10-Year Electric System Master Plan 2004 – 2014

City of Banning
Banning, California

December 2004

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Introduction

The City of Banning ("City") owns and operates the electric system serving Banning, California. The City purchases the majority of its power requirements through contracts with the Southern California Public Power Authority ("SCPPA") as a participant in a number of electric generation plants. The City covers its summer peak load requirements through power purchases in the Western System Power Pool ("WSPP") Forward and Over-the-Counter markets.

The City has an agreement with Southern California Edison (SCE) to utilize SCE's subtransmission system in bringing Banning's power from the California ISO controlled high voltage transmission grid to Banning's distribution system at Banning Substation. The City delivers power over a 34.5 kV subtransmission system to five distribution substations. Power is then delivered to customers over distribution lines of 2,400/4,160Y volts and 7,200/12,470Y volts.

The City serves a peak demand of 46 MW. The 10-year summer system load forecast is projected at 73 MW.

Sound system planning is essential to provide management with guidance to economically develop the City of Banning (City) electric system to ensure adequate service at the lowest cost to customers. The planning should provide for an orderly development of the electric system such that the new investment in facilities is in step with load growth and revenue. System planning should include the following:

- Improvements in the quality of service to customers as improvement opportunities occur.
- Expansion of the existing system far beyond the present design requirements.
- Economic evaluation of the construction of new facilities to meet the required capacity.

By using this approach, interim changes and system additions will be compatible with the capacity level needs as system load growth occurs. To maintain a reasonable economic balance in system planning, the three main components of the electric system – power supply, transmission, and distribution – should be evaluated.

Purpose of Report

The purpose of this Master Plan is to provide general guidance in system planning for the City to prepare a long-range plan for maintaining reliability and serving new growth. The analysis of the existing system indicates where upgrades are most likely to be economical and provides insight into the development of a practical transition from the existing system to the proposed long-range system. Based on this analysis, recommendations are made for improving system performance and increasing system capacity for expansion. Periodic reviews of the Master Plan will be required to examine the applicability of the preferred plan considering actual system developments. Detailed construction work plans should be prepared for the necessary construction, and the Master Plan should be reevaluated as each work plan is prepared.

Summary of Report, Conclusions, and Recommendations

The existing City electric system was analyzed and the findings are detailed in Section 2. Planning criteria, detailed in Section 1, were developed based on City's system reliability and performance goals to evaluate potential alternatives to serve the future planning load. The Master Plan is detailed in Section 3, including the load level at which each substation and distribution improvement is required.

The City electric system was analyzed to serve a system peak demand of 73 MW. The system load was allocated to areas based on City staff's knowledge of the area. Based on these analyses, a preferred expansion plan was selected that included the following:

- Serve new customers.
- Construct the following substations to serve the projected system load growth.
  - Sunset Substation
  - Deustch Substation
- Add a 34 kV breaker to Banning Substation and 34 kV loop from Banning – Sunset – Midway Substation.
- Upgrade existing substation transformer capacity at the following substations.
  - Alola Substation
  - Airport Substation
  - Midway Substation
- Convert 4 kV distribution on Alola Substation to 12 kV.
- Upgrade existing 12.47 kV distribution system as required to maintain adequate and reliable service.

The capital improvements for the Preferred Plan are summarized in Table ES-1. Costs for additional customers, security lights, service capacity increases, ordinary replacements, and retirements are not included in the long-range system improvements, shown in Table ES-1.

Table ES-1
Preferred Plan Capital Requirements ($/2004)

System	LL 1-5	LL 6-10	Total
SCE			
Transmission	$74,670	$0	**$74,670**
Substation	$3,240,000	$0	**$3,240,000**
Total SCE	**$3,314,670**	**$0**	**$3,314,670**
City of Banning			
Transmission	$4,386,840	$707,940	**$5,094,780**
Substation	$8,189,340	$685,500	**$8,874,840**
Distribution	$1,667,480	$149,760	**$1,817,240**
Total City of Banning	**$14,243,660**	**$1,543,200**	**$15,786,860**

General Basis of Study

In the preparation of this Master Plan, including the opinions contained herein, we have made certain assumptions and used certain considerations with respect to conditions that may occur in the future. While we believe these considerations and assumptions are reasonable and reasonably attainable based on conditions known to us as of the date of this Master Plan, they are dependent on future events. Actual conditions may differ from those assumed herein or from the assumptions provided by others; therefore, the actual results will vary from those estimated. In addition, field conditions encountered during design may affect the cost or feasibility of some of the projects.

