County of Los Alamos

1000 Central Avenue
Los Alamos, NM 87544

Agenda - Final

Board of Public Utilities Work Session

Robert Gibson, Chair; Matt Heavner, Vice Chair
Eric Stromberg, Charles Nakhleh and Jennifer Hollingsworth, Members
Philo Shelton, Ex Officio Member
Anne Laurent, Ex Officio Member
Ryn Herrmann, Council Liaison

Wednesday, April 1, 2026 **5:30 PM** **Municipal Building, Council Chambers**

Public Participation ~ in person or https://us06web.zoom.us/j/87563449773

Members of the public may also participate remotely and provide public comment via Zoom.

Link ~ https://us06web.zoom.us/j/87563449773 | Webinar ID ~ 875 6344 9773

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PUBLIC COMMENT:
Oral comments are accepted during the periods identified on the agenda and after initial board discussion on a business item, prior to accepting a main motion on an item. Public comments are limited to three minutes per person. For those participating over Zoom, please use the raise hand function. If you are participating by phone enter *9 to raise your hand. Please submit written comments to the board at bpu@lacnm.us.

1. CALL TO ORDER

2. PUBLIC COMMENT

3. APPROVAL OF AGENDA

3.a. 21497-26 Action to Suspend Procedural Rules for Work Session

Presenters: Board of Public Utilities

4. CONSENT AGENDA

. MOTION: I move that the Board of Public Utilities approve the items on the Consent Agenda as (PRESENTED -or- AMENDED) and that the motions in the staff reports be included in the minutes for the record.

4.a. 21241-26a Approval of Bid No. 26-37 East Rd 14" Water Transmission Line Project in the amount of $1,762,570.88

Presenters: James Martinez, Deputy Utility Manager-Engineering

Attachments: A - IFB 26-37 Construction Plans
B - LoanGrant No WPF-6584

4.b. 21410-26a Award of Task Order No. 15 under AGR22-18e with R&M Construction for the Purpose of Drilling Five Piers in the White Rock Substation for the Transformer Replacement Project in the Amount of $463,657.50, add a 10% project contingency of $46,366 plus Applicable Gross Receipts Tax for the Term of 90 Days.

Presenters: Dennis Astley, Deputy Utility Manager-Electric Distribution

Attachments: A - Task Order No. 15
B - R&M Construction Estimate No. 523

5. PRESENTATIONS

5.a. 21046-26 Annual Update: Results of the Voice of the Customer Survey

Presenters: Catherine D'Anna, Public Relations Manager

Attachments: A - Los Alamos VOC Report of Findings 2026

5.b. 21047-26 Overview of County Council's 2026 Strategic Leadership Plan

Presenters: County Council

Attachments: A - 2026 Strategic Leadership Plan

6. PUBLIC HEARINGS

6.a. CO0745-26.1 Introduction of Incorporated County of Los Alamos Code Ordinance No. 02-379; An Ordinance Amending Chapter 40, Article III, Sections 40-151,

and 40-152 of the Code of the Incorporated County of Los Alamos Pertaining to Gas Service Rates.

Presenters: Joann Gentry, Deputy Utility Manager-Finance & Admin.

Attachments: A - LAC Code Ordinance 02-379 - Gas Rates
B - Gas Rate Ordinance Presentation

7. BUSINESS

7.a. 21048-26 Annual Update: Electric Reliability Plan (ERP) for FY2027

Presenters: Dennis Astley, Deputy Utility Manager-Electric Distribution

Attachments: A - FY27 Electric Reliability Plan
B - Annual ERP Presentation

7.b. 21049-26 Biannual Update of the Integrated Resource Plan (IRP)

Presenters: Ben Olbrich, Deputy Utility Manager-Power Supply

Attachments: A - IRP Implementation Update

7.c. 21199-26 Plug-in / Balcony Solar Systems: Key Information

Presenters: Ben Olbrich, Deputy Utility Manager-Power Supply

Attachments: A - 2026 Plug-In Solar Presentation
B - Plug-in Solar Safety Whitepaper

7.d. 19943-26 American Public Power Association (APPA) Financial and Operating Ratios

Presenters: Philo Shelton, Utilities Manager

Attachments: A - APPA Financial & Operating Ratios
B - APPA Rept on Financial & Operating Ratios
C - Rept on Financial & Operating Ratios Summary

7.e. 21050-26a Announcement of Board of Public Utilities Vacancy

Presenters: Board of Public Utilities

Attachments: A - BPU Vacancy Ad
B - BPU Vacancy Brochure

8. PUBLIC COMMENT

9. ADJOURNMENT

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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 Human Resources at 505-662-8040 as soon as possible.

Complete Board of Public Utilities agenda packets, past agendas, videos, legislation and minutes can be found online at https://losalamos.legistar.com. Learn more about the Board of Public Utilities at https://ladpu.com/BPU.

Agenda No.:	3.a.
Index (Council Goals):	
Presenters:	Board of Public Utilities
Legislative File:	**21497-26**

Title

Action to Suspend Procedural Rules for Work Session

Recommended Action

I move that the Board of Public Utilities suspend their procedural rules for the April 1, 2026 work session so that formal action may be taken.

Body

This action would suspend the rule for this work session and enable the board to take formal action on agenda items.

The Board of Public Utilities Procedural Rules identifies a Work Session as follows:
3.4.b. Work Sessions - work sessions will generally be held on the first Wednesday of each month at 5:30 p.m. The board may schedule work sessions on a regular basis under the requirements of the annual Open Meetings Resolution. Board meetings designated as work sessions will be held for the primary purpose of discussing issues at length with staff in an informal setting without taking formal action, except for required procedural actions such as approving minutes from a prior meeting or adopting a statement for inclusion in the minutes regarding a closed session. Public comment will be taken only at the beginning and ending of the session, and by available written methods.

Agenda No.:	4.a.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services
Presenters:	James Martinez, Deputy Utility Manager-Engineering
Legislative File:	**21241-26a**

Title
Approval of Bid No. 26-37 East Rd 14" Water Transmission Line Project in the amount of $1,762,570.88

Recommended Action
I move that the Board of Public Utilities recommend the Award of Bid No. 26-37 for the East Rd 14" Water Transmission Line Project to NM Underground Utilities, Inc. with the base bid of $1,264,299.00, Bid Alternate A-1 in the amount of $309,425.00, and a 12% contingency in the amount of $188,846.88, for a Total Project Amount of $1,762,570.88, including NMGRT and forward to Council for approval.

Utilities Manager's Recommendation
The Utilities Manager recommends that the Board approve the motion as presented.

Body
The existing 14-inch steel transmission waterline along NM-502, installed in 1949, is approximately 6,700 feet long and has experienced increasing failures due to corrosion. This line is a critical component of Los Alamos' water system, conveying high-volume supply from Otowi Well #4. When failures occur, up to half of the community's water supply can be disrupted, impacting residents, commercial customers, the airport, and the wastewater treatment facility. Due to its age, deteriorating condition, and high consequence of failure, including loss of fire protection across a large area. This pipeline is a top priority for replacement. Continued failures pose significant risks of extended outages, operational strain, and public safety concerns. Replacement with a new 14-inch ductile iron pipeline will improve reliability, restore system resilience, and ensure consistent water service and fire protection for the community.

Alternatives
The existing 14-inch transmission line continues to deteriorate, increasing the likelihood of more frequent failures, extended outages, and reduced fire protection for a significant portion of the community. Delays in replacement may also result in the loss of the currently available 90% grant funding. Staff will continue to pursue this project to maintain system reliability and secure available funding.

Fiscal and Staff Impact
The project has been budgeted through Water Production in FY 2026 in the amount of $3,000,000.00 ($2,250,000 Grant / $250,000 Loan, $500k County Match). This is Loan/ Grant No. WPF-6584, dated January 23, 2026, and included as Attachment "B".

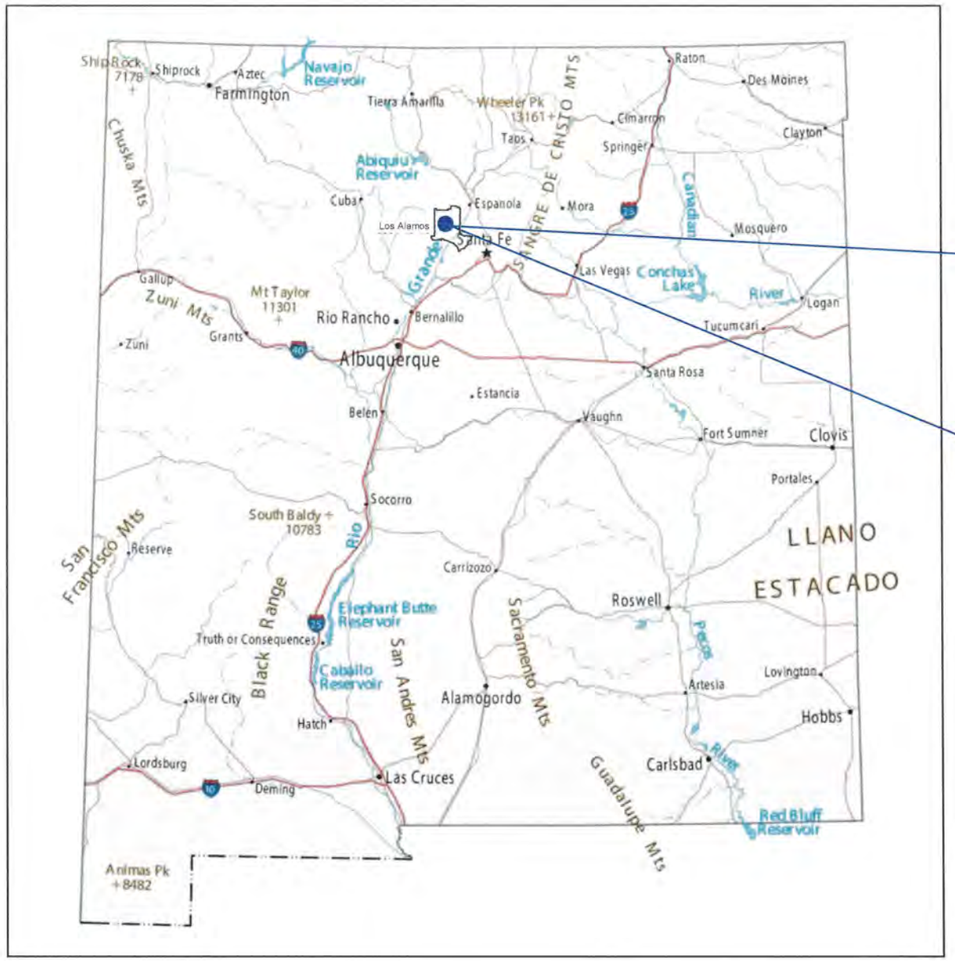
Attachments

A - IFB 26-37 Construction Plans
B - Loan/Grant No. WPF-6584

LOS ALAMOS COUNTY

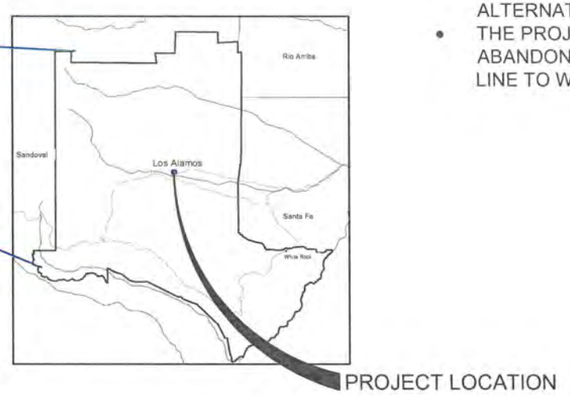
EAST RD 14" WATER TRANSMISSION LINE REPLACEMENT

SEPTEMBER 2025



LOCATION MAP

NTS



PROJECT LOCATION

N

VICINITY MAP

NTS

PROJECT DESCRIPTION

- THIS PROJECT INVOLVES THE REPLACEMENT OF APPROXIMATELY 5,443 LINEAR FEET OF EXISTING 14-INCH STEEL WATER LINE WITH NEW 14-INCH CLASS 250 DUCTILE IRON (DI) PIPE, INCLUDING ALL ASSOCIATED VALVES, FITTINGS, AND APPURTENANCES.
- A BID ALTERNATE INCLUDES AN ADDITIONAL 1,236 LINEAR FEET OF DI WATER LINE. THIS INCLUDES A TIE IN TO AN 8-INCH LINE THAT CONNECTS THE LINE TO AN EXISTING PRV. END TIE-IN LOCATIONS WILL VARY DEPENDING ON AWARD OF THE ALTERNATE.
- THE PROJECT INCLUDES THE REMOVAL OF FIVE (5) FIRE HYDRANTS AND THE ABANDONMENT IN PLACE OF APPROXIMATELY 2,500 LINEAR FEET OF 8-INCH WATER LINE TO WHICH THE HYDRANTS ARE CONNECTED.

GENERAL SHEETS

SHEET G1 COVER SHEET
SHEET G2 GENERAL NOTES
SHEET G3 LAYOUT SHEET

CIVIL SHEETS

SHEET C1 PLAN & PROFILE 0+00 TO 7+00
SHEET C2 PLAN & PROFILE 7+00 TO 14+00
SHEET C3 PLAN & PROFILE 14+00 TO 21+00
SHEET C4 PLAN & PROFILE 21+00 TO 28+00
SHEET C5 PLAN & PROFILE 28+00 TO 35+00
SHEET C6 PLAN & PROFILE 35+00 TO 42+00
SHEET C7 PLAN & PROFILE 42+00 TO 45+85
SHEET C8 PLAN & PROFILE 45+85 TO 48+50
SHEET C9 PLAN & TYPICAL SECTIONS 48+50 TO 52+61

OPTION 1 BASE BID FINAL ALIGNMENT

SHEET C10 PLAN & PROFILE 52+61 TO 54+42.22

OPTION 2 BID ALT FINAL ALIGNMENT

SHEET C11 PLAN & PROFILE 0+00 TO 7+00
SHEET C12 PLAN & PROFILE 7+00 12+36

DETAIL SHEETS

SHEET D1 DETAIL SHEET
SHEET D2 DETAIL SHEET

Approved by: _____ Date: 2/18/26
Department of Public Utiltities
Project Engineer

Approved by: _____ Date: 2/18/26
Department of Public Utilities
Engineering Associate

LOS ALAMOS

	INCORPORATED COUNTY OF LOS ALAMOS DEPARTMENT OF PUBLIC UTILITIES 1000 CENTRAL AVE. SUITE 130 LOS ALAMOS, NEW MEXICO 87544 (505) 662-8150 FAX (505)662-8109	NO.	REVISION DESCRIPTION

Attachment A

GENERAL

1. DEPTH OF TRENCH MAY BE DEEPER ALONG CERTAIN SEGMENTS OF PIPELINE TO CLEAR EXISTING UTILTIES AND TO AVOID THE CREATION OF HIGH POINTS ALONG THE ALIGNMENT. NO ADDITIONAL PAYMENT WILL BE MADE FOR INSTALLING PIPE DEEPER THAN MINIMUM REQUIRED DEPTH.
2. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SITE SAFETY, AND FOR KNOWLEDGE AND COMPLIANCE WITH OSHA STANDARDS. THE CONTRACTOR SHALL MAINTAIN ALL TRENCHES IN A SAFE CONDITION PROTECTING THE WORKERS AND THE GENERAL PUBLIC. TRENCH PROTECTION SHALL BE IN ACCORDANCE WITH APPLICABLE OSHA REGULATIONS. EXCAVATION SHALL BE SLOPED, BRACED, OR SHORT AS REQUIRED BY OSHA REGULATIONS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE SAFE HANDLING OF CONSTRUCTION EQUIPMENT AND MATERIALS TO AND FROM THE STAGING/STORAGE AREA AND FOR SITE SECURITY. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION AND NO ADDITIONAL COMPENSATION SHALL BE MADE THEREFOR
3. ALL WATER, WASTEWATER, GAS AND ELECTRIC UTILITY INSTALLATIONS, RE-CONSTRUCTION OR REPAIR SHALL COMPLY WITH LOS ALAMOS COUNTY DEPARTMENT OF PUBLIC UTILITIES (DPU) CONSTRUCTION STANDARDS AND THE RELEVANT STANDARD DRAWINGS.
4. SUBMITTALS FOR ALL GAS, WATER, SEWER, ELECTRIC AND COUNTY OWNED COMMUNICATION INFRASTRUCTURE SHALL BE SUBMITTED TO THE DPU PROJECT MANAGER FOR REVIEW AND APPROVAL PER THE DPU STANDARD SPECIFICATIONS. SUMBMITTALS SHALL INCLUDE THE COVER SHEET IN THE DPU CONSTRUCTION STANDARDS.
5. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A NEW MEXICO LICENSED PROFESSIONAL SURVEYOR (NMPS), FOR CONSTRUCTION STAKING, AS WELL AS VERIFICATION OF ALL CRITICAL HORIZONTAL AND VERTICAL CONTROL DATA SHOWN ON THESE CONTRACT DRAWINGS. CONTRACTOR SHALL PROVIDE COORDINATE INFORMATION FOR ALL NEW SAS MANHOLES, WATER AND GAS VALVES, ALL BASED ON STATE PLANE COORDINATES.
6. FOR ANY WORK INVOLVING NEW WATER, GAS OR SEWER PIPELINE CONNECTING TO AN EXISTING PIPELINE, CONTRACTOR SHALL OBTAIN A PENETRATION PERMIT FROM THE COUNTY, AT LEAST 48 HOURS IN ADVANCE OF ANY SUCH WORK. THE PERMIT APPLICATION FORM FOR THIS PERMIT CAN BE FOUND AT:

   https://www.losalamosnm.us/Permitting-Information/Add-or-Modify-Utility-Services

7. CONTRACTOR SHALL BE RESPONSIBLE FOR POTHOLING, TO DETERMINE THE EXACT LOCATION OF EXISITNG UTILITIES, PRIOR TO PERFORMING ANY EXCAVATION WORK.
8. PRIOR TO CONNECTING NEW WATER LINES INTO THE EXISTING SYSTEMS THE LOCATE WIRE SHALL BE TESTED AS FOLLOWS. CONTRACTOR WILL ENSURE THAT ALL LOCATE WIRE HAS BEEN INSTALLED AND MADE ACCESSIBLE IN ALL REQUIRED LOCATIONS. CONTRACTOR WILL VERIFY CONTINUITY IN THE LOCATE WIRE WITH THEIR OWN LOCATE EQUIPMENT. THE LOCATED LOCATION WILL BE PAINTED WITH WHITE PAINT AND DPU STAFF WILL THEN VERIFY THE LOCATION AND CONTINUITY OF THE LOCATE WIRE WITH THEIR OWN EQUIPMENT. ANY AREAS WHERE CONTINUITY IS LOST MUST BE REPAIRED AND RE-VERIFIED BY DPU STAFF TO BE LOCATEABLE. CONTRACTOR SHALL COORDINATE THE LOCATE WIRE VERIFICATION WITH DPU PROJECT MANAGER.
9. INFORMATION SPECIFICALLY STATED IN THE CONTRACT DRAWINGS, OR WHEN THE DPU PROJECT MANAGER SPECIFICALLY IDENTIFIES IN THE FIELD, CRITICAL DATA (X, Y, AND Z) RELATED TO WATER VALVES OF ALL KINDS, WATER METERS, FIRE HYDRANTS, CULVERT INLET OR OUTLET INVERTS, WASTEWATER COLLECTION MANHOLE INVERTS AND RIMS, CUSTOMER END OF WASTEWATER SERVICE CONNECTION PIPES/CLEANOUT, SHALL BE COLLECTED BY THE CONTRACTOR'S SURVEYOR FOR THE RECORD DRAWINGS TO BE COMPLETE.
10. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF SURVEY MONUMENTS OR MARKS. IF CONTRACTOR'S ACTIVITIES CAUSED DAMAGE TO ANY OF THESE MARKS, CONTRACTOR SHALL RETAIN, AT THEIR OWN EXPENSE, THE SERVICES OF A NMLPS, TO RE-ESTABLISH THE MARKS IN COMPLIANCE WITH STANDARDS AND PROCEDURES SET FORTH BY THE "GEODETIC MARK PRESERVATION GUIDEBOOK".
11. CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE CLEAN WATER ACT, RELATED TO STORM WATERS. CONTRACTOR SHALL PREPARE, EXECUTE AND MAINTAIN A STORM WATER POLLUTION PREVENTION PLAN (SWPPP), IF THE AREA DISTURBED BY THE CONSTRUCITON OPERATIONS IS ONE ACRE OR MORE IN SIZE. COSTS ASSOCIATED WITH CLEAN WATER ACT COMPLIANCE, ICLUDING BMP'S, SHALL BE INCIDENTAL TO THE PROJECT'S COST.
12. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE COSTS OF REPAIRING ANY DAMAGE OR ALTERATIONS CAUSED DURING EXECUTION OF THIS PROJECT, TO THE ORIGINAL CONDITION OF THIRD PARTY'S PROPERTY (E.G. STRUCTURES, EXISTING UTILITIES OR UTILITY EASEMENTS) LOCATED WITHIN OR OUT OF THE PROJECT BOUNDARIES.
13. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROTECTION OF ALL PROJECT-RELATED MATERIALS OR EQUIPMENT, BEFORE INSTALLATION, UNTIL FINAL WRITTEN ACCEPTANCE PPROVAL OF THE PROJECT BY THE DPU PROJECT MANAGER AND THE COUNTY.
14. ALL MATERIAL QUALITY TESTS SHALL BE PERFORMED BY A RECOGNIZED LABORATORY. SUCH A LABORATORY SHALL BE OPERATED UNDER THE AUSPICES/DIRECTION OF AN NMPE. NAME AND CONTACT OF THE LABORATORY SHALL BE SUBMITTED BY THE CONTACTOR TO THE DPU PROJECT MANAGER AS SOON AS PRACTICAL AFTER THE CONTRACTOR'S RECEIPT OF THE NOTICE TO PROCEED.
15. CONTRACTOR SHALL PROVIDE THE INSTALLATION AND MAINTENANCE OF ANY NECESSARY TRAFFIC CONTROL DEVICES AS OTHERWISE REQUIRED BY LOS ALAMOS COUNTY TRAFFIC MANAGER. TRAFFIC CONTROL DEVICES SHALL COMPLY WITH THE MOST CURRENT EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), BUT MAY BE REVISED UNDER WRITTEN DIRECTION FROM THE COUNTY TRAFFIC ENGINEER.
16. CONTRACTOR SHALL NOTIFY THE DPU PROJECT MANAGER, AT LEAST FIVE (5) DAYS IN ADVANCE OF ANY WORK THAT MAY AFFECT THE OPERATION OF THE PUBLIC UTILITY SYSTEMS (WATER, WASTEWATER, GAS AND ELECTRIC).
17. ALL STRUCTURAL OR UTILITY TRENCH FILL OR BACKFILL SHALL BE FREE OF VEGETATION AND DEBRIS AND CONTAIN NO ROCKS LARGER THAN 3-INCHES.
18. ALL AREAS DISTURBED BY THE CONSTRUCTION ACTIVITIES OF THIS PROJECT, INCLUDING PRIVATE LANDSCAPING, SHALL BE RESTORED.
19. IF THE CONTRACTOR REQUIRES THE USE OF WATER FROM THE OWNER'S/PROJECT'S WATER SOURCE AT ANY TIME DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A $2,000.00 REFUNDABLE DEPOSIT TO OBTAIN A TEMPORARY WATER METER FROM OUR CUSTOMER SERVICE LOCATED AT LOS ALAMOS COUNTY MUNICIPAL BUILDING. THE METER WILL BE USED TO MONITOR WATER CONSUMPTION FOR THE DURATION OF USE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH WATER USAGE, BASED ON ACTUAL METERED CONSUMPTION. REFER TO THE COUNTY WEBSITE FOR CURRENT WATER RATES. THE DEPOSIT WILL BE REFUNDED UPON RETURN OF THE METER IN GOOD WORKING CONDITION AND FULL PAYMENT OF ALL OUTSTANDING WATER CHARGES.

WATER PIPELINES

1. THE PIPELINE SHALL BE SUPPLIED AND INSTALLED IN STRICT COMPLIANCE WITH THE DEPARTMENT OF PUBLIC UTILITIES CONSTRUCTION STANDARDS. CONTRACTOR SHALL NOTIFY THE DPU PROJECT MANAGER IMMEDIATELY UPON ENCOUNTERING FILED CONDITIONS THAT MAY REQUIRE DEVIATIONS FROM THESE STANDARDS.
2. CONTRACTOR SHALL INSTALL PIPELINE SO THAT HIGH POINTS ARE NOT CREATED, UNLESS SPECIFICALLY SHOWN ON APPROVED CONSTRUCTION DRAWINGS. THE PIPE SHALL BE PLACED WITH A UNIFORM GRADE, NO VERTICAL BENDS ARE ALLOWED.
3. PROFILE ELEVATIONS ARE APPROXIMATE AND BASED ON AVAILABLE GIS DATA. FIELD VERIFICATION OF EXISTING GRADES IS REQUIRED. MINIMUM BURY SHALL BE 4 FOOT AT ALL POINTS ALONG THE ALIGNMENT. ADJUSTMENTS NECESSARY SHALL BE CONSIDERED INCIDENTAL UNLESS OTHERWISE APPROVED.
4. ALL FIRE HYDRANTS SHALL BE INSTALLED WITH A MINIMUM 4-FOOT HORIZONTAL CLEARANCE ALL AROUND THEM.

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE DISINFECTION, CHLORINATION, CHLORINE RESIDUAL TESTING, AND HYDROSTATIC (PRESSURE) TESTING OF ALL WATER PIPES INSTALLED. PRESSURE TEST SHALL BE DOCUMENTED ON FORM INCLUDED IN STANDARD SPECIFICATION. DPU PROJECT MANAGER SHALL WITNESS ALL SUCH TESTING.

JAMES ALEXANDER MARTINEZ JR. NEW MEXICO 23903 2/12/24 PROFESSIONAL ENGINEER

Attachment A

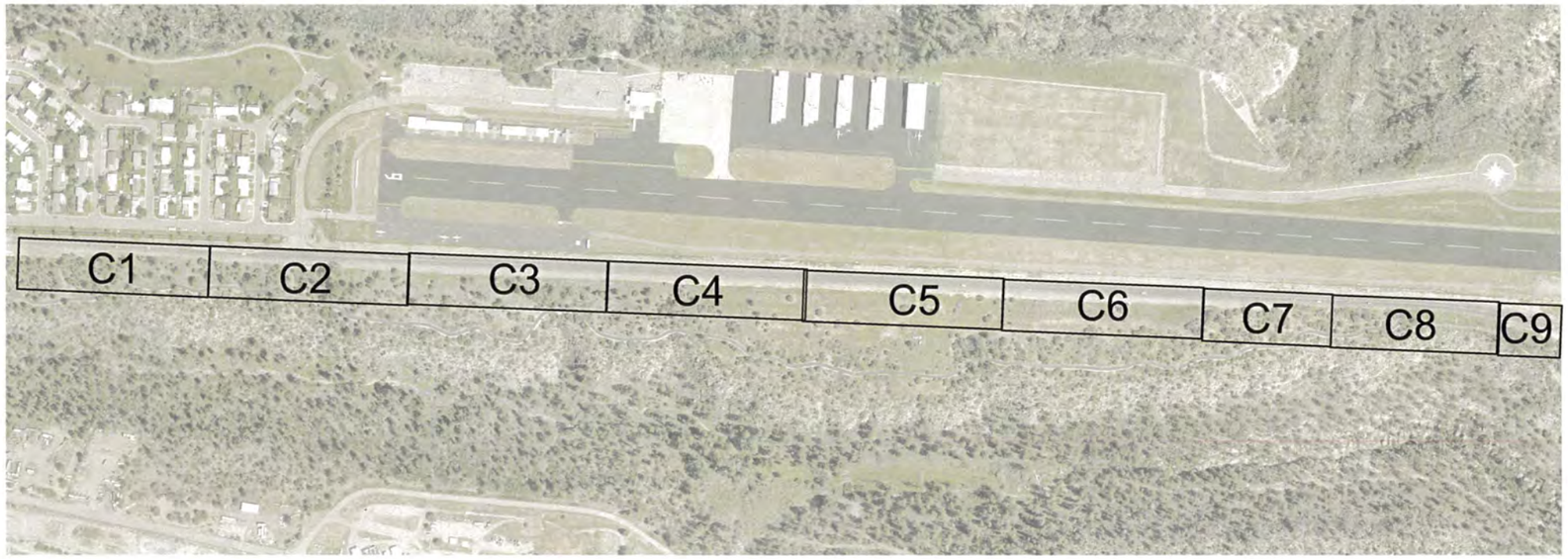
NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

GENERAL NOTES

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
G2



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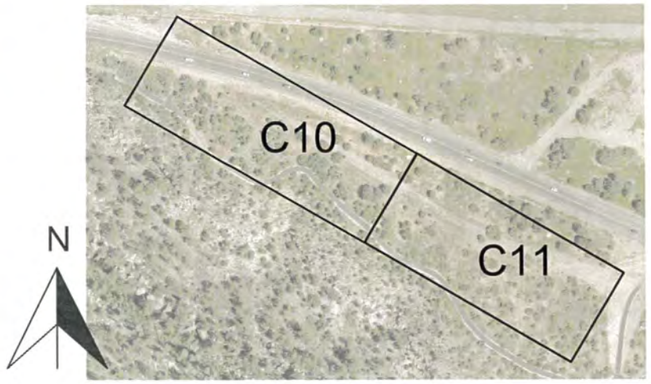
BASE BID SHEET LAYOUT



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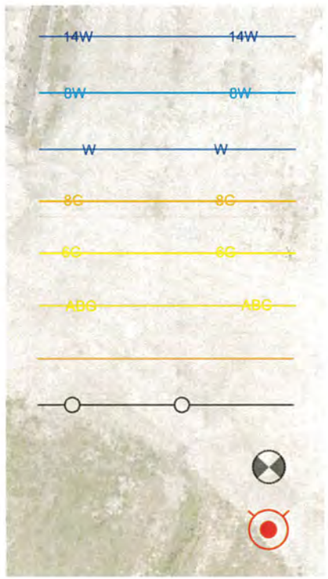
BID ALTERNATE SHEET LAYOUT

LEGEND



NEW 14" WATERLINE

EXISTING 8" WATERLINE

EXISTING 14" WATERLINE

8" GAS LINE

6" GAS LINE

ABANDON GAS LINE

COMMUNICATION LINE

FENCE LINE

GATE VALVE

HYDRANT

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
9/15/23
PROFESSIONAL ENGINEER

Attachment A

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

LAYOUT AND LEGEND

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET

G3

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

STA 0+00
TIE INTO EXISING 14" DI WATERLINE
USING A 14" MJ RESTRAINED COUPLING

STA 0+17.65
INSTALL 14"x45° BEND.

STA 00+50
INSTALL COMBINATION AIR VALVE ASSEMBLY.

STA 0+89.01
INSTALL 14"x45° BEND.

N

0' 50' 100'
GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE

STA 0+00 TIE INTO EXISTING WATERLINE
EXISTING 8" GAS LINE CROSSING
EXISTING 6" GAS LINE CROSSING
EXISTING DIRECT BURY COMMUNICATION LINE CROSSING
INSTALL COMBINATION AIR VALVE ASSEMBLY

EXISTING GRADE

4'0" MIN

7155 7190 7185 7180 7175 7170 7165 7160

0+00 0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00 4+50 5+00 5+50 6+00 6+50 7+00

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
PROFESSIONAL ENGINEER
1/28/20

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 0+00 TO STA 7+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C1

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

STA 13+27 INSTALL NEW FIRE HYDRANT WITH A MINIMUM HORIZONTAL CLEARANCE OF 3 FT FROM FENCE LINE. SEE SHEET D1 FOR DETAIL

N

0' 50' 100'
GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE

INSTALL NEW FIRE HYDRANT

EXISTING GRADE

4'0" MIN

7175
7170
7165
7160
7155
7150
7145

7+00 7+50 8+00 8+50 9+00 9+50 10+00 10+50 11+00 11+50 12+00 12+50 13+00 13+50 14+00

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
2/24/26
PROFESSIONAL ENGINEER

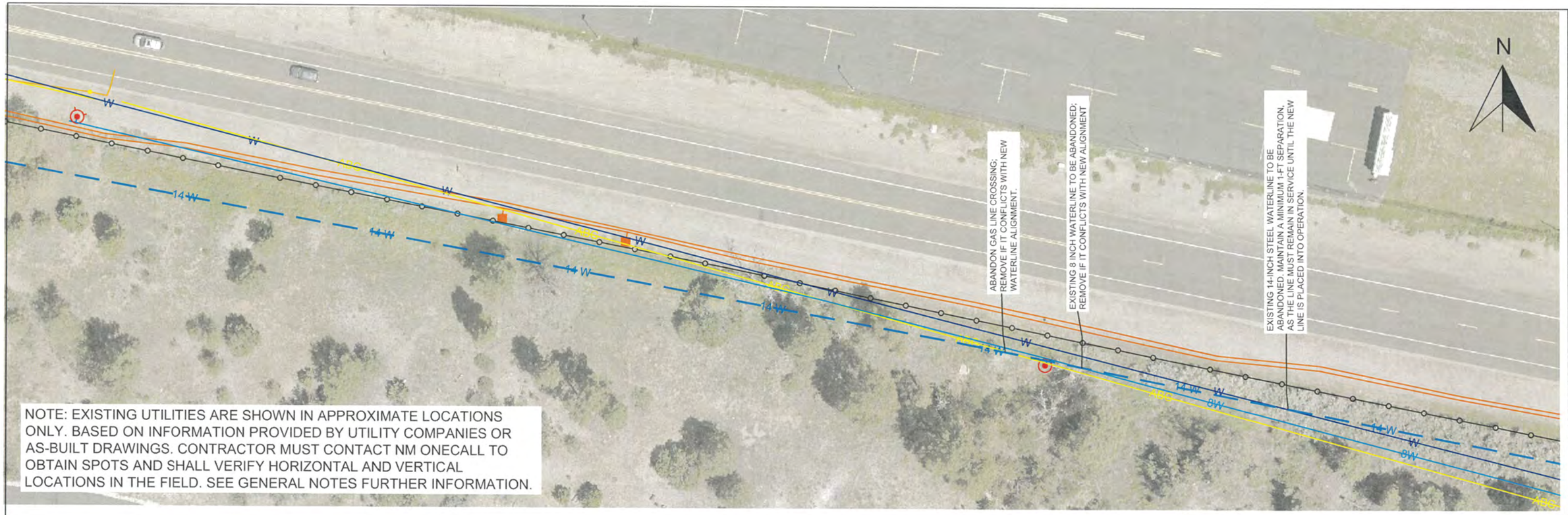
NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 7+00 TO STA 14+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C2

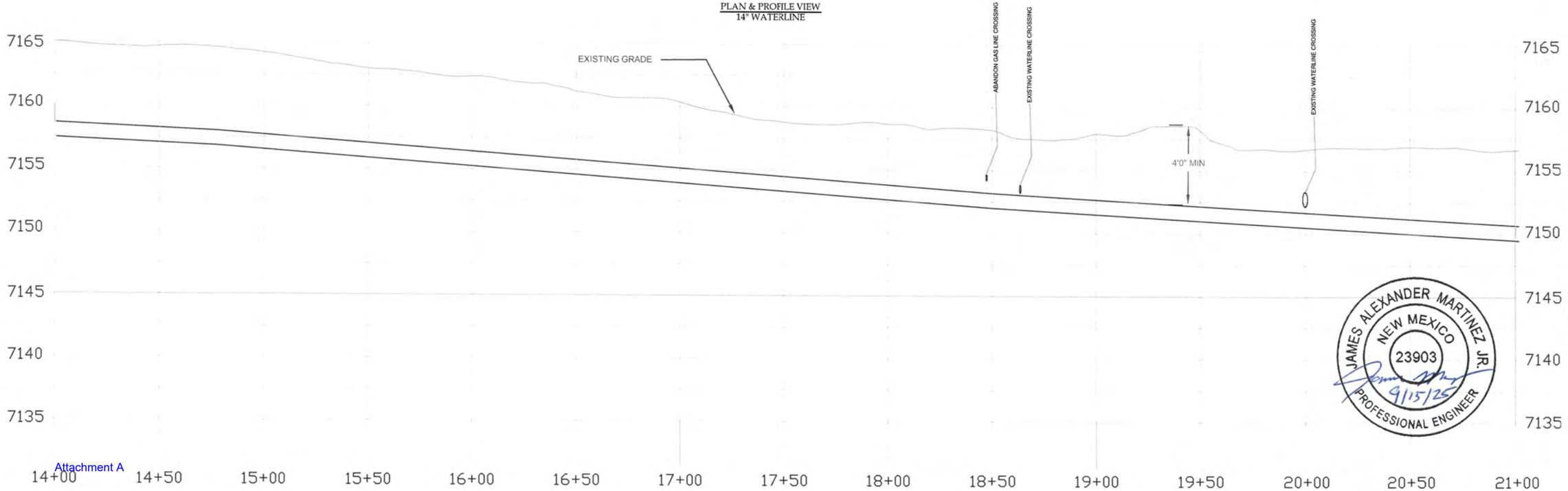


NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

0' 50' 100'

GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE



JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
9/15/25
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

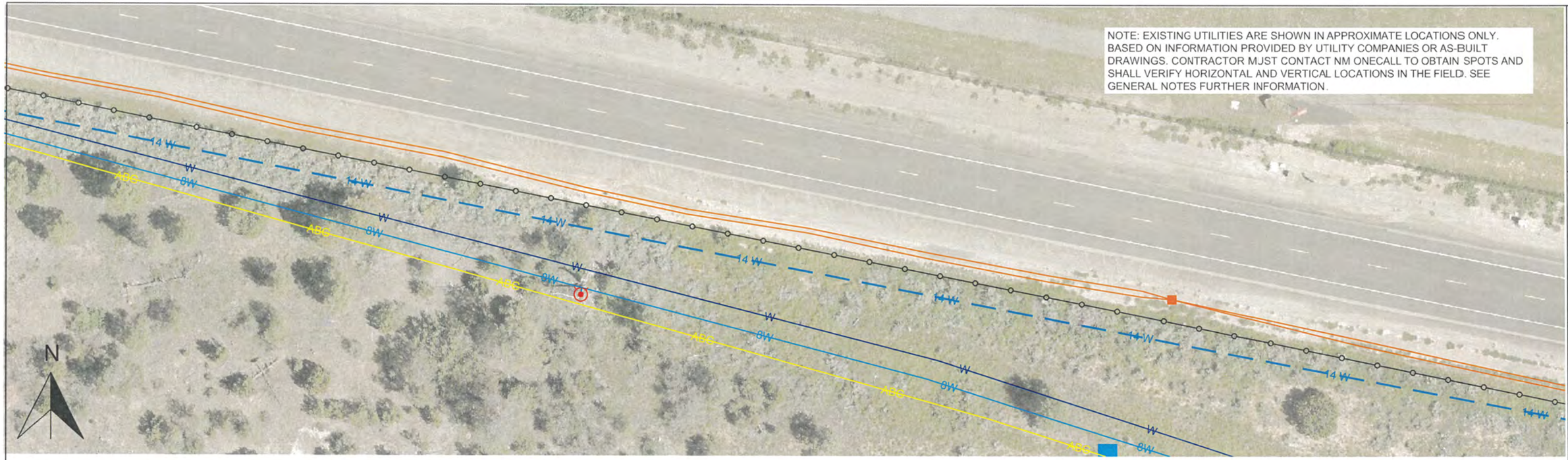
EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 14+00 TO STA 21+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C3

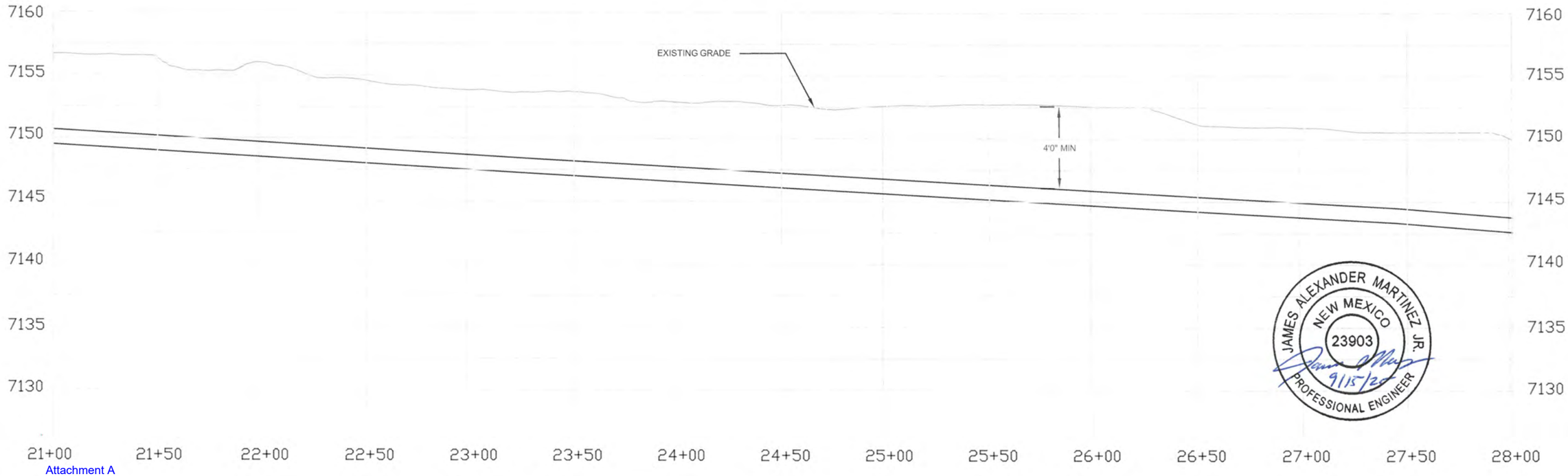
NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MJST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.



0' 50' 100'

GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE



JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
9/15/20
PROFESSIONAL ENGINEER

Attachment A

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 21+00 TO STA 28+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C4

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

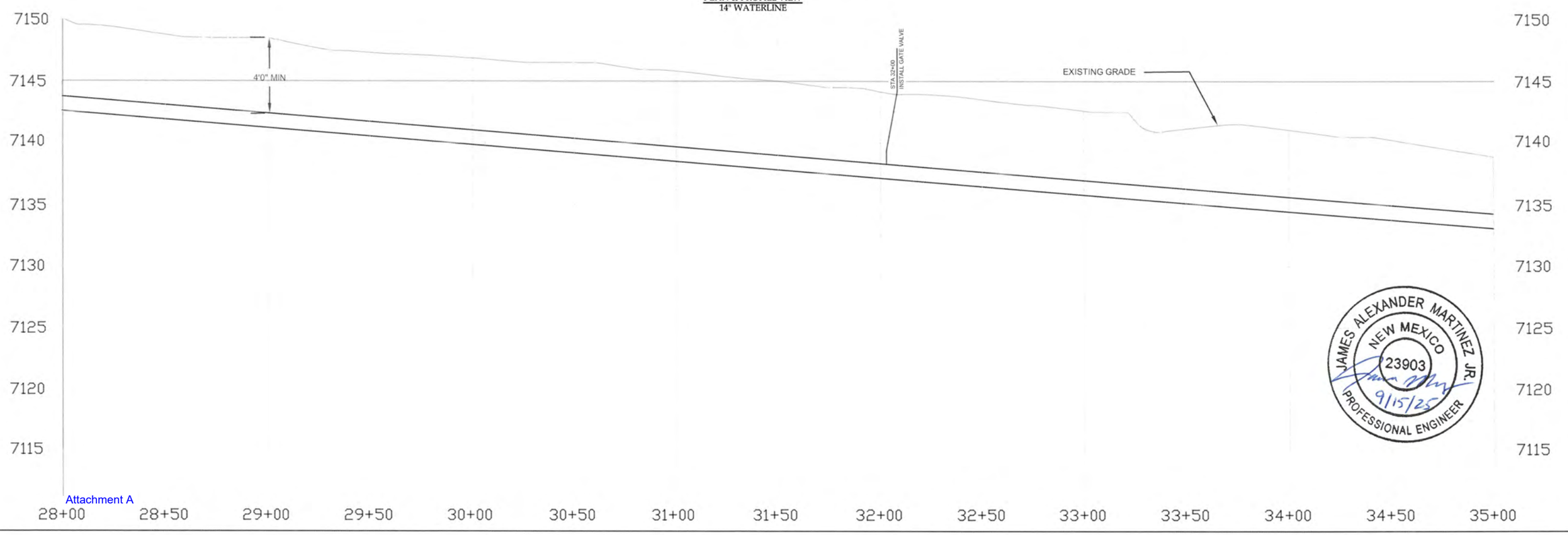
STA 32+00
INSTALL 14" GATE VALVE

14"W
8"W
W
ASC

N

0' 50' 100'
GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE



JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
9/15/25
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 28+00 TO STA 35+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C5

Attachment A

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

STA 38+73 INSTALL NEW FIRE HYDRANT WITH A MINIMUM HORIZONTAL CLEARANCE OF 3 FT FROM FENCE LINE. SEE SHEET D1 FOR DETAIL

EXISTING 14-INCH STEEL WATERLINE TO BE ABANDONED. MAINTAIN A MINIMUM 1-FT SEPARATION. AS THE LINE MUST REMAIN IN SERVICE UNTIL THE NEW LINE IS PLACED INTO OPERATION.

14" W

W

8" W

ABC

N

0' 50' 100'

GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE

EXISTING GRADE

INSTALL NEW FIRE HYDRANT

EXISTING WATERLINE CROSSING

4'0" MIN

7140
7135
7130
7125
7120
7115
7110
7105

35+00 35+50 36+00 36+50 37+00 37+50 38+00 38+50 39+00 39+50 40+00 40+50 41+00 41+50 42+00

NO.	REVISION DESCRIPTION

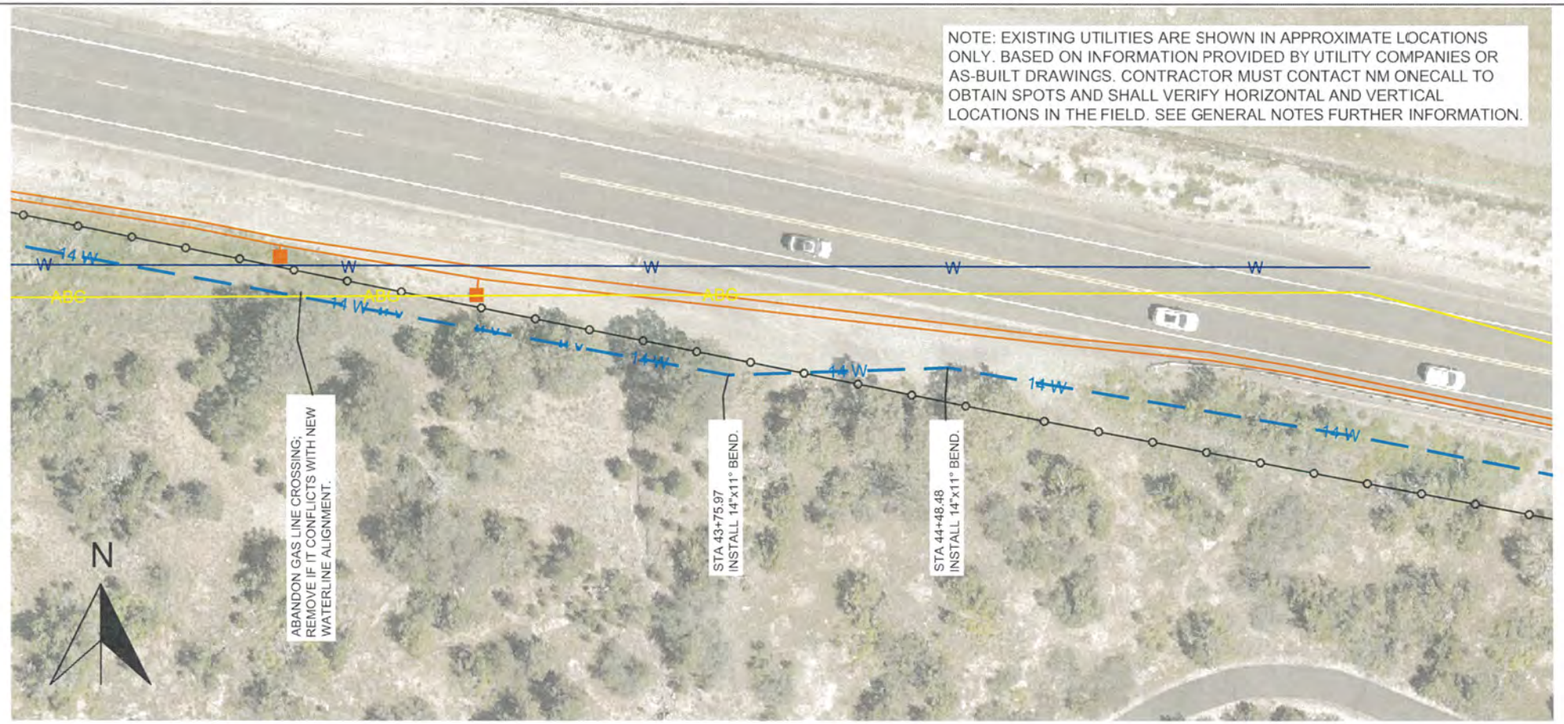
EAST RD 14" WATER TRANSMISSION LINE

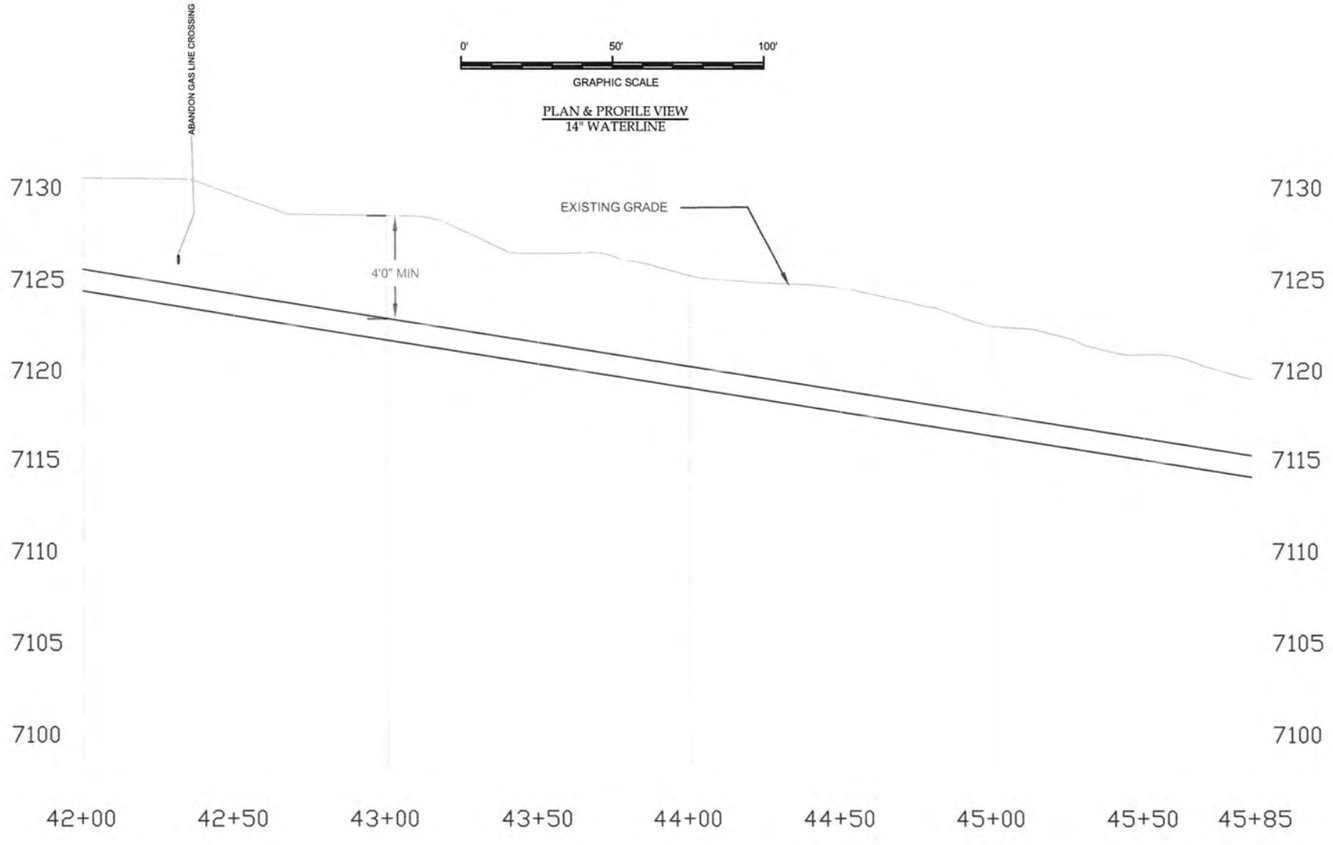
PLAN & PROFILE
STA 35+00 TO STA 42+00

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
1/26/22
PROFESSIONAL ENGINEER

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C6





JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
9/15/25
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 42+00 TO STA 45+85

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C7

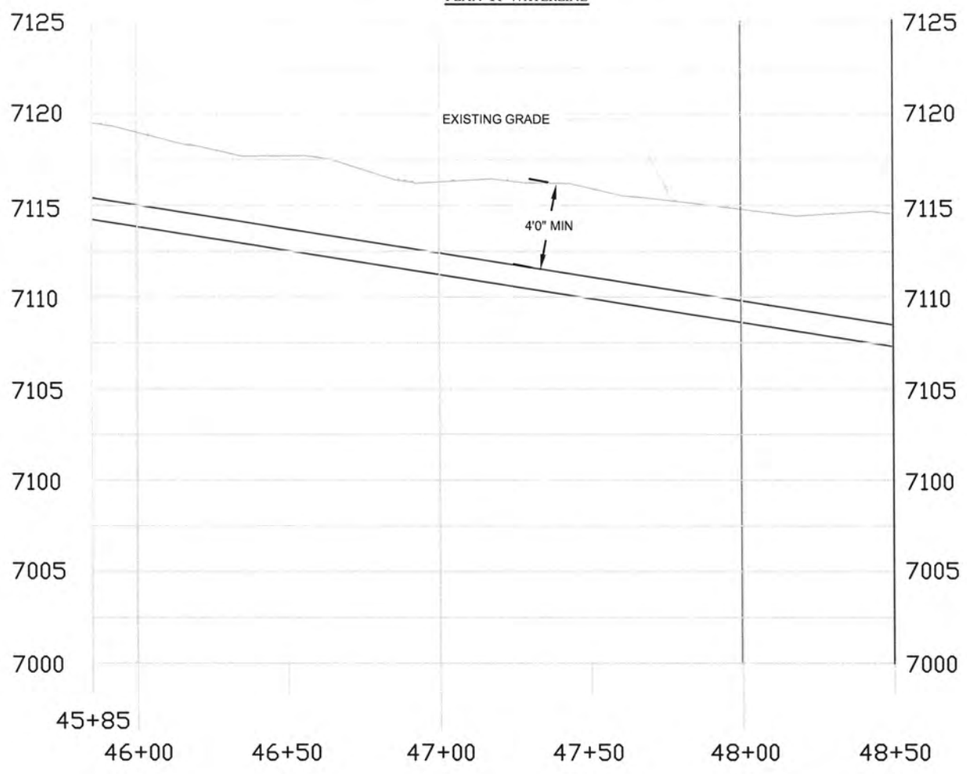
Attachment A

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

0' 50' 100'

GRAPHIC SCALE

PLAN 14" WATERLINE



JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
2/12/21
PROFESSIONAL ENGINEER

Attachment A

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 45+85 TO STA 48+50

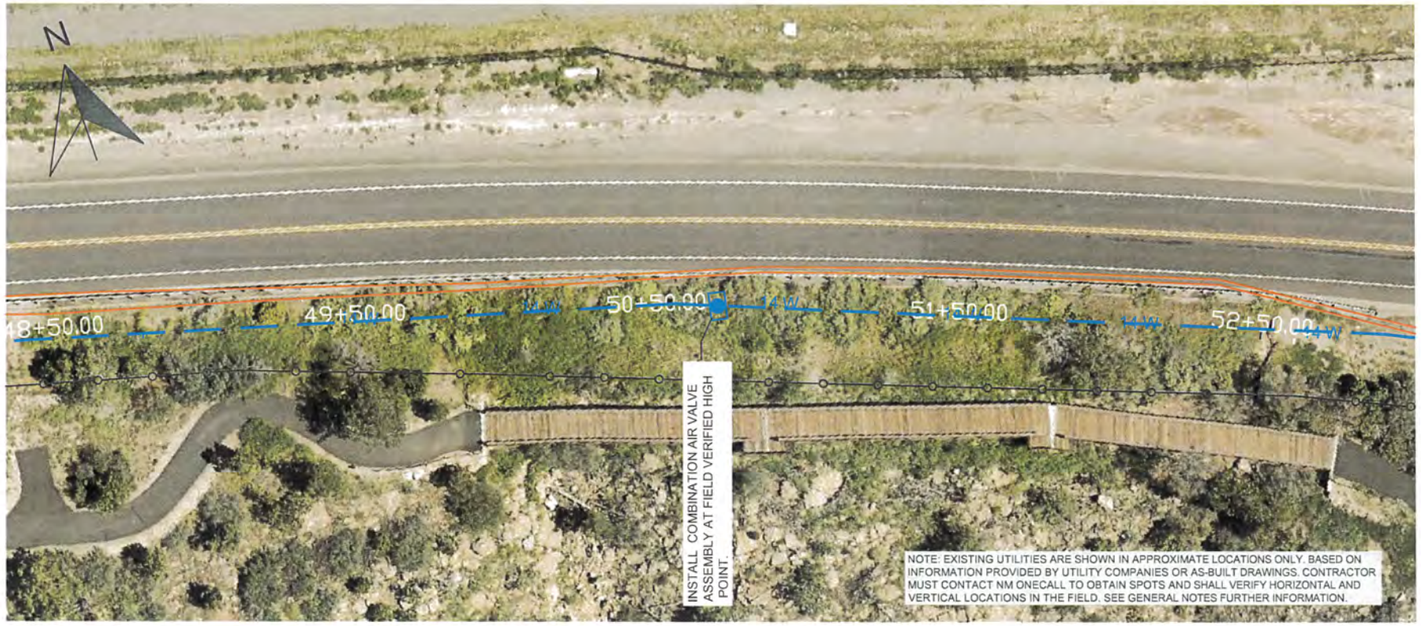
INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C8

NOTES:

SEE TYPICAL SECTION SHEET D2 FOR STA. 48+50 TO STA. 52+61. THE TYPICAL SECTION GOVERNS PIPELINE CONSTRUCTION WITHIN THIS SEGMENT. IN ADDITION, THE ELEVATION TYPICAL SECTION BELOW BETWEEN THESE STATIONS ILLUSTRATES THE CHANGE IN GRADE ACROSS THE SEGMENT, PROVIDING AN IDEA OF VARIATION ALONG THE ALIGNMENT. PIPELINE ELEVATION WITHIN THIS SEGMENT SHALL BE FIELD-ADJUSTED BASED ON THE CONSTRUCTED EMBANKMENT AND THE NEW 10' WIDE ACCESS ROAD GRADES TO MAINTAIN A MINIMUM OF 48" OF COVER. FINAL PIPE ELEVATION SHALL TRANSITION SMOOTHLY TO MATCH THE PROFILE ELEVATIONS AT EACH END.

INSTALL A COMBINATION AIR RELEASE VALVE AT THE TRUE HIGH POINT OF THE PIPELINE. THE EXACT LOCATION SHALL BE DETERMINED IN THE FIELD ONCE ACTUAL LINE GRADES AND ELEVATIONS ARE VERIFIED DURING CONSTRUCTION. COORDINATE FINAL PLACEMENT WITH THE PROJECT MANAGER PRIOR TO INSTALLATION.

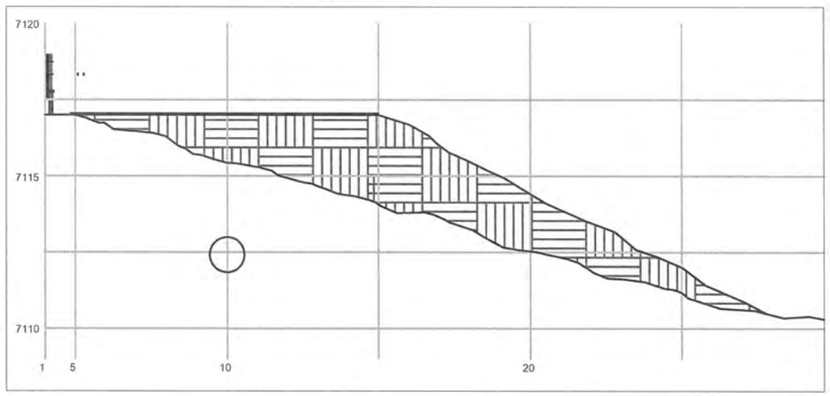


0' 50' 100'

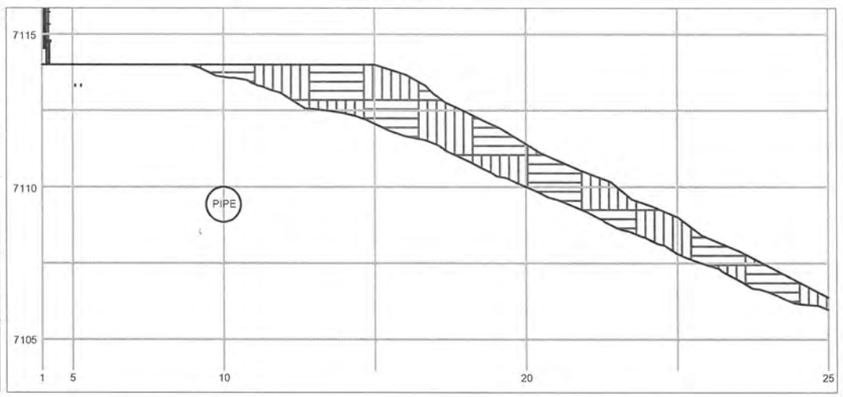
GRAPHIC SCALE

PLAN 14" WATERLINE

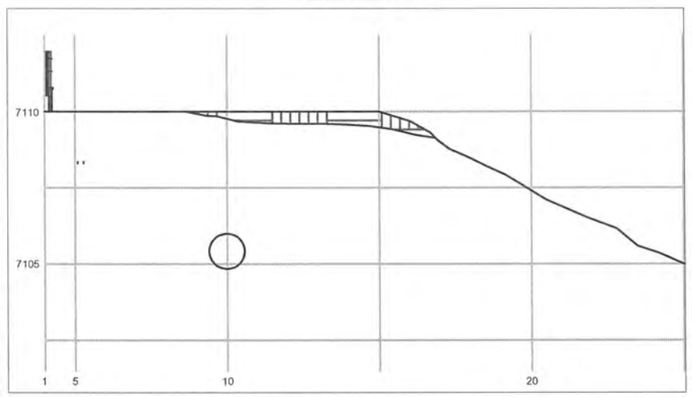
STA 48+50



STA 50+00

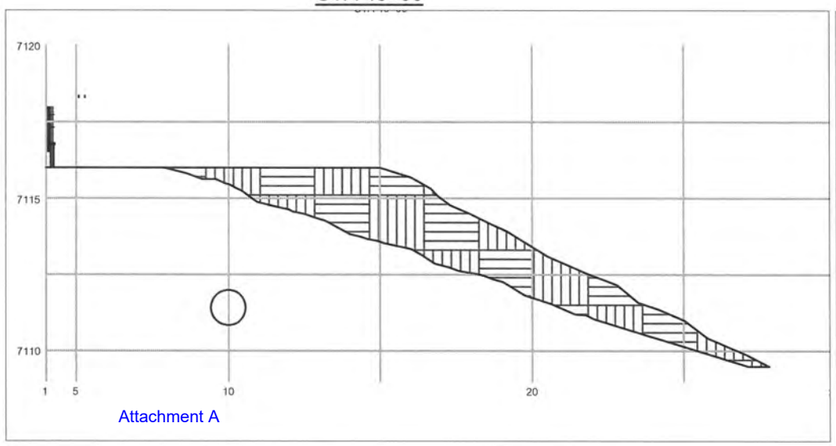


STA 52+00

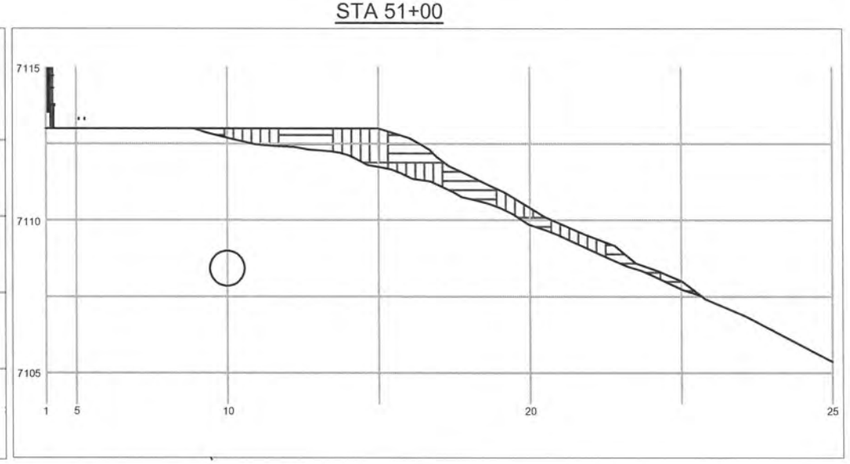


TYPICAL SECTION SCALE: 1:5

STA 49+00



STA 51+00



NO.	REVISION DESCRIPTION

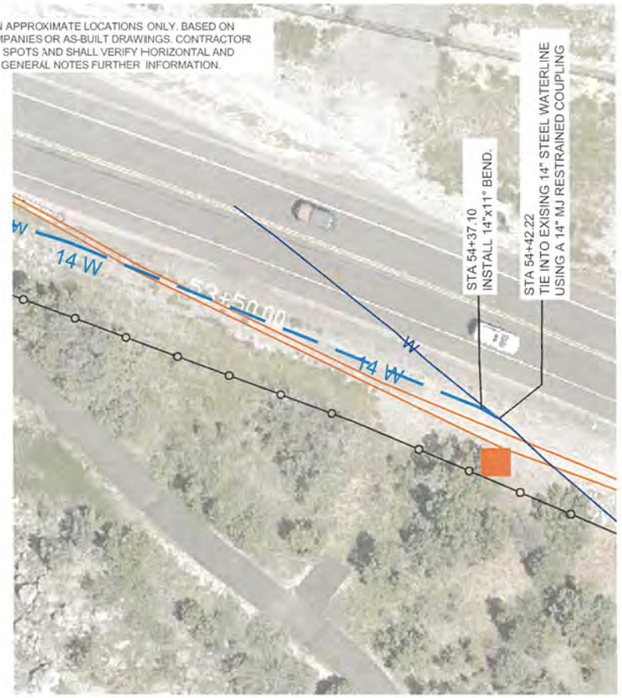
EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 48+50 TO STA 52+61

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C9

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

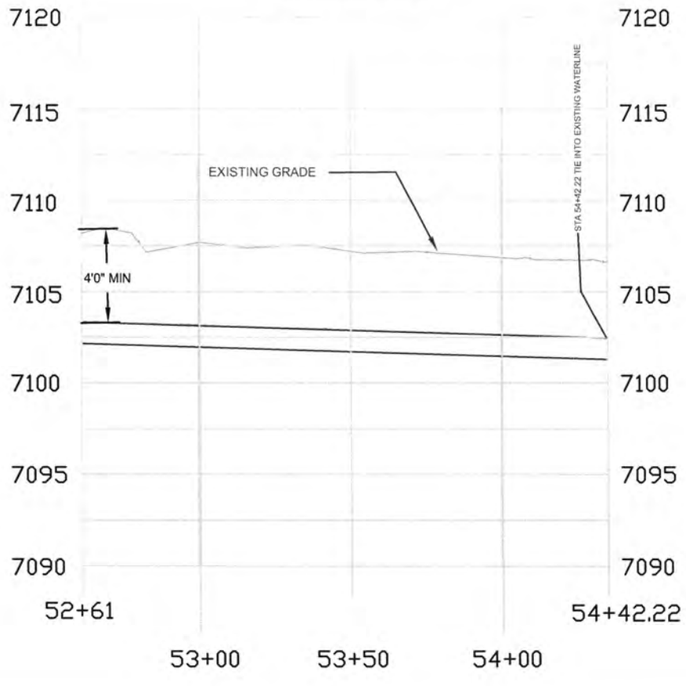


N

0' 50' 100'

GRAPHIC SCALE

PLAN 14" WATERLINE



NOTE: USE ALIGNMENT BETWEEN STA 52+61 TO STA 54+42.22 ONLY IF BID ALTERNATE IS NOT AWARDED. IF BID ALTERNATE IS AWARDED CONTRACTOR SHALL REFERENCE SHEET C11 AND SHEET C12 FOR ALIGNMENT DETAILS.

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
2/10/26
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

PLAN & PROFILE
STA 52+61 TO STA 54+42.22

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C10

Attachment A

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

NOTE: SHEET C11 AND SHEET C12 TO BE REFERENCED FOR ALIGNMENT ONLY IF BID ALTERNATE IS AWARDED. IF NOT AWARDED CONTRACTOR SHALL REFERENCE SHEET C9.

N

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+0

ABS 14"W W+50.00

STA 52461 BASE BID STATIONING ENDS
STA 0H00 BID ALTERNATE STATIONING BEGINS

0' 50' 100'
GRAPHIC SCALE

PLAN & PROFILE VIEW
14" WATERLINE

EXISTING GRADE

4'0" MIN

7110 7105 7100 7095 7090 7085 7080

0+00 0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00 4+50 5+00 5+50 6+00 6+50 7+00

Attachment A

JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
2/13/24
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

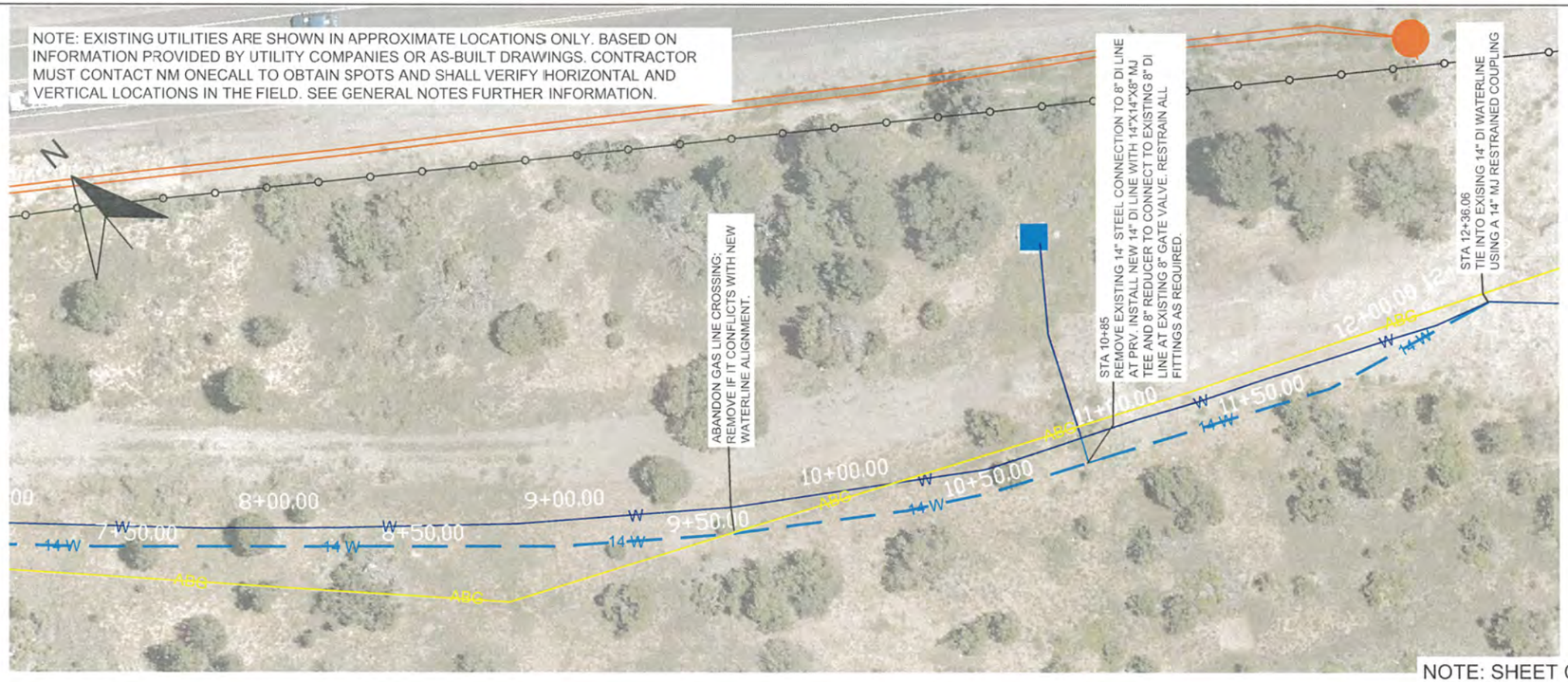
EAST RD 14" WATER TRANSMISSION LINE

BID ALTERNATE
PLAN & PROFILE
STA 0+00 TO STA 7+00

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C11

NOTE: EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY. BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES OR AS-BUILT DRAWINGS. CONTRACTOR MUST CONTACT NM ONECALL TO OBTAIN SPOTS AND SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD. SEE GENERAL NOTES FURTHER INFORMATION.

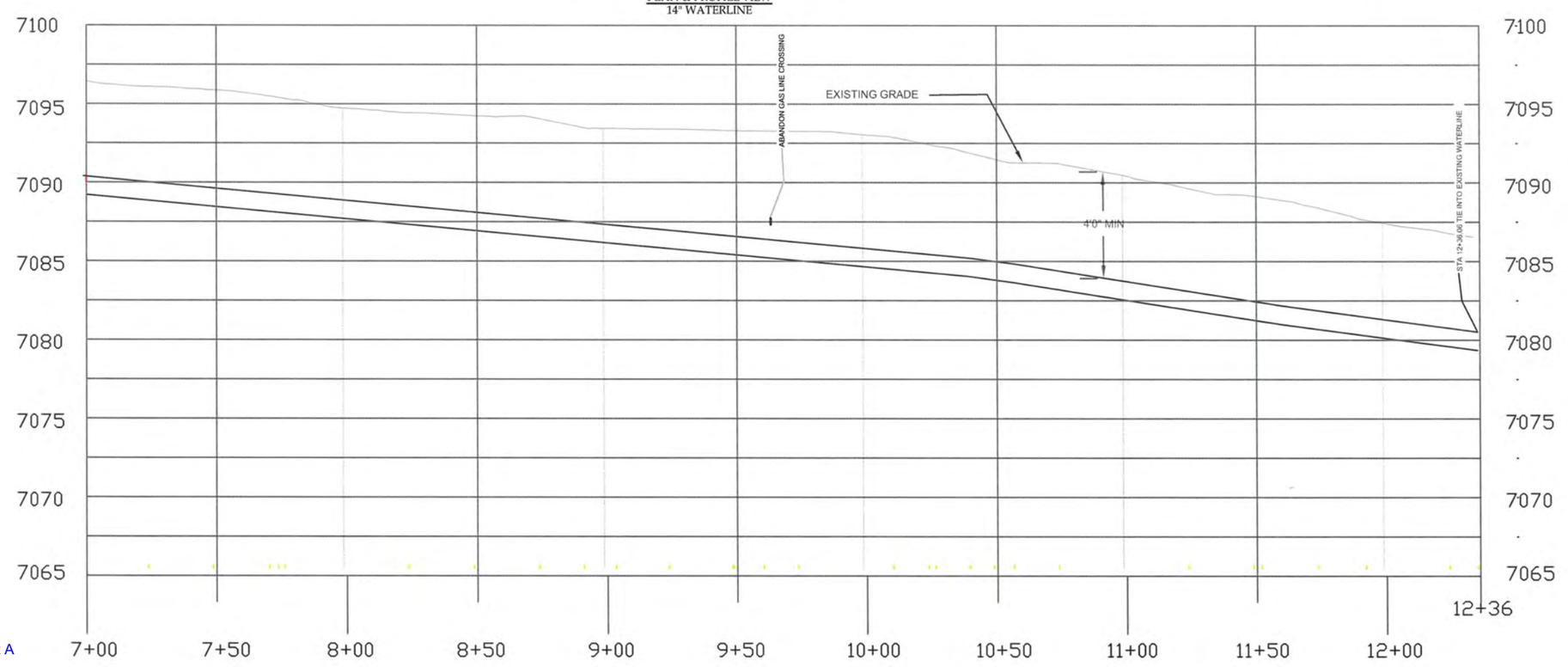


0' 50' 100'

GRAPHIC SCALE

NOTE: SHEET C11 AND SHEET C12 TO BE REFERENCED FOR ALIGNMENT ONLY IF BID ALTERNATE IS AWARDED. IF NOT AWARDED CONTRACTOR SHALL REFERENCE SHEET C9.

PLAN & PROFILE VIEW
14" WATERLINE



JAMES ALEXANDER MARTINEZ JR.
NEW MEXICO
23903
2/12/24
PROFESSIONAL ENGINEER

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

BID ALTERNATE
PLAN & PROFILE
STA 7+00 TO STA 12+36

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
C12

LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – WATER

JOINT RESTRAINT FOR POLYETHYLENE WRAPPED DUCTILE IRON AND C-900 PVC

SECTION 6000 6014

DATE: APRIL 2018 | APPROVED BY: | REVISION: | NO.:

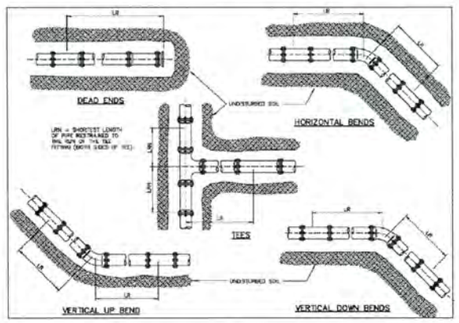
PVC Mechanical Joint Restraint Table

PIPE SIZE	BENDS				TEES			VERTICAL OFFSETS				DEAD ENDS & VALVES
								45		22 1/2		
	11 1/4	22 1/2	45	90	LRR = 5	LRR = 10	LRR = 20	DOWN	UP	DOWN	UP	
4"	2	4	7	16	15	1	1	16	4	8	2	39
6"	2	5	10	25	32	7	1	23	5	11	3	55
8"	3	7	14	33	48	24	1	30	7	15	3	73
10"	4	9	18	39	61	37	1	36	8	17	4	88
12"	5	9	19	46	76	52	5	43	10	21	5	104

Ductile Iron/Poly Wrap Mechanical Joint Restraint Table

PIPE SIZE	BENDS				TEES			VERTICAL OFFSETS				DEAD ENDS & VALVES
								45		22 1/2		
	11 1/4	22 1/2	45	90	LRR= 5	LRR = 10	LRR = 18	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
4"	2	4	8	21	23	1	1	24	4	12	2	59
6"	3	6	12	29	47	10	1	34	6	17	3	83
8"	4	8	16	38	74	37	1	45	8	22	4	109
10"	5	9	19	46	94	57	1	54	10	26	5	131
12"	6	11	22	54	118	80	20	64	12	31	6	155
14"	8	12	25	61	139	101	41	73	14	35	7	177
16"	7	14	29	69	162	124	63	83	15	40	7	200
18"	7	15	32	78	183	145	84	92	17	44	8	222

1. Restrained lengths provided are in feet.
2. Lr - the minimum attached length of solid pipe without joints, fittings, etc. to extend in each direction along the run of the line.
3. Restrained lengths computed for pipe with 4' of cover from top of pipe.
4. Maximum test pressure of 150 psi.
5. All pipe joints and fittings within the restrained length specified in the table shall be restrained.



