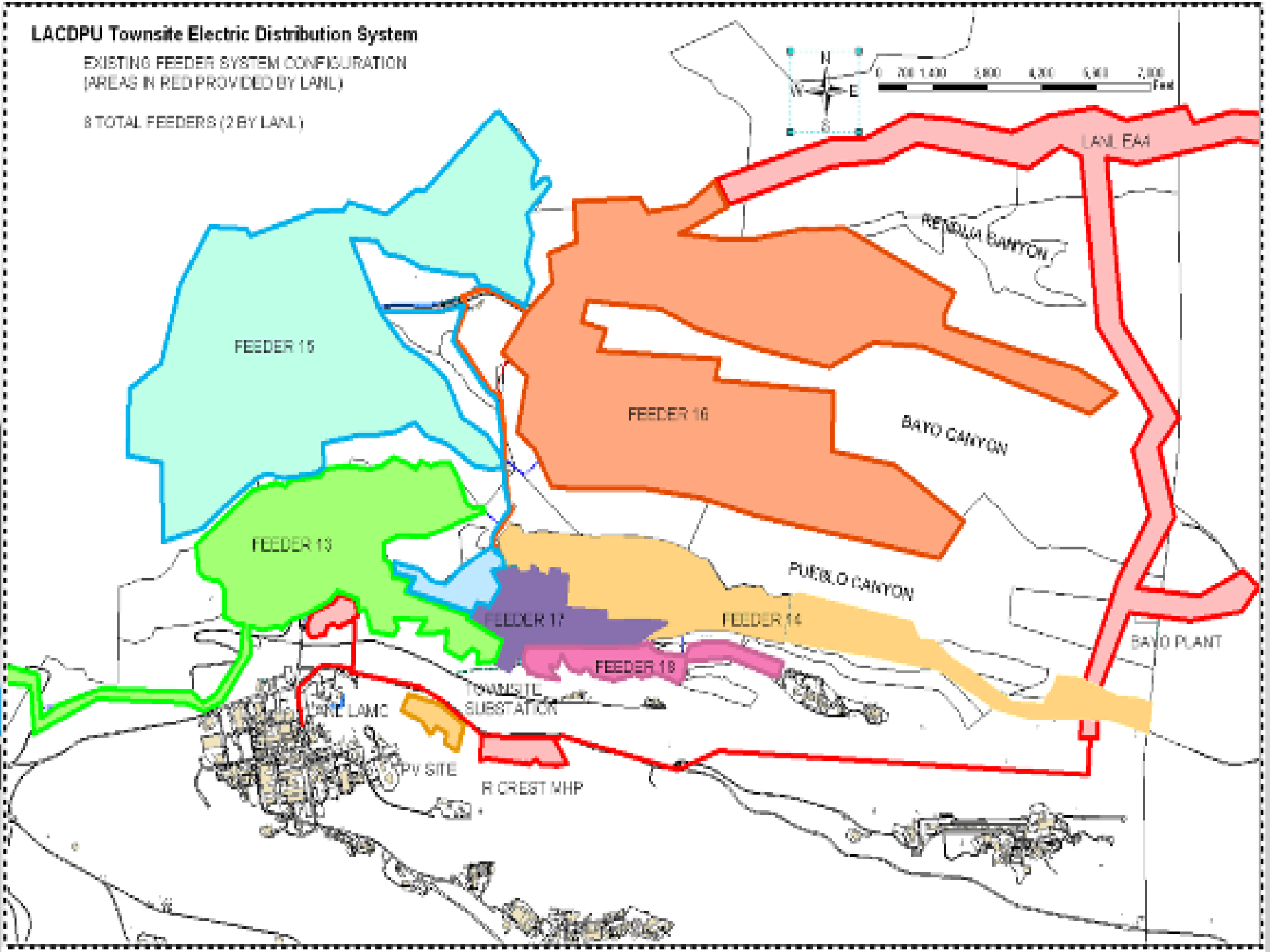
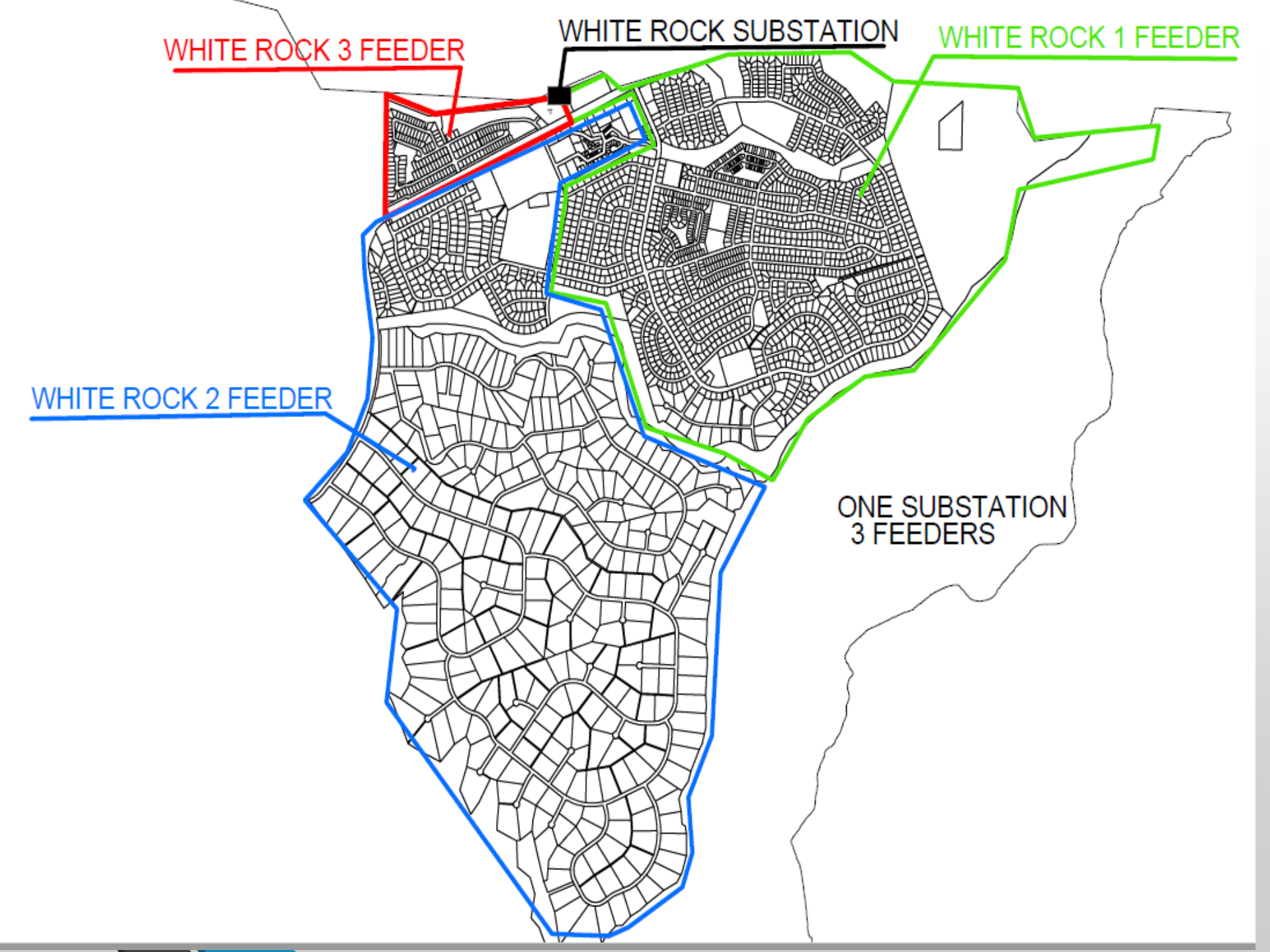
Department of Public Utilities

Electric Distribution

Stephen Marez, P.E.

