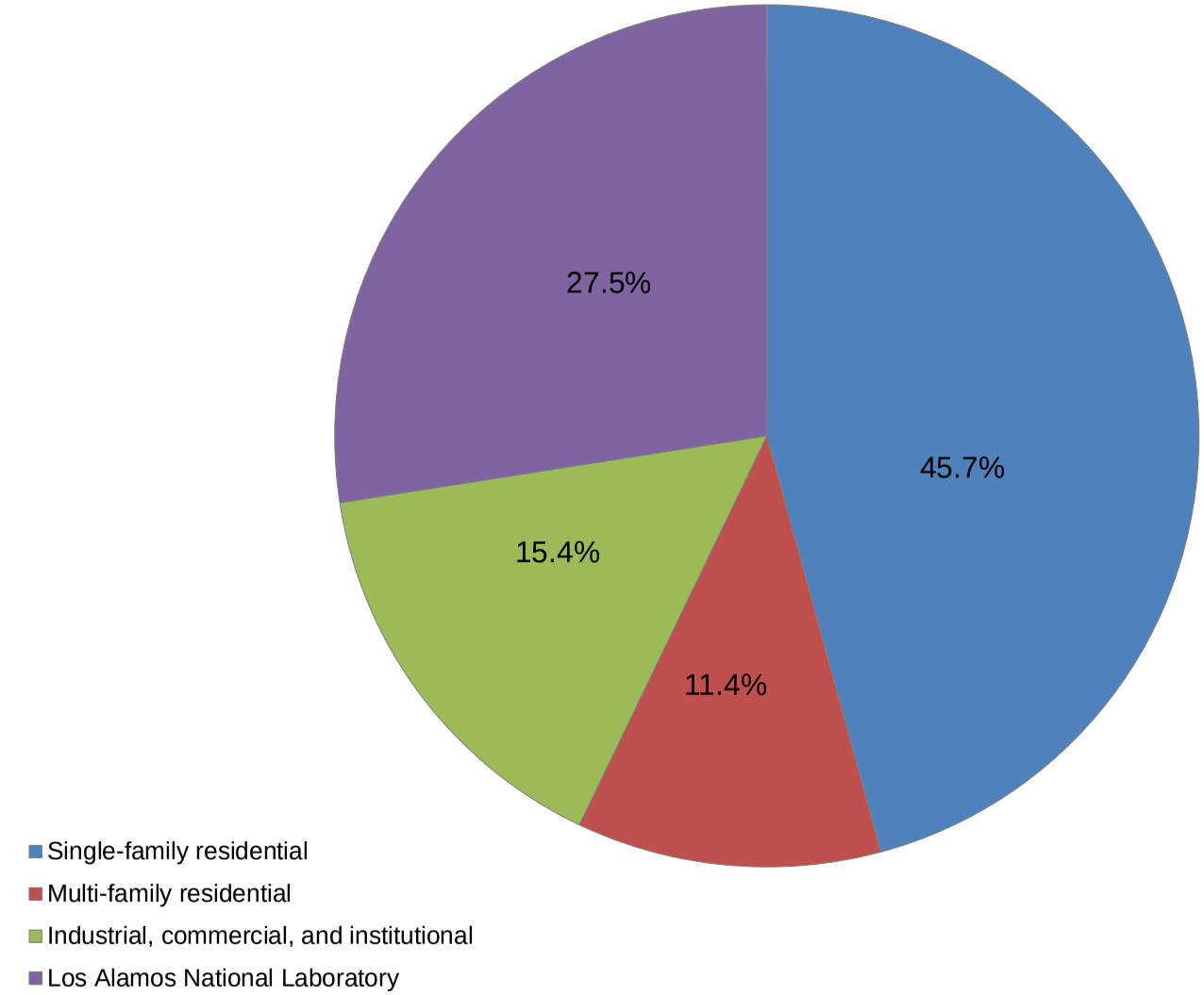


Figure 5-4

LOS ALAMOS COUNTY WATER PLAN

Water Demand by Customer Class in 2016

Daniel B. Stephens & Associates, Inc.

9/7/17

Table 5-5. Water Reuse, 2010-2016

Month	Reuse (gallons)						
	2010	2011	2012	2013	2014	2015	2016
January	81,600	104,800	0	0	0	0	8,354
February	107,100	96,900	0	0	1,012,477	0	5,562,428
March	145,200	7,369,900	5,638,165	3,867,063	4,544,270	2,311,815	7,555,448
April	11,178,612	14,612,700	9,032,844	11,552,192	7,256,932	10,895,334	12,846,001
May	11,427,200	19,023,600	17,904,886	20,165,106	14,125,782	5,531,325	28,466,181
June	23,262,400	22,388,800	24,743,657	21,739,135	18,148,354	14,975,357	22,270,328
July	12,140,000	21,091,000	16,050,773	9,850,279	8,197,735	2,916,420	3,533,764
August	5,531,600	7,950,983	18,097,000	10,504,260	12,815,537	12,186,453	7,008,934
September	18,847,100	4,660,344	13,174,880	7,470,298	16,036,338	16,723,354	18,282,006
October	8,367,300	6,392,581	11,028,777	6,106,035	7,517,914	6,133,506	6,501,094
November	249,300	1,293,627	4,256,322	876,738	1,651,125	321,250	79
December	126,800	0	0	0	0	77	0
Total	91,464,212	104,985,235	119,927,304	92,131,106	91,306,464	71,994,891	112,034,617
Total (acre-feet)	281	322	368	283	280	221	344

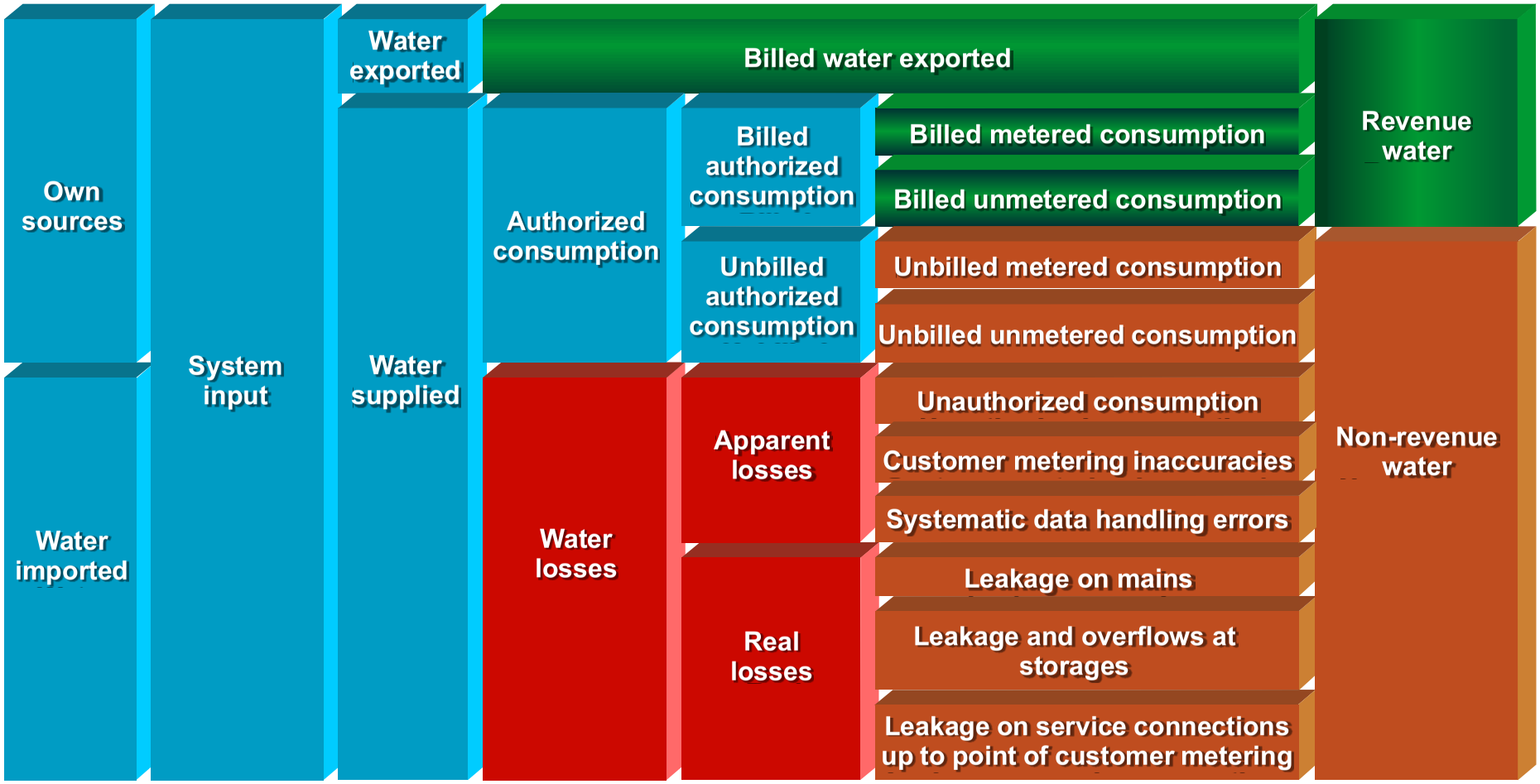


Figure 5-5

LOS ALAMOS COUNTY WATER PLAN

AWWA Water Audit Format

Daniel B. Stephens & Associates, Inc.

9-7-17 JN WR14.0178

The AWWA Water Loss Control Committee makes the AWWA water audit software available for free. The AWWA software provides a nationally recognized, systematic method for documenting and evaluating annual water losses in order to provide information that can be used to reduce loss. The audit provides information on the cost of the losses and provides a measure of benchmarking against other utilities nationwide through the performance indicators. In the updated water conservation planning guidelines the OSE recommends that systems conduct water audits using the AWWA software (NMOSE, 2013).

System and financial information was obtained from the DPU and input into the most up-to-date AWWA water audit software (Version 5.0) (AWWA, 2014) to evaluate performance indicators for the County. The comprehensive water audit balance for Los Alamos County in 2016 is provided as Appendix A. Table 5-6 compares the results of the County's 2016 water audit to the 2011 North American dataset (validated water audit data for 10 utilities with fewer than 50,000 connections; 2011 is the most recent year that AWWA has calculated statistics for).

Table 5-6. Los Alamos County AWWA Water Audit Results for 2016

Item	North American Dataset (2011 average)	Los Alamos County (2016)
Non-revenue water (% by volume)	24.1	17.0
Non-revenue water (% by cost)	9.3	11.8
Apparent losses (gallons per connection per day)	10.38	6.28
Real losses (gallons per connection per day)	58.71	39.54 [a]
Customer retail unit cost ($/1,000 gallons)	5.09	7.78
Variable production cost ($/1,000 gallons)	0.98	0.59
Infrastructure leakage index	3.51	2.41
Water audit data validity score	70.44	72

[a] = Valued at the customer retail unit cost.

For the 2016 County water audit, lower values were calculated for non-revenue water (percent by volume), apparent losses, real water losses, variable production cost, and infrastructure leakage index than the average. Higher values were calculated for the non-revenue water (percent by cost), customer retail unit cost, and data validity score. Based on these data, the County is performing better than average. We recommend that the County compare the values for each of these items when new water audits are performed each year.

Figure 5-6a shows the breakdown between revenue and non-revenue water for Los Alamos County in 2016. Revenue water consists of billed water by sector; non-revenue categories include total authorized unbilled unmetered use (e.g., fire department), total apparent losses (estimated customer meter error, total low-flow inaccuracies, illegal connections and theft, and database errors), and total potential real water loss (calculated by subtracting authorized consumption and apparent losses from adjusted production). Revenue water accounted for 83 percent of total adjusted production in 2016, and non-revenue water accounted for 17 percent of total adjusted production.

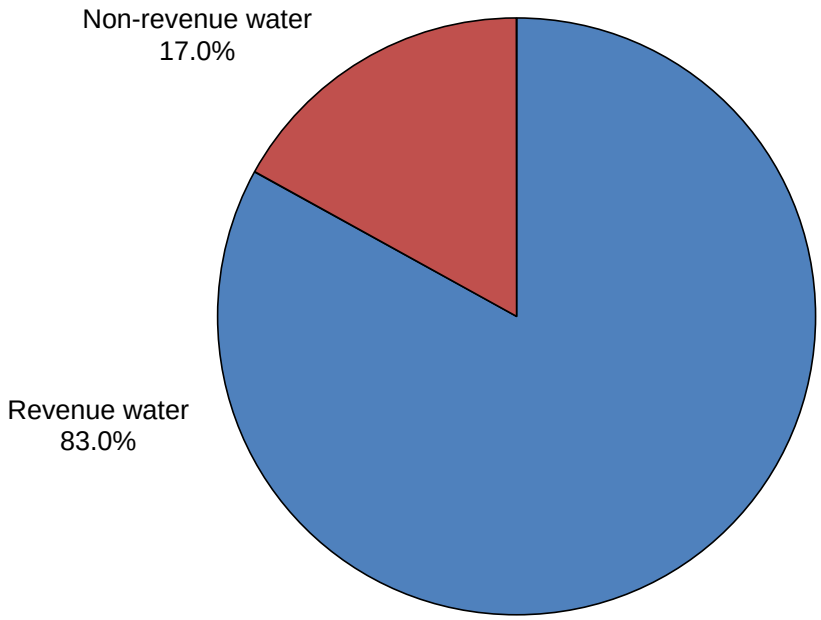
Figure 5-6b further breaks down the 17 percent of total non-revenue water between total potential real water loss (79.9 percent), total apparent losses (12.7 percent), and unbilled unmetered water use (7.4 percent; the volume of unbilled unmetered water use was calculated by the water audit software using the default percentage of 1.25 percent of the adjusted production). There were no unbilled metered water uses in 2016. The 2016 data suggest that the best target for further minimizing the County's non-revenue water is minimizing total potential real water loss, as this is estimated to be the largest component of non-revenue water. Real water loss reflects the volume of water not accounted for by authorized consumption or apparent losses (e.g., leaks). The County should also review the components of apparent loss (e.g., unauthorized consumption and meter error), because if the apparent losses have been under-estimated, the volume shown for total potential real losses may be too high.

The water audit analysis is summarized below:

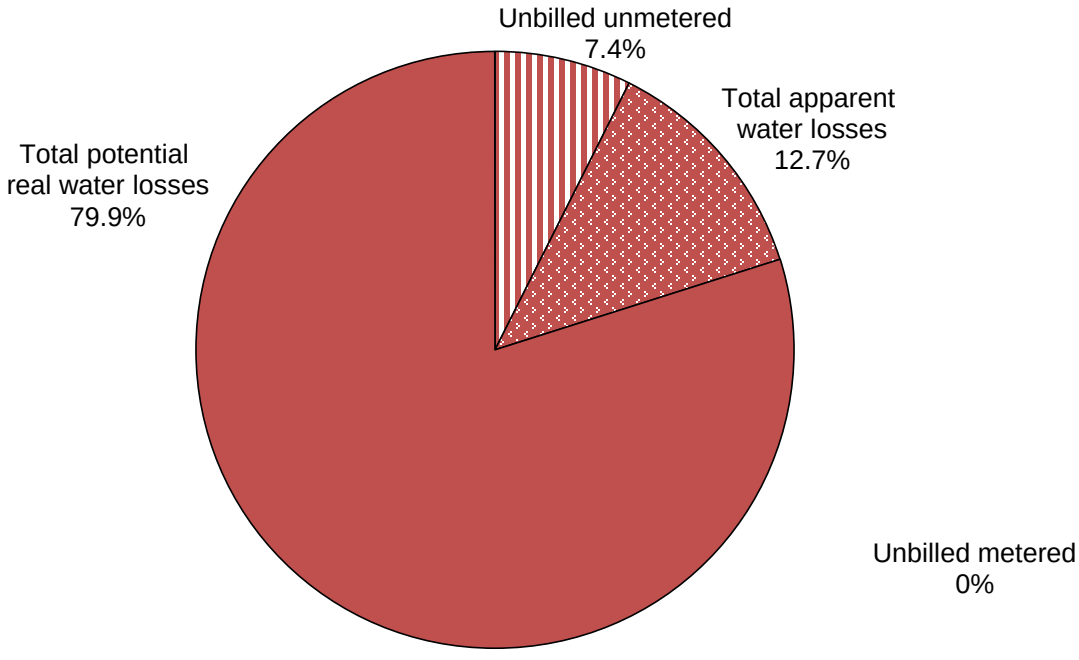
- A total of 1,202.098 million gallons was supplied in 2016, including 286.656 million gallons provided to LANL.

- Total water production was adjusted by subtracting 0.4 percent of the total diversions to account for production meter error. Three production meters were tested in 2016; two were calibrated (Otowi Well 4 and Pajarito Well 2) and one was replaced (Otowi Well 1). The average production meter error of 0.4 percent over-reporting is the average of the results from Otowi Well 4 and Pajarito Well 2.

a. Revenue vs. Non-Revenue Water



b. Non-Revenue Water



Total non-revenue water
154,451,000 gallons

LOS ALAMOS COUNTY WATER PLAN

Los Alamos County
Non-Revenue Water in 2016

Figure 5-6

- Total revenue water in 2016 (756.202 million gallons) was 83 percent of the total water supplied (the LANL sales were treated as exported water in the water audit and are not included in this total).