Section 1
DISTRIBUTION SUBSTATION AND FEEDER PLANNING CRITERIA

1.1 Objective

The objective of these criteria is to provide guidelines for planning the electric distribution system to serve the City of Banning electrical load in a reliable manner and, at the same time, provide the service at an economical cost to the customer. It is intended that the electric system will be planned to meet these criteria; however, in order to maintain reasonable consumer electrical rates, some exceptions to these criteria may be necessary due to high capital costs for system improvements. These exceptions shall be documented in appropriate distribution studies.

1.2 Substation Planning

1.2.1 Load Forecasting

Load projections used to plan system additions are based on historical data plus identified future projects relative to potential load growth. The 10-year summer system load forecast is projected at 73 MW. Load projections include the proposed developments summarized in Exhibit 1-2.

Each substation transformer was examined based on historical load growth and load growth potential to establish relative growth factors. The relative growth factor provides a sense of how a substation load is projected to grow relative to the average system growth which was assigned a relative growth factor of 1.0. The resulting ten year substation and feeder forecast is included in Exhibit 1-1.

The load forecast is also based on a load level with exact loads assigned to specific years. In reality, loads may develop more quickly or more slowly than anticipated. If the actual load develops as projected in the load forecast, the year given would match the load levels. To avoid the impression that facilities need to be constructed for a specific year versus a specific load level, the remainder of this report refers to load levels and the anticipated years.

1.2.2 Substation Capacity

The names, transformer ratings, and number of distribution feeders of the City's five distribution substations are summarized in Table 1-1. Although 22nd Street has three available feeders, only two are loaded at this time.

Table 1-1
General Substation Statistics

Substation	Voltage (kV)	Transformer (kVA)	Distribution Feeders
Alola	34.5-2.4/4.16Y	(2) 3,750/4,670 (OA/FA) (1) 2,000/2,300 (OA/FA)	6
22nd Street	34.5-7.4/12.47Y	15,000/20,000 (OA/FA)	3
Airport	34.5-2.4/4.16Y	3,750/4,687 (OA/FA)	2
Midway	34.5-7.4/12.47Y	(2) 7,500/10,000 (OA/FA)	4
San Gorgonio	34.5-7.4/12.47Y	(2) 10,000/14,000 (OA/FA)	4

Exhibit 1-1 compares the projected transformer loads to their rated capacity. Loading of power transformers is calculated from the base (OA) nameplate rating at 55° C rise.

1.2.3 Substation Capacity Addition

As projected loads exceed the transformer OA ratings as shown in Exhibit 1-1, load will be shifted among feeders by switching and reconnections in order to maintain acceptable voltage conditions and to result in loadings on substation transformers at levels which will provide spare capacity for inter-substation backup in the event of an emergency. If load transformers will not sufficiently relieve overloaded transformers, transformer upgrades, additions or new substations will be evaluated. When acquiring land for new substations, consideration should be given to the ultimate station service area and projected load as well as the possible need for special types for construction.

1.2.4 Emergency Capacity

The station shall be planned so that upon failure of one transformer, load can be transferred to remaining transformers in the substation or to surrounding substations via distribution feeder ties. If emergency loading due to load transfers is expected to exceed 100% of the top nameplate continuous rating of the remaining bank, transformer upgrades, additions or new substations will be evaluated.

1.2.5 Substation Capacitors

Overall system power factor during the summer peak load season will be improved to a calculated 95% by the addition of switched and fixed capacitor banks on the 12.47 kV feeders. Sufficient capacitors shall be planned for each substation to offset the reactive losses in the transformer and uncompensated circuit reactive load, if necessary, in order to maintain proper customer voltage, reserve transformer capacity for serving watt load, and reduce electrical losses. In determining the size and number of capacitors to install, consideration shall be given to the financial charge for reactive power from outside suppliers, loss of transformer capacity and increased operating losses and voltage regulation versus the capital cost to the utility for installing the capacitors in the substation.