Acting Deputy Utility Manager


LACDPU Townsite Electric Distribution System
EXISTING FEEDER SYSTEM CONFIGURATION
(AREAS IN RED PROVIDED BY LANL)
8 TOTAL FEEDERS (2 BY LANL)
N
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
PV SITE
R CREST MHP


WHITE ROCK 3 FEEDER
WHITE ROCK SUBSTATION
WHITE ROCK 1 FEEDER
WHITE ROCK 2 FEEDER
ONE SUBSTATION
3 FEEDERS

FY22 ACHIEVEMENTS

- SWITCH REPLACEMENTS
- WHITE ROCK SEWER PLANT TRANSFORMER
- AMI METER INSTALLATIONS (ONGOING)
- FAIRWAY LIFT STATION POWER
- EL GANCHO LIFT STATION POWER
- RIM TRAIL TUNNEL
- AQUATIC CENTER TRANSFORMER UPGRADE
- WHITE ROCK NON-POTABLE WATER POND / PUMPS

FY22 ACHIEVEMENTS

- DP ROAD PHASE ONE ELECTRIC LINE EXTENSION
- EL MIRADOR SUBDIVISION ONGOING PHASE 2
- EXTENSIVE TREE TRIMMING EFFORTS
- POWER POLE REPLACEMENTS
- PHOTO VOLTAIC SYSTEM INSTALLATIONS
- THE BLUFFS APARTMENT COMPLEX TRANSFORMER
- CANYON WALK APARTMENTS
- STARBUCKS
- TOWNSITE AND WHITE ROCK STATION AIR CONDITIONER INSTALLATIONS

BUDGET VARIANCES FY22

BUDGET SPENDING IN FY21 AS OF JULY11, 2022

OPERATING EXPENSES	FY 2022 BUDGET	FY 2022 ACTUAL	% OF BUDGET
SUPERVISION, MISC. DIRECT ADMIN	761,574.61	661,980.21	87%
SUBSTATION MAINTENANCE	67,873.85	53,455.59	79%
SWITCHING STATION MAINTENANCE	102,552.81	64,169.08	63%
OVERHEAD MAINTENANCE	566,637.85	567,051.08	100%
UNDERGROUND MAINTENANCE	490,601.43	667,543.61	136%
METER MAINTENANCE	193,729.21	98,912.72	91%

Current Budget

The current annual capital budget for electric distribution is $300k for overhead and $400k for underground system replacements. This annual level of spending will minimally fund the in-house replacement of transformers, switches, poles and conductors. All replacements are prioritized through the asset management program.

Three phase transformers are now over $80,000 each

Single phase transformers are now over $15,000 each

Switches are now over $20,000 each

FY23
CAPITAL PROJECTS BUDGET

DESCRIPTION	BUDGET COST
OVERHEAD SYSTEM REPLACEMENTS	
Poles, cross-arms, open secondary, etc.	
White Rock	$150,000
Los Alamos	$150,000
Subtotal OH	**$300,000**
URD REPLACEMENTS	
White Rock	$200,000
Los Alamos	$200,000
Subtotal UG	**$400,000**

ACTIVE PROJECTS

- EL MIRADOR SUBDIVISION PHASE 2 AND PHASE 3
- CHERYL AND CONNIE PRIMARY REPLACEMENT
- AMI COMMERCIAL METER TESTING AND INSTALLATIONS
- LASS SUBSTATION ACTIVATION
- LASS FEEDERS (CANYON CROSSING & DIAMOND)
- EA4 CIRCUIT REPLACEMENT DESIGN
- LOS PUEBLOS & TOTAVI REPLACEMENT DESIGN

ACTIVE PROJECTS

- THE BLUFFS APARTMENTS METERING
- DP ROAD PHASE TWO UTILITY REPLACEMENT PROJECT (SPRING 23)
- RESIDENTIAL PV SYSTEM INSTALLATIONS
- WHITE ROCK SEWER PLANT
- SKI HILL WATER LINE PROJECT
- THE HILLS SUBDIVISION
- EL VADO HYDRO PLANT TRANSFOMER
- ARKANSAS APARTMENTS

O&M PROJECTS

- COMPLETE PRIORITY ONE ITEMS FROM CONDITION ASSESSMENTS.
- THREE PHASE RECLOSER INSTALLATIONS
- POLE REPLACEMENTS ONGOING
- SWITCH REPLACMENTS ONGOING
- TRANSFORMER REPLACEMENTS (DELAYED)
- OUTAGE REPAIRS
- WHITE ROCK SUBSTATION UNIT 1 LOAD TAP CHANGER
- STATION METER DISPLAY REPLACEMENTS

ONGOING ACTION ITEMS

- TRAINING FOR LINEMEN AND ENGINEERING STAFF
- COMPLETE PREPERATION FOR LASS COMMISSIONING
- INSTALL THREE PHASE RECLOSERS WHERE NEEDED
- COMPLETE PROCEDURE DOCUMENTATION
- CONTINUE MILSOFT SYSTEM MODEL
- WORK WITH PROCURMENT ON LONG LEAD ITEMS
- AMI COMMERCIAL METERS- TESTING & INSTALLATION
- COMMISSION THE L.A. SWITCH STATION
- INSTALL CONDUCTORS FROM EAST JEMEZ ROAD TO DIAMOND DRIVE.