- The overall water audit data validity score was 72 out of 100.

- The operating budget for water was approximately $10.2 million in 2016.

- Total annual water system variable cost (the sum of all treatment and power costs) was $616,496 in 2016.

- The cost to produce and supply the next million gallons of water (total annual water system variable cost divided by the County's volume from its own sources for 2016), termed the variable production cost by AWWA, was calculated to be $591.16. The LANL revenues were included in the total annual water system variable cost, and so the volume supplied to LANL was included in the County's volume from its own sources for this calculation.

- The customer retail unit cost for 2016 was calculated to be $7.78 per thousand gallons (this value includes the cost for water; wastewater fees are billed as a flat fee rather than being based on potable water use, so wastewater costs were not included). The customer retail unit cost is calculated by dividing the total revenue ($8,109,095 in 2016, including the revenue from LANL) by the total volume sold (1,042.858 million gallons in 2016). For 2016, the volume sold was the sum of the billed metered water use (756.202 million gallons) and water exported to LANL (286.656 million gallons).

The AWWA water audit software reports performance as financial and operational efficiency indicators (Sections 5.3.1 and 5.3.2).

5.3.1 Financial Indicators

The financial indicators provide information about the relative amounts of non-revenue water and the cost of water losses. The AWWA water audit software estimates that:

- Non-revenue water amounted to 17 percent by the volume of water supplied and cost the County approximately $1.1 million (annual costs of real and apparent losses), or 11.8 percent of the cost of operating the system (with the losses being valued at the customer retail unit cost).
- Total apparent losses were calculated to cost $152,487 in 2016.
- Total potential real losses were calculated to cost $960,579 in 2016.

5.3.2 Operational Efficiency Indicators

Operational efficiency indicators address water losses and are provided by the audit in several forms.

- Apparent loss comes from customers being undercharged or getting water in an unauthorized manner. The annual cost of apparent loss is calculated by multiplying the apparent loss volume by the customer retail unit cost of $7.78 per 1,000 gallons ($7,780 per million gallons). The total apparent losses of 19.600 million gallons were 2.2 percent of the adjusted production.

- Real losses are physical losses from the system. The water audit software gives utilities the option of valuing real water loss based on either customer retail unit cost or variable production cost (the cost to treat and deliver the water). Real losses have been valued using the customer retail unit cost. The total potential real losses of 123.468 million gallons were 13.6 percent of the adjusted production.

- The unavoidable annual real losses (UARL) were 51.23 million gallons (5.6 percent of the adjusted production) in 2016, which was less than the current annual real losses (CARL) of 123.47 million gallons per year (13.6 percent of the adjusted production). The UARL represents the theoretical lower limit of leakage that could be achieved if today's best technology were successfully applied.

The goal set by the international water audit methodology is to reduce losses to the level of UARLs (AWWA, 2003). With the calculated current annual real loss volume being higher than

the unavoidable annual real loss volume, the County has the potential to reduce real water loss in future years.

5.3.3 Recommendations

AWWA provides recommendations to utilities based on the range in which the overall data validity score falls. There are five levels of data validity scores, with Level V including the highest scores. The 2016 water audit analysis indicates that Los Alamos County falls in Level IV, which applies to data validity scores between 71 and 90. The recommendations for improving the data validity score for Level IV utilities (AWWA, 2014) include:

- Refine data collection practices and establish routine business processes.
- Refine, enhance, or expand ongoing programs based upon economic justification.
- Conduct detailed planning, budgeting, and launch of comprehensive improvements for metering, billing, and infrastructure management.
- Establish mid-range (5-year horizon) apparent and real loss reduction goals.

The infrastructure leakage index (ILI) is an AWWA performance indicator used to compare utility performance in operational management of real losses. Target ILI ranges and the circumstances they apply to include 1.0 to 3.0 for utilities with high water resources development costs and a restricted ability to increase revenues, 3.1 to 5.0 for utilities where water resources development costs are reasonable and water rate increases can be feasibly imposed, and 5.1 to 8.0 for utilities with low costs to obtain and treat additional water resources. The lower the amount of leakage and real losses in a system (and the closer the utility's leakage volume is to the UARL volume), the lower the ILI will be. The ILI calculated for the County in 2016 was 2.41, indicating that the system leakage is within the target range of 1.0 to 3.0 for a utility where water resources are costly to develop (AWWA, 2014), as is the case in Los Alamos County. The County should set an ILI goal for the target range of 1.0 to 3.0 for future years, aiming to either maintain or decrease the volume of real water loss.

5.4 County Comprehensive Planning

In 2015, the Los Alamos County Council commissioned an update of the *Los Alamos County Comprehensive Plan,* which was last updated in full in 1987. The new comprehensive plan compiles, updates, and adds to the goals, intentions and strategies that were previously adopted by the Council through the *Los Alamos County Vision Statement and Policy Plan* of 2005, Historic Preservation Plan Element of 2008, Los Alamos Downtown Element of 2009, and White Rock Center Element of 2012 (LAC, 2016). The plan considers the themes of land use, economic vitality, and infrastructure, and emphasizes community development, particularly in the downtown areas of Los Alamos Townsite and White Rock. The community development focus will likely impact population growth and subsequent water usage (LAC, 2016).

The geography of Los Alamos County partially bounds growth within the area. Los Alamos Townsite and White Rock sit on mesas with deep canyons surrounding and throughout both communities. The two towns are also bounded by federally owned lands, which to some extent limit the growth of the communities (LAC, 2016). The County is implementing plans to begin growing their tourism economy by optimizing connectivity between visitor activities and parks, and improving visitor lodging and transportation within the Townsite and White Rock (LAC, 2016). Another addition to Los Alamos County's tourist economy is the new Manhattan Project National Historical Park, which is underway and will showcase much of the history of Los Alamos as it relates to the engineering of the first atomic bomb (LAC, 2016).

The County is also working to create opportunities for community and business development within the two towns, in order to create growth and sustainability. In April 2016, LANL announced its plan to hire 2,400 new employees by 2021. The 2016 Comprehensive Plan indicates that the County is preparing for an increase in population to 20,000 over approximately the next decade (LAC, 2016). Along with the County's desire for growth and development, there is a concurrent desire to preserve the character and feel of existing neighborhoods and avoid sprawl, and the primary focus for new development lies within existing areas of development (LAC, 2016).

As described in the Comprehensive Plan, the County intends to revitalize the downtown areas of both the Townsite and White Rock. Revitalization efforts will include re-zoning and attending

to blighted and abandoned properties, and encouraging new business and population density in these areas (LAC, 2016). The County is in ongoing negotiation to acquire some parcels of land owned by the U.S. Forest Service, and these parcels of land are being considered for future utility use (LAC, 2016). Usable land area is not expected to increase significantly, and the County is planning to make better use of the already available land within its boundaries (LAC, 2016). The Comprehensive Plan document includes information about the capacity for new housing development. Planned, proposed, and potential future dwelling units for Los Alamos and White Rock total 1,108 dwelling units, or 891 and 217 units respectively (LAC, 2016).

Water infrastructure is believed to be sufficient for delivering water to existing users, and routine capital improvement on aged infrastructure is ongoing (LAC, 2016). The County is waiting to determine the need for development of new water resources, such as San Juan-Chama Project water, pending completion of the *Long-Range Water Supply Plan* update.

5.5 Population Projections

The Bureau of Business and Economic Research (BBER) at the University of New Mexico has prepared multiple population projections for Los Alamos County, by examining the growth rate in the previous decades, the age of the population, current rates of in-migration, and death and birth rates (BBER, 1996, 2000). Because Los Alamos County's growth rate slowed significantly in the 1980s and 1990s, the 1996 and 2000 projections for growth were very small, showing an increase of only about 3,000 people (Table 5-7). The previous long-range water supply plan (DBS&A, 2006) presented the BBER projections, but did not use them to project demand, because they did not take recent land transfers and plans for growth into account. Instead, the 2006 projections were based on the growth scenario identified in the August 2004 New Mexico First Town Hall (Fruth, 2004), which showed that a full build-out could occur rapidly, increasing the population to 25,000 people in 2020 (Table 5-7). Contrary to these projections, the population in Los Alamos County actually declined between 2000 and 2010 (Table 5-2), largely due to a reduction in the work force at LANL.

Table 5-7. Population Projections for Los Alamos County 2000 through 2060

Year	Population Census	BBER (1996)	BBER (2000) [a]	Fruth (2004)	BBER (2012)	2014 Population Projections [b]	
						Low	High
2000	18,343	19,317	19,234	18,359	—	—	—
2004	18,796	19,647	19,505	18,796	—	—	—
2005	18,407	19,729	19,573	19,189	—	—	—
2010	17,950	20,123	19,913	21,155	—	—	—
2015	NA	20,601	20,318	23,120	—	—	—
2020	NA	21,079	20,722	25,086	18,063	17,988	20,000
2030	NA	21,758	21,289	—	17,880	17,789	20,812
2040	NA	22,141	21,627	—	17,210	17,123	21,447
2050	NA	22,291	21,761	—	—	16,480	21,874
2060	NA	22,404	21,854	—	—	15,863	22,092

[a] Based on BBER's (2000) "most likely" scenario
[b] Poster Enterprises, 2014
— = Population not estimated for this decade
NA = Not yet available

The State of New Mexico prepared updates of the 16 regional water plans that were published in 2016, and population projections were prepared by a market research consultant as a part of this effort (Poster Enterprises, 2014). BBER released new population projections in November 2012 that project population by decade through 2040, and these projections were extended by the ISC market research consultant in 10-year increments through 2060 using the BBER growth rate trends as a basis for the extensions. Interviews were conducted to obtain input on growth trends and potential water conservation measures, with the feedback being used to refine the projections. Two population projections were developed for Los Alamos County, with the high forecast assuming that the County's goal of a population of 20,000 is achieved in 2020, with a very low rate of growth thereafter, and the low forecast closely tracking the BBER projections (Table 5-7).

The high and low population projections that were developed for Los Alamos County as part of the regional water planning effort have been used as the basis for projecting demand as part of the updated long-range water supply plan. In addition, a separate water demand forecast was obtained from LANL (Table 5-8). There is considerable uncertainty in developing forecasts for LANL over a 40-year horizon, because its mission and size is dependent on political and national security decisions that could result in a wide range of possible activity.

Table 5-8. Los Alamos National Laboratory 10-Year Water Forecast

Fiscal Year	Estimated Annual Consumption [a] (gallons)	Water Demand [b] (acre-feet)
2017	254,600,000	781
2018	262,200,000	805
2019	269,000,000	826
2020	299,100,000	918
2021	363,200,000	1,115
2022	380,800,000	1,169
2023	387,700,000	1,190
2024	389,700,000	1,196
2025	411,700,000	1,263
2026	483,000,000	1,482
2027	490,500,000	1,505

Source: Begay, 2017

[a] After savings from the Sanitary Effluent Reclamation Facility (maximum savings of 72 million gallons per year).

[b] The DPU provides the LANL water supply, so these demands have been included on Table 5-9.

A conceptual master plan has been developed for a new development that is planned in White Rock (Baer, 2016). The A-19 tract development will have a maximum residential density of 8.7 dwelling units per acre (Baer, 2016). This will be a private development with a proposed 159 dwelling units and a small commercial development (Alarid, 2017). The proposed A-19 tract development was not called out specifically in the ISC population projections; however, the high population projection will account for this growth. The 2010 Census reported a County population of 17,950 people and an average household size of 2.33 people (U.S. Census Bureau, 2010). Adding 159 dwelling units would add approximately 370 people, which is within the 20,000-person high projection for 2020. A preliminary plat had been developed by the time this plan was finalized (Alarid, 2017).

5.6 Future Water Demand

DBS&A developed two projections of future water demand for the County for 2020 through 2060. The projections are based on (1) the population projections developed as a part of the State of New Mexico's regional water plan update project (Poster Enterprises, 2014), (2) the

total water system per capita demand for 2016, and (3) a separate water demand forecast that was provided by LANL (Begay, 2017). The demand projections are shown on Table 5-9 and Figures 5-7 and 5-8. Total projected demand ranges between 3,814 and 5,062 ac-ft/yr (the low-water-use projection in 2020 and high-water-use projection in 2060, respectively), with the low projection showing an increase in demand between 2020 and 2030 and decreasing demand between 2030 and 2060, and the high projection showing increasing demands throughout the 40-year time frame.

The previous long-range water supply plan recommended an initial minimum goal of a 12 percent reduction in water demand (DBS&A, 2006). This was one of the long-term goals developed for the County's fiscal year 2013 planning, and it was approved by the Utility Board on September 18, 2013 (Alarid, 2015). Comparing the 2006 water diversions to the more current data, this goal was met by 2014 (Table 5-1), when total diversions were 13 percent less than in 2006. Los Alamos County has a robust water conservation program (Section 8) and published an update to the *Energy and Water Conservation Plan* in 2015 (LADPU, 2015). Further reductions in per capita demand are expected.

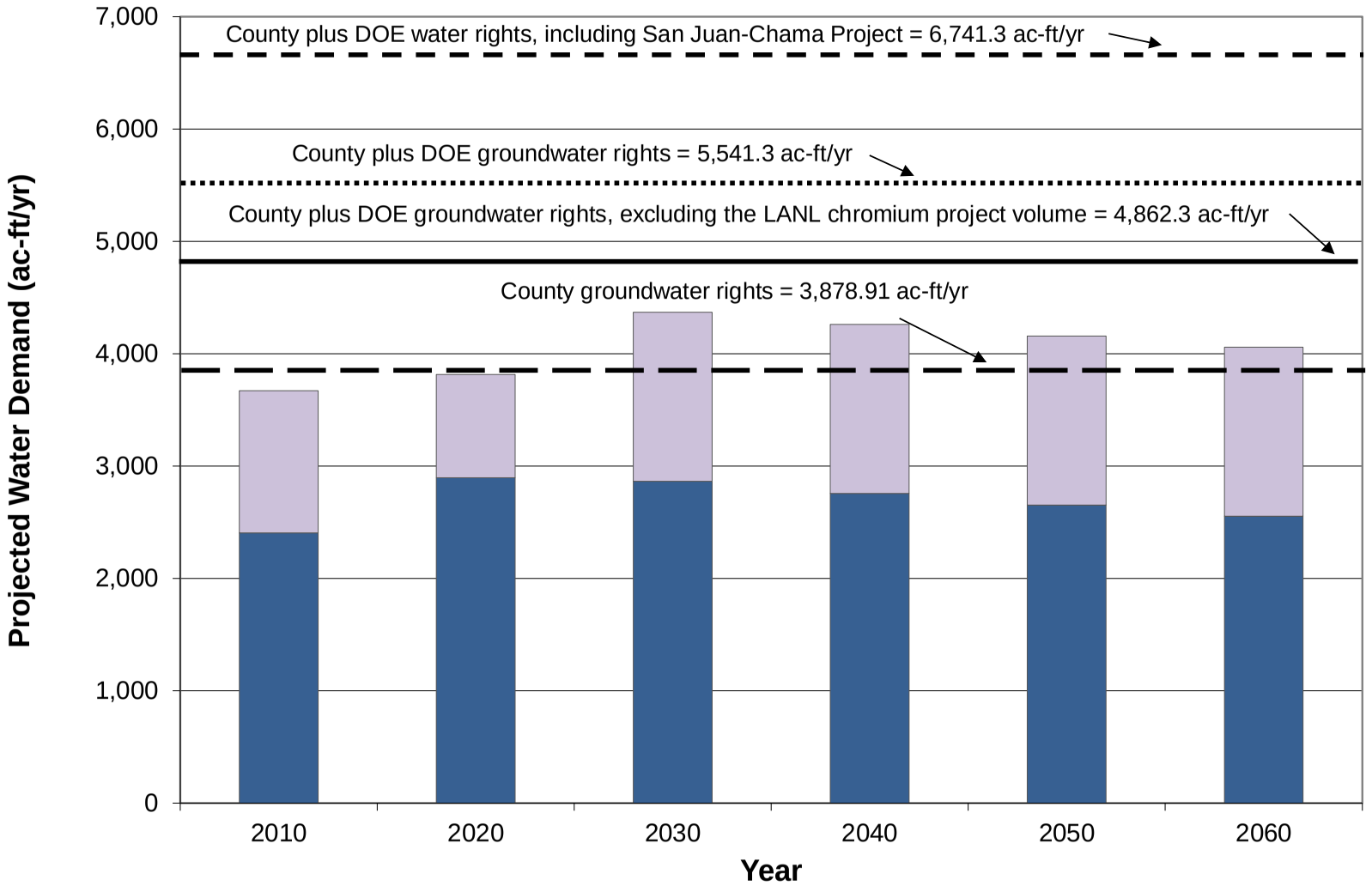
LANL provided a 10-year water demand forecast, spanning the period of fiscal year 2017 to 2027 (Table 5-8). For the projections beyond 2027, to 2060, LANL demand was assumed to remain at the fiscal year 2027 volume. LANL also provided projections for the volume of water to be pumped as part of the chromium interim measure project. As discussed in Section 4.1.1, an application for permit to change an existing water right was filed jointly by DOE and the County in May 2016, in support of the chromium interim measure project that will run through December 2023 (Rodriguez, 2016), and emergency authorization was received on September 10, 2016 (NMOSE, 2016). The volume of water for this application is 679 ac-ft/yr (U.S. DOE and LADPU, 2016). In the absence of any estimates for the volume of water that will be needed to support the future chromium remediation project, the chromium interim measure volume is assumed to be needed through 2060. This volume has not been included in the water demand projections (Table 5-9), as the water will be pumped separately and will not be supplied by the DPU. Figures 5-7 and 5-8 present the low and high water demand projections and illustrate the County- and DOE-owned water rights volumes, including and excluding the volume needed for the chromium interim measure project. The projections assume that the water supply remains available in terms of water rights and contamination, and do not take into account the possibility of treating and using contaminated groundwater, which would be possible (with public support).