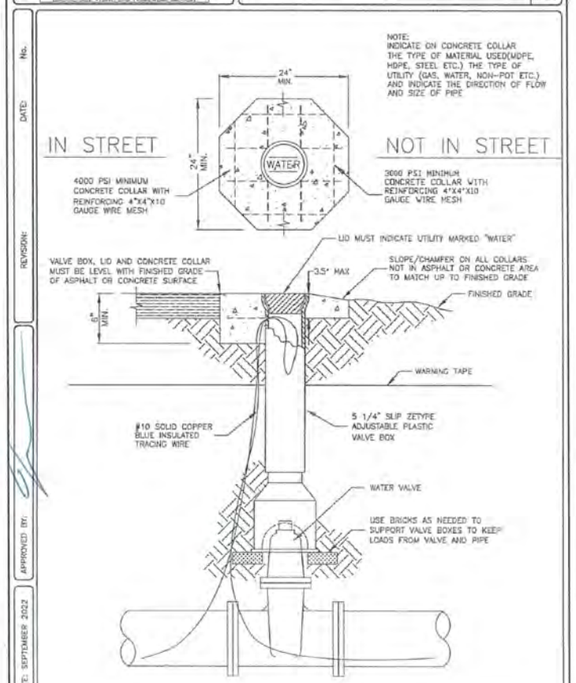
LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – WATER

WATER VALVE BOX

SECTION 6000 6013

DATE: SEPTEMBER 2022 | APPROVED BY: | REVISION: | No.:



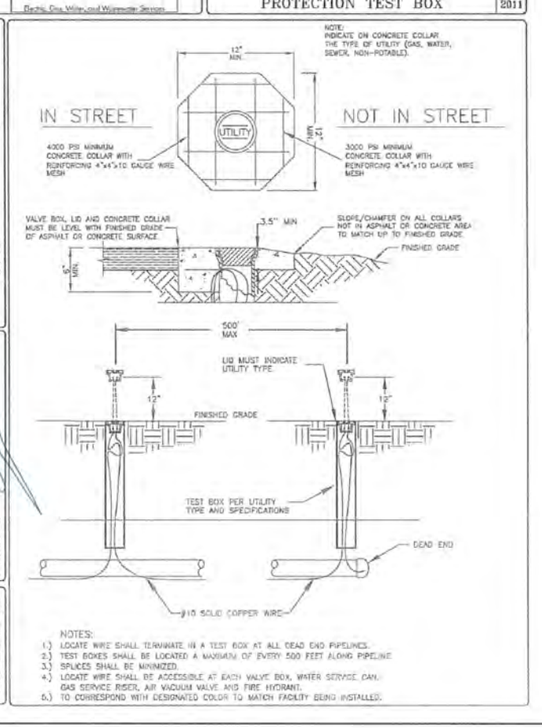
LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – GENERAL

LOCATE WIRE OR CATHODIC PROTECTION TEST BOX

SECTION 2000 2011

DATE: SEPTEMBER 2022 | APPROVED BY: | REVISION: | No.:



JAMES ALEXANDER MARTINEZ JR. NEW MEXICO 23903 PROFESSIONAL ENGINEER

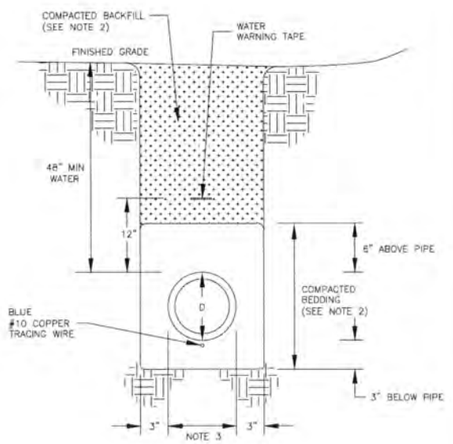
LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – WATER

WATER MAIN TRENCH DETAIL

SECTION 6000 6009

DATE: FEBRUARY 2022 | APPROVED BY: | REVISION: | No.:



NOTES:
1.) D IS THE OUTSIDE PIPE DIAMETER IN INCHES.
2.) SEE COMPACTION SPECIFICATIONS (SECTION 202) FOR ALL REQUIREMENTS.
3.) TRENCH WIDTH SHALL BE DISTANCE FROM OUTSIDE FACE OF OUTER MOST PIPE PLUS 6 INCHES.

Attachment A

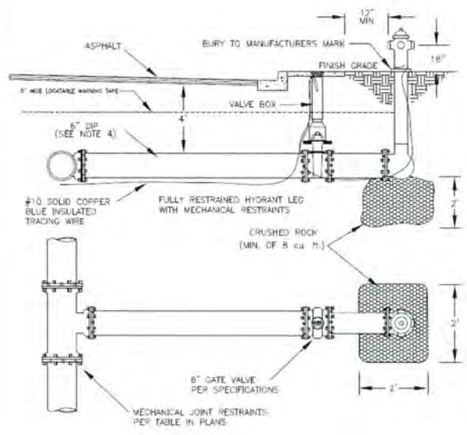
LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – WATER

FIRE HYDRANT DETAIL

SECTION 6000 6011

DATE: APRIL 2018 | APPROVED BY: | REVISION: | No.:



NOTES:
1.) THE CENTER OF THE 4" PUMPER HOSE CONNECTION SHALL BE A MINIMUM OF 18" ABOVE ALL OBSTRUCTIONS, OR AT THE MANUFACTURERS BURY / DEPTH MARK ON BARREL OF THE HYDRANT.
2.) ALL FITTINGS AND JOINTS ON HYDRANT LEG SHALL BE MECHANICALLY RESTRAINED.
3.) FIRE HYDRANT BY MULLER, KENNEDY OR AMERICAN PER LOS ALAMOS COUNTY UTILITIES CONSTRUCTION STANDARDS SPECIFICATION SECTION 601 WATER SYSTEMS.
4.) HYDRANT LEG PIPE MATERIAL MUST BE DIP.
5.) ALL UNDERGROUND FLANGED FITTING FASTENERS MUST BE STAINLESS STEEL TORQUE RATED MECHANICAL JOINT FITTING FASTENERS MAY BE TYPICAL CARBON STEEL.

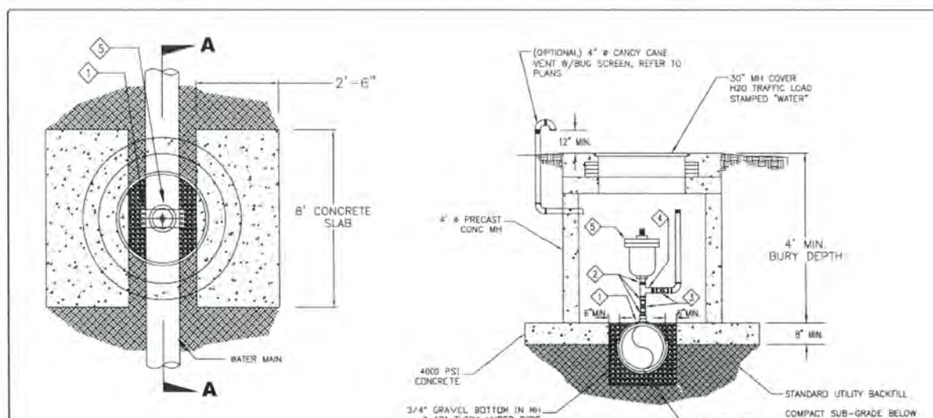
LOS ALAMOS Department of Public Utilities — Electric, Gas, Water, and Wastewater Services

UTILITY CONSTRUCTION STANDARDS – WATER

1" & 2" POTABLE WATER AIR RELEASE & VACUUM VALVE

SECTION 6000 6012

DATE: APRIL 2018 | APPROVED BY: | REVISION: DATE: FEBRUARY 27, 2025 DATE: 3/4/2025 No. 3



NOTES:
1. INSTALL 1" ARV ON 8" TO 12" POTABLE WATER LINES.
2. INSTALL 2" ARV ON 14" AND LARGER POTABLE WATER LINES.
3. ARV, SADDLE, BRASS FITTINGS AND VALVE PER LOS ALAMOS COUNTY UTILITIES CONSTRUCTION STANDARDS SPECIFICATION 601 POTABLE WATER SYSTEMS.
4. MANHOLE PER LOS ALAMOS COUNTY UTILITIES CONSTRUCTION STANDARDS SPECIFICATION 502 STRUCTURES.

KEYED NOTES:
1. SADDLE (FIP)
2. BRASS NIPPLE (MIP)
3. BALL VALVE (FIP)
4. BRASS TEE (FIP)
5. COMBINATION AIR RELEASE/VACUUM (FIP)

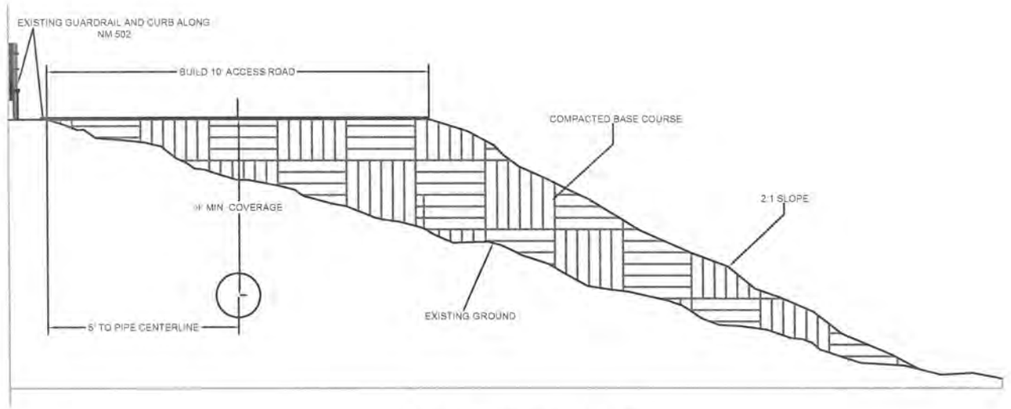
NO. | REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

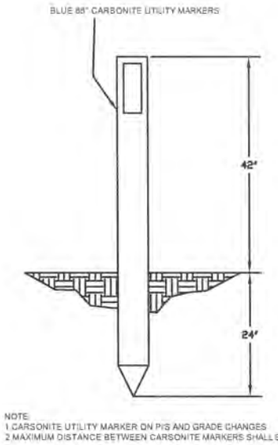
DETAIL SHEET

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET D1



COMPACTED BASE COARSE FILL
TYPICAL DETAIL



NOTE:
1.CARSONITE UTILITY MARKER ON P/S AND GRADE CHANGES
2.MAXIMUM DISTANCE BETWEEN CARSONITE MARKERS SHALL BE

CARSONITE MARKER DETAIL

Attachment A

NO.	REVISION DESCRIPTION

EAST RD 14" WATER TRANSMISSION LINE

DETAIL SHEET

INCORPORATED COUNTY OF LOS ALAMOS
DEPARTMENT OF PUBLIC UTILITIES
1000 CENTRAL AVE. SUITE 130
LOS ALAMOS, NEW MEXICO 87544
(505) 662-8150 FAX (505)662-8109

SHEET
D2

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$2,500,000

WATER PROJECT FUND
LOAN/GRANT AGREEMENT

dated

January 23, 2026

by and between the

NEW MEXICO FINANCE AUTHORITY
as Lender/Grantor,

and

INCORPORATED COUNTY OF LOS ALAMOS, NEW MEXICO,
as Borrower/Grantee.

TOWNSITE 14-INCH WATERLINE REPLACEMENT

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WATER PROJECT FUND
LOAN/GRANT AGREEMENT

THIS LOAN/GRANT AGREEMENT (the "Agreement" or "Loan/Grant Agreement") dated January 23, 2026, is entered into by and between the **NEW MEXICO FINANCE AUTHORITY** (the "NMFA" or "Lender/Grantor"), and the **INCORPORATED COUNTY OF LOS ALAMOS, NEW MEXICO** (the "Borrower/Grantee").

W I T N E S S E T H:

WHEREAS, the NMFA is a public body politic and corporate, separate and apart from the State, constituting a governmental instrumentality, duly organized and created under and pursuant to the laws of the State, particularly NMSA 1978, §§ 6-21-1 through 6-21-31, as amended (the "NMFA Act"); and

WHEREAS, the NMFA Act provides that the NMFA may make loans and grants from the Water Project Fund to qualifying entities for Qualifying Water Projects; and

WHEREAS, pursuant to the Act, the Water Trust Board has established the Board Rules governing the terms and conditions of loans and grants made from the Water Project Fund, as set out in Review and Eligibility of Proposed Water Projects, New Mexico Water Trust Board, 19.25.10 NMAC, pursuant to the Board Rules for Qualifying Water Projects; and

WHEREAS, pursuant to the Board Rules, except as provided in the Policies, a qualifying entity is expected to receive some portion of its funding as a loan in order to maximize the potential for the return of funds to the Water Project Fund, thereby increasing the limited financial resources expected to be available in the Water Project Fund; and

WHEREAS, the Borrower/Grantee is a legally and regularly created, established, duly organized and existing county under and pursuant to the laws of the State and more specifically, Article X, Section 5, of the New Mexico Constitution, is a qualifying entity under the Water Project Finance Act and is qualified for financial assistance as determined by the NMFA and approved by the Water Trust Board pursuant to the Board Rules, the Policies and the Act; and

WHEREAS, the Borrower/Grantee has determined that it is in the best interests of the Borrower/Grantee and the constituent public it serves that the Borrower/Grantee enter into this Agreement with the Lender/Grantor to borrow $250,000 from the Lender/Grantor and to accept a grant in the amount of $2,250,000 from the Lender/Grantor to finance the costs of the Project, this Project being more particularly described in the Term Sheet; and

WHEREAS, the Borrower/Grantee submitted an Application dated September 10, 2024 and December 20, 2024 for the Project; and

WHEREAS, pursuant to the Board Rules the Water Trust Board recommended the Project for funding as a Qualifying Water Project to the Legislature; and

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WHEREAS, Chapter 35, Laws 2025, being House Bill 206 of the 2025 Regular New Mexico Legislative Session, authorized the funding of the Project from the Water Project Fund; and

WHEREAS, the Water Trust Board has recommended that the NMFA enter into and administer this Agreement in order to finance the Project; and

WHEREAS, the NMFA approved on May 22, 2025 that the Borrower/Grantee receive financial assistance in the form of the Loan/Grant; and

WHEREAS, the Borrower/Grantee is willing to pledge the Pledged Revenues to the payment of the Loan Payments and Administrative Fee, with a lien on the Pledged Revenues subordinate to all other liens thereon present and future, except that the lien on the Pledged Revenues of any future loans from the Lender/Grantor to the Borrower/Grantee pursuant to the Water Project Finance Act or the Colonias Infrastructure Act, secured by the Pledged Revenues shall be on a parity with this Agreement; and

WHEREAS, the plans and specifications for the Project have been approved by the NMFA (or by the New Mexico Environment Department or other appropriate agency or entity on behalf of the NMFA, pursuant to an agreement between such agency or entity and the NMFA), prior to the commencement of construction, and the plans and specifications for the Project incorporate available technologies and operational design for water use efficiency; and

WHEREAS, the execution and performance of this Agreement have been authorized, approved and directed by all necessary and appropriate action of the Water Trust Board and the NMFA, and their respective officers.

NOW, THEREFORE, for and in consideration of the premises and the mutual promises and covenants herein contained, the parties hereto agree:

ARTICLE I
DEFINITIONS

Capitalized terms defined in the foregoing recitals shall have the same meaning when used in this Agreement unless the context clearly requires otherwise. Capitalized terms not defined in the recitals and defined in this Article I shall have the same meaning when used in this Agreement including the foregoing recitals, unless the context clearly requires otherwise (such meanings to be equally applicable to both the singular and the plural forms of the terms defined).

"ACH Authorization" means the authorization for direct payment to the NMFA by ACH made by the Borrower/Grantee on the form required by the bank or other entity at which the account is held, from which the Pledged Revenues will be paid.

"Act" means the general laws of the State, particularly the Water Project Finance Act, NMSA 1978, §§ 72-4A-1 through 72-4A-11, and enactments of the Governing Body relating to this Agreement, including the Ordinance, all as amended and supplemented.

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"Additional Funding Amount" means the amount to be provided by the Borrower/Grantee which includes the total value of the Soft Match or Hard Match (each as defined in Section 4.2 of the Policies) which, in combination with the Loan/Grant Amount and other moneys available to the Borrower/Grantee, is sufficient to complete the Project and to provide matching funds required to complete the Project. The Additional Funding Amount is $500,000.

"Administrative Fee" or "Administrative Fee Component" means an amount equal to one-quarter of one percent (0.25%) per annum of the unpaid principal balance of the Loan Amount, taking into account both payments made by the Borrower/Grantee and hardship waivers of payments granted to the Borrower/Grantee pursuant to Section 5.1(a)(iii) of this Agreement.

"Agreement Term" means the term of this Agreement as provided under Article III of this Agreement.

"Application" means the New Mexico Water Trust Board Application dated September 10, 2024 and the New Mexico Water Trust Board Readiness Application dated December 20, 2024 of the Borrower/Grantee and pursuant to which the Borrower/Grantee requested funding for the Project.

"Authorized Officers" means, with respect to the Borrower/Grantee, any one or more of the Chair, Vice Chair, Utilities Manager, Deputy Utility Manager – Finance and Administration, Deputy Utility Manager – Engineering Division and County Clerk thereof; with respect to the NMFA, the Chairman, Vice-Chairman and Secretary of the Board of Directors and the Chief Executive Officer or any other officer or employee of the NMFA designated in writing by an Authorized Officer.

"Board Rules" means Review and Eligibility of Proposed Water Projects, New Mexico Water Trust Board, 19.25.10 NMAC.

"Closing Date" means the date of execution and delivery of this Agreement by the Borrower/Grantee and the NMFA.

"Colonias Infrastructure Act" means NMSA 1978, §§ 6-30-1 through 6-30-8, as amended.

"Conditions" means the conditions to be satisfied prior to the submission of a request for payment or the disbursement of the Loan/Grant Amount, or any portion thereof, from the Water Project Fund, or which otherwise apply to the performance of this Agreement, including those set forth in the Term Sheet.

"Department of Finance and Administration" or "DFA" means the department of finance, and administration of the State.

"Eligible Items" means eligible Project costs for which grants and loans may be made pursuant to NMSA 1978, § 72-4A-7(C), as amended, of the Act, the Board Rules and applicable Policies, and includes, without limitation, Eligible Legal Costs.

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"Eligible Legal Costs" means legal fees and costs for services rendered by legal counsel on behalf of the Borrower/Grantee for transaction of the Project, in an amount not exceeding ten (10) percent of the Loan/Grant Amount, but does not include adjudication services.

"Event of Default" means one or more events of default as defined in Section 10.1 of this Agreement.

"Final Debt Service Schedule" means the schedule of Loan Payments due on this Agreement following the Final Requisition, as determined on the basis of the Loan Amount.

"Final Requisition" means the final requisition of moneys to be submitted by the Borrower/Grantee, which shall be submitted by the Borrower/Grantee on or before the expiration of the Interim Period as provided in Section 5.3 of this Agreement.

"Fiscal Year" means the period commencing on July 1 of each calendar year and ending on the last day of June of the next succeeding calendar year, or any other twelve-month period which any appropriate authority of the Borrower/Grantee may hereafter establish for the Borrower/Grantee as its fiscal year.

"Force Majeure" means acts of God and natural disasters; strikes or labor disputes; war, civil strife or other violence; an order of any kind of the Government of the United States or of the State or civil or military authority or any court of competent jurisdiction; or any other act or condition that was beyond the reasonable control of, without fault or negligence of, or not reasonably foreseeable by the party claiming the Force Majeure event; except for (i) general economic conditions; or (ii) an inability of a party claiming the Force Majeure event to pay any debts when due.

"Generally Accepted Accounting Principles" means the officially established accounting principles applicable to the Borrower/Grantee, consisting of the statements, determinations and other official pronouncements of the Government Accounting Standards Board, Financial Accounting Standards Board, Federal Accounting Standards Board, or other principle-setting body acceptable to the Lender/Grantor, establishing accounting principles applicable to the Borrower/Grantee.

"Governing Body" means the duly organized County Council of the Borrower/Grantee, or any successor governing body of the Borrower/Grantee.

"Grant" or "Grant Amount" means the amount provided to the Borrower/Grantee as a grant pursuant to this Agreement for the purpose of funding the Project and shall not equal more than $2,250,000.

"Gross Revenues" means all income and revenues directly or indirectly derived by the Borrower/Grantee from the operation and use of the System, or any part of the System, for any particular Fiscal Year period to which the term is applicable, and includes, without limitation, all revenues received by the Borrower/Grantee, or any municipal corporation or agency succeeding to the rights of the Borrower/Grantee, from the System and from the sale and use of electric, gas, water and wastewater services or facilities, or any other service, commodity or facility or any combination thereof furnished by the System. In the event there is a conflicting description of

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Gross Revenues in any ordinance or resolution of the Borrower/Grantee, the language of such ordinance or resolution shall control.

Gross Revenues do not include:

(a) Any money received as (i) grants or gifts from the United States of America, the State or other sources or (ii) the proceeds of any charge or tax intended as a replacement therefor or other capital contributions from any source which are restricted as to use;

(b) Gross receipts taxes, other taxes and/or fees collected by the Borrower/Grantee and remitted to other governmental agencies; and

(c) Condemnation proceeds or the proceeds of any insurance policy, except any insurance proceeds derived in respect of loss of use or business interruption.

"Hardship Waiver" means a determination by the NMFA pursuant to Section 5.1(a)(iii) herein that the annual principal payment by the Borrower/Grantee should be forgiven because such payment would cause undue hardship for the Borrower/Grantee or the public it serves.

"Herein," "hereby," "hereunder," "hereof," "hereinabove" and "hereafter" refer to this entire Agreement and not solely to the particular section or paragraph of this Agreement in which such word is used.

"Interest Component" means the portion of each Loan Payment paid as interest on this Agreement, if any, as shown on Exhibit "B" hereto.

"Interim Debt Service Schedule" means the anticipated schedule of Loan Payments due on this Agreement following the Final Requisition, assuming disbursement of the entire Loan Amount within twenty-four (24) months of the Closing Date. The Interim Debt Service Schedule is attached hereto as Exhibit "B".

"Interim Period" means the period no greater than twenty-four (24) months, unless a longer period is approved by the NMFA as provided in Section 5.3 of this Agreement, beginning on the Closing Date, during which the NMFA will disburse moneys to the Borrower/Grantee to pay costs of the Project.

"Lender/Grantor" means the New Mexico Finance Authority.

"Loan" or "Loan Amount" means the amount provided to the Borrower/Grantee as a loan pursuant to this Agreement for the purpose of funding the Project and shall not equal more than $250,000.

"Loan/Grant" or "Loan/Grant Amount" means the combined amount partially provided to the Borrower/Grantee as the Grant Amount and partially borrowed by the Borrower/Grantee as the Loan Amount pursuant to this Agreement for the purpose of funding the Project and shall not equal more than $2,500,000.

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"Loan Payments" means, collectively, the Principal Component and the Interest Component, if any, to be paid by the Borrower/Grantee as payment of this Agreement as shown on Exhibit "B" hereto.

"Net System Revenues" means the Gross Revenues of the System minus Operation and Maintenance Expenses, indirect charges, amounts expended for capital replacements and repairs, required set asides for debt and replacement requirements, and any other payments from the gross revenues reasonably required for operation of the System.

"NMAC" means the New Mexico Administrative Code.

"NMSA 1978" means the New Mexico Statutes Annotated, 1978 Compilation, as amended and supplemented from time to time.

"Operation and Maintenance Expenses" means all reasonable and necessary current expenses of the System, for any particular Fiscal Year or period to which such term is applicable, paid or accrued, related to operating, maintaining and repairing the System, including, without limiting the generality of the foregoing:

(a) Legal and overhead expenses of the Borrower/Grantee directly related and reasonably allocable to the administration of the System;

(b) Insurance premiums for the System, including, without limitation, premiums for property insurance, public liability insurance and workmen's compensation insurance, whether or not self-funded;

(c) Premiums, expenses and other costs (other than required reimbursements of insurance proceeds and other amounts advanced to pay debt service requirements on System bonds) for credit facilities;

(d) Any expenses described in this definition other than expenses paid from the proceeds of System bonds;

(e) The costs of audits of the books and accounts of the System;

(f) Amounts required to be deposited in any rebate fund;

(g) Salaries, administrative expenses, labor costs, surety bonds and the cost of water, materials and supplies used for or in connection with the current operation of the System; and

(h) Any fees required to be paid under any operation, maintenance and/or management agreement with respect to the System.

Operation and Maintenance Expenses do not include any allowance for depreciation, payments in lieu of taxes, franchise fees payable or other transfers to the Borrower/Grantee's general fund, liabilities incurred by the Borrower/Grantee as a result of its negligence or other misconduct in the operation of the System, any charges for the accumulation of reserves for capital

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replacements or any Operation and Maintenance Expenses payable from moneys other than Gross Revenues. In the event there is a conflicting description of Operation and Maintenance Expenses in any ordinance or resolution of the Borrower/Grantee, the language of such ordinance or resolution shall control.

"Ordinance" means the Borrower/Grantee's Ordinance No. 751, adopted by the Governing Body on December 16, 2025, authorizing the acceptance of the Loan/Grant, approving this Agreement and pledging the Pledged Revenues to the payment of the Loan Payments and the Administrative Fee as shown on the Term Sheet.

"Parity Obligations" means this Agreement, and any other obligations, now outstanding or hereafter issued or incurred, payable from or secured by a lien or pledge of the Pledged Revenues and issued with a lien on the Pledged Revenues on a parity with this Agreement, as shown on the Term Sheet.

"Pledged Revenues" means the Net System Revenues of the System of the Borrower/Grantee pledged to the payment of the Loan Payments and the Administrative Fee pursuant to the Ordinance and this Agreement and described in the Term Sheet.

"Policies" means the Water Trust Board Water Project Fund Project Management Policies approved by the Water Trust Board and the NMFA, as amended and supplemented from time to time.

"Principal Component" means the portion of each Loan Payment paid as principal on this Agreement as shown on Exhibit "B" hereto.

"Project" means the project(s) described on the Term Sheet.

"Project Account" means the book account established by the NMFA in the name of the Borrower/Grantee for purposes of tracking expenditure of the Loan/Grant Amount by the Borrower/Grantee to pay for the costs of the Project, as shown in the Term Sheet, which account shall be kept separate and apart from all other accounts of the NMFA.

"Qualifying Water Project" means a water project for (i) storage, conveyance or delivery of water to end-users; (ii) implementation of the federal Endangered Species Act of 1973 collaborative programs; (iii) wastewater conveyance and treatment; (iv) restoration and management of watersheds; (v) flood prevention; or, (vi) water conservation or recycling, treatment or reuse of water as provided by law; and which has been approved by the state legislature pursuant to NMSA 1978, § 72-4A-9(B), as amended.

"Senior Obligations" means any outstanding obligations with a superior lien on the Pledged Revenues as defined in the Term Sheet, or any such obligations hereafter issued and meeting the requirements of the Agreement applicable to the issuance of Senior Obligations.

"State" means the State of New Mexico.

"State Board of Finance" means the State board of finance created pursuant to NMSA 1978, §§ 6-1-1 through 6-1-13, as amended.

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"System" means the joint electric, gas, water and wastewater utility system of the Borrower/Grantee, owned and operated by the Borrower/Grantee, and of which the Project, when completed, will form part. The System consists of all properties, real, personal, mixed or otherwise, now owned or hereafter acquired by the Borrower/Grantee through purchase, condemnation, construction or otherwise, including all expansions, extensions, enlargements and improvements of or to the joint utility system, and used in connection therewith or relating thereto, and any other related activity or enterprise of the Borrower/Grantee designated by the Governing Body as part of the joint utility system, whether situated within or without the limits of the Borrower/Grantee.

"Term Sheet" means Exhibit "A" attached to this Agreement.

"Useful Life" means the structural and material design life of the Project including planning and design features as required by the Act and the Board Rules.

"Water Project Fund" means the fund of the same name created pursuant to the Act and held and administered by the NMFA.

"Water Trust Board" or "WTB" means the water trust board created and established pursuant to the Act.

ARTICLE II
REPRESENTATIONS, COVENANTS AND WARRANTIES

Section 2.1 Representations, Covenants and Warranties of the Borrower/Grantee: The Borrower/Grantee represents, covenants and warrants for the benefit of the NMFA as follows:

(a) Binding Nature of Covenants; Enforceability. All representations, covenants, stipulations, obligations and agreements of the Borrower/Grantee contained in this Agreement shall be deemed to be the representations, covenants, stipulations, obligations and agreements of the Borrower/Grantee to the full extent authorized or permitted by law, and such representations, covenants, stipulations, obligations and agreements shall be binding upon the Borrower/Grantee and its successors and enforceable in accordance with their terms, and upon any board or body to which any powers or duties affecting such representations, covenants, stipulations, obligations and agreements shall be transferred by or in accordance with law. Except as otherwise provided in this Agreement, all rights, powers and privileges conferred and duties and liabilities imposed upon the Borrower/Grantee by the provisions of this Agreement and the Ordinance shall be exercised or performed by the Borrower/Grantee or by such members, officers, or officials of the Borrower/Grantee as may be required by law to exercise such powers and to perform such duties.

(b) Authorization of Agreement. The Borrower/Grantee is a qualifying entity as defined in the Act and the Board Rules. Pursuant to the laws of the State and in particular, the laws governing its creation and existence, as amended and supplemented from time to time, the Borrower/Grantee is authorized to enter into the transactions contemplated by this Agreement and to carry out its obligations hereunder. The Borrower/Grantee has duly authorized and approved its acceptance of the Loan/Grant and the execution and delivery of this Agreement and the other documents related to the transaction described in this Agreement, and this Agreement and the other

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documents related to the transaction to which the Borrower/Grantee is a party constitute legal, valid and binding special obligations of the Borrower/Grantee enforceable against the Borrower/Grantee in accordance with their respective terms.

(c) Nature and Use of Agreement Proceeds. The Borrower/Grantee acknowledges that the distribution of the Loan/Grant Amount shall be deemed to be a distribution to the Borrower/Grantee of proceeds representing the Loan Amount and the Grant Amount on a *pro rata* basis from the maximum Loan Amount and Grant Amount. The Borrower/Grantee shall apply the proceeds of the Loan/Grant solely to Eligible Items that will facilitate the completion of the Project, and shall not use the Loan/Grant proceeds for any other purpose. The Loan/Grant Amount, together with the Additional Funding Amount and other moneys reasonably expected to be available to the Borrower/Grantee, is sufficient to complete the Project in its entirety.

(d) Payment of Loan Amount. The Borrower/Grantee shall promptly pay the Loan Amount and Administrative Fee as provided in this Agreement, except when a Hardship Waiver is obtained pursuant to Section 5(a)(iii) of this Agreement. The Loan and Administrative Fee shall be payable solely from Pledged Revenues and nothing in this Agreement shall be construed as obligating the Borrower/Grantee to make the Loan Payments and to pay the Administrative Fee from any general or other fund of the Borrower/Grantee other than the Pledged Revenues; however, nothing in this Agreement shall be construed as prohibiting the Borrower/Grantee, in its sole and absolute discretion, from making such payments from any moneys which may be lawfully used, and which are legally available, for that purpose.

(e) Scope of Project; Completion of Project; Compliance with Laws. The Project is for storage, conveyance or delivery of water to end users. The Loan/Grant Amount will be used only for Eligible Items necessary to complete the Project. The Project is more particularly described in the Term Sheet. The Project will be completed with all practical dispatch and will be completed, operated and maintained so as to comply with all applicable federal, state and local laws, ordinances, resolutions and regulations and all current and future orders of all courts having jurisdiction over the Borrower/Grantee relating to the acquisition, operation, maintenance and completion of the Project and to the use of the Loan/Grant proceeds.

(f) Necessity of Project. The completion and operation of the Project under the terms and Conditions provided in this Agreement are necessary, convenient, and in furtherance of the governmental purposes of the Borrower/Grantee and are in the best interest of the Borrower/Grantee and the public it serves.

(g) Lien. The Loan Payments constitute an irrevocable lien on the distribution on the Pledged Revenues, the priority of which is consistent with that shown on the Term Sheet.

(h) Agreement Term Not Less than Useful Life. The Agreement Term is not less than the Useful Life of the Project as required by NMSA 1978, § 72-4A-7, as amended, of the Act.

(i) Amount of Agreement. The sum of the Grant Amount, the Loan Amount, and the Additional Funding Amount (and as set forth on the Term Sheet) does not exceed the cost of the Project.

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(j) No Breach or Default Caused by Agreement. Neither the execution and delivery of this Agreement and the other documents related to the transaction, nor the fulfillment of or compliance with the terms and conditions in this Agreement and the other documents related to the transaction, nor the consummation of the transactions contemplated herein and therein, conflicts with or results in a breach of terms, conditions or provisions of any restriction or any agreement or instrument to which the Borrower/Grantee is a party or by which the Borrower/Grantee is bound or any laws, ordinances, governmental rules or regulations or court or other governmental orders to which the Borrower/Grantee or its properties are subject, or constitutes a default under any of the foregoing.

(k) Irrevocable Enactments. While this Agreement remains outstanding and unpaid, any ordinance, resolution or other enactment of the Governing Body applying the Pledged Revenues for the payment of this Agreement, including the Ordinance shall be irrevocable until the Project has been fully acquired and completed, and the Loan Amount, including all principal and interest has been repaid, or provision made for payment thereof, and shall not be subject to amendment or modification in any manner which would result in any use of the proceeds of this Agreement in a manner not permitted or contemplated by the terms hereof. The Borrower/Grantee shall not impair the rights of the NMFA or of any holders of bonds or other obligations payable from the Pledged Revenues while this Agreement is outstanding.

(l) No Litigation. To the knowledge of the Borrower/Grantee, no litigation or proceeding is pending or threatened against the Borrower/Grantee or any other person affecting the right of the Borrower/Grantee to execute or deliver this Agreement and the other documents related to the transaction or to comply with its obligations under this Agreement and the other documents related to the transaction. Neither the execution and delivery of this Agreement and the other documents related to the transaction by the Borrower/Grantee nor compliance by the Borrower/Grantee with the obligations under this Agreement and the other documents related to the transaction, requires the approval of any regulatory body, or any other entity, which approval has not been obtained or which is not reasonably expected to be obtained.

(m) No Event of Default. No event has occurred and no condition exists which, with the giving of notice or the passage of time or upon the execution and delivery of this Agreement and the other documents related to the transaction, would constitute an Event of Default on the part of the Borrower/Grantee under this Agreement and the other documents related to the transaction.

(n) Pledged Revenues Not Budgeted. The portion of the Pledged Revenues necessary to pay the Loan Payments, as and when due, is not needed or budgeted to pay current or anticipated Operation and Maintenance Expenses or other expenses of the Borrower/Grantee.

(o) Expected Coverage Ratio. The Pledged Revenues are reasonably expected to equal or exceed—from the Fiscal Year in which the Closing Date occurs and, on an ongoing basis during each Fiscal Year of the Agreement Term—one hundred percent (100%) of the maximum annual principal and interest due on all outstanding obligations of the Borrower/Grantee payable from the Pledged Revenues.

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(p) Right to Inspect. The NMFA shall have the right to inspect at all reasonable times all records, accounts and data relating to the System and to inspect the System and all properties comprising the System, and the Borrower/Grantee shall supply such records, accounts, and data as are requested by the NMFA, within thirty (30) days of receipt of such request, written or oral.

(q) Financial Capability; Budgeting of Pledged Revenues. The Borrower/Grantee meets and will meet during the Agreement Term the requirements of financial capability set by the Water Trust Board and the NMFA. The Pledged Revenues will be sufficient to make the Loan Payments, as and when due. The Borrower/Grantee will adequately budget for the Loan Payments and other amounts payable by the Borrower/Grantee under this Agreement.

(r) Rate Covenant. The Borrower/Grantee covenants that it will at all times fix, charge and collect such rates and charges as shall be required in order that in each Fiscal Year in which the Loan is outstanding the Gross Revenues shall at least equal the Operation and Maintenance Expenses of the System for the Fiscal Year, plus one hundred percent (100%) of the maximum annual principal and interest payments due on all outstanding obligations payable from the Pledged Revenues.

(s) Borrower/Grantee's Existence. The Borrower/Grantee will maintain its legal identity and existence so long as this Agreement remains outstanding unless another political subdivision, State agency, or other entity by operation of law succeeds to the liabilities, rights and duties of the Borrower/Grantee under this Agreement without adversely affecting to any substantial degree the privileges and rights of the Lender/Grantor.

(t) Use of Project; Continuing Covenant. During the Agreement Term, the Borrower/Grantee will at all times use the Project for the benefit of the Borrower/Grantee and the public it serves. The Borrower/Grantee shall not sell, lease, mortgage, pledge, relocate or otherwise dispose of or transfer the Project or System, or any part of the Project or System so long as this Agreement is outstanding; provided, however, that if the Project is a joint project of the Borrower/Grantee and other qualifying entities (as defined by the Act), the Borrower/Grantee and the other qualifying entities may, with the express written approval of the NMFA and not otherwise, enter into an agreement allocating ownership and operational and maintenance responsibilities for the Project during the term of the Agreement. Any such agreement shall provide that the Lender/Grantor, or either of them, shall have the power to enforce the terms of this Agreement, without qualification, as to each and every qualifying entity (as defined by the Act) other than the Borrower/Grantee, owning or operating any portion of the Project during the term of the Agreement. The Borrower/Grantee will operate and maintain the Project, so that it will function properly over its Useful Life.

(u) Title and Rights of Way. As required by NMSA 1978, § 72-4A-7(A)(3) of the Act, as amended, and the Board Rules, the Borrower/Grantee shall provide written assurance signed by an attorney or provide a title insurance policy ensuring that the Borrower/Grantee has proper title to, easements, rights of way or use permits on the real property upon or through which the Project is being constructed, located, completed or extended, and if any portion of the Project will be designed, constructed, located, completed or extended on real property owned by a qualifying entity (as defined by the Act) other than the Borrower/Grantee, such other qualifying

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entity has title to such real property, and the Borrower/Grantee shall provide written assurance signed by an attorney or provide a title insurance policy ensuring that such other qualifying entity has proper title to such real property.

(v) Additional Funding Amount. Together with the Loan/Grant Amount and other amounts available to the Borrower/Grantee, the Additional Funding Amount is now available to the Borrower/Grantee, and in combination with the Loan/Grant Amount, will be sufficient to complete the Project. If any other additional expenses are incurred, the Borrower/Grantee shall be responsible for payment of such expenses.

(w) Audit Requirement. During the Agreement Term the Borrower/Grantee shall comply with the requirements of the State Audit Act, NMSA 1978, §§ 12-6-1 through 12-6-14, as amended. Upon request by the NMFA, the Borrower/Grantee shall provide the NMFA a copy of any review or audit, report of agreed upon procedures, or any other document prepared pursuant to or required by the State Audit Act.

(x) Reserved.

(y) Efficient Operation. The Borrower/Grantee will operate the System so long as this Agreement is outstanding, will maintain the System in efficient operating condition and make such improvements, extensions, enlargements, repairs and betterments to the System as may be necessary or advisable for its economical and efficient operation at all times and sufficient to supply reasonable demands for System services.

(z) Records. So long as the Agreement remains outstanding, proper books of record and account will be kept by the Borrower/Grantee in accordance with Generally Accepted Accounting Principles, separate from all other records and accounts, showing complete and correct entries of all transactions relating to the System. Such books shall include, but not necessarily be limited to, monthly records showing: (i) the number of customers for the System facilities; (ii) the revenues separately received from charges by classes of customers, including but not necessarily limited to classification by facilities; and (iii) a detailed statement of the expenses of the System.

(aa) Billing Procedure. Bills for water joint electric, gas, water and wastewater utility services or facilities, or any combination, furnished by or through the System, shall be rendered to customers on a regular basis each month following the month in which the service was rendered and shall be due as required by the applicable ordinance, resolution or regulation of the Borrower/Grantee. If permitted by law, if a bill is not paid within the period of time required by such ordinance, resolution or regulation, joint electric, gas, water and wastewater utility services shall be discontinued as required by such ordinance, resolution or regulation, and the rates and charges due shall be collected in a lawful manner, including, but not limited to, the cost of disconnection and reconnection. Electric, gas, water and wastewater utility services may be billed jointly with each other, provided that each such joint bill shall show separately the water and sanitary sewer utility charges.

(bb) Competent Management. The Borrower/Grantee shall employ or contract for experienced and competent personnel to manage the System.

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(cc) Readiness Requirements. The Borrower/Grantee has met the requirements of Executive Order 2013-006 and it has met or will meet prior to the first disbursement of any portion of the Loan/Grant Amount, the Conditions and the readiness to proceed requirements established for the Loan/Grant by the NMFA and the Water Trust Board.

(dd) Other Liens. Other than as provided in the Term Sheet, there are no liens or encumbrances of any nature, whatsoever, on or against the System or the revenues derived from the operation of the same.

(ee) NMFA Written Consent to Additional Loans. The Borrower/Grantee shall obtain the written consent of the NMFA prior to the issuance of additional Senior Obligations or Parity Obligations unless such Senior or Parity Obligation has been issued by the NMFA.

Section 2.2 Representations and Warranties of the NMFA. The NMFA represents as follows:

(a) Authorization of Agreement. The NMFA is a public body politic and corporate separate and apart from the State, constituting a governmental instrumentality, and has all necessary power and authority to enter into and perform and observe the covenants and agreements on its part contained in this Agreement and, by proper action, has duly authorized the execution and delivery of this Agreement.

(b) Legal, Valid and Binding Obligation. This Agreement constitutes a legal, valid and binding obligation of the NMFA enforceable in accordance with its terms.

ARTICLE III
AGREEMENT TERM

The Agreement Term shall commence on the Closing Date and shall terminate at the end of the Useful Life of the Project as required by NMSA 1978, § 72-4A-7, as amended, of the Act.

ARTICLE IV
LOAN/GRANT AGREEMENT CONDITIONS

Section 4.1 Conditions Precedent to Closing of Loan/Grant. Prior to the Closing Date, the following Conditions and readiness to proceed items shall be satisfied:

(a) The NMFA, on behalf of the Water Trust Board, shall have determined that the Borrower/Grantee has met the Conditions and readiness to proceed requirements established for the Loan/Grant by the NMFA and the Water Trust Board including any Conditions set out in the Term Sheet; and

(b) The Borrower/Grantee shall have provided written assurance addressed to the NMFA and signed by an attorney (or shall have provided a title insurance policy) that the Borrower/Grantee has proper title to or easements, rights of way, or permits on the real property upon or through which the Project is being constructed, located, completed or extended; and

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(c) If any portion of the Project will be constructed, located, completed or extended on real property owned by a qualifying entity (as defined by the Act) other than the Borrower/Grantee, the Borrower/Grantee shall have provided written assurance addressed to the NMFA and signed by an attorney (or shall have provided a title insurance policy) that such other qualifying entity has proper title to such real property; and

(d) Prior to the disbursement of any portion of the Loan/Grant Amount for purposes of construction of the Project, the plans and specifications funded with the proceeds of this Agreement will be approved by the NMFA as required by NMSA 1978, § 72-4A-7(B), as amended, or on behalf of the NMFA by the New Mexico Environment Department and the Office of the State of Engineer, and the Borrower/Grantee shall have provided written evidence of such approval to the NMFA; and

(e) Except as otherwise expressly provided in the Conditions, the Borrower/Grantee shall have certified to the Lender/Grantor that the Additional Funding Amount is available for the Project, and, in addition, shall have provided additional evidence reasonably acceptable to the Lender/Grantor of the availability of the Additional Funding Amount; and

(f) The Borrower/Grantee shall be in compliance with the provisions of this Agreement.

(g) Notwithstanding anything in this Agreement to the contrary, the NMFA shall not be obligated to execute the Agreement and may not make the Loan/Grant until the Borrower/Grantee has provided to the NMFA the documents listed on Exhibit "F" attached hereto, all of which must be in form and content acceptable to the NMFA.

Section 4.2 Determination of Eligibility Is Condition Precedent to Disbursement. No request for payment shall be made, nor shall any disbursement be made from the Water Project Fund, for any requisition of any portion of the Loan/Grant Amount, except upon a determination by the NMFA in its sole and absolute discretion that such disbursement is for payment of Eligible Items, and that the request for payment or disbursement does not exceed any limitation upon the amount payable for any Eligible Item pursuant to the Act, the Board Rules, and the Policies governing the Water Project Fund. The NMFA, as a condition precedent to submitting any request for payment to the State Board of Finance or making any requested disbursement from the Water Project Fund, may require submittal of such documentation as the NMFA deems necessary, in its sole and absolute discretion, for a determination whether any requested disbursement is for payment of Eligible Items and is fully consistent with the Act, the Board Rules, and the Policies, as applicable.

ARTICLE V
LOAN TO THE BORROWER/GRANTEE; GRANT TO THE BORROWER/GRANTEE; APPLICATION OF MONEYS

Section 5.1 Loan and Grant to the Borrower/Grantee.

(a) Loan to the Borrower/Grantee. The Lender/Grantor hereby lends to the Borrower/Grantee and the Borrower/Grantee hereby borrows from and agrees to pay to the order

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of the Lender/Grantor, without interest, an amount equal to the Loan Amount, with the principal amount of the Loan Amount being payable as provided by Article VI and Exhibit "B" of this Agreement.

(i) Subordinate Nature of Loan Amount and Administrative Fee Obligation. The obligation of the Borrower/Grantee to make the Loan Payments and to pay the Administrative Fee shall be subordinate to all other indebtedness secured by the Pledged Revenues existing on the Closing Date and, further, that may in the future be secured by the Pledged Revenues; except, however, that the obligation of the Borrower/Grantee to make the Loan Payments and to pay the Administrative Fee shall be on parity with any other obligation, present or future, of the Borrower/Grantee to repay a loan provided by the Lender/Grantor pursuant to the Act or the Colonias Infrastructure Act.

(ii) Administrative Fee. The Borrower/Grantee shall, on an annual basis beginning on the first payment date following the completion of the Project or exhaustion of all Loan/Grant Amounts as set out in Section 5.3 hereof, pay to the Lender/Grantor the Administrative Fee, taking into account both payments made by the Borrower/Grantee and Hardship Waivers granted to the Borrower/Grantee as provided by this Agreement. Any such Administrative Fee payment shall be due irrespective of whether or not a Hardship Waiver is granted to the Borrower/Grantee for the principal payment otherwise due on June 1 of the applicable year or any other year.

(iii) Hardship Waivers of Payment. Each year while any portion of the Loan Amount remains outstanding, no later than April 1 of each such year, the Borrower/Grantee may apply in writing to the NMFA for a determination of whether the annual principal payment on the Loan Amount otherwise due on the upcoming June 1 of such year should be forgiven because such payment would cause undue hardship for the Borrower/Grantee or the public it serves. The Borrower/Grantee shall submit such application to the NMFA for determination with sufficient documentation of the existence of such undue hardship as is reasonably required by the NMFA to make a determination, and the Borrower/Grantee shall promptly respond to additional requests for information from the NMFA. Such application for Hardship Waiver shall be executed by the Authorized Officers of the Borrower/Grantee. An "undue hardship" exists if the NMFA determines that the Borrower/Grantee is facing unforeseen events or an emergency that has caused the Borrower/Grantee to be unable to pay on a timely basis the annual principal payment on the Loan Amount. The NMFA may consult the Department of Finance and Administration in determining whether to grant the Hardship Waiver. The NMFA shall make a determination no later than May 15 of the applicable year, and the NMFA shall promptly communicate to the Borrower/Grantee in writing the results of its determination. Upon receipt of written notice of the determination, either the principal payment otherwise due on June 1 of such year shall be forgiven (in the event of a determination of undue hardship) or the principal payment shall remain outstanding and due and payable on June 1 (in the event no undue hardship is determined to exist).

(b) Grant and Acceptance. The Lender/Grantor hereby grants to the Borrower/Grantee and the Borrower/Grantee hereby accepts from the Lender/Grantor an amount equal to the Grant Amount.

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(c) Project Account. The NMFA shall establish and maintain the Project Account as a book account only, on behalf of the Borrower/Grantee, which account shall be kept separate and apart from all other accounts of the NMFA.

(d) Constitutional and Statutory Debt Limitations. No provision of this Agreement shall be construed or interpreted as creating a general obligation or other indebtedness of the Water Trust Board, the NMFA, the State or the Borrower/Grantee within the meaning of any constitutional or statutory debt limitation.

Section 5.2 Application of Loan/Grant Amount. Following the determination by the NMFA in its sole and absolute discretion that the Conditions to the disbursement of the Loan/Grant Amount have been satisfied, the NMFA shall make an entry in its accounts, and in particular in the Project Account, reflecting the proceeds of the Loan/Grant Amount made available for disbursement from the Water Project Fund to the Borrower/Grantee at its request, and as needed by it to acquire and complete the Project, as provided in Section 7.2 of this Agreement.

Section 5.3 Final Requisition. The Final Requisition shall be submitted by the Borrower/Grantee within the Interim Period. The Interim Period may be extended only as approved in writing by an Authorized Officer of the NMFA, based on the Borrower/Grantee's demonstration, to the reasonable satisfaction of the Authorized Officer of the NMFA, that unanticipated circumstances beyond the control of the Borrower/Grantee resulted in delaying the acquisition and completion of the Project, and submission of the Borrower/Grantee's Final Requisition.

Section 5.4 Investment of Monies. Money in the Water Project Fund, representing proceeds of this Agreement, held and administered by the NMFA, may be invested by the NMFA for the credit of the Water Project Fund.

ARTICLE VI
LOAN PAYMENTS BY THE BORROWER/GRANTEE

Section 6.1 Loan to the Borrower/Grantee; Payment Obligations Limited to Pledged Revenues; Pledge of Pledged Revenues. The NMFA hereby lends to the Borrower/Grantee and the Borrower/Grantee hereby borrows from the NMFA an amount not to exceed the Loan Amount. The Borrower/Grantee promises to pay, but solely from the sources pledged herein, the Loan Payments and the Administrative Fees and other amounts owed by the Borrower/Grantee as herein provided. Subject to any outstanding Parity Obligations and Senior Obligations, the Borrower/Grantee does hereby grant a lien on and a security interest in and does hereby convey, assign and pledge unto the NMFA and unto its successors in trust forever all right, title and interest of the Borrower/Grantee in and to (i) the Pledged Revenues to the extent required to pay the Loan Payments, and to pay the Administrative Fees and other amounts owed by the Borrower/Grantee as herein provided, subject to and subordinate to all other pledges of the Pledged Revenues existing on the Closing Date and, further, that may exist in the future (except only that the pledge of the Pledged Revenues herein shall be on a parity with any other pledge of the Pledged Revenues by the Borrower/Grantee to repay any obligations issued by the Lender/Grantor pursuant to the Act or the Colonias Infrastructure Act); (ii) the Loan/Grant Amount including the Project Account; and (iii) all other rights hereinafter granted, for the securing of the Borrower/Grantee's obligations

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under this Agreement, including payment of the Loan Payments, Administrative Fees and other amounts owed by the Borrower/Grantee as herein provided, however, that if the Borrower/Grantee, its successors or assigns, shall pay, or cause to be paid, all Loan Payments and Administrative Fees at the time and in the manner contemplated by this Agreement, or shall provide as permitted by Section 6.5 of this Agreement for the payment thereof, and shall pay all other amounts due or to become due under this Agreement in accordance with its terms and provisions then, upon such final payment, this Agreement and the rights created thereby shall terminate; otherwise, this Agreement shall remain in full force and effect.

The schedule of Loan Payments, assuming the disbursal of the entire Loan/Grant Amount within twenty-four (24) months after the Closing Date, identified as the Interim Debt Service Schedule, is attached to this Agreement as Exhibit "B". Within thirty (30) days after the Final Requisition is made, the NMFA shall provide a Final Debt Service Schedule, reflecting the amount of the Loan/Grant Amount actually disbursed to the Borrower/Grantee pursuant to this Agreement. Such Final Debt Service Schedule shall supersede the schedule attached hereto as Exhibit "B". The NMFA shall additionally calculate the amount of the Administrative Fee that has accumulated during that twenty-four (24) month period from the Closing Date, and shall include such amount in the first Loan Payment due from the Borrower/Grantee on the Final Debt Service Schedule.

The pledge of the Pledged Revenues and the lien thereon shall be effective upon the Closing Date. The Borrower/Grantee and the NMFA acknowledge and agree that the obligations of the Borrower/Grantee hereunder are limited to the Pledged Revenues; and that this Agreement with respect to the Loan Amount, the Administrative Fee and other amounts owed by the Borrower/Grantee as herein provided, and that the Agreement shall constitute a special, limited obligation of the Borrower/Grantee. No provision of this Agreement shall be construed or interpreted as creating a general obligation or other indebtedness of the Borrower/Grantee or the State within the meaning of any constitutional or statutory debt limitation. No provision of this Agreement shall be construed to pledge or to create a lien on any class or source of Borrower/Grantee moneys other than the Pledged Revenues, nor shall any provision of this Agreement restrict the future issuance of any bonds or obligations payable from any class or source of Borrower/Grantee moneys other than the Pledged Revenues. In addition, to the extent not required for the payment of obligations of the Borrower/Grantee hereunder, the Pledged Revenues may be utilized by the Borrower/Grantee for any other purposes permitted by law.

Section 6.2 Deposit of Payments of Loan Amount to Water Project Fund. All Loan Payments made by the Borrower/Grantee to the NMFA to repay the Loan Amount and interest thereon, if any, shall be deposited into the Water Project Fund.

Section 6.3 Manner of Payment. The Loan Amount and Administrative Fee shall be payable by the Borrower/Grantee to the Lender/Grantor in annual installments on June 1 beginning after expiration of the Interim Period and continuing through the expiration of the last Loan Payment due as outlined in the Final Debt Service Schedule. All payments of the Borrower/Grantee hereunder shall be paid in lawful money of the United States of America to the NMFA at the address designated in Section 11.1 of this Agreement or by electronic debit of the account identified in the ACH Authorization. The obligation of the Borrower/Grantee to make payments hereunder, from and to the extent of the available Pledged Revenues, shall be absolute and unconditional in all events, except as expressly provided hereunder. Notwithstanding any

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dispute between the Borrower/Grantee and the NMFA, any vendor or any other person, the Borrower/Grantee shall make all deposits hereunder, from and to the extent of the available Pledged Revenues, when due and shall not withhold any deposit hereunder pending final resolution of such dispute, nor shall the Borrower/Grantee assert any right of set-off or counterclaim against its obligation to make such deposits required hereunder.

Section 6.4 Borrower/Grantee May Budget for Payments. The Borrower/Grantee may, in its sole discretion, but without obligation and subject to the Constitution of the State, governing laws, and its budgetary requirements, make available properly budgeted and legally available funds to make the Loan Payments and other amounts owed by the Borrower/Grantee hereunder; provided, however, the Borrower/Grantee has not covenanted and cannot covenant to make such funds available and has not pledged any of such funds for such purpose.

Section 6.5 No Penalty for Prepayment of the Loan Amount. The Loan Amount shall be pre-payable by the Borrower/Grantee at the conclusion of the Interim Period without penalty.

Section 6.6 Lender/Grantor's Release of Lien and Further Assurances. Upon payment in full of the Loan Amount, Administrative Fee and other amounts owed by the Borrower/Grantee as herein provided in this Agreement and upon written request from the Borrower/Grantee the Lender/Grantor agrees to execute a release of lien and to give such further assurances as are reasonably necessary to ensure that the Lender/Grantor no longer holds or maintains any lien or claim against the Pledged Revenues.

ARTICLE VII
THE PROJECT

Section 7.1 Agreement to Acquire, Complete and Maintain the Project.

(a) The Borrower/Grantee hereby agrees that in order to effectuate the purposes of this Agreement and to acquire and complete the Project it shall take such steps as are necessary and appropriate to acquire, complete, operate and maintain the Project lawfully and efficiently. The Project shall be constructed and completed substantially in accordance with the approved plans and specifications, and shall fully incorporate the available technologies and operational design for water use efficiency described in the approved plans and specifications. No Loan/Grant funds shall be used for items not constituting Eligible Items.

(b) As provided by NMSA 1978, § 72-4A-7(A)(1), as amended, of the Act, the Borrower/Grantee shall operate and maintain the Project in good operating condition and repair at all times during the Useful Life of the Project, so that the Project will function properly over the Useful Life of the Project; provided, that if any portion of the Project will be constructed, located, completed, installed or extended on real property owned by a qualifying entity (as defined by the Act) other than the Borrower/Grantee, the Borrower/Grantee may, prior to any use of the Loan/Grant funds for the Project on such real property, obtain the written agreement of such other qualifying entity to perform these obligations with respect to such real property (and the portion of the Project to be constructed, located, completed or extended on such real property), which written agreement shall be subject to approval by the Lender/Grantor and shall include an express

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statement by such other qualifying entity that the Lender/Grantor is a third party beneficiary of such written agreement.

Section 7.2 Accounting for Amounts Credited to the Project Account. So long as no Event of Default shall occur and provided that all Conditions to the disbursement of the Loan/Grant Amount have been satisfied (including approval of the plans and specifications), upon receipt by the NMFA of a requisition substantially in the form of Exhibit "C" attached hereto signed by an Authorized Officer of the Borrower/Grantee, supported by certification by the Borrower/Grantee's project architect, engineer, or such other authorized representative of the Borrower/Grantee that the amount of the disbursement request represents the progress of design, construction, acquisition or other Project-related activities accomplished as of the date of the disbursement request, the NMFA shall, in its sole and absolute discretion: (1) submit a request for payment to the State Board of Finance for payment; and/or (2) disburse from the Water Project Fund, amounts which together are sufficient to pay the requisition in full. The NMFA shall make the appropriate entry in the Project Account reflecting the amount of the payment. The certification provided pursuant to this Section 7.2 in support of the requisition must be acceptable in form and substance to the NMFA and, at its request, the Water Trust Board. The Borrower/Grantee shall provide such records or access to the Project as the NMFA, and, at its request, the Water Trust Board, in the discretion of each, may request in connection with the approval of the Borrower/Grantee's requisition requests made hereunder.

Section 7.3 No Disbursement for Prior Expenditures Except upon Approval. No disbursement shall be made from the Water Project Fund of the Loan/Grant Amount, or any portion thereof, without the written approval of the NMFA and, at its request, the Water Trust Board, to reimburse any expenditure made prior to the Closing Date.

Section 7.4 Borrower/Grantee Reporting to Lender/Grantor. During the acquisition implementation, installation and construction of the Project, the Borrower/Grantee shall provide the Lender/Grantor with a quarterly written report executed by an Authorized Officer of the Borrower/Grantee, in the form attached as Exhibit "D" hereto or in another form reasonably acceptable to the Lender/Grantor, describing the status of the Project as of the report date, uses of Loan/Grant funds during the quarterly period ending on the report date, and requests for distributions of Loan/Grant funds anticipated to occur during the quarterly period immediately following the report date. The first quarterly report shall be due on March 31, 2026, and subsequent reports shall be due on each March 31, June 30, September 30 and December 31 thereafter until the report date next following final distribution of the Loan/Grant funds. No reports shall be required after the report date next following final distribution of the Loan/Grant Funds, unless specifically required by the NMFA or the Water Trust Board. The description of the status of the Project in each quarterly report shall include, among other information, (a) a comparison of actual and anticipated requests for distributions of Loan/Grant funds as of the report date with those anticipated as of the Closing Date, (b) a description of actual and anticipated changes in the cost estimates for the Project as of the report date compared with those anticipated as of the Closing Date, (c) a description of the percentage of completion of the Project; and (d) a timeline of projected milestones.

Section 7.5 Completion of Disbursement of Loan/Grant Funds. Upon completion of the Project an Authorized Officer of the Borrower/Grantee shall deliver a certificate to the NMFA

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substantially in the form of Exhibit "E" attached hereto, stating that, to his or her knowledge, either (1) the Project has been completed, or (2) that the portion of the Loan/Grant Amount needed to complete the Project has been disbursed in accordance with the terms of this Agreement. No portion of the Loan/Grant Amount shall be disbursed after expiration of the Interim Period.

Section 7.6 Application of Project Account Subsequent to Disbursement of Loan/Grant Funds; Termination of Pledge.

(a) Upon the completion of the Project as signified by delivery of the completion certificate required by Section 7.5 hereof, the NMFA shall determine, by reference to the Project Account, whether any portion of the authorized Loan/Grant Amount remains unexpended and shall dispose of such unexpended proceeds in accordance with law.

(b) In the event that a portion of the Loan/Grant Amount remains unexpended after the expiration of the Interim Period, the NMFA shall dispose of such funds in accordance with law.

Upon the occurrence of either event described in (a) or (b) above, the NMFA shall make the appropriate entry in the Project Account and, upon such entry, the pledge of the Loan/Grant Amount established in this Agreement shall terminate.

ARTICLE VIII
COMPLIANCE WITH LAWS AND RULES; OTHER COVENANTS

Section 8.1 Further Assurances and Corrective Instruments. The Lender/Grantor and the Borrower/Grantee agree that they will, from time to time, execute, acknowledge and deliver, or cause to be executed, acknowledged and delivered, such supplements hereto and such further instruments as may reasonably be required for correcting any inadequate or incorrect description of the Project or of the Pledged Revenues and for carrying out the intention hereof.

Section 8.2 Representatives of Lender/Grantor or of Borrower/Grantee. Whenever under the provisions hereof the approval of the Lender/Grantor or the Borrower/Grantee is required, or the Borrower/Grantee, or the Lender/Grantor is required to take some action at the request of either of them, such approval or such request shall be given for the Lender/Grantor or for the Borrower/Grantee, by an Authorized Officer of the Lender/Grantor or the Borrower/Grantee, as the case may be, and any party hereto shall be authorized to act on any such approval or request.

Section 8.3 Selection of Contractors. All contractors providing services or materials in connection with the Project shall be selected in accordance with applicable provisions of the New Mexico Procurement Code, NMSA 1978, §§ 13-1-28 through 13-1-199, as amended, or, if the Borrower/Grantee is not subject to the New Mexico Procurement Code, shall be selected in accordance with a documented procurement process duly authorized and established pursuant to laws and regulations applicable to the Borrower/Grantee.

Section 8.4 Non-Discrimination in Employment. Except as otherwise specifically provided in the laws, statutes, ordinances or regulations of the Borrower/Grantee, the Borrower/Grantee shall require in any contract or subcontract executed in connection with the

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Project to which the Borrower/Grantee is a party that there shall be no discrimination against any employee or applicant for employment because of race, color, creed, sex, religion, sexual preference, ancestry or national origin.

Section 8.5 Little Miller Act. To the extent NMSA 1978, § 13-4-1 et seq., (the "Little Miller Act") is applicable to the Project, the Borrower/Grantee shall comply with the requirements of the "Little Miller Act". If bonding requirements of the Little Miller Act are not applicable to the Project, the Borrower/Grantee will require that the contractor to whom is given any contract for construction appertaining to the Project supply a performance bond or bonds satisfactory to the Borrower/Grantee. Any sum or sums derived from said performance bond or bonds shall be used within six (6) months after such receipt for the completion of said construction, and if not so used within such period, shall be treated as Gross Revenues.

Section 8.6 Required Contract Provisions. The Borrower/Grantee shall require the following provisions in any contract or subcontract executed in connection with the Project to which the Borrower/Grantee is a party:

(a) There shall be no discrimination against any employee or applicant for employment because of race, color, creed, sex, religion, sexual preference, ancestry or national origin; and

(b) Any contractor or subcontractor providing construction services in connection with the Project shall post a performance and payment bond in accordance with the requirements of NMSA 1978, § 13-4-18, as amended.

(c) Any contractor or subcontractor providing construction services in connection with the Project shall comply with the prevailing wage laws in accordance with the requirements of NMSA 1978, § 13-4-11, as amended.

Section 8.7 Application of Act and Board Rules. While this Agreement is outstanding, the Lender/Grantor and the Borrower/Grantee expressly acknowledge that this Agreement is governed by provisions and requirements of the Act and the Board Rules, as amended and supplemented, and all applicable provisions and requirements of the Act and Board Rules are incorporated into this Agreement by reference.

Section 8.8 Continuing Disclosure. The Borrower/Grantee shall provide continuing disclosure to the NMFA, as the NMFA may require, that shall include, but not be limited to: annual audits and notification of any event deemed material by the NMFA, including but not limited to, any event which may or does affect the Pledged Revenues, the ability of the Borrower/Grantee to repay the loan, and the default of the Borrower/Grantee in performance or observance of any covenant, term, or condition contained in any other loan agreement.

ARTICLE IX
INSURANCE; NON-LIABILITY OF LENDER/GRANTOR

Section 9.1 Insurance. The Borrower/Grantee shall carry general liability insurance or participate in the State's risk-management program and, to the extent allowed by the New Mexico Tort Claims Act, NMSA 1978, §§ 41-4-1 through 41-4-30, as amended, shall and hereby agrees

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to name the Lender/Grantor as an additional insured with respect to all claims, by or on behalf of any person, firm, corporation or other legal entity arising from the acquisition, completion or implementation of the Project or otherwise during the Agreement Term; provided, that if any portion of the Project will be constructed, located, completed or extended on real property owned by a qualifying entity (as defined by the Act) other than the Borrower/Grantee, the Borrower/Grantee may obtain the written agreement of such other qualifying entity to perform these insurance/risk-management program requirements for Borrower/Grantee with respect to such real property (and the portion of the Project to be constructed, located, completed or extended on such real property), which written agreement shall include an express statement by such other qualifying entity that the Lender/Grantor is a third party beneficiary of such written agreement.

Section 9.2 Non-Liability of Lender/Grantor.

(a) Lender/Grantor shall not be liable in any manner for the Project, Borrower/Grantee's use of the Loan/Grant, the acquisition, implementation, construction, installation, ownership, operation or maintenance of the Project, or any failure to act properly by the Borrower/Grantee or any other owner or operator of the Project.

(b) Lender/Grantor shall not be liable for the refusal or failure of any other agency of the State to transfer any portion of the Loan/Grant Amount in its possession, custody and control to the NMFA for disbursement to the Borrower/Grantee, or to honor any request for such transfer or disbursement of the Loan/Grant Amount.

(c) From and to the extent of the Pledged Revenues, and to the extent permitted by law, the Borrower/Grantee shall and hereby agrees to indemnify and save the NMFA harmless against and from all claims, by or on behalf of any person, firm, corporation, or other legal entity, arising from the acquisition or operation of the Project during the Agreement Term, from: (i) any act of negligence or other misconduct of the Borrower/Grantee, or breach of any covenant or warranty by the Borrower/Grantee hereunder; and (ii) the incurrence of any cost or expense in connection with the acquisition or operation of the Project in excess of the Loan/Grant Agreement proceeds and interest on the investment thereof. The Borrower/Grantee shall indemnify and save the NMFA harmless, from and to the extent of the available Pledged Revenues, and to the extent permitted by applicable law, from any such claim arising as aforesaid from (i) or (ii) above, or in connection with any action or proceeding brought thereon and, upon notice from the NMFA, shall defend the NMFA in any such action or proceeding.

ARTICLE X
EVENTS OF DEFAULT AND REMEDIES

Section 10.1 Events of Default Defined. Any one of the following shall be an "Event of Default" under this Agreement:

(a) Failure by the Borrower/Grantee to pay any amount required to be paid under this Agreement on the date on which it is due and payable;

(b) Failure by the Borrower/Grantee to observe and perform any covenant, condition or agreement on its part to be observed or performed under this Agreement for a period

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of thirty (30) days after written notice, specifying such failure and requesting that it be remedied, is given to the Borrower/Grantee by the Lender/Grantor unless the Lender/Grantor shall agree in writing to an extension of such time prior to its expiration; provided, however, if the failure stated in the notice can be wholly cured within a period of time not materially detrimental to the rights of the Lender/Grantor but cannot be cured within the applicable thirty (30) day period, the Lender/Grantor will not unreasonably withhold their consent to an extension of such time if corrective action is instituted by the Borrower/Grantee within the applicable period and diligently pursued until the failure is corrected; and provided, further, that if by reason of force majeure the Borrower/Grantee is unable to carry out the agreements on its part herein contained, the Borrower/Grantee shall not be deemed in default under this paragraph 10.1(b) during the continuance of such inability (but force majeure shall not excuse any other Event of Default); or

(c) Any warranty, representation or other statement by or on behalf of the Borrower/Grantee contained in this Agreement or in any instrument furnished in compliance with or in reference to this Agreement is false or misleading in any material respect;

(d) A petition is filed against the Borrower/Grantee under any bankruptcy, moratorium, reorganization, arrangement, insolvency, readjustment of debt, dissolution or liquidation law of any jurisdiction, whether now or hereafter in effect, and is not dismissed within thirty (30) days after such filing, but the NMFA shall have the right to intervene in the proceedings prior to the expiration of such thirty (30) days to protect their interests;

(e) The Borrower/Grantee files a petition in voluntary bankruptcy or seeking relief under any provision of any bankruptcy, moratorium, reorganization, arrangement, insolvency, readjustment of debt, dissolution or liquidation law of any jurisdiction, whether now or hereafter in effect, or consents to the filing of any petition against it under any such law; or

(f) The Borrower/Grantee admits insolvency or bankruptcy or its inability to pay its debts as they become due or is generally not paying its debts as such debts become due, or becomes insolvent or bankrupt or makes an assignment for the benefit of creditors, or a custodian (including, without limitation, a receiver, liquidator or trustee) of the Borrower/Grantee for any of its property is appointed by court order or takes possession thereof and such order remains in effect or such possession continues for more than thirty (30) days, but the NMFA shall have the right to intervene in the proceedings prior to the expiration of such thirty (30) days to protect their interests.

(g) Default by the Borrower/Grantee in performance or observance of any covenant contained in any other loan agreement, document or instrument of any type whatsoever evidencing or securing obligations of the Borrower/Grantee to the NMFA.

Section 10.2 Remedies on Default. Whenever any Event of Default has occurred and is continuing and subject to Section 10.3 hereof, the Lender/Grantor may take any or all of the following actions as may appear necessary or desirable to collect the payments then due and to become due or to enforce performance of any obligations of the Borrower/Grantee in this Agreement:

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(a) File a mandamus proceeding or other action or proceeding or suit at law or in equity to compel the Borrower/Grantee to perform or carry out its duties under the law and the agreements and covenants required to be performed by it contained herein;

(b) Terminate this Agreement;

(c) Cease disbursing any further amounts from the Project Account;

(d) Demand that the Borrower/Grantee immediately repay the Loan/Grant Amount or any portion thereof if such funds were not utilized in accordance with this Agreement;

(e) File a suit in equity to enjoin any acts or things which are unlawful or violate the rights of the Lender/Grantor;

(f) Intervene in judicial proceedings that affect this Agreement or the Pledged Revenues; or

(g) Cause the Borrower/Grantee to account as if it were the trustee of an express trust for all of the Pledged Revenues;

(h) Take whatever other action at law or in equity may appear necessary or desirable to collect amounts then due and thereafter to become due under this Agreement or to enforce any other of its rights hereunder; or

(i) Apply any amounts in the Project Account toward satisfaction of any and all fees and costs incurred in enforcing the terms of this Agreement.

Section 10.3 Limitations on Remedies. A judgment requiring payment of money entered against the Borrower/Grantee shall be paid from only available Pledged Revenues unless the Borrower/Grantee in its sole discretion pays the judgment from other available funds.

Section 10.4 No Remedy Exclusive. No remedy herein conferred upon or reserved to the Lender/Grantor is intended to be exclusive, and every such remedy shall be cumulative and shall be in addition to every other remedy given hereunder or now or hereafter existing at law or in equity. No delay or omission to exercise any right or power accruing upon any default shall impair any such right or power or shall be construed to be a waiver thereof, but any such right and power may be exercised from time to time and as often as may be deemed expedient. In order to entitle the Borrower/Grantee or the Lender/Grantor to exercise any remedy reserved in this Article X, it shall not be necessary to give any notice, other than such notice as may be required in this Article X.

Section 10.5 Waivers of Events of Default. The Lender/Grantor may, in its sole discretion, waive any Event of Default hereunder and the consequences of any such Event of Default; provided, however, all expenses of the Lender/Grantor in connection with such Event of Default shall have been paid or provided for. Such waiver shall be effective only if made by a written statement of waiver issued by the NMFA. In case of any such waiver or rescission, or in case any proceeding taken by the Lender/Grantor, on account of any such Event of Default shall have been discontinued or abandoned or determined adversely, then and in every such case, the

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Lender/Grantor shall be restored to its former position and rights hereunder, respectively, but no such waiver or rescission shall extend to any subsequent or other Event of Default, or impair any right consequent thereon.

Section 10.6 No Additional Waiver Implied by One Waiver. In the event that any agreement contained herein should be breached by either party and thereafter waived by the other party, such waiver shall be in writing and limited to the particular breach so waived and shall not be deemed to waive any other breach hereunder.

Section 10.7 Agreement to Pay Attorneys' Fees and Expenses. In the event that the Borrower/Grantee shall default under any of the provisions hereof and the NMFA shall employ attorneys or incur other expenses for the collection of payments hereunder, or the enforcement of performance or observance of any obligation or agreement on the part of the Borrower/Grantee herein contained, the Borrower/Grantee agrees that it shall, on demand therefor, pay to the NMFA the fees of such attorneys and such other expenses so incurred, to the extent such attorneys' fees and expenses may be determined to be reasonable by a court of competent jurisdiction; provided, however, that the obligation of the Borrower/Grantee under this Section shall be limited to expenditures from and to the extent of the available Pledged Revenues of the Borrower/Grantee.

ARTICLE XI
MISCELLANEOUS

Section 11.1 Notices. All notices, certificates or other communications hereunder shall be sufficiently given and shall be deemed given when delivered as follows:

If to the Borrower/Grantee, to:

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

If to the NMFA, then to:

New Mexico Finance Authority
Attn.: Chief Executive Officer
810 W. San Mateo Road
Santa Fe, New Mexico 87505

The Borrower/Grantee or the Lender/Grantor may, by notice given hereunder, designate any further or different addresses to which subsequent notices, certificates or other communications shall be sent.

Section 11.2 Binding Effect. This Agreement shall inure to the benefit of and shall be binding upon the Lender/Grantor and the Borrower/Grantee and their respective successors and assigns, if any.

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Section 11.3 Integration. This Agreement and any other agreements, certifications and commitments entered into between the Lender/Grantor and the Borrower/Grantee on the Closing Date constitute the entire agreement of the parties regarding the Loan/Grant and the funding of the Project through the Loan/Grant as of the Closing Date, and the terms of this Agreement supersede any prior applications, discussions, understandings or agreements between or among the parties in connection with the Loan/Grant, to the extent such prior applications, discussions, understandings or agreements are inconsistent with this Agreement.

Section 11.4 Amendments. This Agreement may be amended only with the written consent of both of the parties hereto. The consent of the NMFA for amendments not affecting the terms of payment of the loan component of this Agreement may be given by an Authorized Officer of the NMFA. The execution of any such consent by an Authorized Officer of the NMFA shall constitute his or her determination that such amendment does not affect the terms of payment of the loan component of this Agreement.

Section 11.5 No Liability of Individual Officers, Directors or Trustees. No recourse under or upon any obligation, covenant or agreement contained in this Agreement shall be had against any member, employee, director or officer, as such, past, present or future, of the Lender/Grantor, either directly or through the NMFA, or against any officer, employee, director or member of the Borrower/Grantee, past, present or future, as an individual so long as such individual was acting in good faith. Any and all personal liability of every nature, whether at common law or in equity, or by statute or by constitution or otherwise, of any such officer, employee, director or member of the Borrower/Grantee or of the NMFA is hereby expressly waived and released by the Borrower/Grantee and by the NMFA as a condition of and in consideration for the execution of this Agreement.

Section 11.6 Severability. In the event that any provision of this Agreement, other than the obligation of the Borrower/Grantee to make the Loan Payments and the Administrative Fee hereunder, shall be held invalid or unenforceable by any court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof.

Section 11.7 Execution in Counterparts. This Agreement may be simultaneously executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

Section 11.8 Applicable Law. This Agreement shall be governed by and construed in accordance with the laws of the State.

Section 11.9 Captions. The captions or headings herein are for convenience only and in no way define, limit or describe the scope or intent of any provisions or sections of this Agreement.

Section 11.10 Further Assurances and Corrective Instruments. The NMFA and the Borrower/Grantee will, from time to time, execute, acknowledge and deliver, or cause to be executed, acknowledged and delivered, such supplements hereto and such further instruments as may reasonably be required for correcting any inadequate or incorrect description of the Project or of the Pledged Revenues, or for otherwise carrying out the intention hereof.

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Section 11.11 NMFA and Borrower/Grantee Representatives. Whenever under the provisions hereof the approval of the NMFA or the Borrower/Grantee is required, or the Borrower/Grantee or the NMFA is required to take some action at the request of the other, such approval or such request shall be given for the NMFA or for the Borrower/Grantee by an Authorized Officer of the NMFA or the Borrower/Grantee, as the case may be, and any party hereto shall be authorized to act on any such approval or request.

Section 11.12 CONSENT TO JURISDICTION. THE BORROWER/GRANTEE IRREVOCABLY AGREES THAT ALL ACTIONS OR PROCEEDINGS IN ANY WAY ARISING OUT OF OR RELATED TO THIS AGREEMENT OR THE DOCUMENTS SIGNED IN CONNECTION WITH THIS TRANSACTION WILL BE LITIGATED IN THE FIRST JUDICIAL DISTRICT COURT, SANTA FE COUNTY, NEW MEXICO, PURSUANT TO NMSA 1978, § 6-21-26.

[Signature pages follow]

[Remainder of page intentionally left blank]

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IN WITNESS WHEREOF, the NMFA, on behalf of itself, has executed this Agreement, which was approved by the Water Trust Board on April 22, 2025 and by the NMFA's Board of Directors on May 22, 2025, in its corporate name by its duly authorized officer; and the Borrower/Grantee has caused this Agreement to be executed in its corporate name and the seal of the Borrower/Grantee affixed and attested by its duly authorized officers. All of the above are effective as of the date first above written.