O&M GOALS

- CONTINUE WITH NO LOSS TIME ACCIDENTS
- COMPLETE THE CAPITAL PROJECTS THAT ARE SCHEDULED
- CONTINUE WITH THE ASSET MANAGEMENT PROGRAM
- CONTINUE WITH UG LIVE-FRONT TRANSFORMER REPLACEMENT PROGRAM
- CONTINUE INSPECTIONS AND MAINTENACE PROGRAM
- DEFINE AND DOCUMENT PROCEDURES

O&M GOALS

- MAINTAIN A SAIDI < 1 HOUR
- MAINTAIN ACCURATE SYSTEM MAPS AND DRAWINGS
- STAY WITHIN BUDGET
- CONTINUE WITH THE UNDERGROUND POWER LINE SEGMENT REPLACEMENTS
- CONTINUE WITH OH POLE AND CROSS-ARM REPLACEMENT PROGRAM

O&M PER ALL ACCOUNTS

	O&M Per All Accounts	APPA Mean Benchmark	Total O&M	Average # of Accounts
FY16	523.61	574.00	4,605,675.00	8796
FY17	491.68	604.00	4,514,158.00	9181
FY18	698.43	655.00	6,700,061.00	9593
FY19	417.10	635.00	3,573,391.00	8561
FY20	272.14		2,384,518.00	8762
FY21	308.18		2,709,888.03	8793

CHALLENGES

- ELECTRICAL ENGINEERING STAFF PROVIDES DESIGN AND PROJECT MANAGEMENT OF ELECTRIC FACILITY INSTALLATIONS ON ALL COUNTY AND CUSTOMER DEVELOPMENTS
- INVENTORY SUPPLY CHAIN DELAYS OVER FIFTY WEEKS FOR MOST MATERIALS, CABLE , TRANSFORMERS, TERMINATONS, METERING EQUIPMENT.

CHALLENGES

Delays in Electric Distribution system projects are due to the increased number of County and private projects.

The construction of homes and apartments did not slow down during COVID. Electric Distribution staff worked on site during the entire COVID pandemic and continue to constantly provide dependable service to our customers.

CHALLENGES

- TIME SCHEDULE CONFLICTS BETWEEN OPERATIONS, CAPITAL PROJECTS AND COUNTY PROJECTS
- METER MAINTENANCE IN THE NEW SYSTEM
- TYLER-MUNIS SYSTEM ASSET DATA ENTRY AND FINANCIAL DATA ACQUISITION.

CHALLENGES

No projects whether public or private are delayed due to Electric Distribution Department performance or material supplies.

This may change if the supply chain does not recover soon. The utility must maintain adequate reserves of materials for emergency outage response.

It is difficult to operate with 50+ week delays in product delivery.

The inflation of material prices is also making it difficult to accurately provide job cost estimates.

The utility supplies transformers, switches, conductor and vaults for all projects. The costs are passed along to the projects.

CABLE PULLING EQUIPMENT

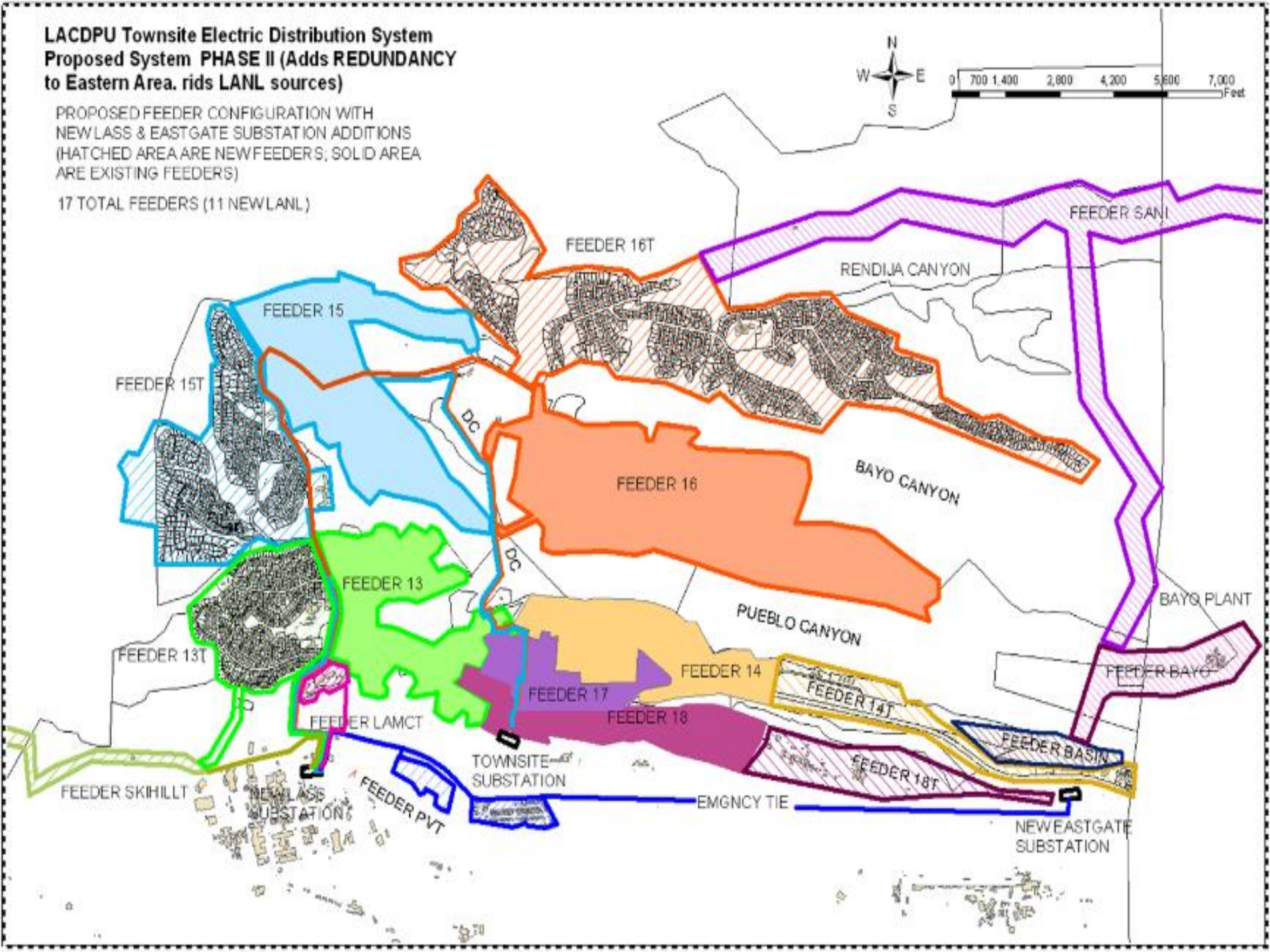
THE CABLE PULLING MACHINE IS USED TO INSTALL UNDERGROUND CONDUCTORS AND THIS MACHINE IS FAILING.

MANAGEMENT AND FLEET ARE WORKING TOGETHER TO REPLACE THE MACHINE ONE YEAR IN ADVANCE OF THE SCHEDULED REPLACEMENT DATE. THE OVERALL COST FOR THE PULLER MACHINE WILL BE NEAR $175,000 .

THIS PIECE OF EQUIPMENT IS ESSENTIAL TO UNDERGROUND ELECTRIC OPERATIONS AND CAPITAL PROJECTS.