Table 5-9. Projected County-Supplied Water Demand, 2020-2060

Year	Population Projection [a]		Projected Per Capita Demand [b] (ac-ft/yr)	2016 Total Diversions (ac-ft/yr)	2016 Water Sales (ac-ft/yr)		Projected Demand [c] (ac-ft/yr)		LANL Water Demand Forecast [d] (ac-ft/yr)	Total Projected Demand [e] (ac-ft/yr)	
	Low	High			County [c]	LANL	Low Projection	High Projection		Low Projection	High Projection
2010	17,950 [f]		0.161	3,689	2,321	880	—	—	—	—	—
2020	17,988	20,000	0.161	—	—	—	2,896	3,220	918	3,814	4,138
2030	17,789	20,812	0.161	—	—	—	2,864	3,351	1,505	4,369	4,856
2040	17,123	21,447	0.161	—	—	—	2,757	3,453	1,505	4,262	4,958
2050	16,480	21,874	0.161	—	—	—	2,653	3,522	1,505	4,158	5,027
2060	15,863	22,092	0.161	—	—	—	2,554	3,557	1,505	4,059	5,062

[a] Poster Enterprises, 2014
[b] Equivalent to 144 gpcd (the 2016 total water system per capita demand)
[c] Excluding LANL demands
[d] Begay, 2017 (through fiscal year 2027; projections held constant beyond 2030)
[e] Including LANL demands, but not including the demand for the LANL chromium plume control and characterization project (679 ac-ft/yr; U.S. DOE and DPU, 2016)
[f] Actual U.S. Census population

ac-ft/yr = Acre-feet per year
LANL = Los Alamos National Laboratory
— = Not applicable

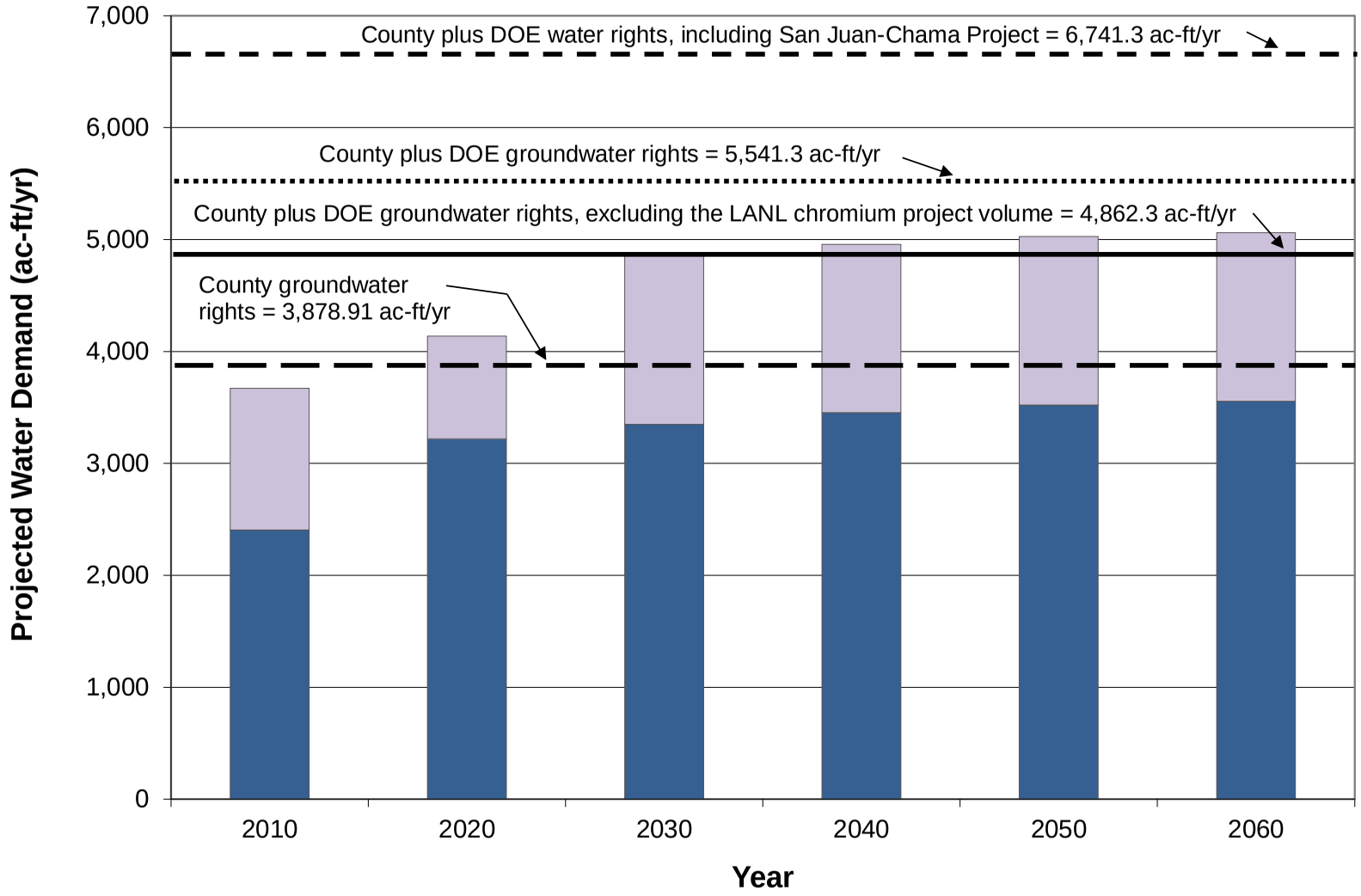


Note: See Section 4.1.1 for a discussion of water rights ownership and leasing.

Figure 5-7

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the Low Water Use Projection



Note: See Section 4.1.1 for a discussion of water rights ownership and leasing.

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the High Water Use Projection

Figure 5-8

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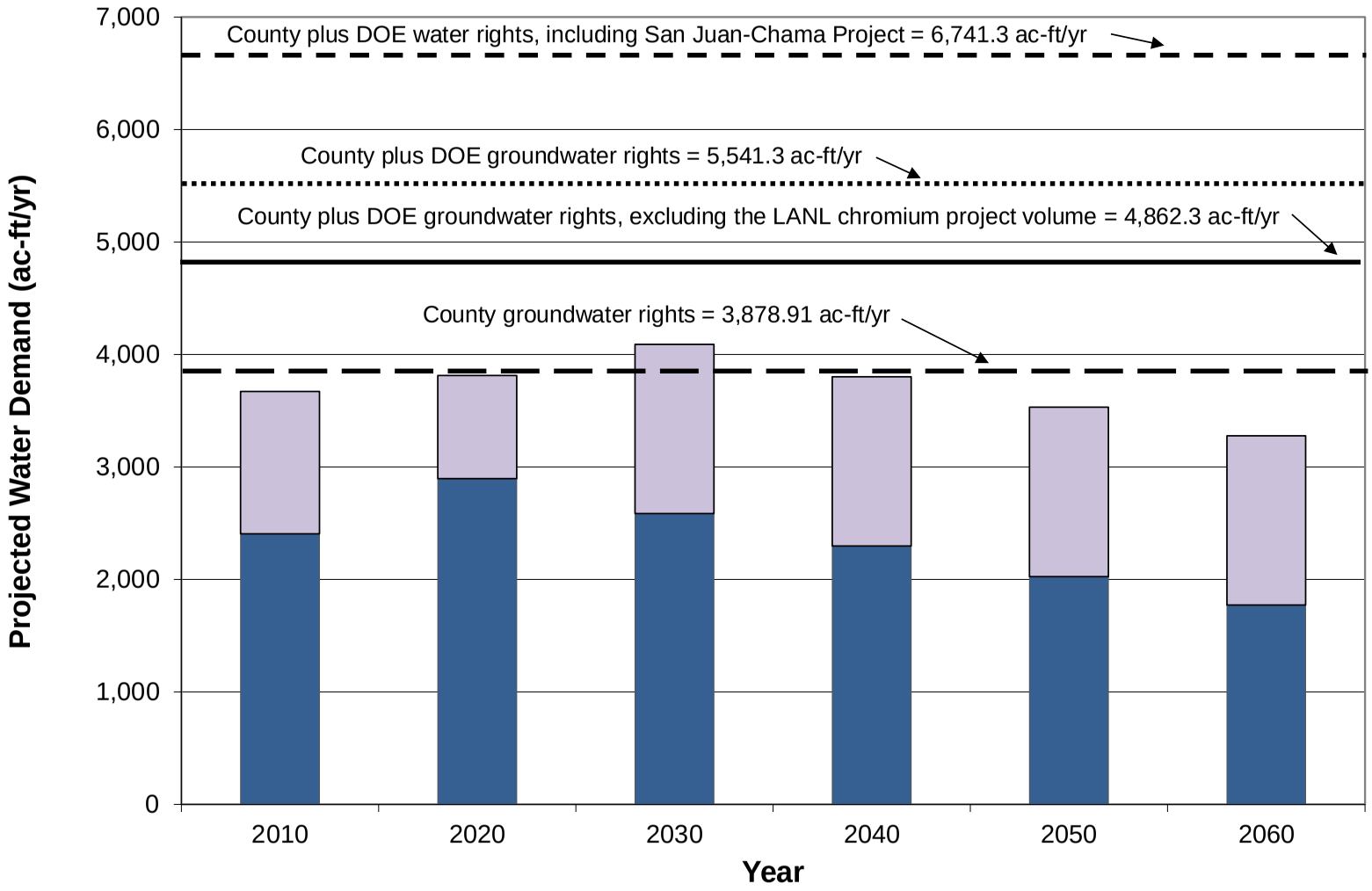
Table 5-10 presents a range in conservation savings that could be achieved with further reductions in the DPU's 2016 per capita demand of 144 gpcd, ranging from a 14-gpcd savings to a 54-gpcd savings (the reduction necessary to match the City of Santa Fe's 2015 per capita value of 90 gpcd). Achieving the City of Santa Fe's 2015 per capita value would be equivalent to a water conservation savings of between 960 and 1,336 acre-feet per year, based on the population projections for 2060.

Table 5-10. Potential Water Conservation Savings

Per Capita Water Use (gpcd)	Reduction from 2016 Per Capita Use (%)	Annual Conservation Savings	
		Low Population Projection (acre-feet) [a]	High Population Projection (acre-feet) [a]
130	10	249	346
120	17	426	594
110	24	604	841
100	31	782	1,089
90 [b]	38	960	1,336

[a] Annual water conservation savings that would be achieved based on reductions from the 2016 per capita value of 144 gallons per day in 2060.
[b] This value is equivalent to the City of Santa Fe's per capita demand in 2015.

Figures 5-9 and 5-10 show low and high water demand projections, assuming that the County water demands are reduced in the future due to conservation (the LANL water demands remain unchanged). Table 5-11 shows the data that are plotted on Figures 5-9 and 5-10. The same low and high population projections that are used for Figures 5-7 and 5-8 have been used for both scenarios, but the per capita demand is assumed to be reduced from 144 gpcd (the 2016 value) to 130 gpcd by 2030, 120 gpcd by 2040, 110 gpcd by 2050, and 100 gpcd by 2060.



Notes: 1. Per capita demand assumed to be reduced over time due to water conservation.

2. See Section 4.1.1 for a discussion of water rights ownership and leasing.

Figure 5-9

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the Low Water Use Projection with Reduced Per Capita Demand

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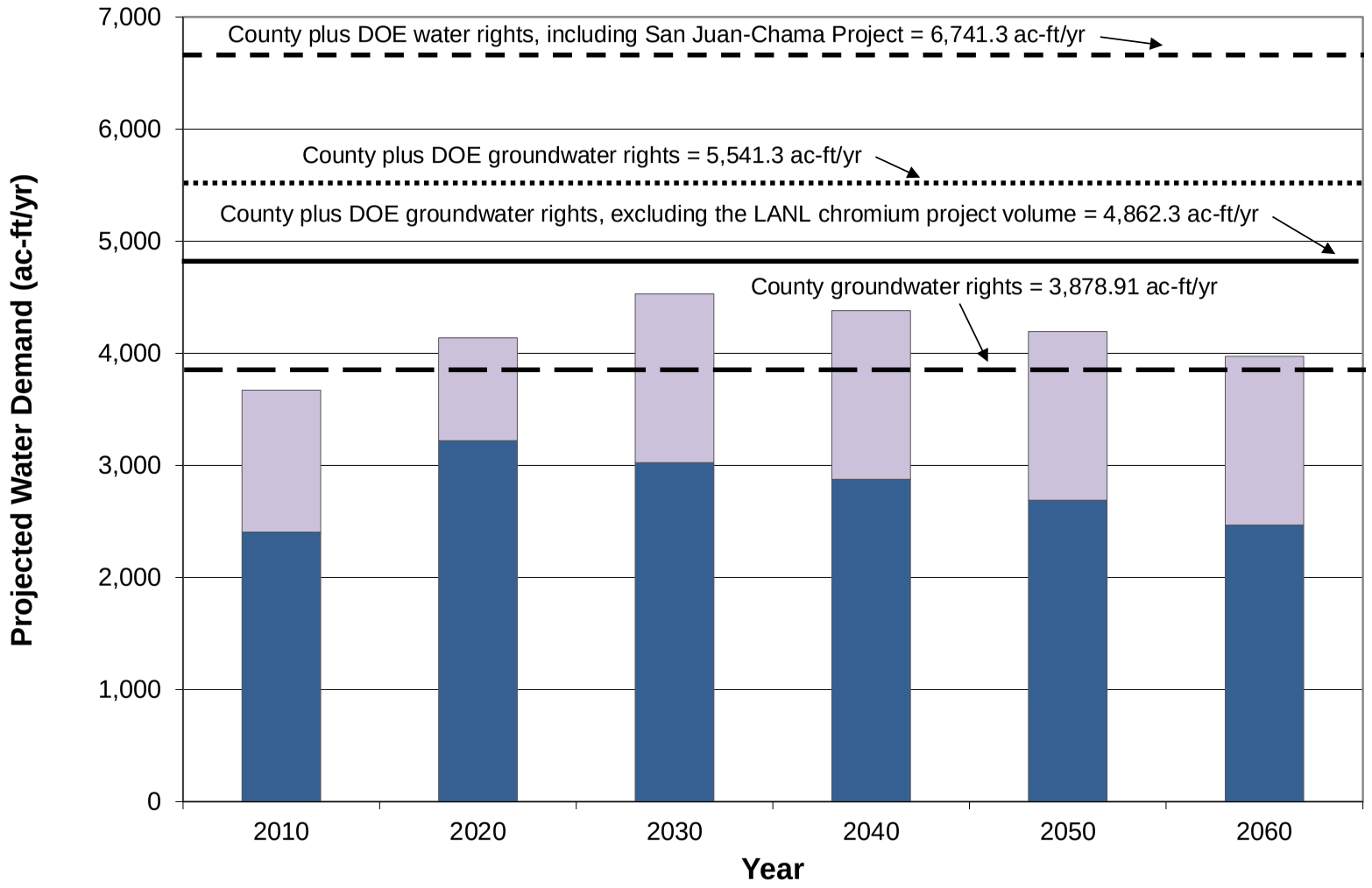

Notes: 1. Per capita demand assumed to be reduced over time due to water conservation.