LENDER/GRANTOR:

NEW MEXICO FINANCE AUTHORITY

By Marquita R Russel
Marquita D. Russel, Chief Executive Officer

PREPARED FOR EXECUTION BY OFFICERS OF THE
NEW MEXICO FINANCE AUTHORITY:

Sutin, Thayer & Browne A Professional Corporation
As Loan/Grant Counsel

By Edward Duffy
Eduardo A. Duffy

APPROVED FOR EXECUTION BY OFFICERS OF THE
NEW MEXICO FINANCE AUTHORITY:

By Mark Chaiken
Mark Chaiken, General Counsel

Doc ID: b1c255d8b75d2e064cb128827b2a821eeaed097e

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BORROWER/GRANTEE:

INCORPORATED COUNTY OF LOS ALAMOS,
NEW MEXICO

By_____
Theresa Cull, Chair

[SEAL]

ATTEST:

By_____
Michael D. Redondo, County Clerk

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EXHIBIT "A"

TERM SHEET

$2,500,000 WATER PROJECT FUND LOAN/GRANT TO THE INCORPORATED COUNTY OF LOS ALAMOS, NEW MEXICO

Project Description:	The Project is for storage, conveyance or delivery of water to end users. The Loan/Grant Amount will be used only for Eligible Items necessary to complete the Project. In particular, the Project will consist of construction of a replacement 14-inch water transmission line, and shall include such other related work and revisions necessary to complete the Project. The Project may be further described in the Application and in the final plans and specifications for the Project approved by the Water Trust Board and the NMFA as provided by this Agreement. However, in the event of any inconsistency, the description of the Project as stated in this Term Sheet shall control.
Grant Amount:	$2,250,000
Loan Amount:	$250,000
Pledged Revenues:	"Pledged Revenues" means the Net System Revenues of the System of the Borrower/Grantee pledged to the payment of the Loan Payments and Administrative Fees pursuant to the Ordinance and the Agreement.
Currently Outstanding Senior Obligations (Senior Lien Tier):	Governmental Unit's Utility System Revenue Bonds, Series 2010A-D (PPRF-2461) maturing in 2030
Currently Outstanding Parity Obligations (Subordinate Lien Tier):	PPRF-3150 maturing in 2034 DW-5456 maturing in 2048 DW-5637 maturing in 2049 DW-5638 maturing in 2049 DW-6368 maturing in 2046 DW-6651 maturing in 2047
Currently Outstanding Subordinate Obligations (Super Subordinate Tier):	OUTSTANDING JUNIOR LIENS OF THE JOINT UTILITY WPF-0318 maturing in 2035 WPF-0340 maturing in 2035 CWSRF 110 maturing in 2045

Doc ID: b1c255d8b75d2e064cb128827b2a821eeaed097e

Docusign Envelope ID: 46EFB03E-BB0C-4968-99C6-7615059EDE3E

WPF-5673 maturing in 2043
WPF-5966 maturing in 2045
CWSRF 135 maturing in 2045
RIP 00059 maturing in 2045

OUTSTANDING JUNIOR LIEN OF THE WATER & WASTEWATER UTILITY

WPF-3557 maturing in 2038
WPF-5426 maturing in 2043

OUTSTANDING JUNIOR LIENS OF THE WATER UTILITY

WPF-0220 maturing in 2031
WPF-0221 maturing in 2032
WPF-4826 maturing in 2041
WPF-5081 maturing in 2042

OUTSTANDING JUNIOR LIEN OF THE WASTEWATER UTILITY

CWSRF 083 maturing in 2043
CWSRF 1438143R maturing in 2035

Authorizing Legislation:	Borrower/Grantee Ordinance No. 751, adopted December 16, 2025
Additional Funding Amount:	$500,000
Closing Date:	January 23, 2026
Project Account Amount:	$2,500,000
Expense Account Deposit:	$0.00
Administrative Fee:	0.25%

Conditions to be satisfied prior to first disbursement of Loan/Grant funds: Delivery to NMFA of (i) a copy of the agenda of the meeting of the Governing Body at which the Ordinance was adopted and at which this Agreement, the Ordinance and all other Loan/Grant documents were authorized by the Governing Body (the "Meeting"), certified as a true and correct copy by the County Clerk of the Borrower/Grantee, (ii) a copy of the minutes or record of proceedings of the Meeting, approved and signed by the Chair and attested to by the County Clerk of the Borrower/Grantee, and (iii) a copy of the notice of meeting for the Meeting evidencing compliance with the Borrower/Grantee's Open Meetings standards in effect on the date of the Meeting.

Other Conditions applicable to the Loan/Grant: All Conditions defined in the Agreement.

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EXHIBIT "B"

PAYMENT PROVISIONS OF THE LOAN

The Loan Amount and Administrative Fee shall be payable by the Borrower/Grantee to the Lender/Grantor in twenty (20) annual installments of principal pursuant to the attached debt service schedule, beginning June 1, 2028 and ending June 1, 2047. The Loan Amount shall be pre-payable upon expiration of the Interim Period without penalty. The Administrative Fee shall be due and payable annually on June 1 of each year while the Loan, or any portion thereof, remains outstanding.

[INTERIM DEBT SERVICE SCHEDULE ATTACHED]

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DETAILED BOND DEBT SERVICE

Los Alamos County
2025 Los Alamos County Water Improvements

Loan Component (LOAN)

Period Ending	Principal	Coupon	Interest	Debt Service
06/01/2028	20,198	0.250%	2,650.00	22,848.00
06/01/2029	22,117	0.250%	1,074.51	23,191.51
06/01/2030	22,172	0.250%	1,019.21	23,191.21
06/01/2031	22,227	0.250%	963.79	23,190.79
06/01/2032	22,282	0.250%	908.22	23,190.22
06/01/2033	22,338	0.250%	852.51	23,190.51
06/01/2034	22,394	0.250%	796.66	23,190.66
06/01/2035	22,450	0.250%	740.68	23,190.68
06/01/2036	22,506	0.250%	684.56	23,190.56
06/01/2037	22,563	0.250%	628.29	23,191.29
06/01/2038	22,619	0.250%	571.89	23,190.89
06/01/2039	22,676	0.250%	515.34	23,191.34
06/01/2040	22,732	0.250%	458.65	23,190.65
06/01/2041	22,789	0.250%	401.81	23,190.81
06/01/2042	22,846	0.250%	344.84	23,190.84
06/01/2043	22,903	0.250%	287.73	23,190.73
06/01/2044	22,961	0.250%	230.47	23,191.47
06/01/2045	23,018	0.250%	173.07	23,191.07
06/01/2046	23,076	0.250%	115.52	23,191.52
06/01/2047	23,133	0.250%	57.83	23,190.83
	450,000		13,475.58	463,475.58

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BOND DEBT SERVICE

Los Alamos County
Townsite 14' waterline replacement (WPF-6584)

Period Ending	Principal	Coupon	Interest	Debt Service	Annual Debt Service
06/01/2028	11,221	0.250%	1,472.22	12,693.22	12,693.22
12/01/2028					
06/01/2029	12,287	0.250%	596.95	12,883.95	12,883.95
12/01/2029					
06/01/2030	12,318	0.250%	566.23	12,884.23	12,884.23
12/01/2030					
06/01/2031	12,348	0.250%	535.44	12,883.44	12,883.44
12/01/2031					
06/01/2032	12,379	0.250%	504.57	12,883.57	12,883.57
12/01/2032					
06/01/2033	12,410	0.250%	473.62	12,883.62	12,883.62
12/01/2033					
06/01/2034	12,441	0.250%	442.59	12,883.59	12,883.59
12/01/2034					
06/01/2035	12,472	0.250%	411.49	12,883.49	12,883.49
12/01/2035					
06/01/2036	12,503	0.250%	380.31	12,883.31	12,883.31
12/01/2036					
06/01/2037	12,535	0.250%	349.05	12,884.05	12,884.05
12/01/2037					
06/01/2038	12,566	0.250%	317.72	12,883.72	12,883.72
12/01/2038					
06/01/2039	12,598	0.250%	286.30	12,884.30	12,884.30
12/01/2039					
06/01/2040	12,629	0.250%	254.81	12,883.81	12,883.81
12/01/2040					
06/01/2041	12,661	0.250%	223.23	12,884.23	12,884.23
12/01/2041					
06/01/2042	12,692	0.250%	191.58	12,883.58	12,883.58
12/01/2042					
06/01/2043	12,724	0.250%	159.85	12,883.85	12,883.85
12/01/2043					
06/01/2044	12,756	0.250%	128.04	12,884.04	12,884.04
12/01/2044					
06/01/2045	12,788	0.250%	96.15	12,884.15	12,884.15
12/01/2045					
06/01/2046	12,820	0.250%	64.18	12,884.18	12,884.18
12/01/2046					
06/01/2047	12,852	0.250%	32.13	12,884.13	12,884.13
	250,000		7,486.46	257,486.46	257,486.46

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EXHIBIT "C"

FORM OF REQUISITION
(Water Project Fund)

RE: $2,500,000 Loan/Grant Agreement by and between the New Mexico Finance Authority, as Lender/Grantor, and the Incorporated County of Los Alamos, New Mexico, as Borrower/Grantee (the "Agreement" or "Loan/Grant Agreement")

Loan/Grant No. WPF-6584 Closing Date: January 23, 2026

TO: NEW MEXICO FINANCE AUTHORITY

You are hereby authorized to disburse from the Project Account with regard to the above-referenced Agreement, the following:

I. PAYMENT INFORMATION

REQUISITION NO. _____ PAYMENT AMOUNT: $_____

PAYEE'S NAME: _____
PAYEE'S ADDRESS: _____
_____

II. REQUISITION INFORMATION (complete for all payments)

- *Attach proof of expenditures (cancelled check, wire transfer receipt, bank ledger, etc.).*
- *List all Vendors, Payment Purposes, or Eligible Item Categories below or attach separate page or spreadsheet if needed.*

Vendor Name _____
Total Amount $_____ Invoice No.(s) _____
Purpose of Payment _____
Eligible Item Category _____

Vendor Name _____
Total Amount $_____ Invoice No.(s) _____
Purpose of Payment _____
Eligible Item Category _____

Vendor Name _____
Total Amount $_____ Invoice No.(s) _____
Purpose of Payment _____
Eligible Item Category _____

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III. WIRING INFORMATION:

BANK NAME:	
ABA ROUTING NUMBER:	
ACCOUNT NUMBER:	

IV. MATCH INFORMATION

AMOUNT OF LOCAL MATCH EXPENDED SINCE LAST REQUISITION: $_____

Attach proof of expenditures for hard match (detailed invoices, cancelled checks, wire transfer receipt, bank statement, etc.) and written certification of type and value of any soft match.

AMOUNT OF LOCAL MATCH EXPENDED TO DATE: $_____

TOTAL REQUIRED MATCH: $500,000

V. VERIFICATION AND AUTHORIZATION

Each obligation, item of cost or expense mentioned herein is for a loan/grant made by the Lender/Grantor pursuant to the Water Project Finance Act to the Borrower/Grantee within the State of New Mexico, is due and payable, has not been the subject of any previous requisition, and is a proper charge against the Project Account. All representations contained in the Agreement and the related closing documents remain true and correct, and the Borrower/Grantee is not in breach of any of the covenants contained therein.

The proceeds of the Loan/Grant are to be used to pay the costs of Eligible Items, as defined in the Agreement. Eligible Items include (1) planning, designing, construction, improving or expanding a qualified project; (2) developing engineering feasibility reports for Qualified Projects; (3) inspecting construction of Qualified Projects; (4) providing professional services; (5) completing environmental assessments or archeological clearances and other surveys for Qualified Projects; (6) acquiring land, easements or rights of way; (7) eligible legal costs associated with development of Qualified Projects, within limits set forth in the Loan/Grant Agreement.

All construction and all installation of equipment with proceeds of the Loan/Grant has or will be used in accordance with plans and/or specifications approved on behalf of the New Mexico Finance Authority by the New Mexico Environment Department and/or the Office of the State Engineer, has or will be acquired in compliance with applicable procurement laws and regulations, and has or will be inspected and approved in accordance with applicable laws and regulations.

Capitalized terms used herein, are used as defined or used in the Loan/Grant Agreement.

DATE: _____

_____

AUTHORIZED OFFICER
(As Provided in the Loan/Grant Agreement)
Print Name:_____
Print Title: _____

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EXHIBIT "D"

WATER PROJECT FUND STATUS REPORT
PREPARED FOR THE
NEW MEXICO FINANCE AUTHORITY

Fund Recipient: Incorporated County of Los Alamos **Contact Name:** **Title:** **Email Address:**	**Project Number**: WPF-6584 **Project Name**: Townsite 14" Waterline Replacement **Project Type**: Construction

Reporting Period: From _____ **To**_____

☐ Quarterly Project Report: ☐1st ☐2nd ☐3rd ☐4th

☐ Final Project Report ☐ Other _____

WPF Funding Expiration: _____

Total WPF Award: $2,500,000 **Current Balance**: $_____

Loan 10% Grant 90% Match $500,000

Expected WPF Award Expenditure Next Quarter: $_____

Local Match Expenditure: To Date $_____ **Next Quarter** $_____

Project Phase: ☐Planning ☐ Design ☐ Construction

PROJECT COMPLETION: Original Date _____ **Current Date**_____

_____**% Complete Days Remaining to Complete** _____ **On Schedule?** ☐**Yes** ☐**No**

Briefly Describe Project Progress During This Reporting Period:

Issues Addressed During This Reporting Period, including any current or anticipated issues that remain unresolved:

Goals/Milestones, With Timeline or Dates, For The Next Reporting Period:

Authorized Officer **PRINT NAME:**_____

PRINT TITLE:_____

SIGNATURE: **Date:**

All fields must be completed.

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EXHIBIT "E"

FORM OF CERTIFICATE OF COMPLETION

RE: $2,500,000 Loan/Grant Agreement by and between the NMFA, as Lender/Grantor, and the Incorporated County of Los Alamos, New Mexico as Borrower/Grantee (the "Agreement" or "Loan/Grant Agreement")

Loan/Grant No. WPF-6584

Closing Date: January 23, 2026

TO: NEW MEXICO FINANCE AUTHORITY

I, _____, the _____ of the
[Name] [Title or position]

Borrower/Grantee, hereby certify as follows:

1. The project described in the Loan/Grant Agreement (the "Project"), or the applicable phase of the project if funding was for a phased Project, was completed and placed in service on _____, 20___.

2. The total cost of the Project was $ _____.

3. Cost of the Project paid from the Loan/Grant Amount was $ _____.

4. Cost of the Project paid from the Additional Funding Amount was $ _____.

5. The portion of the Loan/Grant Amount unexpended for the Project is $ _____.

6. The Project was completed and is and shall be used consistent with and subject to the covenants set forth in the Loan/Grant Agreement.

This certificate shall not be deemed to prejudice or affect any rights of or against third parties which exist at the date of this certificate or which may subsequently come into being.

INCORPORATED COUNTY OF LOS ALAMOS,
NEW MEXICO

By: _____

Its: _____

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EXHIBIT "F"

DOCUMENTS

1. Open Meetings Act Resolution No. 25-01 adopted by the Borrower/Grantee on January 7, 2025

2. Ordinance No. 751 adopted on December 16, 2025, Notice of Meeting, Meeting Agenda, Minutes and Affidavits of Publication of Notice of Meeting and Intent to Adopt Ordinance and Notice of Adoption of Ordinance in the *Los Alamos Daily Post*

3. Loan/Grant Agreement

4. General and No Litigation Certificate of the Borrower/Grantee

5. Delivery, Deposit and Cross-Receipt Certificate

6. Right of Way Certificate (to be executed prior to construction funding)

7. Final Opinion of Counsel for the Borrower/Grantee

8. Approving Opinion of Sutin, Thayer & Browne A Professional Corporation, Loan/Grant Counsel to the NMFA

9. NMFA Application and Project Approval (informational only)

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Agenda No.:	4.b.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services
Presenters:	Dennis Astley, Deputy Utility Manager-Electric Distribution
Legislative File:	**21410-26a**

Title
Award of Task Order No. 15 under AGR22-18e with R&M Construction for the Purpose of Drilling Five Piers in the White Rock Substation for the Transformer Replacement Project in the Amount of $463,657.50, add a 10% project contingency of $46,366 plus Applicable Gross Receipts Tax for the Term of 90 Days.

Recommended Action
I move that the Board of Public Utilities recommend Award Task Order No. 15 under AGR22-18e with R&M Construction for the Purpose of Drilling Five Piers in the White Rock Substation for the Transformer Replacement Project in the Amount of $463,657.50, add a 10% project contingency of $46,366.00, plus Applicable Gross Receipts Tax for the Term of 90 Days and forward to Council for approval.

Utilities Manager's Recommendation
The Utilities Manager recommends that the Board approve the motion as presented.

Body
The community of White Rock is served solely by transformer T2. The foundation with drilled piers is necessary because of the soil conditions where transformer T1 needs to be installed. Los Alamos County initially requested bids from General Contractors and received no bids. After receiving no bids, a second request for bids was issued and one bid was received from a contractor without the proper licensing. Another contractor assumed the task from whom we have an on-call agreement and submitted the bid, in the amount of $463,657.50, to drill 4 piers, 48-inches in diameter and 21 feet below the surface of the substation for the substation transformer along with a 36-inch pier to a depth of 10 feet for a bus support. The bus support is required due to the distance from the switch to the transformer. The bid will include the labor, rebar cages and concrete for the foundations and transformer pad.

Alternatives
Failure to approve this proposal would prevent the foundation for the new transformer from being completed and prevent installation of the transformer. The only option would be to reopen the bidding process again and attempt to attract additional bidders to the job.

Fiscal and Staff Impact
The fiscal impact will be covered by the electric distribution fund; the expenditure authority will be redirected from the LA URD Replacement CIP budget for Los Pueblos, which has been delayed for several years. No staff impacts are planned.

Attachments

A - Task Order No. 15
B - R&M Construction Estimate No. 523

AGR22-18a TASK ORDER #15 White Rock Sub-Station Foundation

Approval of this Task Order is contingent on Council Approval of Amendment No. 2 to Services Agreement No. AGR22-18e with R and M Construction LLC for On-Call Facility Construction Services. This item is presented separately for approval on March 31, 2026, County Council Agenda.

DATE PREPARED: March 26, 2026

CHARGE: ED-7935

CONTRACT MANAGER: Miguel Jimenez, Sr. Project Manager, 505-662-1430. All changes in scope, budget, or schedule (extensions) need to be approved in advance by Miguel Jimenez.

COUNTY REQUESTOR/CONTACT: Dennis Astley, Deputy Utilities Manager, 505-662-8165. All changes in scope, budget, or schedule (extensions) need to be approved in advance by Dennis Astley.

ATTACHMENTS:
Proposal from R & M Construction dated March 19, 2026.

COMMENCE WORK DATE:
Upon issuance of Purchase Order.

REQUESTED DELIVERY DATE:
Construction completed by July 7, 2026.

SCOPE OF WORK REQUESTED:
Drill Piers at White Rock Substation include providing and installing rebar cages and forming and pouring transformer pad. Price to include drilling equipment, materials, manpower to execute work per updated design provided by DPU- ED engineering on February 19, 2026.

DELIVERABLES:
Enter a high-level list of deliverables or refer to the attachments for details

ESTIMATED COST:

Total Task Order: $433,071.80 plus $30,585.70 NMGRT (7.0625%) for a total Task Order value of 463,657.50.

Current Contract Value	$21,000,000.00	Plus GRT
Estimated value of all task orders to date, including this task order:	$10,505,575.60	Plus GRT
Remaining Contract Value:	$10,494,424.40	Plus GRT

SIGNATURE PAGE

Original Task Order

Dennis Astley **Date** Project Manager/Deputy Utilities Manager	**Miguel Jimenez** **Date** Contract Manager
Eric Martinez **Date** Public Works Director	**Philo Shelton, III** **Date** Utilities Manager
Anne W Laurent **Date** County Manager	**Robert Sanchez** **Date** R & M Construction

R&M Construction

Estimate 523

PO Box 1026
Alcalde, NM 87511

Date: March 19, 2026

LAC Service Agreement # Number: AGR22-18e

Customer	Project
Contact Name: Manuel Martinez	**White Rock Substation Foundatin Piers**
Company Name: Los Alamos County	Company Name: Los Alamos County
Address: 1000 Central Ave Los Alamos, NM 87544	Address: 1000 Central Ave Los Alamos, NM 87544

Subcontractor	Product Name / Description	QTY	Unit Price	Total
	Scope of work as follows, Drill Piers at White Rock Substation to include providing and installing Rebar Cages and Forming and Pouring Transformer Pad. Price to include Drilling Equipment, Materials, Manpower to execute work per updated design provided by LAC Electrical Engineering Department FEbruary 19th 2025. Agreement # Number: AGR22-18e			
Amercan Fence	**Construction Fence**	1ea.	L.S.	$3,200.00
Waste Management	**Portable Toilet**	1ea.	L.S.	$900.00
BSN	**Staking/Layout**	1ea.	L.S.	$3,500.00
Subcontractor	**Clearing/Grubbing**	1ea.	L.S.	$10,000.00
Subcontractor	**36" Dia x 10' Pier Depth**	1ea.	$15,500.00	$15,500.00
Subcontractor	**48" Dia x 21' Pier Depth**	4ea.	$25,000.00	$100,000.00
Subcontractor	**48" x 4' Cylindrical Concrete Forms**	4ea.	$2,100.00	$8,400.00
Subcontractor	**Additional Cost for Drilling Depth**	1'	$4,000.00	
Subcontractor	**Rebar for 36" x 10' Pier**	1ea.	$15,000.00	$15,000.00
Subcontractor	**Concrete for 36" x 10' Pier**	1ea.	$7,500.00	$7,500.00
Subcontractor	**Rebar for 48" x 17' Pier**	1ea.	$27,000.00	$108,000.00
Subcontractor	**Concrete for 48" x 17' Pier**	1ea.	$10,000.00	$40,000.00
Subcontractor	**Locates**	1ea.	L.S.	$4,500.00
Subcontractor	**Concrete Testing**	1ea.	L.S.	$15,000.00
R and M Construction	**Project Manager**	160 Man hours	$91.00	$14,560.00
R and M Construction	**Superintendent**	480 Man hours	$91.00	$43,680.00
Waste Management	**Dumpster and Dump Fees**	1ea.	L.S.	$15,000.00
Commercial West Insuran	**Bonds**	1ea.	3%	$12,142.20
R and M Construction	**Mobilization**	1ea.	4%	$16,189.60
			Sub Total:	$433,071.80
			GRT 7.0625	$30,585.70
			Total	**$463,657.50**

ACCEPTED *- All work on Change Orders to be perfomred under the same terms and conditions as specified in the original contract / purchage order unless otherwise stipulated.*

Attachment B

Agenda No.:	5.a.
Index (Council Goals):	
Presenters:	Catherine D'Anna, Public Relations Manager
Legislative File:	**21046-26**

Title
Annual Update: Results of the Voice of the Customer Survey

Body
Ms. Sofia Vigeant and Ms. Catherine Vollmer of GreatBlue Research will present results and recommendations from the annual Voice of the Customer Survey which was conducted January 13 through February 23. This was the fifth year that GreatBlue Research conducted the Voice of the Customer Survey for DPU and there were 400 Residential and 40 Commercial complete responses. The final report gives a snapshot of participant demographics, an overview of responses, key study findings and recommendations in response to those findings.

Attachments
A - Los Alamos VOC Report of Findings 2026

LOS ALAMOS
where discoveries are made

Report of Findings

2026 Voice of Customer Study

26 March 2026

Confidential & Proprietary

Table of Contents

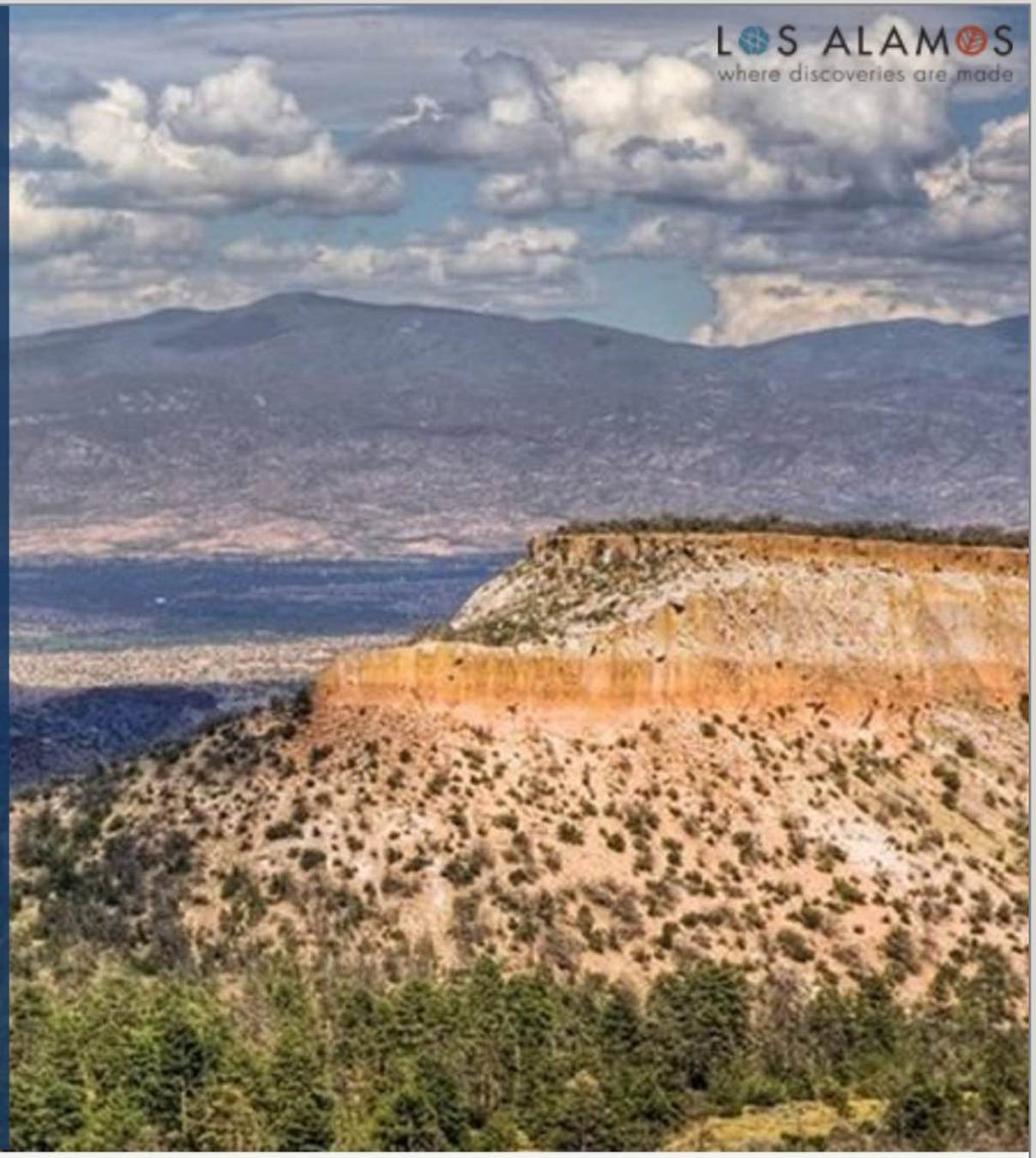
Section One
Project Overview

Section Two
Key Study Findings

Section Three
Considerations

Section Four
About GreatBlue

Section Five
Aggregate Data
(Provided Separately)



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Project Overview

Research Objectives

- GreatBlue Research was commissioned by the Los Alamos County Department of Public Utilities (hereinafter “the DPU”) to conduct market research to understand their residential and commercial customers' perceptions of the utility and services provided.

- The primary goals for this research study were to assess overall satisfaction with the DPU, satisfaction with the quality and reliability of the DPU's services, and customers' perceptions of the DPU's communication platforms.

- The outcome of this research will enable the DPU to a) more clearly understand and ultimately set customer expectations, b) act on near-term opportunities for improvement, and c) create a strategic roadmap to increase customer satisfaction.

Areas of Investigation

The 2026 Voice of Customer study leveraged a quantitative research methodology to address the following areas of investigation:

- Ratings of the DPU's organizational characteristics
- Satisfaction with the quality and reliability of services received
- Satisfaction with customer service and field service personnel
- Satisfaction with the rates paid for the quality of service received
- Current and preferred methods of receiving information about the DPU
- Satisfaction with the quality of communication received from the DPU
- Satisfaction with the DPU's website's ease of navigation and content
- Use and satisfaction with the DPU's self-service portal
- Awareness, use, and satisfaction with the Los Alamos Now application.
- Support for the DPU investing in clean energy and willingness to pay extra for investments
- Demographic profile of residential respondents

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Research Methodology Snapshot | Residential

Methodology	No. of Completes	No. of Questions	Incentive	Sample
Digital	400	53*	None	Customer List

Target	Quality Assurance	Margin of Error	Confidence Level	Research Dates
Residential Customers	Dual-level**	+/- 4.7%	95%	January 13 - February 24, 2026

* This represents the total possible number of questions; not all respondents will answer all questions based on skip patterns and other instrument bias.
** Supervisory personnel, in addition to a computer-aided interviewing platform, ensure the integrity of the data is accurate.

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Research Methodology Snapshot | Commercial

Methodology	No. of Completes	No. of Questions	Incentive	Sample
Digital & Telephone	40	47*	None	Customer List

Target	Quality Assurance	Margin of Error	Confidence Level	Research Dates
Commercial Customers	Dual-level**	+/- 13.8%	95%	January 13 - February 24, 2026

* This represents the total possible number of questions; not all respondents will answer all questions based on skip patterns and other instrument bias.
** Supervisory personnel, in addition to a computer-aided interviewing platform, ensure the integrity of the data is accurate.

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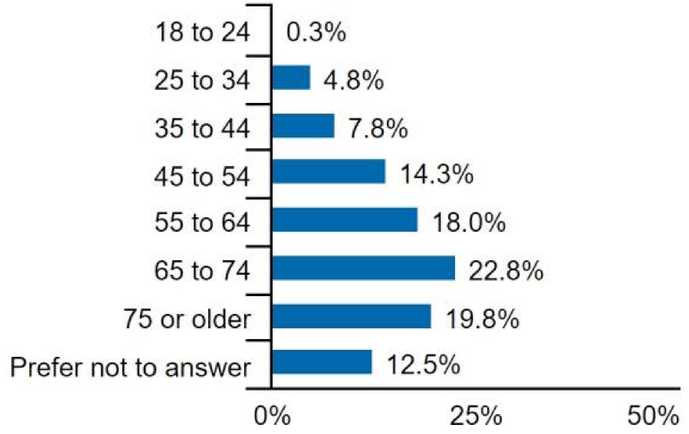
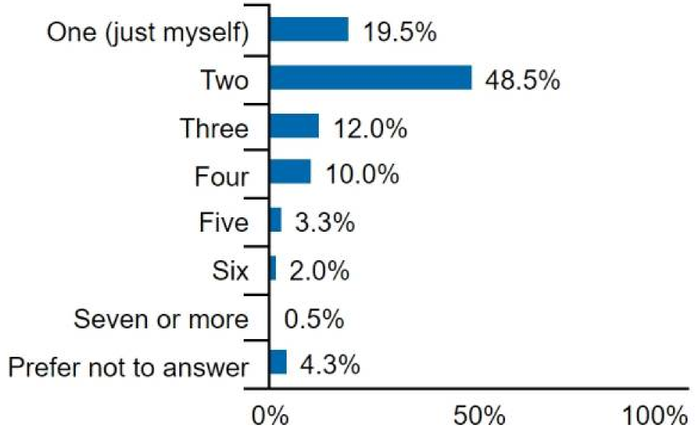
Respondent Profile | Demographics

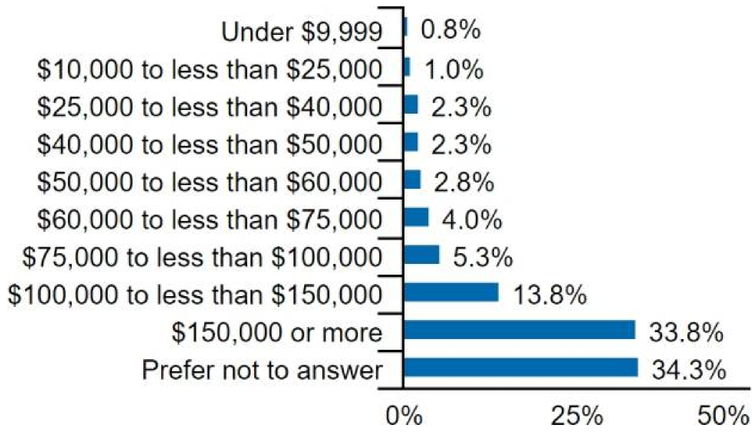
Age



Household Size



Income

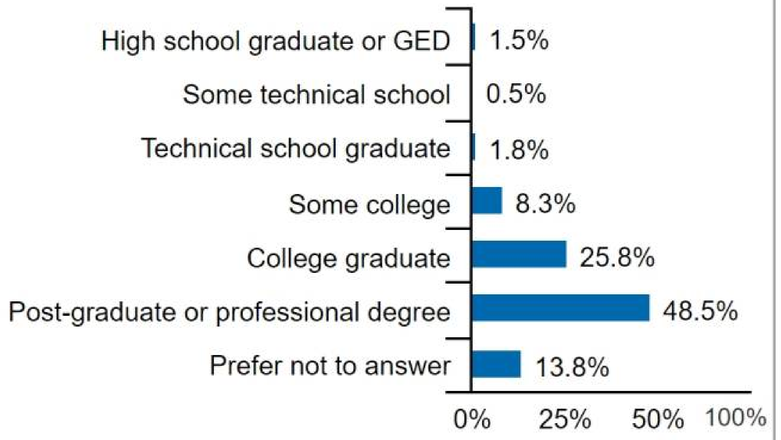


Rent vs. Own

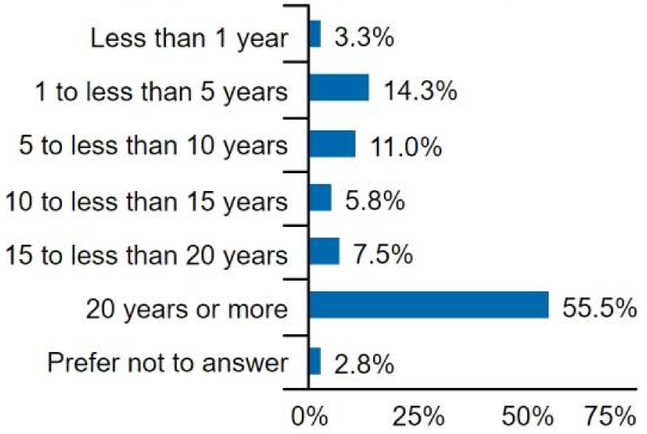
88.0% Own | **8.8%** Rent

3.3% of respondents provided responses of "prefer not to answer" or "don't know"

Education



Length of Time as Customer



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Guide to Footnotes

General

n=362	*The lowercase "n" is used to indicate the base size, or the amount of respondents who answered a particular question.*
NP+S	*The NP+S (net positive score) is a score based on a question asking respondents to describe their relationship with their utility. The score is an aggregation of the following responses: "an advocate of my utility" and "a satisfied customer."*

Statistical Significance

(+/-)	*indicate statistical significance at a 95% confidence level, denoting whether it is higher or lower than the compared subgroup. They are used in charts and tables.*

Scale Questions

"Aggregate of ratings 7-10 shown"	*This phrase indicates positive ratings from questions that use a 10-point scale. The positive ratings are defined as a rating of 7 through 10.*

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Key Study Findings

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Key Study Findings

Ratings

- In 2026, when rating the DPU on a series of organizational characteristics, residential customers reported an average positive rating of 70.3%, while commercial customers reported an average rating of 75.9%.
- Over 85.0% of residential and commercial customers reported being satisfied with the **overall quality of services** received from the DPU in 2026.
- Similarly, approximately nine-out-of-ten or more residential and commercial customers reported being satisfied with the **reliability** of all services they received from the DPU in 2026.
- The net positive rating (satisfied customers + advocates) among residential customers decreased to 70.8% (from 79.9% in 2025), while the NP+S among commercial customers decreased to 82.5% (from 85.7% in 2025).
- Satisfaction with customer service decreased for both residential (83.4%, -3.5 percentage points) and commercial customers (66.7%, -13.3 percentage points).
- Nearly two-thirds of residential customers (65.3%) and nearly three-fifths of commercial customers (58.3%) indicated their questions or issues were "taken care of the first time" when they contacted the DPU.

Communications

- A majority of residential (86.3%) and commercial customers (95.0%) reported being satisfied with the quality of the DPU's communications.
- Most residential (80.5%) and commercial customers (85.0%) reported that the frequency of communication from the DPU is "about right."
- The most common methods of receiving information from the DPU among residential customers were bill inserts (63.0%) and email (37.0%), while one-half (50.5%) preferred bill inserts and nearly one-half (45.8%) preferred email for receiving information about the DPU.
- Among commercial customers, the most common method of receiving information was mail (46.2%), but over one-half (56.4%) preferred email.
- Over two-fifths of both residential (42.3%) and commercial customers (47.5%) were aware of the Los Alamos Now app, an increase for residential customers compared to 2025 (+6.2 percentage points). Among app users, 70.7% of residential and 100.0% of commercial customers reported being satisfied with their experience. Further, over seven-out-of-ten residential (70.7%) and all commercial customers (100.0%) reported being either "very" or "somewhat satisfied" with the app.
- Nearly three-fifths of residential (58.5%) and one-half of commercial customers (50.0%) reported using the Bill and Payment Portal, a slight increase for residential customers (+1.9 percentage points), but a decrease for commercial customers (-11.9 percentage points).

Environmental Sustainability

- Over two-thirds of residential (69.0%) and three-quarters of commercial (75.0%) customers would support the DPU taking on the objective to "reduce potable water use by 12% from 143 gallons per capita per day, to 126 gallons per capita per day by 2030."
- Over one-half of residential customers (54.5%) would **not** support the DPU "supporting phase-out of natural gas service by 2070 with at least a 10% reduction in usage by 2030," although over two-thirds of commercial customers (66.7%) would support this initiative.

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Satisfaction with Services

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Satisfaction | Organizational Characteristics

When rating the DPU on a series of organizational characteristics in 2026, residential customers provided decreased average positive ratings compared to 2025 (-2.5 percentage points), while commercial customers provided increased average positive ratings in comparison (+5.1 percentage points). This was driven by residential customers reporting lower ratings for the DPU "responding promptly to customer questions and complaints" (-6.7 percentage points). However, residential customers gave higher ratings for the DPU "helping customers conserve electricity, gas, and water" (+3.2 percentage points). Commercial customers provided higher ratings for the DPU "being transparent about company operations and policies" (+11.3 percentage points), as well as the DPU "helping customers conserve electricity, gas, and water" (+10.0 percentage points) and their "community outreach" (+10.0 percentage points).

Aggregate of ratings 7-10 shown without "don't know / unsure" responses	Commercial		Residential		Public Power Data Source*
	2025	2026	2025	2026	2025
Helpful and knowledgeable staff	80.0%	82.5%	82.0%	77.8%	67.1%
Communicating with customers	75.0%	80.0%	76.7%	75.3%	63.5%
Responding promptly to customer questions and complaints	73.7%	79.5%	78.7%	72.0%	65.9%
Overall satisfaction with DPU	85.7%	82.5%	76.8%	71.8%	70.2%
Community outreach	61.1%	71.1%	71.0%	71.5%	59.9%
Providing good service and value for the cost of the service	76.2%	75.0%	70.2%	67.0%	62.6%
Helping customers conserve electricity, gas, and water	50.0%	60.0%	63.7%	66.9%	54.5%
Being transparent about company operations and policies	65.0%	76.3%	63.6%	60.3%	61.7%
Average	70.8%	75.9%	72.8%	70.3%	63.2%

Q:Please rate the DPU on the following organizational characteristics using a 10-point scale where one is very poor and ten is very good.
**The Public Power Data Source is a residential customer satisfaction benchmarking tool*

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Satisfaction | Reasons for Dissatisfaction

The top reasons for providing poor ratings for the DPU for any company characteristic among residential customers were the "cost / too expensive," "poor customer service / support," and "billing issues."

Among the few dissatisfied commercial customers, reasons cited were "billing issues" and "multiple reasons" by two (2) customers.

Reasons for Poor Rating	2026	
	Commercial	Residential
Sample size	*3*	*110*
Cost / too expensive	**0**	**40**
Expressed multiple reasons	**1**	**9**
Poor customer service / support	**0**	**7**
Billing issues	**1**	**7**
No community outreach	**0**	**6**
Poor communication / lack of information / not responsive	**0**	**5**
Grid / infrastructure needs updating	**0**	**4**
No outage notification system	**0**	**3**
Provide more renewable energy options	**0**	**3**
Need to provide conservation tips	**0**	**2**

Top 10 residential responses shown

Q:Please indicate why you provided a poor rating for DPU?

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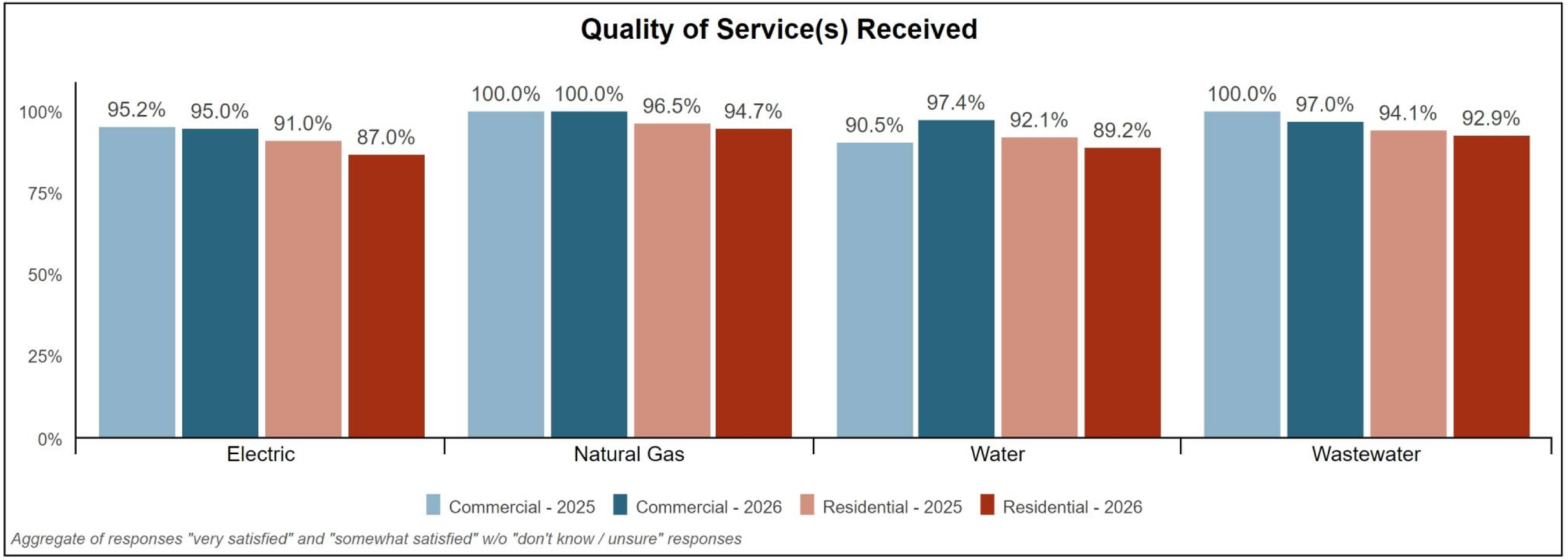
Satisfaction | Quality of Services Received

In 2026, more than 85.0% of surveyed residential and commercial customers were satisfied with the **quality** of all services received from the DPU. However, residential customers reported lower satisfaction ratings for the quality of electric and water services compared to 2025 (-4.0 and -2.9 percentage points, respectively). Notably, all surveyed commercial customers reported being satisfied with the quality of natural gas services they received from the DPU, while an increased frequency of commercial customers reported being satisfied with the quality of water service (+6.9 percentage points).



Aggregate of responses "very satisfied" and "somewhat satisfied" w/o "don't know / unsure" responses

Electric: n=392 residential, n=40 commercial ; Natural Gas: n=374 residential, n=36 commercial ; Water n=379 residential, n=38 commercial; Wastewater n=350 residential, n=33 commercial
Q: How satisfied are you with the quality of the service(s) you receive from DPU? Quality is a measure of what is involved in receiving a utility service. It includes safety, maintenance, utility system infrastructure and customer service.

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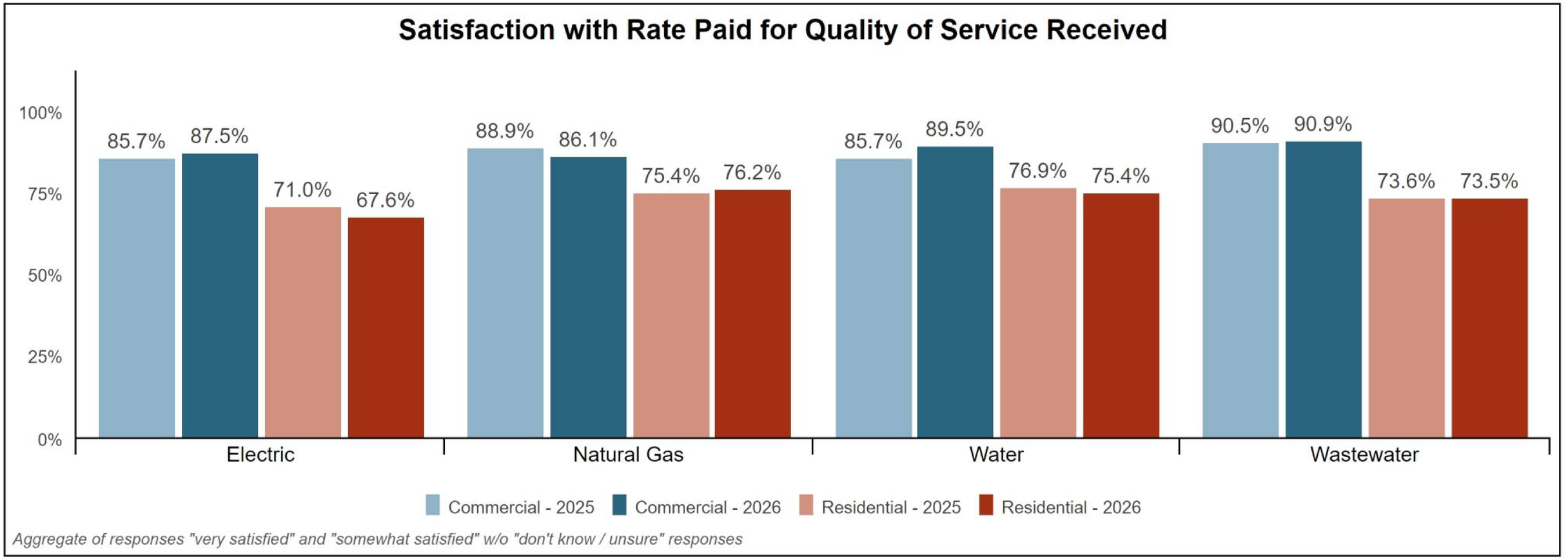
Satisfaction | Price Paid for Quality Received

Among residential customers, satisfaction with the **price paid for the quality** of the DPU's wastewater, natural gas, and water services remained consistent, while satisfaction with the price paid for the electric service quality received was slightly lower compared to 2025 (-3.4 percentage points). Notably, a slightly higher percentage of commercial customers reported being satisfied with the price paid for the quality of water services received from the DPU (+3.8 percentage points).



Electric: n=386 residential, n=40 commercial ; Natural Gas: n=369 residential, n=36 commercial ; Water n=374 residential, n=38 commercial; Wastewater n=351 residential, n=33 commercial
Q: How satisfied are you with the rate you pay for the quality of service you receive for each of the four (4) services DPU provides?

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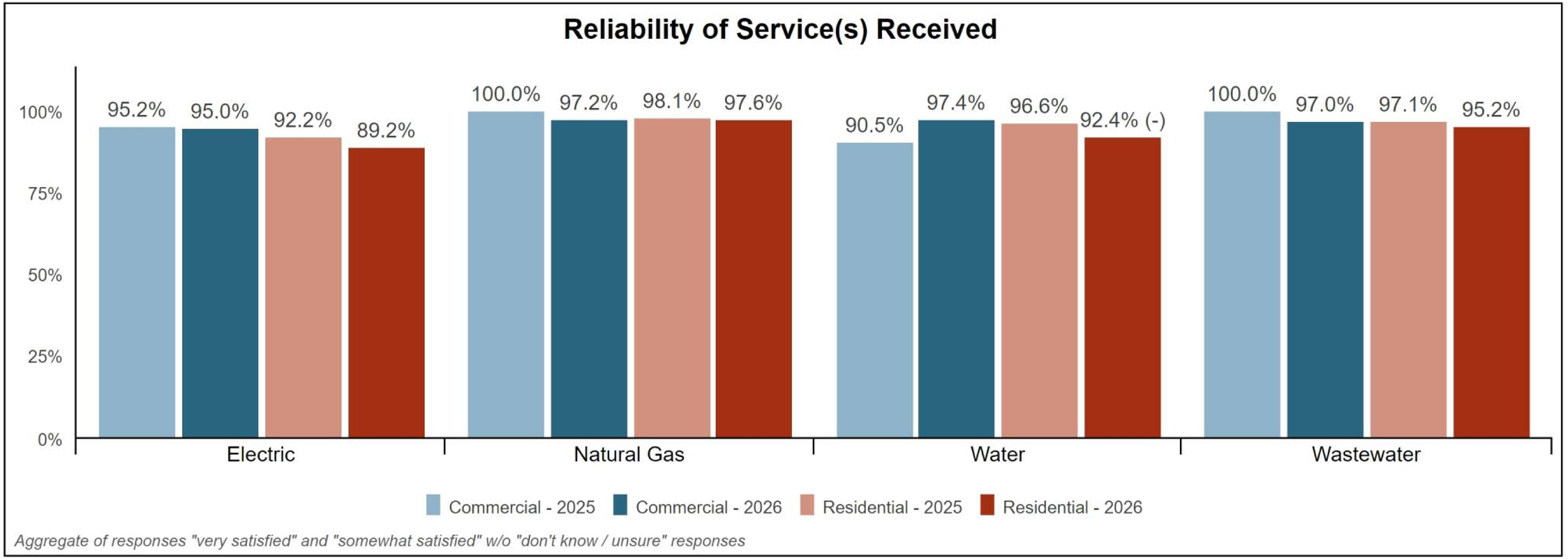
Satisfaction | Reliability of Services Received

Approximately nine-out-of-ten or more residential customers reported satisfaction with the **reliability** of all services they received in 2026, with nearly all reporting satisfaction with the reliability of the DPU's natural gas and wastewater service. However, significantly fewer residential customers were satisfied with the reliability of the water service they received compared to 2025 (-4.2 percentage points). Similarly, over nine-out-of-ten commercial customers reported being satisfied with the reliability of all services they received, with more commercial customers reporting satisfaction with the reliability of water service compared to 2025 (+6.9 percentage points).



Electric: n=398 residential, n=40 commercial ; Natural Gas: n=379 residential, n=36 commercial ; Water n=384 residential, n=38 commercial; Wastewater n=352 residential, n=33 commercial
Q: Please indicate how satisfied you are with the reliability of the service(s) you receive from DPU.
(+/-) indicate statistical significance at a 95% confidence level compared to the 2025 survey.

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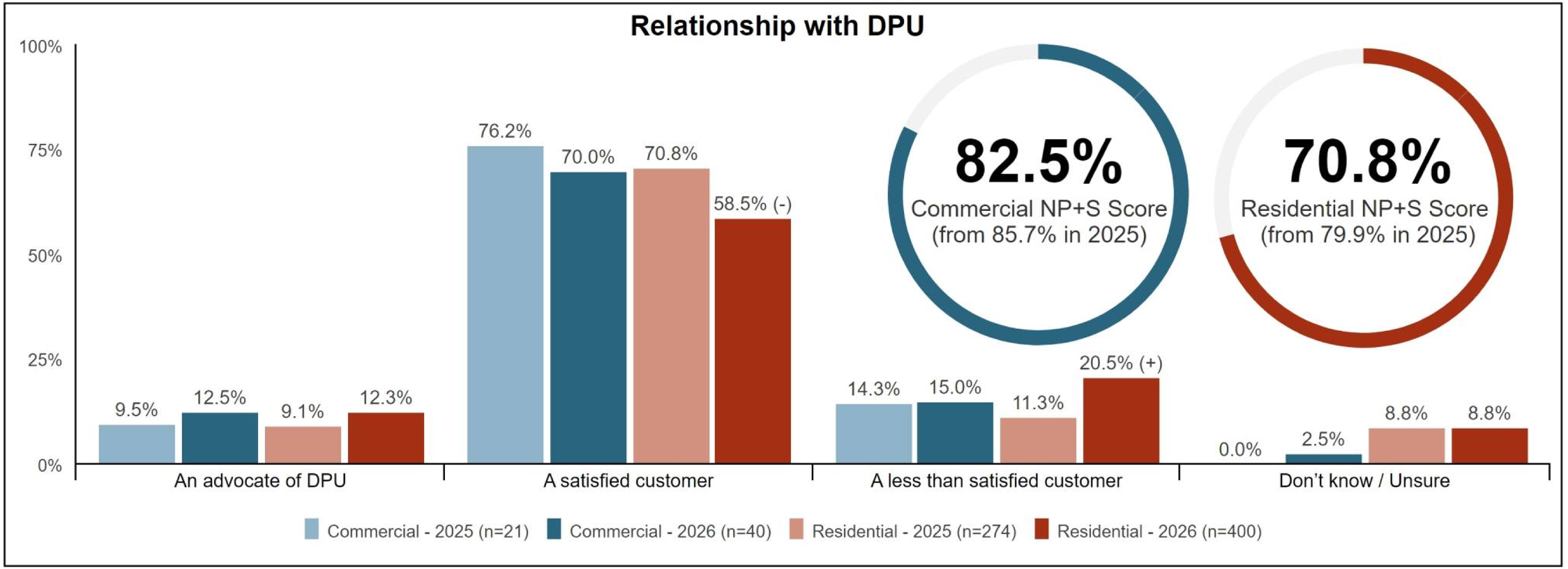
Satisfaction | NP+S Score

In 2026, the DPU scored a lower net positive rating (satisfied customers + advocates) among residential customers (70.8% from 79.9% in 2025), which was largely due to a significant increase in residential customers self-reporting as "a less than satisfied customer" compared to 2025 (+9.2 percentage points) as opposed to being a "satisfied customer" (-12.3 percentage points). Similarly, the DPU scored a slightly lower net positive rating among commercial customers as well (82.5% from 85.7% in 2025), with fewer commercial customers self-reporting as a "satisfied customer" (-6.2 percentage points).



Q:Which of the following best describes your relationship with DPU?

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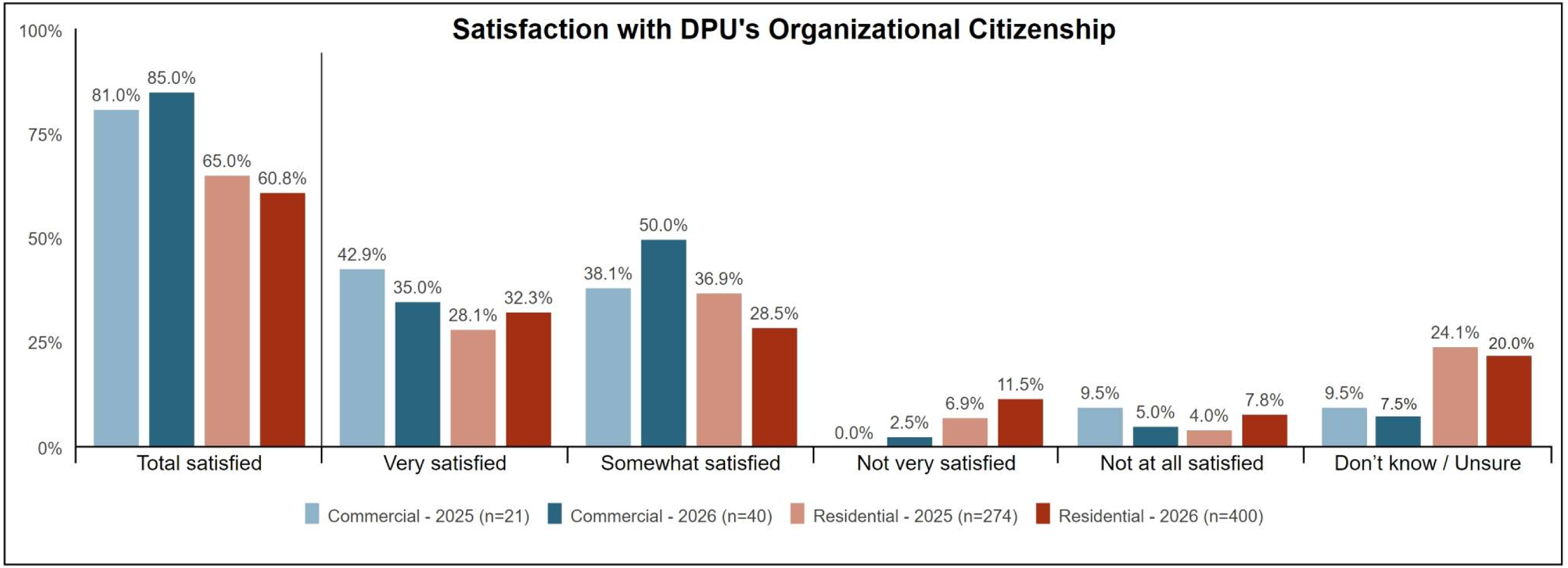
Satisfaction | Organizational Citizenship

Three-fifths of residential customers (60.8%) and over eight-out-of-ten commercial customers (85.0%) reported being either "very satisfied" or "somewhat satisfied" with the DPU's organizational citizenship, marking a decrease in satisfaction among residential customers (-4.2 percentage points). However, nearly one-third of residential customers were "very satisfied" with the DPU's organizational citizenship, an increase compared to 2025 (+4.2 percentage points). Of note, one-fifth of residential customers reported being unsure of their satisfaction with the DPU's organizational citizenship.



Q: How satisfied are you with DPU's organizational citizenship? In other words, how satisfied are you that DPU is environmentally, socially, and financially responsible?

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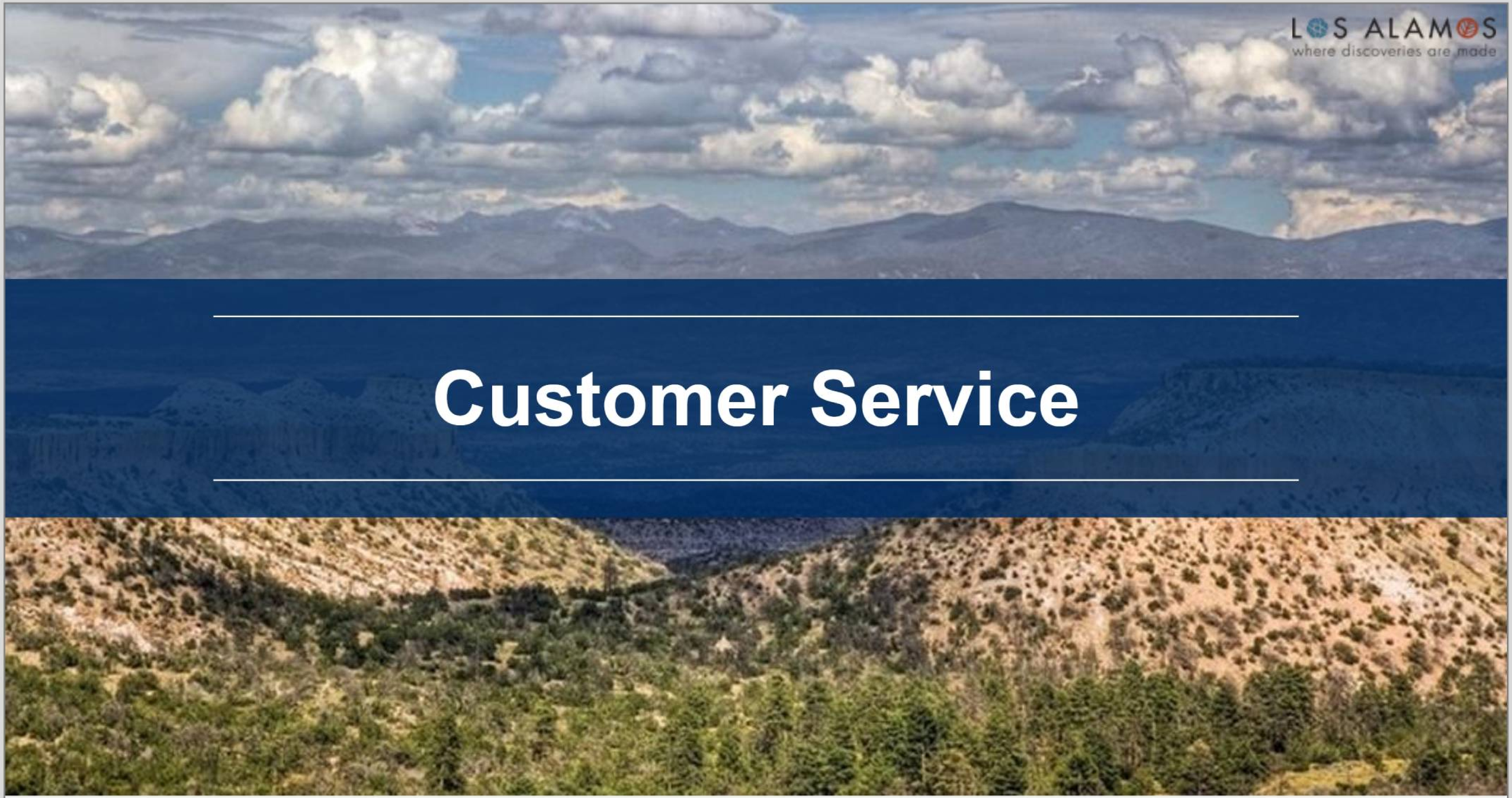

Customer Service

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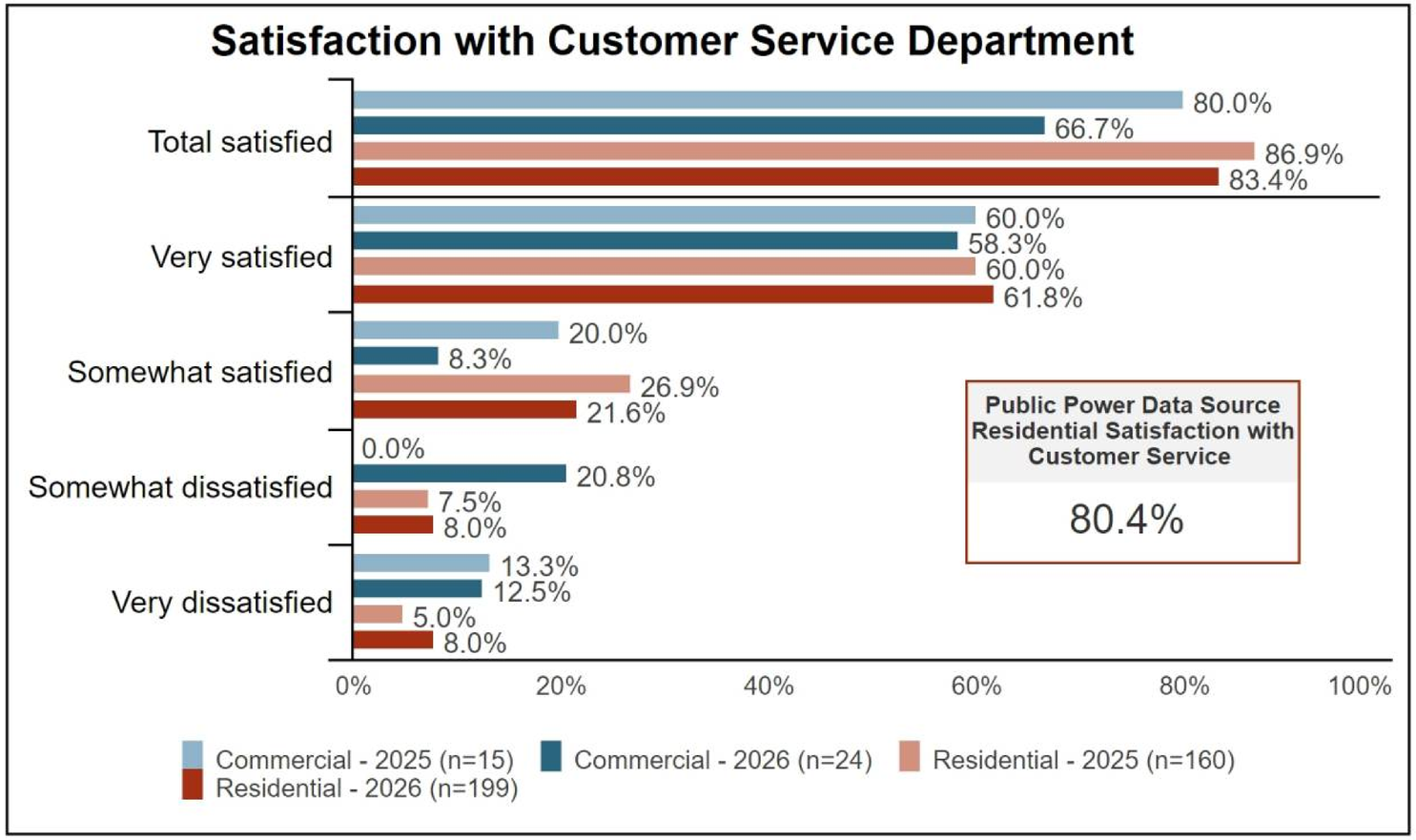
Customer Service | Satisfaction & Purpose of Contact

Among residential customers who have contacted the DPU in the last 12 months, this was primarily for a "water service problem," a "billing question," or a "trash or recycling concern," while nearly one-half of commercial customers reported contacting the DPU for a "billing question." Among these residential customers, customer service satisfaction ratings declined slightly in 2026 (-3.5 percentage points), although over eight-out-of-ten surveyed residential customers reported being satisfied with the service provided by the customer service department. Customer service satisfaction ratings declined for commercial customers as well in 2026 (-13.3 percentage points), with two-thirds of commercial customers reporting satisfaction.



Purpose of Contact	2026	
	Commercial	Residential
Sample size	*24*	*199*
Water service problem, question, issue, or concern	**20.8%**	**23.6%**
Billing question	**45.8%**	**23.1%**
Trash or recycling concern	**0.0%**	**20.1%**
Move in/out	**4.2%**	**14.6%**
Other	**8.3%**	**13.1%**
Sewer service problem, question, issue, or concern	**4.2%**	**12.6%**
Payment or pay arrangement	**0.0%**	**12.1%**
Electric service problem, question, issue, or concern	**8.3%**	**12.1%**

Top 8 responses shown

Q: How satisfied were you with the service provided by the customer service department?
Q: If you have recently contacted DPU in the last 12 months, what was the purpose of the contact?

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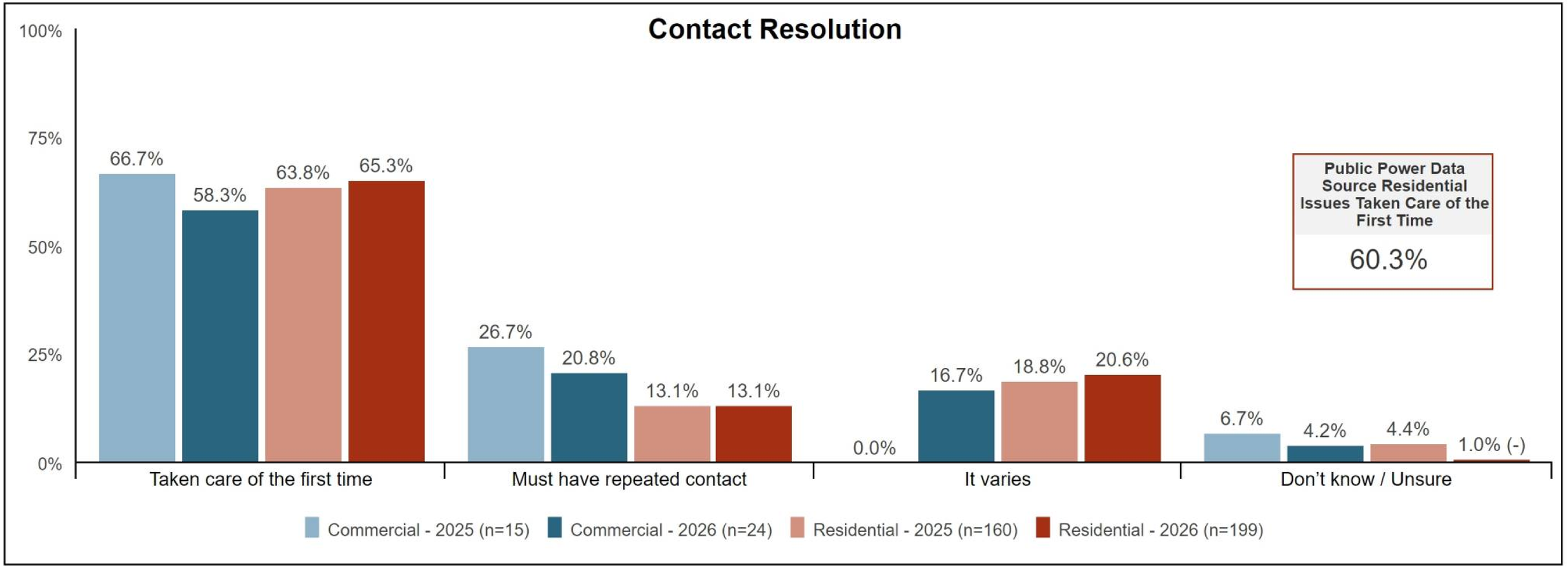
Customer Service | Issue Resolution

Nearly two-thirds of residential customers and nearly three-fifths of commercial customers indicated their questions or issues were "taken care of the first time" when they contacted the DPU. Of note, a decreased percentage of commercial customers indicated their issue was resolved the first time compared to 2025 (-8.4 percentage points).



Q: Generally, when you contact DPU, are your questions answered or issues resolved the first time, or must you contact them again?

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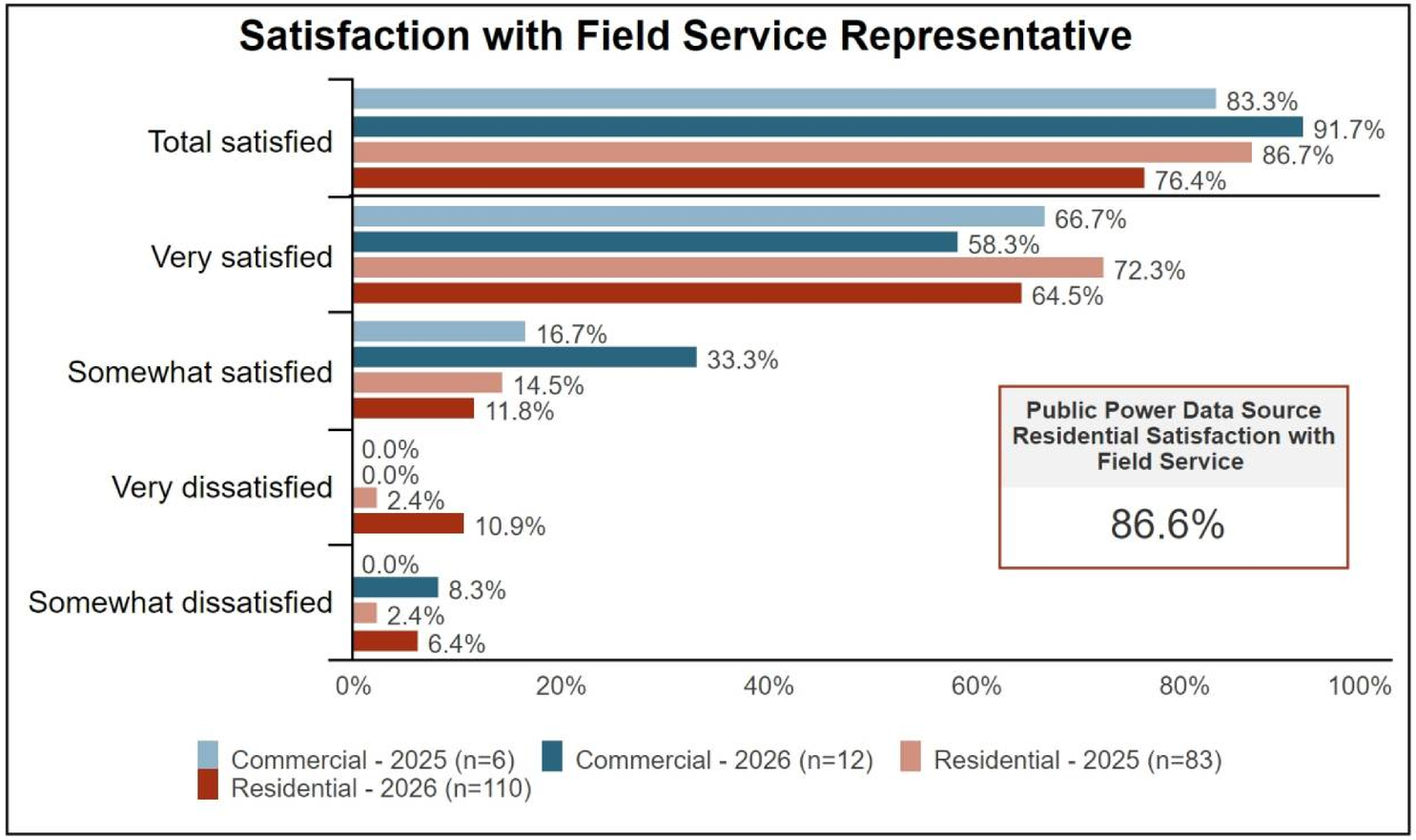
Customer Service | Satisfaction with Field Service

Satisfaction with the DPU's field representatives increased among commercial customers (+8.4 percentage points), with over nine-out-of-ten commercial customers reporting satisfaction in 2026. However, residential customers reported decreased satisfaction with the DPU's field representatives (-10.3 percentage points), with just over three-quarters of customers reporting satisfaction. Among those customers who indicated a field representative visited their home or business in the last 12 months, the most common reason among residential customers was for a miscellaneous reason not listed in the survey or a "meter reading," while over nine-out-of-ten commercial customers had a "service problem/repair."



Purpose of Visit	2026	
	Commercial	Residential
Sample size	*12*	*110*
Other	**0.0%**	**41.8%**
Meter reading	**8.3%**	**34.5%**
Service problem/repair	**91.7%**	**32.7%**
Outage restoration	**0.0%**	**3.6%**

Q: If a field representative visited your home in the last 12 months, what was the purpose of the visit?
Q: How satisfied were you with the service provided by the DPU field representative?

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Communication & Awareness

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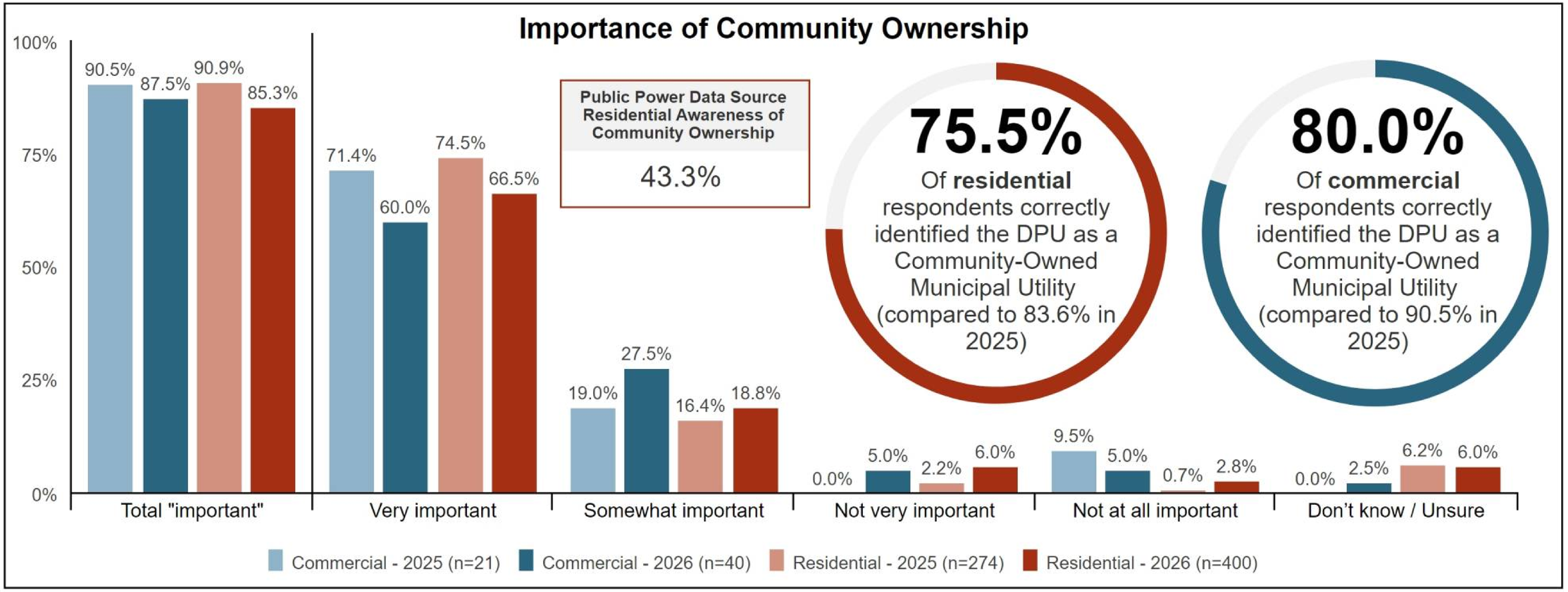
Awareness | Community Ownership

Three-quarters of residential customers and four-fifths of commercial customers correctly identified the DPU as a Community-Owned Municipal Utility. Of note, awareness that the DPU is community-owned declined among both residential (-8.1 percentage points) and commercial (-10.5 percentage points) customers in 2026. Additionally, over eight-out-of-ten residential customers and commercial customers indicated it is either "very important" or "somewhat important" to maintain local control of their municipal utility, although perceived importance decreased for both residential and commercial audiences (-5.6 and -3.0 percentage points, respectively).



Q: Are your utility services provided by a "Community-Owned Municipal Utility" or a "Business-Owned or Privately-Owned Investor Company?"
Q: DPU is a "Community-Owned Municipal Utility." How important to you is it to maintain local control of your municipal utility?