System Management

- **Perform System Analysis**
- **Utilize Milsoft/GIS interface for system model and mapping;**
- **Maintain protective device coordination**
- **Circuit configuration to provide redundancy**
- **New Los Alamos Switch Station for added redundancy**
- **Ensure GIS maps and Feeder 1-lines are up-to-date;**
- **Provide accurate switching procedures**


LACDPU Townsite Electric Distribution System
Proposed System PHASE II (Adds REDUNDANCY to Eastern Area. rids LANL sources)
PROPOSED FEEDER CONFIGURATION WITH NEW LASS & EASTGATE SUBSTATION ADDITIONS (HATCHED AREA ARE NEW FEEDERS; SOLID AREA ARE EXISTING FEEDERS)
17 TOTAL FEEDERS (11 NEW LANL)
N
W
E
S
0 700 1,400 2,800 4,200 5,600 7,000 Feet
FEEDER 16T
FEEDER SANI
RENDIJA CANYON
FEEDER 15
FEEDER 15T
DC
DC
FEEDER 16
BAYO CANYON
FEEDER 13
BAYO PLANT
PUEBLO CANYON
FEEDER 13T
FEEDER 14
FEEDER 14T
FEEDER BAYO
FEEDER 17
FEEDER 18
FEEDER LAMCT
FEEDER BASIN
FEEDER 18T
TOWNSITE SUBSTATION
FEEDER SKIHILLT
NEW LASS SUBSTATION
FEEDER PVT
EMGNCY TIE
NEW EASTGATE SUBSTATION

Estimated Cost of Replacements

PROJECT SUBDIVISION OR AREA	TRENCH LENGTH FEET	DIGGING CONDITIONS	YEAR INSTALLED	ESTIMATED COST OF REPLACEMENT	PROJECT DURATION	PRIORITY
LA SENDA PIEDRA LOOP	25000	BASALT	1970	$2,500,000	2 YEAR PROJECT	1
LOS PUEBLOS NAVAJO	9500	HARD TUFFA	1978	$1,400,000	1 YEAR PROJECT	2
LA VIST, SIERRA VISTA, PINION	8000	BASALT / FILL	1970-76	$1,200,00	2 YEAR PROJECT	3
TIMBER RIDGE, LOMA VISTA, RIDGEPARK, OPENNHEIMER	4000	TUFFA / FILL	1975-80	$600,000	1 YEAR PROJECT	4
RIDGECREST, HASTA LA VISTA	25000	BASALT / FILL	1970	$2,500,000	2 YEAR PROJECT	5
EASTERN AREA WEST OF CANYON ROAD	4000	TUFFA / FILL	1978	$400,000	1 YEAR PROJECT	6
ARAGON TO MEADOW LANE	46661	BASALT / FILL	1970-80	$5,500,000	3 YEAR PROJECT	7
WESTERN AREA	9000	TUFFA / FILL	1980	$700,000	2 YEAR PROJECT	8

TRENCH AND CONDUIT INSTALLATIONS BY ON CALL CONTRACTORS . COSTS INCLUDE PAVEMENT AND SIDEWALK REPAIRS.

Switches

- 168 Pad mount Switches
- Service Life Estimated @ 20 Years
- 6 remaining switches installed in the 1970's and 1980's
- They are prioritized for replacement
- Almost all switch replacements occur at night due to long outage requirements on major feeder sections. Switches are evaluated and replaced as listed in the priority list.


WARNING
KEEP OUT
3
2
1
OPEN
CLOSED
DANGER

SWITCHES BY AGE AND CIRCUIT

	QUANTITY	PRIOR TO 2006	2006-2021
CIRCUIT 13	25	10	15
CIRCUIT 14	30	9	21
CIRCUIT 15	37	17	20
CIRCUIT 16	19	7	12
CIRCUIT 17	11	2	9
CIRCUIT 18	14	1	13
WHITE ROCK 1	11	9	2
WHITE ROCK 2	7		7
WHITE ROCK 3	5		5
EA4	3	1	2
BANDELIER	8		8
TOTAL	171	56	115

Transformers

- 217 Three Phase Transformers

  11% Over 30 Years Old

  Replacement Cost Approximately

  $80,000 each

- 1294 Single Phase Transformers

  20% Over 30 years Old

  Replacement Cost Approximately

  $15,000 each

- Service Life 25 to 40 Years

- LIVE FRONT TRANSFORMERS ARE REPLACED AS PART OF CAPITAL AND OPERATIONS ACTIVITIES. AL OTHERS ARE REPLACED WHEN FAILURE OCCURS

3-Phase Transformers by age and circuit

	QUANTITY	1980 - 1989	1990 - 1999	2000 - 2006	2006-2021
CIRCUIT 13	48	10	12	15	11
CIRCUIT 14	42	15	13	5	9
CIRCUIT 15	13		5	4	4
CIRCUIT 16	12		5	2	5
CIRCUIT 17	40	4	12	20	4
CIRCUIT 18	26	6	5	7	5
WHITE ROCK 1	16		4	8	4
WHITE ROCK 2	15		6	7	2
WHITE ROCK 3	0				
TOTAL	217	24	18	72	103

1- Phase Transformers by age and circuit

	QUANTITY	1980 - 1989	1990 - 1999	2000 - 2006	2006-2021
CIRCUIT 13	308	116	52	75	65
CIRCUIT 14	58	10	14	20	14
CIRCUIT 15	235	18	37	80	100
CIRCUIT 16	*257*	67	30	47	113
CIRCUIT 17	8				8
CIRCUIT 18	15			6	9
WHITE ROCK 1	188	25	43	49	71
WHITE ROCK 2	217	50	60	57	50
WHITE ROCK 3	8				8
TOTAL	1294	286	236	334	438

Power Poles

- 2386 Poles
- Inspected for Structural Integrity and Treated in 2006, 2013 and 2021
  - 286 Rejects (12%)
  - 160 Priority (7%)
  - Useful Life 60+ Years if Treated in Regular Intervals

OVERHEAD MAINTENANCE

7 wood X-arms

2 fiberglass X-arms

- OH maintenance will be ongoing until the entire system is replaced

2006 Power Pole Study and Treatment
By PMC (Pole Maintenance Company)

Results in 258 rejected poles being braced with steel
to ensure integrity of each structure until replacement

2013 Power Pole Study and Treatment
By Osmose

Results in the 28 rejected poles added to the list

2015 Power Pole Replacement Project
By Elite Power and Recovery

Results in the replacement of 286 Power Poles
As part of the circuit 15 and 16 replacement Project

2021 Power Pole Study
and Treatment Project 20 rejected

2006 Power Pole Study

TABLE 3.3		Totals by Area				
Pole Series	Area	Pole Count	Total Rejects	Considered Priority of the Rejects	Percent of Total Rejects	Percent Priority Rejects
1000	Western Area	363	36	16	10%	4%
2000	Eastern Area	155	14	8	9%	5%
3000	North Communit	656	60	39	9%	6%
4000	North Mesa	128	13	11	10%	9%
5000	Barranca Mesa	256	44	18	17%	7%
6000	White Rock	343	53	35	15%	10%
7000	Pajarito Acres	250	22	16	9%	6%
8000	Ski Hill	44	2	2	5%	5%
9000	S-18	191	26	15	14%	8%
Grand Totals		2386	270	160	11%	7%