2. See Section 4.1.1 for a discussion of water rights ownership and leasing.

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the High Water Use Projection with Reduced Per Capita Demand

Figure 5-10

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9/7/17

Table 5-11. Projected County-Supplied Water Demand Assuming Decreased Demand Due to Water Conservation, 2020-2060

Year	Per Capita Water Demand Used to Calculate County Demand (gpcd)	Low Demand Scenario (ac-ft/yr)			High Demand Scenario (ac-ft/yr)			LANL Projected Demand (ac-ft/yr)
		County Projected Demand	Potential Conservation Savings	County Projected Demand with Conservation	County Projected Demand	Potential Conservation Savings	County Projected Demand with Conservation	
2010	144 [a]	2,712	—	2,712	2,712	—	2,712	904
2020	144	2,896	0	2,896	3,220	0	3,220	918
2030	130	2,864	279	2,585	3,351	326	3,025	1,505
2040	120	2,757	460	2,297	3,453	577	2,876	1,505
2050	110	2,653	628	2,025	3,522	833	2,689	1,505
2060	100	2,554	782	1,772	3,557	1,089	2,468	1,505

[a] Actual 2016 value

gpcd = Gallons per capita per day
ac-ft/yr = Acre-feet per year
LANL = Los Alamos National Laboratory
— = Not applicable

6. Reconciliation of Supply with Demand

To ensure that adequate water resources are available to meet future demands, the County must take into consideration the quantity of supply available, limitations to the supply due to water quality concerns, and the legal ability to use the available supply (water rights).

The physical water supply is discussed in detail in Section 3. Given the amount of water in storage and the large saturated thickness in relation to observed rates of water level decline, and assuming that the County remains the primary diverter in the area, the County is expected to have an adequate quantity of supply to meet the projected demands over a 40-year time frame. Wells may need to be replaced or moved to new locations, but it is expected that the available supply somewhere in the vicinity of Los Alamos will be adequate to fulfill the County's existing water rights. Ongoing monitoring of water levels and aquifer testing is recommended to confirm that threats to water supply do not develop.

As discussed in Section 3.2.2, there is some risk to the supply due to contamination, and if the County's supply wells were to be impacted, they could become unusable over the 40-year plan horizon (without treatment). The hexavalent chromium plume near several supply wells will continue to be monitored as the interim measure is implemented, and the presence of this contamination highlights why contingency planning for potential impacts to water supply wells is important.

If contaminant levels exceed applicable standards in any supply well, the DPU could potentially re-drill the well in an alternate location and continue to pump the same volume, provided that the transfer of the diversion point is approved by the OSE. Potential locations for replacement wells have not been identified, but the best locations would be upgradient from contaminant sources, accessible to existing water supply infrastructure, in productive zones, and separate from the influence of other pumping wells. The County filed an application for an additional point of diversion (Otowi Well No. 2) on April 28, 2016, and the new well will be drilled under an exploratory well permit during the fall and winter of 2017-2018. This well will be drilled to supplement the system's existing production wells in anticipation of declining production rates from existing wells that are nearing the end of their service life (Alarid, 2016), rather than as a replacement well for any future contamination of well(s) that could occur.

As discussed in Section 4.1.1, DOE owns 30 percent (1,662.39 ac-ft/yr) of the total groundwater rights (5,541.3 ac-ft/yr), and the long-term lease that was in place for County to use these water rights expired in 2011. A portion of the volume of the DOE-owned water rights (679 ac-ft/yr) will be used for the chromium interim measure project; however, the County is pursuing a lease for the full DOE-owned water rights volume (1,662.39 ac-ft/yr). The lease is not yet in place. If DOE declines to lease their water rights to the County, the groundwater rights volume that the County has access to will be reduced to 3,878.91 ac-ft/yr. As discussed in Section 5.4, both low- and high-water-use projections were developed based on County and LANL growth projections made for the current New Mexico regional water plan updates. To evaluate the gap between the projected demands and the available supply, the two scenarios (low-water-use and high-water-use) were considered.

The County-owned groundwater rights volume (3,878.91 ac-ft/yr) is adequate to meet the DPU-only low-water-use projections for all decades, and the DPU-plus-LANL low-water-use projections for 2020. The County-owned groundwater rights volume is not adequate to meet the DPU-plus-LANL low-water-use projections for 2030, 2040, 2050, or 2060 (Figure 5-7). The County-owned groundwater rights volume is also adequate to meet the DPU-only high-water-use projections for all decades, but is not adequate to meet the DPU-plus-LANL high-water-use projections for any decade (Figure 5-8).

With increased conservation in the amounts shown on Table 5-11, the County-owned groundwater rights volume is not adequate to meet the DPU-plus-LANL low-water-use projections for 2030, but the 2020, 2040, 2050, and 2060 low-water-use projections can be met with this volume (Figure 5-9). Even with increased conservation, the County-owned groundwater rights volume is not adequate to meet any of the DPU-plus-LANL high-water-use projections (Figure 5-10). If the remaining DOE water rights are not leased to the County, the DPU continues to be the sole water provider for LANL, and the high population projections are realized, even with significant additional conservation the County will need to implement a project to bring their San Juan-Chama Project water online.

Additional discussion of contaminant and water rights risks is presented in Sections 3.2.3 and 4.3, and recommendations for responding to these risks are discussed in Section 9.

7. Climate Change

One of the goals of the DPU water resource planning effort is anticipating and preparing for potential climate change impacts. For water resources planning, it is important to understand both natural variations in climate and variations that may result from anthropogenic climate change. This section includes information on natural climate variability (Section 7.1), anticipated changes in temperature and precipitation due to climate change (Section 7.2), potential impacts of climate change in the Los Alamos area (Section 7.3), and recommendations for mitigating climate change impacts (Section 7.4).

7.1 Natural Climate Variability

The climate of Los Alamos County naturally exhibits variability in precipitation and temperature, including both seasonal and annual variations. Weather patterns in the southwestern United States, including the Los Alamos area, are affected by several natural cycles:

- *El Niño/La Niña:* El Niño and La Niña are characterized by unusually warm and unusually cool temperatures, respectively, in the equatorial Pacific. Years in which El Niño is present are more likely to be wetter than average in New Mexico, and years with La Niña conditions are more likely to be drier than average.

- *The Pacific Decadal Oscillation (PDO):* The PDO is a long-lived pattern of climate variability caused by shifting sea surface temperatures between the eastern and western Pacific Ocean that cycle approximately every 20 to 30 years. Warm phases of the PDO (shown as positive numbers on the PDO index) correspond to El Niño-like temperature and precipitation anomalies (i.e., wetter than average), while cool phases of the PDO (shown as negative numbers on the PDO index) correspond to La Niña-like climate patterns (drier than average). It is believed that since 1999, Los Alamos County has been in the cool phase of the PDO.

- *The Atlantic Multidecadal Oscillation (AMO):* The AMO refers to variations in surface temperatures of the Atlantic Ocean which, similarly to the PDO, cycle on a multi-decade

frequency. The pairing of a cool phase of the PDO with the warm phase of the AMO is typical of drought in the southwestern United States (McCabe et al., 2004; Stewart, 2009). The AMO has been in a warm phase since 1995 and it is possible that the AMO may be shifting to a cool phase, but the data are not yet conclusive. LANL has been doing statistical analyses to evaluate the correlation between the AMO and warming temperatures and has concluded that anthropogenic effects account for two-thirds of the post-1975 global warming, while the AMO accounts for one-third of the effect (Chylek et al., 2014).

These natural cycles and other short-term meteorological conditions lead to considerable annual and monthly variability in temperature and precipitation.

7.2 Changes in Temperature and Precipitation

In addition to the natural variability in temperature and precipitation, there is significant research indicating that long-term trends, particularly in temperature, are changing. The Intergovernmental Panel on Climate Change (IPCC) is an international body that was created to assess the science related to climate change world-wide. The IPCC's most recent research efforts are summarized in the Fifth Assessment Report, which was released in September 2013.

IPCC assessments are prepared and reviewed by hundreds of scientists and provide a scientific basis for governments at all levels to develop policies related to climate change. The Fifth Assessment report indicates that globally the atmosphere and oceans have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (IPCC, 2013). Atmospheric concentrations of greenhouse gases are rising so quickly that all current climate models project significant warming trends over continental areas in the 21st century. The IPCC report also suggests that it is extremely likely that more than half of the increase in annual surface temperature from 1951 to 2010 is explained by anthropogenic increases in greenhouse gases and other anthropogenic forcings (IPCC, 2014). Likely impacts of climate change include increased numbers of dry days and extreme events (IPCC, 2012).

In the United States, regional assessments conducted by the U.S. Global Change Research Program (USGCRP, 2015) have found that temperatures in the southwestern United States have increased and are predicted to continue to increase. Reduced snowpack and streamflow and increased drought and wildfires are anticipated impacts of climate change in the southwest (USGCRP, 2015). Recent flows in the Upper Colorado and Rio Grande were 3 to 5 percent lower during 2001 through 2010 than 20th Century average flows, and snowmelt occurred earlier (Overpeck et al., 2013).

To assess climate trends in New Mexico, the NMOSE and NMISC (2006) conducted a study of observed climate conditions over the century and found that observed wintertime average temperatures had increased statewide by about 1.5 degrees Fahrenheit (°F) since the 1950s. A number of other studies predict temperature increases in New Mexico from 5° to 10°F by the end of the century (Forest Guild, 2008; Hurd and Coonrod, 2008; USBR, 2011).

More recently, the USBR, with technical assistance from Sandia National Laboratories and the U.S. Army Corps of Engineers, conducted a climate risk impact assessment for the Upper Rio Grande that evaluated climate impacts in northern New Mexico (USBR, 2013). The study, entitled the Upper Rio Grande Impact Assessment (URGIA), found that average temperatures from 1971 through 2011 rose at a rate of approximately 0.7°F per decade, approximately twice the global average, for a total warming of approximately 2.5°F since 1971. Temperatures are predicted to rise an additional 4° to 6°F by the end of the century. The study additionally projected a decrease in native Rio Grande water by about a third and a decrease in tributary flow by about a quarter, increasing frequency, intensity, and duration of droughts and floods, earlier snowmelt runoff, and increased variability in the magnitude, timing, and spatial distribution of streamflow and other hydrologic variables.

Although there is consensus among climate scientists that global temperatures are warming, there is considerable uncertainty regarding the specific local and temporal impacts that can be expected. Predictions of annual precipitation are also subject to uncertainty, particularly regarding precipitation during the summer monsoon season in the southwestern U.S.

While attribution of individual events remains a challenge, droughts and heavy short-term precipitation in the Southwest are predicted to be more severe as human-induced climate change progresses (USGCRP, 2014). An example of extreme precipitation events occurred in September 2013 in Boulder, Colorado, where a 3-day rainfall exceeded the monthly total for any month on record and was classified as a 1,000-year event (chance of 1 in 1,000 of occurring) (NOAA Climate.gov, 2013). During the same September 2013 time period, the Los Alamos area also experienced extreme precipitation. Initial research indicates that the extreme events that occurred in Colorado in 2013 were not due to anthropogenic climate change (NOAA Climate.gov, 2014). Since extreme events occur infrequently, however, it is difficult to observe trends and conclusively attribute causes.

7.3 Impacts of Climate Change on Los Alamos County

Climate change impacts that are likely to occur in Los Alamos County based on studies of the Southwest and New Mexico in particular (Christensen et al., 2004; Hurd and Coonrod, 2008; NMOSE/NMISC, 2006; Overpeck et al., 2013; USBR, 2011, 2013, 2015; USGCRP, 2015; Williams et al., 2010) include:

- Though model predictions vary, increasing temperatures are expected to occur. Warming will continue with longer and hotter heat waves during summer months.

- Higher temperatures will result in a longer and warmer growing season, resulting in increased water demand for outdoor watering during the spring and summer months and potentially lower rates of recharge.

- Reservoir and other open water evaporation is expected to increase. This could affect the non-potable water in storage in Los Alamos Reservoir and could potentially lead to shortages of San Juan-Chama Project water.

- Although predictions of annual precipitation are subject to greater uncertainty “given poor representation of the North American monsoon processes in most climate models” (NMOSE/NMISC, 2006), precipitation is expected to be more concentrated and intense,

so increases in the frequency and severity of flooding are projected. Due to the presence of various contaminated areas around Los Alamos due to historical LANL operations, stormwater management is a key issue for the County and LANL.

- Streamflow in major rivers across the Southwest is projected to decrease during this century, due to a combination of diminished cold season snowpack in the headwaters regions and higher evapotranspiration during the warm season. The USBR developed projections of the hydrologic impacts of modeled climate changes for the Upper Rio Grande Basin over the rest of this century and published their results in the climate risk impact assessment for the Upper Rio Grande (USBR, 2013). Their analysis included the reliability of the San Juan-Chama Project water under potential climate change scenarios. The projections suggest an increase in the month-to-month and inter-annual variability, and a somewhat more reliable supply from the San Juan-Chama Project than for the native Rio Grande supply (USBR, 2013). The results for the average total San Juan-Chama allocations were 94 percent of contracted water rights in the 2020s, 88 percent in the 2050s, and 81 percent in the 2090s (USBR, 2013), indicating that the average total San Juan-Chama Project allocation would be reduced by about 20 percent by the 2090s (USBR, 2013).

- The USBR collaborated with the City of Santa Fe and Santa Fe County on a basin study focused on the Santa Fe River Basin in northern New Mexico. This study evaluated surface water sources in New Mexico and southern Colorado that provide water supply to the City of Santa Fe and Santa Fe County, including the San Juan-Chama Project, and local groundwater supplies (USBR, 2015). Projected changes to the water supply and San Juan-Chama Project operations include an overall decrease in flows by 25 percent (the total Project diversion decreases from around 90,000 acre-feet per year during the historical simulation period [1950 through 1999] to between 70,000 and 80,000 acre-feet per year during the 2050 through 2099 period), decreased summer flows, increased spring flows, reduced storage in Heron Reservoir, and less frequent full water allocations to contractors (USBR, 2015). Contractors are projected to receive a full allocation in 99 percent of simulated years from 1950 through 1999, 94 percent during the 2020s, 72 percent during the 2050s, and 61 percent in the 2090s (USBR,

2015). The USBR plans to complete a Rio Grande Basin study and is looking for partners (Llewellyn, 2017).

- As cited in USBR (2015), Roach (2009) performed an analysis using 604 years of tree-ring records developed by Gangopadhyay and Harding (2008) to assess what Heron Reservoir storage would have been over the full hydrologic sequence. The analysis found that there was approximately a 10 percent chance that Heron Reservoir would start a year with less than 95,200 acre-feet in storage, meaning that the San Juan-Chama Project allocation would be less than the contracted amount less than 10 percent of the time (USBR, 2015).

- The seasonal distribution of streamflow is projected to change as well: flows could be somewhat higher than at present in late winter as warmer conditions lead to more winter precipitation falling as rain and less as snow, but peak runoff will be weaker due to reduced snowpack. Late spring/early summer flows are projected to be much lower than at present, given the combined effects of less snow, earlier melting, and higher evaporation rates after snowmelt. Since the County relies primarily on groundwater, this is not anticipated to present a major concern for County water resources, but these pressures may lead to overall added stress on the Rio Grande systems, which may increase vulnerability to administrative changes in junior water rights management, as discussed in Section 4 and by Kenney et al. (2008).

During the period of observed record, the Southwest has experienced two significant dry periods, the 1950s and the early 2000s, with the second drought period being warmer and producing greater water loss. The 1980s and 1990s were wetter and promoted a lot of vegetation growth, creating conditions of higher vulnerability to forest fire (NOAA, 2013). The extreme drought conditions prevalent throughout New Mexico and Los Alamos in the past 10 years have resulted in the mortality of many trees. Between 2002 and 2005, more than 90 percent of the mature piñon trees in the Los Alamos area died from a combination of drought stress and bark beetle infestation (Breshears et al., 2005, as cited in LANL, 2014a). Lower-elevation ponderosa pine and mixed conifer stands were also affected. More recently, large numbers of mature ponderosa pine are dying, apparently due to prolonged drought stress. These conditions lead to vulnerability to wildfire and post-fire flooding.

Los Alamos County has already experienced extreme wildfires and post-fire flooding since 2000:

- The Cerro Grande fire burned 47,000 acres in May 2000. The fire started as a result of controlled burning in Bandelier National Monument and directly impacted structures and vegetation in the Los Alamos area.

- The Las Conchas wildfire started on June 26, 2011 in the Jemez Mountains, approximately 10 miles west of Los Alamos, and ultimately burned approximately 156,600 acres, making it the largest wildfire in New Mexico history at the time. Fire damage in the upper portions of watersheds above Los Alamos greatly increased the risk of flash floods and flood damage in the downstream canyons (LANL, 2014a).

- On September 13, 2013, anywhere from 2.49 to 3.52 inches of rain fell at different locations around Los Alamos within a 24-hour period. All of the local canyons flooded, and some experienced substantial channel and bank erosion and widespread sediment deposition. Infrastructure, including roads, gaging stations, and other sampling equipment, was also significantly damaged (LANL, 2014a). With saturated antecedent soil conditions caused by a previous storm on September 10, the flooding that occurred during the September 12 to 13 storm damaged LANL's environmental monitoring and control infrastructure, including access roads, groundwater monitoring wells, gaging stations, and watershed controls. The damage to or impairment of flood- and sediment-control structures included a large amount of erosion in the Pueblo Canyon Wetlands, and overflow from sediment traps and retention basins in other canyons. LANL has since installed various sediment-control structures to minimize the erosive nature of stormwater runoff and to enhance deposition of sediment.