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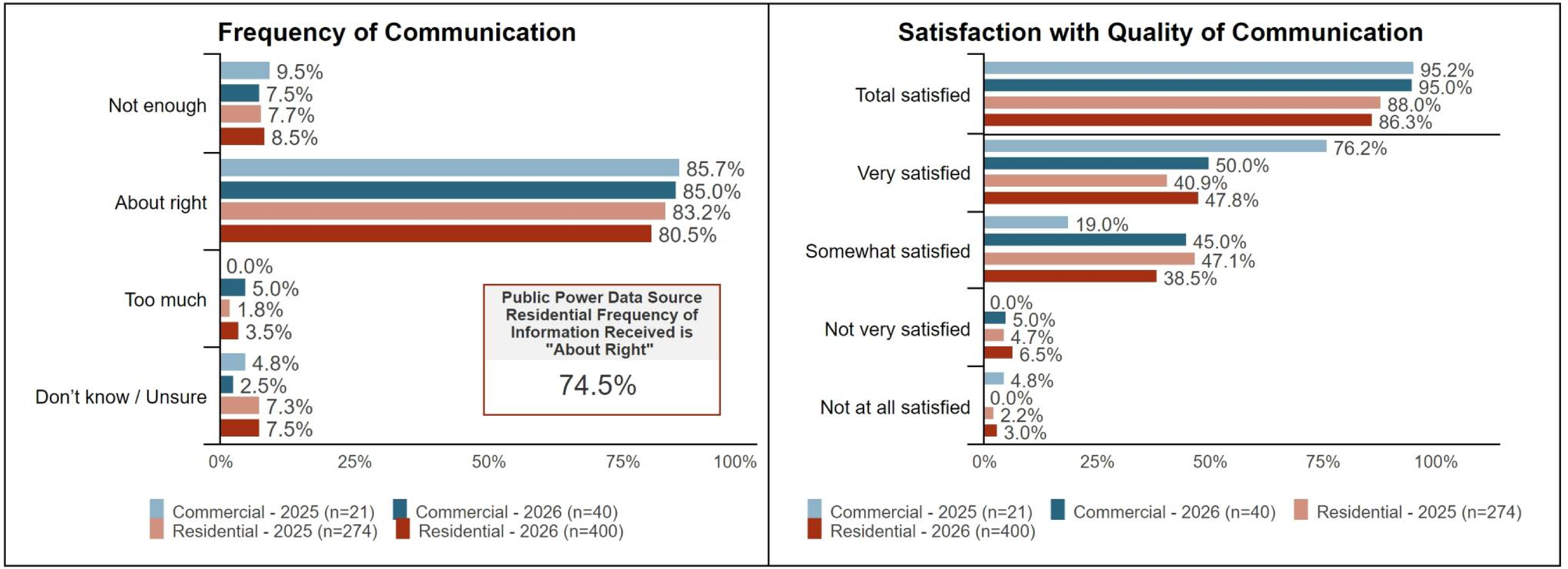
Communication | Satisfaction with Frequency & Quality

Four-fifths of both residential and commercial customers indicated the frequency at which they receive information from the DPU is "about right." Similarly, a majority of residential and commercial customers reported being satisfied with the quality of communication they receive from the DPU, with more residential customers being "very satisfied" with the communication they receive from the DPU compared to 2025 (+6.9 percentage points).



Q: How would you describe the frequency at which you receive information from DPU?
Q: Overall, how satisfied are you with the quality of communication you receive from DPU?

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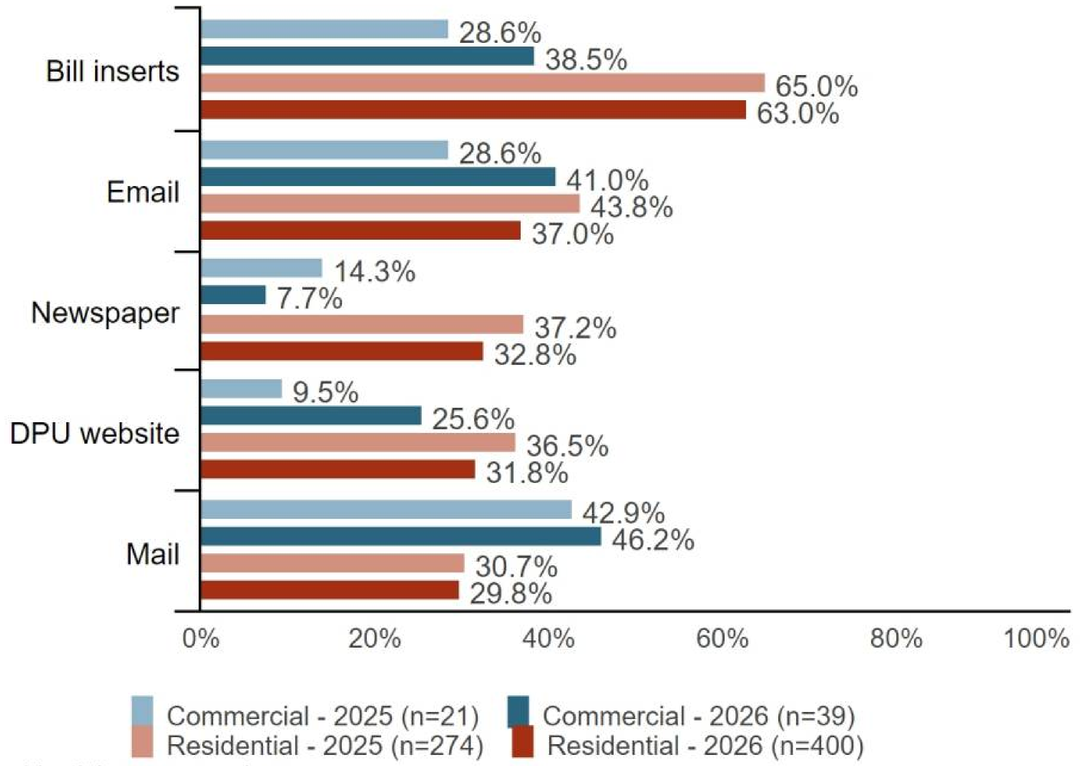
Communication | Current Vs. Preferred Methods

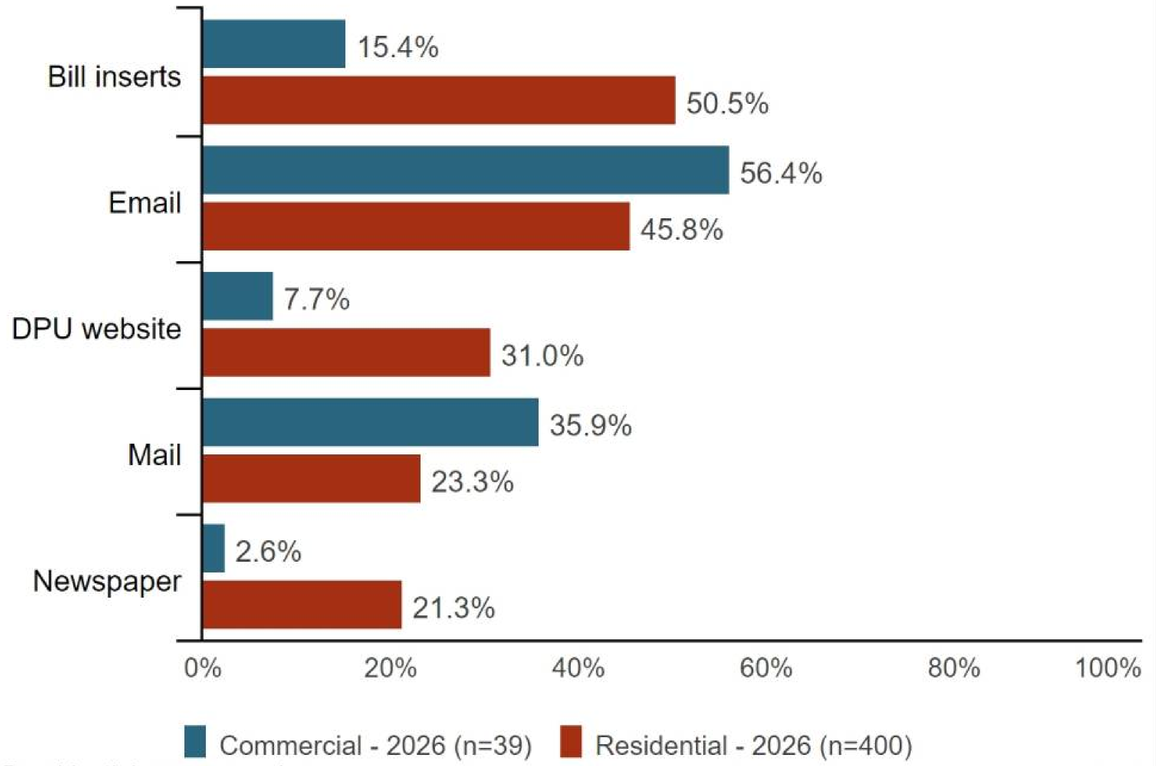
The most common methods of receiving information among residential customers, by a significant margin, were "bill inserts," followed by "email," with one-half of surveyed residential customers **preferring** to receive information about the DPU through "bill inserts," and nearly one-half preferring to receive this information through "emails." Among commercial customers, the most common method of receiving information was through the "mail," followed by "email" and "bill inserts," while over one-half of commercial customers reported a **preference** for "email" communication.

Current Method of Communication



Top 5 residential responses shown

Preferred Method of Communication



Top 5 residential responses shown

Question format was changed to single select in 2026

*Q: Please tell me how you **currently** receive information about DPU?*
*Q: Please tell me your most **preferred** method of receiving information about DPU.*

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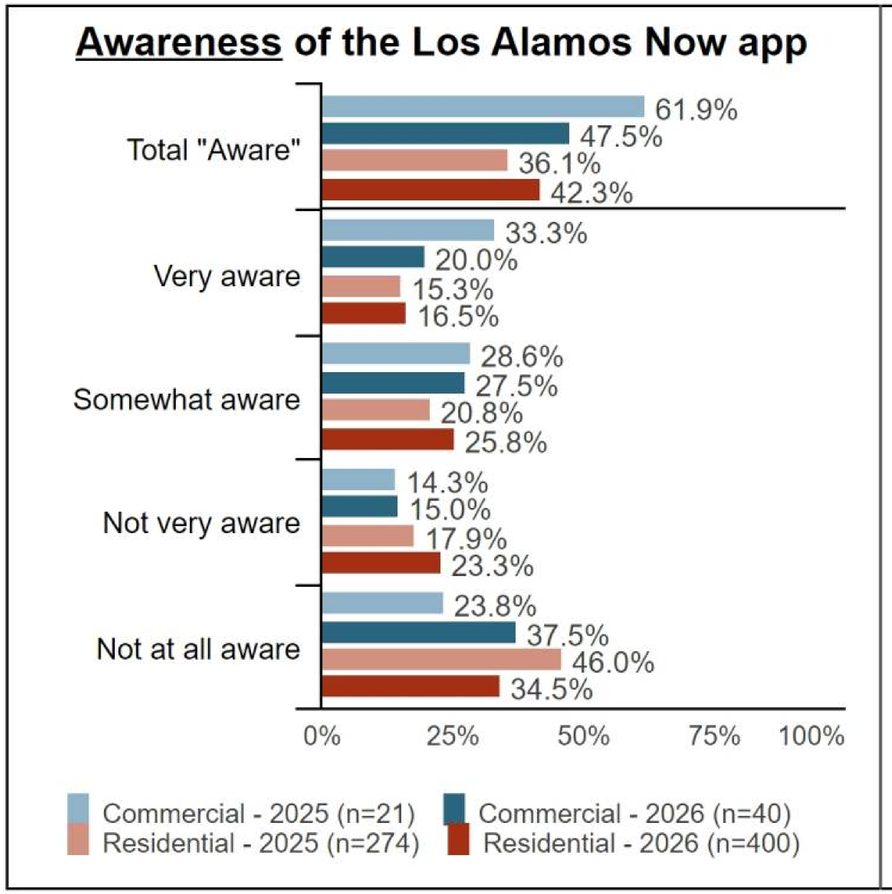
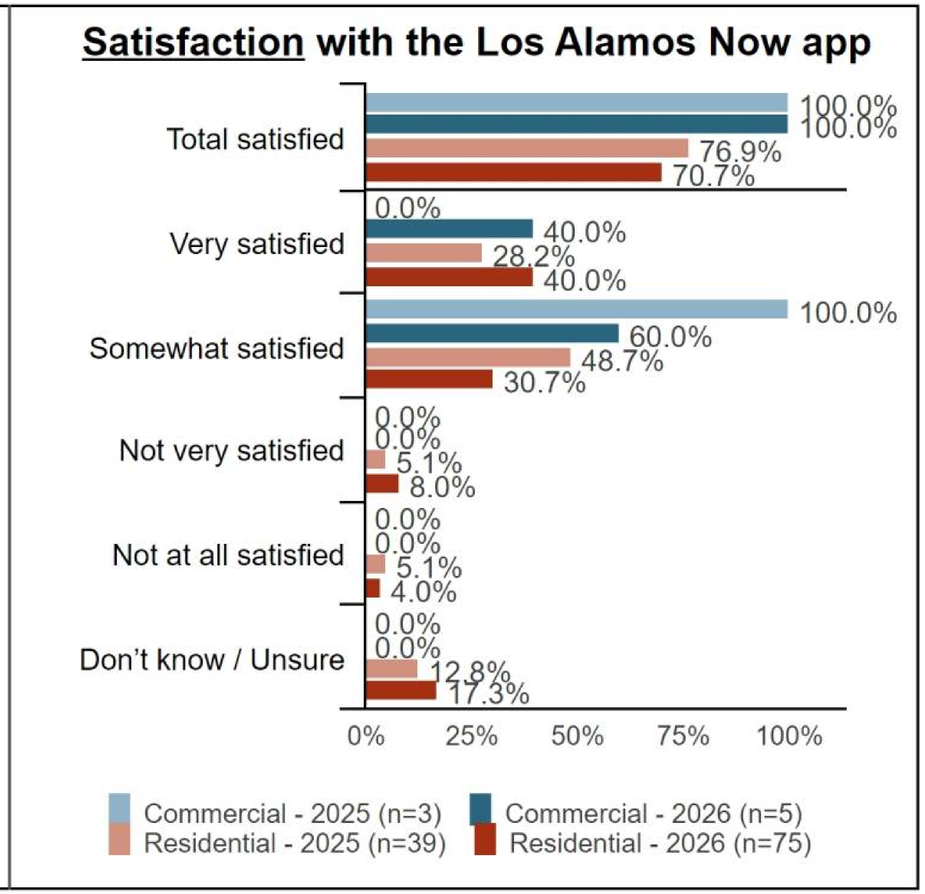
Communication | Satisfaction with Los Alamos Now App

18.8%
Of **residential** customers have used the **Los Alamos Now app** (over 14.2% in 2025)

12.5%
Of **commercial** customers have used the **Los Alamos Now app** (from 14.3% in 2025)

Over two-fifths of both residential and commercial customers were aware of the *Los Alamos Now* app, an increase for residential customers compared to 2025 (+6.2 percentage points), but a decrease among commercial customers (-14.4 percentage points). Among customers who have used the app, over seven-out-of-ten residential and all commercial customers reported being either "very" or "somewhat satisfied" with it.





Q: Prior to this survey, how aware were you of the DPU's app, Los Alamos Now?
Q: Please indicate if you have used any of DPU's Self-Service tools. (Los Alamos Now app)
Q: How satisfied are you with each of DPU's Self-Service tools? (Los Alamos Now app)

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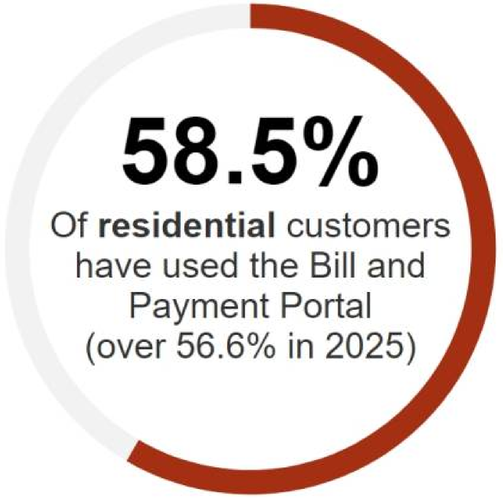
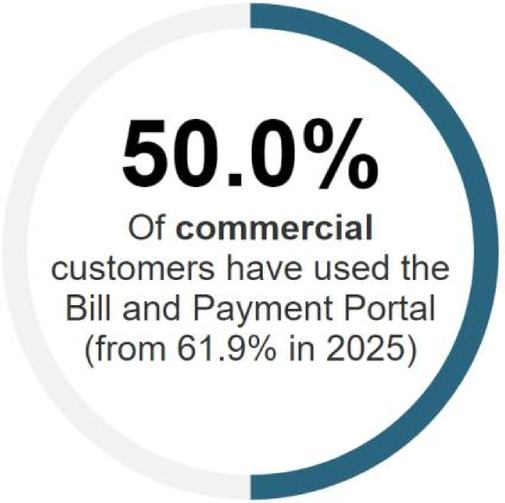
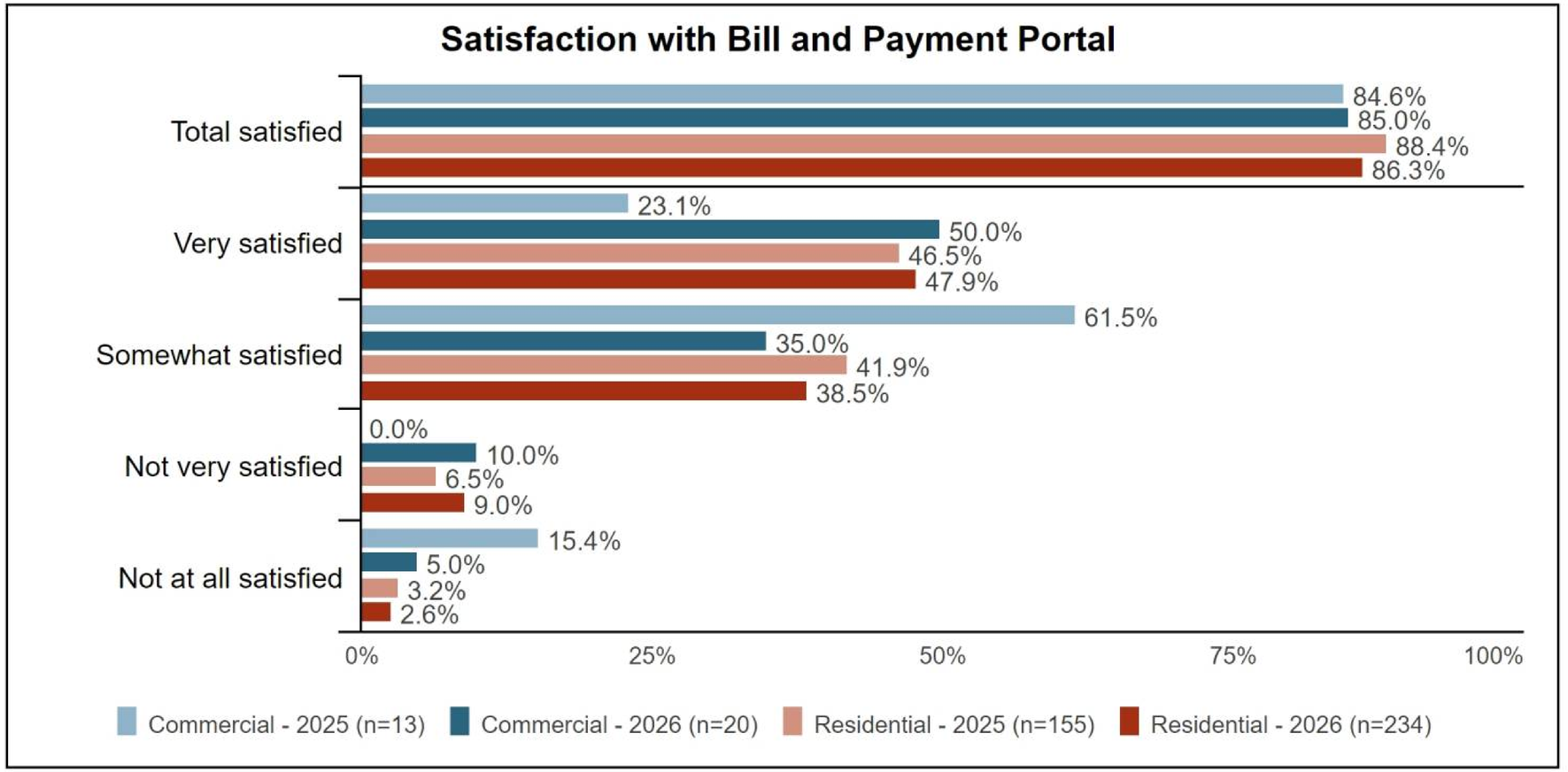
Communication | Satisfaction with Bill & Payment Portal

LOS ALAMOS where discoveries are made





Nearly three-fifths of residential and one-half of commercial customers reported using the Bill and Payment Portal, a slight increase for residential customers (+1.9 percentage points), but a decrease among commercial customers (-11.9 percentage points). Among those respondents who have used the Bill and Payment Portal, over four-fifths of both customer bases reported being satisfied with their experience using the portal, while satisfaction decreased slightly among residential customers (-2.1 percentage points).



Q: Please indicate if you have used any of DPU's Self-Service tools. (Bill and payment portal)
Q: How satisfied are you with each of DPU's Self-Service tools? (Bill and payment portal)

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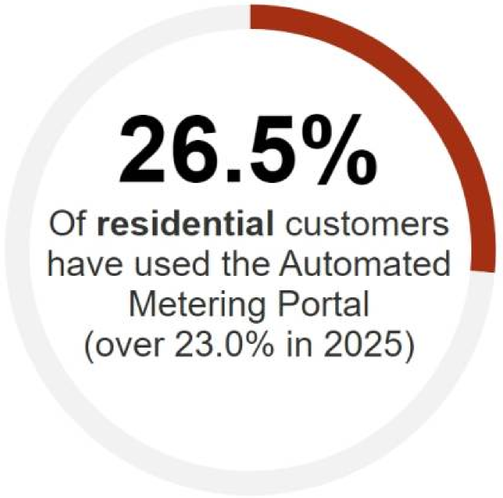
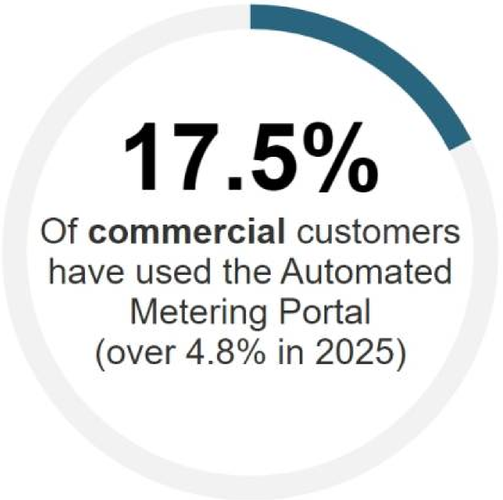
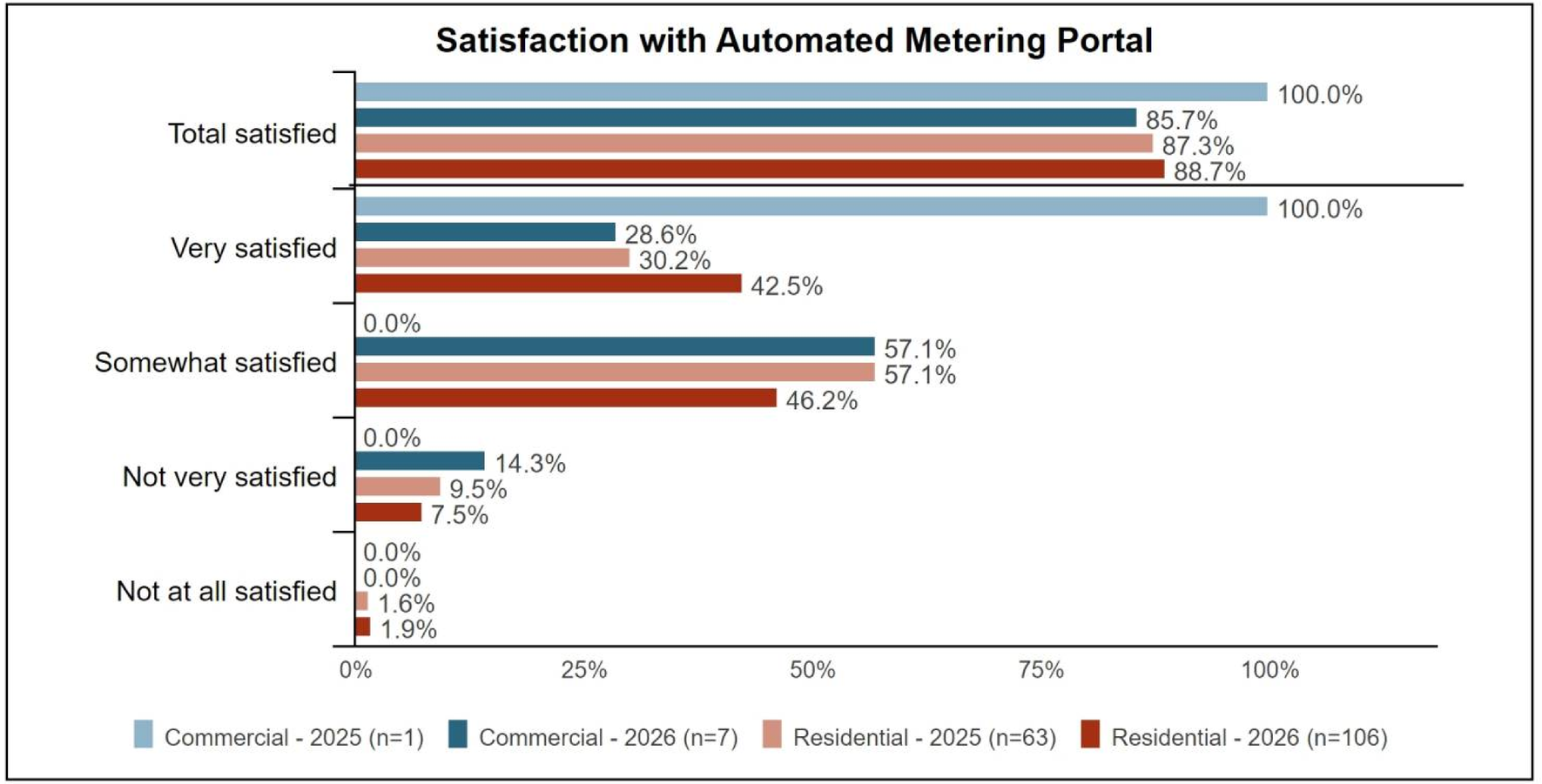
Communication | Satisfaction with Automated Metering Portal

LOS ALAMOS where discoveries are made





Over one-quarter of residential and nearly one-fifth of commercial customers reported using the Automated Metering Portal, an increase for both residential and commercial customers compared to 2025 (+3.5 and +12.7 percentage points, respectively). Of those customers, nearly nine-out-of-ten residential and commercial customers reported being satisfied with their experience using it.



Q: Please indicate if you have used any of DPU's Self-Service tools. (Automated metering portal)
Q: How satisfied are you with each of DPU's Self-Service tools? (Automated metering portal)

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Environmental Sustainability

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Sustainability | Support for DPU Initiatives

Over two-thirds of residential and three-quarters of commercial customers would either "strongly support" or "somewhat support" the DPU taking on the objective to "reduce potable water use by 12% from 143 gallons per capita per day, to 126 gallons per capita per day by 2030." Conversely, over one-half of residential customers would either "strongly oppose" or "somewhat oppose" the DPU "supporting phase-out of natural gas service by 2070 with at least a 10% reduction in usage by 2030," although over two-thirds of commercial customers would support the initiative.

Level of Support for DPU Environmental Sustainability Initiatives

	Total "Support"		Total "Oppose"	
	Commercial	Residential	Commercial	Residential
Reduce potable water use by 12% from 143 gallons per capita per day, which is the 2020 calendar baseline, to 126 gallons per capita per day by 2030	75.0%	69.0%	25.0%	31.0%
Be a net carbon-neutral electric provider by 2040	82.9%	64.7%	17.1%	35.3%
Support phase-out of natural gas service by 2070 with at least a 10% reduction in usage by 2030 as measured by annual therms per heating degree day compared to a 2016-2020 average	66.7%	45.5%	33.3%	54.5%

Without "don't know" responses

Residential n=400, Commercial n=40
Q:The DPU has a goal to continuously, conscientiously work toward environmental sustainability. For each of the three following objectives, please tell us your level of support.

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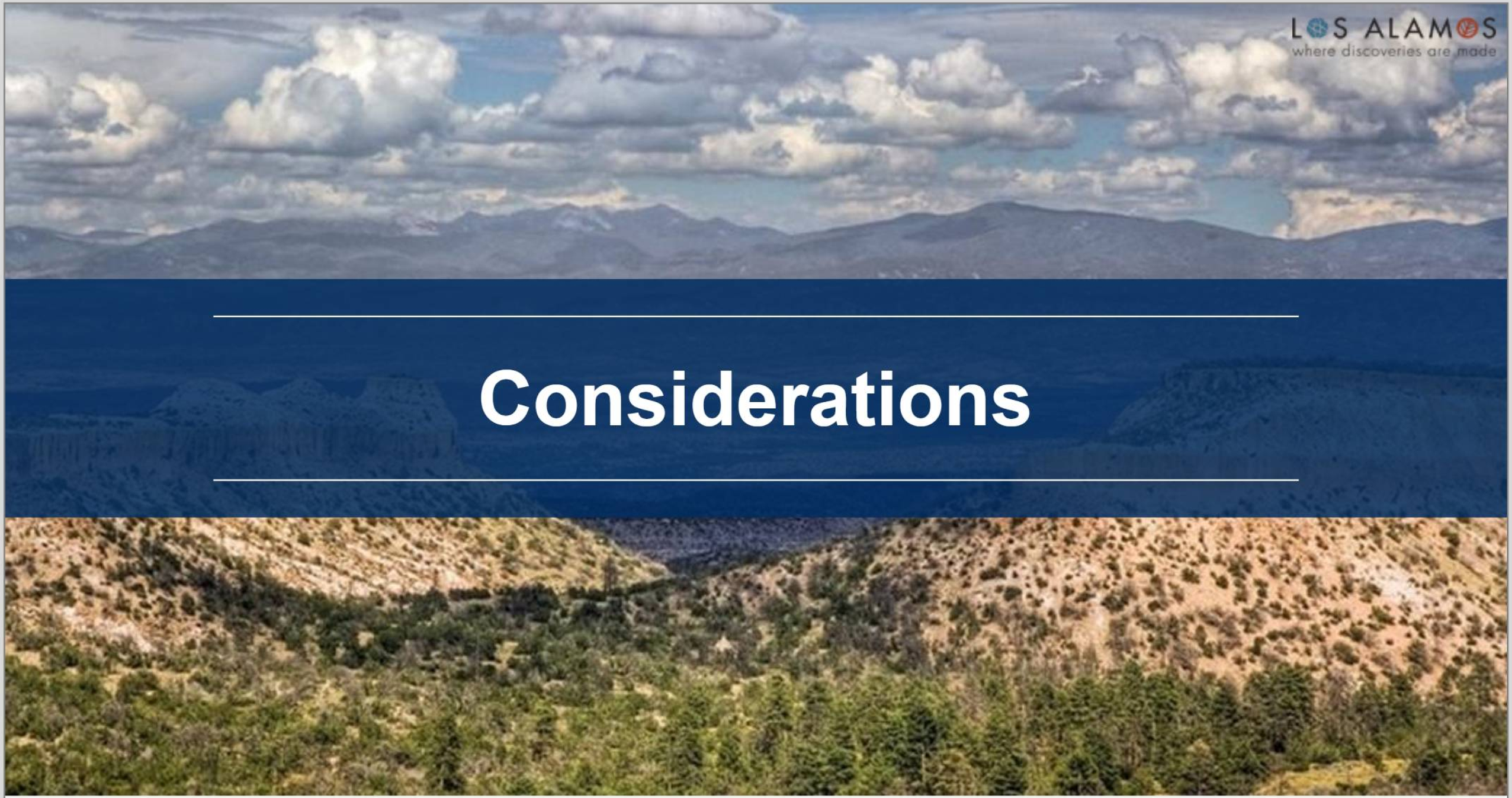

Considerations

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Considerations

Strengthen Perceived Value to Improve Customer Sentiment

The slight decline in the 2026 NP+S suggests an opportunity to strengthen customers' overall perception of value, particularly among residential customers. Lower ratings for responsiveness to questions and complaints, along with cost and billing concerns among dissatisfied customers, indicate that both service experience and cost perceptions could be influencing sentiment. At the same time, increased satisfaction with the DPU's efforts to help customers conserve electricity, gas, and water, among both residential and commercial customers, as well as strong support for water conservation initiatives, highlight an area of positive momentum. Customers may be more receptive to value-based messaging when it is tied to tangible benefits such as cost savings and resource efficiency. Aligning service improvements with clearer communication of value can help reinforce customer satisfaction and support stronger advocacy.

Actionable Insights

- Improve responsiveness to customer questions and complaints by evaluating response time standards, as well as training customer service employees to be better equipped to resolve issues on first contact, if not already doing so.
- Strengthen messaging that connects conservation efforts to direct customer benefits, such as cost savings and long-term rate stability.
- Incorporate conservation achievements and program impacts into regular communications to reinforce the value customers receive.
- Explore opportunities to bundle service improvements and conservation initiatives into a cohesive "value narrative" to better justify pricing and overall service quality.

Align Environmental Initiatives with Customer Priorities

Customer feedback on environmental initiatives reveals a clear divergence in support, particularly between residential and commercial customers. While there is broad support for water conservation goals, opposition to natural gas phase-out efforts among residential customers is notably high. In contrast, commercial customers show stronger alignment with these long-term sustainability goals. These findings suggest that while customers may support sustainability in principle, specific initiatives, especially those perceived as disruptive, require clearer communication from the DPU. Proactively addressing these concerns will be critical to building a broader consensus and minimizing resistance as the DPU advances its environmental goals in the future.

Actionable Insights

- Develop targeted education campaigns that clearly explain the timeline and customer impact of phasing out natural gas service.
- Emphasize cost implications, reliability considerations, and available support programs to address key residential concerns
- Continue promoting water conservation efforts as a "low-resistance" entry point to build broader trust and engagement in sustainability initiatives

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Harnessing the Power of Data

...to help clients achieve organizational goals.

Data supporting strategic decisions to improve products and services. Since 1979, our experience with study and instrument design, data collection, analysis, and formal presentation assists our clients in identifying the "why" and "what's next."

Talent with a knowledge base in a wide range of industries and methodologies ensures a 360º view of the challenges faced and the expertise to address them.

Solutions that are customized to provide a personalized approach to understanding organizational, employee, and customer needs, allowing for more informed decisions.

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- Focus Groups
- In-Depth Interviews

Studies:

- Awareness and Perception Studies
- Customer and Employee Satisfaction Studies
- Journey Mapping
- Creative and New Concept Testing

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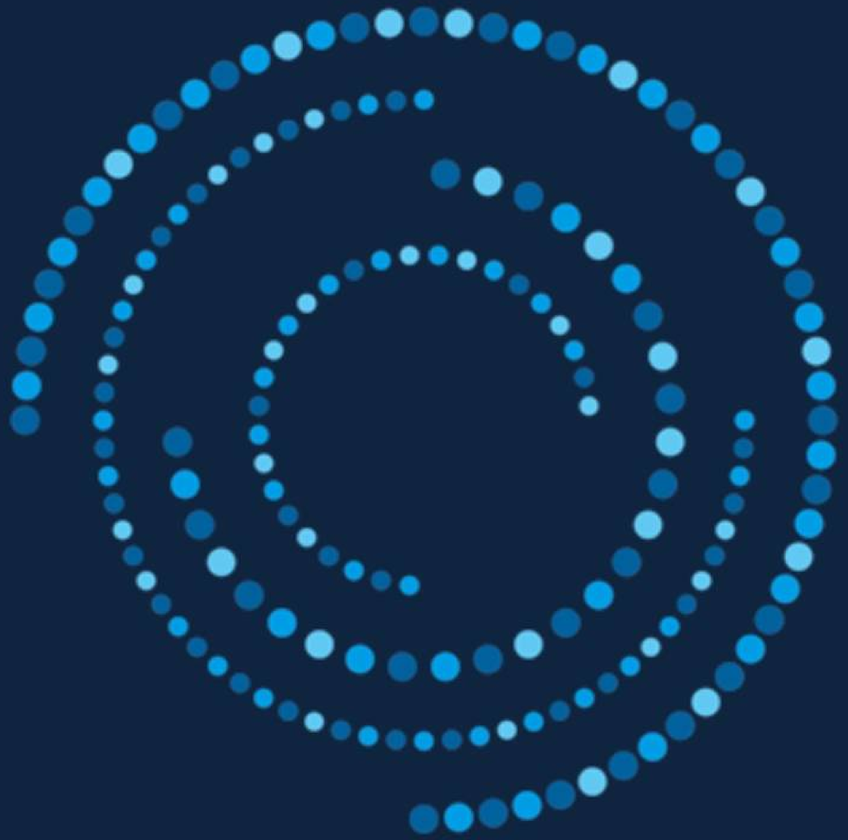

WHAT'S NEXT.

/GreatBlueResearch

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GreatBlue Research

Agenda No.:	5.b.
Index (Council Goals):	
Presenters:	County Council
Legislative File:	**21047-26**

Title
Overview of County Council’s 2026 Strategic Leadership Plan

Body
Vice Chair Ryn Herrmann will review Council's 2026 Strategic Leadership Plan and address questions from BPU members. The plan is included as Attachment A and available online: https://www.losalamosnm.gov/Government/Transparent-Los-Alamos-County/Plans-Studies-Reports/Council-Documents

Attachments
A - 2026 Strategic Leadership Plan

2026 STRATEGIC LEADERSHIP PLAN

LOS ALAMOS

Adopted November 4, 2025

VISION

Los Alamos is a world-renowned community where discovery and innovation are inspired by its dramatic history. Extraordinary educational, recreational, and cultural opportunities abound in a vibrant and welcoming small-town atmosphere situated in a magnificent mountain setting.

INTRODUCTION

On October 2, 2025, the Los Alamos County Council held a Strategic Planning meeting. Prior to that meeting, Council members were asked to complete a survey on the existing strategic objectives to help guide and prioritize the discussion on next year's plan. The survey was completed by 6 of 7 Councilors and the following topics and results were noted:

- Keep the strategic objective as is, keep but modify, or eliminate.
  Most of the strategic objectives had a mix of responses to keep as is or modify. There were many suggestions provided on these responses. Only one objective (Economic Vitality – Educational, Arts, Cultural, and Historical Amenities) received a unanimous response to keep as is. Only one Councilor suggested eliminating an objective (Economic Vitality – Community Broadband).

- Prioritize these strategic objectives as (high, medium, or low).
  Councilors were limited to no more than 7 high priorities. The objectives receiving the highest number of high-priority rankings were Quality Governance – Communication and Engagement, Quality Governance – Fiscal Stewardship, Operational Excellence – Effective, Efficient, and Reliable Services, and Economic Vitality – Housing. Quality of Life – Inclusion, Access, and Belonging and Environmental Stewardship – Greenhouse Gas Reduction each received two low-priority votes.

- Identify whether the strategic objectives are "in the County's control" or "out of the County's control."
  Most of the objectives were considered by the majority to be "in control." However, Environmental Stewardship – Greenhouse Gas Reduction and Environmental Stewardship – Carbon-Neutral Energy Supply each received three "out of control" votes, and four objectives received two "out of control" votes (Quality Governance – Intergovernmental, Tribal, and Regional Relations, Economic Vitality – Housing, Economic Vitality – Local Business, and Environmental Stewardship – Water Conservation).

- Determine whether the strategic objective is a "core service" or "non-core service of the County."
  The majority felt that the following objectives were "core services": Quality Governance – Fiscal Stewardship, Operational Excellence – Effective, Efficient, and Reliable Services, Operational Excellence – Infrastructure Asset Management, Operational Excellence – Employee Recruitment and Retention, Economic Vitality – Community Broadband, Quality of Life – Mobility, Qualify of Life – Open Space, Parks, and Recreation, Quality of Life – Public Safety, and Environmental Stewardship – Waste Management. Most felt that Quality Governance – Intergovernmental, Tribal, and Regional Relations, Economic Vitality – Housing, Economic Vitality – Local Business, Economic Vitality – Downtown Revitalization, Economic Vitality – Educational, Arts, Cultural, and Historic Amenities, Economic Vitality – Tourism and Special Events, Quality of Life – Inclusion, Access, and Belonging, Environmental Stewardship – Natural Resource Protection, Environmental Stewardship – Greenhouse Gas Reduction, and Environmental – Carbon Neutral Energy Supply were "non-core services."

This information was reviewed and used to update the strategic plan. The Council subsequently adopted five focus areas areas and 22 objectives for 2026. The focuss areas and objectives address issues that are important to the community and the governance of essential functions. They are tools to help maintain a focus on important and challenging issues, but they are not all-inclusive of the broad scope of the County's work and investments.

While all 22 objectives are important, the top five rankings in the National Community Survey, conducted in August/September 2024, are effective, efficient, and reliable services; local business; housing; fiscal stewardship; and communication and engagement. Notably, the survey's 74 percent overall rating of County services is a statistically significant increase of 10 percent over the 2022 rating. Highest performing areas are public safety, natural environment, parks and recreation, mobility, and arts and culture. Lowest performing areas are economy (quality and variety of businesses and services), affordability (housing, food, health care and services), and community design (appearance, new development, and housing options).

Concrete actions for addressing each of the 22 objectives will be determined, in the context of community survey input and all ongoing County efforts, for making and communicating progress and identifying challenges throughout the year. Many of the actions will come from existing plans listed at the end of this document, which can be found on the County's website at losalamosnm.us/reference-docs. An electronic performance dashboard, also available on the County's website, captures the scope of County actions to address each of the objectives and is updated in January 2026.

A high-level summary of the progress made toward the 2025 focus areas and priorities will be provided in the State of the County Annual Report in January 2026.

STRATEGIC
FOCUS AREAS & OBJECTIVES

Quality Governance

Quality governance is participatory, consensus-oriented, transparent, accountable, effective, efficient, and responsive to present and future needs of stakeholders.

Communication and Engagement

Inform, engage, and solicit feedback from community members and affected parties, including boards and commissions, on County projects, policies, and priorities to promote a culture of open communication and collaboration to increase public participation.

Intergovernmental, Tribal, Regional Relations, and Partnerships

Collaborate and problem-solve with the County's major employers; community partner organizations (local education, health care, and other organizations); neighboring Pueblos; and regional, state, and federal governmental entities.

Fiscal Stewardship

Evaluate alternative methods and approaches for expenditures and investments, ensure transparency, and comply with applicable budgetary and financial regulatory standards and fiscal sustainability.

STRATEGIC
FOCUS AREAS & OBJECTIVES

Operational Excellence

Operational excellence involves having structures, processes, standards, and oversight in place to ensure that effective services are efficiently delivered within available resources and that services continuously improve to anticipate and meet future needs.

Effective, Efficient, and Reliable Services

Deliver customer-focused, accessible, reliable, and sustainable services to the community through collaborative decision-making, and efficient implementation.

Infrastructure Asset Management

Evaluate the County's assets and infrastructure to prioritize funding to first maintain and protect those investments and to second inform new investments.

Employee Recruitment and Retention

Attract and employ diverse and highly qualified staff, retain staff through development opportunities, equity and upskilling opportunities, and compensation and benefits, and promote staff to address increasingly complex challenges.

STRATEGIC
FOCUS AREAS & OBJECTIVES

Economic Vitality

Economic vitality encompasses the ability of the community to diversify, develop, grow, and sustain the many elements necessary for a local economy to flourish.

Housing

Increase the capacity for new housing development and the amount and variety of housing types to meet the needs of a changing and growing population, particularly middle- and lower-income households.

Local Business

Encourage the retention of existing businesses, facilitate the startup of new businesses, and assist in opportunities for business growth.

Downtown Revitalization

Revitalize the downtown areas of Los Alamos and White Rock by facilitating and incentivizing development opportunities.

Educational, Arts, Cultural, and Historical Amenities

Promote and enable educational, arts, cultural, and historical enrichment opportunities, in coordination with community partners, and provide for the preservation and restoration of historic buildings and the protection of archaeological sites.

Tourism and Special Events

Promote tourism, sponsor special events, and support community events, by enhancing amenities, utilizing indoor and outdoor facilities, and encouraging local business support and increasing capacity for overnight stays.

Community Broadband

Implement community broadband as a self-sustaining essential service that enables reliable high-speed Internet access throughout the County at competitive pricing.

STRATEGIC
FOCUS AREAS & OBJECTIVES

Quality of Life

Quality of life is a reflection of general wellbeing and the degree to which community members are healthy, comfortable, welcomed, included, and able to enjoy the activities of daily living.

Health, Wellbeing, and Social Services

Expand access to behavioral, mental, and physical health and social services and amenities to address identified issues and promote wellbeing in the County and the region.

Inclusion, Access, and Belonging

Promote inclusion, access, and belonging through events and training, facility planning, and expanded opportunities and services for diverse needs and interests.

Mobility

Improve and expand access to, and provide disability accommodation for, alternative modes of travel including public transit, cycling, and walking amenities and services.

Open Space, Parks, and Recreation

Manage, maintain, and improve designated open spaces, parks and recreation facilities, trails, and amenities as defined by adopted plans and approved projects.

Public Safety

Ensure overall community safety through proactive and sustained implementation of police, fire, hazard mitigation, and emergency response plans.

STRATEGIC
FOCUS AREAS & OBJECTIVES

Environmental Stewardship

Environmental stewardship is the responsible use and protection of the natural environment through active participation in conservation efforts and sustainable practices in coordination with community and organizational partners.

Natural Resource Protection

Take actions to protect wildlife and wildlife habitat, safeguard water quality, and mitigate tree loss in the community.

Water Conservation

Reduce potable water use and increase non-potable water use and water harvesting for irrigation where suitable.

Climate Action and Resiliency

Implement the roadmap for reducing greenhouse gas emissions, achieving a carbon neutral energy supply, and increasing climate resilience.

Waste Management

Divert community waste from landfills through recycling, re-use, composting and waste reduction programs, and zero-waste campaigns.

REFERENCE DOCUMENTS

Administrative Services

2025–2026 Biennial Budget (FY25, Adopted–FY26, Adopted)

2026 Budget in Brief (FY26 Adopted Budget)

2025 Annual Comprehensive Financial Report (ACFR)

2025 Popular Annual Financial Report (PAFR)

Community Development

2025 East Downtown Los Alamos Metropolitan Redevelopment Area Plan

2024 Los Alamos Affordable Housing Plan

2023 White Rock Metropolitan Redevelopment Area Plan

2021 Los Alamos Downtown Master Plan

2021 White Rock Town Center Master Plan

2020 North Mesa Housing Study

2019 Los Alamos Housing Market Needs Analysis

2019 Los Alamos County Economic Vitality Strategic Plan

2018 Fuller Lodge Interpretive Plan

2018 Los Alamos Tourism Strategic Plan

2016 Los Alamos County Comprehensive Plan

2014 Brand Action Plan

2011 Los Alamos Creative District Plan

2009 Regional Economic Development Strategic Plan

2008 Los Alamos County Historic Preservation Plan

Community Services

2025 Cemetery Master Plan

2025 Trails and Open Space Management Plan

2024 Comprehensive Health Plan

2023 Integrated Master Plan

2022 ADA Audit Report

2020–2023 Los Alamos County Library System Strategic Plan

2020 Health Services Gap Analysis Final Report

County Manager

2024 Communication Plan

2024 Los Alamos Climate Action Plan

2023 Community Broadband Strategic Plan

2022 Los Alamos Resiliency, Energy, and Sustainability Task Force Final Report

2022 Racial Equity and Inclusivity Task Force Final Report

2017 Foundation Document—Manhattan Project National Historical Park

Emergency Management

2024 Los Alamos Local Hazard Mitigation Plan

2023 Continuity of Operations Plan

2023 Emergency Operations Plan

2023 Local Hazard Mitigation Plan

Fire

2019-2024 Los Alamos Fire Department Strategic Plan

Public Utilities

FY2026 Strategic Goals & Objectives

2024 Drinking Water Quality Report

2022 Integrated Resource Plan

2022 Water and Energy Conservation Plan

2018 Long Range Water Supply Plan

2014 Electric Reliability plan

Public Works

2026 Snow and Ice Plan

2025 Pedestrian Master Plan

2023 Facility Condition Reports

2022 Food Waste Composting Feasibility Study

2022 Transit Study

2021 Pavement Management Analysis and Report

2017 Bicycle Transportation Plan

2013 Airport Master Plan

2011 Canyon Rim Trail Master Plan

Agenda No.:	6.a.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; Quality Governance - Fiscal Stewardship; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services; DPU FY26 - 2.0 Achieve and Maintain Excellence in Financial Performance
Presenters:	Joann Gentry, Deputy Utility Manager-Finance & Admin.
Legislative File:	**CO0745-26.1**

Title
Introduction of Incorporated County of Los Alamos Code Ordinance No. 02-379; An Ordinance Amending Chapter 40, Article III, Sections 40-151, and 40-152 of the Code of the Incorporated County of Los Alamos Pertaining to Gas Service Rates.

Recommended Action
I introduce, without prejudice, Incorporated County of Los Alamos Code Ordinance No. 02-379; An Ordinance Amending Chapter 40, Article III, Sections 40-151, and 40-152 of the Code of the Incorporated County of Los Alamos Pertaining to Gas Service Rates and ask the staff to assure that it is published as provided in the County Charter.

Utilities Manager's Recommendation
The Utilities Manager recommends that the Board of Public Utilities introduce this Ordinance.

Body
The ten-year forecast for the gas utility presented with the FY2027 and FY2028 budget included a series of rate increases to generate the revenues needed to sustain current operations and to build the cash reserves required for future infrastructure investments. The proposed rate increases for the Gas Fund span two consecutive years: 29% in FY2027 and 17% in FY2028 for residential, multifamily, and commercial customers, and 30% in FY2027 and 19% in FY2028 for County and Schools customers.

During the rate analysis completed for the FY2027 and FY2028 budget, projected FY2026 sales revenue was estimated at $8.36 million. Due to a warmer winter and lower usage, current projections indicate sales revenue will be approximately $5.9 million-about $2.45 million below expectations. The FY2025 audited net income for the Gas Fund reflected a loss of $489,267, and the projected net loss for FY2026 is approximately $2.36 million.

For FY2027 and FY2028, we projected our sales in therms using a five-year average of 6.8 million therms. Based on the projected decrease in therm sales and the proposed rate increases for FY2027 and FY2028, the gas fund is expected to reach a positive cash flow in FY2029. We anticipate beginning to fund cash reserves in FY2030 and fully funding those reserves by FY2032.

The proposed rates are expected to restore the gas fund’s cash flow to a sustainable level within the projected time frame. This plan will provide sufficient funding for essential repairs,

replacements, and ongoing operations, while also supporting progress toward our long-term cash reserve targets. Future rate increases are projected to be 3% starting in FY2029.

Citizens are welcome to attend and provide public comment regarding the proposed Gas Service Rates at these scheduled meetings:

BPU Public Hearing: May 6, 2026
Council Introduction: May 19, 2026
Council Public Hearing: June 9, 2026

Alternatives

As noted above, rate increases will be necessary to support essential operations, infrastructure replacement, and the restoration of cash reserves. Without taking action, DPU would be forced to curtail maintenance and replacement activities, which would ultimately impact system reliability.

Fiscal and Staff Impact/Planned Item

The proposed increases are expected to restore our gas fund to a positive gas flow in FY2029 as well as fund our long-term cash reserves.

Attachments

A - LAC Code Ordinance 02-379 - Gas Rates
B - Gas Rate Ordinance Presentation

INCORPORATED COUNTY OF LOS ALAMOS CODE ORDINANCE NO. 02-379

AN ORDINANCE AMENDING CHAPTER 40, ARTICLE III, SECTIONS 40-151 AND 40-152 OF THE CODE OF THE INCORPORATED COUNTY OF LOS ALAMOS PERTAINING TO THE NATURAL GAS SERVICE RATE SCHEDULE

WHEREAS, the Incorporated County of Los Alamos ("County") is an incorporated county of the State of New Mexico as provided in Article 10, Section 5, of the New Mexico Constitution; and

WHEREAS, pursuant to the County Charter, Section 500, there is a Department of Public Utilities ("Department") charged with the duty to operate County owned electric, gas, water and sewer systems; and

WHEREAS, pursuant to the County Charter, Section 502, the Department head shall be known as the "Utilities Manager" who shall conduct the business of the Department subject to the polices established by the Board of Public Utilities ("BPU"); and

WHEREAS, pursuant to the County Charter, Section 504, the Department's utility systems shall be operated on a compensatory basis, and the utility rates and charges shall be just, reasonable, and comparable to those in neighboring communities, and shall be uniform for all consumers of the same class; and

WHEREAS, the Department Utilities Manager has determined the current gas utility rates will not meet the requirement for the gas utility to operate on a compensatory basis unless the gas rates are increased to cover the projected revenue requirements adopted in the Department's fiscal year 2027 budget and fiscal year 2028 projections; and

WHEREAS, pursuant to County Charter, Section 203.1(d), any change in County utility rates shall be by ordinance; and

WHEREAS, pursuant to Section 4.6(a) of the *Board of Public Utilities Procedural Rules* (ed. 09/18/2024), the Utilities Manager is responsible for preparing and presenting proposed utility rate ordinances to the BPU; and

WHEREAS, pursuant to County Charter, Section 504, the rates to be paid by consumers for utility services shall be proposed by the BPU, to the County Council, and shall become effective on the date of adoption by the County Council; and

WHEREAS, pursuant to Section 4.6(b) of the *Board of Public Utilities Procedural Rules*, the Utilities Manager shall introduce a draft of the proposed gas rate increase ordinance to the BPU and present the budget and operational reasons for the proposed increase to the BPU at a public meeting, prior to a final public hearing on the proposed increase to the natural gas rate ordinance; and

WHEREAS, the Utilities Manager initially presented the proposed natural gas rate ordinance to the BPU on April 1, 2026; and

WHEREAS, the Utilities Manager, after receiving comments from the BPU, then presented the final proposed increased gas rate ordinance to the BPU on May 6, 2026; and

WHEREAS, on May 6, 2026, the BPU approved the final proposed increased gas rate ordinance and recommended forwarding it to the County Council; and

WHEREAS, on May 19, 2026, the County Council, pursuant to County Charter, Section 203.2.1 introduced the proposed gas rate ordinance; and

WHEREAS, on June 9, 2026, the County Council, pursuant to County Charter, Section 203.2.2 held a public hearing on the proposed increase to the natural gas rate ordinance; and

WHEREAS, the natural gas rate schedule shall be amended as follows, with strike through-text deleted and underline-text added.

NOW, THEREFORE, BE IT ORDAINED BY THE GOVERNING BODY OF THE INCORPORATED COUNTY OF LOS ALAMOS:

Section 1. Section 151 of Chapter 40 of the Code of the Incorporated County of Los Alamos is hereby amended as follows:

Sec. 40-151. - Gas rate schedules 7A and 7E.

(a) *Residential service schedule 7A.* The residential rate applies to customers in a single dwelling or in a single dwelling unit of a multiple dwelling or apartment for domestic purposes only.

(b) *General commercial and industrial service schedule 7E.* The commercial and industrial rate applies to customers for use in or in connection with any commercial, business or industrial activities, including multiple dwelling units where service for more than one unit is taken through a master meter, and to other customers not otherwise specifically falling within another class.

(c) *Service charge.*

(1) Per meter rated 250 CFH or less: [~~$11.08 per month after September 30, 2023; $13.00 per month after September 30, 2024; $14.25 per month after September 30, 2025;~~] $15.53 per month after June 30, 2026; $16.93 per month after June 30, 2027.

(2) Per meter rated more than 250 CFH: [~~$33.24 per month after September 30, 2023; $39.00 per month after September 30, 2024; $41.25 per month after September 30, 2025;~~] $44.96 per month after June 30, 2026; $49.01 per month after June 30, 2027.

(d) *Gas consumption charge.* (One therm is equal to 100,000 British Thermal Units (BTU))

(1) The gas consumption charge for schedules 7A and 7E shall be made up of two components: fixed cost recovery, and a variable cost of gas component.

i. The fixed cost recovery shall be [~~$0.27~~] $0.48 per therm [~~(one therm is equal to 100,000 British Thermal Units (BTU)) after September 30, 2023; $0.32 after September 30, 2024; $0.34 after September 30, 2025.~~] after June 30, 2026; $0.58 per therm after June 30, 2027.

ii. The variable cost of gas rate shall be calculated each month based on the projected cost of gas for the billing month plus an adjustment for any prior over or under collection for gas purchases and/or gas transportation costs, provided, however that the variable cost of gas rate shall not be lower than $0.11 per therm per month.

(2) The projected cost of gas shall be at the rate as stated on the San Juan Index or any recognized index that may replace the San Juan Index.

(3) Should the variable cost of gas exceed $4.00 per therm, the billed rate to consumers shall not reflect the cost of gas over that amount until the rate is approved by an ordinance of the council.

Section 2. Section 152 of Chapter 40 of the Code of the Incorporated County of Los Alamos is hereby amended as follows:

Sec. 40-152. - Gas rate schedules 7L and 7N.

(a) *Applicability.*

(1) *Schedule 7L:* Interdepartmental service—Incorporated County of Los Alamos.

(2) *Schedule 7N:* Schools service—Los Alamos Public Schools.

(b) *Service charge.*

(1) Per meter rated 250 CFH or less: [~~$11.08 per month after September 30, 2023; $13.00 per month after September 30, 2024; $14.25 per month after September 30, 2025;~~] $15.53 per month after June 30, 2026; $16.93 per month after June 30, 2027.

(2) Per meter rated more than 250 CFH: [~~$33.24 per month after September 30, 2023; $39.00 per month after September 30, 2024; $41.25 per month after September 30, 2025.~~] $44.96 per month after June 30, 2026; $49.01 per month after June 30, 2027.

(c) *Gas consumption charge.* (One therm is equal to 100,000 British Thermal Units (BTU))

(1) The gas consumption charge for schedules 7L and 7N shall be made up of ~~three~~ two components: fixed cost recovery, and a variable cost of gas component. [~~and an extraordinary gas cost recovery fee.~~]

i. The fixed cost recovery shall be [~~$0.24~~] $0.43 per therm [~~(one therm is equal to 100,000 British Thermal Units (BTU)) after September 30, 2023; $0.28 after September 30, 2024; $0.30 after September 30, 2025.~~] after June 30, 2026; $0.53 per them after June 30, 2027.

ii. The variable cost of gas rate shall be calculated each month based on the projected cost of gas for the billing month plus an adjustment for any prior over or under collection for gas purchases and/or gas transportation costs, provided, however that the variable cost of gas rate shall not be lower than $0.11 per therm per month.

(2) The projected cost of gas shall be at the rate as stated on the San Juan Index or any recognized index that may replace the San Juan Index.

(3) Should the variable cost of gas exceed $4.00 per therm the billed rate to consumers shall not reflect the cost of gas over that amount until the rate is approved by an ordinance of the Council.

Section 3. **Effective Date.** This ordinance shall become effective upon adoption with the amended gas ordinance being applied for all billings on or after July 1, 2026.

Section 4. **Severability.** Should any section, paragraph, clause or provision of this ordinance, for any reason, be held to be invalid or unenforceable, the invalidity or unenforceability of such section, paragraph, clause or provision shall not affect any of the remaining provisions of

this ordinance.

Section 5. **Repealer.** All ordinance or resolutions, or parts thereof, inconsistent herewith are hereby repealed only to the extent of such inconsistency. This repealer shall not be construed to revive any ordinance or resolution, or part thereof, heretofore repealed.

ADOPTED this 9th day of June 2026.

COUNCIL OF THE INCORPORATED COUNTY OF LOS ALAMOS

_____

Randall T. Ryti,
Council Chair

ATTEST:

_____

Michael D. Redondo,
Los Alamos County Clerk

Gas

Incorporated County of Los Alamos Code Ordinance 02-379

Overview

- The Gas Rate consists of 3 components
  - o Monthly Service Charge
  - o Fixed Charge per therm
  - o Cost of Gas pass through per therm (variable)

- NMMEAA Discount ($0.586)

Customer Base

5- Year Average

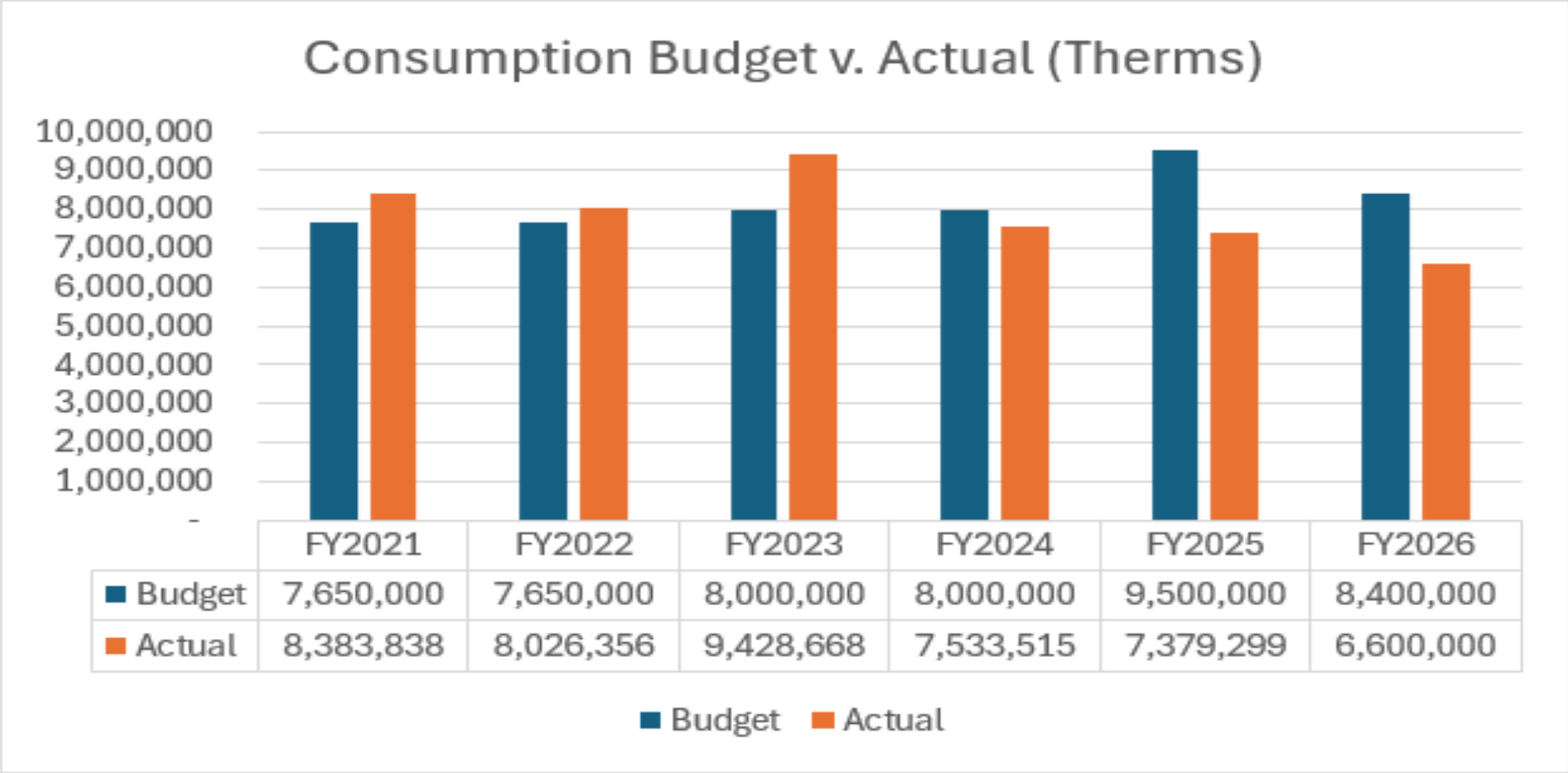
Number of Customers per Type

	Los Alamos	White Rock	Total
Residential	5,286	2,443	7,729
Commercial	359	58	417
County	37	10	47
School	25	2	27

Number of Meters per size

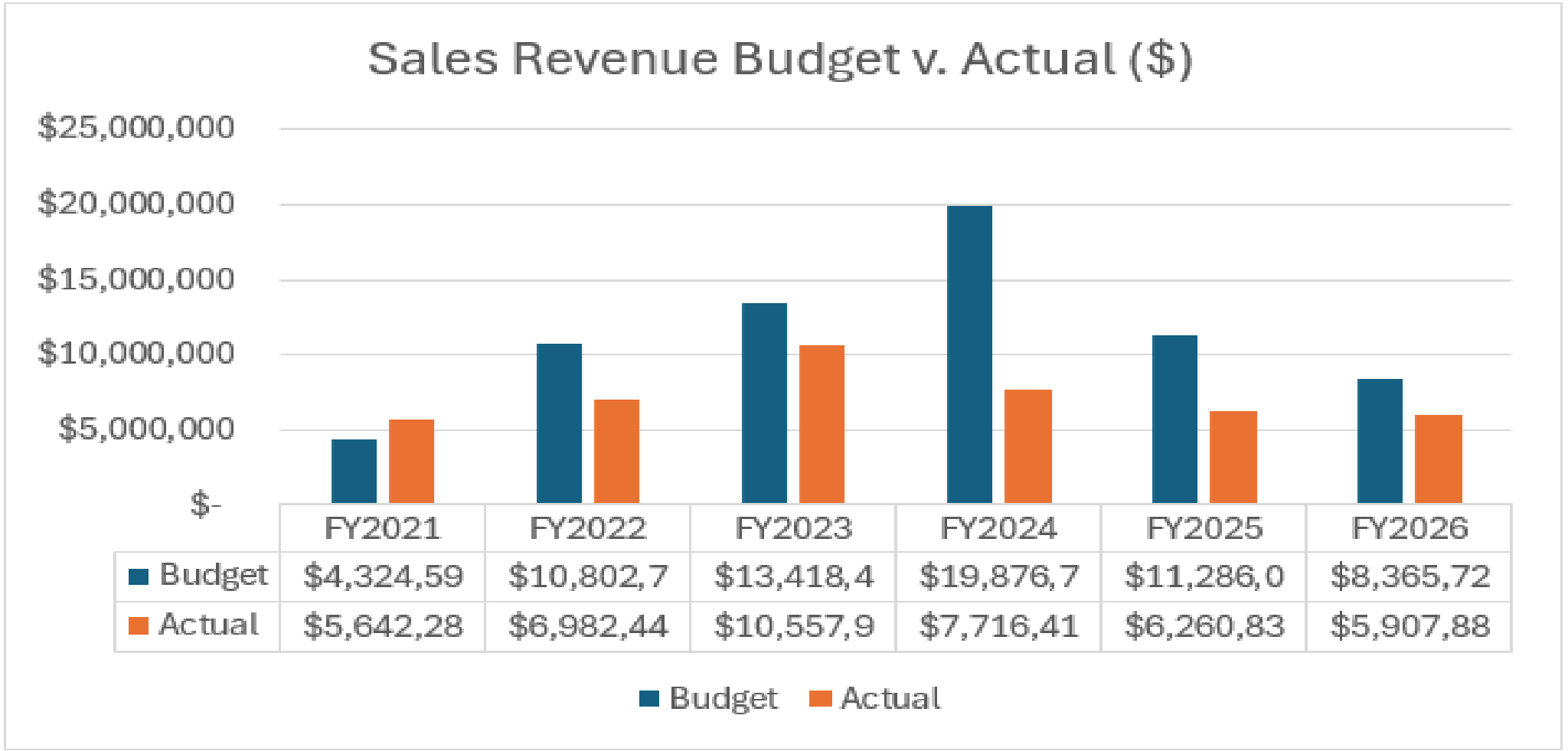
	Small Meter	Large Meter
Residential	7,701	28
Commercial	222	195
County	16	31
School	12	15

Consumption



	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
Budget	7,650,000	7,650,000	8,000,000	8,000,000	9,500,000	8,400,000
Actual	8,383,838	8,026,356	9,428,668	7,533,515	7,379,299	6,600,000

Sales



	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
Budget	$4,324,59	$10,802,7	$13,418,4	$19,876,7	$11,286,0	$8,365,72
Actual	$5,642,28	$6,982,44	$10,557,9	$7,716,41	$6,260,83	$5,907,88

Attachment B

Proposed Rates

		Through 6/30/2026	After 6/30/2026	After 6/30/2027
Residential Multifamily Commercial 7A, 7E	Service Charge Small Meter	$ 14.25	$ 15.53	$ 16.93
	Service Charge Large Meter	$ 41.25	$ 44.96	$ 49.01
	Fixed Charge	$ 0.34	$ 0.48	$ 0.58

		Through 6/30/2026	After 6/30/2026	After 6/30/2027
County Schools 7L, 7N	Service Charge Small Meter	$ 14.25	$ 15.53	$ 16.93
	Service Charge Large Meter	$ 41.25	$ 44.96	$ 49.01
	Fixed Charge	$ 0.30	$ 0.43	$ 0.53

Typical Bill

Estimated Residential Cost of Gas at 70 Therms
(Assuming cost of gas $0.42 per therm)

	Through 6/30/2026	After 6/30/2026	After 6/30/2027
70 Therms	$ 53.20	$ 63.00	$ 70.00
Service Charge	$ 14.25	$ 15.53	$ 16.93
	$ 67.45	$ 78.53	$ 86.93

Los Alamos County Department of Public Utilities

Historical & Projected Typical Monthly Bill for Residential

	ELECTRIC 500 kwh	GAS 75 therms	WATER 6,000 gal	SEWER	Total (excludes refuse)	Total $$ change	Total % change
FY2018	$69.60	$42.50	$39.06	$47.45	**$198.61**	$5.24	2.71%
FY2019	$69.60	$44.00	$39.91	$51.24	**$204.75**	$6.14	3.09%
FY2020	$69.60	$42.50	$43.12	$54.32	**$209.54**	$4.79	2.34%
FY2021	$69.60	$53.75	$45.23	$55.95	**$224.53**	$14.99	7.15%
FY2022	$69.60	$59.75	$47.07	$57.07	**$233.49**	$8.96	3.99%
FY2023**	$69.60	$87.51	$50.20	$57.93	**$265.24**	$31.75	13.60%
FY2024	$76.10	$59.83	$53.96	$59.08	**$248.97**	($16.27)	-6.13%
FY2025	$83.25	$61.75	$58.19	$60.56	**$263.75**	$14.78	5.94%
FY2026	$90.75	$71.25	$61.87	$64.80	**$288.67**	$24.92	9.45%
FY2027*	$106.19	$78.53	$66.81	$69.33	**$320.86**	$32.19	11.15%
FY2028*	$108.61	$86.93	$72.15	$74.88	**$342.57**	$21.71	6.77%

TOTAL CHANGE IN MONTHLY BILL FY2018 TO FY2027 $122.25

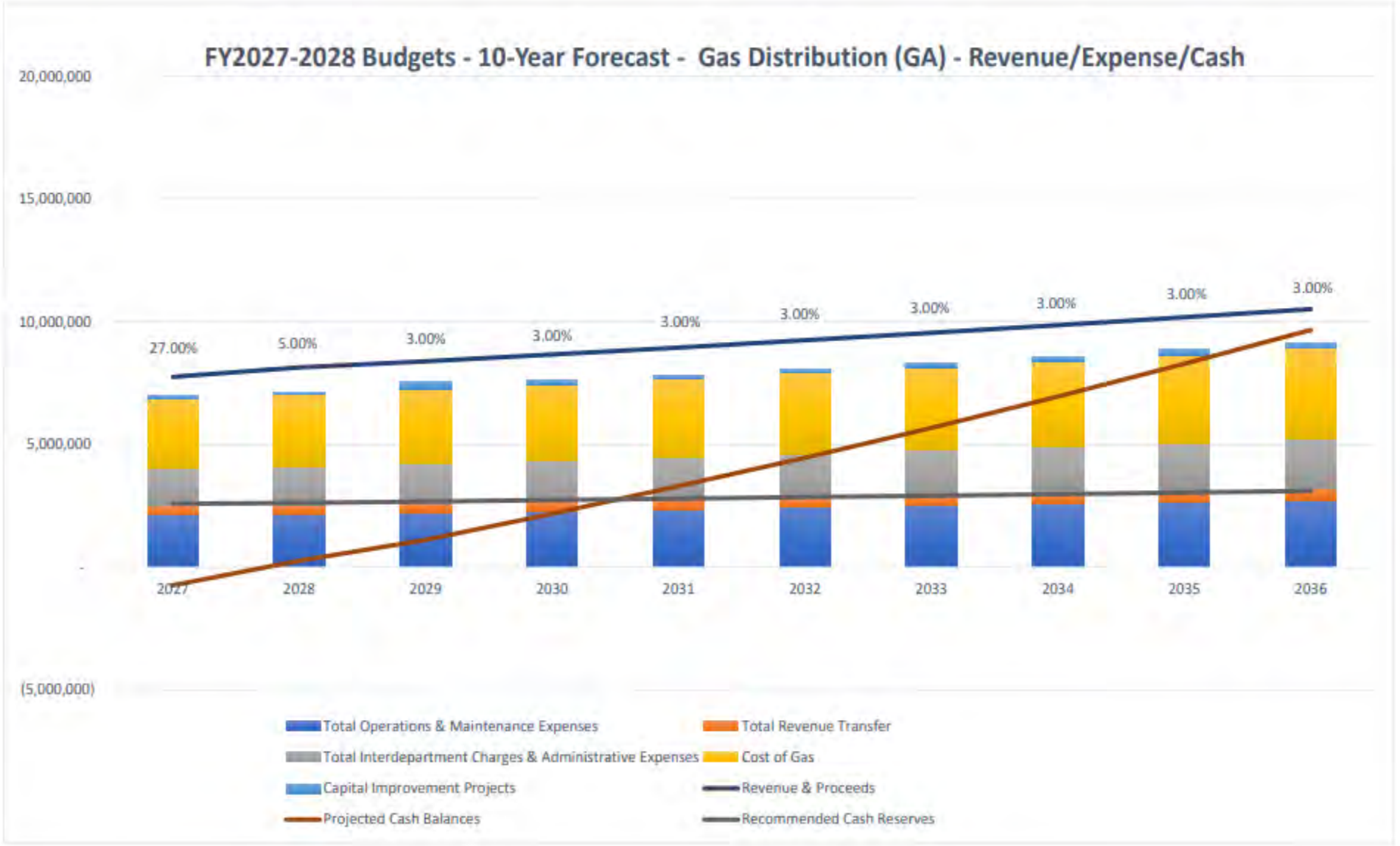
Attachment B

10-Year Forecast

TEN-YEAR FINANCIAL FORECAST
GAS FUND
FY2027 to FY2036

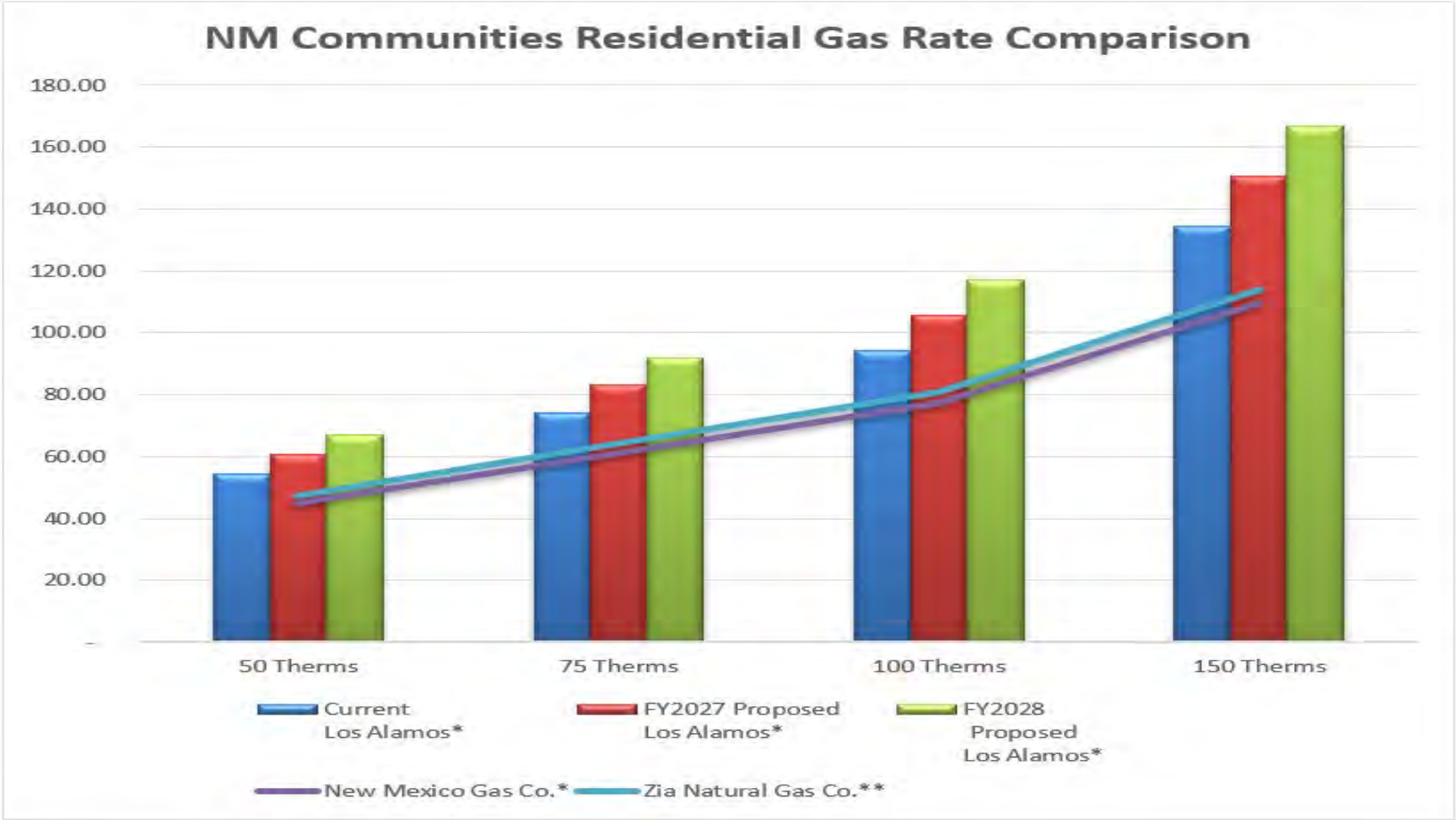
GAS	PROPOSED 2027	PROJECTED 2028	FORECAST 2029	FORECAST 2030	FORECAST 2031	FORECAST 2032	FORECAST 2033	FORECAST 2034	FORECAST 2035	FORECAST 2036
Therm Sales	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000	6,800,000
Revenue per Therm	1.1368	1.1937	1.2295	1.2664	1.3043	1.3435	1.3838	1.4253	1.4681	1.5121
Rate Increase Percentage	**27.0%**	**5.0%**	**3.0%**	**3.0%**	**3.0%**	**3.0%**	**3.0%**	**3.0%**	**3.0%**	**3.0%**
REVENUE/CASH INFLOW										
Sales Revenue	$ 7,730,375	$ 8,116,894	$ 8,360,401	$ 8,611,213	$ 8,869,549	$ 9,135,636	$ 9,409,705	$ 9,691,996	$ 9,982,756	$ 10,282,238
Interest on Cash & Reserves	-	-	6,519	27,786	54,526	82,794	111,523	141,874	173,914	207,088
Miscellaneous Revenue	-	-	-	-	-	-	-	-	-	-
Revenue on Recoverable Work	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Transfers In	-	-								
TOTAL REV - CASH INFLOWS	7,750,375	8,136,894	8,386,920	8,658,999	8,944,075	9,238,430	9,541,228	9,853,870	10,176,669	10,509,326
EXPENSES/CASH OUTFLOWS										
Operational Expenditures	3,678,465	3,735,748	3,847,821	3,963,256	4,082,154	4,204,619	4,330,758	4,460,681	4,594,502	4,732,338
Cost of Gas	2,830,177	2,915,082	3,003,000	3,094,000	3,187,000	3,283,000	3,382,000	3,484,000	3,589,000	3,697,000
Capital	135,000	110,000	295,000	130,000	130,000	175,000	175,000	175,000	200,000	220,000
Capital Paid with Debt/Grants	-	-	-	-	-	-	-	-	-	-
Revenue Transfer	361,009	379,059	390,431	402,144	414,208	426,635	439,434	452,617	466,195	480,181
TOTAL EXP-CASH OUTFLOWS	7,004,651	7,139,889	7,536,252	7,589,400	7,813,362	8,089,254	8,327,192	8,572,298	8,849,697	9,129,519
NET CASH FLOW	**745,724**	**997,005**	**850,668**	**1,069,599**	**1,130,713**	**1,149,176**	**1,214,036**	**1,281,572**	**1,326,972**	**1,379,807**
BEGIN UNRESTRICTED CASH/INV	(2,481,950)	(1,736,226)	(739,221)	111,448	931,046	1,061,760	1,310,935	2,524,971	3,806,544	5,133,516
TRANSFER TO/FROM RESERVES	-	-	-	(250,000)	(1,000,000)	(900,000)	-	-	-	-
END UNRESTRICTED CASH/INV	(1,736,226)	(739,221)	111,448	931,046	1,061,760	1,310,935	2,524,971	3,806,544	5,133,516	6,513,323
BEG RESERVE BALANCES	1,000,000	1,000,000	1,000,000	1,000,000	1,250,000	2,250,000	3,150,000	3,150,000	3,150,000	3,150,000
TRANSFER TO/FROM RESERVES	-	-	-	250,000	1,000,000	900,000	-	-	-	-
END RESERVE BALANCES	1,000,000	1,000,000	1,000,000	1,250,000	2,250,000	3,150,000	3,150,000	3,150,000	3,150,000	3,150,000
RESERVE TARGET	2,585,513	2,621,658	2,676,456	2,732,897	2,791,031	2,850,910	2,912,585	2,976,110	3,041,541	3,108,935

Attachment B



Attachment B

Neighboring Communities



Attachment B

Questions?