Power Poles Replaced Since 2006

Pole Series	Area	POLES REPLACED SINCE 2006
1000	Western Area	60
2000	Eastern Area	35
3000	North Community	80
4000	North Mesa	20
5000	Barranca Mesa	52
6000	White Rock	45
7000	Pajarito Acres	65
8000	Ski Hill	25
9000	EA4	30
Grand Totals		412

Pole Top Assemblies

- Inspected on an Annual Rotation

  by LACU Operations Staff to support

  AMT recommendations in preparation of the Annual Budget

- Goals: **NESC Compliant Attachments**

  Condition of Pole Assemblies

  Identify Attachments

  Structural Integrity of Crossarms and Equipment

Conductors

- Overhead 34% of Total
- Service Life Approximately 30 Years

- Underground 66% of Total
- UG Primary Cable Total 697,885‘ (per GIS 2021)

  -In Conduit 72%

  -Direct Bury 28%

  Service Life Approximately 20 TO 30 Years Depending on installation method and type

Conductors install underground prior to 1980 are almost always direct buried or inserted in existing pipe.

Age of Overhead Conductors by Circuit

	1980 - 1989	1990 - 1999	2000 – 2006	2006-2021
CIRCUIT 13		20%		10%
CIRCUIT 14				
CIRCUIT 15		20%		80%
CIRCUIT 16	24%		25%	51%
CIRCUIT 17				
CIRCUIT 18				
WHITE ROCK 1	75%	10%	5%	
WHITE ROCK 2	85%	10%	5%	

Conductors are replaced as load increases in areas

LOS ALAMOS TOWNSITE UNDERGROUND CABLE INSTALLATIONS (FEET)				
PROJECT SUBDIVISION OR AREA	1 PHASE PRIMARY CABLE	3 PHASE PRIMARY CABLE	1 PHASE SECONDARY CABLE	YEAR INSTALLED
EASTERN AREA WEST OF CANYON ROAD	2821		11978	1978
TIMBER RIDGE, LOMA VISTA, RIDGEPARK, OPENNHEIMER	9724	17088	9506	1975-80
WESTERN AREA	9045	11349	20596	1980
RIDGEWAY, UPPER SANDIA, UPPER TRINITY, UPPER FAIRWAY	5447	16242	12009	2004
PONDEROSA ESTATES	7179	6828	5996	1992
LOS PUEBLOS NAVAJO	11079		20015	1978
BROADVIEW BIG ROCK LOOP LA MESA	25160	12813	23015	1980-90
LOMA LINDA	2410		4988	1980
QUEMAZON	31705	30570	23444	2001-3
NC1 NC2 BURNED AREA	37858	87063	53776	2004-5
DEER TRAIL	2406		1571	2000
TRINITY - DP ROAD TO 20TH		30972		2013
DEL NORTE DEL SOL SUBDIVISIONS	15495		13740	2006
ENTRADA PAJARITO CLIFFS		21792		2012-16
RIM ROAD QUARTZ	4044		9187	2018
SAN IDELFONSO TSANKAWI	11497	40149	12229	2014
EAST ROAD AIRPORT TO ENTRADA		18360		2017
NM502 PROJECT TEWA TO CENTRAL AND TRINITY	5200	12100		2020
DP ROAD PHASE 1	1100	5000		2021
CANYON ROAD NM502 TO 15TH	2821	9832		2006
DIAMOND DRIVE		32760		2007-9

137,185’ PRIMARY UG CABLE INSTALLED PRIOR TO 2000 - 25% OF TOTAL
400,724’ PRIMARY UG CABLE INSTALLED AFTER 2000 - 75% OF TOTAL

TOWNSITE CONTAINS 77% OF UG CABLE COUNTY WIDE

WHITE ROCK UNDERGROUND CABLE INSTALLATIONS (FEET)

PROJECT SUBDIVISION OR AREA	1 PHASE PRIMARY CABLE	3 PHASE PRIMARY CABLE	1 PHASE SECONDARY CABLE	YEAR INSTALLED
PINION TRAILS	10011		5697	2003-06
EL MIRADOR	6500	13500	7200	2019-21
LA SENDA PIEDRA LOOP	34666			1970
LA VIST, SIERRA VISTA, PINION	15462		10669	1970-76
RIDGECREST, HASTA LA VISTA	16754		11954	1970
ARAGON TO MEADOW LANE	46661	16422	41280	1970-80

129,965’ OF UG PRIMARY CABLE INSTALLED PRIOR TO 2000 - 81% OF TOTAL
30,011’ OF UG PRIMARY CABLE INSTALLED AFTER 2000 - 19% OF TOTAL

WHITE ROCK CONTAINS 23% OF UNDERGROUND CABLE COUNTY WIDE

System Reliability

- **Systemic:**

  Overhead and Underground Failures

- **Non-Systemic:**

  Third Party Damage (Human Caused)

  Animals

  Weather

  Trees

  Unknown

SAIDI = SYSTEM AVERAGE INTERUPTION DURATION INDEX

The standard for measurement of system reliability according to IEEE And APPA. Our benchmark for reliability is 60 minutes.

OUTAGES BY CAUSE

2/14/2022	Utilites	18	HUMAN	9:34	9:49	0:15	213
7/30/2021	Utilites	WR1	OH Failure	16:50	19:15	2:25	1586
11/29/2021	Utilites	16	OH Failure	3:59	4:55	0:56	17
2/24/2022	Utilites	16	OH Failure	4:34	4:55	0:21	22
6/26/2022	Utilites	13	OH Failure	22:50	2:00	3:10	15
6/27/2022	Utilites	ELK RIDGE	OH Failure	14:45	15:10	0:25	20
10/22/2021	Utilites	TOWNSITE	TA3 SOURCE	7:42	9:50	2:08	4249
7/10/2021	Utilites	WR1	TREE	22:30	0:00	1:30	10
9/29/2021	Utilites	16	TREE	19:45	23:40	3:55	5
3/22/2022	Utilites	16	TREE	21:30	0:00	2:30	6
3/22/2022	Utilites	16	TREE	0:00	8:00	8:00	6
3/22/2022	Utilites	13,SKI HILL	TREE	20:00	0:00	4:00	35
3/22/2022	Utilites	13,SKI HILL	TREE	0:00	11:40	11:40	35
7/6/2021	Utilites	WR2	Unknown	10:45	11:45	1:00	25
7/10/2021	Utilites	14	Unknown	11:30	15:00	14:30	3
7/17/2021	Utilites	WR2	Unknown	12:30	14:30	2:00	16
10/2/2021	Utilites	14	UNKNOWN	23:30	0:00	0:30	539
10/2/2021	Utilities	14	UNKNOWN	0:00	1:00	1:00	539
5/10/2022	Utilites	WR2	Unknown	18:00	18:30	0:30	7
7/18/2021	Utilites	13	URD Failure	22:30	0:00	1:30	13
7/19/2021	Utilites	13	URD Failure	0:00	5:00	5:00	13
7/22/2021	Utilites	13	URD Failure	18:30	19:10	0:40	5
8/25/2021	Utilites	WR1	URD Failure	16:30	18:30	2:00	20
9/26/2021	Utilites	14	URD Failure	4:45	11:00	6:15	5
10/6/2021	Utilites	16	URD Failure	9:00	12:30	3:30	41
10/13/2021	Utilites	16	URD Failure	17:00	21:00	4:00	50
10/18/2021	Utilites	16	URD Failure	10:20	11:20	1:00	55
10/19/2021	Utilites	14	URD Failure	2:23	6:00	3:37	19
10/25/2021	Utilites	15	URD Failure	2:50	3:50	1:00	1564
10/25/2021	Utilites	15	URD Failure	2:50	3:50	1:00	47
12/22/2021	Utilites	13	URD Failure	6:30	8:40	2:10	1655
12/28/2021	Utilites	17	URD Failure	1:30	2:45	1:15	57
6/18/2022	Utilites	15	URD Failure	15:15	20:00	4:45	1564
6/18/2022	Utilites	WR2	URD Failure	18:30	23:30	5:00	25
6/22/2022	Utilites	17	URD Failure	9:00	11:00	2:00	2
6/27/2022	Utilites	15	URD Failure	8:15	13:30	5:15	60
12/15/2021	Utilites	14,17,18	WEATHER	6:30	8:30	2:00	2594
12/15/2021	Utilites	13	WEATHER	6:30	9:20	2:50	1655
12/15/2021	Utilites	TOWNSITE	WEATHER	15:23	15:32	0:09	4249
12/15/2021	Utilites	13,SKI HILL	WEATHER	6:30	16:43	10:13	35
1/1/2022	Utilites	16	WEATHER	16:50	17:10	0:20	1842