As discussed previously, while it may be difficult to determine if a specific event is caused by climate change, these are the types of impacts that the County needs to continue to plan for.

7.4 Recommendations for Mitigating Impacts of Climate Change

Though it is difficult to determine whether individual events are a result of natural climate variability or climate change, it is important for the County to be prepared to address variability, including drought and extreme precipitation events, and to be aware that these conditions may be both more frequent and more severe as a result of climate change. Higher temperatures and drought may contribute to increased demands for water, diminished supplies, impacts to vegetation, and wildfire risk. Extreme precipitation may damage infrastructure due to stormwater runoff and flooding, mobilize surface or shallow contaminants due to erosion, and create extreme sedimentation that can affect reservoir storage, as has occurred at Los Alamos Reservoir following the Cerro Grande and Las Conchas fires.

The following are recommendations that the DPU could implement to prepare for long-term and severe drought, as well as for extreme precipitation events:

- As a part of the long-range water supply plan, adaptive management should be implemented, where decisions are made sequentially over time, allowing adjustments to be made as more information is known. This approach may be useful in dealing with the additional uncertainty introduced by potential climate change.

- Research and monitoring should be conducted to fill knowledge gaps and enhance planning capabilities. Although neither will eliminate all uncertainty, they will provide significant improvements in understanding the effects of climate change on water resources and in evaluating associated uncertainties and risks required for more informed decision making (Brekke et al., 2009).

- The County should continue to implement and update the Los Alamos Energy and Water Conservation Plan to help reduce outdoor demands during periods of drought and to use water resources efficiently during all times.

- To account for the potential for reduced streamflow to result in shortages of San Juan-Chama Project water in some years, the San Juan-Chama Project water, if developed, should be conjunctively managed with more reliable groundwater resources.

- It will be important to bring surface water from Los Alamos Reservoir online, allowing for conservation of groundwater resources during times when surface water is available, while having provisions for meeting demand with groundwater during extreme drought periods when surface water is not available. DPU awarded a contract in September 2017 to reestablish the Los Alamos Reservoir supply by summer 2018 (Alarid, 2017).

- The County should prepare for the increasing risk of large and severe wildfires, working together with U.S. Forest Service and New Mexico State Forestry Division personnel to identify particular fire risks and vulnerabilities. Ponderosa pine and Douglas fir are particularly susceptible to drought and rising temperatures (Williams et al., 2010). An important component of wildfire planning is to work with emergency personnel on a plan to protect critical drinking water infrastructure during potential fires. The DPU should also coordinate with LANL on its efforts to mitigate the effects of potential wildfires:

  - LANL operates a program to reduce wildfire fuels and manage forest health throughout forested areas on Laboratory and DOE property. Defensible space is created and maintained around facilities and other high-priority areas, and areas not designated as defensible space are managed for a combination of wildfire fuel reduction and forest health. The major roads within the facility continue to be thinned along the road easements to the fencelines, to provide firebreaks and improve vehicle visibility to wildlife crossing the roads (LANL, 2014a).

  - Following the Los Conchas fire in 2011, high-priority areas in the canyons were armored to protect against potential flood damage (LANL, 2014a).

The U.S. EPA published the 2013 Draft National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Industrial Activities, also referred to as the Multi-Sector General Permit (MSGP), by Federal Register (FR) notice on September 27, 2013 (78 FR 59672). The MSGP requires the implementation of control measures,

development of stormwater pollution prevention plans (SWPPPs), and monitoring of stormwater discharges from permitted sites. LANL conducts stormwater sampling and has implemented some flood mitigation measures. DPU should continue to work with LANL to mitigate the risk of extreme precipitation events and flooding mobilizing contamination, which could affect the drinking water system.

Climate change modeling for the Southwest is based on varying carbon emissions scenarios, with higher rates of warming predicted with higher emissions. While Los Alamos County alone cannot significantly change regional emissions, the DPU can contribute to reduced emissions through its energy policies, as discussed in the *Energy and Water Conservation Plan* (LADPU, 2015).

8. Water Conservation

The existing long-range water supply plan (DBS&A, 2006) included a water conservation plan, and additional documents that address water conservation have been published since that time. The DPU published an *Energy and Water Conservation Plan* in 2013 (LADPU, 2013a), and this document was revised and reissued in 2015. The updated *Energy and Water Conservation Plan* focuses on conservation goals for the planning period of 2015 through 2019 (LADPU, 2015), and it meets the requirements of the New Mexico *Water Conservation Planning Guide for Public Water Suppliers* (NMOSE, 2013). The 2015 *Energy and Water Conservation Plan* includes a water audit covering fiscal year 2014 (July 1, 2013 through June 30, 2014), as well as the completed GPCD calculator worksheets covering 2007 through 2014 (LADPU, 2015). A new water audit covering calendar year 2016 and GPCD analyses for 2015 and 2016 were completed as a part of this project (Sections 5.3 and 5.1).

The conservation program is implemented by customers primarily on a voluntary basis and the goals are not directed toward LANL, which falls outside of the County's jurisdiction (LADPU, 2015). Existing water conservation program activities that are discussed in detail in the 2015-2019 Energy and Water Conservation Plan (LADPU, 2015) include:

- *Customer meter testing and replacement.* The DPU routinely tests large customer meters and replaces those that are not working properly. A replacement program for all customer water meters is underway, and will be completed by fiscal year 2022 (over 2,000 White Rock customer meters have already been replaced) (Alarid, 2017). Existing 1-inch customer meters are being replaced with ¾-inch by ⅝-inch meters that will better measure low flows (Alarid, 2017). The County plans to install advanced metering infrastructure (AMI) on all existing water meters in 2018, and the new meters are compatible with AMI (Alarid, 2017).

- *Large water customer usage and account review.* The DPU completed a large water meter review project in 2011 that addressed discrepancies in the billing or metering of large customers.

- *System leak detection surveys.* The DPU surveys 20 percent of the water system annually in an effort to identify and fix water leaks.

- *Regulatory measures.* The Los Alamos Board of Public Utilities adopted Water Rule W-8 in 2005 to prohibit water waste and implement the even/odd address watering schedule, daytime watering restrictions, and leak repair requirements.

- *Water rates.* The Los Alamos County Council approved a tiered water rate structure in July 2014 for the DPU's single-family and multi-family residential customers.

- *County park irrigation water audits.* The DPU has worked with the County parks to conduct irrigation audits, recommend irrigation scheduling and maintenance, and identify any leaks or problems. The Los Alamos County Sustainability Plan includes a goal of reducing water demand for County parks by 25 percent of 2012 demand by 2020 (LADPU, 2013b).

- *Residential water leak training and audits*. The DPU participates in the nationally advertised "Fix a Leak" week, offering fix a leak demonstrations and providing water audits for high water using customers.

- *Commercial water audits.* The DPU conservation coordinator implemented a commercial water audit program in 2012, initially conducting seven audits on facilities including a hotel, grocery store, and school campus. The program is ongoing, and each participating facility is provided with a detailed report of the audit findings and recommendations.

- *Residential water conservation outreach.* Educational materials are distributed to DPU customers through bill inserts, feature articles, workshops, and booklets on subjects including graywater use, rainwater harvesting, xeriscape and permaculture, and energy efficiency.

- *Public school outreach.* Since 2008, the DPU has had a contract with the Pajarito Environmental and Education Center (PEEC) to perform energy and water conservation outreach in the public schools.

- *Conservation partnerships.* The DPU participates in numerous regional and national conservation partnerships in order to share ideas, resources, and lessons learned. Existing partnerships include EPA WaterSense (promotional partner), Alliance for Water Efficiency (charter member), New Mexico Water Conservation Alliance (member), U.S. EPA Energy Star (promotional partner), Alliance to Save Energy (member), and Los Alamos Sustainability Program (participant).

- *Residential bill revisions.* The DPU implemented changes to the residential customer bills in 2012, and customer bills now show usage for the past 13 months, allowing for comparison of usage between the current month and the previous year. Additional revisions are being planned.

A Conservation Advisory Group was formed in 2011 and has eight members, representing the Los Alamos Public Schools, County Parks Division, County Environmental Services Division, small commercial customers, and residential customers (LADPU, 2015). The long-term goal of the water conservation program is to achieve a 12 percent reduction in per capita water demand by 2050, as approved by the Utility Board on September 18, 2013 (Alarid, 2015). Specific actions that have been identified to assist in meeting this goal include:

- Increase water conservation education in the public schools.
- Increase adult education efforts, including outreach lectures and demonstration workshops.
- Implement residential irrigation water audits, focusing on customers with high summer water use.
- Improve Water Rule W-8 by researching its effectiveness, revising as necessary, and potentially adding enforcement capabilities.

- Implement incentives for replacement of lawns, including rebates for plant purchases and technical assistance.
- Implement the county's non-potable water master plan (Forsgren & Associates, 2013), which presents water use criteria for evaluating the efficiency of the existing non-potable water systems and for additional sites that could be potentially served by one of the non-potable water systems in the future.

The DPU monitors the success and implementation of the Energy and Water Conservation Program annually, using activities such as evaluating data from the Cayenta billing system, completing the OSE GPCD calculator, and using the Alliance for Water Efficiency tracking tool (LADPU, 2015).

9. Recommendations

The DPU is planning for potential future growth and increased water demands. While the groundwater supply will likely continue to produce at current rates for well beyond the 40-year planning period, issues regarding water rights and potential water quality concerns indicate that the DPU needs to proactively plan for the future. A summary of recommendations for addressing the future water supply needs of the County follows.

Water Supply (Quantity) and Demand

- Monitor water levels in the vicinity of the water supply wells and evaluate declines on a regular basis, with particular emphasis on monitoring the Guaje well field. Static water levels should also be measured in each of the active production wells on at least an annual basis.

- Expand the existing annual production meter calibration and large customer meter testing programs. Continue to calibrate the LANL master meter annually.

- Update the water demand analysis in a few years to re-evaluate whether and/or when a San Juan-Chama Project water supply project will be needed. Current unknowns that will better inform the water need projections once defined include (1) execution of a new lease with DOE for the full volume of water rights that they own (1,662.39 ac-ft/yr), (2) entering into a new water supply contract between the County and DOE (the current contract expires in 2019), and (3) definition of the water demands for the chromium remediation project, following completion of the chromium interim measure project.

Water Quality/Contaminant Risk Recommendations

- Work closely with LANL and NMED regarding the ongoing monitoring of contaminants and assessment of anticipated transport velocities and flow paths, especially relating to the chromium interim measure and future remediation projects.

- Evaluate contaminant data on a quarterly basis to identify any trends or changes.

- Begin contingency planning for alternate production well locations. In a worst case scenario, wells could be affected by contaminants over the planning period. To prepare for this contingency, identify possible locations for new wells that are upgradient from or off-gradient of key source areas, and begin to resolve infrastructure, land access, and water rights transfer issues so that alternative wells could be developed in a timely manner.

- To mitigate potential climate change impacts, work with emergency personnel to develop a plan to protect drinking water infrastructure in the event of a wildfire, and work with LANL to prepare for extreme precipitation events, to ensure that stormwater runoff does not mobilize contaminants to the detriment of the drinking water system.

Water Rights

- Pursue a new lease with DOE for their water rights (1,662.39 ac-ft/yr).

- Renegotiate the contract that County has with DOE for supplying water to LANL before it expires in 2019.

- Secure services of a water rights attorney to advise and plan for water rights acquisition (availability of pre-1907 water rights, return flow credits, costs, time to secure, potential litigation).

- Pursue return flow credits as identified in the 1999 return flow study (SWC, 1999).

- Evaluate and quantify pumping effects on the Rio Grande from the current water production regime and explore potential changes in pumping amounts and locations in order to be prepared to address OSE concerns during a potential water rights transfer application process.

- Meet with the OSE to discuss priority administration and the number and amount of water rights that are senior to the County's water rights.

Water Conservation

- Continue and expand the existing water conservation program, as discussed in Section 8, monitoring the effectiveness of the existing and new conservation measures and refining the conservation program as needed.

- Work to minimize system water loss. Conduct annual water audits to assess the change in system water loss over time, and update the recommendations for further improvements.

- Monitor the effectiveness of voluntary compliance with Rule W-8 in reducing water waste, and if necessary, pass an enforceable ordinance so that penalties can be assessed.

- Update the subdivision regulations to include requirements for graywater reuse, water harvesting, xeriscaping, and low-water-use indoor plumbing for all new commercial and residential development.

- Establish rebate programs for xeriscaping and appliance replacement.

- Distribute indoor plumbing leak detection and retrofit kits.

Implementation of these recommendations will help the DPU be prepared to meet the County's future water supply needs.

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Appendix A

Los Alamos County Water Audit

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	James Alarid
Email Address:	james.alarid@lacnm.us
Telephone | Ext.:	
Name of City / Utility:	Los Alamos County
City/Town/Municipality:	Los Alamos
State / Province:	New Mexico (NM)
Country:	United States
Year:	2016 Calendar Year
Audit Preparation Date:	8/1/2017
Volume Reporting Units:	Million gallons (US)
PWSID / Other ID:	NM3500115

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Los Alamos County (NM3500115)
Reporting Year: 2016 (1/2016 - 12/2016)

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ----------> Pcnt: Value:

Volume from own sources:	7	1,202.098	MG/Yr	2	0.40%		MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	8	286.656	MG/Yr				MG/Yr

Enter negative % or value for under-registration

WATER SUPPLIED: 910.653 MG/Yr

Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

Pcnt: Value:

Billed metered:	8	756.202	MG/Yr		
Billed unmetered:	n/a	0.000	MG/Yr		
Unbilled metered:	n/a	0.000	MG/Yr		
Unbilled unmetered:		11.383	MG/Yr	1.25%	MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 767.585 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

143.068 MG/Yr

Apparent Losses

Pcnt: Value:

Unauthorized consumption:		2.277	MG/Yr	0.25%	MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	15.433	MG/Yr	2.00%	MG/Yr
Systematic data handling errors:		1.891	MG/Yr	0.25%	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 19.600 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 123.468 MG/Yr

WATER LOSSES: 143.068 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 154.451 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	162.0	miles
Number of active AND inactive service connections:	7	8,554	
Service connection density:		53	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	6	65.0	psi

COST DATA

Total annual cost of operating water system:	10	$10,201,663	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$7.78	$/1000 gallons (US)	
Variable production cost (applied to Real Losses):	5	$591.16	$/Million gallons	☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 72 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Los Alamos County (NM3500115)
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

	Apparent Losses:	19.600	MG/Yr
+	Real Losses:	123.468	MG/Yr
=	**Water Losses:**	**143.068**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	51.23	MG/Yr
	Annual cost of Apparent Losses:	$152,487	
	Annual cost of Real Losses:	$960,579	Valued at **Customer Retail Unit Cost**

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	17.0%	
	Non-revenue water as percent by cost of operating system:	11.8%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.28	gallons/connection/day
	Real Losses per service connection per day:	39.54	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.61	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	123.47	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.41	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Los Alamos County (NM3500115)	
Reporting Year:	2016	1/2016 - 12/2016
Data Validity Score:	72	

		Water Exported 286.656			Billed Water Exported	Revenue Water 286.656
Own Sources (Adjusted for known errors) 1,197.309	System Input 1,197.309	Water Supplied 910.653	Authorized Consumption 767.585	Billed Authorized Consumption 756.202	Billed Metered Consumption (water exported is removed) 756.202	Revenue Water 756.202
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 11.383	Unbilled Metered Consumption 0.000	Non-Revenue Water (NRW) 154.451
					Unbilled Unmetered Consumption 11.383	
			Water Losses 143.068	Apparent Losses 19.600	Unauthorized Consumption 2.277	
					Customer Metering Inaccuracies 15.433	
					Systematic Data Handling Errors 1.891	
Water Imported 0.000				Real Losses 123.468	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

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Water Audit Report for: Los Alamos County (NM3500115)
Reporting Year: 2016 1/2016 - 12/2016
Data Validity Score: 72

Water Loss Control Planning Guide

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

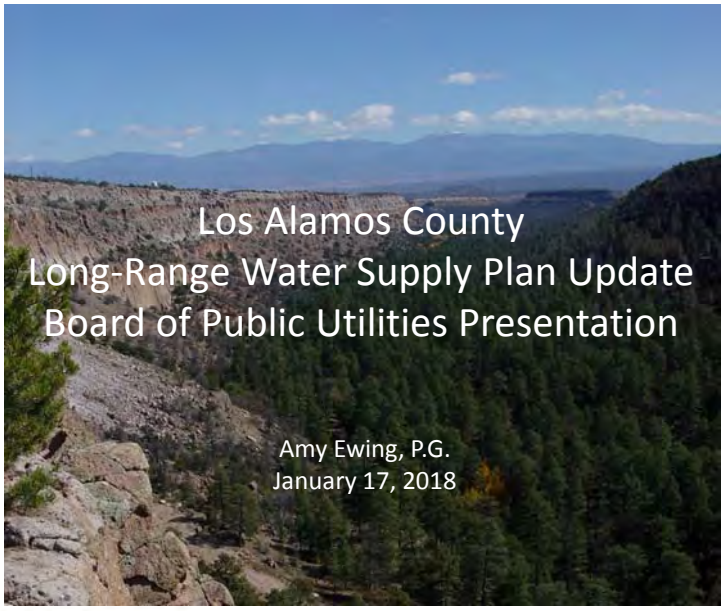
For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

Note: this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI (without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term planning.
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		



Los Alamos County
Long-Range Water Supply Plan Update
Board of Public Utilities Presentation

Amy Ewing, P.G.
January 17, 2018

Daniel B. Stephens & Associates, Inc.