Agenda No.:	7.a.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services; DPU FY26 - 5.0 Continuously, Conscientiously, Work Toward Environmental Sustainability
Presenters:	Dennis Astley, Deputy Utility Manager-Electric Distribution
Legislative File:	**21048-26**

Title
Annual Update: Electric Reliability Plan (ERP) for FY2027

Body
This presentation by Dennis Astley, Deputy Utility Manager - Electric Distribution is an update to the Electric Reliability Plan “ERP” which is a living-document. The purpose for this report is to have a path forward to provide safe and reliable electric service for the residents of Los Alamos County. The electrification study that is now underway is part of the ongoing efforts of the department.

Attachments
A - FY27 Electric Reliability Plan
B - Annual ERP Presentation

LOS ALAMOS

Department of Public Utilities

Electric, Gas, Water, and Wastewater Services

FY 2026 ELECTRIC RELIABILITY AND RESILIENCE PLAN

Dennis G. Astley, PE

Deputy Utility Manager -Electric Distribution

(FOR INFORMATION & DISCUSSION ONLY)

Contents

Reliability and Resilience 3
Terms to Know 4
Department Goals 5
County Development Plans 5
Department Staff 6
Outage Response 8
Assessment of Performance Measures 9
Electric Distribution Operations Staff 11
Distributed Generation 12
Reliability Indices 13
Overview of SAIDI & Disturbances 14
Description of Distribution System and Impacts on Reliability 15
The Local Distribution Grid: 15
Threats to the Distribution System 15
Distributed Generations and Electric Cars 17
Future Goals Set for an ALL-Electric Los Alamos County 17
Age and replacement challenges 17
Access to Infrastructure 18
Maintain - Repair or Replace! 18
Discussion of Short-Term Action Plans 19
Asset Management Program (AMP) for OH 19
Overhead Pole Replacement Program 19
Asset Management Program (AMP) for UG 20
UG Primary Replacement Program 20
New LASS Substation Addition 21
SCADA and System Modeling 22
Discussion of Long-Term Action Plans 24
Three Phase Primary OH Backbone Rebuild 24
Primary UG Improvement Projects: 24
Future Capital Projects 25
In Summary 26
Appendix A: 28
OUTAGE RESTORATION PROCEDURE 28
Appendix B: 31
SUBDIVISION MAPS WITH AGE 31
Appendix C 36
ASSESSMENT PRIORITY LIST 36

Reliability and Resilience

The true definition of reliability is the measured resilience of the system. This report is the update to the Electric Reliability Plan “ERP” and is a living-document. The purpose for this report is to have a path forward to achieve an electric distribution system that is resilient to exterior stress and system growth. A system that can maintain service during environmental changes. A system that can recover from external impacts and changes. An electric distribution system that can maintain a SAIDI of 60 minutes or less for the residents of Los Alamos County. The SAIDI calculations exclude PNM Wildfire prevention outages, transmission line outages and LANL supply line failures.

System resilience is achieved through the implementation of engineering best practices, effective operation management, and responsible financial administration. The steps to achieve system resilience are basic. Understand the strengths and weaknesses of the organization. Identify the threats, define the impacts of the threats, assess the vulnerabilities of the system, prioritize the risks of the threats, and develop solutions to mitigate the threats.

There is always a focus on actions to improve the system resilience. Capital projects have improved the main three phase system resilience and overall reliability. These projects have been able to minimize outage durations by offering redundancy in the circuit configurations.

The Los Alamos County Department of Public Utilities “LACDPU”, in this case electric distribution “ED”, spends most of its operational budget on reactive operations and maintenance “O&M”. Proactive inspections and assessments are ongoing. The department spends a great deal of time and funds supporting County, commercial and residential consumer projects.

The continued growth of the county has been a concern to management. The ability of the system to respond to growth and changing conditions is limited. Future actions are needed to prepare for and adapt to changing conditions. Proper planning and increased revenue will be needed to meet system demands. The County has plans to reduce and eliminate natural gas consumption in the county so this will lead us in the direction of an all-electric county. The increase in distributed generation and electric vehicle charging will add complexity and stress to the distribution system. The distribution system is not currently designed and constructed to support this objective. The complete reconstruction of the distribution system may be required. Ongoing efforts to address this issue include an ongoing contract with Burns and McDonald (1898). The services provided by 1898 included an assessment of the distribution system along with electrical engineering personnel. The electric distribution system model was updated to accurately model the system and simulate conditions under increased demand on the system. The project also looked at the trends of solar and distributed generation adoption by similar communities in order to forecast future growth.

Terms to Know

Resilience

The ability of the power sector to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions through adaptable and holistic planning and technical solutions. [1]

Reliability

A measure of whether a power system can provide regular, consistent power, typically defined by System Average Interruption Duration Index (SAIDI), Customer Average Interruption Duration Index (CAIDI), and System Average Interruption Frequency Index (SAIFI). [1]

Threat

Anything that can damage, destroy, or disrupt the power sector. Threats can be natural, human caused, or technological. Threats are not typically within the control of power system planners and operators. They may consist of wildfires, hurricanes, storm surges, cyberattacks, and others. This term is often used interchangeably with *hazard*. [1]

Vulnerability

Weaknesses within infrastructure, processes, or systems, or the degree of susceptibility to various threats. Different measures can be taken to reduce vulnerability or improve adaptive capacity to threats to the power sector. Vulnerabilities are typically identified through stakeholder interviews, technical analyses, and/ or literature reviews. [1]

Risk

The potential for loss, damage, or destruction of key resources or power system assets resulting from exposure to a *threat*. Risk is evaluated as the product of the *threat* likelihood and *vulnerability* severity scores.[1]

References,

1. **POWER SECTOR RESILIENCE PLANNING GUIDEBOOK**
A Self-Guided Reference for Practitioners
Sherry Stout, Nathan Lee, Sadie Cox, and James Elsworth
U.S. Department of Energy's National Renewable Energy Laboratory
Jennifer Leisch
United States Agency for International Development

Department Goals

Goal 1.0 Provide utility services safely, reliably and efficiently.

- The evaluation of outages and the assessment of the system is essential. Engineering will need to identify the threats to the system. The construction of a robust system that is engineered to withstand weather events and protect against contact with animals and humans. Identify the impact and consequences of power loss on customers. The impact on customers can include health, safety, financial loss and loss of access to vital services.
- Identify the vulnerabilities of the system, in planning, design and construction. The assessment of the distribution system identifies weaknesses in the system and allows engineering to prioritize and mitigate the weaknesses that make the system vulnerable to threats. Management will then develop emergency plans and procedures to mitigate the extent of and duration of system outages. The vulnerability of the system will include process definition and personnel experience.
  Proper training and periodic review of emergency response procedures will mitigate the threats and reduce the risks and eliminate vulnerabilities.
- Identify the cause and impact of power outages on the commercial customers. The nature of the County and its customers' demands reliable power. This is a highly educated and active community.
- Identify and prioritize the critical loads within the system. Repairs and replacements are prioritized by the number of customers affected and the duration of outages.
- Identify strengths and weaknesses in administration and management. The use of technology and proper process management aids management.
- Identify the risks associated with possible external threats. The risk of tree fall, animal contact or weather-related events are the main causes of outages. The system is designed and built to address these risks. These efforts are continuously reviewed and implemented by staff. The operation of the utility focuses on problem identification, repair, and mitigation. The outage data gathered is documented in the monthly reliability report.
- A detailed assessment of the system will be reported in December with the presentation of the Asset Management Report. System assessments will be completed in November and a report with budget recommendations will be developed.

County Development Plans

The County Master Plan for future development is a dynamic process. The County is now in the process of establishing a county wide broadband to home system. This effort directly involves the electric utility. The installation of fiber on existing power poles will require engineering review and operations construction.

The broadband utility, whether county owned or privately operated, will have to establish a pole attachment and conduit lease agreement just as Comcast and Lumen have done.

Each pole will have to be reviewed to meet NESC specifications. If the pole requires modification, the utility will perform the modifications and charge the broadband utility. This process will require additional valuable time from utility crew. Engineering will review each application for attachment and process the work orders as required. Engineering will also create Task orders and purchase orders as part of contract management.

Many new projects are proposed to increase housing in the County. The County is also moving forward with the installation of electric charging stations for various customer groups. The commercial charging stations will require three phase transformers for level 3 charging. The same is true for school bus charging and fleet vehicles. Level 1 and 2 chargers can be operated on single phase transformer. Each of these installations will require extensive line extensions to connect to the system. Electric switches will have to be installed to protect the branch circuits. Residential car chargers are not reported to the utility. The demand on the system will increase as these are installed in greater numbers. Time of Use (TOU) and demand billing charges will have to be implemented to assist in demand management.

The supply chain is not fully recovered. Most product costs and lead times are still providing difficulty.

Department Staff

The reliability of the system is only as good as the people operating the utility. Staff must be maintained to continue the improvement of the utility. Throughout the Covid years and still today, the electric distribution department has remained fully staffed and on duty. The entire department was on site every day throughout the pandemic period. This is a description of the utility staff and their function.

Engineering

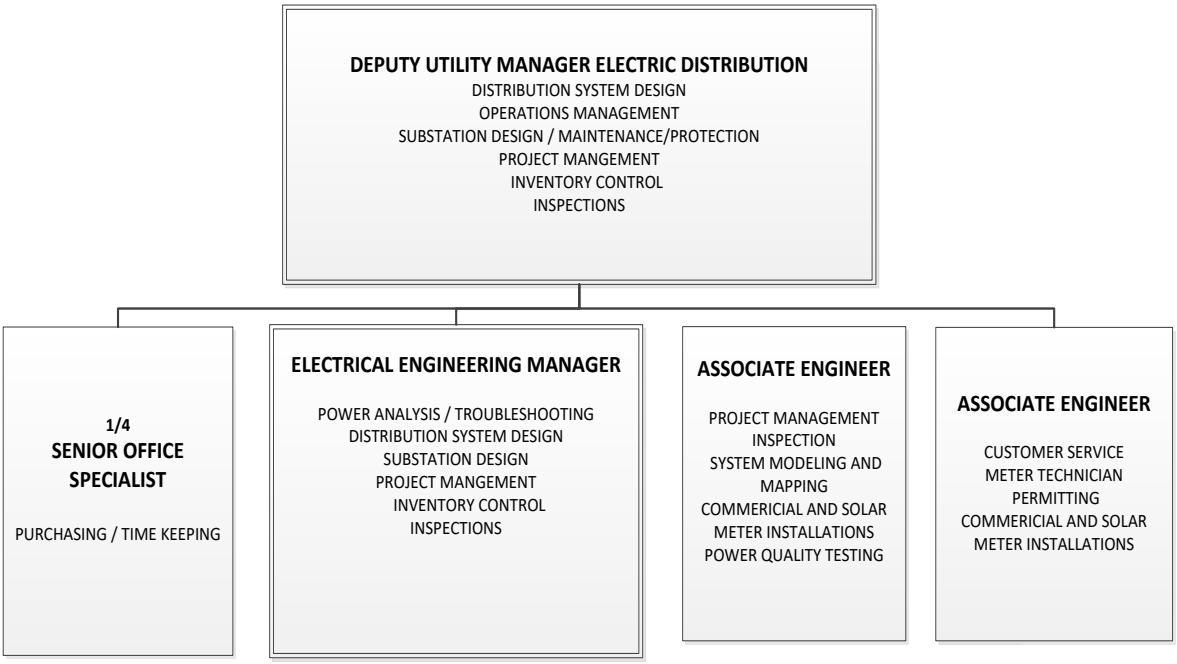
The administration and engineering department includes Deputy Utility Manager Dennis Astley P.E., Engineering Associate Mariano Montoya, and Engineering Associate Mariano Valdez. Dennis Astley has been with the department for 1.5 years. Mariano has been with the engineering department for just over four years. Mariano manages electric metering, project management and system modeling. Mariano Valdez has been in the department 1.5 years and manages new services. The Engineering Manager position is currently vacant.

The engineering department performs the following:

- Project In House Project Designs – For the Utility, County, Residential & Commercial
- System Assessments and Inspections
- Data Collection- Sensus, Munis, GE power systems, Sweitzer systems
- Project Development and Budgeting – Asset Management program
- Procurement and Inventory material management- Specifications, Purchasing
- Project Management
- System Modeling- AutoCAD and Milsoft

- System Protection- Relay and Recloser controls
- Substation construction and maintenance
- Switch Station construction and maintenance
- System Mapping – ArcGIS In house management
- Operations- Management, Design, Planning, Logistics, Work Orders and Support
- Safety and Training- Equipment Testing and Replacement
- Customer Service- Permits – Upgrades, New Construction, Solar
- Distributed Generation Management – Solar, Battery
- Electric Metering- Data Collection, System Analysis, Commercial Meter Installations, Testing, Customer Service.

Existing Electric Distribution Engineering Staff



Operations Management

Direct supervision of the electric distribution department. Thirteen Employees which include a line superintendent, three Supervisors, seven Linemen, Electrical Engineering Manager and two Engineer's Associates. Providing the crews with detailed project plans and switching procedures. Communicating effectively with Line Supervisors and their crews. Manage the ongoing procurement requirements to sustain operations, capital projects and system maintenance. Providing continued support to all County departments and their capital projects.

Metering

The analysis of the large commercial electric metering in the County is ongoing and will be furthered with the use of test equipment designed to test commercial meters underload. The monitoring of all commercial meters in the AMI project and the installation of radio repeaters and collectors. Review commercial accounts in conjunction with Utility billing. All new installations are inspected for correctness and the information provided to the billing department. The distributed generation meters in the system are being evaluated and documented accurately. All information is verified and confirmed by Engineering. The Smart meter program is supported by Engineering.

Outage Response

A major goal of any distribution system engineer is to minimize outages. The concerns include both the number of outages as well as the duration of these outages. The occurrence of outages is inevitable. Every outage is a learning experience in which proactive measures can be implemented to prevent future outages. Materials and equipment must be managed effectively to minimize response and restoration times. Appendix 'A' contains the process of outage restoration.

Safety

It is of the greatest importance that safety be an integral part of my training. Conduct meetings with all personnel to discuss switching procedures and job safety. Document and address safety issues as they are brought to my attention by the line electricians and other people. The department must also meet County training requirements. This year we began a line worker specific training program.

Office Management

Utilize office tools to maximize performance:

- AutoCAD- Prepare all designs and construction details
- ArcGIS – Update and maintain all Electric Distribution layers
- Munis- Update and maintain all Electric Distribution layers
- Sensus RNI – Software to monitor and retrieve data from meters
- Excel- Data Spreadsheets and graphs
- Visio- System diagrams
- Enervista- Software to monitor and program protection relays
- GE Power Management- Software to monitor and program protection reclosers
- Milsoft (WindMil) - Engineering analysis and modeling software – ongoing project
- Sweitzer Accelerator software for SCADA, relays and Reclosers

Assessment of Performance Measures

Project Management- Direct all aspects of Electric Utility Projects including development of the project plan, design drawings, budget, schedule, execution, and closeout. Communicate effectively and coordinate project activities with all affected agencies, departments, and stakeholders.

Standard of Measurement- Develop a well thought out project plan. Ensure that project quality assurance measures are implemented throughout the project. Execute projects with a high level of customer service and environmental stewardship.

Electric Condition Assessment -Direct the creation of work orders for condition assessment. Record findings and maintain records for future projects.

Standard of Measurement - Complete and accurate records of existing infrastructure. Information that is readily available to all engineers for use in design and troubleshooting.

Preventive Maintenance- Utilize information collected from condition assessment to develop necessary maintenance programs and projects. Provide evaluation and rating method for prioritization for projects to be done. Direct all aspects of project development and execution. Track maintenance programs to coordinate data collection and mapping.

Standard of Measurement- Ensure project prioritization, development and execution are effectively carried out. Projects are directly related to the improvement of system reliability and customer service.

Data Collection and Mapping - Conduct and coordinate data collection efforts with operations. Collect historical data of repairs and problems. Maintain As built drawings of current projects. Maintain system drawings in AutoCAD and ArcGIS. Provide information and data collected as part of the condition assessment. Coordinate mapping and presentation of data collection with Engineering. Meet all requirements of asset management.

Standard of Measurement**-** Well coordinated data collection and use of historical data. Maps produced and updated in a timely fashion. Assets are correctly accounted for and documented.

Training- Recommend training programs and equipment for electric distribution personnel to maintain safety procedures and awareness.

Standard of Measurement**-** Maintain a workforce that is certified and trained in all applicable work practices.

Customer Service- Assist customers in all aspects of Utility Department operations including Electric and GWS inquiries. Provide information on existing utilities and permitting requirements. Provide cost estimates and define customer responsibilities on commercial and large residential projects. Resolve customer grievances. Provide information to the Public Information office regarding outages and projects. Coordinate activities with other County departments.

Standard of Measurement**-** Maintain a high level of customer satisfaction. Meet requirements for public information.

Inspections -Conduct inspections of electric infrastructure according to defined schedules. Maintain inspection logs. Create Work Orders for inspections of battery banks and other equipment which require PPE and line electrician participation. Create Work Orders for maintenance of equipment.

Standard of Measurement**-** Maintain Utility records and comply with all defined requirements.

Materials Management –Define material requirements for all projects and normal operations. Order materials for projects and stage materials prior to project start date.

Work with warehouse personnel to identify procurement issues which cause inefficiencies and delays. Work with Supervisors to define ready stock requirements and maintain stock levels. Communicate effectively with management and procurement to resolve inventory issues. Work with management to define material specifications.

Standard of Measurement**-** Maintain inventory levels at levels which are sufficient to perform maintenance and execute projects.

System Protection – Inspect electronic system protection equipment according to defined schedules. Make changes to settings as defined by management. Download information as required to evaluate system operation.

Standard of Measurement**-** Operation of system protection as defined by management.

Operations Management:
Manage line crew work activities.
Develop work schedules.
Develop switching plans and staking sheets.
Inspect projects as required.
Responsible for procurement and inventory.
Conduct meetings and maintain documentation in the Asset Management Program.
Coordinate activities with other departments.
Respond to all outages as required.
Meet with the public as needed.
Respond to customer complaints and resolve them.

Work with contractors to successfully complete all projects.
Coordinate with and support Engineering in utilities and the general county.
Create and maintain drawings and maps.
Perform new installations and maintenance of commercial meters.

Electric Distribution Operations Staff

The electric operations department has ten qualified Journeyman Linemen. First a 4-person crew assigned primarily to the overhead distribution system to replace rotten poles, weathered cross-arms and aged or obsolete transformers. The challenge with the overhead distribution system is that a portion of it is at least 40 years of age and operate near or past its useful life.

A second 3-person crew is primarily dedicated to proactively replacing live-front and obsolete switchgear, transformers, and sections of underground power lines that have failed multiple times. Line crews also convert open secondary service lines to insulated triplex service lines.

The third 3-person crew primarily works on major capital improvement projects that replace the aged infrastructure but adds improved reliability features such as new line protection facilities, loops, tie-lines, or 3 phase conversions. These duties are in addition to customer service and the operation of the utility which occupies at least one crew each week full-time. New service connections, solar system installations, panel upgrades, power outages, power quality issues and customer concerns are some of the duties addressed by the utility line crews.

One lineman is responsible for onsite standby duty each week. The crew with the standby lineman will perform customer service disconnect/reconnects and answer all customer outage or trouble calls. This affects the ability of the crew to complete assigned projects. When required, all linemen will respond to large scale outages.

Existing Electric Distribution Operations Staff

Line Superintendent
Three Line Crew Supervisors
7 Journeyman Line Workers

Electric Distribution Projects

In Construction:
El Mirador Subdivision
Jemez Fire Protection Project
Lift Stations
El Mirador Subdivision
Arkansas Place Apartments
East Jemez Conduit intercepts for LASS feeders
LASS Feeder Conductor Installations
Padmount Switch Replacements

Designs Complete Awaiting Construction:
Trinity/Oppenheimer Primary Replacement
Piedra Loop/ La Senda Primary Replacement
Electric School Bus Charging Stations
Century Bank Project
Power Pole Replacements
East Gate Primary Cable Replacement
Overlook ballpark Communications Tower- Pending Procurement
Myrtle Apartments Master Metering- Pending Contractor Mobilization
Canada Bonita

In Design and Procurement:
Los Pueblos Electric Primary Replacement
Sherwood Rounds
White Rock Visitors Center Food Trucks and Pavilion
Middle School Gymnasium
Arbolada Subdivision
Los Alamos Center Plaza
Los Alamos Broadband Project

Future Projects in Planning:
EV Community and County Car Charging Stations
Fleet Electric Charging Stations

Distributed Generation

Los Alamos County now has over 537 customers in process or connected to the utility with Solar system installations. The connected load is 3560KW with 207KW pending (as of 3/20/2025).

The Department goal for distributed generation is 6000 KW (6 MW).

NUMBER OF CUSTOMERS	557
TOTAL KW	4013
CONNECTED KW	3759
Connected Residential KW	3045
Connected Commercial KW	713
KW Pending	254

The installation of the new AMI system improved outage response times with the implementation of the outage identification. The new Sensus meter software allows staff to see all meters affected by an outage. The line crews can then respond directly to the area without extensive troubleshooting and inspections.

Reliability Indices

LACDPU measures its system reliability with four (4) performance factors as defined by IEEE Standard 1366-2003.

SAIDI = System Average Interruption Duration Index. This is the total duration of interruption for the average customer during a predefined period of time; or

$$SAIDI = \frac{\text{Sum of all customer outage durations}}{\text{Total number of Customers Served}}$$

SAIFI = System Average Interruption Frequency Index. This is how often the average customer experiences an outage over a predefined period of time; or

$$SAIFI = \frac{\text{Total number of customer interruptions}}{\text{Total number of Customers Served}}$$

CAIDI = Customer Average Interruption Duration Index. This is the average time required to restore service; or

$$CAIDI = \frac{\text{Sum of all customer outage durations}}{\text{Total number of customer interruptions}} = \frac{SAIDI}{SAIFI}$$

ASAI = Average System Availability Index. This is the fraction of time that a customer has received power during the defined reporting period; or

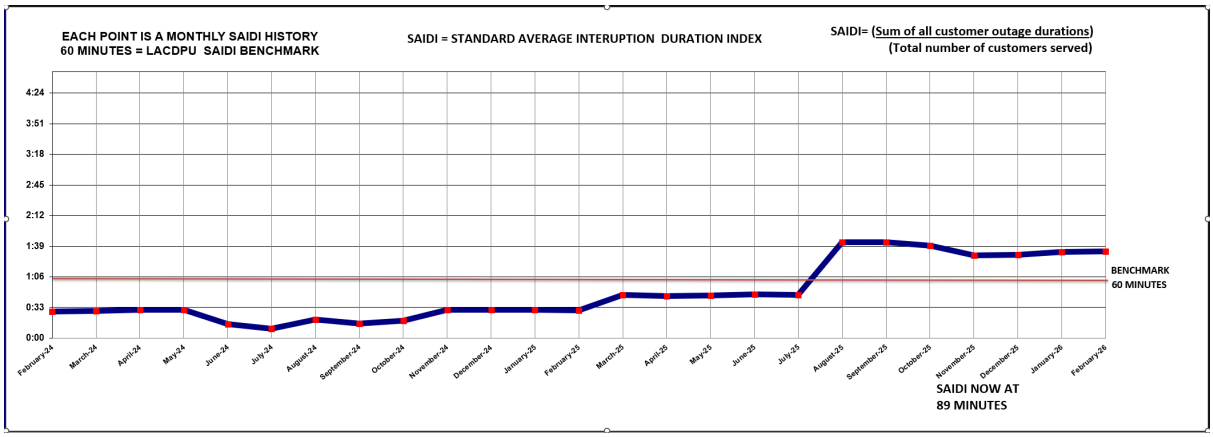
$$ASAI = \frac{\text{Service hours available} - SAIDI}{\text{Customer demand hours}} = \frac{8760 - SAIDI}{8760}$$

Table 1. Reliability Performance Measurement Factors as of 2/28/2026

Total # Accounts	**9045**	
Total # Interruptions	24	
Sum Customer Interruption Durations	**13471:56:00**	**hours:min:sec**
#Customers Interrupted	7223	
SAIFI	**0.80**	**int./cust.**
SAIDI	**1:29**	**hours:min**
CAIFI	**0.332%**	
CAIDI	**1:51**	**hours:min**
ASAI	**99.3487%**	

The calculations are based on a 12-month history. All outages' effects will remain in the calculations for one year as demonstrated in Figure 1.

Figure 1. Graph of LAC SAIDI



Overview of SAIDI & Disturbances

We continue to have sporadic and random underground line section failures throughout the system; and this can be expected into the future. Areas with direct bury conductors more than 30 years are subject to failure. During the fault identification, isolation, and re-routing of power (around failed line section), we've had some residual (secondary) failures. The issue is having to close-in into a faulted line with a standard 200-amp elbow. Some underground subdivisions may have 10 transformers daisy-chained, and the only recourse is close-in into the fault section one or two times. The utility installed fault indicators along the system to identify faulty sections of line faster.

Human causes of outages also occur due to digging. In these cases, the utility files a third-party damage report and charges the contractor for the repairs.

On the overhead system we've had a few outages due to tree contact with the electric lines. Tree branches blowing into the open-secondary (un-insulated) in consumer backyards. The ongoing replacement of open secondary conductors with insulated triplex conductors mitigates these outages.

The utility has an ongoing contract with a tree trimming contractor to proactively trim trees as they grow into power lines. Outages due to tree contacts has been reduced. The damage caused by a tree fall can be extensive. The value in having a resilient system is far worth the cost of trimming trees. The utility also prevents major pole and transformer failures largely because of our pole replacement and transformer replacement program. Although the transformer replacement program has slowed down due to supply chain constraints.

Description of Distribution System and Impacts on Reliability

The Local Distribution Grid:

The townsites source for power is a radial line from TA3. The loss of the canyon crossing will cause a townsite wide outage. Several sub feeders are available for service, but they cannot support the entire townsite. The single most important reliability project the department needs to undertake is the construction of a second switch station for the Los Alamos town site. The *Los Alamos Switchgear Substation "LASS"* is located at the County Eco Center site. The new switch station is critical to meet the future electrical supply needs of Los Alamos and will help maintain the system reliability success ED has demonstrated in the last decade.

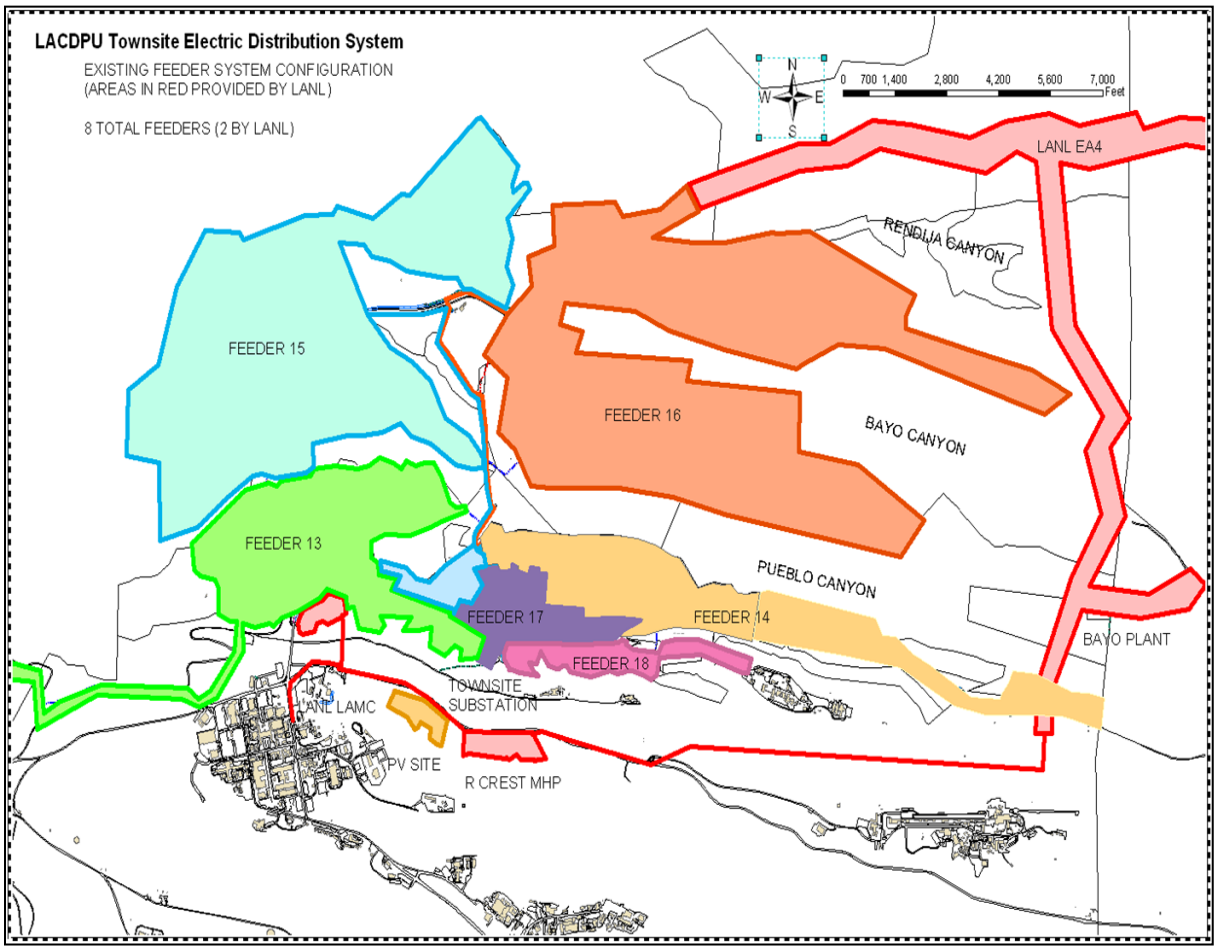
The addition of the LASS station will greatly assist in the redundancy of the supply system. The system as constructed will not support the full electrification of the townsite. The entire distribution grid will have to be reconstructed to support such an endeavor. The LASS has not been put into service due to issues getting circuits across the canyon. LANL has provided a duct bank to LAC and we will be getting bids to encase the asbestos containing conduit this year. With the asbestos pipe encased, the conductor can safely be pulled through the duct bank.

Threats to the Distribution System

The Townsite switch station serves almost 6500 customers with primarily 6 feeders; and a feeder outage may affect between 800 to 3600 customers. Figure 8. illustrates how having two additional substation sources will configure the Los Alamos distribution grid such that the 6500 customers can be served by 12 feeders: thereby substantially reducing the customers per feeder. i.e. potential feeder power outages would affect less customers in the future!

The Townsite switch station has six (6) feeders, #13, #14, #15, #16, #17, and #18. In addition, LANL provides *primary metering* points to LACDPU to serve other LAC customers via LANL distribution lines including Royal Crest mobile home park, NM Consortium Building, Los Alamos Medical Center (LAMC), Ski Hill, Pueblo & Rendija Canyons, and Totavi in San Idelfonso Pueblo. Overall, eight (8) distribution feeders serve the Los Alamos community as illustrated in Figure 2.

Figure 2. Townsite Electric Feeder Circuits



LACDPU owns and operates the Electric Distribution System (EDS) in Los Alamos and White Rock areas. The EDS is comprised of approximately 66% underground (UG) distribution and 34% overhead (OH) distribution serving approximately 8,500 customers. There are approximately 6,500 customers in the Los Alamos area and 2,550 customers in White Rock.

There are two operating distribution voltages in the LACDPU's system, 13.2 KV line-to-line (7.62KV line-to-neutral) in Los Alamos Townsite; and 12.47 KV line-to-line (7.2KV line-to-neutral) in White Rock. LAC can utilize the same distribution system components such as poles, fuses, wire, insulators, rubber goods, switchgear, etc. in both areas because the components are rated at 15KV line-to-line. However, LACDPU must keep different transformer inventories for Townsite and While Rock because of the different operational voltages.

Distributed Generations and Electric Cars

The electric distribution grid is absorbing production from PV installations. The impact of the reverse flows will soon exceed the capacity of conductors and transformers in the system. Electric vehicle chargers will increase the load on the system at traditionally off-peak times. This is stressful on the system because solar systems do not function at night. Homes that are currently installing solar systems are also increasing the size of their services to accommodate EV chargers and heat pumps. The upgrades to transformers and conductors required will be scattered throughout the county as areas are affected and show signs of stress or failure. Most repairs and upgrades will be performed by operations crews with operations budgets. The operating budget of the utility will have to be increased to meet the challenges.

Future Goals Set for an ALL-Electric Los Alamos County

The Utility Board of Los Alamos County set a future goal to eliminate gas consumption in the County. This would mean that all homes and businesses would be completely operated with electricity. The current distribution system will not support this as it exists today. Although the main backbone three phase systems have been upgraded, they would require replacement by 2050. The residential areas within the county are not adequately sized to handle the increased load. The utility will require the reconstruction of all residential areas within the county. In addition, a very large number of homes do not have the correct power panel size to provide whole home electric consumption. The homes will have to be upgraded, and new service lines will have to be installed. The increased addition of photovoltaic systems and car chargers is now having an impact on the distribution grid. Current staffing levels will not support the expansions and upgrades needed to move toward total electrification.

Age and replacement challenges

A portion of the OH system conductors exceed 40 years and are operating at or near the end of its useful life. Similarly, a large portion of the UG system was installed during the 1970s with cable technology that was good for 30-40 years. Therefore, LACDPU must plan to proactively replace those sections of the distribution network that experience and show signs of failure; having a 15-year replacement strategy is a good start. It will require over 24 million dollars over the 10-year period to accomplish this goal. This estimate does not include upgrades sufficient for all electrification. This estimate is with current inflation costs. Inflation will also increase in the near term. The utility needs a rate increase to keep up with the cost of operating the electric distribution system. Appendix B illustrates the age of subdivisions within the county.

Access to Infrastructure

The OH and UG systems have repair and replacement challenges which may impact the SAIDI as replacement projects are underway. Figure 3. illustrates a map area of inaccessible areas due to right-of-way encroachment or customer blockage. Having inadequate work access or having to work around landscaped areas, etc., make it difficult for LACDPU to replace rotten poles and overloaded transformers. For the UG system, having to dig in and around areas congested with buried utilities makes it difficult to dig for routine repairs; more so when having to install replacement lines. Overhead system replacement work needs to be performed while the existing power line is energized or while *hot*. *Hot* work safety procedures require the feeder over-current protection be disabled (from normal reclosing) while the work is being performed. This means that an inadvertent line contact may kick-out an entire feeder (or line section) while the *hot work* is underway. Similarly, and with underground systems, replacement of live-front (uninsulated) equipment will generally require an outage *before and after* the work; again, for safety purposes. Therefore, replacing portions of the existing system will generally require the disabling of the overcurrent protection, small power outages or switchovers, additional safety precautions, slower work processes, etc. Replacement projects may impact the SAIDI temporarily and will increase the cost of replacement.

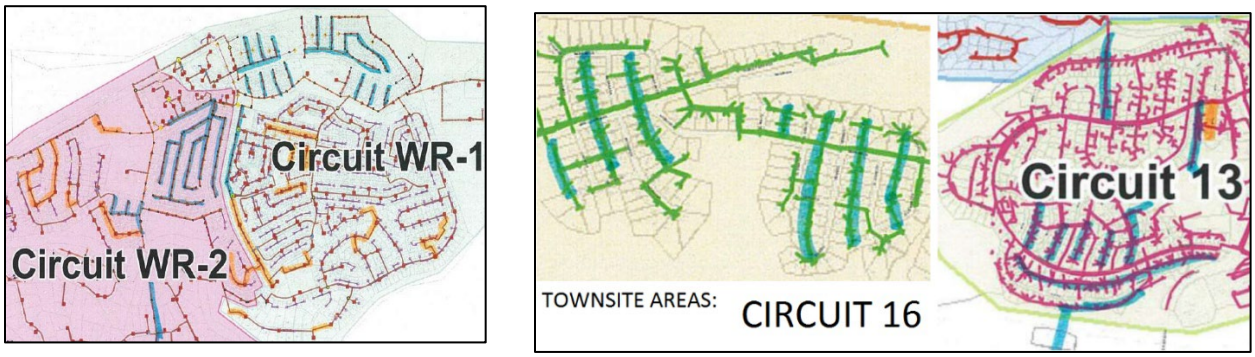


Figure 3. Areas not readily accessible

Maintain - Repair or Replace!

Through the Asset Management Program process, the lingering question is whether to maintain, repair or replace. Based in the Asset Management Program AMP, LACDPU will continue to operate under the following guidance:

1. LACDPU must adequately maintain its electric distribution system moving forward so that equipment can reach and exceed its useful life. For OH, this means pole inspection and treatment every 10 years for new poles and 5 years for older poles. For UG, this means continuing with the AMP features with respect to quarterly inspections & routine O&M.
2. LACDPU must continue to track repairs to its distribution system; after several failures, UG sections must be planned for replacement.

3. LACDPU must continue to prioritize replacement efforts to critical feeder sections which impact the most customers and have the biggest impact on the SAIDI.

The next sections provide short-term and long-term action plans, “Plans” that must be constructed in parallel largely because of the age of the distribution system. The Plans do impact the revenue requirements for the utility, but LACDPU is conscientious about implementing the Plans over several years. The LACDPU strategy is to continue to improve the system reliability yet maintain electrical rates below rates of neighboring utilities. Also, LACDPU will continue to ask for utility board feedback with regards to electric reliability, value, and the increased level of rates to support those two efforts. LACDPU’s goal is to strive to provide the highest level of reliable, utility service its customers expect to receive.

Discussion of Short-Term Action Plans

Asset Management Program (AMP) for OH

Under the department’s AMP, each of 10 crew members is responsible for his Feeder. Six linemen are assigned to the six overhead distribution feeders: 13, 15, 16, EA4, WR1 & WR2. Each year, the AMP program requires that each lineman perform quarterly line patrols, a detailed feeder assessment, and provide input with regards to feeder areas that require immediate and long-term action plans. For example, tree trimming, leaning pole, loose guy wire, etc. would be considered an immediate action. Feeder conversions, tie-lines, reconductoring, etc. would be considered long-term actions.

Overhead Pole Replacement Program

The EA4 overhead line is the connection between the townsite and Guaje/Rendija Canyons. The EA4 overhead line is the primary source of power for the townsite water system in Guaje canyon. The utility issued a contract for system design to replace the feeder. The replacement will be an upgraded system. The new lines will be transmission-grade with larger conductors to support future growth. The EA4 line can also be used as a back feed to feeder 16.

Infrared OH and UG line inspection

During the winter, the department will continue to *infrared* critical sections of the underground and overhead systems to look for hot spots as illustrated in Figure 4. Hot spots are areas that have loose connections leading to high-resistant points; these points will eventually burn up, fail, and cause a power outage.

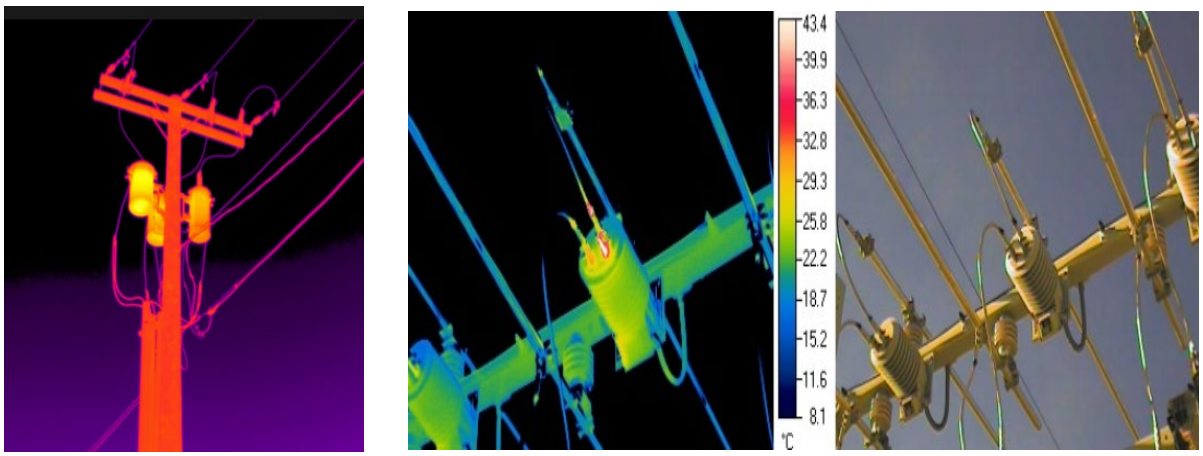


Figure 4. Infra-red picture for transformer pole & air break switch

Asset Management Program (AMP) for UG

Four linemen are assigned to the four underground distribution feeders: 14, 17, 18, & LAMC/Landfill. Similarly, each year the linemen perform quarterly line patrols, a detailed feeder assessment, and provide input with regards to feeder areas that require immediate and long-term action plans. For example, unleveled equipment, equipment oil leakage, rodent intrusion, equipment tagging, etc. would be considered for immediate action. Switch replacement, live-front transformer replacement, rust or oxidation painting, etc., would be considered a long-term action plan.

UG Primary Replacement Program

As previously stated, much of the existing primary underground distribution system consists of typical 1970s cable standards with 30–40-year cable life expectancy including: non-jacketed, direct buried, 175 mil insulation, XLP (cross link poly), non-strand filled cable. Today's primary underground cable has a 40–50-year cable life expectancy including: exterior jacket, 220 mil (more insulation), TRXLPE (tree retardant cross link poly) or EPR (ethylene propylene rubber), strand-filled and installed in conduit. Conduit has been installed in the county since 2001.
The department recently acquired a new cable pulling machine. The machine is equipped with a winch to pull cable into the conduit.

LACDPU continues to experience primary cable failures in subdivision areas, but mainly during the wet seasons. Moist ground tends to accelerate the *treeing effect* in the cable insulation leading to primary cable failures. The *tree effect* provides the shorting path, or *fault*, between the energized conductor and grounded neutral. When primary cable sections experience two or more *faults*, the line section is ranked with a low or high priority. When high priority primary line sections are designed for replacement, other engineering and reliability upgrade features are added. For example, radial lines may be converted to loops, single phase lines may be converted to three-phase, ridding of live-front equipment, adding sectionalizing points, re-routing for accessibility, etc. The idea is to ensure that even if the newly installed line fails, power can be restored even faster than before while impacting the

least number of customers. Some examples include, the Canyon URD Project, San Idlefonso, Sioux Village, Del Note / Del Sol, Tsankawi, Meadow Lane, NM4, Trinity, Arizona, 35th street, 36th Street, Woodland, Club Road, 48th Street, Diamond Drive, 15th Street, WR2 Loop Addition, Trinity Apartment Replacement Project, NM502, DP Road phase 1, Rim Road, Connie, Cheryl, Aragon, Longview, La Paloma and the Los Alamos Medical Center LAMC. Replacement with the LASS Feeder project are projects which included loops, tie-points, and other reliability improvement designs as part of the original replacement project.

New LASS Substation Addition

The top reliability project for LACDPU is the construction of the new LASS Substation addition near the County landfill as illustrated in Figure 5. The LASS Substation is needed to maintain the SAIDI target into the future. LASS is also critical to the supply of steady and reliable electric power to the residents of the Los Alamos Townsite; more so if the Townsite area is expected to grow electrically.

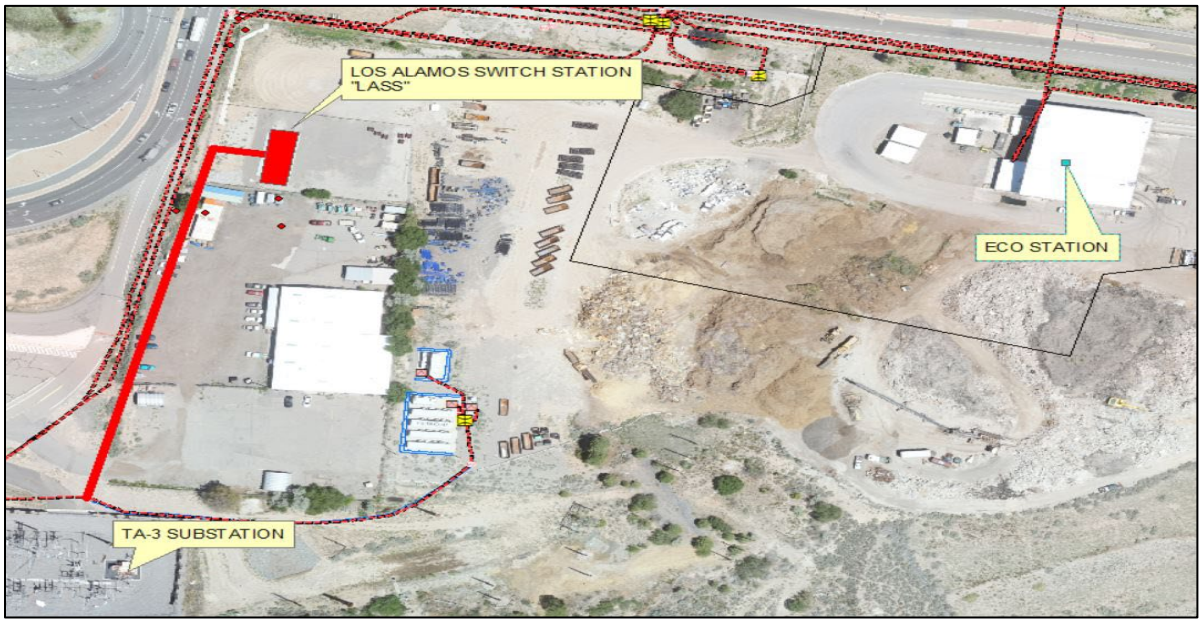


Figure 5. LASS station Location Relative to LANL

The LASS substation will relieve load from the existing Townsite Substation. The station will tie to TA-3 on breakers LC1 and LC2. Under existing conditions and for a TC1 feeder outage, the Townsite peak demand exceeds the TC2 feeder ampacity rating as illustrated in Table 3. below. The loading condition may worsen as Los Alamos County succeeds in bringing in electrical growth addition at the former 901 Trinity Site and DP Road.

Table 3. TC2 Feeder Loading for a TC1 Feeder Outage

Feeder	Size	Rating	Max Carrying Load	Townsite Peak Load
TC1	(2) 500 mcm CU	720 amp	16 MW	
TC2	1000 mcm Cu	615 amp	14.1 MW	16 MW

The LASS Substation will add feeder sources to maintain and improve the SAIDI and the system reliability in the Townsite area as illustrated in Figure 6. and as follows:

1. Reduce the number of customers on Townsite substation feeders 13, 15, & 16 (by moving half the customers on those feeders to LASS).
2. Provide new feeders 13T, 15T, 16T, S6, SM6.
3. Provide power to LACDPU customers with LACDPU power lines and not from LANL power lines, i.e., Transfer Station, LAMC (S6), Elk Ridge MH Park.
4. Add 50% additional system redundancy during scheduled or unscheduled outages to Townsite Substation Feeders. Feeders 13T, 15T, & 16T on LASS can back feed feeders on Townsite 13, 15, 16, Ski Hill and LAMC.

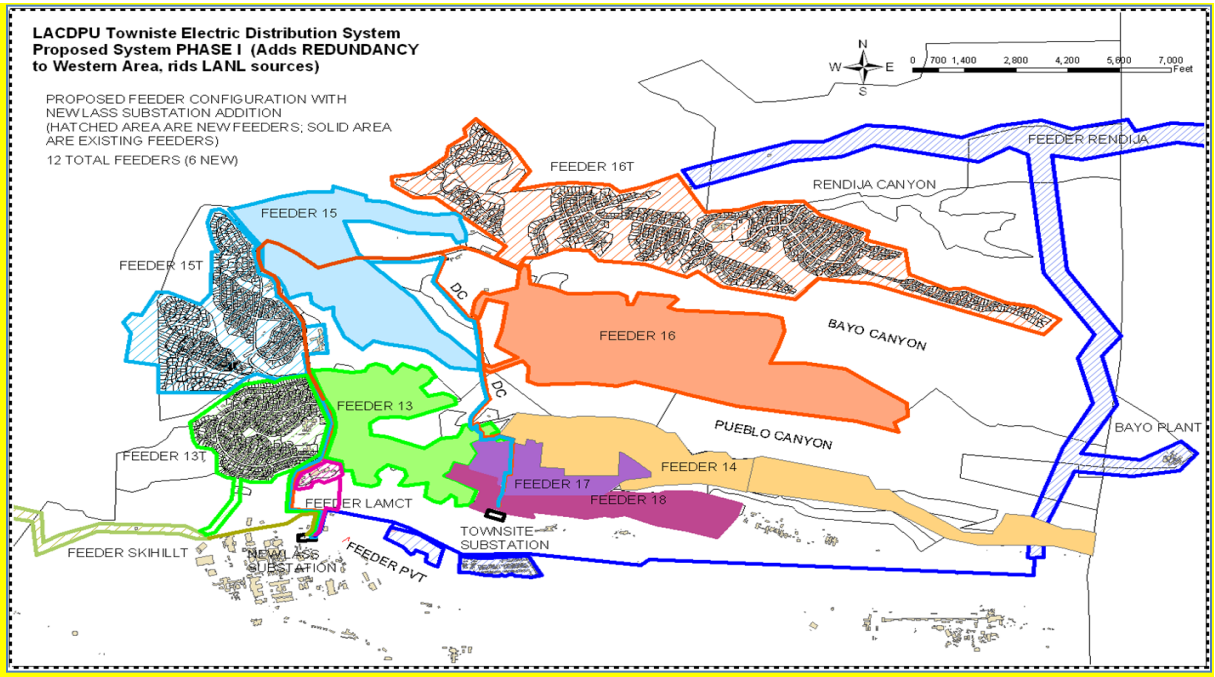


Figure 6. Los Alamos distribution area with LASS substation addition

SCADA and System Modeling

The LACDPU power production group (LACP) has SCADA capabilities at the Townsite and White Rock substations. LACP monitors the individual feeder relay for breaker status and real-time power flows. During a power outage, the LACDPU lineman must patrol the power line to find and isolate the problem; then, return to the substation to develop a restoration plan and restore power. LACP has dispatch locations at LANL TA-3 and PCS building #5.

The LACDPU electric distribution department will develop and install a SCADA system which will monitor the electric equipment in the field. The system will be based on Sweitzer RTU units called RTAC. The RTAC will communicate with all stations, relays, reclosers and line sensors. The system will incorporate information from the AMI, ArcGIS and the Milsoft Modeling system to provide real time system status to crews in the field and engineering. The new SCADA system will be based in Building #5 at PCS.

Electrical Engineering utilizes an electric distribution modeling system developed by Milsoft. The system is called WindMil. The model provides essential information on circuit loading and connectivity options. The model can analyze circuit configurations to ensure that circuits are not overloaded, and loads are balanced. The model is a living system that is modified as improvements are made in the system. With the implementation of a SCADA system, the model will provide real-time system performance. The Milsoft package can then be expanded to provide a full real-time outage management system. The information will be accessible to linemen and engineers remotely also to assist in outage response. This is the future of the system.

Feeders 13 and 16 have four-feeder line electronic reclosers (EOCRs) that will be integrated into the SCADA system. The EOCRs will be replaced and retrofitted with a SCADA card, a cell modem, and integrated into a new communication system. Feeder 15 is in the process of having a new recloser installed. These *node additions* can be mapped into the SCADA system for remote monitoring. With SCADA control, an outage can be detected by LAC electric distribution crews and immediately be aware of the power outage area. Linemen can then be dispatched directly to the problem area and not have to rely on customer outage calls. When the linemen isolate and repair the overhead power line problem, the lineman can restore power quickly.

Similarly, and after the new LASS substation is constructed, all *back feeding* tie-points can be fitted with SCADA system radios.

In summary, developing a new SCADA system into the distribution feeder network will help LACDPU identify outages quickly; allow lineman to be dispatched directly to the problem areas, and allow LACDPU the ability to re-route power and restore power quickly and efficiently.

Discussion of Long-Term Action Plans

Three Phase Primary OH Backbone Rebuild

Table 4. illustrates the feeder length of the main three-phase OH back bone system with pole quantities. The long-term plan is to replace all three phase back bone poles to ensure the long-term reliability; a single major back-bone pole failure could potentially impact thousands of customers. Single-phase pole laterals which serve less than 50 customers will be replaced on a lower priority basis. The main canyon crossings have been replaced.

FEEDER #	# OF POLES	MILES OF LINE
13	81	3.44
Ski Hill	70	3.5
15	111	3.15
16	137	4.53
WR1	65	1.83
WR2	73	3.41
EA4	150	9
TOTALS	687	28.86

Table 4. Three Phase Main Feeder OH Backbone Lengths

Primary UG Improvement Projects:

Major underground replacement projects or additions were constructed in the past: 0.8 mile, WR2 Loop Addition, 1.2-mile, Canyon Road Rebuild Project, and 1.0 mile, Tsikumu Village Primary Replacement Project. The three projects have become burdensome to LACDPU customers and affected the SAIDI year after year. The projects not only replaced the failed underground sections but also added three phase power line sections and new single phase primary loops. Each small project cost about $800K and it will be difficult to sustain those types of projects in the future without impacting utility rates. Costs for materials are rising rapidly.

Major underground capital replacement projects have been identified in the immediate future by the asset management team. LACDPU is prepared to deal with major SAIDI impact projects as they may arise in the future. A list of major projects includes the Los Pueblos, La Senda and Pajarito Acres, Timber Ridge, La Vista and Big Rock Loop.

Other long term UG projects which will provide long-term reliability improvement is the addition of new UG or OH Loops. LACDPU has many radial lines which power anywhere from 30 to 100 customers; a failure on the radial line leaves few alternatives to restore power in a timely fashion. By identifying these long radial power lines, LACDPU can install new Loops within reasonable costs. Figure 7. illustrates priority areas for Loop additions in White Rock.

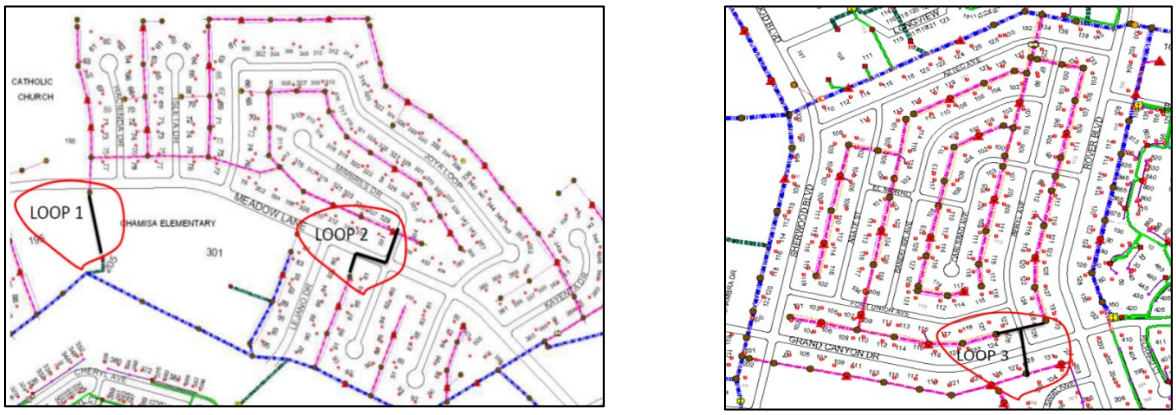


Figure 7. Single Phase Loop Addition Targets in White Rock

The LACDPU has many underground subdivisions with single phase primary laterals with 10+ transformers configured in a daisy-chain. When LACDPU experiences a faulted line section, it must identify the fault, isolate it, then back feed the outage area from a new power source. Back feed is done by manually transferring electrical load with a 200-amp elbow; at least two times during the restoration process. With continual line section failures, the manual back feeding process is resulting in secondary and residual failures, i.e. elbows or other weakened points. Therefore, LACDPU must look at other engineering solutions in identifying and isolating failed line sections so that no secondary or residual failures occur.

New Supply Line from the Jemez Coop and the San Idelfonso Pueblo

Discussions have been underway to install a tie between the PNM Transmission line on Pueblo land to the county of Los Alamos. The plan to install 50MW of solar and tie to the County is in consideration. It will require many improvements and a new substation to transfer power across the river and up Rendija Canyon.

Future Capital Projects

10 Year Capital Project Plan ($34.1 Million over 10 years)

2025 - SKI HILL $2,800,000
2025 - OPENNHEIMER / TRINITY / TIMBER RIDGE $1,200,000
2025 - 2026 - PIEDRA LOOP $ 550,000
2025 - 2026 - LOS PUEBLOS $1.0M
2026 - 2027 – Aragon, Ridgecrest, Garver, Catherine $1.5M
2026 – 2027 – Quemazon, North Road $750,000
2028 – Sandia, 41st – 47th, Ridgeway Tie $1M (Bond)
2028 – Grand Canyon, Bryce, Richard Ct, Rover $2M (Bond)
2028 - EA4 RECONSTRUCTION $7.5 MILLION (Bond)

2029 – Tewa, Otowi, Nambe Loop, Santa Clara $1M
2029 – La Senda $1.5M
2030 – Oakwood Loop, Nugget, Opal, Pinon $1.8M
2030 – Rover, Ridgecrest $1.9M
2031 – Sage $1M
2031 – Kimberly Loop $1M
2032 – Trinity from Diamond to Oppenheimer $1M
2032 – Briston Pl, Brighton, Paul Place, Todd Loop $600,000
2033 – Los Alamos Replacement $1M
2033 – White Rock Replacement $1M
2034 – Los Alamos Replacement $1M
2034 – White Rock Replacement $1M
2035 – Los Alamos Replacement $1M
2035 – White Rock Replacement $1M

In Summary

In 2001 the Cerro Grande Fire North community reconstruction began and was completed in 2004. In 2006 the first system wide condition assessment was completed. LACDPU was struggling with the system reliability and the SAIDI was over 5 hours per consumer. At that time, there were many problems in the distribution system and LACDPU needed to develop short-term and long-term action plans to address the different infrastructure issues. In 2005 the townsite switch station was installed providing new breaker control and feeder separations. The cross-canyon loads were separated from the downtown circuits. In 2005 the White Rock substation Unit 2 failed and was replaced in 2006 with new switchgear which provided the additional WR3 feeder. In 2010, the department developed an Electric Reliability Plan, “ERP”; the ERP identified the issues and problems into three different work areas: engineering, overhead, and underground. The 2010 ERP described the strategy for the short-term and long-term action plans in the three work areas. During 2010, increased revenue funds were authorized to address the different action plans and the SAIDI steadily decreased. The workload was tough and LAC-DPU crews all too often functioned in a reactive mode, i.e. a problem occurs, fix it, move on to another problem.

Also in 2011, the ERP was updated, and the action plans were updated as well. Increased revenue funds were authorized to continue with the action plans and the SAIDI continued to decrease. By 2012, the ED department had started to catch up with the increased workload and the department reorganized its FTES (full time employees). Two operations staff retired but were replaced with two new linemen; this allowed the department to develop a third line operations crew.

By 2013 and 2014, the ED department was able to catch up enough that 2 crews were primarily assigned to pro-active O&M and replacement projects. For the first time in recent memory, LACDPU can properly plan and replace sections of the electrical distribution grid which have failed in the past. By the same time, LACDPU had met its SAIDI target. However, the SAIDI target would not have been possible without the increased revenue and operational funds authorized.

In 2019 the engineering staff was reduced with the resignation of the Deputy Utility Manager for electric distribution. In 2020 the COVID pandemic shut down the supply chain and most operations. Construction of housing did not slow down, even as lumber prices skyrocketed. In 2020 an associate engineer was hired, and he resigned in 2021. In 2022 a new associate engineer was hired and is now active in the engineering program. The availability of electrical engineers is diminished. It will be difficult to maintain skilled electrical engineering staff in the future. Planning for future upgrades is dependent on the funding and labor provided to the department. The current disasters in the United States have continued to produce a supply chain crisis. Costs continue to be escalated and lead times are still an issue. The department may require the addition of FTE positions to meet the goals of the County Administration.

The Asset Management Program incorporates field inspections from the linemen into the system condition assessment. The linemen provide the necessary information to prioritize system replacement requirements. These requirements are then entered into the next budget cycle for the Utility Board and Council.

Though LACDPU met the SAIDI target of 1 hour or less prior to a transformer failure, there are still challenges ahead. The drive to meet the SAIDI target begins with the consumers who expect a steady and reliable electrical supply but ends with them as well; because the consumers must sustain the electrical rates which provide the revenue stream to meet and sustain the SAIDI target. However, LACDPU recognizes the balance between electric reliability with the retail cost for electricity within the neighboring utilities AND how much LACDPU consumers are willing to support. Therefore, LACDPU will continue to engage its consumers through a consumer survey on this issue. Also, Increased installation of solar panels in the county and energy conservation measures are decreasing revenue to the department.

Appendix A:

OUTAGE RESTORATION PROCEDURE

The purpose for this document is to formalize a **consistent procedure** when responding to outages affecting the substation breakers or electronic and hydraulic reclosers "OCRs"; collaboratively referred to OCDs.

BACKGROUND:
As you are aware, Engineering and Operations is continuously being graded on its SAIDI which is the Sum of Customer Interruption Durations / Total number of consumers. The goal is to have a SAIDI less than 60 minutes but ours consistently exceeds that value. At the present time, maintaining a SAIDI of 60 minutes will be difficult to achieve due to the age of our electrical system and the lack of system redundancy. As we continue the overhead rebuild process, continue our bad underground replacement strategy and add additional substations, the SAIDI will trend down. In the meantime, though, it is very important that we don't impact the SAIDI more than necessary during the outage restoration process. The following procedure attempts to minimize outage time but also makes you aware of the potential impacts of energizing the OCDs under 3 phase conditions.

FACTS ABOUT OUTAGES:
According to NRECA and other studies, 70-80 percent of Faults on overhead systems are temporary or of a transient nature. In addition, 70% of all Faults are single-line-to-ground Faults. What this means is that 50% - 56% of the time, RESETTING the OCD and CLOSING IN (on 1 shot) will restore power. However, it's also important to recognize that 30% of the time, a larger problem such as phase-to-phase, 3 phase Fault, "tree online", "downed power pole", etc. could exist. Energizing a PH-PH or 3PH fault creates substantially higher fault currents than 1 PH faults thereby potentially causing greater equipment damage; even worse, energizing a permanent fault near human contact could be disastrous.

Therefore, the following procedure shall be used when responding to OCD type outages:

When a breaker operates – call the **Deputy Utility Manager – Electric Distribution** and begin public information procedures.

Obtain outage information from the Meter Management System. Determine which protective devices have operated.

STEP 1:
BEFORE you energize an OCD, INTERROGATE the substation breaker or OCR control. **Here's what you want to look for**:

- 2 or 3 Phase Faults (other than 1 Ph).
- Ph to Ph (or 2 phase) generally means "slapping of lines" - watch for that on long spans (such as canyon crossings).
- 3 Ph Faults generally means something fell across line, pole down, etc. i.e. a PERMANENT Fault, don't RECLOSE but start patrolling; look for areas with trees, call dispatch to see if anyone reported an accident;
- Faults higher than 4000 amps for **Townsite**; a value this high is within **the first mile** and so take a quick patrol before energizing.
- The OCDs are preprogrammed to provide a distance to the Fault, look for that value and phase.
- Faults around 3000 amps are immediately downstream of the OCRs at North and Barranca Mesas, perform a quick patrol.
- Faults higher than 3000 amps for **White Rock** are within 0.75 miles; 2200 amps (Rover) - 1300 amps (Sherwood) are at the end of the lines.

STEP 2:
If you do want to close the OCD (remember it's OK 55% of the time), FIRST, **place the OCD on Non-Reclosing** or 1-Shot before energizing.

- For the Multilin substation breakers, place the breaker on "Recloser Disabled". Note: any operation within 30 seconds after a manual close, even when placed on NORMAL (reclosers ENABLED), will lock-out the breaker; we experienced this before.
- For the ABB OCRs, place the breaker on "Recloser Blocked".

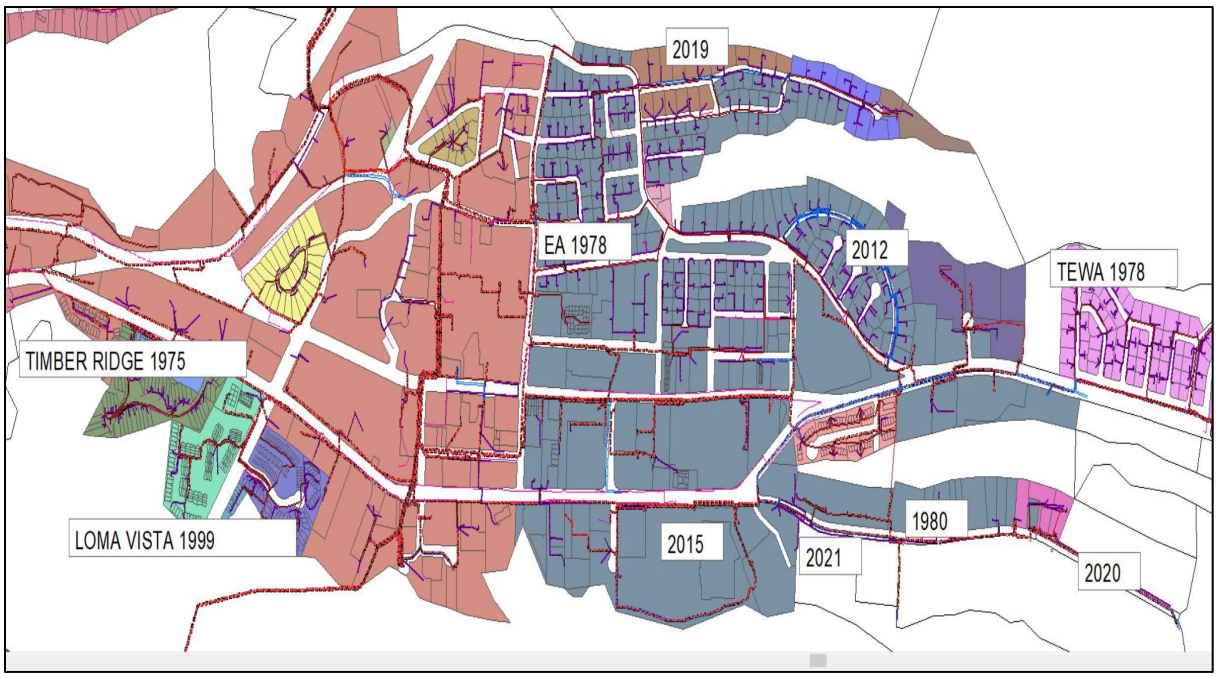
STEP 3:
If the OCD holds after several minutes, place the OCD back to NORMAL by disabling the Non-Reclosing or Recloser Blocked functions or Enabling the Recloser Function.

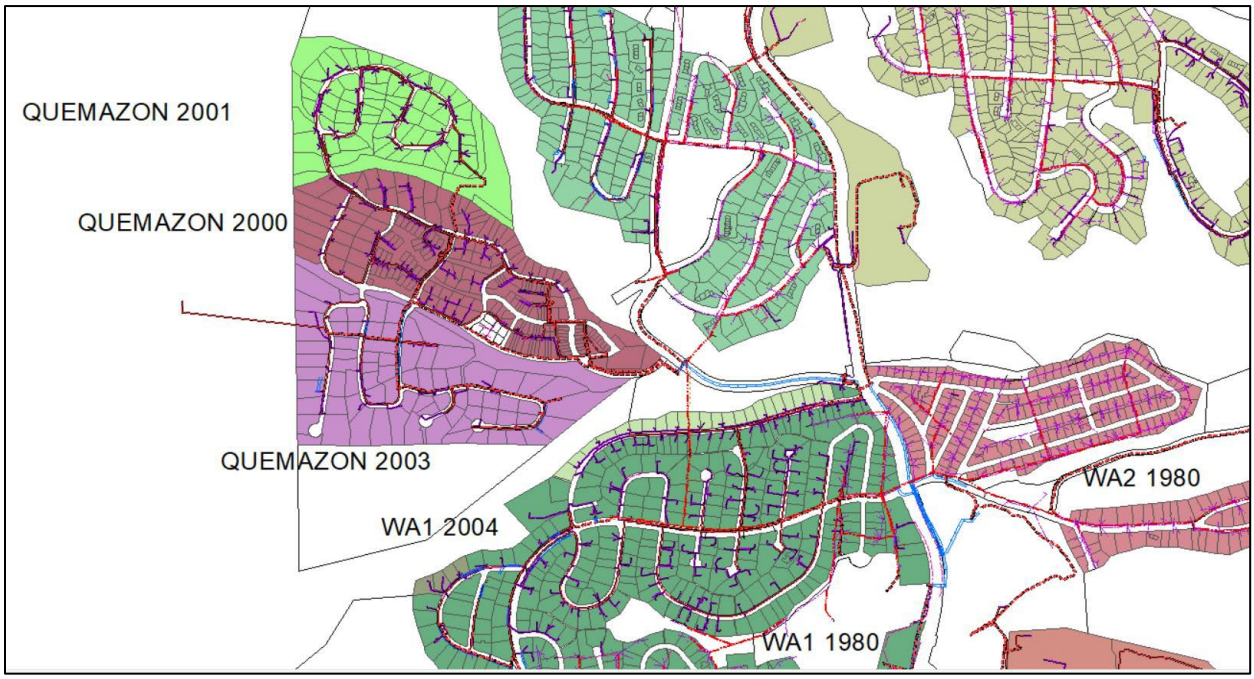
ADDITIONAL INSTRUCTIONS:

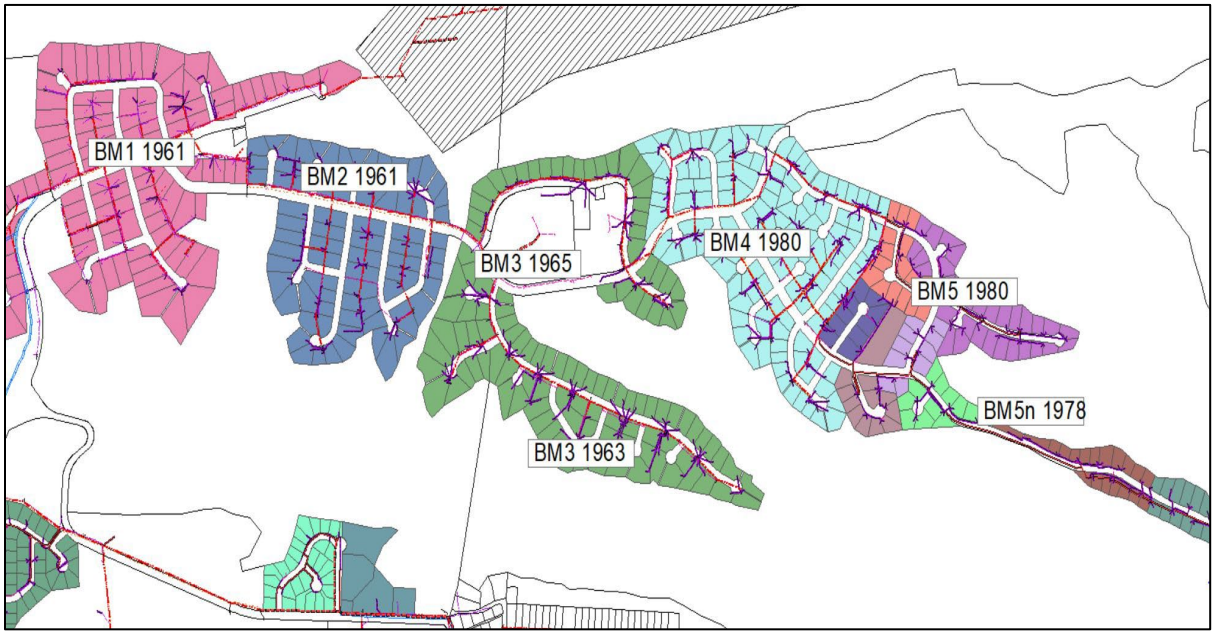
- Do not respond to the FIRST OCCURRENCE when Dispatch calls about a voltage sag or blink to the LANL system. When there is a substation breaker operation at The LAC Townsite substation, EVERYONE tied to the substation (including LANL) will experience a voltage sag or flicker. Keep note of the occurrence; if the problem persists SEVERAL times (say 3 blinks), then go to the substation, determine which feeder experienced the operation, interrogate the OCD, and patrol.
- Similarly, if someone calls that their lights went off-and-on; take note of the call but don't respond unless it happens on SEVERAL occasions. It's obvious the OCD/OCR is doing its job; recall that 70-80% of Faults are momentary or transient in nature.
- In either situation, notify Stephen Marez about the incident on the following day. We will then download the OCD information and follow up on the cause and location of the disturbance.

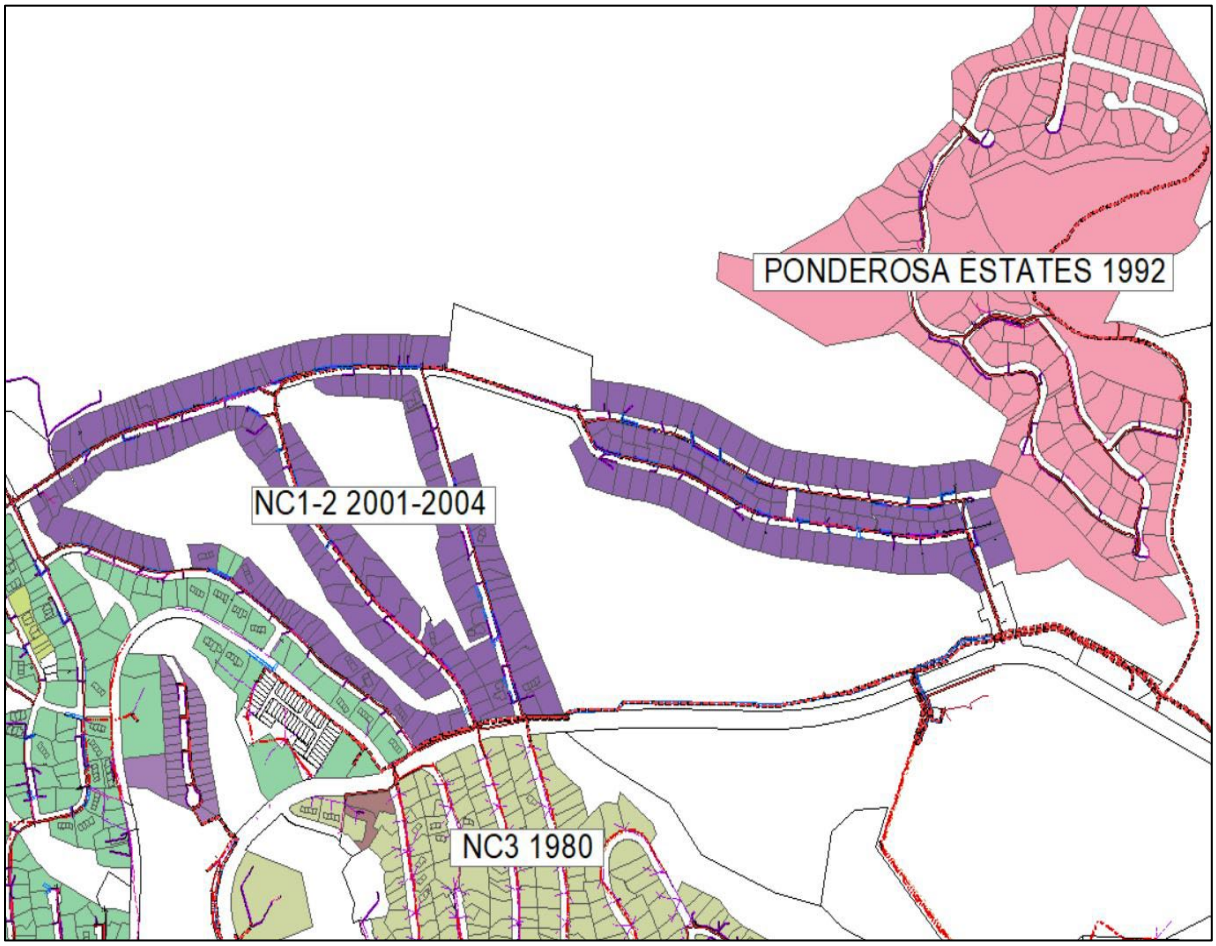
TO ALL LINE CREWS: ANY QUESTIONS ASK !!