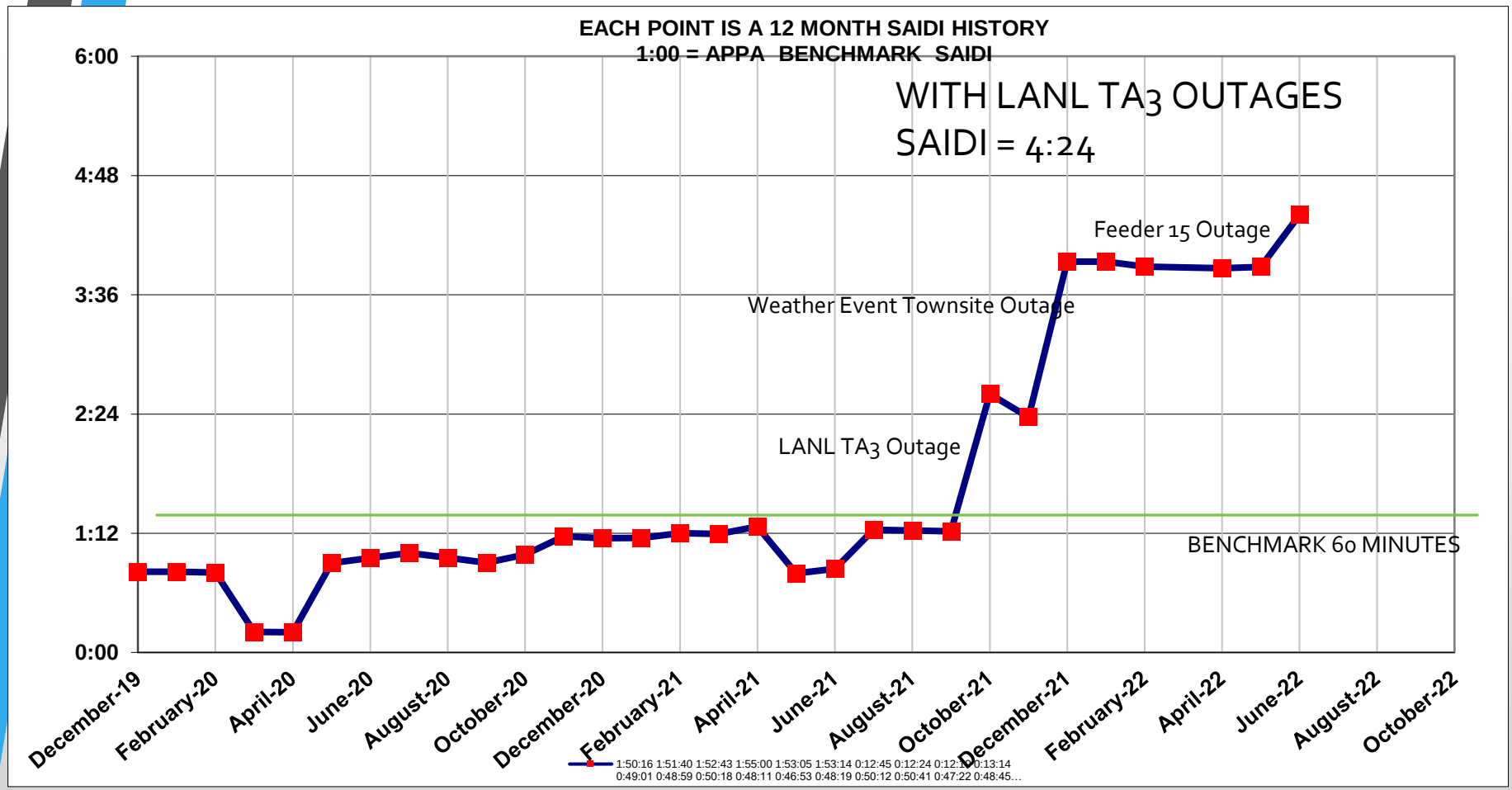
The reliability of the system is good. The major events that caused the most outage durations have been caused underground failures and weather events.

The multiple projects completed over the last decade have been focused on the three-phase primary backbone of the electric distribution system, both overhead and underground. The addition of the new Los Alamos Switch Station will further the reliability and redundancy of the system.

The current focus is on replacing the direct bury residential infrastructure in conduit.

Improvements to the electric distribution system are needed to meet DPU's goal of providing safe and reliable utility services.