Topics

1. Introduction
2. Overview of plan updates
3. Water demand projections
4. Questions

Daniel B. Stephens & Associates, Inc.

Introduction

- The Department of Public Utilities (DPU) supplies water for Los Alamos, White Rock, Los Alamos National Laboratory, and Bandelier National Monument.
- To prepare for the future water supply needs of these communities, a long-range water supply plan was published in 2006 and an update has been prepared (2017).

Introduction

- The objective of the plan is to
  - evaluate projected demands in relation to available supply,
  - consider water quality and water rights risks to the supply, and
  - ensure that both a viable physical supply and associated water rights are in place as needed to meet future demands.

Introduction

- The update roughly follows the organization of the 2006 plan.
- Information from the 2006 plan was used as a starting point and information was updated to reflect the changes that have occurred since the 2006 plan was finalized.

LRWS Plan Outline

- Section 1, Introduction
- Section 2, Overview of Los Alamos County Water System
- Section 3, Hydrogeologic Overview and Risks to Water Supply
- Section 4, Water Rights

LRWS Plan Outline (continued)

- Section 5, Water Demand
- Section 6, Reconciliation of Supply with Demand
- Section 7, Potential Impacts of Climate Change
- Section 8, Water Conservation
- Section 9, Recommendations

Overview of Plan Updates

- Section 2, Water System Overview
  - The water system is supplied by 12 wells that draw on the regional aquifer beneath the Pajarito Plateau.
  - Well depths are up to 3,000 feet below ground surface (ft bgs), and water levels range from approximately 250 to 1,200 ft bgs.

Overview of Plan Updates

- Section 2, Water System Overview (cont.)
  - Two new applications have been filed recently:
    - An application for an additional point of diversion for a new well that will be called Otowi Well 2 was filed in April 2016 and this well is being drilled under an exploratory permit.
    - An application for permit to change an existing water right was filed jointly by DOE and the County in support of the chromium plume control interim measure and chromium plume center characterization project (May 2016), and emergency authorization was received on September 10, 2016.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Demonstrated saturated thickness is at least 1,900 feet (supply well PM-5).
  - Average water level declines:
    - Pajarito Well Field average (1965-2016): −1.08 ft/yr
    - Otowi Well Field average (1990-2016): −0.81 ft/yr
    - Guaje Well Field average (1954-2016): −3.45 ft/yr
  - Even if net recharge is negligible, continuation of the observed rates of decline does not represent a substantial risk to the water supply.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Monitoring of production wells is conducted by the DPU as part of routine monitoring and compliance with the U.S. Safe Drinking Water Act, and monitoring is also conducted by LANL.
  - Recent monitoring and reporting indicates that all drinking water produced by the DPU water system meets federal and state drinking water standards.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - The water plan discusses the known contamination and water quality standard exceedances, highlighting issues in the regional aquifer.

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Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Perchlorate
    - Perchlorate contamination is present in groundwater beneath Mortandad Canyon.
    - In 2015, perchlorate concentrations exceeded the 2012 LANL Compliance Order on Consent screening level of 4 µg/L in one monitoring well completed in the regional aquifer (R-15, detections ranged from 7.22 to 9.05 µg/L).

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Perchlorate (continued)
    - The 2016 LANL Compliance Order on Consent does not include a screening level for perchlorate, and the perchlorate standard that will apply going forward is an NMED tap water screening level of 13.8 µg/L.
    - If future detected concentrations are similar, this screening level will not be exceeded in the regional aquifer.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Hexavalent chromium
    - A hexavalent chromium plume is present in the regional aquifer, and the primary source is blowdown of potassium dichromate from the TA-03 power plant cooling tower that occurred from 1956 to 1972.
    - Since the 2006 water plan was completed, the areal extent and concentrations within the plume have been better defined.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Hexavalent chromium (continued)
    - The New Mexico Water Quality Control Commission groundwater standard for human health is 50 µg/L for chromium.
    - In 2015, chromium concentrations exceeded this standard in five regional aquifer monitoring wells—R-28, R-42, R-62, R-50 Screen 1, and R-43 Screen 1—with exceedances ranging from 117 to 915 µg/L.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Hexavalent chromium (continued)
    - The May 2015 *Interim Measures Work Plan* presents LANL's approach for controlling movement of chromium-contaminated groundwater along the downgradient portions of the plume.
    - LANL plans to extract contaminated groundwater, treat it at the surface using ion exchange, and reinject it into the aquifer, with project implementation beginning in 2016.

Overview of Plan Updates

- Section 3, Risks to Water Supply
  - Hexavalent chromium (continued)
    - The July 2015 *Work Plan for Chromium Plume Center Characterization* outlines actions that will be implemented to further investigate the aquifer in the center of the chromium plume and further characterize the nature and extent of the contamination in order to identify remedial alternatives for the chromium plume.

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Overview of Plan Updates

- Section 4, Water Rights
  - The County's water rights were originally owned by the U.S. DOE.
  - In 2001, 70 percent ownership was transferred to the County, and U.S. DOE retained 30 percent ownership.
  - The U.S. DOE water rights were leased until 2011, when the lease expired.

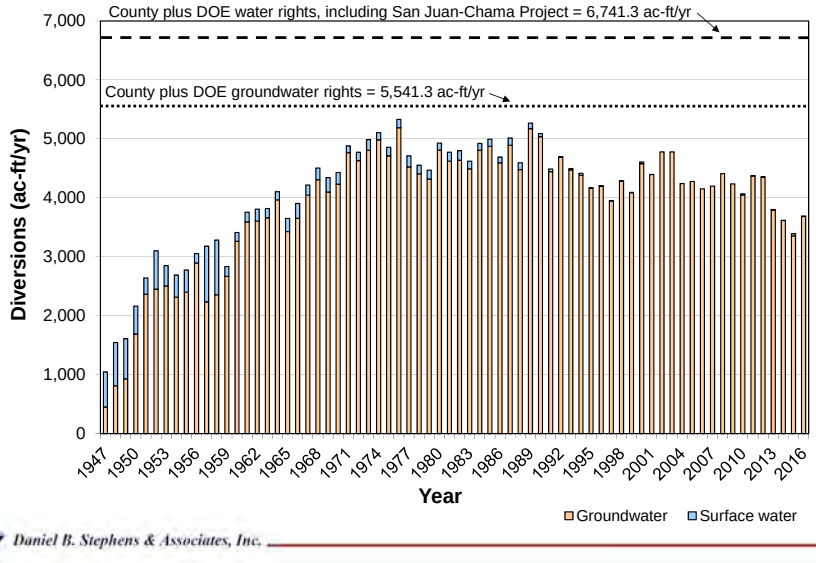
Overview of Plan Updates

- Section 4, Water Rights (continued)
  - The joint application for permit to change an existing water right in support of the chromium plume control interim measure and chromium plume center characterization project is for 679 ac-ft/yr.
  - The County plans to enter into a new lease with the U.S. DOE for their water rights (1,662.39 ac-ft/yr), for use by all customers, including LANL.

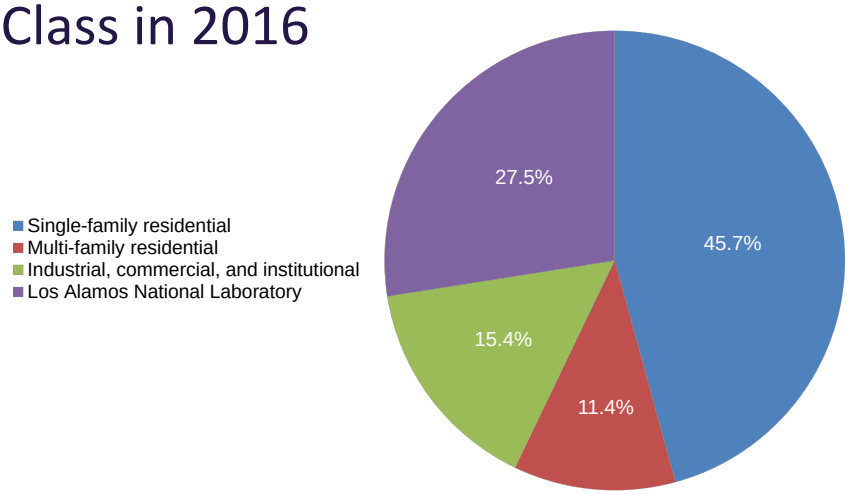
Overview of Plan Updates

- Section 5, Water Demand
  - Between 1950 and 2000, population increased, and since 2000, it has decreased by approximately 2 percent.
  - Diversions increased between 1950 and 1990, due to increased population, and decreased between 1990 and 2010, partially due to water conservation efforts.
  - Demand from the LANL's operations also impacts the magnitude of diversions.

Historical Water Diversions



Water Demand by Customer Class in 2016



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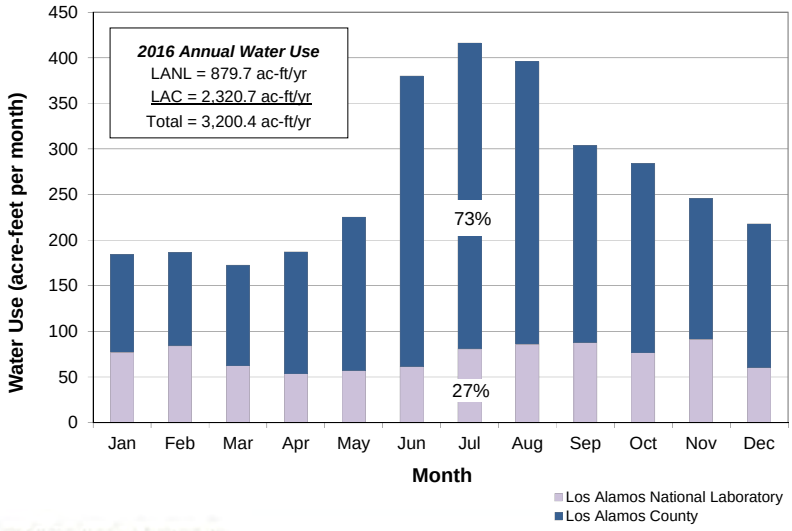
Monthly Water Use in 2016



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Overview of Plan Updates

- Section 5, Water Demand (continued)
  - The 2006 population projections projected rapid growth, totaling 25,000 people in 2020.
  - Contrary to these projections, the population declined between 2000 and 2010, largely due to a reduction in the work force at LANL.
  - Los Alamos County had 17,950 residents in 2010.

Overview of Plan Updates

- Section 5, Water Demand (continued)
  - Population projections were developed as a part of the 2016 State regional water planning update, and these projections were used for the County water demand projections.
  - Projected County demand is based on population times the 2016 total system water demand (excluding LANL sales) of 144 gallons per day.
  - LANL provided separate water demand projections for FY 2017-2027 (781-1,505 ac-ft/yr).

Overview of Plan Updates

- Section 5, Water Demand (continued)
  - Population projections (County):

Year	Low Projection	High Projection
2020	17,988	20,000
2030	17,789	20,812
2040	17,123	21,447
2050	16,480	21,874
2060	15,863	22,092

Overview of Plan Updates

- Section 5, Water Demand (continued)
  - Total projected demand (County + LANL):

Year	Low Projection (ac-ft/yr)	High Projection (ac-ft/yr)
2020	3,814	4,138
2030	4,369	4,856
2040	4,262	4,958
2050	4,158	5,027
2060	4,059	5,062

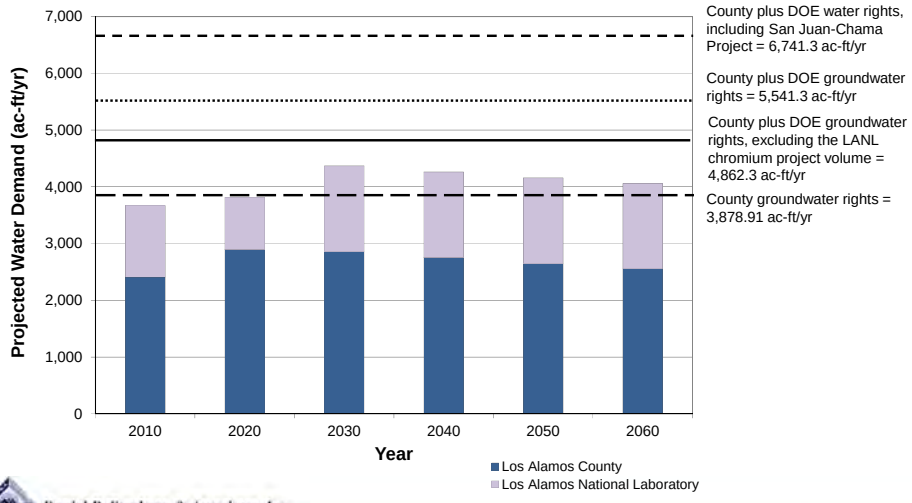
Overview of Plan Updates

- Section 6, Water Supply and Demand
  - The County has rights to use 1,200 acre-feet of San Juan-Chama Project water.
  - Bringing it online would diversify the water supply, helping the County to mitigate any future effects due to contamination of existing wells and/or climate change.

Projected Water Demand

- Section 6, Water Supply and Demand (continued)
  - Demand projections scenarios without additional conservation or U.S. DOE water rights:
    - The County-owned groundwater rights volume (3,878.91 ac-ft/yr) is adequate to meet the DPU only low-water-use projections for all decades, and the DPU-plus-LANL low-water-use projections for 2020.
    - The County-owned groundwater rights volume is not adequate to meet the DPU-plus-LANL low-water-use projections for 2030, 2040, 2050, or 2060.

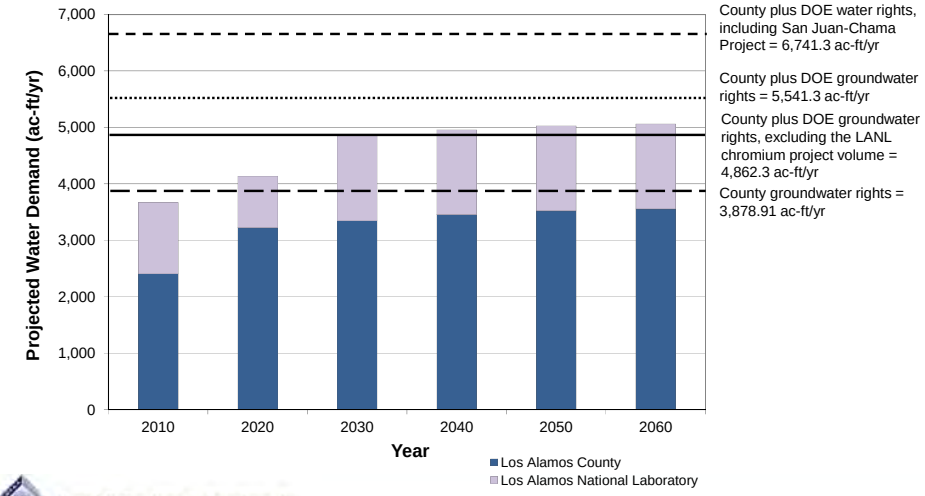
Projected Water Demand
Low Water Use Projection



Projected Water Demand

- Section 6, Water Supply and Demand (continued)
  - Demand projections scenarios without additional conservation or U.S. DOE water rights (continued):
    - The County-owned groundwater rights volume is adequate to meet the DPU-only high-water use projections for all decades.
    - The County-owned groundwater rights volume is not adequate to meet the DPU-plus-LANL high-water-use projections for any decade.

Projected Water Demand
High Water Use Projection



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Projected Water Demand

- Section 6, Water Supply and Demand (continued)
  - Demand projections scenarios with additional conservation:
    - With increased conservation, the County-owned groundwater rights volume is not adequate to meet the DPU-plus-LANL low-water-use projections for 2030, but the 2020, 2040, 2050, and 2060 low-water-use projections can be met with this volume.