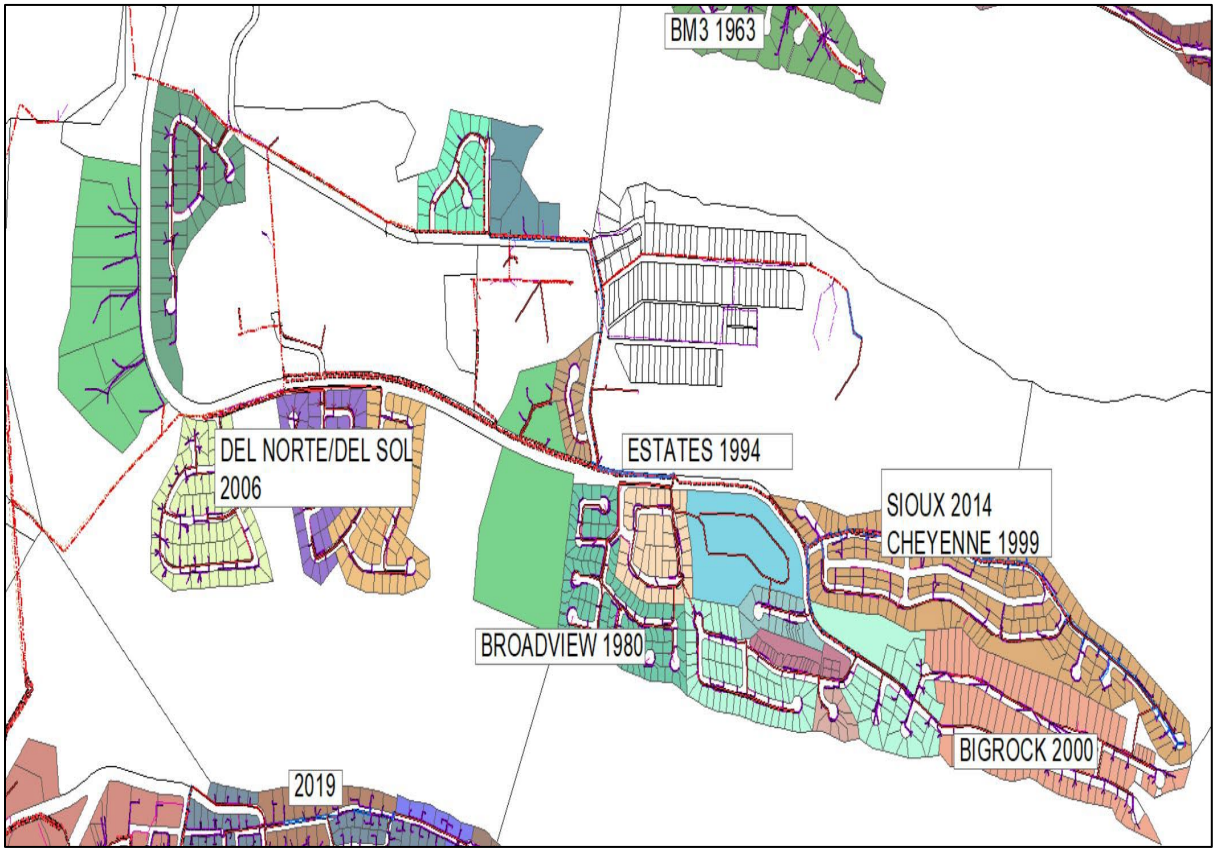
Appendix B:
SUBDIVISION MAPS WITH AGE

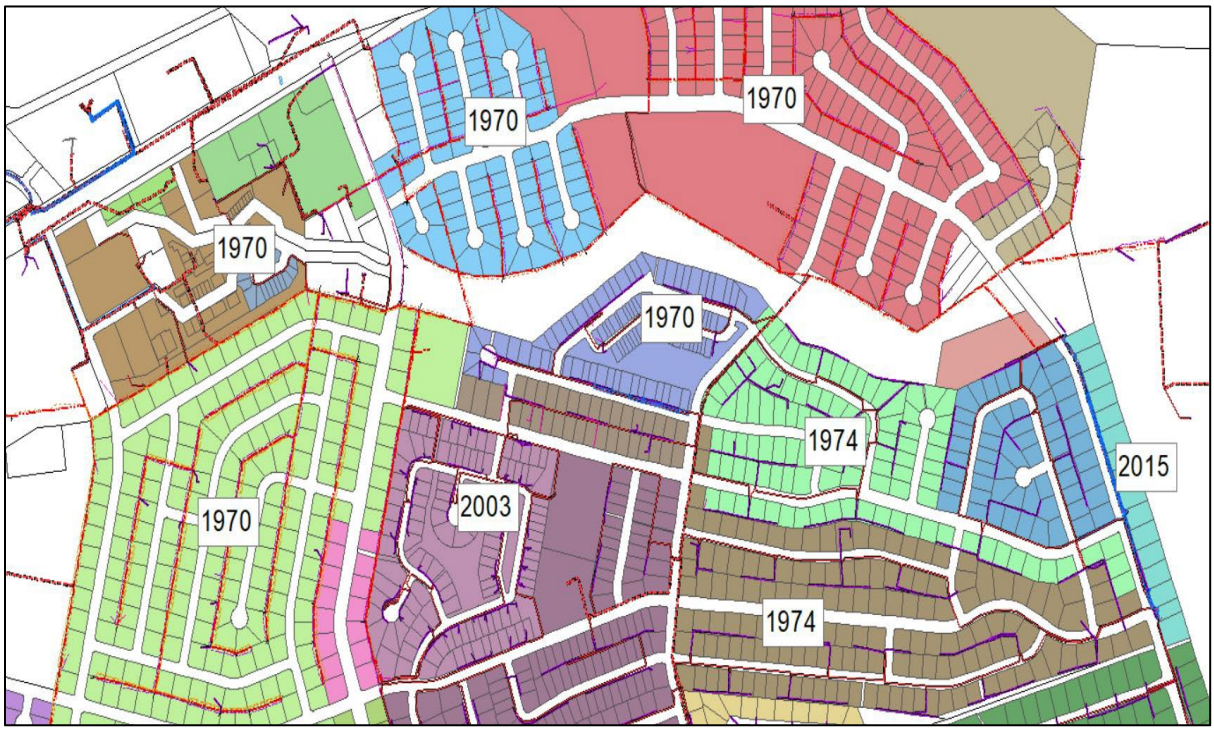


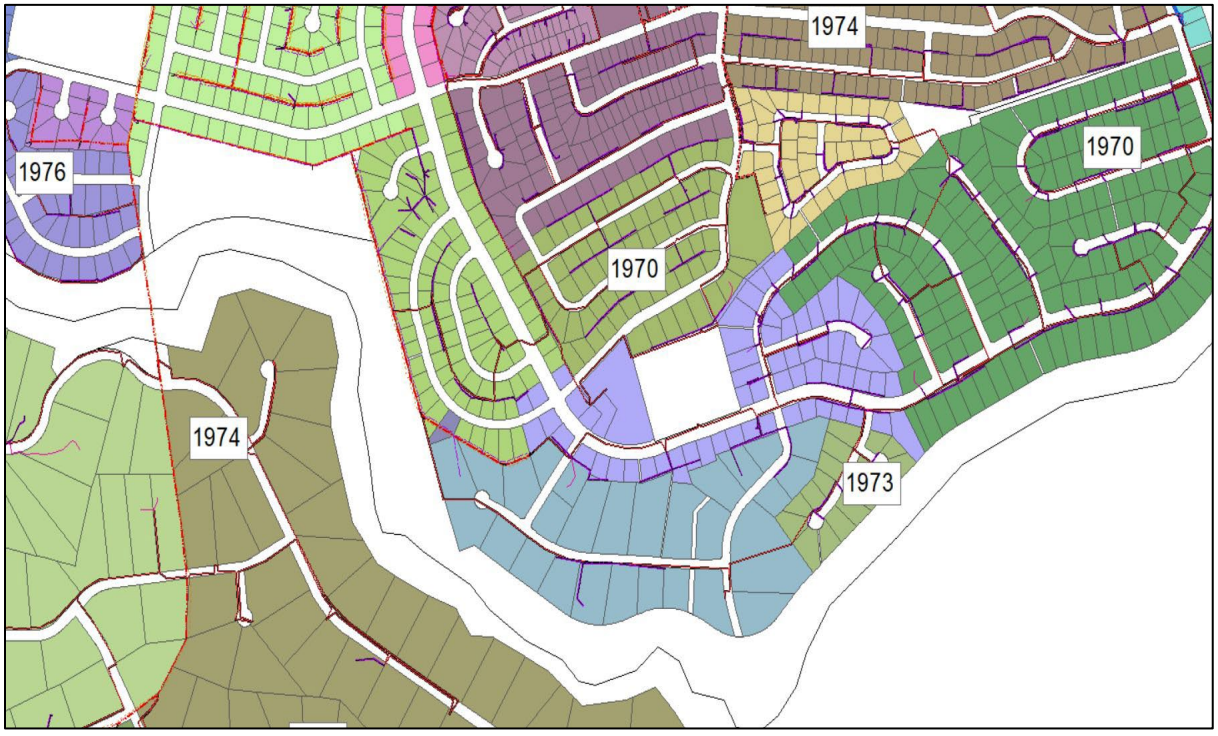


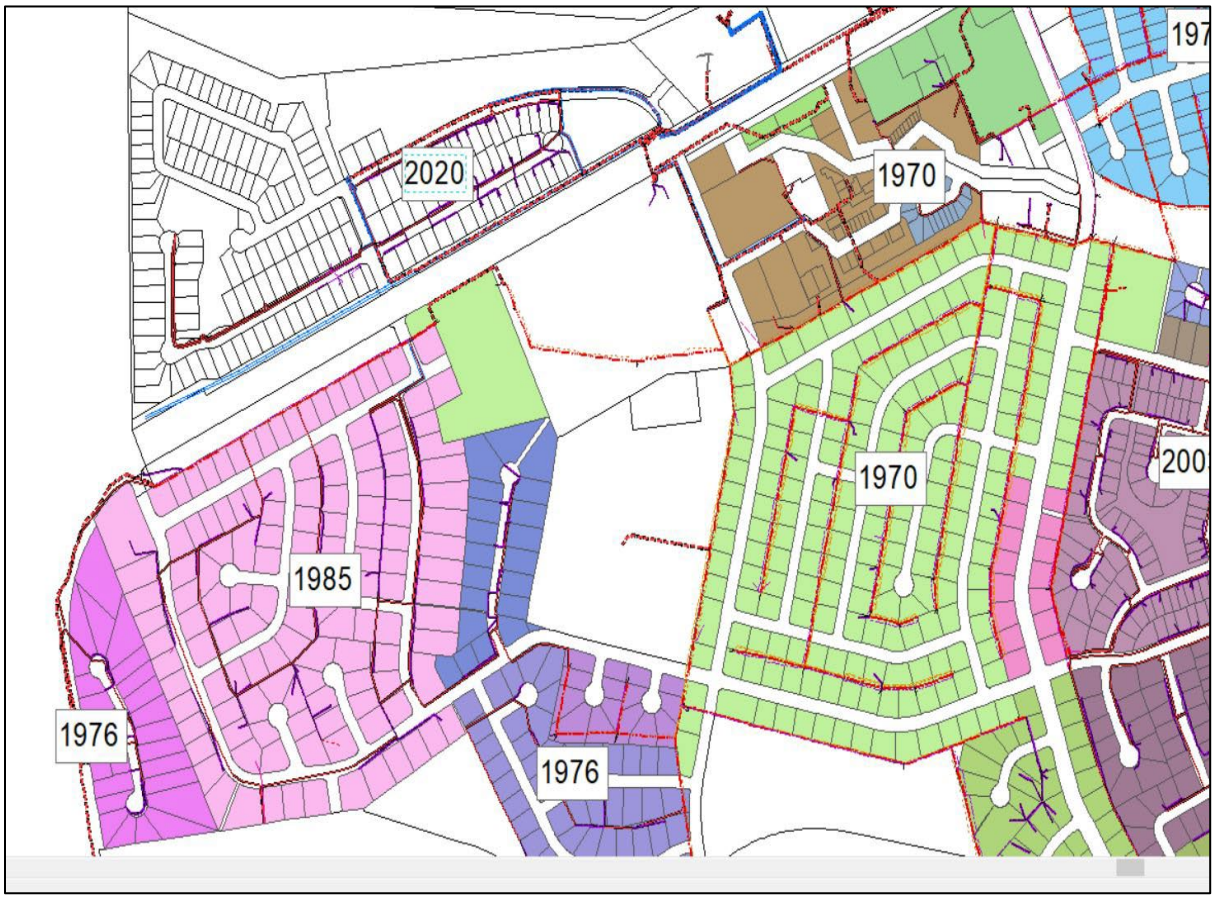

BM1 1961
BM2 1961
BM3 1965
BM4 1980
BM5 1980
BM5n 1978
BM3 1963

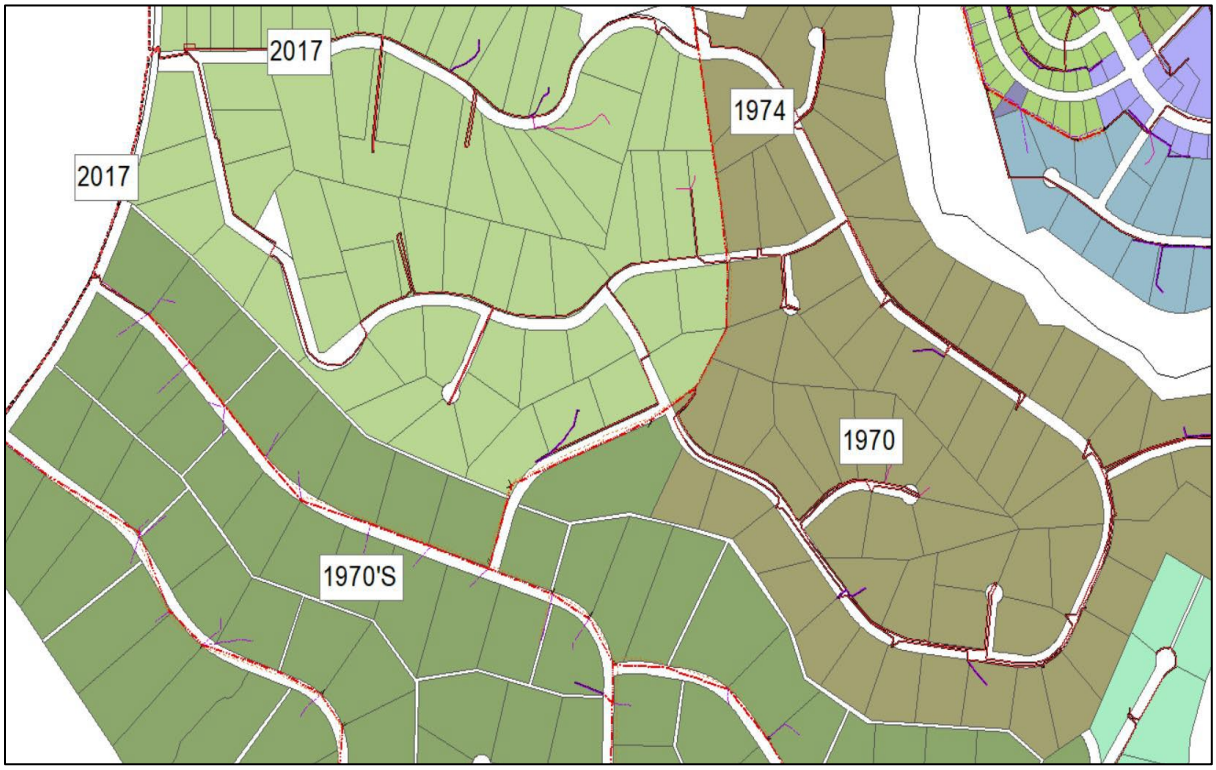

PONDEROSA ESTATES 1992
NC1-2 2001-2004
NC3 1980


BM3 1963
DEL NORTE/DEL SOL
2006
ESTATES 1994
SIOUX 2014
CHEYENNE 1999
BROADVIEW 1980
BIGROCK 2000
2019


1970
1970
1970
1970
1974
2015
2003
1970
1974


1974
1976
1970
1970
1974
1973


2020
1970
1970
1985
1976
1976


2017
2017
1974
1970
1970'S

Appendix C
ASSESSMENT PRIORITY LIST

CIRCUIT-PRIORITY-RANK	DESCRIPTION
13-1-1	REPLACE 1000' 3 PHASE PRIMARY 500MCM FROM OPPENHEIMER TO TIMBER RIDGE
13-1-2	REPLACE 1000' 3 PHASE PRIMARY 1/0 CABLE ON OPPENHEIMER FROM TRINITY TO THE SOUTH
13-1-3	REPLACE 1000' 3 PHASE PRIMARY 500MCM FROM STATION TO OPPENHEIMER
13-1-4	REPLACE SWITCHES SC1305A, SC1309 AND SC1309A
13-1-5	NEED TO REPLACE TRANSFORMERS 725 AND 726
13-1-6	NEED TO RELOCATE TRANSFORMERS 1058, 1059 TO SIDEWALK
13-1-7	NEED TO REPLACE TRANSFORMERS 856 AND 857
14-1-1	REPLACE 15TH AND IRIS SWITCH SC1401A
14-1-2	REPLACE YMCA SWITCH SC1401A2
14-1-3	REPLACE YMCA TRANSFORMER #1117
14-1-4	REPLACE SOMBRILLO SWITCH SC 1404A AND REPLACE LINE TO NM502
14-1-5	REPLACE EASTGATE SWITCH T23201
14-2-1	REPLACEMENT OF TRANSFORMERS: 852,969,787,788,972,968,970,1117
14-2-2	SHANNON SWITCH INSTALL JUNCTION AND ROMOVE SC20505
14-2-3	REPLACEMENT OF SWITCHES SC1404A,1405,1406,1407,1406A,1408,1409,1406B,1410
15-1-1	REPLACE URD PRIMARY LINE FROM SYCAMORE TO PUEBLO COMPLEX
15-1-2	REPLACE SC1517 PMH9 AT QUEMAZON
15-1-3	REPLACE SC 1501A ON ROSE STREET
15-1-4	REPLACE SC1512 URBAN AT NORTH ROAD
15-1-5	INSTALL LOOP FEED FOR TOTAVI
16-1-1	INSTALL PRIMARY J-BOXES AT 897 & 921 ESTATES DR.
16-1-2	REPLACE PRIMARY CABLE IN LA MESA RRAILER PARK

16-1-3	INSTALL PRIMARY J-BOXES AT CORNER OF KRISTI LN AND BROADVIEW
16-1-4	INSTALL PRIMARY J-BOXES AT CORNER OF TIFFANY AND BROADVIEW
16-1-5	REPLACE 1 PHASE PRIMARY SECTIONS ON LOS PUEBLOS : 2000' TOTAL
16-2-1	REPLACEMENT OF SWITCHES 1603A, 1604,1605,1605A,1605B,1610
16-1-2	REPLACE PRIMARY CABLE IN LA MESA RRAILER PARK
17-1-1	REPLACE POLE #6152
17-1-2	REPLACE POLE #6154
17-1-2	REPLACE POLE 6137
17-1-3	REPLACE POLE #6138
17-1-4	REPLACE POLE # 6143
17-1-5	REPLACE POLE #6144
17-1-6	REPLACE POLE #6034
17-1-7	REPLACE POLE #6011
17-1-8	REPLACE POLE #6002
17-1-9	REPLACE POLE #6037
18-1-1	REPLACE SWITCH SC1803
18-1-2	INSTALL TRANSFORMER PAD AT MERRICK -
18-1-3	REPLACE OPEN DELTA TRANSFORMERS AT DP ROAD
18-1-4	REMOVE TRANSFORMER 1101 FROM MAIN TIE TO 18 AT DP ROAD
EA4-1-1	DESIGN AND REPLACEMENT
WR1-1-1	REPLACE 4 PADMOUNT SWITCHES ON ARAGON AVE.,WR3-3,WR3-4,WR3-5,WR3-6
WR1-1-2	CHANGE OUT TRANSFORMER P3631 AT DNCU MALL
WR1-1-3	CONDUCTOR REPLACEMENT LA SENDA AND PIEDRA LOOP
WR2-1-1	REPLACE CONDUCTOR VALLE DEL SOL

ELECTRIC RELIABILITY PLAN

INFORMATION AND DISCUSSION

Dennis Astley, P.E.
Deputy Utility Manager - Electric Distribution

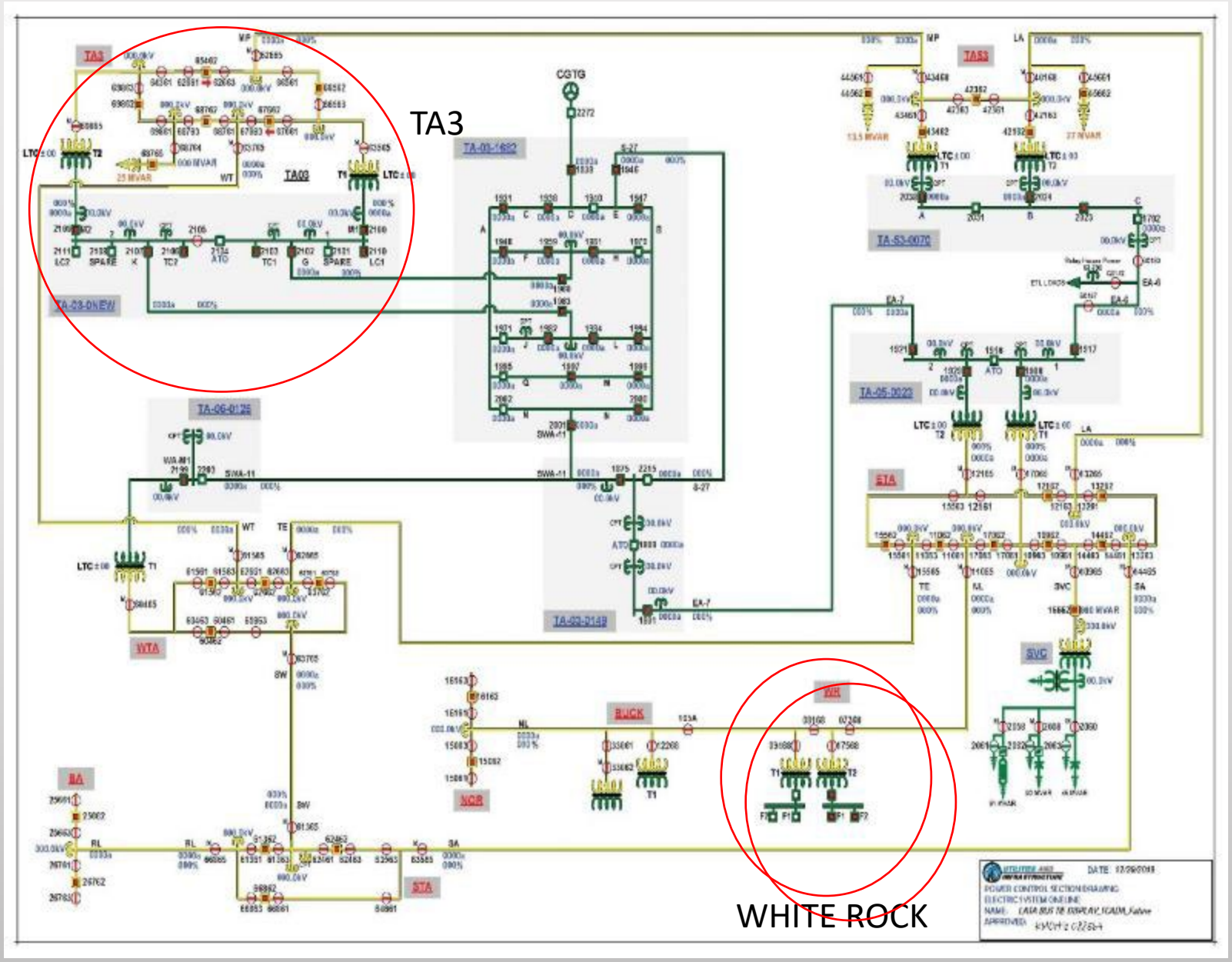
DISTRIBUTION SYSTEM

RELIABILITY MEASURES

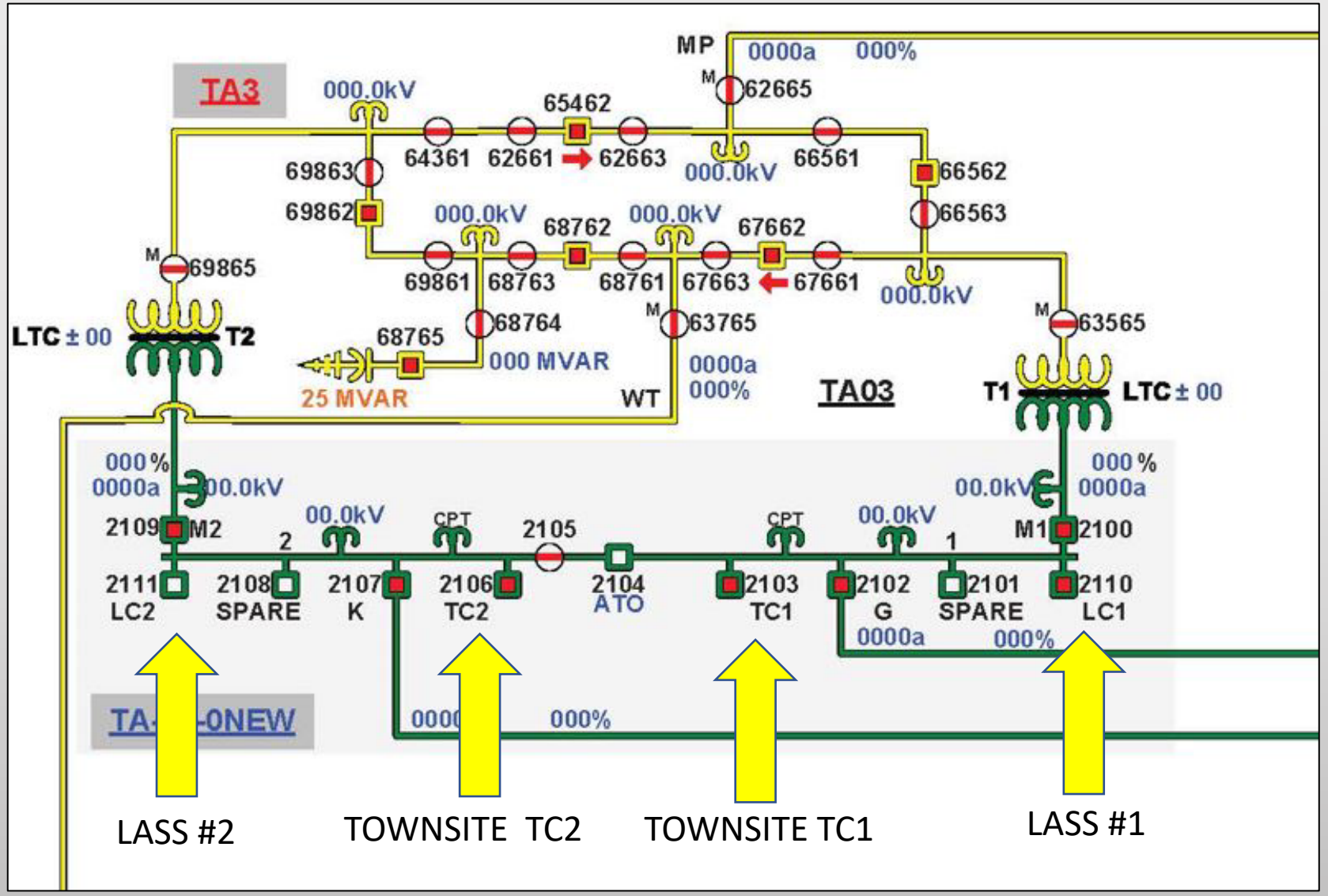
SHORT TERM ACTION PLANS

LONG TERM ACTION PLANS

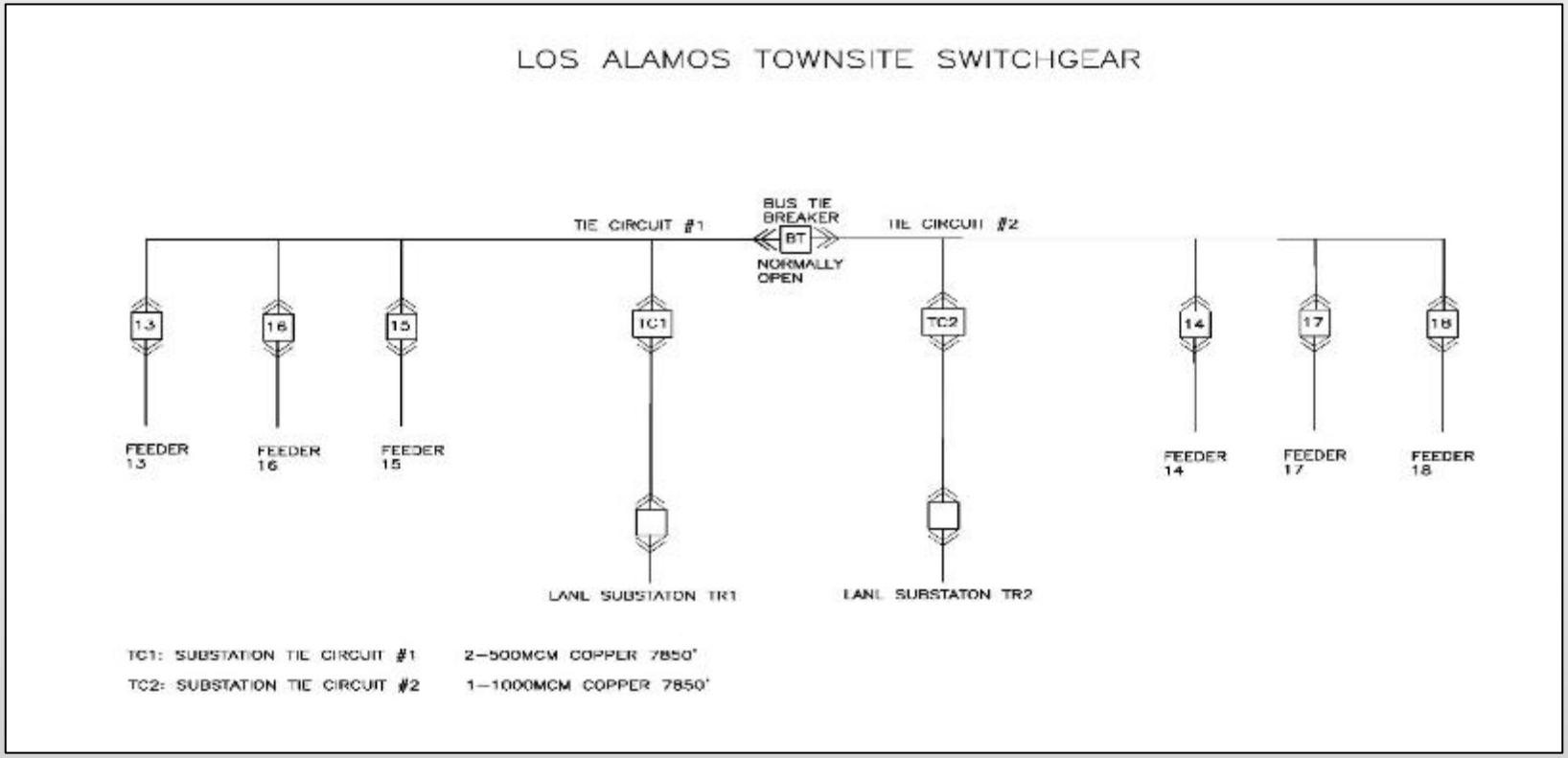
LOS ALAMOS COUNTY AREA TRANSMISSION SYSTEM



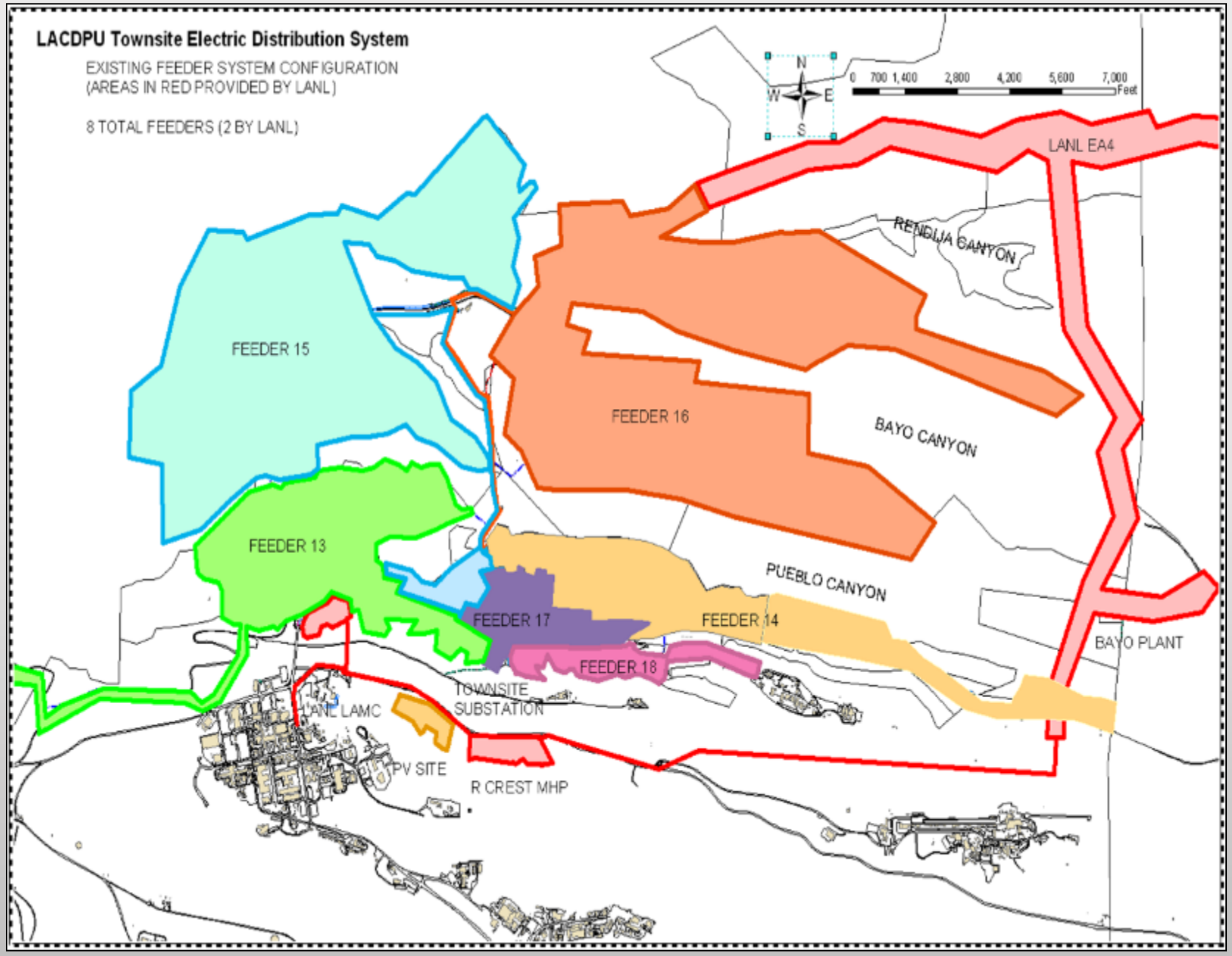
TA-3 Substation



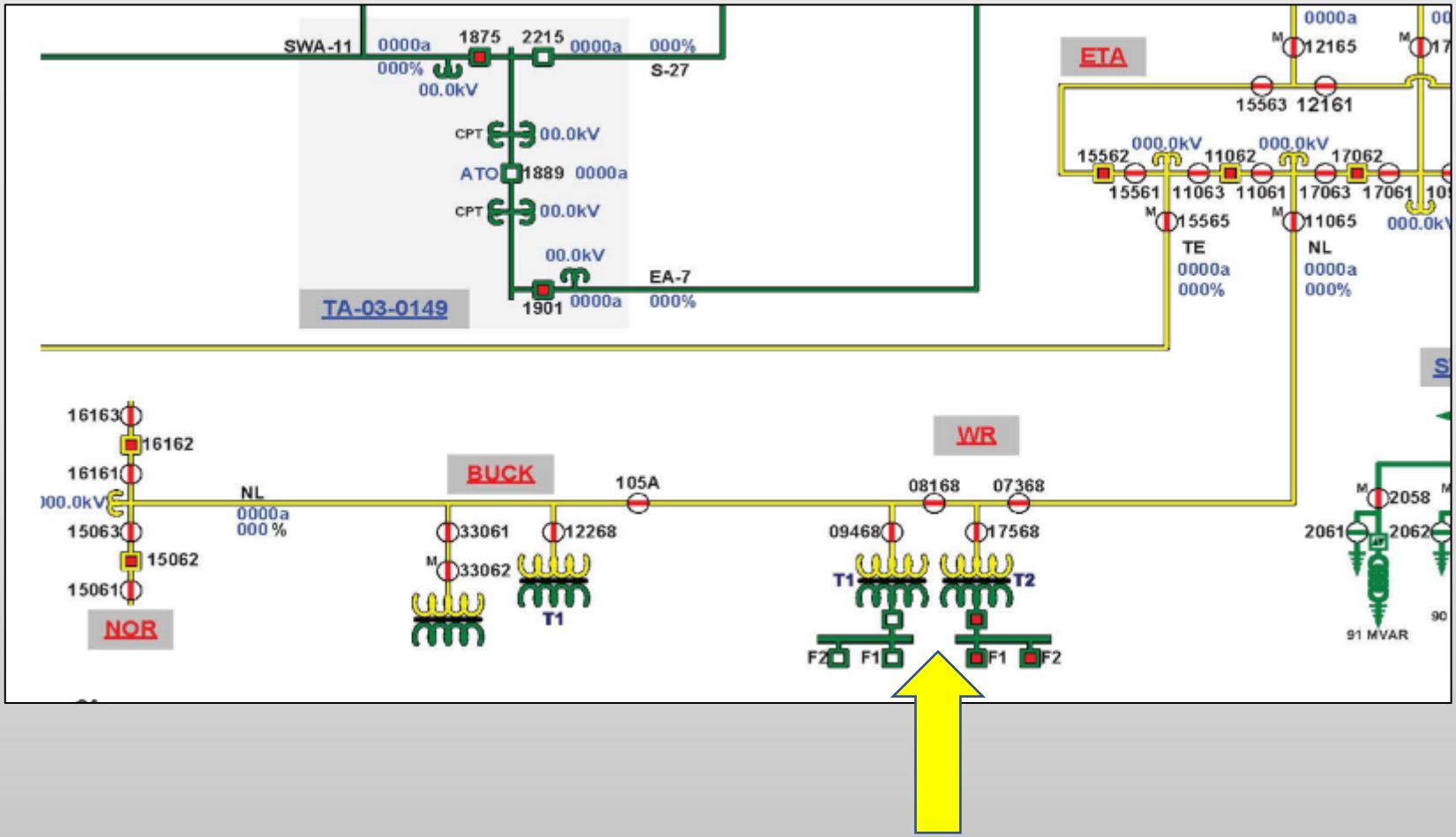
TOWNSITE SWITCH STATION



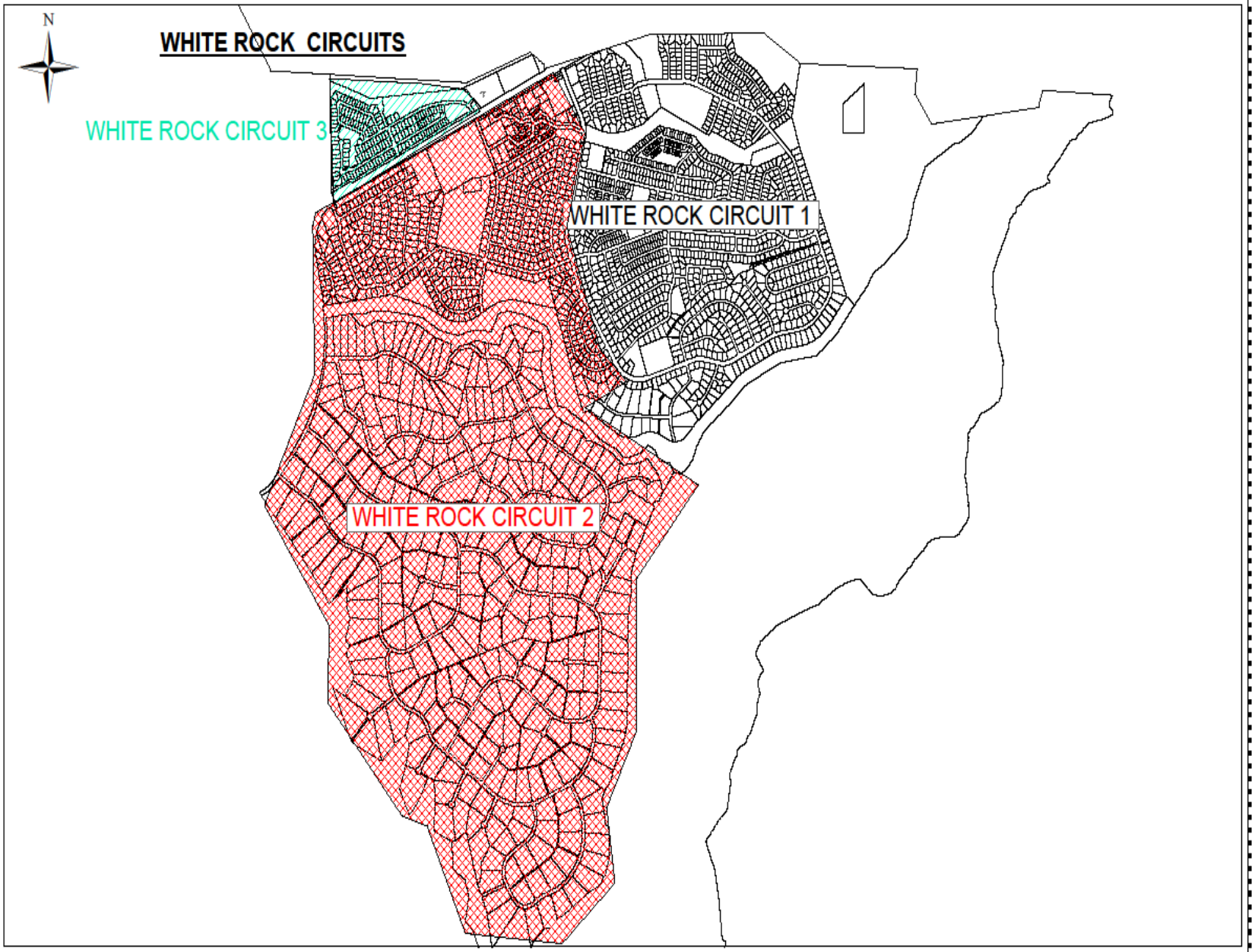
Circuit 13: Western Area and Ski Hill
Circuit 14: Eastern Area and Pajarito Cliff Site
Circuit 15: Quemazon , North Community, Ponderosa Estates
Circuit 16: North Mesa and Barranca Mesa
Circuit 17: Downtown Commercial North of Trinity
Circuit 18: Downtown Commercial South of Trinity and DP Road


LACDPU Townsite Electric Distribution System
EXISTING FEEDER SYSTEM CONFIGURATION
(AREAS IN RED PROVIDED BY LANL)
8 TOTAL FEEDERS (2 BY LANL)
N
W
E
S
0 700 1,400 2,800 4,200 5,600 7,000 Feet
LANL EA4
RENDIJA CANYON
FEEDER 15
FEEDER 16
BAYO CANYON
FEEDER 13
PUEBLO CANYON
FEEDER 17
FEEDER 14
FEEDER 18
BAYO PLANT
TOWNSITE SUBSTATION
LANL LAMC
PV SITE
R CREST MHP

WHITE ROCK SUBSTATION

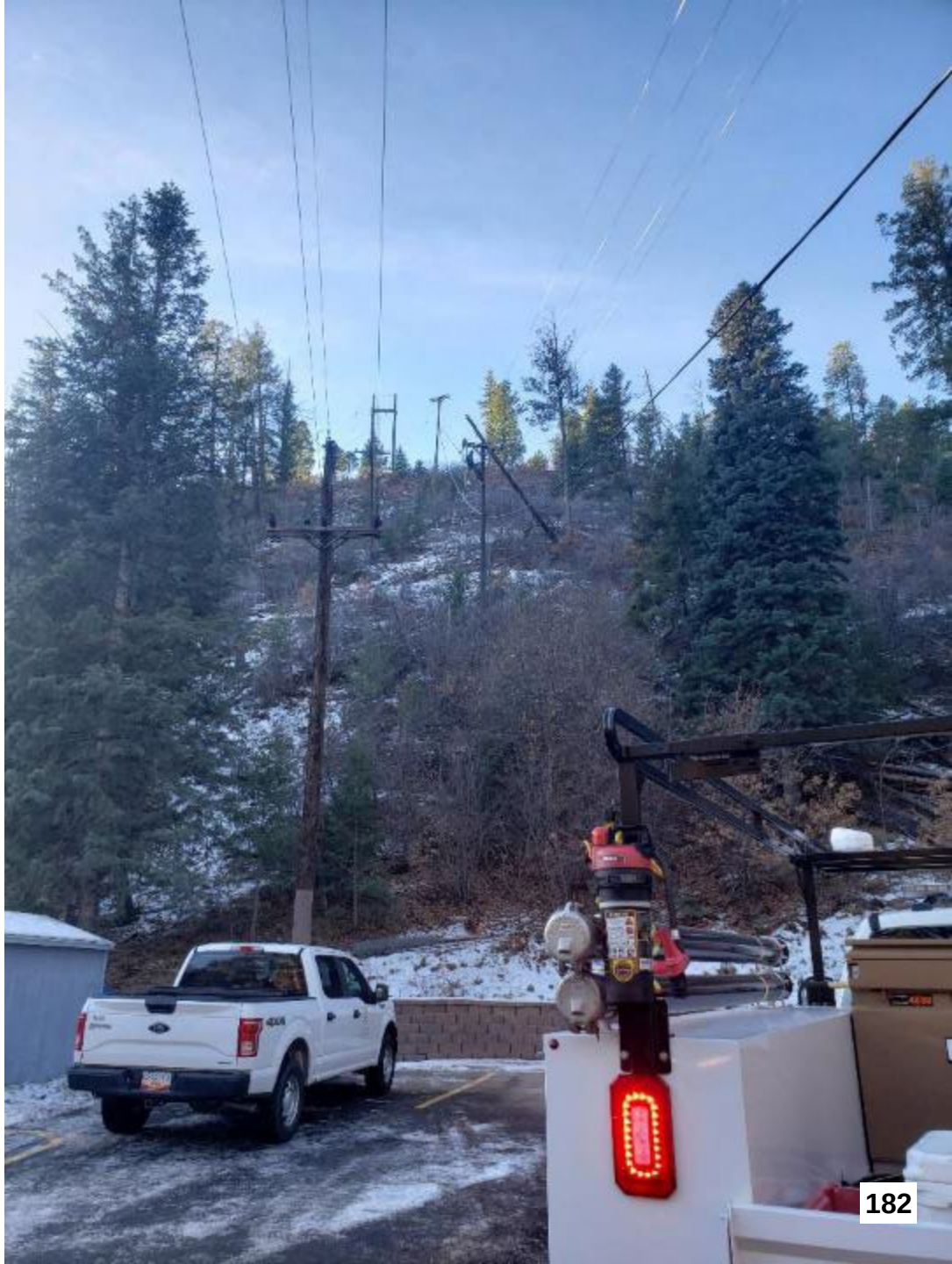


WHITE ROCK SUBSTATION


N
WHITE ROCK CIRCUITS
WHITE ROCK CIRCUIT 3
WHITE ROCK CIRCUIT 1
WHITE ROCK CIRCUIT 2

RECENT SYSTEM OUTAGES

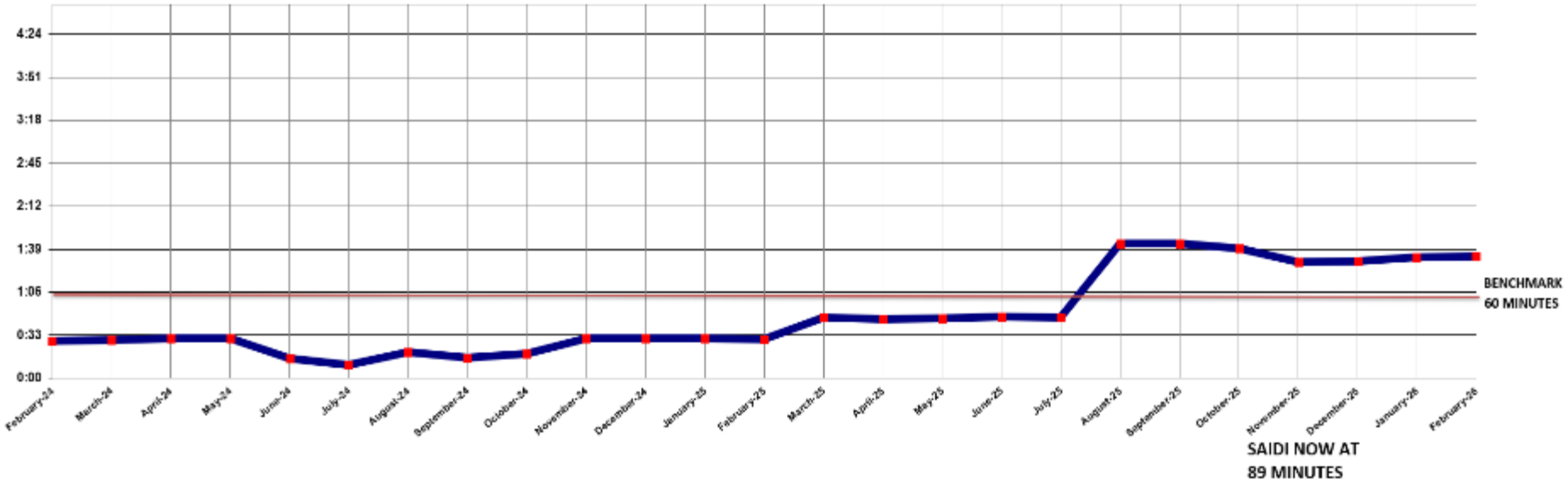
TREE CONTACT WITH POWER LINES



EACH POINT IS A MONTHLY SAIDI HISTORY
60 MINUTES = LACDPU SAIDI BENCHMARK

SAIDI = STANDARD AVERAGE INTERUPTION DURATION INDEX

SAIDI= (Sum of all customer outage durations)
(Total number of customers served)



Strategy for Improving the SAIDI

- Continue to perform a root-cause analysis for every power outage.
- Continue with the Asset Management Program, “AMP”, for line inspections, operations & maintenance, “O&M”, etc.
- Continue to monitor line sections which have failed during the past; prioritize, and place into the AMP.
- Continue extensive tree trimming efforts , in house and with an on call contractor.
- Continue to dedicate one crew for overhead power line O&M.
- Continue to dedicate one crew for underground power line replacement.
- Manage Outage Response to minimize outage times and reduce SAIDI.
- Increase quantity of fault indicators in the system to track and identify underground faults faster.
- Install new three phase reclosers in the system to isolate primary line faults and restore power in a safer manner.
- Install a SCADA system to monitor the electric grid in real time

Short-Term Action Plans

- Asset Management Program for OH
- Overhead Pole and Line Replacement Program

- Asset Management Program for UG
- UG Primary Replacement Program

Short-Term Action Plans

New LASS Substation Addition

NEW LASS FEEDERS

13T - WESTERN AREA

15T- NORTH COMMUNITY

16T- BARRANCA MESA

S6- LOS ALAMOS MEDICAL CENTER

SM6- TRINITY DRIVE

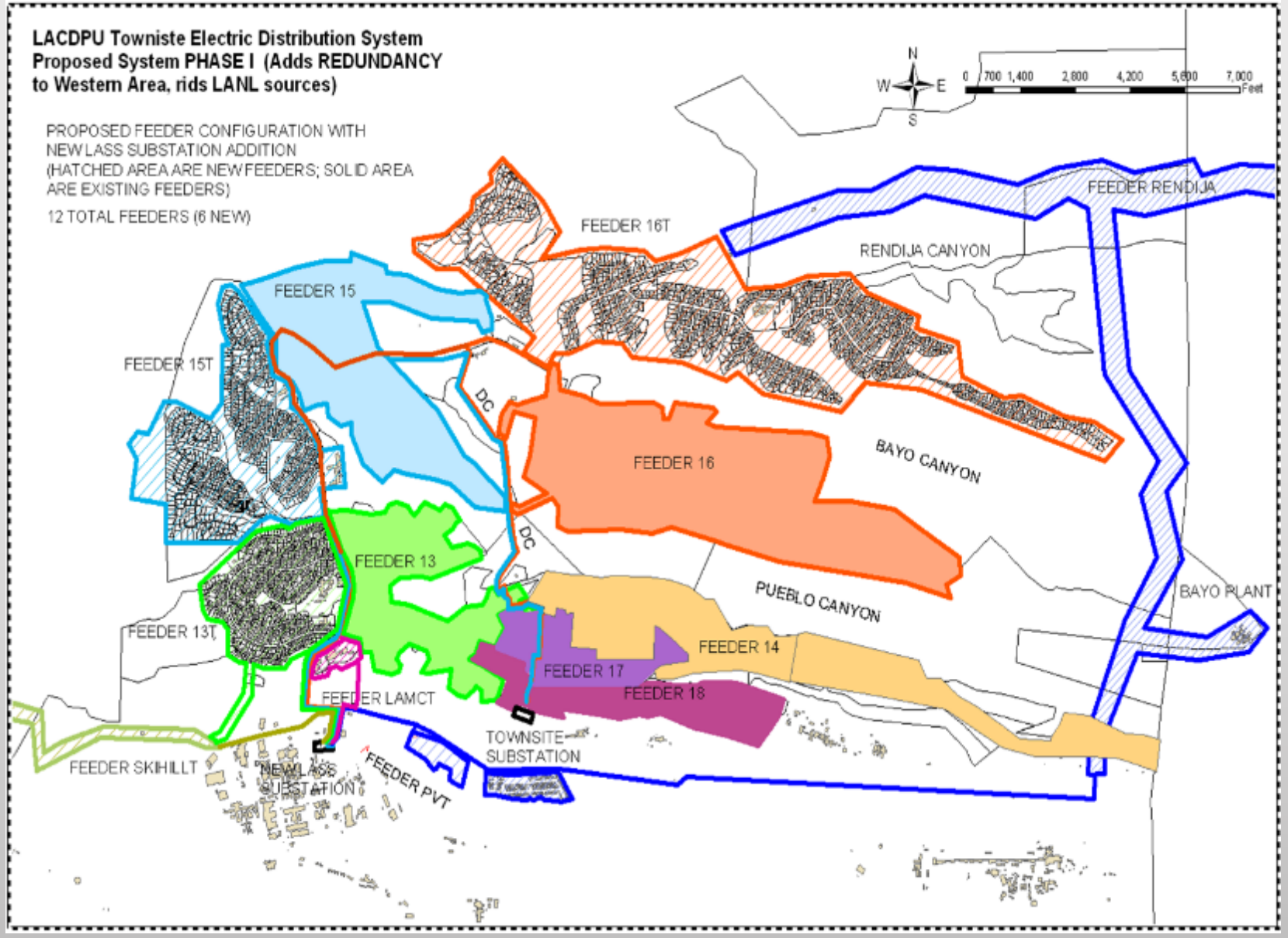
S18- EAST JEMEZ ROAD , EASTGATE,RENDIJA CANYON

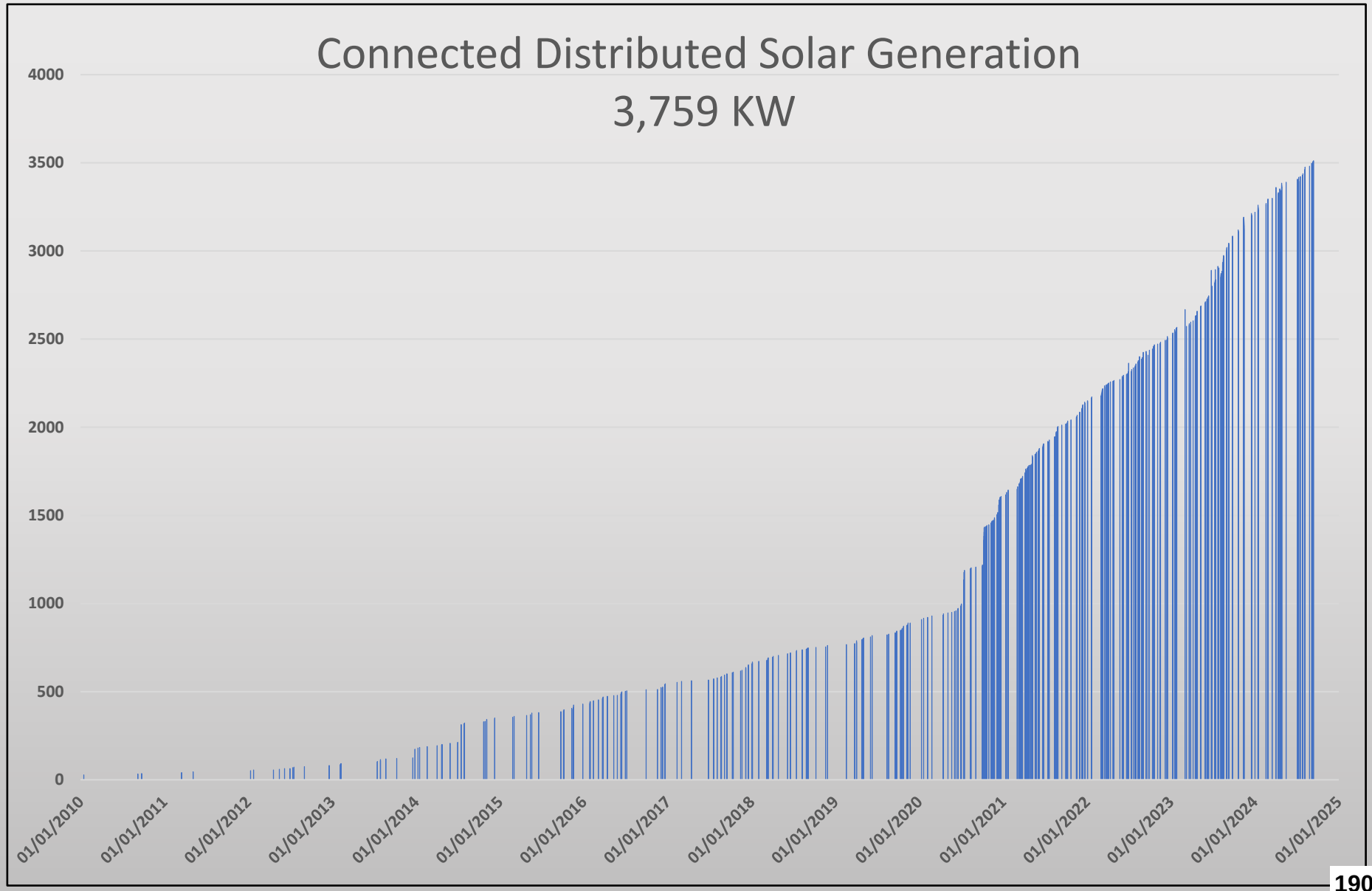
S3- ECO STATION, CONCRETE PLANT

The LASS Substation will add feeder sources to maintain and improve the SAIDI and the system reliability in the Townsite area as illustrated in the next slide.

- Provide new feeders 13T, 15T, 16T, S6, SM6.
- Reduce the number of customers on Townsite substation feeders 13, 15, & 16 (by moving half the consumers on those feeders to LASS). Reducing the number of consumers affected by primary feeder outages.
- Provide power to LACDPU customers at the Eco Station, LA Medical Center (S6) and Elk Ridge MH Park.
- Add 50% additional system redundancy during scheduled or unscheduled outages to Townsite Substation Feeders. Feeders 13T, 15T, & 16T on LASS can back feed feeders on Townsite 13, 15, 16 and the Ski Hill.

Los Alamos Distribution Area with LASS




Connected Distributed Solar Generation
3,759 KW
4000
3500
3000
2500
2000
1500
1000
500
0
01/01/2010
01/01/2011
01/01/2012
01/01/2013
01/01/2014
01/01/2015
01/01/2016
01/01/2017
01/01/2018
01/01/2019
01/01/2020
01/01/2021
01/01/2022
01/01/2023
01/01/2024
01/01/2025

FUTURE OUTLOOK

Planning for future upgrades is dependent on the funding provided to the department. The political environment and current disasters in the United States have compounded the supply chain crisis. Costs continue to escalate and lead times are still expanded.

Distributed Generation and Electric Vehicle Impacts on the System

The electric distribution grid is absorbing production from increased distributed generation (PV). The impact of the reverse flows could strain the reliability of the system.

Electric vehicle chargers and battery installations will increase the load on the system at off-peak times.

Homes are also increasing the size of their services to accommodate air conditioning and heat pumps. The upgrades to transformers and conductors required will be scattered throughout the county as areas are affected and show signs of stress or failure.

Future Goals Set for an ALL-Electric Los Alamos County

The Utility Board of Los Alamos County set a future goal to eliminate gas consumption in the County. This would mean that all homes and businesses would be completely operated with electricity.

The current distribution system will not support this as it exists today. Although the main backbone three phase systems have been upgraded, it would require replacement by 2050. The utility will require the reconstruction of all residential areas within the county.

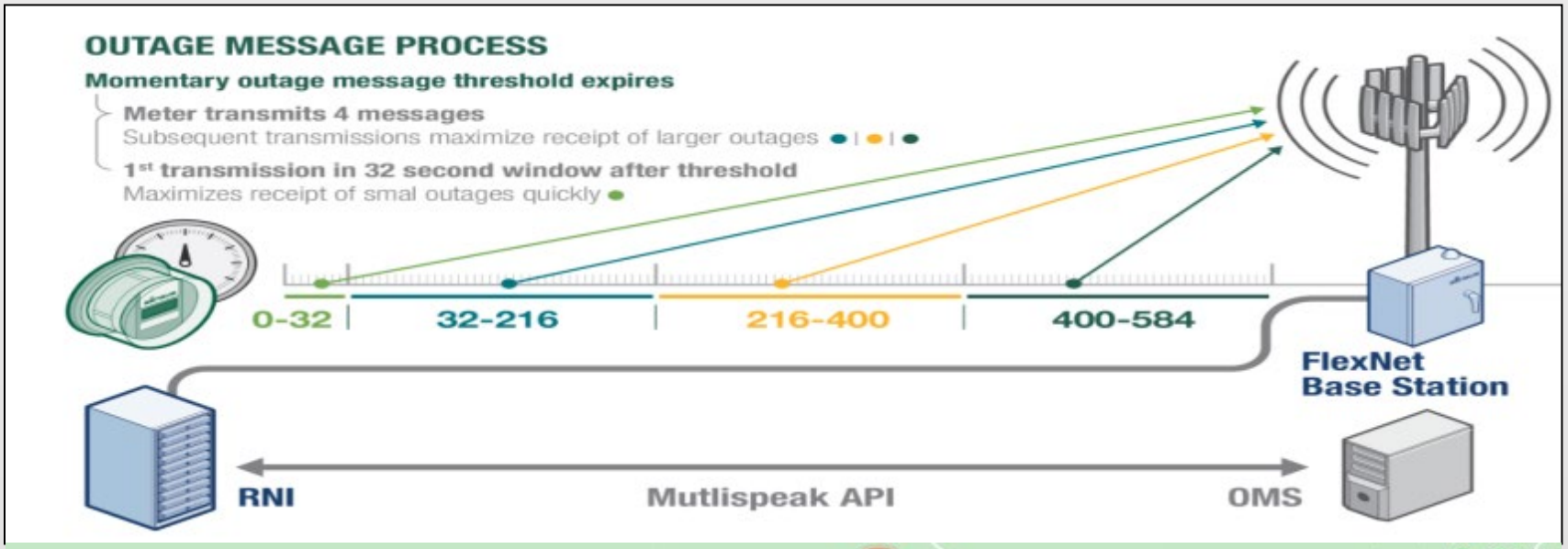
In addition, a very large number of homes do not have the correct power panel size to provide whole home electric consumption.

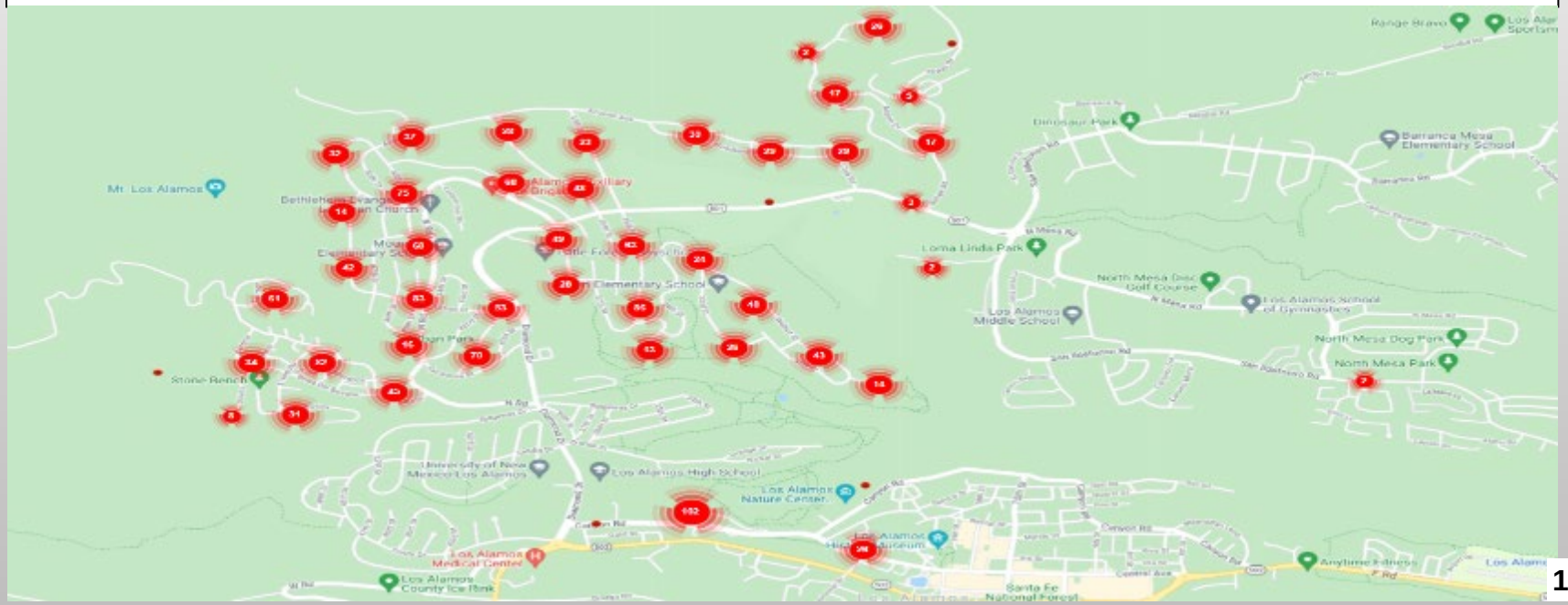
Distribution System SCADA

The DPU electric distribution department will develop and install a SCADA system which will monitor the electric equipment in the field.

The system will incorporate information from the AMI, ArcGIS, and the Milsoft Modeling system to provide real time system status to crews in the field and engineering.

AMI System


OUTAGE MESSAGE PROCESS
Momentary outage message threshold expires
Meter transmits 4 messages
Subsequent transmissions maximize receipt of larger outages
1st transmission in 32 second window after threshold
Maximizes receipt of smal outages quickly
0-32
32-216
216-400
400-584
FlexNet Base Station
RNI
Mutlispeak API
OMS


Mt. Los Alamos
Barranca Mesa Elementary School
Loma Linda Park
Los Alamos Middle School
North Mesa Dog Park
North Mesa Park
Los Alamos High School
Los Alamos Nature Center
Los Alamos Medical Center
Los Alamos County Ice Rink
Santa Fe National Forest

Capital Project Proposals

2025 - SKI HILL $2,800,000
2025 - OPENNHEIMER / TRINITY / TIMBER RIDGE $1,200,000
2025 - 2026 - PIEDRA LOOP $ 550,000
2025 - 2026 - LOS PUEBLOS $1.0M
2026 - 2027 – Aragon, Ridgecrest, Garver, Catherine $1.5M
2026 – 2027 – Quemazon, North Road $750,000
2028 – Sandia, 41st – 47th, Ridgeway Tie $1M (Bond)
2028 – Grand Canyon, Bryce, Richard Ct, Rover $2M (Bond)
2028 - EA4 RECONSTRUCTION $7.5 MILLION (Bond)
2029 – Tewa, Otowi, Nambe Loop, Santa Clara $1M
2029 – La Senda $1.5M
2030 – Oakwood Loop, Nugget, Opal, Pinon $1.8M
2030 – Rover, Ridgecrest $1.9M
2031 – Sage $1M
2031 – Kimberly Loop $1M
2032 – Trinity from Diamond to Oppenheimer $1M
2032 – Briston Pl, Brighton, Paul Place, Todd Loop $600,000
2033 – Los Alamos Replacement $1M
2033 – White Rock Replacement $1M
2034 – Los Alamos Replacement $1M
2034 – White Rock Replacement $1M
2035 – Los Alamos Replacement $1M
2035 – White Rock Replacement $1M

QUESTIONS ?

Agenda No.:	7.b.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; Quality Governance - Fiscal Stewardship; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services; DPU FY26 - 2.0 Achieve and Maintain Excellence in Financial Performance
Presenters:	Ben Olbrich, Deputy Utility Manager-Power Supply
Legislative File:	**21049-26**

Title
Biannual Update of the Integrated Resource Plan (IRP)

Body
This briefing describes the efforts of staff to identify, evaluate and develop new generation resources for the Los Alamos Power Pool, in consideration of the generation needs and preferred portfolio identified by the 2022 Integrated Resource Plan. An "Outline for Proposed Scope of Work" will be provided. The next update will take place in six months.

Attachments
A - IRP Implementation Update

Integrated Resource Planning
vs.
Dynamic Modelling

A new approach to
generation and load planning

Ben Olbrich

April 1, 2026

IRP with Scenario Based Planning

- **What DPU has done in the past**
- Static assumptions updated every 2 to 5 years
- Scenario-based modeling with fixed inputs with deterministic or stochastic analysis
- Uses historical and forecasted load and selected generation options
- Provides clear long-term direction and generation planning focused on least-cost, reliable generation resource mix to meet future electric demand over 20+ years into the future
- Identifies a preferred generation resource portfolio

IRP Limitations

- Expensive cost $300,000+ limits frequency
- Results are coarse, identifying general classes of generation resources which may not be practical or achievable
- Static result - an update is needed to plan for changes in:
  - Candidate generation resources
  - Load forecasts
  - Market prices and forces

Scenario-Based & Adaptive Planning

- This is what was attempted with the last IRP
  - Multiple scenarios with stochastic analysis
  - One planning update built into the agreement
- One planning update wasn't enough
  - Too many planned generation and market changes over the past three years
  - Large, complex model that isn't owned or licensed to DPU
- The "Adaptive Planning" part was insufficient – we need dynamic modelling, not a static IRP

IRP Alternatives

- Integrated System Plan (ISP): a holistic, long-term planning process that combines generation, transmission, distribution, and customer-side resources (like DERs) to meet decarbonization and reliability goals
- Integrated Grid Plan (IGP): a comprehensive, strategic process that merges traditionally siloed planning—generation, transmission, and distribution—into a unified, long-term framework
- Non-Wires Alternatives (NWAs): Targeting specific grid needs with demand-side management, storage, or local generation, often avoiding or postponing large transmission/distribution investments
- Scenario-Based & Adaptive Planning: Using probabilistic modeling (e.g., LEAP) to handle uncertainty, rather than relying on a single, linear forecast, allowing plans to adjust as technologies change

Dynamic Modelling

- A new approach
- Near-real-time or continuous planning cycle
- Continuously updated model reflecting changing generation, load and market conditions
- Adaptive decision-making under uncertainty
- Iterative simulations adjusting to new data
- Requires granular operational, market, weather, DER, and grid sensor data
- Continuously updated datasets

Quick Comparison

	TRADITIONAL IRP	Dynamic Modelling
Frequency	Every 2-5 years	Near-real-time or continuous
Planning Horizon	20+ years	Days, weeks, months, years
Methodology	Scenario-based modeling with fixed inputs Deterministic or stochastic analysis	Iterative simulations adjusting to new data
Data Inputs	Historical and forecasted load and selected generation options	Granular operational, market, weather, generation and transmission data
Benefits	Clear long-term direction and capital asset planning	High adaptability, improved short-term generation and load planning accuracy and optimization
Limitations	Slow to adapt to rapid changes and limited flexibility	Requires advanced data systems and analytics

Path Forward – Dynamic Modelling

- Change the scope of work to meet the need
  - Don’t ask for an IRP
  - Don’t ask for a specific solution
- Ask for solutions for the problem, the statement of need rather than a scope of work
  - Dynamic generation and load forecasting
  - Build the model as a starting point
  - Allow for frequent updates to the inputs and constraints as needed, not simply periodically
    - Could be performed as an on-call service
    - Could be performed by staff if the model is licensed to DPU
  - Option for day-ahead and real-time generation and load planning to support **Extended Day-Ahead Market (EDAM)**

Agenda No.:	7.c.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; Environmental Stewardship - Carbon-Neutral Energy Supply; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services; DPU FY26 - 5.0 Continuously, Conscientiously, Work Toward Environmental Sustainability
Presenters:	Ben Olbrich, Deputy Utility Manager-Power Supply
Legislative File:	**21199-26**

Title
Plug-in / Balcony Solar Systems: Key Information

Body
This presentation provides an overview of plug-in solar systems, with an overview of technology, safety, regulations, impacts, policy options and resources. Plug-in solar, also called balcony solar, is a term for small-capacity photovoltaic systems that can be installed by plugging directly into a normal electrical receptacle. At a minimum they consist of one to several photovoltaic panels, a micro inverter and a power cord. They can be installed temporarily and relocated as desired. This simplicity of design and installation lowers the installed cost of these systems compared to roof-mounted and grid-tied photovoltaic systems. For over a decade, plug-in solar systems have been sold in Germany and existed in the U.S. through a do-it-yourself approach. Plug-in solar has gained increased public awareness in the U.S. since March 2025, when Utah passed the first legislation to legalize and streamline their use and Bright Saver initiated early pilot installations in the Bay Area. While plug-in solar systems have undeniable cost and portability benefits over conventional solar systems, they do present some issues for both the users and the utility.

Attachment A is this presentation, and attachment B provides a detailed explanation by UL Solutions of the differences between traditional and plug-in solar systems, and some of the most significant electric safety issues that plug-in solar systems can present.

Attachments
A - 2026 Plug-In Solar Presentation
B - Plug-in Solar Safety Whitepaper

Plug-In Solar Systems: Key Information for the BPU

Overview of technology, safety, regulations, impacts, policy options and resources

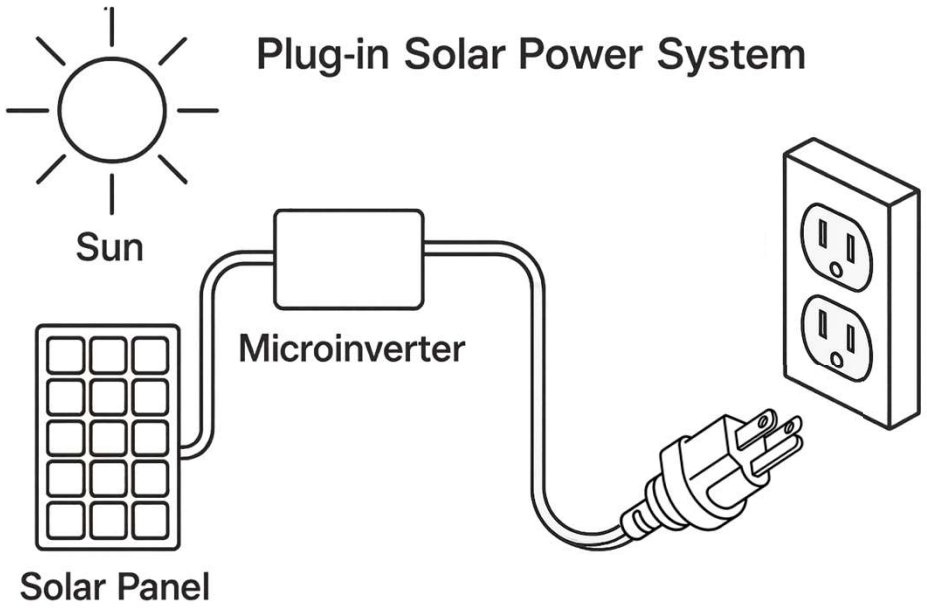
Ben Olbrich
Deputy Utilities Manager – Power Supply
Los Alamos Department of Public Utilities
April 1, 2026

What Are Plug-In Solar Systems?