SYSTEM RELIABILITY FY20 TO FY23



- **SAIDI – System Average Interruption Duration Index**

  A measure of outage time per customer if all customers were out at the same time (hours per year)

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

PRIORITY LIST PROJECTS

CIRCUIT-PRIORITY-RANK	DESCRIPTION
13-1-1	REPLACE SWITCHES SC1305A, SC1309 AND SC1309A
13-1-2	NEED TO REPLACE TRANSFORMERS 725 AND 726
14-1-1	REPLACE 15TH AND IRIS SWITCH SC1401A
14-1-2	REPLACE YMCA SWITCH SC1401A2
15-1-1	CHANGE OUT POLES AT ARKANSAS 3091,3093,3095,3098,3087,3095
15-1-2	REPLACE URD PRIMARY LINE FROM SYCAMORE TO PUEBLO COMPLEX
16-1-1	INSTALL PRIMARY J-BOXES AT 897 & 921 ESTATES DR.
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	REPLACE MULTIPLE POLES AND CROSSARMS
WR1-1-1	REPLACE 4000' 1-PHASE PRIMARY: CHERYL CT,CONNIE
WR1-1-2	REPLACE 4 PADMOUNT SWITCHES ON ARAGON AVE. WR1-3,WR3-2,WR3-3,WR3-4,WR3-5,WR3-6
WR1-1-3	CHANGE OUT TRANSFORMER P3631 AT DNCU MALL
WR2-1-1	CONDUCTOR REPLACEMENT LA SENDA AND PIEDRA LOOP
WR2-1-2	REPLACE CONDUCTOR VALLE DEL SOL

Future Budget

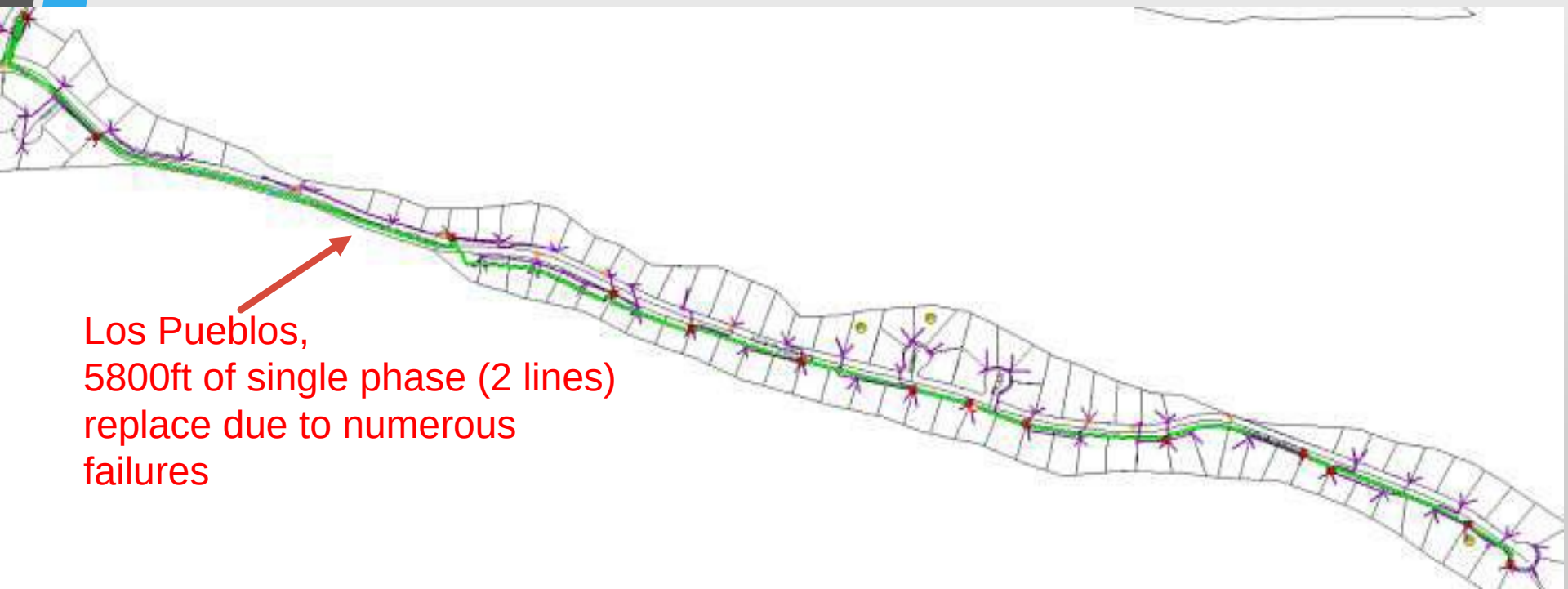
The electric distribution system will require the replacement of direct buried and old conductors. The assessment provided, identifies the need for $16 million over the next 14-year period. This includes the replacement of the EA-4 line which supplies primary power to the townsite water well system.

Major UG issues to contend with in the future\ New Rate Case Study in the near future

■ **Underground System**

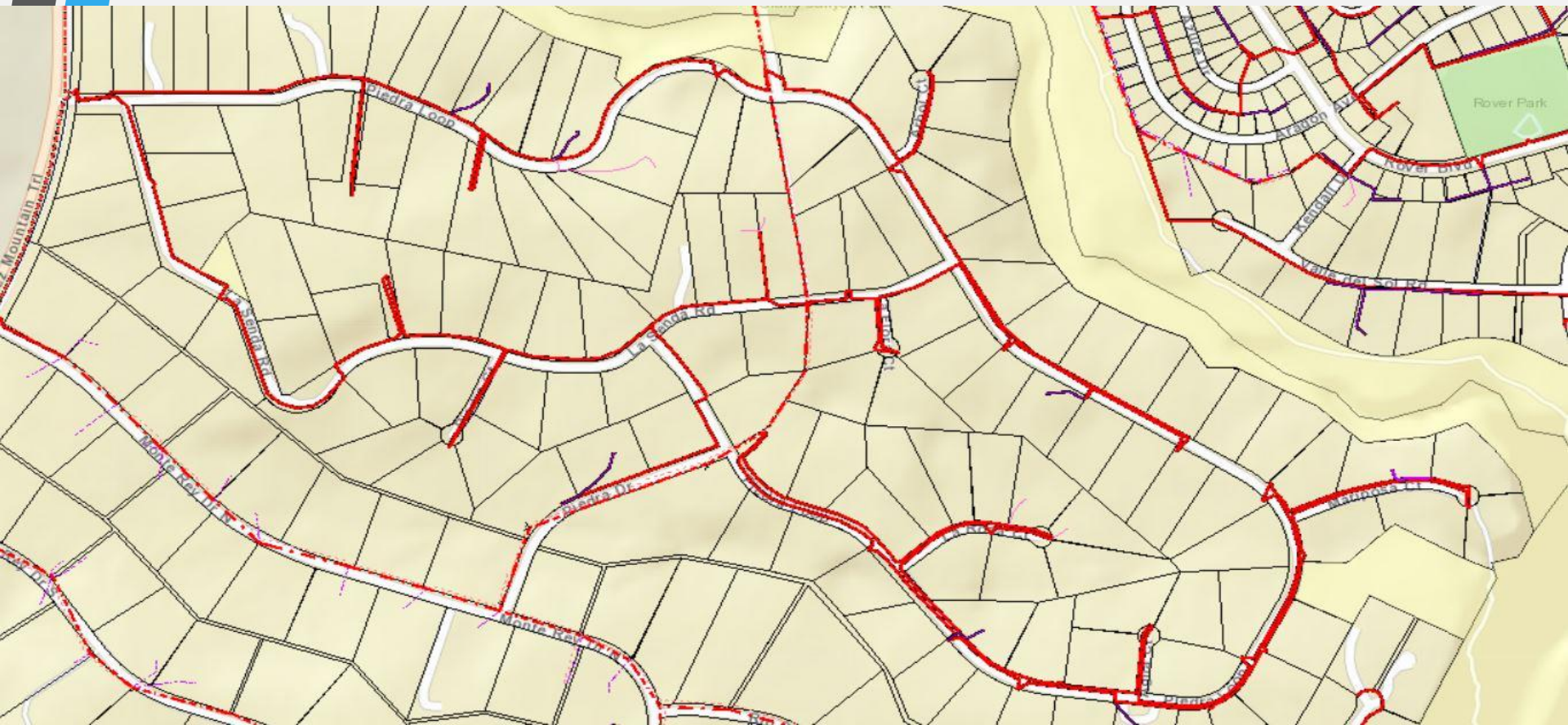
- Need to have the project funds to continue with URD replacement projects for SEGMENTS of the grid that we know will fail or have failed several times;