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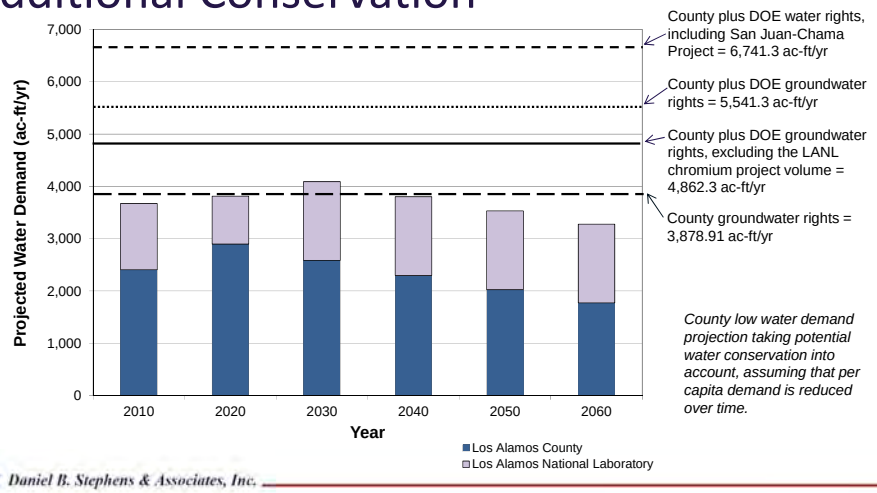
Projected Water Demand
Low Water Use Projection With Additional Conservation

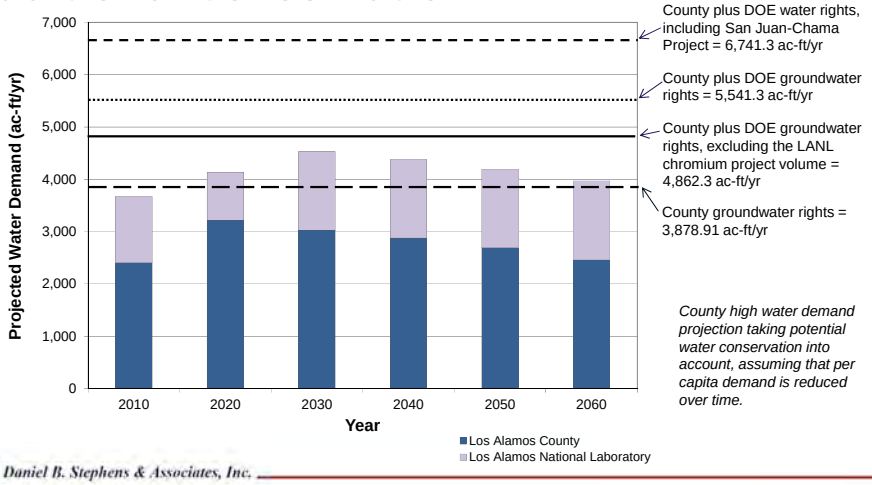


County low water demand projection taking potential water conservation into account, assuming that per capita demand is reduced over time.

Projected Water Demand

- Section 6, Water Supply and Demand (continued)
  - Demand projections scenarios with additional conservation (continued):
    - Even with increased conservation, the County-owned groundwater rights volume is not adequate to meet any of the DPU-plus-LANL high-water-use projections.

Projected Water Demand
High Water Use Projection With Additional Conservation



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Projected Water Demand

- Section 6, Water Supply and Demand (continued)
  - Demand projections scenarios with additional conservation (continued):
    - If the remaining DOE water rights are not leased to the County, the DPU continues to be the sole water provider for LANL, and the high population projections are realized, even with significant additional conservation the County will need to implement a project to bring their San Juan-Chama Project water online.

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Overview of Plan Updates

- Section 7, Impacts of Climate Change
  - Climate change impacts that are anticipated:
    - Increasing temperatures
    - Longer and warmer growing season (resulting in increased outdoor water demand)
    - Increased reservoir evaporation
    - More concentrated and intense precipitation
    - Decreasing streamflow in major rivers across the Southwest
    - Change in the seasonal distribution of streamflow

Overview of Plan Updates

- Section 7, Impacts of Climate Change (continued)
  - Recommendations for mitigating the impacts:
    - Implement adaptive management as a part of the long-range water supply plan.
    - Use research and monitoring to fill knowledge gaps and enhance planning capabilities.
    - Continue to implement and update the Los Alamos Energy and Water Conservation Plan.
    - Conjunctively manage surface and groundwater resources.
    - Prepare for the increasing risk of large and severe wildfires.

Overview of Plan Updates

- Section 8, Water Conservation
  - The updated Energy and Water Conservation Plan focuses on conservation goals for the planning period of 2015 through 2019.
  - A Conservation Advisory Group was formed in 2011 to assist in developing conservation goals.
  - A new long-term water conservation goal of reducing per capita use 9 percent by 2030 (from 144 to 131 gallons per day) was adopted in 2017.

Overview of Plan Updates

- Section 8, Water Conservation (continued)
  - Specific conservation goals include:
    - Increase water conservation education in the public schools.
    - Increase adult education efforts.
    - Implement residential irrigation water audits.
    - Improve the water waste rule.
    - Implement incentives for outdoor water conservation.
    - Implement the county's non-potable water master plan.

Overview of Plan Updates

- Section 9, Recommendations
  - Pursue a new lease with the U.S. DOE for the water rights they own.
  - Renegotiate the contract with the U.S. DOE for supplying water to LANL (it expires in 2019).
  - Work closely with LANL and NMED regarding the ongoing monitoring of contaminants.

Overview of Plan Updates

- Section 9, Recommendations (continued)
  - Update the water demand analysis in a few years to re-evaluate whether and/or when a San Juan-Chama Project water supply project will be needed. Unknowns that will better inform the water need projections once defined include
    - (1) execution of a new lease with DOE for the full volume of water rights that they own
    - (2) entering into a new water supply contract between the County and DOE, and
    - (3) definition of the water demands for the chromium remediation project, following completion of the chromium interim measure project.

Summary of Requested Changes

- The LACWU acronym was replaced with "County" or "DPU", as appropriate.
- Water production and water demand data were updated through 2016.
- The recommendation to begin an environmental assessment for a San Juan-Chama Project was removed.

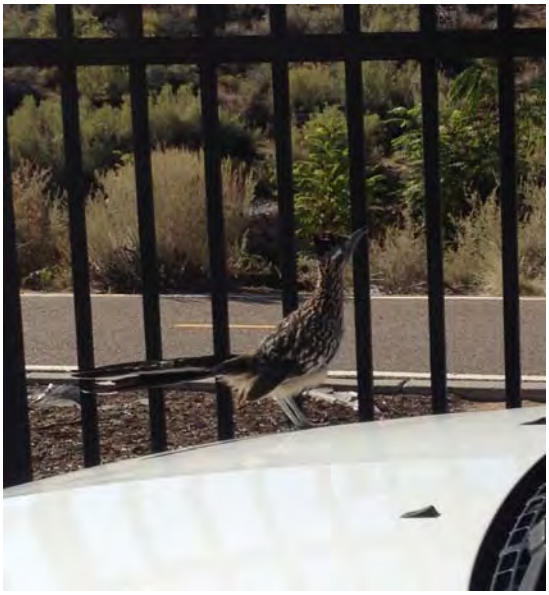
Summary of Requested Changes

- Per capita water use analyses were added for 2015 and 2016.
- The water audit analysis was updated using 2016 data.
- A discussion of the finalized County Comprehensive Plan was added.

Summary of Requested Changes

- The recommendations were updated to
  - update the water demand analysis in a few years to re-evaluate whether/when a San Juan-Chama Project will be needed, and
  - add a new water supply recommendation addressing water conservation and minimizing water loss.

Questions?



Agenda No.:	8.C
Index (Council Goals):	BCC - N/A
Presenters:	Tim Glasco, Utilities Manager
Legislative File:	**10306-18**

Title
Transfer of Funds from the Gas Fund to the Wastewater Fund

Recommended Action
I move Board of Public Utilities approve transfer of $2.5 million from the gas fund to the wastewater fund. I further move the Board of Public Utilities approve Budget Revision 2018-10 for the fund transfer and for expenditure of $2.5 million from the wastewater fund for the purpose of advance payment on the Los Alamos Wastewater Treatment plant construction debt and forward to the County Council for their approval.

Staff Recommendation
The Staff recommends approval of the fund transfer, budget amendment and pay-down of the Los Alamos Wastewater Treatment Plant indebtedness.

Body
The Department of Public Utilities faces the cost of replacement of the White Rock Wastewater Treatment Plant while still paying debt service on construction of the Los Alamos Wastewater Treatment Plant. In order to be able to pay the debt of both plants, estimated at approximately $2.1 million per year, sewer rates for our customers would have to be increased significantly, or alternatively, construction of the White Rock plant delayed until 2029 when the LA Plant debt is retired. In previous BPU meetings, numerous scenarios of debt restructuring, alternative financing, and delay of construction have been examined. The final recommendation of the Board was to pursue immediate construction of the White Rock plant, refinance existing debt, phase in a series of small rate increases and transfer excess funds from the gas fund to the wastewater fund in order to pay down the debt.

Staff have evaluated the existing status of the gas reserves, requirements to comply with the financial reserves policy, future capital and operational needs, and the long-range forecast of gas demand and have determined that $2.5 million dollars could be transferred to the wastewater fund without compromising the gas fund.

Attached is a fund flow showing anticipated gas reserves out 10 years into the future at the present gas rate and expected gas sales volumes. This analysis shows that, after transfer of the $2.5 million, the fund would still have an excess cash balance of approximately $339,000. However, with the warm weather we have been experiencing this year, sales volume is currently down approximately 20%, with resulting income down approximately 10%. To be conservative, yet still transfer the maximum amount that can prudently be spared, staff recommends transfer of $2.5 million.

In order for the wastewater fund to then spend the $2.5 million dollars on debt repayment, a budget adjustment to the wastewater budget in the same amount is necessary. County Finance also recommends a gas budget adjustment to transfer funds to wastewater.

Alternatives

The County can decide not to transfer the funds, and continue payment of the LA WWTP debt at the existing rate. This would in all likelihood require delay in construction of the White Rock WWTP, and/or a significant increase in the sewer rate.

Fiscal and Staff Impact

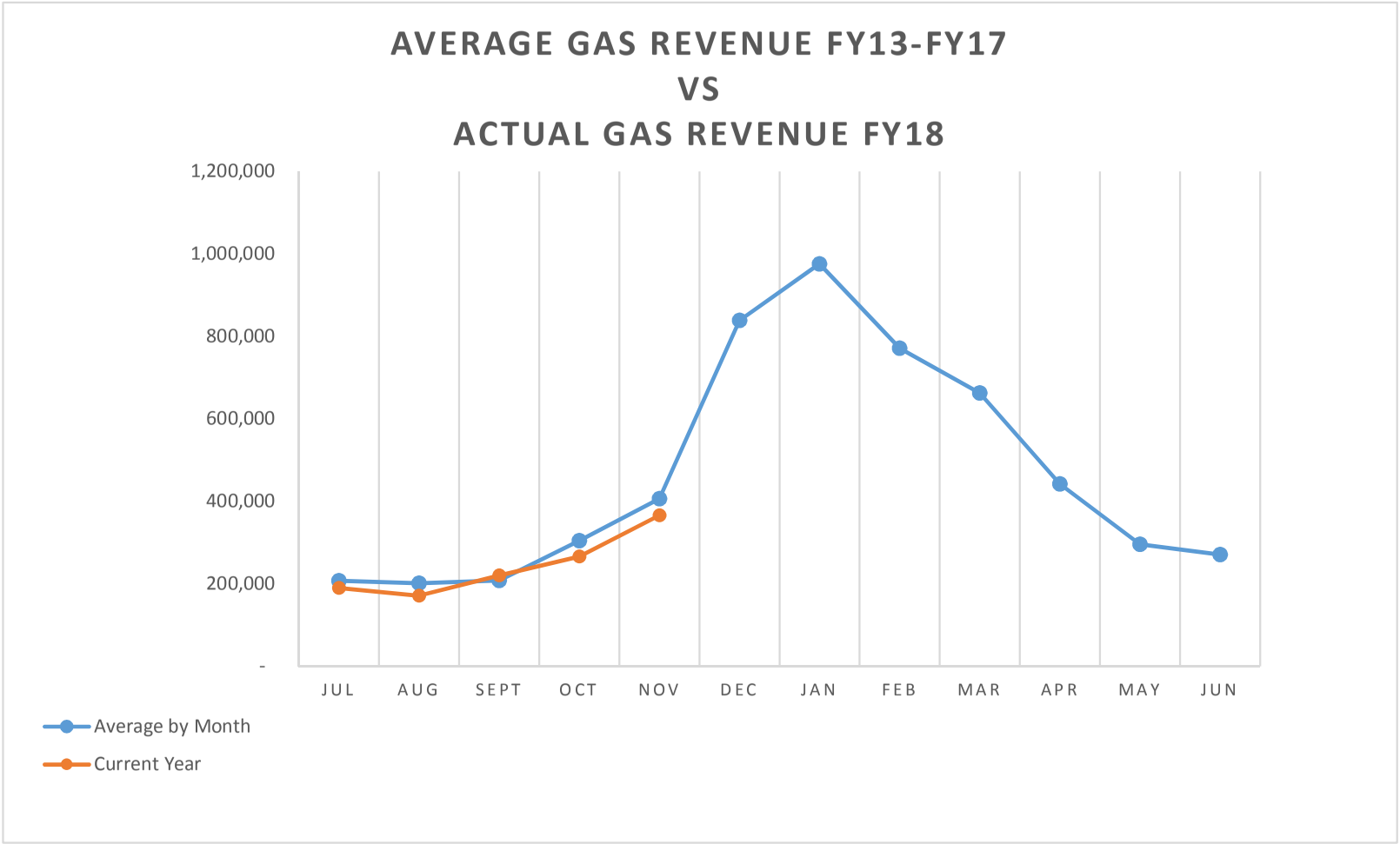
Reduction of the gas fund by $2.5 million, temporary increase in the wastewater fund by $2.5 million, followed by a decrease in indebtedness of the wastewater fund by the same amount after expenditure of the transferred funds.

Attachments

A - LADPU 10-year Financial Forecast - FY2018 through FY2027 Gas Reserve Analysis
B - Average Gas Revenue FY13-FY17 vs. Actual Gas Revenue FY18
C - Budget Revision 2018-10

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Gas Distribution

2.00%	Actual 2017	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Supervision, Misc Direct Admin		256,975	262,114	267,356	272,703	278,158	283,721	289,395	295,183	301,087	307,108
Gas Distribution		290,994	296,814	302,750	308,805	314,981	321,281	327,706	334,261	340,946	347,765
Gas Meters		137,486	140,235	143,040	145,901	148,819	151,795	154,831	157,928	161,086	164,308
Ongoing AMI Costs			28,310	28,310	28,310	28,310	28,310	28,310	28,310	28,310	28,310
Interdepartmental Charges		366,631	373,964	381,443	389,072	396,853	404,790	412,886	421,144	429,567	438,158
Administrative Division Allocation		718,310	559,431	570,619	582,032	593,673	605,546	617,657	630,010	642,610	655,462
In Lieu Taxes		202,705	209,290	217,978	216,581	220,150	226,666	228,062	231,165	232,871	232,406
Profit Transfer		262,075	260,153	280,440	277,179	285,511	300,726	303,986	311,231	315,216	314,129
Cost of Gas		2,537,766	2,905,422	3,339,819	3,270,006	3,448,419	3,774,217	3,844,031	3,999,173	4,084,501	4,061,230
TOTAL Operations Expenses		4,772,942	5,035,732	5,531,755	5,490,589	5,714,873	6,097,051	6,206,865	6,408,404	6,536,194	6,548,876
Capital		4,633,851				260,151	262,753	265,380	268,034	270,714	273,421
TOTAL Cash Outflow		**9,406,793**	**5,035,732**	**5,531,755**	**5,490,589**	**5,975,024**	**6,359,804**	**6,472,245**	**6,676,438**	**6,806,908**	**6,822,298**
total cash flow less cost of gas		6,869,027	2,130,310	2,191,936	2,220,584	2,526,605	2,585,587	2,628,214	2,677,265	2,722,407	2,761,068
Revenue Forecast											
Therm Sales		7,650,000	7,650,000	7,650,000	7,650,000	7,650,000	7,650,000	7,650,000	7,650,000	7,650,000	7,650,000
Fixed portion of per unit charge		$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230	$ 0.230
Rate Increase Percentage											
Total Sales Revenue excluding pass thru		2,665,311	2,665,311	2,665,311	2,665,311	2,665,311	2,665,311	2,665,311	2,665,311	2,665,311	2,665,311
Interest on Utility Reserves		82,000	83,640	85,313	87,019	88,759	90,535	92,345	94,192	96,076	97,998
Revenue on Recoverable Work		20,000	20,400	20,808	21,224	21,649	22,082	22,523	22,974	23,433	23,902
TOTAL Cash Inflow excluding pass thru		2,767,311	2,769,351	2,771,432	2,773,554	2,775,719	2,777,927	2,780,180	2,782,477	2,784,820	2,787,210
Net Cash Flow excluding cost of gas passthru		(4,101,716)	639,041	579,496	552,971	249,114	192,340	151,966	105,212	62,413	26,142
Cummulative net cash flow		(4,101,716)	(3,462,675)	(2,883,179)	(2,330,209)	(2,081,095)	(1,888,754)	(1,736,788)	(1,631,576)	(1,569,163)	(1,543,021)
Cash Balance	5,677,382	1,575,666	2,214,707	2,794,203	3,347,173	3,596,287	3,788,628	3,940,594	4,045,806	4,108,219	4,134,361
Recommended Cash Balance		1,236,550	1,190,079	1,215,848	1,497,155	1,523,832	1,552,454	1,578,998	1,606,885	1,634,575	1,661,687



Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
207,489	201,471	208,451	304,494	406,478	838,992	975,957	771,716	663,091	442,135	295,711	270,750
190,455	171,344	220,225	266,045	366,165							

Budget Revision 2018-10 Los Alamos Treatment Plant Loan Prepayment

Board of Public Utilities Meeting Date: January 17, 2018 Council Meeting Date: January 30, 2018

	Fund/Dept	Brass Org	Revenue (decrease)	Expenditures (decrease)	Transfers In(Out)	Fund Balance (decrease)
1	Utilities - Gas Fund	531-853311 xxx	$ -	$ -	$ (2,500,000)	$ (2,500,000)
1	Utilities - Wastewater Fund	551-855511 xxx	$ -	$ 2,500,000	$ 2,500,000	

Description: The purpose of this budget revision is to transfer $2,500,000 from the Gas Fund to the Wastewater Fund and add budget authority to prepay a portion of the New Mexico Environment Department (NMED) loan serviced by New Mexico Finance Authority (NMFA) for the Los Alamos Wastewater Treatment Plant.