- Small photovoltaic (PV) systems designed to plug directly into a standard household outlet
  - Typically, 300–1200 watts of capacity per unit
  - Often marketed as DIY, low-cost, simple-to-install solar options
  - Do not require traditional rooftop solar permitting in some jurisdictions
  - Intended to lower household metered electricity consumption

Technology Overview

- Consist of PV panels + microinverter + power cord
  - Microinverter synchronizes output with household grid voltage
  - Output is backfed into home circuits through a branch circuit
  - Reduces household net load during solar production



Components are not to scale

History of Laws in Europe and the United States

- Europe: Germany pioneered plug-in solar regulations (mid-2010s). 1.2 million systems
- EU nations standardized safety rules permitting plug-and-play systems
- Widespread adoption due to simplified grid interconnection
- United States: Patchwork of state-level policies
  - UTAH Section 2. § 54-15-601 is enacted to read:
    - Exempts 1200 W max power output plug-in solar systems from state interconnection requirements and net metering program requirements
    - Device shall include a device or feature that prevents the system from energizing the building's electrical system during a power outage
    - Restricts “electrical corporations” from requiring approval, fees, or additional equipment beyond what’s integrated into these system
    - Waives “electrical corporations’” liability for damage or injury caused by these systems
  - Some states restrict outlet-connected solar due to safety standards

Safety Considerations

- Risk of overloading branch circuits if improperly used – "**breaker masking**"
  - Potential fire hazards from non-certified equipment
  - Backfeed concerns during outages if anti-islanding fails
  - Can be mitigated by plugging into a dedicated branch circuit
- Lack of a compatible ground fault circuit interrupters (GFCI)
- The lack of a comprehensive Underwriters Laboratories (UL) standard ***was*** an issue, has been dealt with by UL 3700 in December 2025

Breaker Masking

Power distribution circuits require protection for wiring and devices connected to it, and this is usually in the form of circuit breakers. When a system sends power back into the wiring through an outlet, it adds current to the existing branch circuit without the upstream circuit breaker detecting it. The breaker only monitors electricity flowing in the circuit from the panel, so it can't account for the extra power being added from the solar unit. That means the combined current from the grid and the plug-in solar system can exceed what the wires and connected devices were designed to handle — even though the breaker never trips.

https://www.solarpowerworldonline.com/2026/02/balcony-plug-in-solar-panels-are-we-ready-for-this-new-era-of-accessible-energy/

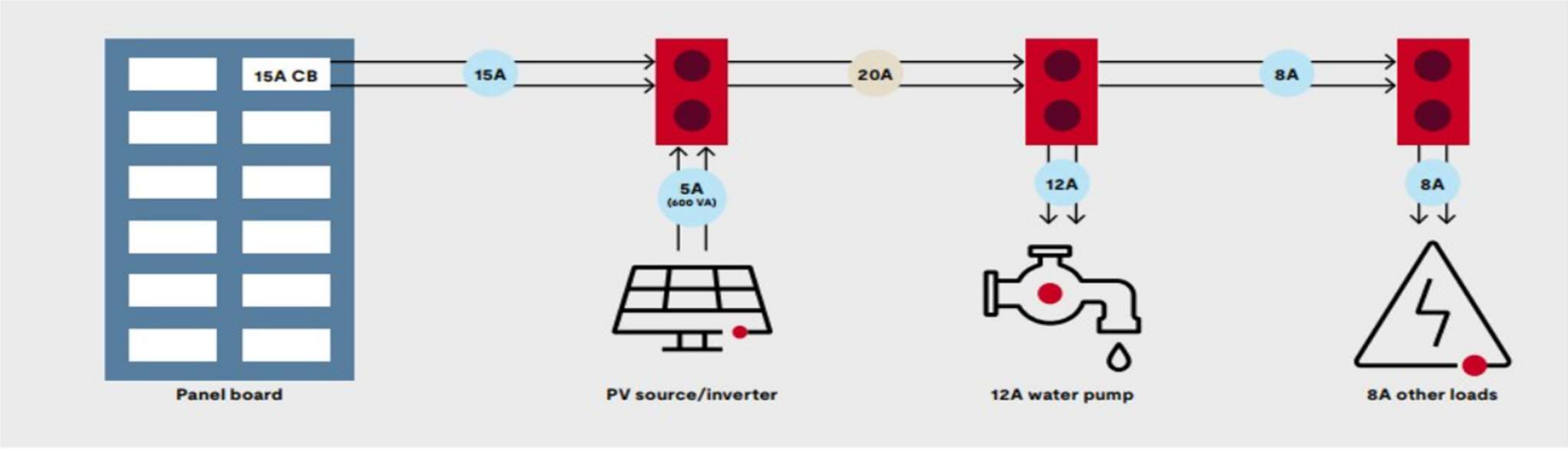


Figure 3. Branch circuit in an overload scenario with PIPV

Source: UL Solutions

Regulatory Landscape

- Some states classify plug-in solar as appliances, not generation systems
- Other jurisdictions require permits and utility interconnection approval
- NM Construction Industries Division (CID) has safety concerns
  - Many of these units are not UL-listed and lack sufficient technical documentation
  - The systems are not currently recognized or specifically addressed within the NEC
  - There is concern that the systems may exceed the capacity of existing branch circuits
  - Homes constructed prior to 2005 may have #14 AWG exterior general wiring, which could create overload or safety issues
- Los Alamos Community Development Department and DPU rules apply
  - County requires a permit for roof and ground mounted PV panels
  - DPU distributed generator interconnection agreement currently applies to plug-in solar systems
- Underwriters Laboratories
  - UL 1741 safety standard for inverters and interconnection system equipment, prevents "islanding," where an inverter continues to feed power into the grid during an outage, which could injure utility workers
  - UL 1741 SA/SB: These supplements go beyond basic shutdown to include smart grid functions like voltage/frequency ride-through and active power management
  - UL 3700 white paper and testing criteria addressing the safety implications of Plug-In PV (PIPV) systems, such as balcony solar, published December 11, 2025
- NEC compliance may be required for safe operation

Consumer Considerations

- Low upfront cost compared to rooftop solar
  - May reduce bills modestly depending on household load patterns
  - Limited generation capacity limits financial impact
  - Unclear eligibility for incentives or tax credits in many areas
- Suitable for renters, buildings with old roofing, temporary occupancy

Utility Grid Impacts

- Minimal impact at small penetration levels
  - Unmetered exports possible
  - Reverse power flow could affect transformer loading and cause voltage fluctuations on distribution feeders in rare cases
  - Difficult for utilities to track adoption and system locations without interconnection agreements
- If current interconnection agreement is applied to plug-in systems staff workload could be burdensome

Utility Business & Operations Impacts

- Shadow PV adoption affects revenue models
- Revenue erosion due to lowered metered consumption
  - Can mitigate with increased fixed and/or demand charges to capture distribution system operation costs
  - If average residence uses 650kWh/month, a 1kW PV system with 22% capacity factor will generate 0.22kW*730hrs/month = 161kWh/month, 25% of usage
  - If 2,000 metered premises used 1kW plug-in solar systems, 2,000*161kWh/month = 322,000kWh/month, 3.2% of average monthly County load
- How to handle power exports? DPU interconnection agreement compensates for exported energy, may need to revise this rule

Shadow Adoption Considerations

- Accessibility could lead to shadow adoption, where a plug-in solar is used without an interconnection agreement
- Under current DPU rules, exported energy is compensated only with an interconnection agreement
- Existing interconnection agreement holders with solar systems could use plug-in solar systems to increase compensated energy exports beyond the agreement

Liability Considerations

- How can DPU and County assert that they are not liable for any damage or injury caused by plug-in solar systems?

Interconnection Options for Consideration

- Require interconnection agreement under existing DPU rules, County permitting, and NM CID permitting and inspection
  - $500 one-time fee under DPU fee schedule to supply and install an electric meter that records and reports exported energy
  - Other fees for County and NM CID permits and inspections
  - Provides compensation for exported energy under rule E-5
- Require interconnection ***registration*** for plug-in systems
  - Establish clear permitting and system requirements but waive the ***interconnection agreement and fee***
  - Allow limited plug-in capacity with safety guardrails
  - Enables data collection to improve grid planning
  - No compensation for exported energy
  - Would include liability and indemnification
- Waive interconnection agreement for plug-in solar
  - Consider plug-in solar as an appliance with safety considerations regulated under UL, NEC, NM CID and County permitting
  - No compensation for exported energy
  - Potential issues with liability and indemnification

Other Ideas for Consideration

- Increase demand charge to cover all fixed electric distribution costs; this eliminates the cost-shifting from customers with PV to those without PV
- Limit the plug-in system size per premises
- Must enable AMI meter functions to use plug-in solar systems, no opt-out
- Public safety education about plug-in solar systems
  - Inform about what's permitted, best practices and safety risks
  - Can be too much of a good thing - using larger or multiple systems increases probability of breaker masking
  - Proper securement so they don't fall or blow away in the wind
  - Utility may provide no compensation for exported energy – public needs to "right size" their system
  - Consider portable solar generators as an alternative

Information Sources

- https://www.ul.com/ Underwriters Laboratories (UL Solutions):
  - Safety Considerations for Plug-In Photovoltaic (PIPV) Systems: https://www.ul.com/insights/safety-considerations-plug-photovoltaic-pipv-systems
  - Testing and Certification Framework: https://www.ul.com/news/ul-solutions-debuts-testing-and-certification-framework-safer-plug-solar-across-united-states
- https://www.brightsaver.org/
  - Democratizing Solar white paper: https://www.brightsaver.org/whitepaper?srsltid=AfmBOorDzv93BLdki9lUW_jbjeqS1nIxKFQjadP4tU8gVB_eHlBztn8V
  - States that have announced plug-in solar bills: https://www.brightsaver.org/publicly-filed-states?utm_source=substack&utm_medium=email
  - https://www.npr.org/2026/03/12/nx-s1-5737287/solar-panels-utilities-energy-saving?utm_source=substack&utm_medium=email
- https://www.volts.wtf/ Volts
  - What's the deal with balcony solar? https://www.volts.wtf/p/whats-the-deal-with-balcony-solar?utm_source=publication-search
  - Legislative bill tracker and utilities opposition: https://www.volts.wtf/p/volts-community-thread-28-iran-bend?utm_source=publication-search
- https://www.wired.com/story/why-balcony-solar-hasnt-taken-off-in-the-us/#:~:text=One%20concern%20is%20a%20phenomenon,of%20breaker%20masking%20causing%20harm
- https://www.solarpowerworldonline.com/2026/02/balcony-plug-in-solar-panels-are-we-ready-for-this-new-era-of-accessible-energy/

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WHITE PAPER

Interactions of Plug-In PV with Protection of Existing Power Systems

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Table of contents

Introduction 03

Understanding PIPV and how it compares to traditional 04

The emergence of PIPV systems for residential use 05

Overcurrent protection 06

Touch safety risks in grid-interactive inverters 10

- Grid-interactive inverter output circuits are not evaluated for user contact and touch safety 10
- Addressing electric shock safety for the general public 11
- Risks associated with PIPV output cord and attachment plug 12
- Potential solutions for PIPV output circuit shock safety protection 13

Ground fault circuit protection for user safety in PIPV systems 14

- Safety risks when PIPV interaction compromises GFCI protection 15
- GFCI Hazard Mitigation in PIPV Systems 17

Summary 18

Annex A 19

- GFCI research testing with PIPVs 19
- GFCI circuit breaker testing 20
- GFCI receptacle testing 22

Annex B 23

- How the US is different from Europe 23

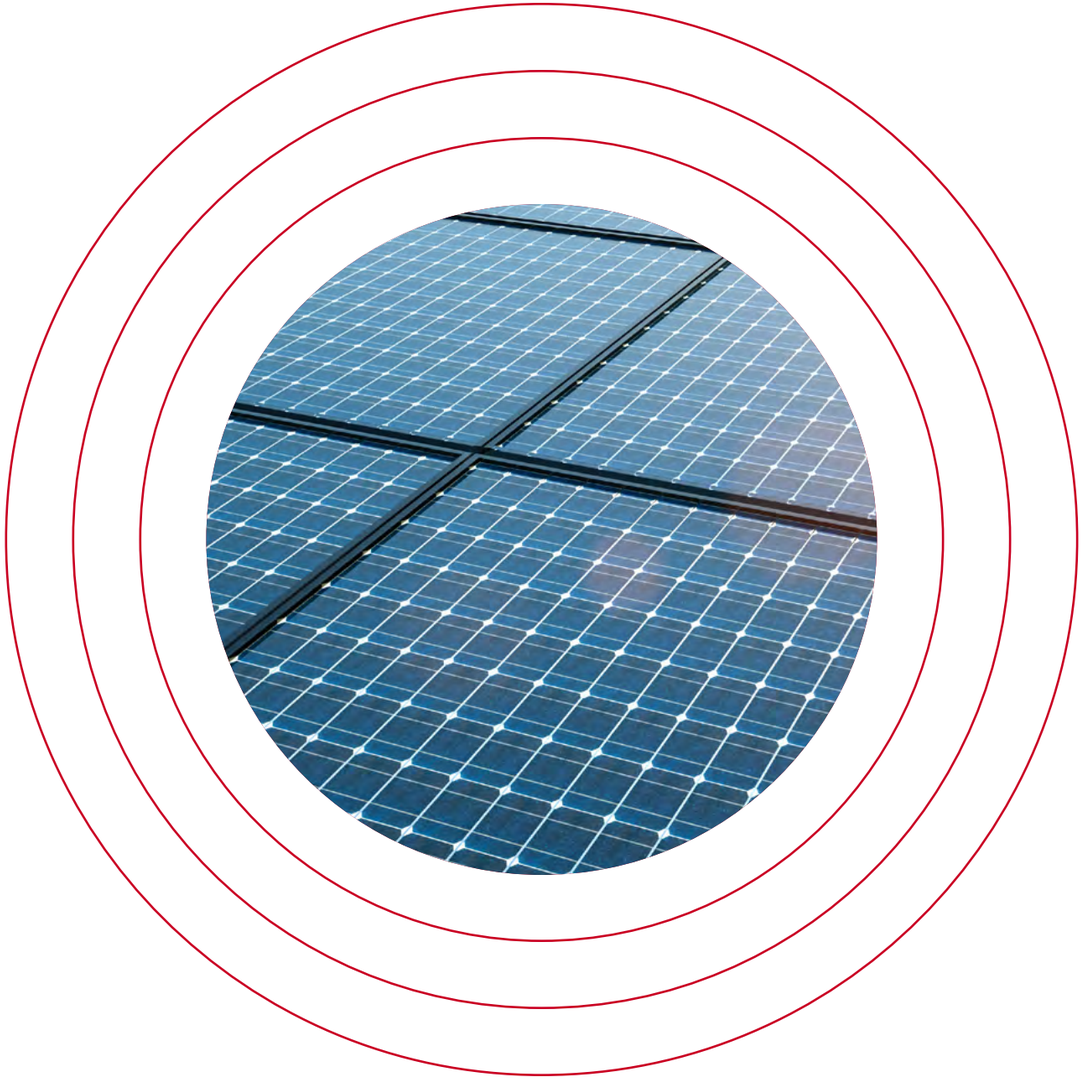
Introduction

There is growing interest in plug-in photovoltaic (PIPV) technology in the United States, particularly for residential consumer use. Traditional photovoltaic (PV) systems such as rooftop solar arrays have long been the standard in residential applications, but a better understanding of the unique hazards presented by PIPV is necessary to support safe use.

This white paper examines:

- **The differences between traditional PV systems and PIPV,** including installation methods and electrical integration with premises wiring.
- **The need for special attention to overcurrent protection** of the circuit to which PIPV connects, due to its unique configuration and interaction with existing wiring.
- **The unique risks associated with PIPV,** primarily because the output circuits of utility-interactive inverters are not evaluated for user contact or touch safety, which may pose electric shock hazards.
- **Consideration of Ground-Fault Circuit Interrupter (GFCI) requirements** and the interaction of PIPV with existing overcurrent and ground fault protection devices.

It is worth noting that additional hazards associated with PIPV are addressed in UL 3700, Outline of Investigation for Interactive Plug-In PV (PIPV) Equipment and Systems. This Outline of Investigation, led by UL Solutions engineers and experts, defines requirements for safety and compliance in PIPV as technology evolves.



Understanding PIPV and how it compares to traditional

Traditional PV systems typically include PV modules, their mounting system and an inverter to convert the generated direct current (DC) electricity into alternating current (AC). This AC power is then used by standard electrical equipment, distributed within the premises or fed into the utility grid. These PV systems may also be integrated into a broader distributed energy resource (DER) system, which includes other sources and elements, such as battery energy storage. In residential settings, PV systems are commonly installed on rooftops.

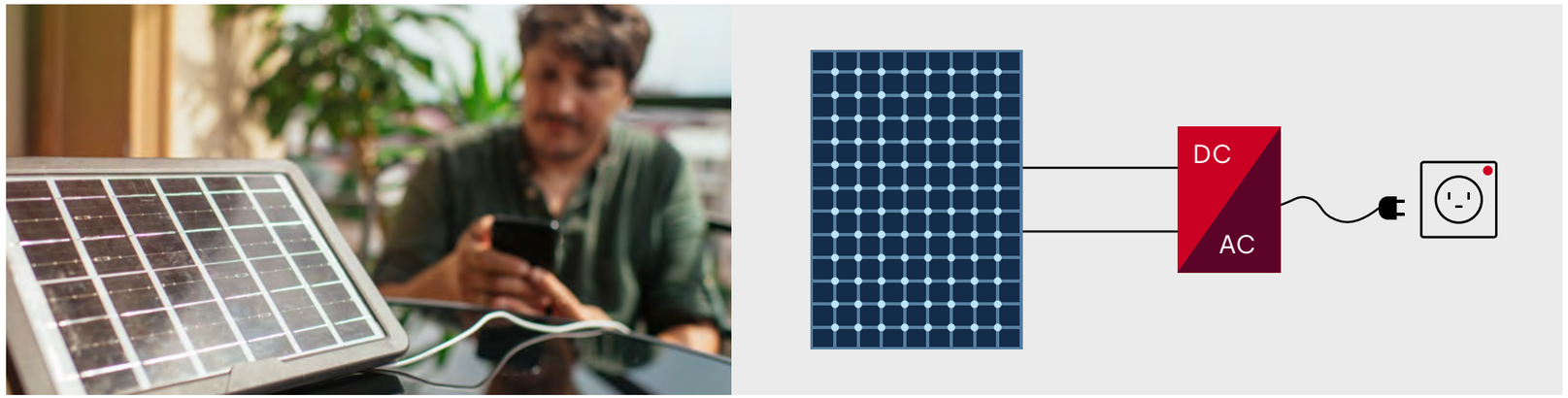
The first PV system was installed in the 1800s[1] and the technology has evolved significantly since then. Over the past four decades, widespread deployment of PV systems has led to valuable insights into module performance, potential hazards and practical approaches to risk mitigation. As a result, product safety standards and installation codes have continually evolved to provide consistent and appropriate requirements and risk mitigation. Safety standards for PV systems and their subsystems strive to promote safety through protection against electric shock, fire and mechanical hazards.

Today, in the United States and many other countries, PV systems are permanently installed and wired by qualified professionals using certified equipment that meets applicable safety standards. These installations are inspected and approved by code authorities for compliance with applicable codes. Electric utility engineers also review grid-interactive PV systems to verify adherence to local grid interconnection requirements.

1. A Brief History of Solar Panels, Elizabeth Chu and D. Lawrence Tarazano, U.S. Patent and Trademark Office.

The emergence of PIPV systems for residential use

PIPV systems are PV systems connected to building wiring through a cord-and-plug connection to a standard receptacle. These systems export power into a common residential receptacle using a power supply cord and attachment plug. Marketed for residential applications as a plug-and-play solution, PIPV products are designed for consumer installation and offer a more affordable way to adopt solar energy at home. Some PIPV products are referred to as “balcony solar” because consumers can choose to install them on residential balconies.



(a) (b)

Figure 1. (a) Balcony-type PIPV module installation; (b) PIPV electrical schematic.

An example of an installed PIPV system and an electrical schematic are shown in Figures 1(a) and 1(b).

Unlike traditional PV systems, PIPV systems have electrical wiring — specifically, the power supply cord — that is not permanently installed. These systems typically bypass review and authorization by code authorities, and utilities perform little to no oversight after the products are in use.

These unique factors necessitate a comprehensive review of the application of PIPV systems in relation to current standards, codes and existing infrastructure. These systems also require a thorough safety science assessment of the products and their installations.

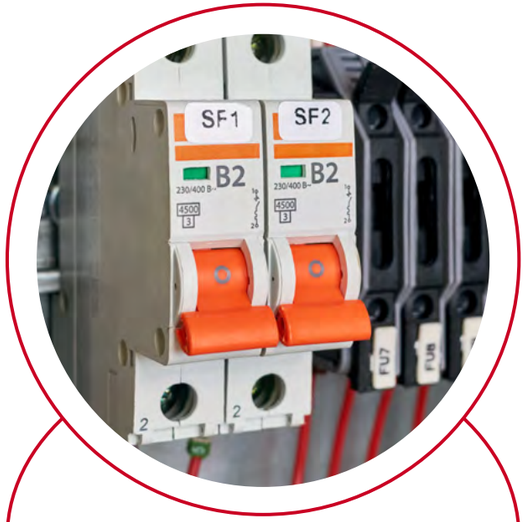
Overcurrent protection

NFPA 70, the National Electrical Code® (NEC), is issued by the National Fire Protection Association (NFPA) and serves as the applicable model code for electrical safety in the United States. This includes the safety of premises, wiring systems and residential PV installations. The NEC is adopted, with or without amendments, by thousands of local jurisdictions across the United States and enforced by authorized regulatory officials.

Branch circuits and branch circuit conductors require overcurrent protection in accordance with Articles 210 and 240 of the NEC. The sizing requirement of the overcurrent protective device is specified in Sections 210.20 and 240.4. These requirements are based on several factors, including the size of the load, conductor size, conductor type, equipment and outlet receptacle rating. These NEC installation requirements, along with the use of listed overcurrent protective devices, protect branch-circuit conductors and loads from the full range of overcurrent.

For overcurrent protection of circuits that include multiple sources operating concurrently, Article 705 applies, although it does not explicitly cover a PIPV source connected to a branch circuit. Requirements in Article 690 address rules for the installation of PV systems; however, the existing requirements address the installation of permanently installed PV systems connected through dedicated wiring connections to the premises wiring system and do not specifically address PIPV systems connected through an existing receptacle.

The NEC requirements in Articles 210 and 240 are based upon a single source supplying power from the panelboard to the load circuit. A PIPV source back-feeding a receptacle introduces additional current that is not protected by the upstream panelboard branch circuit overcurrent protective device. Back-feeding branch circuits with two sources of power can overload conductors and provide current to loads on that circuit beyond their evaluated, tested and certified limits, which could result in a risk of electric shock and fire.



For example, an outdoor 14 AWG copper branch circuit protected by a 15 A circuit breaker is permitted to have multiple NEMA 5-15 receptacles for connecting loads on that branch circuit. If there is an overload condition on the circuit, the 15 A circuit breaker would sense the overload above 15 A and trip, safely de-energizing the circuit, as shown in Figure 2.

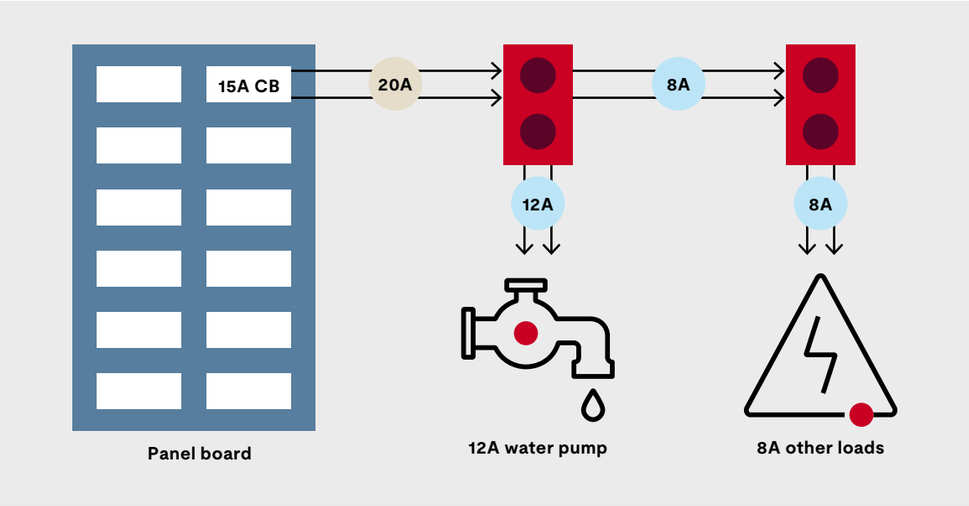


Figure 2. Branch circuit in an overload scenario without PIPV

However, if that same circuit has a Plug-in PV product back-feeding through one of the receptacles, and a similar overload condition occurs on that circuit, the PV inverter will contribute to the overload current. If the current from the utility (grid) source supply in the branch circuit is at or below 15 A, the circuit breaker at the panel will not sense the current within the branch circuit as an overload and will not trip the circuit breaker. The combined current from the utility source and the PIPV source can result in the circuit being continuously overloaded, posing a risk of fire or shock through damaged conductors, insulation and/or equipment connected to that circuit.

An example of the combined utility and 600 VA PIPV source current exceeding the 15 A branch circuit rating is shown on Figure 3, although situations may also exist where the PIPV source is larger than 600 VA or multiple PIPV sources are connected. The larger the PIPV source, the higher the likelihood of an undetected overload occurring. However, even small PV sources can introduce an undetected overload on the branch circuit conductors.

While NEC Section 705.12(B) does permit an installation where the sum of 125% of the power source output circuit current (i.e. PV source) and rating of the overcurrent protective device does not exceed 120% of the busbar ampere rating (e.g. in a panelboard), the permission is limited only to equipment where a busbar is connected to loads and where the primary power source (utility) and PV source are located at opposite ends of a busbar containing loads. Such a configuration limits the likelihood of an overload on the busbars as the loads draw the current between the two sources. However, the busbar location requirements and 120% limit are not applicable for branch-circuit wiring, and a PIPV configuration intended for use by consumers cannot be reliably maintained.

Additionally, in the panelboard application with the additional 20% current from a PV source permitted by NEC Section 705.12(B), each branch circuit will have properly sized overcurrent protection for the branch circuit conductors and connected loads. In the PIPV real circuit application, the conductors and loads are not sized or protected for the additional PIPV output current that is added to the branch circuit.

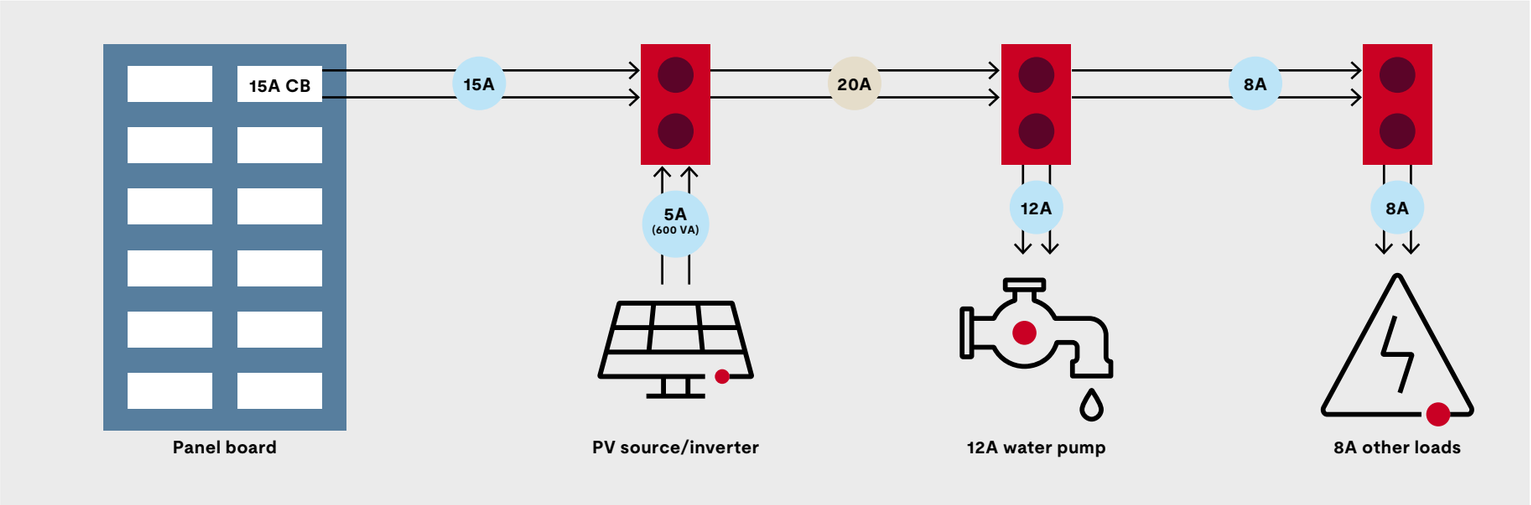


Figure 3. Branch circuit in an overload scenario with PIPV

When multiple PIPV units are connected to a single branch circuit, users may inadvertently increase the risk of conductor overloads that go undetected by the circuit's existing overcurrent protection. Although the use of multiple PIPVs on one circuit is generally discouraged, the potential for this scenario remains high due to consumer unawareness of the associated safety risks. This risk is further compounded when PIPV products utilize standard NEMA 5-15 plugs and are installed by individuals without electrical training. To address these concerns, several mitigation strategies are proposed below, though additional solutions may also be viable depending on system design and regulatory developments.

Dedicated circuit with unique plug-in PV receptacle

To mitigate the risk of undetected overloads, one effective strategy is to require that Plug-In PV (PIPV) systems be installed exclusively on dedicated branch circuits. This ensures that no additional loads share the circuit, thereby preventing cumulative current from the utility and PIPV sources from exceeding conductor ratings. Implementing this approach necessitates the use of a uniquely configured plug and receptacle system, designed to connect only to the designated circuit and incompatible with standard NEMA 5-15 receptacles. This prevents users from relocating the PIPV unit to other circuits, which could undermine the safety strategy. In this configuration, the PIPV source backfeeds power solely through the dedicated circuit to a properly rated overcurrent protective device at the panel. When appropriately sized for both the PIPV output and conductor capacity, this device can reliably detect and interrupt overcurrent conditions, safeguarding the wiring and terminations.

Unique PIPV receptacle with integrated overcurrent protection

In branch circuits that include multiple receptacles, a practical mitigation strategy involves replacing the first receptacle with a uniquely configured PIPV receptacle that incorporates an integral overcurrent protective device. This configuration ensures that the PIPV system can only be connected at a designated point in the circuit, preventing users from inadvertently plugging the unit into other receptacles that lack appropriate protection. By limiting the PIPV connection to a single, purpose-built receptacle, the risk of overloading conductors due to cumulative current from both the utility and PIPV sources is significantly reduced. The integrated overcurrent protective device must be properly rated to match the PIPV output and the branch circuit conductor size, ensuring reliable detection and interruption of overcurrent conditions. This approach enhances safety by maintaining control over the installation location and electrical characteristics of the PIPV system.

Unique PIPV receptacle with oversized conductors

Another mitigation strategy involves replacing the first receptacle in a branch circuit with a uniquely configured PIPV receptacle, combined with the use of oversized conductors. By installing larger-gauge branch circuit wiring, the system can accommodate the combined current from both the utility and PIPV sources without exceeding conductor ampacity limits. This approach reduces the risk of overload under scenarios like those illustrated in Figure 3. To ensure safe operation, the PIPV output should be limited to a defined maximum rating, and the number of PIPV units connected to the circuit should be restricted. This can be achieved through the use of proprietary receptacle configurations that prevent unauthorized or unintended connections. All loads and receptacles on the circuit must be appropriately rated for the total expected current. For example, a 12 AWG copper conductor rated for 20 A can safely carry up to 16 A of continuous current (based on an 80% derating factor).

Power control systems with unique plug-in PIPV receptacle

A further mitigation approach involves integrating power control systems (PCS) into branch circuits that support PIPV installations. PCS technology, evaluated under UL 3141, Outline of Investigation for Power Control Systems, and addressed in NEC Article 120 and Section 705.13, actively monitors and regulates the output of multiple power sources to help the total current remain within safe operating limits. When installed by qualified personnel, a properly designed PCS can detect and respond to combined current from both the utility and PIPV sources, preventing overload conditions on branch circuit conductors. To maintain compatibility and safety, the PIPV system must connect through a uniquely configured receptacle that restricts installation to circuits equipped with PCS protection. This configuration prevents users from inadvertently plugging PIPV units into unprotected receptacles, thereby maintaining the integrity of the overload mitigation strategy.

Touch safety risks in grid-interactive inverters

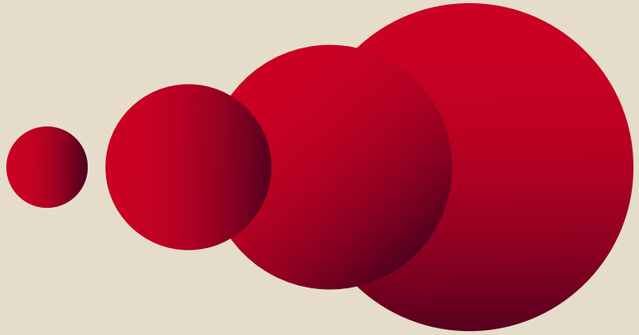
Grid-interactive inverter output circuits are not evaluated for user contact and touch safety

PV inverters take DC energy from the PV modules and convert it into AC output power that can be used to power loads. One specific type of PV inverter is the utility grid-interactive inverter that synchronously exports power in parallel with the electric utility grid. Grid-interactive inverters are evaluated in accordance with IEEE 1547 and IEEE 1547.1 for grid connectivity and UL1741, the Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, addressing product safety and grid connection functionality. The IEEE 1547 and IEEE 1547.1 electric utility grid performance requirements and tests focus on the inverters performing specific actions and functions intended to support stable operation of the electric utility grid. Some of those grid performance functions include cessation of output current during extreme abnormal grid events such as high overvoltage, low undervoltage and loss of utility grid voltage. In certain locations, such as California, PV inverters are also required to have specific advanced grid support functionality for some applications.

The utility grid interconnection performance requirements are designed to align the functionality of PV inverters with that of electric utility generation and system protection equipment. Under the grid-interactive performance requirements, the AC output terminals and wiring of grid-interactive inverters and generators are only evaluated to limit and sometimes cease output current flow under specific abnormal operating conditions of the electric utility. Utility interactive inverter output circuits are considered hazardous circuits. Hence, they are required to be protected from general access, enclosed appropriately and insulated from human contact.

There may appear to be a similarity between the required function to cease current flow from a grid-interactive inverter output circuit and the concept of preventing human exposure to the inverter output. However, there is a significant difference in the hardware requirements, software requirements and evaluation between ceasing output current for grid performance requirements and providing protection from electric shock and other hazards for the public from those outputs.

Further, grid-interactive inverters also make use of software for most control functions. Software that controls safety circuits needs an extra level of evaluation and control to prevent misoperation and shock hazards reliably. Utility grid interconnection performance requirements and tests focus exclusively on the suitability of connections to the grid and do not address electric shock, energy, and fire hazards that could pose a risk to the general public from accessing the inverter outputs. This presents a critical safety concern for PIPV products due to the unconventional use of the attachment plug as a power output interface.



Addressing electric shock safety for the general public

Product safety standards and electrical codes are designed to protect the public from exposure to circuits and components that may present hazards, such as electric shock. Typically, parts classified as electrically hazardous are enclosed to prevent contact, while any components that remain accessible are subject to rigorous evaluation to ensure they meet safety criteria. These components must demonstrate that they do not pose a risk under normal or foreseeable abnormal conditions, a concept commonly referred to as “touch safe.”

Touch-safe circuits must incorporate robust and reliable protective measures to prevent hazardous voltage or current from becoming accessible. These protections are evaluated under both normal and abnormal operating conditions, including scenarios involving overloads, hardware failures, insulation breakdowns and software malfunctions. Consumer products intended for general public use are specifically designed and tested to help ensure that, in the event of a failure, the product defaults to a safe state, minimizing risks of electric shock, high energy exposure or fire. This principle of “fail-safe” design is foundational to modern safety engineering.

For example, USB circuits and Class 2 low-voltage, limited-energy power supplies used to power many consumer electronic products are designed, tested and certified with the expectation that consumers may come into contact with the outputs. These outputs are rigorously evaluated to maintain low voltage and limited electrical energy output, thereby reducing hazards under both normal and foreseeable abnormal conditions.

Even after a touch-safe circuit is evaluated for protection from electric shock, its conductors and components must be spaced appropriately, isolated and insulated from all other hazardous circuits and uninsulated live parts, such as higher-voltage PV DC and battery source circuits. This prevents the touch safe circuit from potentially becoming energized and losing its protection from an adjacent hazardous circuit.

Although PIPV and AC modules share many physical similarities, there are significant differences in their installations, installation locations and accessibility to users. AC modules and their wiring are not typically exposed to the general public’s contact. In support of this concept, NEC Section 690.33(C) requires that any user-accessible connectors be of a locking type to prevent access to hazardous live parts. AC modules and their wiring are typically installed on roofs and are not exposed to physical interactions or damage associated with regular user contact.

Conversely, ground-fault circuit interrupter (GFCI) electric shock protection is required for appliances in wet locations where user interaction and potential damage to the products and wiring are expected. PV module construction includes glass and thin, flexible plastic to insulate cells and internal wiring that operate at hazardous voltages. PV modules could be more susceptible to damage that exposes live parts to the user in an environment that is not typical of rooftop applications. The PIPV product type, installation location, proximity to users and likelihood of regular user contact necessitate GFCI protection.

It is important to understand that GFCI protection applies only to the AC portions of PIPV systems. The DC circuits in PIPVs present different shock hazards and are typically isolated from the AC side, meaning GFCI devices will not protect against shock hazards in the DC circuit. Since PV modules remain energized whenever exposed to light, DC circuits require alternative protective measures. These can include physical barriers, electronic safeguards or a combination of both. UL 3700 addresses the appropriate protection strategies for these DC circuits.

Risks associated with PIPV output cord and attachment plug

Most commercially available PIPV products have common 15A power cords with accessible plug pins. Common 15A NEMA 5-15P attachment plug blade terminals, which terminate a power supply cord, were designed to connect a piece of utilization equipment, such as an appliance, to a receptacle connected to a source of power. Plug blade terminals become de-energized when they are removed from a receptacle and do not pose a shock hazard when used to connect a load to an outlet. However, those plugs are not intended, evaluated, tested or rated as the output conductor for a power generation source. If a PIPV product is exposed to sunlight, it will generate electricity, which can cause the plug blades to be energized at hazardous levels on the accessible plug blades, unless special mitigation measures are successfully implemented.

IEEE 1547 utility export limits are not designed to protect people from electric shock hazards. Under islanded or open phase conditions, the inverter is allowed up to two seconds to cease output current. The two-second performance allowance and lack of a single-fault shock safety reliability evaluation can create a risk of electric shock on the exposed attachment plug blades used in a PIPV product. Therefore, relying solely on the inverter grid connection function to limit exposure to human shock hazards at PIPV plug blades is not an appropriate solution.

New PIPV product safety requirements must supplement the utility grid-interactive performance requirements with touch safety requirements to protect the public from electric shock hazards for the PIPV output circuits. Touch safety limits will need to include additional hardware protection measures, different protection components, additional evaluations and testing, including software safety assessments. The safety evaluation must account for single-point failures in critical components of the protection hardware circuit, as well as software failures.

Potential solutions for PIPV output circuit shock safety protection

Utility grid-interactive performance functionality by itself is insufficient to protect the public from electric shock hazards on the PIPV plug blades and other accessible parts in the output circuit. Multiple methods might prove suitable to provide electric shock protection on PIPV output circuits for the public, including:

- **PIPV unique configuration plug and receptacle –** A uniquely configured, mating pair that does not have exposed live parts that can be contacted by the user.
- **Accessible grid-interactive/touch safe output circuit –** A grid-interactive inverter that includes additional protection for its PIPV output circuit to provide necessary, reliable electric shock protection for the public. This would require additional functional safety assessments of the software and hardware to demonstrate that the hazards have been mitigated under normal and abnormal (fault) conditions.

Ground fault circuit protection for user safety in PIPV systems

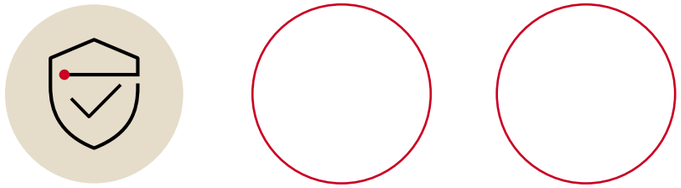
A GFCI is a life-safety device designed to protect people from electrical shock hazards caused by damaged equipment or wiring. The NEC requires GFCI protection in environments where water increases the risk of electrical shock. Common examples include outdoor areas, wet or damp locations, and spaces near sinks, bathtubs or pools, such as bathrooms, kitchens and pool pump circuits. According to NEC Section 210.8(A), all outdoor circuits serving dwelling units must be equipped with Class A GFCI protection, implemented through at least one of the following approved installation methods:

GFCI circuit breaker – installed on the branch circuit panel board supplying one or more outdoor receptacles

GFCI receptacle – installed on the branch circuit at the first outlet in a string feeding multiple other outdoor receptacles

It should be noted that NEC Section 210.8(A) requires outdoor receptacles to be on a branch circuit that is separate from other building loads, including indoor circuits.

Safety risks when PIPV interaction compromises GFCI protection



Damage of GFCIs

There is a significant compatibility concern with PIPVs back-feeding existing branch circuits that were only intended and evaluated for traditional source-to-load power flow.

UL 943, the Standard for Ground-Fault Circuit-Interrupters, evaluates GFCI protection for unidirectional current flow (e.g., from the panelboard to the load). This one-directional current flow is signified by required markings for “line” and “load” connections on the GFCI. GFCI protection of these circuits must be maintained throughout their use and installation to mitigate the risk of electric shock to the public.

Significant concerns have been noted related to the misuse of GFCIs when backfed. This damage has resulted in GFCI circuitry failure, allowing power to continue while leaving the branch circuit unprotected from electric shock hazards that GFCI functionality is designed to address.

It is foreseeable and expected that the use of a PIPV with a NEMA 5-15 attachment plug allows for uncontrolled installations and connections to non-bidirectional breakers and receptacle-type GFCI-protected circuits.

PIPV products are generally designed for consumer use, allowing connection to existing residential electrical circuits. However, the back-feeding of power into a GFCI-protected circuit — an inherent function of PIPVs — is currently outside the scope of GFCI certification and performance standards. To accommodate this bidirectional power flow, updates to UL 943 Standard requirements are necessary to support continued GFCI protection of the branch circuit when a PIPV system is present. These updates should include provisions for appropriate identification markings specific to bidirectional use. Ultimately, this will require the installation of a properly evaluated and certified bidirectional GFCI device on circuits connected to PIPV systems.

The risk of electric shock increases with grid voltage and requires a corresponding shorter trip time to limit electric shock energy. If the local load current drawn on the protected circuit is lower than the inverter generation output current, the circuit voltage will increase until the inverter ceases output current. The UL 943 disconnect duration limit is voltage dependent, and a higher circuit voltage after the GFCI trip increases the electric shock energy and would correspond to a shorter duration GFCI response via a shorter trip time. The voltage following the GFCI trip is a function of the inverter output current and the load on that circuit. The GFCI has no means to interrupt the PV inverter output current to protect against the increased electric shock hazard.

During a ground fault, circuit breaker type GFCIs only open the ungrounded current carrying conductor to isolate and interrupt panelboard power to the protected load circuit. For circuit breaker protected GFCI circuits, the grounded conductor (neutral) remains solidly connected through the panelboard’s neutral to ground bond reference. That neutral to ground reference provides a ground referenced return current path for the PV inverter output current, such that tripping the circuit breaker type GFCI does not also interrupt a ground-fault current path from the PV inverter output.

Even if a circuit was provided with appropriate bidirectional GFCI protection, the PIPV with a NEMA 5-15 attachment plug could mistakenly or intentionally be connected to a branch circuit without appropriate bidirectional GFCI protection that interrupts both line and neutral current carrying conductors, posing a significant likelihood of creating electric shock hazards on the unprotected circuit.

Safety risks when PIPV interaction compromises GFCI protection

Blinding of GFCIs

A second significant concern related to GFCI protection is the potential of blinding GFCIs when using PIPV. A PIPV is a parallel coupled supply source connected to the branch circuit, where two or more sources share the same centrally located neutral-ground bond reference at the main panel board. During a ground fault event, branch circuit GFCI protection interrupts the utility grid power source from the load. However, a PIPV parallel supply present on the isolated load circuit continues to supply current to the ground fault for up to two seconds following the loss of utility power. UL Solutions conducted testing to observe the behavior of GFCI protected branch circuits backfed by PIPV isolated PV grid-interactive microinverter. See Annex A.

The possibility of PIPV blinding the required ground fault circuit protection is a significant safety concern. Engineered solutions are required to minimize the risk of this occurring in practice.

GFCI Hazard Mitigation in PIPV Systems

Potential solutions to mitigate hazards with GFCI interactions are outlined below. It should be noted that other means may be found suitable.

Unique plug-in attachment means – Requiring a unique (non-NEMA) connector configuration for PIPVs, where intermatibility is achieved by the same manufacturer mating halves so the PIPV cannot be plugged into an existing non-PIPV circuit, could mitigate the risk of a shock hazard as described above. A unique configuration is an effective means to mitigate unintended use, thereby not compromising GFCI protection for both existing legacy GFCI protection and preventing back-feeding of non-bidirectional GFCIs. A PIPV with a proprietary mating plug and receptacle, connected in the appropriate circuit location on a branch circuit with a certified, marked and evaluated GFCI protective device, will maintain necessary GFCI electric shock protection and mitigate risk conditions.

Dedicated circuit – Requiring that PIPV can only be installed on a dedicated circuit (i.e., with no other outlets and loads) helps ensure that compatible GFCI protection is provided for that circuit.

Summary

PIPV products can offer innovative methods for harnessing renewable energy to generate clean power for the public. However, they can present significant hazards when connected with traditional wiring systems used in the United States and other locations.

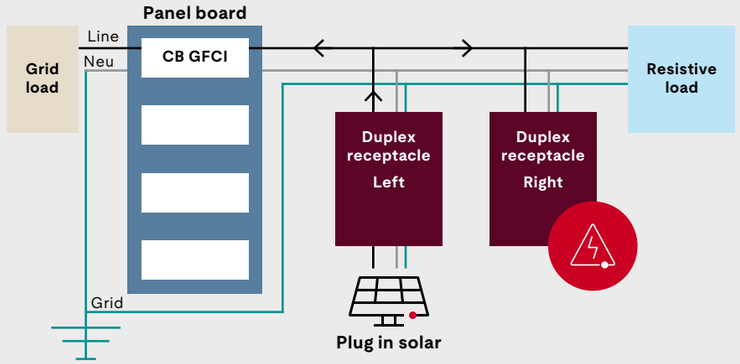
Based on the concerns outlined, special risk mitigation requirements are necessary to allow the safe use of PIPV products. In the absence of these special measures, PIPV can present electric shock hazards and fire hazards to consumers, potentially defeating protective technologies required for public protection without any awareness that the previous protection has been compromised. Allowing PIPV to be plugged into any existing branch circuit with no mitigation for the above concerns is not supported by UL Solutions. There are potential engineered solutions that can be applied and will be necessary to promote safe use of PIPV products. These can include both inherent product features and special installation practices that allow the public to choose electricity sources while also remaining safe.

Annex A

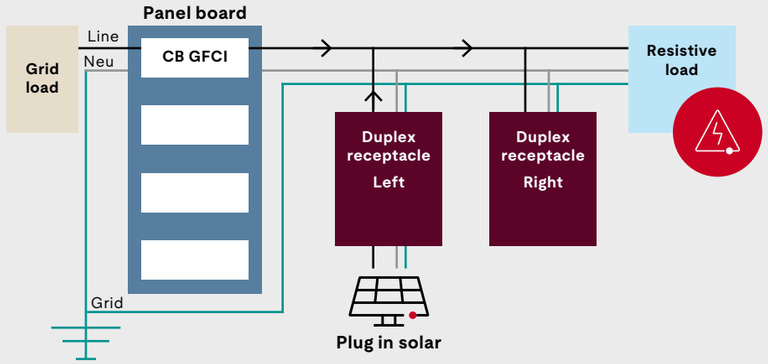
GFCI research testing with PIPVs

UL Solutions conducted testing to observe the behavior of GFCI-protected multiple receptacle branch circuits backfed by an isolated PV grid-interactive microinverter that included bidirectional current flow. This laboratory testing included three potential GFCI installation configurations on single-phase branch circuits rated 120Vac.

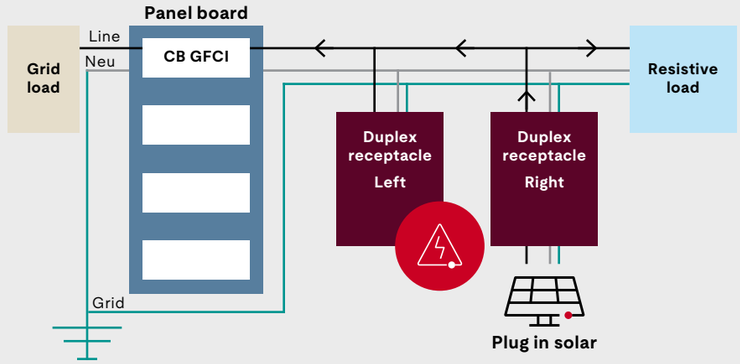
The following three test configurations were conducted, differing in the current flow direction(s). The test configurations varied based on the location of the isolated PV inverter, ground fault, GFCI location and GFCI type.



Test configuation 1



Test configuation 2



Test configuation 3

GFCI circuit breaker testing

All test configurations were initially conducted using a GFCI circuit breaker in the panelboard. The tests were conducted with a 500-ohm ground fault representing the human body impedance model as required by UL 943. A simulated ground fault was introduced by connecting the 500 Ohm resistance in the circuit at the location represented by the lightning bolt. UL 943 requires the GFCI to interrupt the circuit operating at 120 volt alternating current (VAC) within 28.6 milliseconds (ms). This response time is considered compliant if the average of 10 measurements meets the 28.6 ms. Baseline testing was conducted on the circuit protected by the GFCI circuit breaker without a PV inverter. The GFCI circuit breaker detected and interrupted the circuit and de-energized the load within 12.6 ms (the average of 10 measurements).

Test configurations 1, 2 and 3 were conducted with an isolated PV inverter exporting continuous power to the circuit, and then the 500 Ohm ground fault was introduced. Ten measurements were recorded and averaged for each of the three test configurations.

The results were as follows:

Configuration 1 – 36.3ms

Configuration 2 – 32.8ms

Configuration 3 – 36.7ms

All test results exceeded the maximum allowable interrupting time of 28.6ms (for the average of 10 measurements) according to UL943, which also requires that any single test iteration shall not exceed 125% of interruption time limit.

Taking a closer look at the test results oscilloscope data, the blue waveform is the ground fault current through the 500 Ohm body model. As depicted by the blue trace, the circuit breaker GFCI detected and opened the circuit in slightly more than a ½ power frequency cycle, followed by the GFCI interruption of the grid power. After the GFCI circuit breaker opens, the grid power (indicated by the red arrow) continues to flow through the PV inverter output current until its anti-islanding function detects the loss of grid power and ceases the AC output current flow. The blue and green traces to the right of the red arrow clearly show continued PV inverter current flow into the ground fault for roughly 1.5 cycles after the GFCI tripped. The Blue Trace shows the total net duration of ground fault current from the utility grid plus the continued current flow from the PV inverter until the anti-islanding protection ceases current export at 35.1ms, exceeding the UL 943 limit.

Blue Trace – Ground fault shock hazard current through the 500 Ohm body impedance model

Green Trace – Voltage across the ground fault. Grid voltage before GFCI trip (at red arrow) and voltage supported by inverter output current following the GFCI clearing.

Purple Trace – PV inverter output current

Note that in this case, the GFCI circuit breaker randomly selected for this testing performed significantly quicker than the response time required in UL 943. Other GFCI circuit breakers, which would still comply with the UL 943 requirements, could demonstrate longer response times of up to 28.6 ms.

A grid-interactive inverter is required to cease-to-energize its AC output within two seconds of loss of the utility grid source according to UL 1741 and IEEE 1547 anti-islanding performance requirements. Grid-interactive anti-islanding is a performance function that is inherently variable and dependent on the parallel loads and utility source feeding the circuit. The response time to anti-islanding conditions often varies between several cycles and can be up to two seconds. The GFCI safety and grid interconnection performance requirements are not compatible, and additional protection measures are necessary to maintain the GFCI timing and energy limits to prevent the risk of electric shock. It should be noted that, for the above-ground fault test conditions, the particular inverter responded much faster than the grid interconnection requirement, which allows up to two seconds. However, not all inverters will respond as quickly as the one tested above.

GFCI receptacle testing

This section covers testing of the same three configurations using a GFCI receptacle (instead of a GFCI circuit breaker). Test results were observed to comply with UL 943 interrupting time requirements. A GFCI receptacle type differs as it interrupts both the ungrounded line conductor and the grounded current-carrying neutral conductor. By opening the neutral-grounded conductor, the PV inverter output circuit is disconnected from the panelboard neutral-to-ground bond, which removes the inverter's current return path for a ground fault shock current. The phenomenon was observed in the previous test case, where the PV inverter output current continued to flow into the simulated human body, with a 500 Ohm load resistance, after the GFCI trip during the inverter anti-islanding current cessation. In this GFCI Receptacle test condition, the inverter no longer had a neutral-to-ground reference in the panelboard. Without a reference to ground, the inverter output did not feed current into a ground fault, simulated by a 500 Ohm load resistance representing a human body. These results clarify the need for bidirectional type GFCIs that must open and interrupt all current-carrying conductors to remove the ground fault return for the PV inverter output current during anti-islanding current cessation and to maintain the GFCI clearing time to limit ground fault energy.

Any electrical reference of the branch circuit to ground can provide a return current path for a grid-interactive inverter to supply electric shock ground fault current. Many products intentionally have filter circuits with components between current-carrying conductors and ground to reduce electrical noise. These filters, as well as common circuit leakage current and miswired circuits, as described in the next section, have the potential to similarly reference the inverter output circuit and cause extended current export beyond the UL 943 GFCI protection limits.

Additional testing

At a later date, we anticipate performing additional PIPV testing with other protection technologies in a single-phase, three-wire 120Vac/240Vac circuit configuration with a shared neutral (often called split phase). This configuration will also need to be reviewed for practical use with PIPVs.

Annex B

How the US is different from Europe

PIPV products have become popular in Europe. Residual current, such as residual current circuit breakers with overcurrent protection (RCBOs) and residual current circuit breakers (RCCBs), are equipment installed in European Union (EU) household circuit installations to provide integral personal protection against electrical shock hazards and overcurrent protection. These protective devices are required to open all current carrying conductors (2 pole, 4 pole), maintaining residual current shock protection. Receptacle type GFCIs, like residual current devices (RCDs) open all current carrying conductors and continue to maintain ground fault protection. However, Circuit Breaker GFCI types only open the ungrounded conductor. This maintains the neutral to ground bond, allowing the PIPV inverter to continue current export (up to two seconds), which defeats the GFCI electric shock protection.

RCCBs are not used in the US, but they do have some notable differences from the Ground Fault Circuit Interrupters (GFCI) protection required to be used in the U.S., as defined in codes like the NEC.

The high-level functionality of the RCCB and GFCI protection is intended to limit electric shock hazards for load products powered by the electric power system. These protective devices monitor, measure and limit ground fault current that can cause electrocution for adults and children who come into contact with electrically live parts from damaged appliances, wiring and other electric load products. Both of these protective products interrupt electric current flow into a ground fault within a very short period. At 120Vac, the GFCI products are required to stop the ground fault current within 0.0286 seconds to limit the electric shock energy that could enter a human body to avoid electrocution hazards. As the magnitude of the AC ground fault increases, the disconnection time becomes shorter to limit exposure time and total shock energy, as per the Class A equation.

The main difference is that GFCI interrupts the circuit at 5mA ± 1mA to provide let-go protection, which allows individuals to remove themselves from the hazard voluntarily. An RCD interrupts the circuit at 30mA, the threshold to protect against ventricular fibrillation, and exposure times are slightly extended compared to GFCIs. The lower threshold in the US standards provides more conservative protection for persons at higher risk, including children and the elderly, who are more susceptible to electric shock hazards.

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Agenda No.:	7.d.
Index (Council Goals):	Quality Excellence - Effective, Efficient, and Reliable Services; DPU FY26 - 1.0 Provide Safe and Reliable Utility Services; Quality Governance - Fiscal Stewardship; DPU FY26 - 2.0 Achieve and Maintain Excellence in Financial Performance
Presenters:	Philo Shelton, Utilities Manager
Legislative File:	**19943-26**

Title
American Public Power Association (APPA) Financial and Operating Ratios

Body
DPU has participated the last couple of years in APPA's Financial and Operating Ratios report (Attachment A). Exhibit B is a summary of DPU's data that is provided to APPA and used in this report. Exhibit C was developed for ease of BPU's review to show two years of DPU's data, APPA's median national data, the median customer count for between 5,000 and 10,000 customers, and the median west region.

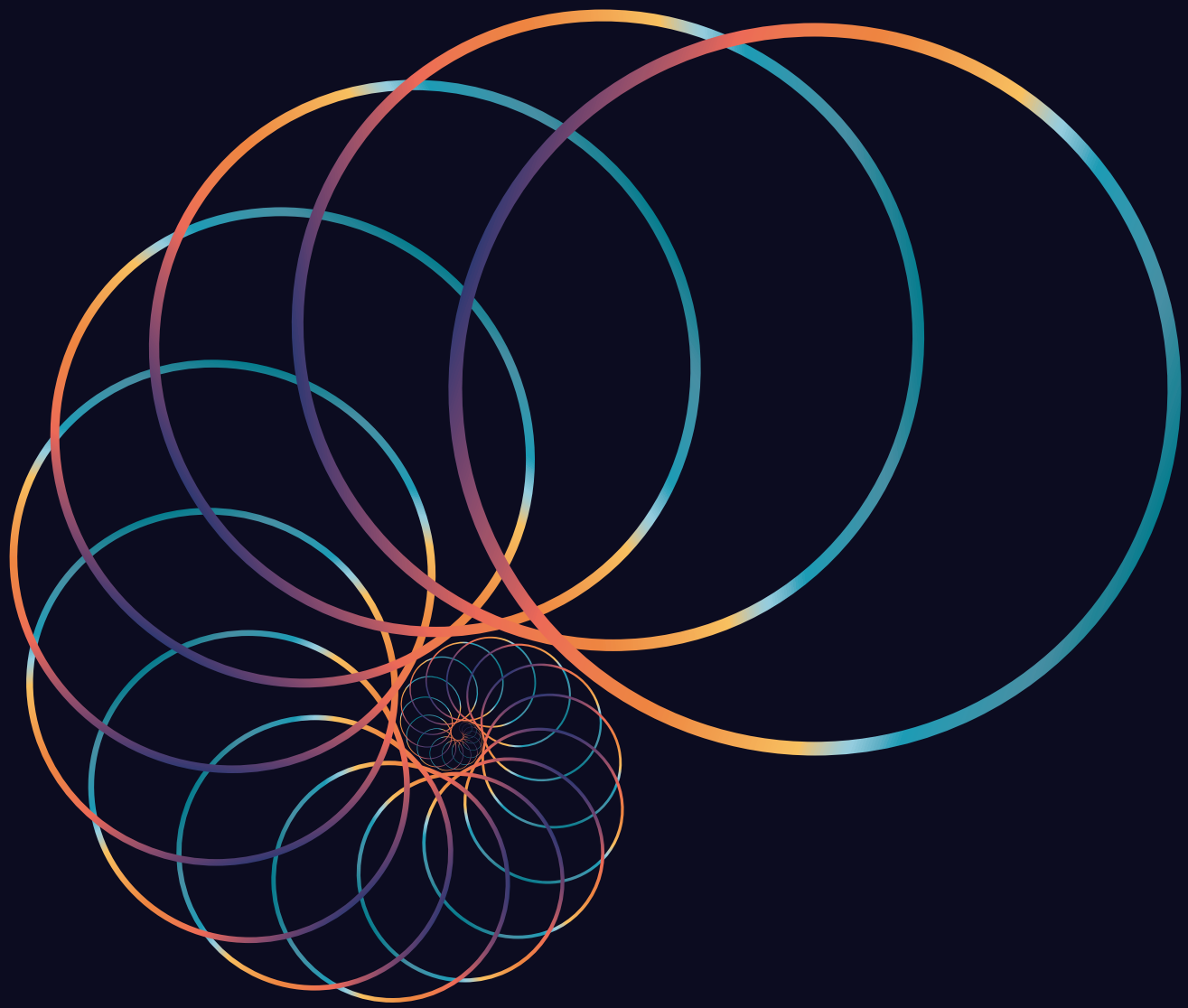
Attachments
A - APPA Financial & Operating Ratios
B - APPA Rept on Financial & Operating Ratios
C - Rept on Financial & Operating Ratios Summary

AMERICAN PUBLIC POWER ASSOCIATION

FINANCIAL and OPERATING RATIOS

of Public Power Utilities

JANUARY 2026



FINANCIAL AND OPERATING RATIOS
of Public Power Utilities

Prepared by Kevin Tillmann, Manager, Research and Statistics,
American Public Power Association

The American Public Power Association is the voice of not-for-profit, community-owned utilities that power approximately 2,000 towns and cities nationwide. We represent public power before the federal government to protect the interests of the more than 55 million people that public power utilities serve across the United States and its territories. We advise on electricity policy, grid technology and operations, and workforce development in support of safe, modern, and resilient utilities.

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TABLE OF CONTENTS

I. INTRODUCTION **1**

REPORT FORMAT 1

UTILITIES IN THE REPORT 2

DEFINITIONS, DATA SOURCES, AND COMPUTATIONS 4

FACTORS INFLUENCING RATIOS 4

II. SUMMARY TABLES **5**

MEDIAN VALUES BY CUSTOMER COUNT 6

MEDIAN VALUES BY REGION 7

MEDIAN VALUES BY POWER GENERATION CLASS 8

III. DETAILED TABLES **9**

1. REVENUE PER KILOWATT-HOUR 9

2. DEBT TO TOTAL ASSETS 12

3. OPERATING RATIO 13

4. CURRENT RATIO 14

5A. TIMES INTEREST EARNED 15

5B. DEBT SERVICE COVERAGE 16

6. NET INCOME PER REVENUE DOLLAR 17

7. UNCOLLECTIBLE ACCOUNTS PER REVENUE DOLLAR 18

8. RETAIL CUSTOMERS PER NON-POWER-GENERATION EMPLOYEE 19

9. TOTAL OPERATION AND MAINTENANCE EXPENSE PER KILOWATT-HOUR SOLD 20

10. TOTAL OPERATION AND MAINTENANCE EXPENSE PER RETAIL CUSTOMER 21

11. TOTAL POWER SUPPLY EXPENSE PER KILOWATT-HOUR SOLD 22

12. PURCHASED POWER COST PER KILOWATT-HOUR 23

13. RETAIL CUSTOMERS PER METER READER 24

14. DISTRIBUTION OPERATION AND MAINTENANCE EXPENSES PER RETAIL CUSTOMER 25

15. DISTRIBUTION OPERATION AND MAINTENANCE EXPENSES PER CIRCUIT MILE 26

16. CUSTOMER ACCOUNTING, CUSTOMER SERVICE, AND SALES EXPENSE PER RETAIL CUSTOMER 27

17. ADMINISTRATIVE AND GENERAL EXPENSES PER RETAIL CUSTOMER 28

18. LABOR EXPENSE PER WORKER-HOUR 29

19. ENERGY LOSS PERCENTAGE 30

20. SYSTEM LOAD FACTOR 31

21. CAPITAL EXPENDITURES TO DEPRECIATION EXPENSES 32

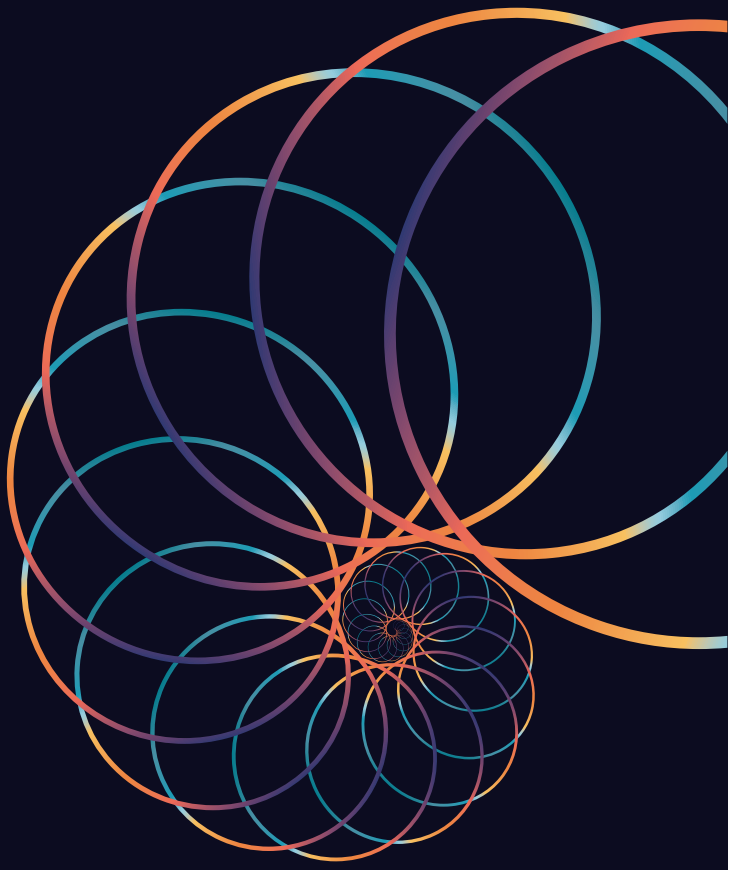
APPENDIX A: 2024 PERFORMANCE INDICATORS SURVEY **33**

APPENDIX B: DATA SOURCES AND COMPUTATIONAL PROCEDURES **36**

APPENDIX C: REGIONAL DEFINITIONS **40**

APPENDIX D: UTILITIES INCLUDED IN THE REPORT **41**

I. INTRODUCTION



This report presents data for 21 categories of financial and operating ratios for 190 community-owned electric utilities in the United States that had at least 150,000 megawatt-hours (MWh) in sales and approximately 50% or more retail sales in 2024. The ratios can be a useful tool in assessing electric utility performance. However, they do not provide definitive information, nor should the level of any indicator be taken as the "correct" level of performance.

It is important that users are familiar with definitions of ratios and the variables that may affect them. Although the groupings of the ratios by customer count, region, and net power generation adjust for major variables, other factors may also influence the ratios. The financial and operating ratios provide a useful starting point for analyses and may be used to pinpoint areas in need of further investigation. The ratios should be analyzed in conjunction with other information and should not be the sole basis for broad conclusions.

Report Format

Section II lists the median values of the ratios in summary tables by customer count, region, and net power generation. Section III presents detailed breakdowns for each ratio with the number of utilities, means, medians, and first and third quartile values. The information is organized by customer count, region, and net generation. Definitions and descriptive information precede each set of tables. A copy of the 2024 Performance Indicators Survey, as well as formulas, data sources, definitions of regions, and the utilities included in the report can be found in Appendices A through D.

The following table presents medians and number of responses for each ratio for all regions, customer counts, and generation classes.

FINANCIAL RATIOS	UTILITIES	MEDIAN
1. Revenue per kWh		
a. All Retail Customers	190	$0.110
b. Residential Customers	179	$0.126
c. Commercial Customers	179	$0.116
d. Industrial Customers	155	$0.080
2. Debt to Total Assets	188	0.284
3. Operating Ratio	186	0.853
4. Current Ratio	190	2.93
5a. Times Interest Earned	150	6.46
5b. Debt Service Coverage	152	3.85
6. Net Income per Revenue Dollar	185	$0.084
7. Uncollectible Accounts per Revenue Dollar	190	$0.0008
OPERATING RATIOS		
8. Retail Customer per Non-Power Generation Employee	186	323
9. Total O&M Expense per kWh Sold	170	$0.090
10. Total O&M Expense (Excluding Power Supply Exp.) per Retail Customer	187	$675
11. Total Power Supply Expense per kWh Sold	178	$0.066
12. Purchased Power Cost per kWh	175	$0.065
13. Retail Customers per Meter Reader*	107	8,611
14. Distribution O&M Expense per Retail Customer	170	$242
15. Distribution O&M Expense per Circuit Mile	170	$9,043
16. Customer Accounting, Service, and Sales Expense per Retail Customer	170	$74
17. Administrative and General Expense per Retail Customer	170	$231
OTHER RATIOS		
18. Labor Expense per Worker-Hour	186	$51.97
19. Energy Loss Percentage	166	3.25%
20. System Load Factor	178	55.6%
21. Capital Expenditures to Depreciation Expense	189	1.52

*Only includes utilities with at least one meter reader. See Section III for the methodology of this ratio.

Utilities in the Report

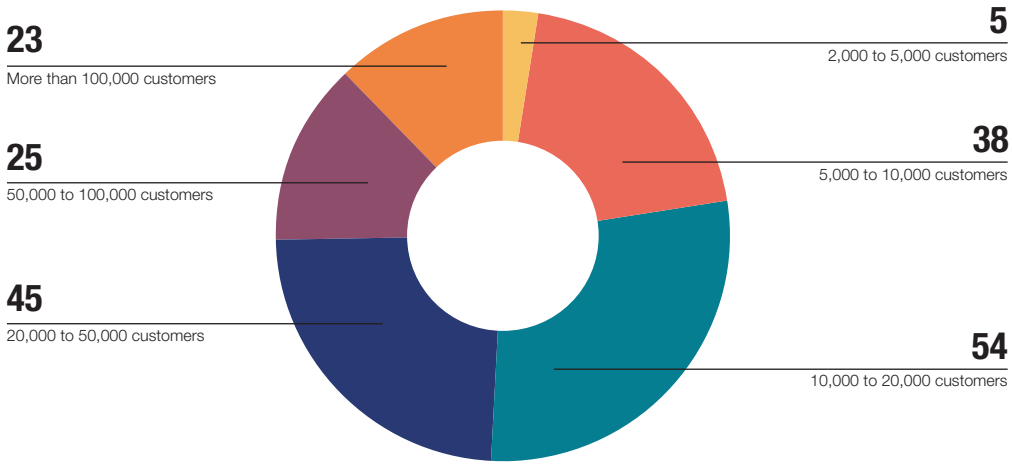
The utilities included in this report are those that responded to the American Public Power Association's 2024 Performance Indicators Survey. The survey was sent to all public power utilities with sales to consumers that account for approximately 50% or more of their total sales, and that have retail sales or sales for resale of 150,000 MWh or more.

Direct comparisons with previous ratio reports should not be made because the composition of utilities included may have changed. Although 190 utilities are included in this report, not all utilities were incorporated into each ratio. Many utilities did not have or did not provide information necessary for certain ratios. Also, data were excluded from calculations if there was reason to believe the information was incorrect (e.g., extreme values). Furthermore, the Energy Information Administration increased the sales threshold for utilities to complete EIA Form 861, so for utilities with 150,000-200,000 MWh in total sales, data from the EIA Form 861S was used, which contains fewer data points.

The respondents are grouped into six classes based on customer count. Mean, median, and first and third quartile values are calculated for each of these classes. Medians and quartiles are

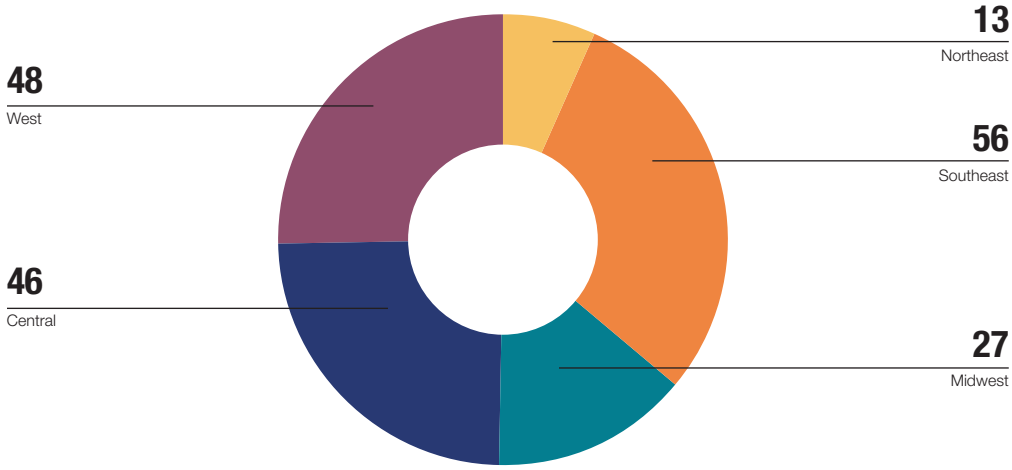
calculated based on each utility's ratio and therefore each utility is represented equally. Means are weighted — calculated by summing the values for all utilities and then computing the ratio from these totals. Since large utilities heavily influence the mean (particularly when there are only a small number of utilities in the sample), medians provide a better measure of the typical utility. Figure 1 shows the number of responses in each class. All ratios with fewer than five responses in a category are not shown within their subcategory as it is not possible to compute summary data for such few responses.

Figure 1. Number of Responses by Customer Count



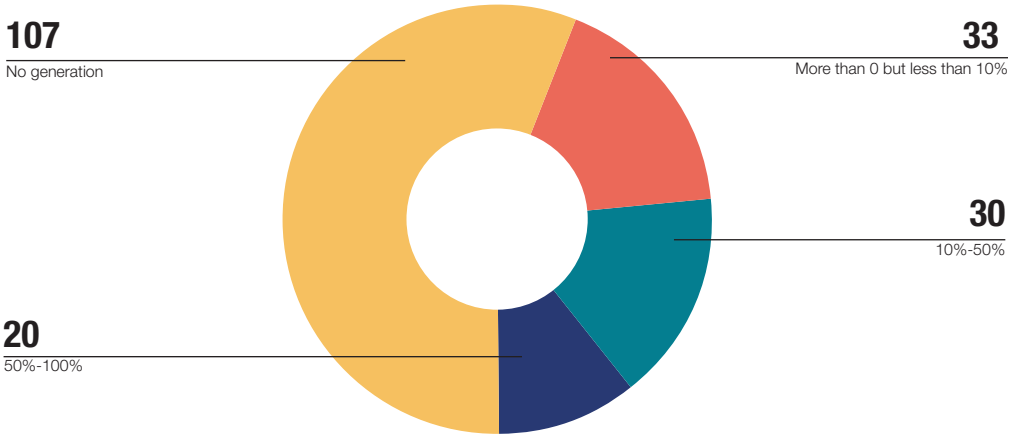
Utilities are also grouped based on geographic location. See Appendix C for a full breakout of each region. Figure 2 shows the number of utilities in each region.

Figure 2. Number of Responses by Region



Finally, respondents are grouped into categories based on the percentage of how much of each utility's power supply comes from its own generation. The classes range from "No generation" to "50%-100%" generation. Figure 3 shows the number of utilities in each category. Utilities that had negative generation are classified as "No generation."

Figure 3. Number of Responses by Generation



Definitions, Data Sources, and Computations

Section III, "Detailed Tables," provides definitions for each ratio and Appendix B outlines information on data sources and computations. The data in this report come from two sources: EIA's 2024 report on Forms EIA-861 and EIA-861S and APPA's 2024 Performance Indicators Survey.

Factors Influencing Ratios

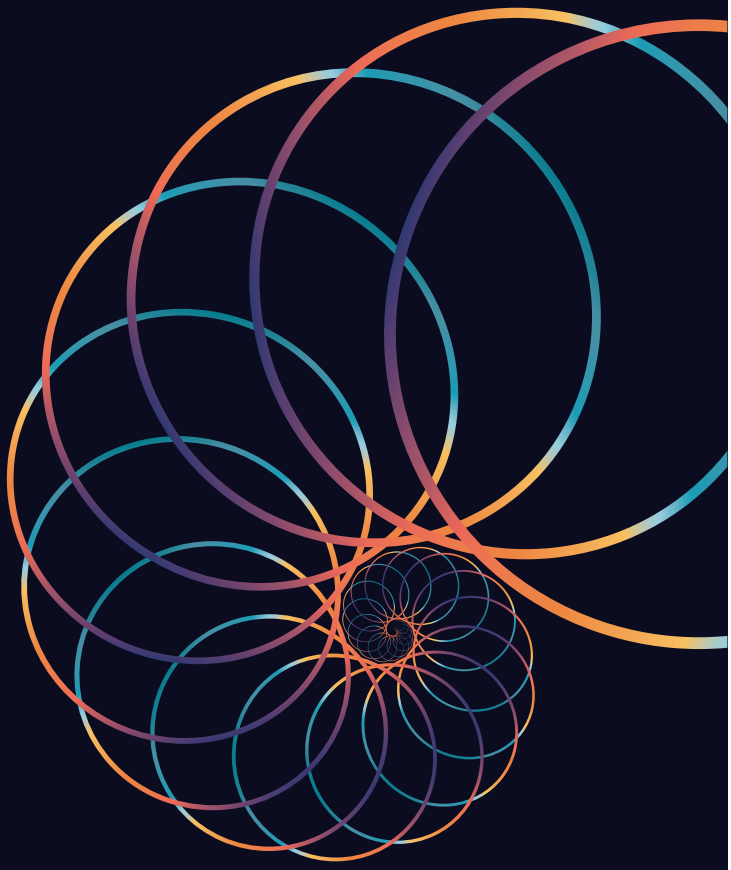
Each of the ratios in this report may be influenced by a variety of economic, environmental, and technical factors. Aggregating the data may mask significant differences. When making comparisons, users should attempt to understand the various factors that might affect a particular ratio. An individual utility with a high or low value for a given ratio relative to the median for a group is not necessarily indicative of a performance problem but might be due to policies or situations faced by the utility.

The groupings in this report adjust for regional variations, differences in the number of customers served, and differences in operations based on the proportion of power requirements generated by the utility. Other factors that might influence the ratios include:

- Composition of customers served;
- Geographic location;
- Population density;
- Source of power supply (and physical, economic, or institutional barriers to acquiring alternative power supply);
- Amount of taxes, payments in lieu of taxes, contributions and free electricity or services that a utility makes to or receives from local government;
- Number of contract employees used (e.g., consultants, contract labor for maintenance, tree trimming);
- Financial policies (e.g., proportion of major capital expenditures financed by long-term debt versus current revenue);
- Management policies (e.g., the extent to which a utility focuses on customer service or other programs);
- Regulatory policies;
- Relatively small number of utilities reporting data on a particular ratio (small numbers of utilities frequently appear in the detailed breakdowns);
- Degree of precision of the data component; or
- Differences in utility reporting periods.

Ratios are calculated from fiscal year and calendar year data.

II. SUMMARY TABLES



The following tables present summary data on the 21 financial and operating ratios by customer count (Table A), by region (Table B), and by generation class (Table C). These tables present medians for each of the ratios. Section III includes definitions and detailed data on means, medians, and quartiles. Appendix B includes data sources and calculation procedures.

The average number of retail customers reported by each utility on the 2024 Performance Indicators Survey determines customer count. Responding utilities are grouped into five geographic regions: Northeast, Southeast, Midwest, Central, and West. See Appendix C for a detailed description of the regions.

Generation refers to the power a utility produces and is based upon the utility's net generation as a percentage of total sources of energy as reported on Form EIA-861.