- The Los Pueblos, Navajo and Totavi power line will need to be replaced sometime in the near future**; costs close to 1.4 million dollars**



Major UG issues to contend with in the future

The Pajarito Acres and La Senda underground electric conductors Are old and direct buried. The area has had many failures and is in need Of replacement. The area is generally basalt with difficult digging conditions. The replacement of these conductors will take several years and should be Initiated next year. Costs will be **over two million dollars** for the entire area Installation of new conduit and conductors.

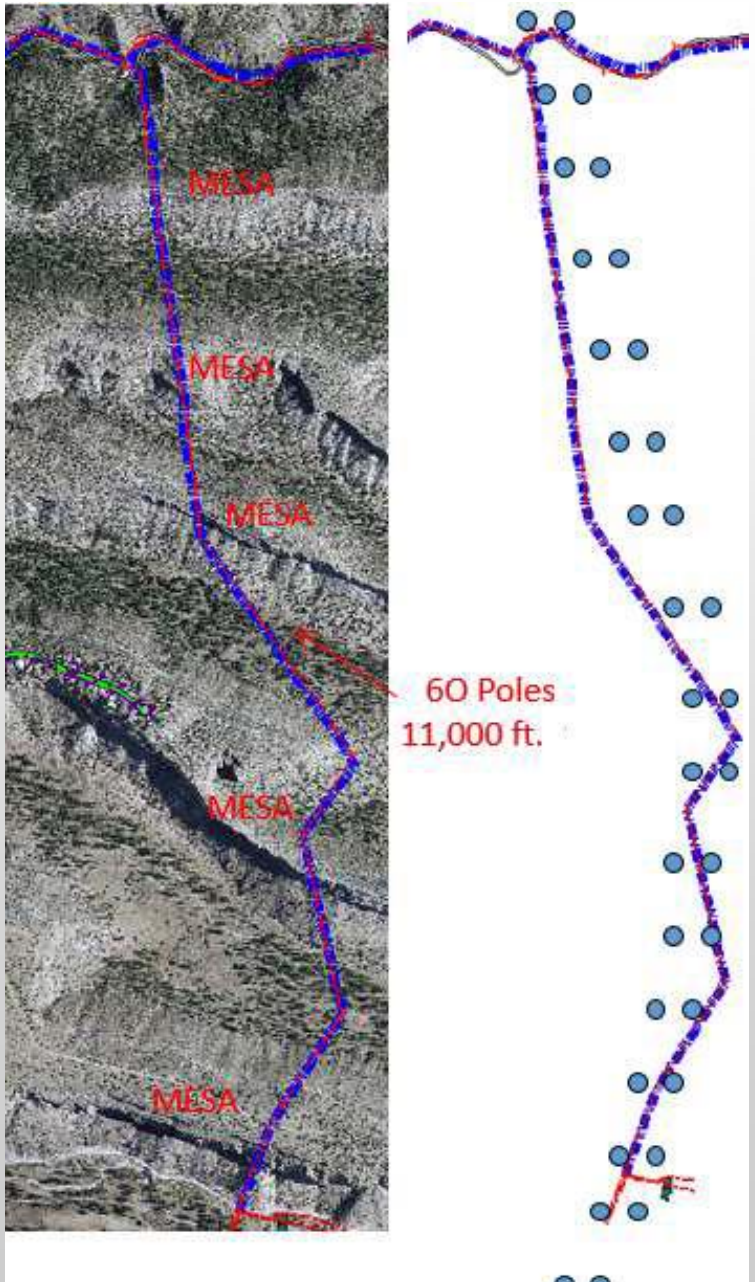


Major OH issues to contend with in the future

Overhead System
EA4 Feeder Replacement Project between PCS and Rendija Canyon **may cost over $2 Million.**

This project could be split into smaller projects; for example, start with the Pueblo Canyon Crossing first.

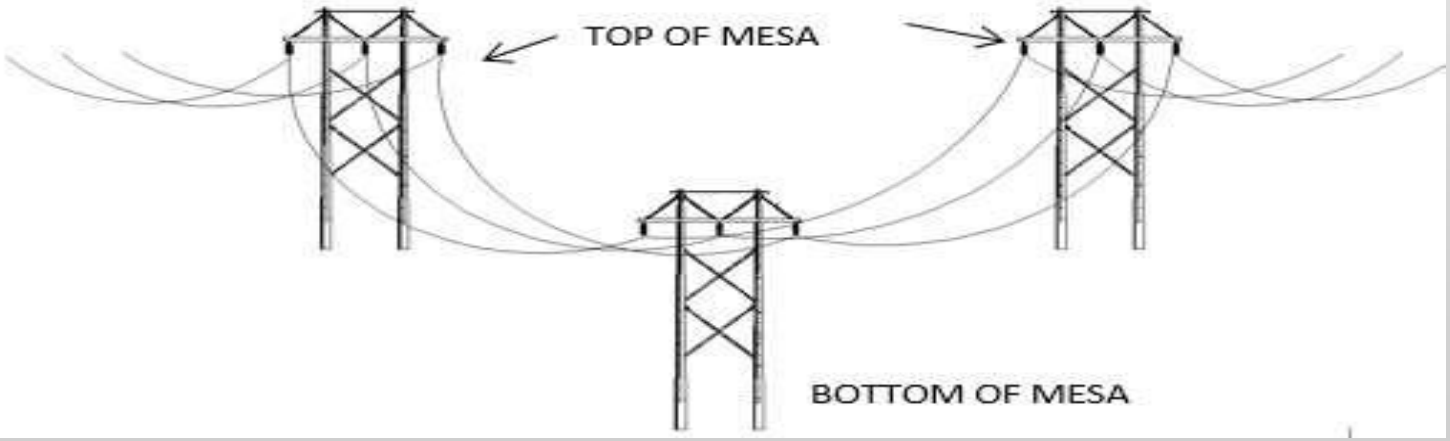
The first phase should begin within 3 years;



Major OH issues to contend with in the future

- There are presently 60 pole structures
- Most are 2 or 3 pole H-type deadends (expensive)

- Proposed Design (< 20 pole H structures)
- Utilize transmission types structures to span the canyons



QUESTIONS?