Fiscal Impact: The net fiscal impact on the Joint Utilities Fund is to increase expenditures by $2,500,000.

Agenda No.:	9.A
Index (Council Goals):	BCC - N/A
Presenters:	Board of Public Utilities
Legislative File:	**10296-18**

Title

Status Reports

Body

Each month the Board receives in the agenda packet informational reports on various items. No presentation is given, but the Board may discuss any of the reports provided.

Attachments

A - Electric Reliability Report
B - Accounts Recievables Report
C - Safety Report

STATUS REPORTS

ELECTRIC RELIABILITY

Los Alamos County Utilities

Electric Distribution Reliability

January 17, 2017

Stephen Marez
Senior Engineer

Electric Distribution Reliability Study
Twelve Month Outage History

Prepared by Stephen Marez
Senior Engineer L.A.C.U.

Date	Call Rcd.	Circuit	Cause	Start Time	End Time	Duration	Customers Affected (Meters)	Combined Customer Outage Durations	Total Outage H:M:S	Running SAIDI
1/1/2017	Utilities	15	Animal	13:00	13:45	0:45	25	18:45:00	18:45:00	0:00:07
1/16/2016	Utilities	13	Weather	20:15	23:59	3:44	5	18:40:00	37:25:00	0:00:15
1/29/2017	Utilities	15	Animal	2:20	3:00	0:40	1145	763:20:00	800:45:00	0:05:19
1/29/2017	Utilities	15	Animal	2:20	3:15	0:55	131	120:05:00	920:50:00	0:06:07
1/29/2017	Utilities	15	Animal	2:20	3:40	1:20	72	96:00:00	1016:50:00	0:06:45
1/29/2017	Utilities	15	Animal	2:20	4:30	2:10	527	1141:50:00	2158:40:00	0:14:19
3/6/2017	Utilities	WR1	OH Failure	8:00	9:30	1:30	5	7:30:00	2166:10:00	0:14:22
4/27/2017	Utilities	16	URD Failure	9:00	10:00	1:00	70	70:00:00	2236:10:00	0:14:50
4/29/2017	Utilities	16	URD Failure	0:00	5:00	5:00	7	35:00:00	2271:10:00	0:15:04
5/6/2017	Utilities	WR1	Animal	9:35	10:30	0:55	30	27:30:00	2298:40:00	0:15:15
5/15/2017	Utilities	16	URD Failure	12:15	13:15	1:00	40	40:00:00	2338:40:00	0:15:31
5/6/2017	Utilities	WR1	Planned	9:00	12:00	3:00	10	30:00:00	2368:40:00	0:15:43
6/18/2017	Utilities	14	URD Failure	15:15	15:30	0:15	539	134:45:00	2503:25:00	0:16:36
6/27/2017	Utilities	17	URD Failure	11:30	12:30	1:00	4	4:00:00	2507:25:00	0:16:38
7/26/2017	Utilities	WR1	URD Failure	6:50	10:30	3:40	10	36:40:00	2544:05:00	0:16:53
8/12/2017	Utilities	EA4	OH Failure	14:30	15:00	0:30	5	2:30:00	2546:35:00	0:16:54
9/10/2017	Utilities	16	URD Failure	17:00	18:50	1:50	40	73:20:00	2619:55:00	0:17:23
9/19/2017	Utilities	14	URD Failure	2:45	3:35	0:50	18	15:00:00	2634:55:00	0:17:29
9/19/2017	Utilities	14	URD Failure	7:45	9:00	1:15	80	100:00:00	2734:55:00	0:18:09
9/19/2017	Utilities	14	URD Failure	7:45	14:15	6:30	45	292:30:00	3027:25:00	0:20:05
10/5/2017	Utilities	15	Tree	16:00	16:15	0:15	10	2:30:00	3029:55:00	0:20:06
10/27/2017	Utilities	18	Planned	8:30	9:30	1:00	1	1:00:00	3030:55:00	0:20:06
11/24/2017	Dispatch	TC2	Supply line Failure	2:54	6:03	3:09	2264	7131:36:00	10162:31:00	1:07:25
11/24/2017	Dispatch	TC1	System Failure	3:53	5:59	2:06	4069	8544:54:00	18707:25:00	2:04:06
11/30/2017	Utilities	WR1	Planned	19:00	23:00	4:00	1	4:00:00	18711:25:00	2:04:07
11/30/2017	Utilities	WR1	Planned	19:00	0:30	5:30	5	27:30:00	18738:55:00	2:04:18
12/22/2017	Utilities	13	URD Failure	12:30	15:50	3:20	15	50:00:00	18788:55:00	2:04:38
12/27/2017	Utilities	13	URD Failure	18:30	21:07	2:37	1	2:37:00	18791:32:00	2:04:39

CIRCUIT SAIDI IS CALCULATED ACCORDING TO THE NUMBER OF CUSTOMERS IN EACH CIRCUIT RESPECTIVELY

Running SAIDI Circuit 13	Running SAIDI Circuit 14	Running SAIDI Circuit 15	Running SAIDI Circuit 16	Running SAIDI Circuit 17	Running SAIDI Circuit 18	SAIDI Circuit EA4 & Royal Crest	Running SAIDI Circuit WR1	Running SAIDI Circuit WR2	Monthly SAIDI		Monthly Customer Minutes out of service	WEATHER SAIDI
		0:00:36										
0:00:41												0:00:07
		0:25:05										
		0:28:56										
		0:32:01										
		1:08:38							FEBRUARY	0:14:19	2158:40:00	
							0:00:17		MARCH	0:00:03	7:30:00	
			0:02:17									
			0:03:25						APRIL	0:00:42	105:00:00	
							0:01:19					
			0:04:43									
							0:02:28		MAY	0:00:39	70:00:00	
	0:15:00											
				0:01:09					JUNE	0:00:55	138:45:00	
							0:03:51		JULY	0:00:15	36:40:00	
						0:00:05			AUGUST	0:00:01	2:30:00	
			0:07:07									
	0:16:40											
	0:27:48											
	1:00:22								SEPTEMBER	0:03:11	480:50:00	
		1:08:42										
					0:00:17				OCTOBER	0:00:01	396:00:00	
4:19:13	14:14:14	4:57:24										
			4:45:27	40:54:14	40:07:18							
							0:04:00					
							0:05:02		NOVEMBER	1:44:12	15708:00:00	
0:01:49												
0:00:06									DECEMBER	0:00:21	84:07:00	
										SAIDI TOTAL		WEATHER
Circ 13	**Circ 14**	**Circ 15**	**Circ 16**	**Circ 17**	**Circ 18**	**Circ EA4**	**Circ WR1**	**Circ WR2**	**Total**	**2:04:39**		**0:00:07**
1655	**539**	**1875**	**1842**	**209**	**213**	**165**	**1586**	**961**	**9045**			

Twelve Month History	December 2017	
Total # Accounts	9045	
Total # Interruptions	28	
Sum Customer Interruption Durations	18791:32:00	hours:min:sec
# Customers Interrupted	9174	
SAIFI(APPA AVG. = 1.0)	1.01	int./cust.
SAIDI (APPA AVG. = 1:00)	2:04	hours:min
CAIDI	2:02	hours:min/INT
ASAI	99.9990%	% available

- **SAIFI - System Average Interruption Frequency Index**
  A measure of interruptions per customer (Per Year)

  SAIFI= (Total number of customer interruptions)
  (Total number of customers served)

- **SAIDI – System Average Interruption Duration Index**
  A measure of outage time per customer if all customers were out at the same time (hours per year)

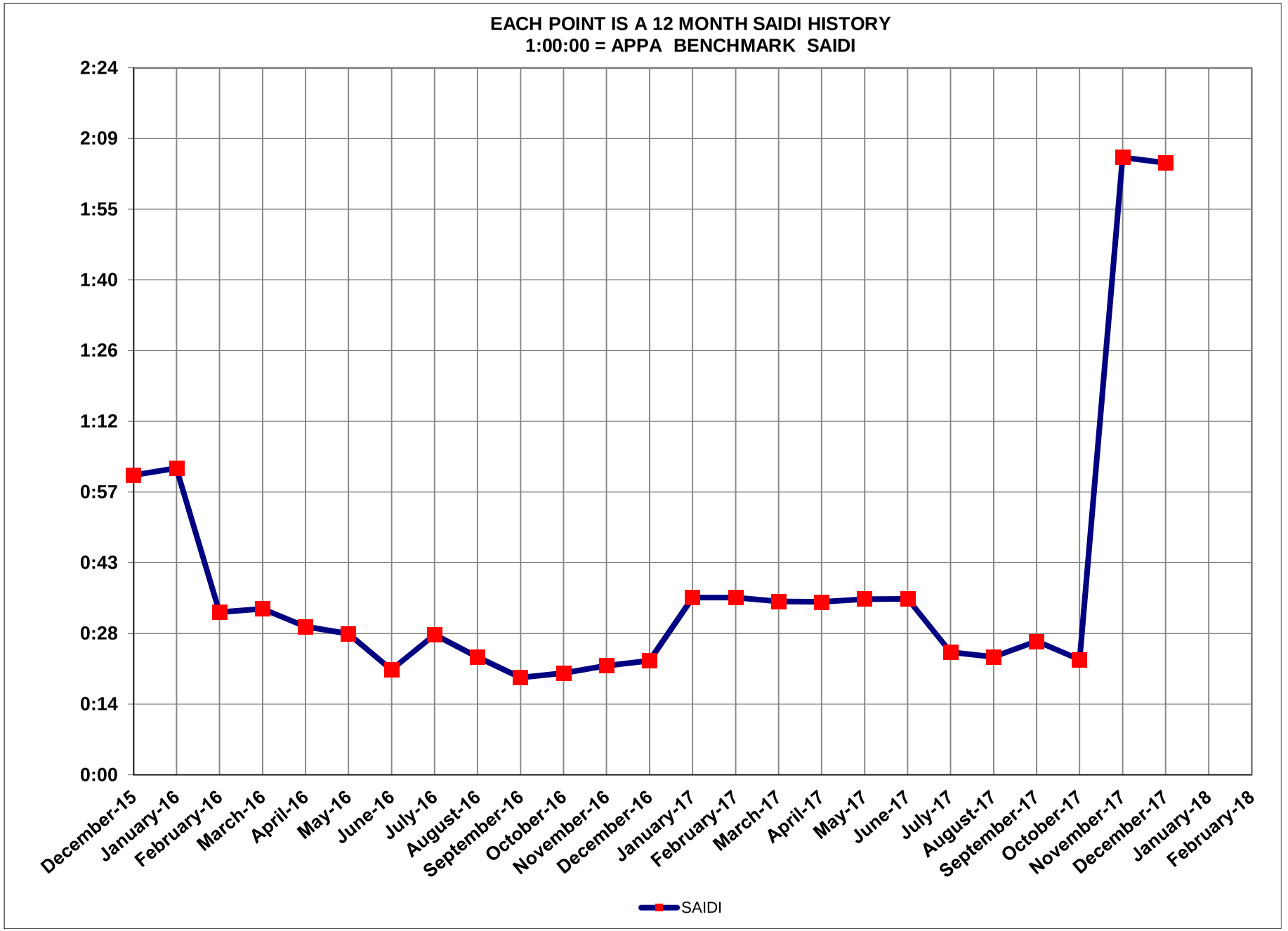
  SAIDI=(Sum of all customer outage durations)
  (Total number of customers served)

- **CAIDI – Customer Average Interruption Duration Index**
  A measure of the average outage duration per customer (hours per interruption)

  CAIDI=(Sum of all customer outage durations) = SAIDI
  (Total number of customer interruptions) SAIFI

- **ASAI – Average System Availability Index**
  A measure of the average service availability (Per unit)

  ASAI= (Service hours available) = 8760-SAIDI
  (Customer demand hours) 8760


EACH POINT IS A 12 MONTH SAIDI HISTORY
1:00:00 = APPA BENCHMARK SAIDI
2:24
2:09
1:55
1:40
1:26
1:12
0:57
0:43
0:28
0:14
0:00
December-15
January-16
February-16
March-16
April-16
May-16
June-16
July-16
August-16
September-16
October-16
November-16
December-16
January-17
February-17
March-17
April-17
May-17
June-17
July-17
August-17
September-17
October-17
November-17
December-17
January-18
February-18
SAIDI

STATUS REPORTS

ACCOUNTS RECEIVABLES

Los Alamos County Utilities Department
Active Receivables Over 90 Days Past Due
January 2, 2018

Account	*Acct Type*	*Comments*	*90 - 119*	*120 +*
2009984	RES	Payment of $326 on 1/5/18	177.12	14.88
2022445	RES	Payment of $545 on 1/4/18	264.86	18.54
2020087	COMM	Payment of $712.72 on 1/5/18	721.36	10.68
2002399	COMM	Payment Arrangement - Will pay $1000-$1500 by 1/11/18	723.81	36.00
2116108	COMM	Payment Arrangement-Will pay $1500 1/8/18 and $1000 per wk	1,227.48	-
			3,114.63	80.10
			TOTAL	**$ 3,194.73**

Los Alamos County Utilities Department
Receivables More than 60 Days Inactive
January 2, 2018

YEAR	*OUTSTANDING 1/2*	*# OF ACCOUNTS*	*OUTSTANDING 12/1*	*# OF ACCOUNTS*
FY14	28,242.22	96	28,242.22	96
FY15	25,510.66	95	25,938.31	97
FY16	21,079.15	120	21,079.15	120
FY17	28,036.53	106	28,610.28	111
FY18	4,248.46	44	1,690.41	36
TOTAL	**$ 107,117.02**	**461**	**$ 105,560.37**	**460**

STATUS REPORTS

SAFETY

DATE	TYPE	DEPT	EE #	PROP	CAUSE
12/26/17	PD	ELDIST	N/A	1213	Keys stolen in attempted theft

DOI	REPT DT	TYPE	DESC	LOCATION
		PD	Property Damage	
		BI	Bodily Injury	
		PI	Personal Injury	
12/11/17	12/26/17	PD	Clmnt alleges sewer back-up	2952 Villa St.

	Hours Worked	Hours Worked	Hours Worked	Hours Worked	Hours Worked	Hours Worked
	ADMIN	EL DIST	EL PROD	GWS	WA PROD	WWTP
MONTH						
Jan - 2017	2612.0	1286.0	1602.0	2857.0	1066.0	987.0
Feb - 2017	3592.0	1462.0	3135.0	3912.0	1301.0	1055.0
Mar - 2017	5675.0	1989.0	4450.0	5833.0	1711.0	3525.0
Apr - 2017	3700.0	1411.0	1879.0	4633.0	1243.0	1047.0
May - 2017	3446.0	1201.0	2906.0	4010.0	4227.0	1277.0
June - 2017	3444.0	2976.0	1760.0	2987.0	1663.0	1334.0
July - 2017	4071.0	1462.0	1558.0	3732.0	1453.0	1345.0
Aug - 2017	5757.0	1641.0	2680.0	4286.0	2895.0	3097.0
Sept - 2017	3385.0	1329.0	1659.0	3439.0	1355.0	1122.0
Oct - 2017	3029.0	1424.0	1468.0	3522.0	1188.0	1238.0
Nov - 2017	3476.0	1416.0	1506.0	3398.0	1182.0	1201.0
Dec - 2017	3204.0	1251.0	1372.0	3047.0	2427.0	946.0
Total Hrs Worked ->	45391.0	18848.0	25975.0	45656.0	21711.0	18174.0
Number of Recordable Injury and Illness Cases	0	1	0	4	0	1
OSHA Recordable Injury & Illness Incidence Rate	0.00	10.61	0.00	17.52	0.00	11.00
Number of OSHA Days Away Days Restricted (DART) cases	0	0	0	3	0	0
OSHA Days Away Days Restricted (DART) Rate	0.00	0.00	0.00	13.14	0.00	0.00