TABLE A. FINANCIAL & OPERATING RATIOS: MEDIAN VALUES BY CUSTOMER COUNT

Ratio	2,000 to 5,000 customers	5,000 to 10,000 customers	10,000 to 20,000 customers	20,000 to 50,000 customers	50,000 to 100,000 customers	More than 100,000 customers
1. Revenue per KWH						
a. All Retail Customers	$0.112	$0.105	$0.112	$0.110	$0.124	$0.111
b. Residential Customers	a	$0.121	$0.129	$0.121	$0.131	$0.126
c. Commercial Customers	a	$0.116	$0.118	$0.110	$0.121	$0.105
d. Industrial Customers	a	$0.081	$0.088	$0.073	$0.097	$0.076
2. Debt to Total Assets	0.263	0.219	0.228	0.285	0.345	0.497
3. Operating Ratio	0.750	0.884	0.859	0.869	0.758	0.756
4. Current Ratio	3.33	3.68	2.64	2.79	3.90	1.89
5a. Times Interest Earned	8.25	15.82	11.56	6.37	4.48	2.36
5b. Debt Service Coverage	a	6.38	4.07	4.30	2.71	2.82
6. Net Income per Revenue Dollar	$0.102	$0.050	$0.093	$0.087	$0.084	$0.088
7. Uncollectible Accounts per Revenue Dollar	$0.0016	$0.0003	$0.0007	$0.0012	$0.0011	$0.0025
8. Retail Customer per Non-Power Generation Employee	a	305	365	332	304	306
9. Total O&M Expense per KWH Sold	a	$0.081	$0.092	$0.091	$0.094	$0.076
10. Total O&M Expense (Excluding Power Supply Exp.) per Retail Customer	a	$669	$609	$675	$725	$683
11. Total Power Supply Expense per KWH Sold	a	$0.067	$0.069	$0.065	$0.078	$0.051
12. Purchased Power Cost per KWH	a	$0.066	$0.067	$0.061	$0.071	$0.051
13. Retail Customers per Meter Reader	a	6,756	6,660	9,547	7,589	34,808
14. Distribution O&M Expense per Retail Customer	a	$271	$240	$242	$238	$215
15. Distribution O&M Expense per Circuit Mile	a	$8,904	$8,325	$8,861	$9,644	$14,746
16. Customer Accounting, Service, and Sales Expense per Retail Customer	a	$65	$62	$76	$68	$97
17. Administrative and General Expense per Retail Customer	a	$230	$212	$201	$290	$266
18. Labor Expense per Worker-Hour	a	$46.37	$52.43	$56.05	$56.30	$62.10
19. Energy Loss Percentage	a	3.43%	3.17%	3.55%	2.84%	3.25%
20. System Load Factor	a	57.8%	54.5%	52.1%	56.7%	57.7%
21. Capital Expenditures to Depreciation Expense	a	1.35	1.22	1.45	1.83	1.90

a Medians are not calculated for fewer than 5 responses

TABLE B. FINANCIAL & OPERATING RATIOS: MEDIAN VALUES BY REGION

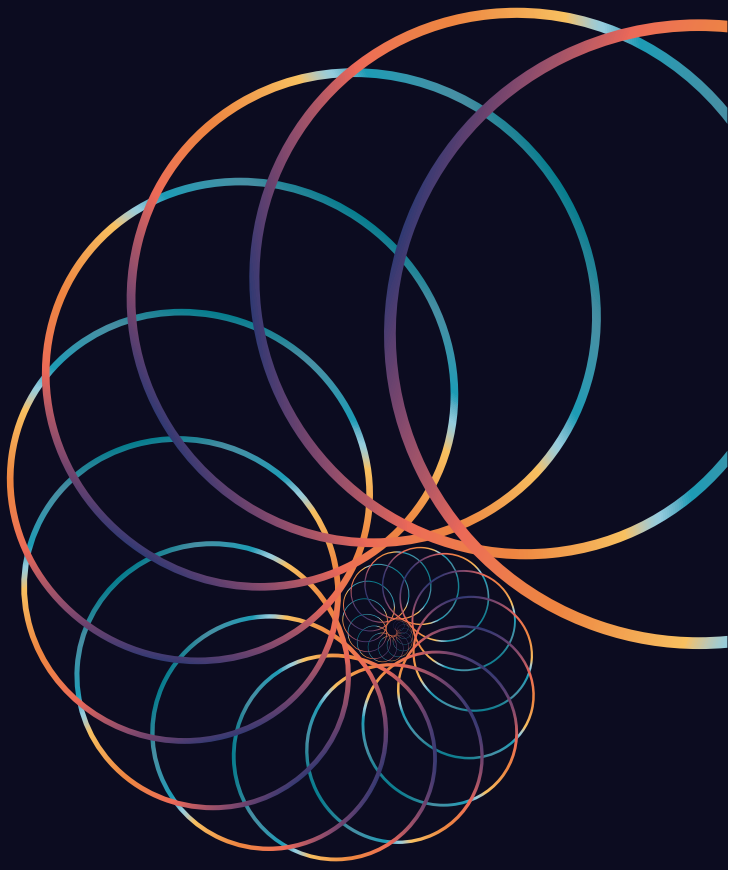
Ratio	Northeast	Southeast	Midwest	Central	West
1. Revenue per kWh					
a. All Retail Customers	$0.152	$0.112	$0.109	$0.100	$0.111
b. Residential Customers	$0.161	$0.124	$0.126	$0.115	$0.133
c. Commercial Customers	$0.163	$0.118	$0.120	$0.104	$0.110
d. Industrial Customers	$0.136	$0.074	$0.090	$0.081	$0.077
2. Debt to Total Assets	0.326	0.287	0.302	0.264	0.346
3. Operating Ratio	0.886	0.854	0.888	0.867	0.776
4. Current Ratio	2.57	2.20	3.33	3.29	3.65
5a. Times Interest Earned	4.45	6.87	10.37	5.14	7.59
5b. Debt Service Coverage	2.54	4.25	3.93	3.48	3.72
6. Net Income per Revenue Dollar	$0.050	$0.046	$0.092	$0.094	$0.141
7. Uncollectible Accounts per Revenue Dollar	$0.0037	$0.0009	$0.0001	$0.0008	$0.0008
8. Retail Customer per Non-Power Generation Employee	365	299	405	316	334
9. Total O&M Expense per kWh Sold	$0.137	$0.098	$0.090	$0.076	$0.083
10. Total O&M Expense (Excluding Power Supply Exp.) per Retail Customer	$972	$520	$615	$726	$784
11. Total Power Supply Expense per kWh Sold	$0.078	$0.073	$0.072	$0.060	$0.060
12. Purchased Power Cost per kWh	$0.087	$0.078	$0.070	$0.055	$0.053
13. Retail Customers per Meter Reader	6,945	6,314	7,009	10,171	12,448
14. Distribution O&M Expense per Retail Customer	$217	$238	$231	$242	$259
15. Distribution O&M Expense per Circuit Mile	$20,211	$8,220	$7,814	$9,644	$9,141
16. Customer Accounting, Service, and Sales Expense per Retail Customer	$151	$74	$48	$65	$104
17. Administrative and General Expense per Retail Customer	$420	$184	$321	$238	$213
18. Labor Expense per Worker-Hour	$73.30	$44.36	$52.43	$50.39	$66.88
19. Energy Loss Percentage	3.55%	3.53%	2.74%	3.25%	3.08%
20. System Load Factor	55.5%	52.0%	52.0%	58.3%	55.7%
21. Capital Expenditures to Depreciation Expense	1.03	1.54	1.73	1.38	1.74

TABLE C. FINANCIAL & OPERATING RATIOS: MEDIAN VALUES BY POWER GENERATION CLASS*

Ratio	No Generation	More than 0 but less than 10%	10%-50%	50%-100%
1. Revenue per kWh				
a. All Retail Customers	$0.111	$0.102	$0.115	$0.152
b. Residential Customers	$0.125	$0.122	$0.126	$0.140
c. Commercial Customers	$0.111	$0.127	$0.117	$0.109
d. Industrial Customers	$0.080	$0.085	$0.080	$0.086
2. Debt to Total Assets	0.269	0.257	0.447	0.438
3. Operating Ratio	0.868	0.858	0.765	0.750
9. Total O&M Expense per kWh Sold	$0.092	$0.086	$0.086	$0.082
11. Total Power Supply Expense per kWh Sold	$0.071	$0.064	$0.060	$0.060
12. Purchased Power Cost per kWh	$0.072	$0.059	$0.051	$0.048
17. Administrative and General Expense per Retail Customer	$201	$250	$276	$272
18. Labor Expense per Worker-Hour	$48.66	$54.06	$66.20	$57.04
19. Energy Loss Percentage	3.48%	2.76%	3.26%	2.82%
21. Capital Expenditures to Depreciation Expense	1.52	1.52	1.33	1.96

* Only the ratios affected by power generation are included in this table

III. DETAILED TABLES



The following tables present a detailed breakdown of each of the 21 ratios. Each table includes the ratio by customer count, region, and generation class where applicable. The numbers of responses are presented along with the mean, median, and first and third quartiles of the ratio for each class.

1. Revenue per Kilowatt-hour

a. All retail customers – The ratio of total electric operating revenues from sales to ultimate customers to total kilowatt-hour sales. This ratio measures the revenue received for each kilowatt-hour of electricity sold to all classes of customers, including residential, commercial, industrial, public street and highway lighting, and other customers.

b. Residential customers – The ratio of residential revenue to residential sales. This ratio measures the revenue received for each kilowatt-hour of electricity sold to residential customers.

c. Commercial customers – The ratio of commercial revenue to commercial sales. This ratio measures the revenue received for each kilowatt-hour of electricity sold to commercial customers.

d. Industrial customers – The ratio of industrial revenue to industrial sales. This ratio measures the revenue received for each kilowatt-hour of electricity sold to industrial customers.

The definition of commercial and industrial customers may vary between utilities, with the resulting classification based on specific load characteristics or demand rather than on a popular definition of "commercial" or "industrial." Revenue and sales data include only full-service (bundled sales), thus data for customers who purchase power from an alternative supplier are excluded.

More detailed revenue-per-kilowatt hour data, including data for all retail electric utilities in the United States, can be found at www.PublicPower.org/Resource/Average-Revenue-Kilowatt-Hour-Report.

TABLE 1A. REVENUE PER KILOWATT-HOUR: ALL RETAIL CUSTOMERS

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**190**	**$0.127**	**$0.092**	**$0.110**	**$0.126**
1. Customer Count					
2,000 to 5,000 customers	5	0.167	a	0.112	a
5,000 to 10,000 customers	38	0.098	0.086	0.105	0.114
10,000 to 20,000 customers	54	0.110	0.092	0.112	0.133
20,000 to 50,000 customers	45	0.107	0.090	0.110	0.123
50,000 to 100,000 customers	25	0.126	0.104	0.124	0.154
More than 100,000 customers	23	0.133	0.100	0.111	0.124
2. Region					
Northeast	13	0.210	0.136	0.152	0.173
Southeast	56	0.110	0.103	0.112	0.121
Midwest	27	0.117	0.094	0.109	0.120
Central	46	0.097	0.084	0.100	0.116
West	48	0.142	0.089	0.111	0.171
3. Generation					
No generation	107	0.112	0.094	0.111	0.121
More than 0 but less than 10%	33	0.101	0.091	0.102	0.123
10%-50%	30	0.138	0.092	0.115	0.169
50%-100%	20	0.137	0.107	0.114	0.172

a Quartiles are not calculated for fewer than 9 responses

TABLE 1B. REVENUE PER KILOWATT-HOUR: RESIDENTIAL CUSTOMERS

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**179**	**$0.147**	**$0.111**	**$0.126**	**$0.142**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	31	0.122	0.108	0.121	0.133
10,000 to 20,000 customers	52	0.127	0.110	0.129	0.149
20,000 to 50,000 customers	45	0.124	0.109	0.121	0.138
50,000 to 100,000 customers	25	0.143	0.120	0.131	0.179
More than 100,000 customers	23	0.154	0.115	0.126	0.148
2. Region					
Northeast	12	0.233	0.142	0.161	0.187
Southeast	55	0.128	0.114	0.124	0.135
Midwest	24	0.136	0.112	0.126	0.133
Central	42	0.122	0.105	0.115	0.138
West	46	0.157	0.103	0.133	0.179
3. Generation					
No generation	96	0.124	0.112	0.125	0.135
More than 0 but less than 10%	33	0.131	0.103	0.122	0.144
10%-50%	30	0.163	0.109	0.126	0.173
50%-100%	20	0.157	0.114	0.140	0.208

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

TABLE 1C. REVENUE PER KILOWATT-HOUR: COMMERCIAL CUSTOMERS

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**179**	**$0.130**	**$0.098**	**$0.116**	**$0.134**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	31	0.113	0.095	0.116	0.122
10,000 to 20,000 customers	52	0.123	0.102	0.118	0.140
20,000 to 50,000 customers	45	0.110	0.096	0.110	0.130
50,000 to 100,000 customers	25	0.134	0.103	0.121	0.163
More than 100,000 customers	23	0.133	0.095	0.105	0.120
2. Region					
Northeast	12	0.201	0.144	0.163	0.185
Southeast	55	0.112	0.107	0.118	0.125
Midwest	24	0.129	0.103	0.120	0.134
Central	42	0.093	0.086	0.104	0.120
West	46	0.151	0.091	0.110	0.176
3. Generation					
No generation	96	0.116	0.103	0.117	0.127
More than 0 but less than 10%	33	0.110	0.093	0.111	0.135
10%-50%	30	0.135	0.100	0.117	0.166
50%-100%	20	0.141	0.095	0.109	0.175

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

TABLE 1D. REVENUE PER KILOWATT-HOUR: INDUSTRIAL CUSTOMERS

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**155**	**$0.082**	**$0.069**	**$0.080**	**$0.098**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	29	0.079	0.070	0.081	0.094
10,000 to 20,000 customers	46	0.081	0.076	0.088	0.103
20,000 to 50,000 customers	38	0.090	0.065	0.073	0.092
50,000 to 100,000 customers	19	0.067	0.065	0.097	0.119
More than 100,000 customers	20	0.084	0.071	0.076	0.094
2. Region					
Northeast	10	0.116	0.124	0.136	0.148
Southeast	49	0.073	0.068	0.074	0.090
Midwest	22	0.085	0.080	0.090	0.105
Central	37	0.076	0.071	0.081	0.097
West	37	0.084	0.064	0.077	0.129
3. Generation					
No generation	87	0.078	0.067	0.080	0.096
More than 0 but less than 10%	30	0.072	0.073	0.085	0.094
10%-50%	24	0.116	0.070	0.080	0.124
50%-100%	14	0.075	0.074	0.086	0.147

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

2. Debt to Total Assets

The ratio of long-term debt, plus current and accrued liabilities, to total assets and other debits. This ratio measures a utility's ability to meet its current and long-term liabilities based on the availability of assets.

Long-term debt includes bonds, advances from the municipality, other long-term debt, any unamortized premium on long-term debt, and any unamortized discount on long-term debt. Current and accrued liabilities include warrants, notes and accounts payable, payables to the municipality, customer deposits, taxes accrued, interest accrued, and miscellaneous current and accrued liabilities. Total assets and other debits include utility plants, investments, current and accrued assets, and deferred debits.

This ratio may be influenced by the extent to which its components include information applicable to a non-electric portion of the utility (e.g., gas or water). In addition, the ratio may be influenced by a utility's financial policies.

TABLE 2. DEBT TO TOTAL ASSETS

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**188**	**0.507**	**0.142**	**0.284**	**0.439**
1. Customer Count					
2,000 to 5,000 customers	5	0.477	a	0.263	a
5,000 to 10,000 customers	38	0.599	0.105	0.219	0.346
10,000 to 20,000 customers	52	0.247	0.112	0.228	0.334
20,000 to 50,000 customers	45	0.298	0.167	0.285	0.449
50,000 to 100,000 customers	25	0.383	0.197	0.345	0.470
More than 100,000 customers	23	0.554	0.405	0.497	0.584
2. Region					
Northeast	12	0.690	0.219	0.326	0.519
Southeast	56	0.513	0.166	0.287	0.497
Midwest	26	0.528	0.124	0.302	0.422
Central	46	0.429	0.103	0.264	0.359
West	48	0.497	0.160	0.346	0.460
3. Generation					
No generation	106	0.402	0.142	0.269	0.367
More than 0 but less than 10%	32	0.347	0.093	0.257	0.354
10%-50%	30	0.551	0.223	0.447	0.543
50%-100%	20	0.520	0.269	0.438	0.552

a Quartiles are not calculated for fewer than 9 responses

3. Operating Ratio

The ratio of total electric operation and maintenance expenses to total electric operating revenues. This ratio measures the proportion of revenues received from electricity sales, rate adjustments, and other electric activities required to cover the operation and maintenance costs associated with producing and selling electricity.

Operation and maintenance expenses include the costs of power production, purchased power, transmission, distribution, customer accounting, customer service, sales, and administrative and general expenses. This ratio may be influenced by the availability of alternative power options and the costs of purchased power.

TABLE 3. OPERATING RATIO

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**186**	**0.761**	**0.754**	**0.853**	**0.922**
1. Customer Count					
2,000 to 5,000 customers	5	0.707	a	0.750	a
5,000 to 10,000 customers	37	0.829	0.815	0.884	0.939
10,000 to 20,000 customers	51	0.904	0.796	0.859	0.954
20,000 to 50,000 customers	45	0.837	0.762	0.869	0.930
50,000 to 100,000 customers	25	0.783	0.675	0.758	0.853
More than 100,000 customers	23	0.734	0.679	0.756	0.855
2. Region					
Northeast	12	0.721	0.640	0.886	0.980
Southeast	53	0.787	0.775	0.854	0.939
Midwest	27	0.835	0.807	0.888	0.929
Central	46	0.806	0.755	0.867	0.897
West	48	0.728	0.723	0.776	0.864
3. Generation					
No generation	104	0.823	0.796	0.868	0.939
More than 0 but less than 10%	32	0.814	0.753	0.858	0.900
10%-50%	30	0.744	0.711	0.765	0.887
50%-100%	20	0.728	0.697	0.750	0.865

a Quartiles are not calculated for fewer than 9 responses

4. Current Ratio

The ratio of total current and accrued assets to total current and accrued liabilities. This is a measure of the utility's short-term liquidity (i.e., the ability to pay bills). The current ratio takes a snapshot of the utility's liquidity at a point in time and thus may vary considerably at other times of the year.

Total current and accrued assets include cash and working funds, temporary cash investments, notes and accounts receivable, receivables from the municipality, materials and supplies, prepayments, and miscellaneous current and accrued assets. Total current and accrued liabilities include warrants, notes and accounts payable, payables to the municipality, customer deposits, taxes accrued, interest accrued, and miscellaneous current and accrued liabilities.

TABLE 4. CURRENT RATIO

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**190**	**1.91**	**1.83**	**2.93**	**4.99**
1. Customer Count					
2,000 to 5,000 customers	5	1.98	a	3.33	a
5,000 to 10,000 customers	38	1.16	1.95	3.68	8.32
10,000 to 20,000 customers	54	2.61	1.75	2.64	4.98
20,000 to 50,000 customers	45	2.85	1.96	2.79	4.24
50,000 to 100,000 customers	25	2.89	2.12	3.90	6.42
More than 100,000 customers	23	1.67	1.55	1.89	3.17
2. Region					
Northeast	13	1.75	1.71	2.57	2.96
Southeast	56	1.50	1.26	2.20	3.85
Midwest	27	3.61	1.98	3.33	5.46
Central	46	1.98	2.05	3.29	6.70
West	48	2.09	2.31	3.65	5.73

a Quartiles are not calculated for fewer than 9 responses

5a. Times Interest Earned

The ratio of net income, plus interest on long-term debt, to interest on long-term debt. This ratio measures the ability of a utility to cover interest charges and is indicative of the safety margin to lenders. Utilities that do not report any long-term debt are excluded from this ratio.

This ratio might be influenced by a utility's financial policies.

TABLE 5A. TIMES INTEREST EARNED

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**150**	**2.38**	**2.67**	**6.46**	**16.18**
1. Customer Count					
2,000 to 5,000 customers	5	5.56	a	8.25	a
5,000 to 10,000 customers	25	7.86	6.55	15.82	59.54
10,000 to 20,000 customers	33	2.38	4.82	11.56	22.52
20,000 to 50,000 customers	39	6.85	4.31	6.37	11.86
50,000 to 100,000 customers	25	3.98	1.74	4.48	7.56
More than 100,000 customers	23	2.01	1.72	2.36	4.02
2. Region					
Northeast	11	1.46	1.51	4.45	6.15
Southeast	44	2.01	3.81	6.87	14.13
Midwest	19	3.29	3.53	10.37	36.41
Central	34	2.59	2.45	5.14	19.51
West	42	2.81	3.00	7.59	12.52

a Quartiles are not calculated for fewer than 9 responses

5b. Debt Service Coverage

The ratio of net revenues available for debt service to total long-term debt service for the year. This ratio measures the utility's ability to meet its annual long-term debt obligation.

Net revenues available for debt service equal operating electric income plus depreciation expenses plus interest payment on long-term debt. Operating electric income represents operating revenues minus operating expenses.

This ratio might be influenced by a utility's financial policies.

TABLE 5B. DEBT SERVICE COVERAGE

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**152**	**2.69**	**2.44**	**3.85**	**9.03**
1. Customer Count					
2,000 to 5,000 customers	4	b	a	b	a
5,000 to 10,000 customers	26	2.98	3.59	6.38	12.45
10,000 to 20,000 customers	35	3.26	2.33	4.07	11.25
20,000 to 50,000 customers	39	4.01	3.35	4.30	9.66
50,000 to 100,000 customers	25	0.79	0.88	2.71	4.05
More than 100,000 customers	23	3.67	2.29	2.82	3.75
2. Region					
Northeast	11	2.08	1.87	2.54	3.70
Southeast	46	3.16	2.99	4.25	10.75
Midwest	20	1.96	3.10	3.93	20.50
Central	33	1.07	2.28	3.48	8.91
West	42	4.05	2.33	3.72	7.60

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 respons

6. Net Income per Revenue Dollar

The ratio of net income to total electric operating revenues. This ratio measures the amount of income remaining after accounting for operation and maintenance expenses, depreciation, taxes and tax equivalents, for every dollar received from sales of electricity.

The ratio might be influenced by the type and availability of power supply options and by the amount of taxes and tax equivalents that a utility transfers to the municipality or other governmental body. Financial policies and the amount of debt may also affect this ratio (e.g., how a utility finances capital investments).

TABLE 6. NET INCOME PER REVENUE DOLLAR

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**185**	**$0.084**	**$0.029**	**$0.084**	**$0.150**
1. Customer Count					
2,000 to 5,000 customers	5	0.219	a	0.102	a
5,000 to 10,000 customers	36	0.080	0.033	0.050	0.098
10,000 to 20,000 customers	51	0.059	0.040	0.093	0.148
20,000 to 50,000 customers	45	0.102	0.032	0.087	0.152
50,000 to 100,000 customers	25	0.101	0.019	0.084	0.150
More than 100,000 customers	23	0.078	0.039	0.088	0.147
2. Region					
Northeast	13	0.051	0.019	0.050	0.083
Southeast	56	0.041	0.014	0.046	0.082
Midwest	26	0.075	0.035	0.092	0.141
Central	44	0.087	0.035	0.094	0.153
West	46	0.120	0.089	0.141	0.188

a Quartiles are not calculated for fewer than 9 responses

7. Uncollectible Accounts per Revenue Dollar

The ratio of total uncollectible accounts to total electric utility operating revenues. This ratio measures the portion of each revenue dollar that will not be collected by the utility.

This ratio will be influenced by the financial and customer service policies of the utility.

TABLE 7. UNCOLLECTIBLE ACCOUNTS PER REVENUE DOLLAR

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**190**	**$0.0043**	**$0.0002**	**$0.0008**	**$0.0024**
1. Customer Count					
2,000 to 5,000 customers	5	0.0012	a	0.0016	a
5,000 to 10,000 customers	38	0.0024	0.0000	0.0003	0.0008
10,000 to 20,000 customers	54	0.0044	0.0001	0.0007	0.0029
20,000 to 50,000 customers	45	0.0031	0.0005	0.0012	0.0024
50,000 to 100,000 customers	25	0.0018	0.0002	0.0011	0.0023
More than 100,000 customers	23	0.0051	0.0006	0.0025	0.0048
2. Region					
Northeast	13	0.0043	0.0025	0.0037	0.0047
Southeast	56	0.0030	0.0004	0.0009	0.0024
Midwest	27	0.0015	0.0000	0.0001	0.0009
Central	46	0.0025	0.0003	0.0008	0.0022
West	48	0.0060	0.0001	0.0008	0.0034

a Quartiles are not calculated for fewer than 9 responses

8. Retail Customers per Non-power-generation Employee

The ratio of the average number of retail customers from all classes to the total number of full-time, part-time, and contract employees not involved in the generation of power. This ratio measures the average number of customers served by each non-generation employee.

The ratio may be influenced by the mix of customers and by population density. It will be influenced by the extent that employees shared with other (non-electric) departments are not properly prorated, or that employees involved in resale transactions are included. Part-time employees are assumed to work half-time (i.e., two part-time employees are counted as one full-time employee). To the extent that this assumption is violated, the ratio will be biased. Contract employees include only those individuals performing regular utility work on an ongoing basis.

TABLE 8. RETAIL CUSTOMERS PER NON-POWER-GENERATION EMPLOYEE

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**186**	**257**	**256**	**323**	**425**
1. Customer Count					
2,000 to 5,000 customers	4	b	a	b	a
5,000 to 10,000 customers	37	240	250	305	424
10,000 to 20,000 customers	53	344	302	365	466
20,000 to 50,000 customers	45	319	266	332	414
50,000 to 100,000 customers	24	265	257	304	361
More than 100,000 customers	23	247	260	306	413
2. Region					
Northeast	13	391	282	365	403
Southeast	56	304	256	299	389
Midwest	27	410	261	405	497
Central	45	231	254	316	408
West	45	220	246	334	460

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

9. Total Operation and Maintenance Expense per Kilowatt-hour Sold

The ratio of total electric utility operation and maintenance expenses, including the cost of generated and purchased power, to total kilowatt-hour sales to ultimate and resale customers. This ratio measures average total operation and maintenance expenses associated with each kilowatt-hour of electricity sold, either for resale or to ultimate customers.

Included in operation and maintenance costs are the expenses associated with power supply (generation and purchased power), transmission, distribution, customer accounting, customer services, sales, and administrative and general functions of the electric utility. Because power supply expenses typically comprise the largest component of total operation and maintenance expenses, this ratio might be influenced by the proportion of power generated by a utility and the availability of alternative power supplies. Kilowatt-hours of electricity produced but not sold (e.g., energy furnished without charge, energy used internally, and energy losses) are not included in the denominator.

TABLE 9. TOTAL O&M EXPENSE PER KWH SOLD

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**170**	**$0.087**	**$0.072**	**$0.090**	**$0.109**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	28	0.080	0.072	0.081	0.099
10,000 to 20,000 customers	48	0.094	0.075	0.092	0.111
20,000 to 50,000 customers	45	0.089	0.074	0.091	0.118
50,000 to 100,000 customers	23	0.080	0.075	0.094	0.110
More than 100,000 customers	23	0.087	0.064	0.076	0.101
2. Region					
Northeast	10	0.156	0.060	0.137	0.161
Southeast	53	0.082	0.074	0.098	0.110
Midwest	23	0.095	0.083	0.090	0.105
Central	41	0.072	0.069	0.076	0.098
West	43	0.088	0.069	0.083	0.112
3. Generation					
No generation	91	0.093	0.074	0.092	0.110
More than 0 but less than 10%	32	0.083	0.072	0.086	0.106
10%-50%	30	0.095	0.072	0.086	0.118
50%-100%	17	0.077	0.064	0.082	0.102

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

10. Total Operation and Maintenance Expense (Excluding Power Supply Expense) per Retail Customer

The ratio of total electric utility operation and maintenance expenses, excluding all costs of power supply, to the total number of ultimate customers.

Operation and maintenance expenses include the costs of transmission, distribution, customer accounting, customer services, sales, and administrative and general expenses. The costs of power supply (generation and purchased power) are excluded from the ratio. This ratio might be affected by population density and the mix of customers between various classes (residential, commercial, industrial, or other). Also, the extent to which a utility services resale customers will influence the ratio.

TABLE 10. TOTAL O&M EXPENSE (EXCLUDING POWER SUPPLY EXPENSE) PER RETAIL CUSTOMER

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**187**	**$821**	**$465**	**$675**	**$907**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	38	1,332	516	669	1,005
10,000 to 20,000 customers	53	1,321	461	609	941
20,000 to 50,000 customers	45	784	451	675	857
50,000 to 100,000 customers	25	849	462	725	893
More than 100,000 customers	23	767	552	683	881
2. Region					
Northeast	13	1,171	832	972	1,268
Southeast	56	639	434	520	787
Midwest	26	732	421	615	792
Central	46	994	562	726	898
West	46	802	575	784	966

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

11. Total Power Supply Expense per Kilowatt-hour Sold

The ratio of the total costs of power supply to total sales to both ultimate and resale customers. This ratio measures all power supply costs, including generation and purchased power, associated with the sale of each kilowatt-hour of electricity.

The ratio includes operation and maintenance costs arising from all generation types, including steam, nuclear, hydraulic, and other types of generation. Operation and maintenance expenses include the costs of fuel, labor, supervision, engineering, materials, and supplies. They also include the costs of purchased power. The ratio may be influenced by the geographic location of the utility, the availability of alternative power supplies, the degree to which the utility can generate its own power, and access to transmission. The ratio does not include kilowatt-hours produced but not sold (e.g., energy used internally, energy furnished without charge, or energy losses).

TABLE 11. TOTAL POWER SUPPLY EXPENSE PER KWH SOLD

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**178**	**$0.061**	**$0.050**	**$0.066**	**$0.083**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	31	0.067	0.053	0.067	0.077
10,000 to 20,000 customers	51	0.073	0.059	0.069	0.084
20,000 to 50,000 customers	45	0.059	0.050	0.065	0.080
50,000 to 100,000 customers	25	0.066	0.051	0.078	0.085
More than 100,000 customers	23	0.059	0.041	0.051	0.076
2. Region					
Northeast	11	0.102	0.027	0.078	0.092
Southeast	55	0.064	0.053	0.073	0.085
Midwest	24	0.069	0.064	0.072	0.083
Central	42	0.047	0.046	0.060	0.072
West	46	0.060	0.042	0.060	0.078
3. Generation					
No generation	95	0.069	0.051	0.071	0.085
More than 0 but less than 10%	33	0.059	0.055	0.064	0.077
10%-50%	30	0.059	0.044	0.060	0.078
50%-100%	20	0.058	0.046	0.060	0.077

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

12. Purchased Power Cost per Kilowatt-hour

The ratio of the cost of purchased power to the kilowatt-hours purchased. This ratio measures the purchased power component of power supply costs.

Purchased power includes purchases from investor-owned utilities, municipalities, cooperatives, or other public authorities for subsequent distribution and sale to ultimate customers. It does not include power exchanges. Adjustments to the cost data were made in a few cases to eliminate power exchanges. The cost reflects the amount billed, including adjustments and other charges.

The ratio might be influenced by the geographic location of the utility, availability of alternative power supplies, access to transmission, and the type of purchase agreement, such as firm power, economy power, or surplus sales.

TABLE 12. PURCHASED POWER COST PER KWH

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**175**	**$0.067**	**$0.048**	**$0.065**	**$0.083**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	30	0.077	0.055	0.066	0.081
10,000 to 20,000 customers	52	0.070	0.057	0.067	0.084
20,000 to 50,000 customers	45	0.061	0.047	0.061	0.081
50,000 to 100,000 customers	23	0.067	0.043	0.071	0.082
More than 100,000 customers	22	0.067	0.041	0.051	0.084
2. Region					
Northeast	12	0.100	0.056	0.087	0.093
Southeast	54	0.078	0.065	0.078	0.083
Midwest	23	0.070	0.056	0.070	0.079
Central	42	0.046	0.043	0.055	0.063
West	44	0.061	0.042	0.053	0.075
3. Generation					
No generation	96	0.075	0.056	0.072	0.083
More than 0 but less than 10%	33	0.057	0.055	0.059	0.073
10%-50%	30	0.062	0.041	0.051	0.081
50%-100%	16	0.065	0.040	0.048	0.168

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

13. Retail Customers per Meter Reader

The ratio of retail customers to the number of meter readers employed by the utility. This measures the average number of retail customers served by each meter reader.

The number of meter readers includes the total number of full-time meter readers plus half of all part-time meter readers. It is assumed that all part-time employees work half-time (i.e., one full-time employee is equivalent to two part-time employees). Population density, frequency of meter readings, and the technology or methods used to read meters will influence the ratio.

As more utilities implement advanced meters that can gather usage data without having to send a meter reader to the customer's residence or business, utilities require fewer meter readers to cover their service territories. Some utilities have installed advanced meters across their entire service territory and no longer employ meter readers. These utilities have been excluded from the customer count and region summaries of this ratio. However, utilities with zero meter readers are captured in the last part of this ratio, which shows the percentage of a utility's customers that have advanced meters installed.

The first and third quartile and median figures in this final category still reflect only those utilities with at least one meter reader. The weighted mean in this category does include all utilities, with or without meter readers. Overall, 82 utilities reported zero meter readers, and all of them but one were in the "80% or more" class for advanced meter deployment.

TABLE 13. RETAIL CUSTOMERS PER METER READER

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total*	**107**	**17,568**	**4,799**	**8,611**	**14,441**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	18	9,763	4,548	6,756	8,573
10,000 to 20,000 customers	30	8,011	4,231	6,660	13,448
20,000 to 50,000 customers	26	10,602	5,254	9,547	13,373
50,000 to 100,000 customers	14	12,628	5,583	7,589	23,113
More than 100,000 customers	16	23,663	11,967	34,808	69,830
2. Region					
Northeast	7	43,185	a	6,945	a
Southeast	34	13,749	4,256	6,314	10,716
Midwest	13	20,356	6,104	7,009	9,469
Central	25	18,651	5,535	10,171	14,756
West	28	17,941	6,119	12,448	19,495
3. Advanced Meter Percent**					
No advanced meters	4	b	a	b	a
More than 0 but less than 40%	6	10,611	a	4,377	a
40%-80%	8	9,351	a	6,142	a
80% or more	169	24,695	5,751	9,671	17,054

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses
* Total only includes utilities with at least one meter reader
**Mean (weighted) and Utilities includes utilities with zero meter readers

14. Distribution Operation and Maintenance Expenses per Retail Customer

The ratio of total distribution operation and maintenance expenses to the total number of retail customers. This ratio measures the average distribution expense associated with delivering power to each retail customer.

Distribution costs include expenses associated with labor, supervision, engineering, materials, and supplies used in the operation and maintenance of the distribution system. Population density and the mix of customer classes served by the utility will influence the ratio.

Utilities that do not allocate expenses to all three categories of (1) distribution expense; (2) customer accounting, customer service, and sales expense; and (3) administrative and general expense are excluded from ratios 14 through 17.

TABLE 14. DISTRIBUTION O&M EXPENSES PER RETAIL CUSTOMER

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**170**	**$243**	**$178**	**$242**	**$320**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	32	388	178	271	327
10,000 to 20,000 customers	46	315	179	240	301
20,000 to 50,000 customers	45	347	206	242	324
50,000 to 100,000 customers	21	250	156	238	335
More than 100,000 customers	23	219	153	215	266
2. Region					
Northeast	12	204	180	217	287
Southeast	53	240	172	238	329
Midwest	21	291	149	231	277
Central	46	225	180	242	309
West	41	258	218	259	359

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

15. Distribution Operation and Maintenance Expenses per Circuit Mile

The ratio of distribution operation and maintenance expenses to the total circuit miles of distribution line. This measures the total distribution costs associated with each circuit mile of distribution line used to deliver power to customers.

Distribution costs include expenses associated with labor, supervision, engineering, materials, and supplies used in the operation and maintenance of the distribution system. The ratio will be affected by population density, the mix of customer classes served by the utility, the dispersion of customers within the utility's service territory, and the proportion of underground and overhead distribution lines.

Utilities that do not allocate expenses to all three categories of (1) distribution expense; (2) customer accounting, customer service, and sales expense; and (3) administrative and general expense are excluded from ratios 14 through 17.

TABLE 15. DISTRIBUTION O&M EXPENSES PER CIRCUIT MILE

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**170**	**$12,561**	**$5,898**	**$9,043**	**$16,611**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	32	11,052	6,516	8,904	13,159
10,000 to 20,000 customers	46	9,675	5,813	8,325	20,607
20,000 to 50,000 customers	45	9,782	4,873	8,861	14,748
50,000 to 100,000 customers	21	9,997	4,802	9,644	21,462
More than 100,000 customers	23	14,685	7,244	14,746	19,439
2. Region					
Northeast	12	15,693	14,486	20,211	27,996
Southeast	53	10,937	4,033	8,220	14,748
Midwest	21	9,989	5,798	7,814	9,810
Central	43	11,179	7,207	9,644	13,241
West	41	14,096	5,499	9,141	24,235

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

16. Customer Accounting, Customer Service, and Sales Expenses per Retail Customer

The ratio of total customer accounting, service, and sales expenses to the total number of retail customers. This ratio measures the average expenses incurred by the utility in handling each customer's account. This includes the costs of obtaining and servicing all retail customers. Uncollectible accounts and meter reading expenses are included in this ratio.

The ratio includes the costs of labor, materials, and other expenses associated with advertising, billing, collections, records, and handling inquiries and complaints. It also includes the costs of promoting and providing customer service programs such as energy services or conservation programs. The ratio will be influenced by the degree to which the utility provides various energy services and other types of customer programs and by the mix of customer classes it serves.

Utilities that do not allocate expenses to all three categories of (1) distribution expense; (2) customer accounting, customer service, and sales expense; and (3) administrative and general expense are excluded from ratios 14 through 17.

TABLE 16. CUSTOMER ACCOUNTING, CUSTOMER SERVICE, AND SALES EXPENSE PER RETAIL CUSTOMER

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**170**	**$148**	**$50**	**$74**	**$108**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	32	65	40	65	86
10,000 to 20,000 customers	46	76	48	62	89
20,000 to 50,000 customers	45	102	55	76	138
50,000 to 100,000 customers	21	89	54	68	115
More than 100,000 customers	23	171	83	97	172
2. Region					
Northeast	12	181	61	151	187
Southeast	53	83	55	74	96
Midwest	21	68	40	48	101
Central	43	106	45	65	87
West	41	203	66	104	162

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

17. Administrative and General Expenses per Retail Customer

The ratio of total electric utility administrative and general expenses to the total number of retail customers. This ratio measures the average administrative and general expenses incurred by the utility on behalf of each retail customer.

Administrative and general expenses are those electric operation and maintenance expenses not allocable to the costs of power production (generation and power purchases), transmission, distribution, or customer accounting, service, and sales. Items that may be included are compensation of officers and executives, office supplies, professional fees, property insurance and claims, pensions and benefits, and other expenses not provided for elsewhere.

Utilities that do not allocate expenses to all three categories of (1) distribution expense; (2) customer accounting, customer service, and sales expense; and (3) administrative and general expense are excluded from ratios 14 through 17.

The amount and type of the utility's generation might affect the ratio.

TABLE 17. ADMINISTRATIVE AND GENERAL EXPENSES PER RETAIL CUSTOMER

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**170**	**$287**	**$145**	**$231**	**$348**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	32	431	178	230	345
10,000 to 20,000 customers	46	259	131	212	358
20,000 to 50,000 customers	45	233	122	201	280
50,000 to 100,000 customers	21	396	203	290	355
More than 100,000 customers	23	276	176	266	334
2. Region					
Northeast	12	405	249	420	611
Southeast	53	275	136	184	263
Midwest	21	390	169	321	421
Central	43	379	166	238	346
West	41	228	125	213	298
3. Generation					
No generation	99	264	141	201	301
More than 0 but less than 10%	29	265	152	250	321
10%-50%	26	343	198	276	387
50%-100%	16	253	186	272	678

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

18. Labor Expense per Worker-hour

The ratio of total annual earnings of full-time, part-time, and contract labor employees to the total number of hours worked during the year by these employees. This ratio measures the actual cost of labor to the utility.

Total annual earnings include all payroll compensation received by full-time, part-time, or contract employees, including straight time pay, overtime pay, and payment for time not worked, such as sick pay, vacation pay, holiday pay, or other payments. Fringe benefits, such as health care premiums paid by the employer, are excluded.

Hours worked includes total productive hours spent at work, including both straight time and overtime hours worked. Hours paid but not worked, such as on holidays or other paid leave, are not included. This is not the same as a wage rate, which is simply the earnings per hour. A wage rate generally includes hours not worked (such as vacation or sick pay).

Part-time or contract employee data without entries for all three categories of (1) number of employees, (2) earnings, and (3) hours worked were dropped from the total number.

TABLE 18. LABOR EXPENSE PER WORKER-HOUR

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**186**	**$65.77**	**$43.44**	**$51.97**	**$86.64**
1. Customer Count					
2,000 to 5,000 customers	4	b	a	b	a
5,000 to 10,000 customers	38	43.34	41.55	46.37	52.19
10,000 to 20,000 customers	53	52.64	44.53	52.43	62.50
20,000 to 50,000 customers	45	56.29	43.47	56.05	67.19
50,000 to 100,000 customers	24	60.20	40.81	56.30	70.40
More than 100,000 customers	22	69.46	49.41	62.10	78.51
2. Region					
Northeast	12	78.93	64.46	73.30	78.69
Southeast	55	48.00	40.79	44.36	50.18
Midwest	27	56.57	42.91	52.43	57.61
Central	46	59.58	42.22	50.39	56.22
West	48	78.48	58.08	66.88	74.56
3. Generation					
No generation	106	50.61	42.01	48.66	58.39
More than 0 but less than 10%	33	54.97	44.30	54.06	62.50
10%-50%	28	71.26	56.24	66.20	80.45
50%-100%	19	71.12	43.46	57.04	70.44

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

19. Energy Loss Percentage

The ratio of total energy losses to total sources of energy. This ratio measures how much energy is lost in the utility's electrical system and is an indicator of the efficiency of the electrical system. It represents the percentage of electrical energy that is bought or generated by the utility but is not available to be sold to customers (or for the utility's own use).

Losses include both physical losses that occur in the distribution system and metering and billing losses. Generation, purchases, net exchanges, and net wheeling are all included in total sources of energy.

TABLE 19. ENERGY LOSS PERCENTAGE

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**166**	**3.41**	**2.30**	**3.25**	**4.36**
1. Customer Count					
2,000 to 5,000 customers	3	b	a	b	a
5,000 to 10,000 customers	29	3.15	1.96	3.43	4.58
10,000 to 20,000 customers	48	2.87	2.41	3.17	3.78
20,000 to 50,000 customers	42	3.34	2.39	3.55	4.72
50,000 to 100,000 customers	23	3.44	2.42	2.84	4.18
More than 100,000 customers	21	3.47	2.23	3.25	3.65
2. Region					
Northeast	12	5.15	2.89	3.55	3.65
Southeast	53	2.46	2.55	3.53	4.60
Midwest	21	2.76	1.76	2.74	3.48
Central	39	3.60	1.94	3.25	4.34
West	41	3.86	1.91	3.08	3.78
3. Generation					
No generation	91	3.05	2.50	3.48	4.55
More than 0 but less than 10%	31	2.54	1.58	2.76	3.61
10%-50%	28	3.47	2.20	3.26	3.72
50%-100%	16	3.75	1.37	2.82	4.77

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

20. System Load Factor

The ratio of the system average load, total sales plus losses (in megawatt-hours) divided by 8,760 (hours), to system peak demand (typically a summer or winter peak measured during a particular hour at all delivery points and generator busses on a totalized basis).

System load factor is descriptive of the total system load characteristics. It tells system planners how much the overall system load varies diurnally and seasonally. It is a very broad indicator. It also provides financial planners with information about how to spread fixed costs across energy sales. This gives financial planners and rate designers information to support greater unbundling of fixed and variable costs — a goal of competitive rate design.

20. SYSTEM LOAD FACTOR

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**178**	**56.0**	**48.5**	**55.6**	**62.2**
1. Customer Count					
2,000 to 5,000 customers	2	b	a	b	a
5,000 to 10,000 customers	31	48.8	50.3	57.8	65.7
10,000 to 20,000 customers	52	56.7	48.6	54.5	58.6
20,000 to 50,000 customers	45	53.3	46.5	52.1	59.5
50,000 to 100,000 customers	25	60.7	48.5	56.7	69.8
More than 100,000 customers	23	55.5	52.9	57.7	63.5
2. Region					
Northeast	12	44.9	53.9	55.5	57.8
Southeast	55	53.6	46.5	52.0	57.7
Midwest	55	53.6	46.5	52.0	57.7
Central	42	61.0	51.0	58.3	70.3
West	45	57.3	47.6	55.7	65.7

a Quartiles are not calculated for fewer than 9 responses
b Means and medians are not calculated for fewer than 5 responses

21. Capital Expenditures to Depreciation Expense

The amount of capital expenditures in a year divided by depreciation expenses.

TABLE 21. CAPITAL EXPENDITURES TO DEPRECIATION EXPENSES

	Utilities	Mean (weighted)	First Quartile	Median	Third Quartile
Total	**189**	**$1.92**	**$1.00**	**$1.52**	**$2.22**
1. Customer Count					
2,000 to 5,000 Customers	5	2.40	a	1.22	a
5,000 to 10,000 Customers	38	1.53	0.85	1.35	1.78
10,000 to 20,000 Customers	54	1.24	0.64	1.22	2.37
20,000 to 50,000 Customers	45	1.58	1.16	1.45	1.96
50,000 to 100,000 Customers	24	1.78	1.20	1.83	2.32
More than 100,000 Customers	23	2.01	1.59	1.90	2.26
2. Region					
Northeast	13	1.67	0.54	1.03	1.67
Southeast	56	1.82	1.01	1.54	2.21
Midwest	27	2.03	1.03	1.73	2.43
Central	46	2.24	0.89	1.38	2.16
West	48	1.91	1.11	1.74	2.32
3. Generation					
No generation	107	1.76	1.00	1.52	2.19
More than 0 but less than 10%	33	1.51	0.86	1.52	2.40
10%-50%	30	2.00	0.92	1.33	1.86
50%-100%	19	1.97	1.42	1.96	2.36

a Quartiles are not calculated for fewer than 9 responses

APPENDIX A

2024 Performance Indicators Survey

BACKGROUND

Public power utilities with at least 150,000 MWh in total sales and at least 50% retail sales according to your utility's 2024 EIA data, with a few exceptions, are invited to participate in APPA's 2024 Performance Indicators Survey.

Data from this survey will be used to calculate performance indicators published in summary form in the APPA report, Financial and Operating Ratios of Public Power Utilities, 2026. The report results may be used to respond to inquiries from congressional offices and committees, federal administrative and regulatory agencies, state and local officials, and the news media. All individual utility responses will remain confidential.

The deadline is November 15, 2025. Please contact Kevin Tillmann at 202-467-2920 or KTillmann@PublicPower.org with any questions.

CONTACT INFORMATION

1) Utility: _____

2) City: _____

3) State: _____

4) First Name: _____

5) Last Name: _____

6) Email: _____

7) Phone: _____

PART I. EMPLOYMENT, HOURS AND EARNINGS – CALENDAR YEAR ENDING IN 2024

Prorate employees allocated to or from other departments or units. Enter amounts in whole numbers.

8) Total Average Number of Employees (Electric Employees):*
Average annual employment should be computed by summing the number of employees for all 2024 pay periods, then dividing the sum by the total number of such pay periods in the year. For example, if employees are paid semi-monthly, there would be 24 pay periods. The number of employees on the payroll for each of the 24 periods should be summed up, and the total divided by 24.
Prorate the number of employees allocated to, or from, other departments (e.g., gas or water) of a multiple utility, or other government units (e.g. general administration). For example, in a multiple utility (a utility with functions besides electric) that has one accounting department for all municipal utility operations, prorate personnel allocated to electric utility operations. Another example would be a secretary employed by the municipality that handles some electric utility affairs. Only report the hours dedicated to the electric utility.

Full-Time: _____ Part-Time: _____

9) Total Annual Earnings (Electric Employees):*
Provide total direct earnings for 2024. Include all wage and salary payments to supervisory and non-supervisory employees. Total earnings should equal gross earnings received by employees from the utility. Prorate earnings of employees whose time is allocated to, or from, other utility or government operations. Please include paid time off. Annual earnings does not include medical coverage or other benefits.

Full-Time: _____ Part-Time: _____

10) Total Annual Hours Worked (Electric Employees):*
Provide the total number of hours actually worked during 2024 for all full-time and part-time employees and contract labor. Include only time on duty. Do not include time paid but not worked, such as vacations, sick leave, holidays, etc. Obtain hours worked from payroll or other time records wherever possible. If hours worked data are not maintained separately from hours paid, please enter your best estimate on the basis of scheduled hours. For example: if 10 employees worked an average of 40 hours per week for 50 weeks, total hours worked would be 10 x 40 x 50 = 20,000.

Full-Time: _____ Part-Time: _____

11) Total Average Number of Employees (Contract Labor):*
Report information for persons (or full-time equivalent) working under contract to the utility on an on-going basis. This includes work that is ongoing on a limited or as needed basis. This would include jobs such as tree-trimming or facility maintenance, but it would not include consultants or others working on a temporary basis. If an agency is used for contract labor, please include the total amount paid to the agency in the wage figures.
For questions regarding contract labor, distinguish between contract employees for whom the utility is responsible for supervising day-to-day activities, and contract employees primarily supervised by the contracting company.

Contract Employees Supervised by Utility: _____

Contract Employees Supervised by Contracting Company: _____

	Employees Supervised by Utility:	Employees Supervised by Contacting Company:
12) Total Annual Hours Worked (Contract Labor):*		
13) Total Annual Earnings (Contract Labor):*		

14) Number of Power Production Employees:*
NOTE: Power Production Employees are those employees who are directly involved in the generation of electricity (generally, power plant employees). Include all employees involved in the operation and maintenance of power generating facilities. If your utility has no electric generation, then you should have no power production employees.

Full-time:	Part-time:	Contract:

15) Number of Meter Readers:*
If responsible for meters other than electric, prorate employees allocated to electric only. If you deployed smart meters and no longer employ field meter readers, please enter zero.

Full-time:	Part-time:	Contract:

PART II. SELECTED ELECTRIC UTILITY STATISTICS – CALENDAR YEAR ENDING IN 2024

16) Distribution Lines (up to 69 kV)*
Circuit miles include the total length in miles of separate circuits regardless of the number of conductors used per circuit. We are looking for distribution lines as the utility defines it as long as it is not greater than 69 kV.

Total Distribution Line Circuit Miles: _____

17) Total Electric Utility Uncollectible Accounts (FERC 904)* _____

18) Total Electric Utility Debt Service Payments on Long-Term Debt*
Debt Service - The amount necessary to pay principal and interest on outstanding long-term debt. _____

19) Capital Expenditures (report capital expenditures for 2024 only)* _____

PART III. FINANCIAL DATA

Must report full dollar amounts, rounding to nearest dollar.

20) Total Current and Accrued Assets*
Include cash and working funds, temporary cash investments, notes and accounts receivable, receivables from the municipality, materials and supplies inventory, prepayments, and miscellaneous current and accrued assets. _____

21) Total Assets and Other Debits*
Include utility plant, investments, current and accrued assets, deferred debits, and deferred outflows of resources. _____

22) Total Long-Term Debt*
Include bonds, advances from the municipality, other long-term debt, any unamortized premium on long-term debt, and any unamortized discount on long-term debt. _____

23) Total Current and Accrued Liabilities*
Include warrants, notes and accounts payable, payables to the municipality, customer deposits, taxes accrued, interest accrued, and miscellaneous current and accrued liabilities. _____

24) Electric Operating Revenue*
Include only revenue from sales to ultimate customers and sales for resale. _____

25) Depreciation Expense*
This includes amortization expense. _____

26) Net Operating Electric Income*
Electric Operating Revenue - Electric Operating Expenses _____

27) Interest payment on Long-Term Debt paid during fiscal year*
Include the amount of interest on outstanding long-term debt issued or assumed by the utility. _____

28) Net Income*
Net Operating Electric Income + Other Electric Income - Electric Deductions - Taxes _____

29) Purchased Power Expenses*
Includes purchases from investor-owned utilities, municipalities, cooperatives or other public authorities for subsequent distribution and sale to ultimate customers. _____

PART IV. TOTAL ELECTRIC OPERATION AND MAINTENANCE EXPENSES

The answers to the following questions will be used to compute total electric operating and maintenance expenses, which equals the sum of total power supply, transmission, distribution, customer accounts, and administrative and general expenses.

30) Total Power Supply Expenses*
Operating costs for generation must include purchased power expenses as well as all power generation. Therefore, this answer must be greater than or equal to purchased power expenses. _____

31) Transmission Expenses* _____

32) Distribution Expenses*
Include expenses associated with labor, supervision, engineering, materials, and supplies used in the operation and maintenance of the distribution system. _____

33) Customer Accounting, Service, and Sales Expenses
Include expenses related to handling each customer's account. This includes:
- The cost of obtaining and servicing all retail customers
- Uncollectible accounts and meter reading expenses
- The cost of labor, materials, and other expenses associated with advertising, billing, collections, records, and handling inquiries and complaints
- The cost of promoting and providing customer service programs such as energy services or conservation programs. _____

34) Administrative and General Expenses*
Include electric operation and maintenance expenses not allocable to the costs of power production (e.g., generation and power purchases), transmission, distribution, or customer accounting, service and sales. Items which may be included are compensation of officers and executives, office supplies, professional fees, property insurance and claims, pensions and benefits, transfers to the municipality, and other expenses not provided for elsewhere. _____

APPENDIX B

DATA SOURCES AND COMPUTATIONAL PROCEDURES

The financial and operating ratios in this report are calculated using data from APPA's 2024 Performance Indicators Survey in addition to data from the U.S. Department of Energy's Energy Information Administration (EIA). The survey includes data on employees, hours worked, earnings, distribution lines, reliability, lost workdays, and uncollectible accounts. It also includes financial data formerly reported on Form EIA-412, including balance sheet, income statement and operation and maintenance expense information. Data on revenues, kilowatt-hour sales, and customers is obtained from Forms EIA-861 and EIA-861S.

The numbered items below contain data sources and computational procedures for each of the ratios in the report. Definitions are found within the body of the report. All data are for 2024.

1. Revenue per kWh (Dollars)

a. All Retail Customers

$$\frac{\text{Revenue}}{\text{Retail Customers}}$$

$$\frac{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total Revenue}}{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total Megawatt-hours}}$$

b. Residential Customers

$$\frac{\text{Residential Revenue}}{\text{Residential Customers}}$$

$$\frac{\text{EIA Form 861, Schedule 4, Part A, Residential Revenue (column a)}}{\text{EIA Form 861, Schedule 4, Part A, Residential Megawatt-hours (column a)}}$$

c. Commercial Customers

$$\frac{\text{Commercial Revenue}}{\text{Commercial Customers}}$$

$$\frac{\text{EIA Form 861, Schedule 4, Part A, Commercial Revenue (column b)}}{\text{EIA Form 861, Schedule 4, Part A, Commercial Megawatt-hours (column b)}}$$

d. Industrial Customers

$$\frac{\text{Industrial Revenue}}{\text{Industrial Customers}}$$

$$\frac{\text{EIA Form 861, Schedule 4, Part A, Industrial Revenue (column c)}}{\text{EIA Form 861, Schedule 4, Part A, Industrial Megawatt-hours (column c)}}$$

2. Debt to Total Assets

$$\frac{\text{Long Term Debt + Current and Accrued Liabilities}}{\text{Total Assets and other Debits}}$$

$$\frac{\text{(APPA Survey, 22) + (APPA Survey, 23)}}{\text{APPA Survey, 21}}$$

3. Operating Ratio

$$\frac{\text{Total Electric O\&M Expense}}{\text{Electric Operating Revenue}}$$

$$\frac{\text{(APPA Survey, 30) + (APPA Survey, 31) + (APPA Survey, 32) + (APPA Survey, 33) + (APPA Survey, 34)}}{\text{APPA Survey, 24}}$$

4. Current Ratio

$$\frac{\text{Total Current \& Accrued Assets}}{\text{Total Current \& Accrued Liabilities}}$$

$$\frac{\text{APPA Survey, 20}}{\text{APPA Survey, 23}}$$

5a. Times Interest Earned

$$\frac{\text{Net Income + Interest Payment on Long -Term Debt}}{\text{Interest Payment on Long-Term Debt}}$$

$$\frac{\text{(APPA Survey, 28) + (APPA Survey, 27)}}{\text{APPA Survey, 27}}$$

5b. Debt Service Coverage

$$\frac{\text{Net Operating Electric Income + Depreciation Expenses + Interest Payment on Long-Term Debt}}{\text{Total Electric Utility Debt Service Payments on Long-term Debt}}$$

$$\frac{\text{(APPA Survey, 26) + (APPA Survey, 25) + (APPA Survey, 27)}}{\text{APPA Survey, 18}}$$

6. Net Income per Revenue Dollar

$$\frac{\text{Net Income}}{\text{Electric Operating Revenue}}$$

$$\frac{\text{APPA Survey, 28}}{\text{APPA Survey, 24}}$$

7. Uncollectible Accounts per Revenue Dollar

$$\frac{\text{Total Electric Utility Uncollectible Accounts}}{\text{Electric Operating Revenue}}$$

$$\frac{\text{APPA Survey, 17}}{\text{APPA Survey, 24}}$$

8. Retail Customers per Non-power-generation Employee

$$\frac{\text{Total Number of Customers}}{\text{Employees - Power Production Employees}}$$

$$\frac{\text{EIA Form 861 or 861S, Schedule 4, Part A Total Number of Customers (column e)}}{\text{((APPA Survey, 8) + (APPA Survey, 11)) – (APPA Survey, 14)}}$$

Employees = Full Time + Part Time/2 + all contract employees (supervised by utility and supervised by contractor)

9. Total O & M Expense per kWh Sold

$$\frac{\text{Total Electric Operation and Maintenance Expenses}}{\text{Retail Sales + Resale Sales}}$$

$$\frac{\text{(APPA Survey, 30) + (APPA Survey, 31) + (APPA Survey, 32) + (APPA Survey, 33) + (APPA Survey, 34)}}{\text{(EIA Form 861, Schedule 2, Part B, line 11 + line 12, or EIA Form 861S, Schedule 4A, Total Retail Sales) *1000}}$$

10. Total O & M Expense (Excluding Total Production Expense) per Retail Customer

$$\frac{\text{Total Electric Operation and Maintenance Expenses – Total Production Expenses}}{\text{Total Number of Customers}}$$

$$\frac{\text{(APPA Survey, 30) + (APPA Survey, 31) + (APPA Survey, 32) + (APPA Survey, 33) + (APPA Survey, 34) – (APPA Survey, 30)}}{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total Number of Customers (column e)}}$$

11. Total Power Supply Expense per kWh Sold

$$\frac{\text{Total Production Expenses}}{\text{Retail Sales + Resale Sales}}$$

$$\frac{\text{APPA Survey, 30}}{\text{(EIA Form 861, Schedule 2, Part B, line 11 + line 12, or EIA Form 861S, Schedule 4A, Total Retail Sales) *1000}}$$

12. Purchased Power Cost per kWh

$$\frac{\text{Purchased Power Expenses}}{\text{Purchases}}$$

$$\frac{\text{APPA Survey, 29}}{\text{(EIA Form 861, Schedule 2, Part B, line 2) * 1000}}$$

13. Retail Customers per Meter Reader

$$\frac{\text{Total Number of Customers}}{\text{Meter Readers}}$$

$$\frac{\text{EIA Form 861 or 861S, Schedule 4, part A, Total number of customers (column e)}}{\text{APPA Survey, 15}}$$

(Number of Meter Readers = Full Time + Part Time/2 + Contract)

14. Distribution O & M Expenses per Retail Customer

$$\frac{\text{Distribution Expenses}}{\text{Total Number of Customers}}$$

$$\frac{\text{APPA Survey, 32}}{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total Number of Customers (column e)}}$$

15. Distribution O & M Expenses per Circuit Mile

$$\frac{\text{Distribution Expenses}}{\text{Total Distribution Line Circuit Miles}}$$

$$\frac{\text{APPA Survey, 32}}{\text{APPA Survey, 16}}$$

16. Customer Accounting, Customer Service, and Sales Expense per Retail Customer

$$\frac{\text{Customer Accounts Expenses; Customer Service and Information Expenses; and Sales Expenses}}{\text{Total Number of Customers}}$$

$$\frac{\text{APPA Survey, 33}}{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total Number of Customers (column e)}}$$

17. Administrative and General Expenses per Retail Customer

$$\frac{\text{Administrative and General Expenses}}{\text{Total Number of Customers}}$$

$$\frac{\text{APPA Survey, 34}}{\text{EIA Form 861 or 861S, Schedule 4, Part A, Total number of customers (column e)}}$$

18. Labor Expense per Worker-hour

$$\frac{\text{Total Labor Expense}}{\text{Total Hours Worked}}$$

$$\frac{\text{(APPA Survey, 9) + (APPA Survey, 13)}}{\text{(APPA Survey, 10) + (APPA Survey, 12)}}$$

Labor Expense = Full-Time Earnings + Part-time Earnings + Contractor Earnings
Hours Worked = Full-Time Hours + Part-Time Hours + Contractor Hours (supervised by utility and supervised by contractor)

19. Energy Loss Percentage

$$\frac{\text{Total Energy Losses}}{\text{Total Sources of Energy}}$$

$$\frac{\text{EIA Form 861, Schedule 2, Part B, line 15}}{\text{EIA Form 861, Schedule 2, Part B, line 10}}$$

To express as a percent, multiply the result by 100.

20. System Load Factor

$$\frac{\text{((Retail Sales + Resale Sales + Total Energy Losses) / 8760 hrs/yr)}}{\text{Highest Hourly Peak Demand}}$$

$$\frac{\text{EIA Form 861, Schedule 2 Part B (line 11 + line 12 + line 15) / 8760}}{\text{(EIA Form 861, Schedule 2, Part A, line 6)}}$$

To express as a percent, multiply the result by 100.

21. Capital Expenditures to Depreciation Expanse

$$\frac{\text{Capital Expenditures}}{\text{Depreciation Expenses}}$$

$$\frac{\text{APPA Survey, 19}}{\text{APPA Survey, 25}}$$

APPENDIX C

REGIONAL DEFINITIONS

The regions specified in this report comprise the following states. Hawaii and Washington, D.C. are not included in any of the nine regions but are included in national totals and in summaries by revenue class.

Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont
Southeast	Alabama, Delaware, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, U.S. Virgin Islands, Virginia, and West Virginia
Midwest	Illinois, Indiana, Michigan, Ohio, and Wisconsin
Central	Arkansas, Louisiana, Oklahoma, Texas, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota
West	Alaska, American Samoa, Arizona, California, Colorado, Guam, Idaho, Montana, New Mexico, Nevada, Northern Mariana Islands, Oregon, Utah, Washington, and Wyoming

APPENDIX D

UTILITY PARTICIPANTS IN THE 2024 PERFORMANCE INDICATORS SURVEY

ALABAMA
Decatur Utilities
Huntsville Utilities
Riviera Utilities
Scottsboro Electric Power Board
Troy, City of

ARKANSAS
Benton Utilities
Clarksville Light & Water Co.
Conway Corporation
Paragould City Light, Water & Cable

ARIZONA
Pinal County, Electrical District No. 4 of
Salt River Project

CALIFORNIA
Alameda Municipal Power
Anaheim Public Utilities
Burbank Water and Power
Los Angeles Department of Water & Power
Merced Irrigation District
Modesto Irrigation District
Moreno Valley, City of
Pasadena Water and Power Department
Redding, City of
Roseville Electric
Sacramento Municipal Utility District
San Francisco (Hetch Hetchy Water & Power), City of
Silicon Valley Power
Vernon, City of

COLORADO
Colorado Springs Utilities
Fountain Utilities
Loveland Water & Power

CONNECTICUT
Groton Utilities
Norwich Public Utilities

FLORIDA
JEA
Keys Energy Services
Kissimmee Utility Authority
Lakeland Electric
Orlando Utilities Commission
Tallahassee Electric Utility, City of

GEORGIA
Albany Water, Gas & Light Commission
Crisp County Power Commission
Marietta Board of Lights & Water

GUAM
Guam Power Authority

IDAHO
Idaho Falls Power

IOWA
Cedar Falls Utilities

ILLINOIS
Geneva Electric Department
Naperville Department of Public Utilities
Rochelle Municipal Utilities
Springfield City Water, Light & Power

INDIANA
Crawfordsville Electric Light and Power
Jasper, City of
Lebanon, City of
Logansport Municipal Utilities
Richmond Power and Light
Tell City Electric Department

KANSAS
Garden City, City of
Kansas City Board of Public Utilities
McPherson Board of Public Utilities
Winfield, City of

KENTUCKY
Glasgow, City of
Henderson City Utility Commission
Owensboro Municipal Utilities
Paducah Power System

LOUISIANA
Lafayette Utilities System

MARYLAND
Easton Utilities Commission
Hagerstown Light Department

MASSACHUSSETTS
Braintree Electric Light Department
Danvers, Town of
Middleborough Gas and Electric Department
Shrewsbury Electric and Cable Operations
Westfield Gas & Electric Light Department

MICHIGAN
Coldwater Board of Public Utilities
Grand Haven Board of Light & Power
Lansing Board of Water & Light
Marquette Board of Light & Power
Traverse City Light & Power
Zeeland Board of Public Works

MINNESOTA
Alexandria Board of Public Works
Anoka, City of
Austin Utilities
Brainerd Public Utilities
Detroit Lakes Public Utilities
Elk River Municipal Utilities
Grand Rapids Public Utilities Commission
Marshall Municipal Utilities
Moorhead Public Service
New Ulm Public Utilities
Owatonna Public Utilities
Rochester Public Utilities
Willmar Municipal Utilities

MISSOURI
Carthage Water and Electric Plant
Hannibal, City of
Poplar Bluff Municipal Utilities & City Cable
Rolla Municipal Utilities
Springfield, City Utilities of

NEBRASKA
Cedar-Knox Public Power
Grand Island, City of
Hastings, City of
Lincoln Electric System
Loup Power District
Nebraska Public Power District
Omaha Public Power District

NEW MEXICO
Farmington, City of
Los Alamos County Utilities

NEW YORK
Freeport Electric
Long Island Power Authority
Massena Electric Department
Plattsburgh Municipal Lighting Department
Rockville Centre, Village of

NORTHERN MARIANA ISLANDS
Commonwealth Utilities Corp.

NORTH CAROLINA
Fayetteville Public Works Commission
Greenville Utilities Commission
Kinston, City of
Morganton, City of
New Bern, City of
New River Light & Power Co.
Shelby, City of
Statesville, City of
Tarboro, Town of
Wilson Energy

OHIO
Bryan Municipal Utilities
Hudson Public Power
Orrville, City of
Westerville Electric Division

OKLAHOMA
Tahlequah Public Works Authority

OREGON
Canby Utility Board
Central Lincoln People's Utility District
Columbia River People's Utility District
Eugene Water & Electric Board
McMinnville Water & Light
Northern Wasco County People's Utility District

SOUTH CAROLINA
Orangeburg, City of
Santee Cooper (South Carolina Public Service Authority)

SOUTH DAKOTA
Brookings, City of
Watertown Municipal Utilities

TENNESSEE
Athens Utilities Board
Benton County Electric System
Bolivar Energy Authority
Bristol Tennessee Essential Services
CDE Lightband
Clinton Utilities Board
EPB - Chattanooga Electric Power Board
Jackson Energy Authority
LaFollette Utilities
Lawrenceburg Utility Systems
Lewisburg Electric System
McMinnville Electric System
Memphis Light, Gas and Water Division
Milan Department of Public Utilities
Nashville Electric Service
Newport Utilities
Pulaski Electric System
Sevier County Electric System
Tullahoma Utilities Authority
Union City Electric System
Weakley County Municipal Electric System

TEXAS
Austin Energy
Brownsville Public Utilities Board
College Station, City of
Denton Municipal Electric
Georgetown Utility Systems
Kerrville Public Utility Board
Lubbock Power & Light
New Braunfels Utilities

U.S. VIRGIN ISLANDS
Virgin Islands Water & Power Authority

UTAH
Lehi City
Provo City Power
Springville, City of
St. George, City of

VIRGINIA
BVU Authority
Danville Department of Utilities

VERMONT
Burlington Electric Department

WASHINGTON
Benton PUD
Centralia City Light
Clallam County, Public Utility District No. 1 of
Clark Public Utilities
Cowlitz County, Public Utility District No. 1 of
Franklin PUD
Grays Harbor County, Public Utility District No. 1 of
Lewis County, Public Utility District No. 1 of
Mason County Public Utility District No. 3
Okanogan County, Public Utility District No. 1 of
Richland - Richland Energy Services, City of
Seattle City Light
Tacoma Public Utilities
Vera Water & Power

WISCONSIN
Kaukauna Utilities
Manitowoc Public Utilities
Marshfield Utilities
Menasha Utilities
Shawano Municipal Utilities
Sun Prairie Utilities
Wisconsin Rapids Water Works & Lighting Commission

AMERICAN PUBLIC POWER ASSOCIATION

2451 Crystal Drive
Suite 1000
Arlington, VA 22202-4804

www.PublicPower.org

Report on Financial and Operating Ratios (2021-2024)

Utility: Los Alamos County Utilities

State: NM

	FY 2024	FY 2023	FY 2022	FY 2021
1. Revenue per KWH				
a. All Retail Customers	0.097	0.081		
b. Residential Customers	0.141	0.123		
c. Commercial Customers	0.135	0.117		
d. Industrial Customers	0.084	0.069		
2. Debt to Total Assets	0.382	0.724		
3. Operating Ratio	1.243	1.217		
4. Current Ratio	1.40	0.23		
5a. Times Interest Earned	142.89	-46.41		
5b. Debt Service Coverage	0.29	3.03		
6. Net Income per Revenue Dollar	NA	-0.412		
7. Uncollectible Accounts per Revenue Dollar	0.0000	0.0000		
8. Retail Customers per Non-Power-Generation-Employee	NA	NA		
9. Total OM Expense per KWH Sold	0.127	0.135		
10. Total OM Expense (Excl. Power Supply Exp.) per Retail Customer	2075	1871		
11. Total Power Supply Expense per KWH Sold	0.091	0.101		
12. Purchased Power Cost per KWH	0.418	0.068		
13. Retail Customers per Meter Reader	4,291	4,638		
14. Distribution OM Expense per Retail Customer	NA	810		
15. Distribution OM Expense per Circuit Mile	NA	50,076		
16. Customer Accounting, Service and Sales Expense per Retail Customer	NA	34		
17. Administrative and General Expense per Retail Customer	NA	313		
18. Labor Expense per Worker-Hour	54.61	46.45		
19. Energy Loss Percentage	NA	5.16		
20. System Load Factor	63.1	68.5		
21. Capital Expenditures to Depreciation Expense	1.06	1.25		

Sources: Energy Information Administration, Form EIA-861 and Form EIA-861S, and APPA's Performance Indicators Survey.

American Public Power Association's 2024 Performance Indicators Survey

Report on Financial and Operating Ratios					
Utility: Los Alamos County Utilities State: NM	FY 2024	FY2023	Median APPA	Median Customer Count*	Median West Region**
1. Revenue per kWh	$0.097	$0.081	$0.110	$0.105	$0.111
a. All Retail Customers	$0.141	$0.123	$0.126	$0.121	$0.133
b. Residential Customers	$0.135	$0.117	$0.116	$0.116	$0.110
c. Commercial Customers	$0.084	$0.069	$0.080	$0.081	$0.077
d. Industrial Customers	0.382	0.724	0.284	0.219	0.346
2. Debt to Total Assets	1.243	1.217	0.853	0.884	0.776
3. Operating Ratio	1.40	0.23	2.93	3.68	3.65
4. Current Ratio	142.89	-46.41	6.46	15.82	7.59
5. a. Times Interest Earned b. Debt Service Coverage	0.29	3.03	3.85	6.38	3.72
6. Net Income per Revenue Dollar	NA	-$0.412	$0.084	$0.050	$0.141
7. Uncollectible Accounts per Revenue Dollar	$0.0000	$0.0000	$0.0008	$0.0003	$0.0008
8. Retail Customers per Non-Power Generation Employee	NA	NA	323	305	334
9. Total O&M Expense per kWh Sold	$0.127	$0.135	$0.090	$0.081	$0.083
10. Total O&M Expense (Excluding Power Supply Exp.) per Retail Customer	$2,075	$1,871	$675	$669	$784
11. Total Power Supply Expense per kWh Sold	$0.091	$0.101	$0.066	$0.067	$0.060
12. Purchased Power Cost per kWh	$0.418	$0.068	$0.065	$0.066	$0.053
13. Retail Customers per Meter Reader	4,291	4,638	8,611	6,756	12,448
14. Distribution O&M Expense per Retail Customer	NA	$810	$242	$271	$259
15. Distribution O&M Expense per Circuit Mile	NA	$50,076	$9,043	$8,904	$9,141
16. Customer Accounting, Service, and Sales Expense per Retail Customer	NA	$34	$74	$65	$104
17. Administrative and General Expense per Retail Customer	NA	$313	$231	$230	$213
18. Labor Expense per Worker-Hour	$54.61	$46.45	$51.97	$46.37	$66.88
19. Energy Loss Percentage	NA	5.16%	3.25%	3.43%	3.08%
20. System Load Factor	63.1%	68.5%	55.6%	57.8%	55.7%
21. Capital Expenditures to Depreciation Expense	1.06	1.25	1.52	1.35	1.74

**Customer Count - 5,000 to 10,000 customers*

***West Region - Alaska, American Samoa, Arizona, California, Colorado, Guam, Idaho, Montana, New Mexico, Nevada, Northern Mariana Islands, Oregon, Utah, Washington, and Wyoming*

Agenda No.:	7.e.
Index (Council Goals):	
Presenters:	Board of Public Utilities
Legislative File:	**21050-26a**

Title
Announcement of Board of Public Utilities Vacancy

Body
Member Matt Heavner's partial term will end on June 30, 2026. As this is a partial term, he is eligible to apply for a full first term. The current makeup of the Board is two Independents, two Republicans and one Democrat. A Los Alamos County board cannot have a super majority of any one party, and given that the Board does not have a simple majority of any one party, then applicants can be registered with any party.

The proposed ad and brochure are attached for BPU review.

Attachments
A - BPU Vacancy Ad
B - BPU Vacancy Brochure

We are searching for our next Board of Public Utilities member!

Could it be you?

There is currently one vacancy for the term July 1, 2026, through June 30, 2031.

APPLICATIONS WILL BE ACCEPTED THROUGH 11:59 PM ON APRIL 27, 2026

Duties, details, application requirements & vacancy brochure can be found online at **ladpu.com/BPU**.

If you meet the requirements, desire to serve the community, have knowledge and experience that could benefit the BPU, and are registered to vote, then you are encouraged to apply!

REPRESENT YOUR COMMUNITY

BE PART OF SOMETHING THAT MATTERS TO EVERYONE!

APPLY

FOR THE
LOS ALAMOS COUNTY
BOARD OF PUBLIC UTILITIES

ACCEPTING APPLICATIONS NOW!

DEADLINE TO APPLY
Monday, April 27, 2026 at 11:59 pm

LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water, and Wastewater Services

APPLICATIONS

COMPLETE THE ONLINE APPLICATION AT
ladpu.com/BPUApplication

All applications for Los Alamos County Boards & Commissions must be submitted online. Paper copies are not available.

HOW DO I GET MORE INFORMATION?

If you have any questions , please contact:

Robert Gibson, BPU Chair
505.662.8136, robert.gibson@losalamosnm.gov

Philo Shelton, Utilities Manager
505.662.8148, philo.shelton@losalamosnm.gov

Kathy Casados, Executive Assistant
505.662.8136, kathy.casados@losalamosnm.gov

BPU WEBSITE
ladpu.com/BPU

DPU WEBSITE
ladpu.com/DPU

BOARDS, COMMISSIONS & COMMITTEES
ladpu.com/boardsandcommissions

WATCH PAST BPU MEETING VIDEOS
ladpu.com/BPUMeetings

In the Search field drop-down, select "Board of Public Utilities"

APPLICATION PROCESS

There is currently one vacancy for a five-year term beginning July 1, 2026 and ending June 30, 2031.

Applicants will be contacted to interview with a Council appointed working group comprised of the Council Liaison to the BPU, a Councilor appointed by the Council Chair, the BPU Chair, and the County Manager.
The Utilities Manager will also participate as a non-voting member of the working group.

TIMELINE

These dates may be subject to change:

- April 27: All applications due by 11:59 p.m. *(no exceptions)*
- April 28: DPU begins contacting all applicants to schedule interviews.
- April 29 - May 8: Council Working Group will interview all applicants. (*Please note that all interviews will be recorded via Zoom and may be viewed by County Councilors.)*
- May 19: County Council will select and appoint an applicant during a regular meeting.
- June 3 & 17: The selected applicant is encouraged to attend these BPU meetings as a citizen.
- July 1: New BPU member term begins.
- July 15: First BPU Regular Session of FY27.

What is the BPU?

The Board of Public Utilities (BPU) is the governing body of the Department of Public Utilities (DPU). Under the jurisdiction and control of the BPU, the DPU provides the county with electric, water, gas and wastewater services.

The BPU consists of five County Council-appointed voting members, and the Utilities Manager and County Manager as ex-officio members.

Through policy direction, the BPU guides the DPU senior management team to create a "high-performing community-centric utility contributing to its future with innovative and diversifed utility solutions."

Members of the BPU work together with the DPU to serve and represent the interests of the whole community, regardless of a member's own personal preferences and beliefs.

Who can apply?

To be eligible for appointment, an applicant must

- be 18 years or older;
- be a resident of the county for a minimum of one year prior to the date of appointment;
- be registered to vote in the county;
- not hold any public office or be an employee of the County government;
- not conduct any business with the DPU except as a consumer.

An LAC board cannot have a super majority of any one party. The current makeup of the BPU is two Independents, two Republicans. and one Democrat. Applicants can be registered as any party.

How long are the terms?

BPU members typically serve five-year terms, which begin on July 1st and end on June 30th. Member term expirations are staggered to provide continuity. Each member may reapply to serve an additional five-year term. A partial term does not count as a first term.

Department of Public Utilities
MISSION • VISION • VALUES

MISSION

To provide safe, reliable, economical, and environmentally responsible utility services.

VISION

Continually earn community trust through exceptional utility services.

VALUES

We value Community, Employees, Partners, and the Environment through:

Safety
Trust
Professionalism
Customer Service
Fiscal Responsibility
Ethical Behavior
Communication
Collaboration
Innovation
Fairness

SHOULD I APPLY?

YES!

If you meet the eligibility requirements, have a selfless desire to serve the community and think your knowledge and experience might be an asset to the BPU, then you are encouraged to apply.

STRENGTH THROUGH DIVERSITY

Having in-depth knowledge of the utilities industry is not required. Having a diverse group of members is extremely important and only strengthens the BPU's ability to serve the interests of *all* customers through sound leadership actions and policies.

What are member duties?

Each decision and action of the BPU affects how the DPU operates, which ultimately affects the citizens of Los Alamos County. For the BPU to function effectively, each member must:

- faithfully attend BPU meetings and work sessions;
- review materials and come to meetings prepared;
- prepare reports when necessary;
- participate in discussions;
- adhere to policies and procedures;
- represent the interests of customers, not personal agendas;
- rotate attendance at quarterly Boards and Commissions luncheons & Farmers Market;
- accept and fulfill assignments negotiated by the BPU chair.

Additional duties of the BPU, according to the County Code of Ordinances (Section 40-42), can be found online at: ladpu.com/BPUDuties

When does the BPU meet?

Meeting sessions of the BPU are open to the public, held in a hybrid manner, and recorded and posted online for future viewing. BPU members and staff typically meet in Council Chambers and the public may choose to attend in person or participate remotely via Zoom.

- Work sessions are held at 5:30 p.m. on the first Wednesday of each month and typically last three hours.
- Regular sessions are held at 5:30 p.m. on the third Wednesday of each month and typically last two hours.
- Special sessions are scheduled as necessary.

APPLY BY
April 27, 2026