1.2.6 Substation Design Consideration

Substations shall be designed so that the failure of one circuit breaker does not outage two transformers. The bus-ties are important elements for system reliability and should be included with new transformer additions. The bus, circuit breakers, current transformers, etc., shall be sized to accommodate the ultimate emergency loading of the transformers and circuits.

1.3 Power Transformers

1.3.1 Transfer Operating Capacity

Basic transformer operating capacity is 100% of the OA rating. This will result in spare capacity up to the transformer top MVA rating during an emergency when one bank is out of service and inter-substation backup is required. Planning of new transformers shall include evaluation of “triple-rated” units, such as an OA/FA/FA of 15/20/25 MVA to allow additional transfer capacity.

1.3.2 Single Transformer Installations

For single transformer installations, consideration shall be given to the number of customers interrupted should the transformer fail. In order to perform transformer maintenance, sufficient ties need to exist.

1.3.3 Voltage Regulation

In order to permit a 5% voltage drop on the primary voltage lines, it is recommended that the voltage regulation at each substation be adjusted to maintain 125 to 127 volts on a 120 volt basis at the distribution bus. New power transformers will be equipped with Load Tap Changers (LTC’s).

1.4 Circuit Planning

1.4.1 Circuit Capacity

Overhead lines should be designed and constructed for a 167°F operating temperature. Each circuit shall be designed to be loaded nominally to 60% conductor capacity as detailed in Table 1-2 to allow for summer loading and load transfers. The following should also be considered in determining maximum circuit loading:

- Circuit breaker trip ratings of 400 Amps.

- Continuous rating of the underground getaway as well as the remainder of the circuit.
- Adequate ties to other circuits in case of an outage.
- Adequate capacity to receive load following the outage of an adjoining circuit.
- Allowable voltage regulation along the circuit.

Table 1-2
Conductor Ratings

Conductor	Modeled Current Carrying Capacity (1)	Summer Current Carrying Capacity (2)	60% Modeled Capacity (2)
Underground Conductors			
#2 AL	128	128	77
2 CU	164	164	98
1/0 AL	167	167	100
2/0 AL	190	190	114
4/0 AL	248	248	149
250 AL	272	272	163
350 AL	329	329	197
350 CU	418	418	251
500 AL	400	400	240
500 CU	504	504	302
750 AL	497	497	298
750 CU	626	626	376
Overhead Conductors			
8 CU	96	91	58
6 CU	128	119	77
4 ACSR	140	120	84
4 CU	170	159	102
2 ACSR	184	160	110
2 CU	228	206	137
1/0 ACSR	242	214	145
2/0 ACSR	276	248	165
3/0 ACSR	315	287	189
4/0 ACSR	357	332	214
336 ACSR	529	494	317
477 ACSR	659	554	395

(1) South Wire rating – assumes 75°C (167°F) conductor temperatures, 25°C (77°F) ambient, 2 ft/sec. wind.
(2) Calculated summer rating - assumes 75°C (167°F) conductor temperatures, 37°C (100°F) ambient, 2 ft/sec. wind.
(3) Planning rating – allows capacity for summer de-rating and load transfers.

1.4.2 Circuit Ties

Circuits shall be planned such that upon loss of one circuit, sufficient adjacent circuits can be used to restore the lost load by closing tie-switches in the field. The number and location of ties should be such that restoration of unfaulted sections can be completed in a timely fashion. Generally, a minimum of three ties will be necessary.

1.4.3 Voltage Levels

For the design load, a 5% voltage drop was assumed to be the maximum allowable voltage drop from the substation to the end of the distribution feeders or between distribution line regulator stations. The voltage drop calculations assumed a substation bus voltage of 126 volts and a 120 volt base.

1.4.4 Circuit Capacitors

Sufficient capacitors shall be planned for each circuit to maintain the power factor at 95% or above to reduce electrical losses and provide proper customer voltage. Capacitor size shall be limited to cause no more than 3% voltage rise on the circuit.

1.4.5 Circuit Regulators

If the circuit is long and heavily loaded, and capacitors cannot provide adequate voltage support, line regulators shall be planned to provide additional voltage support. Series regulators may be installed on a temporary basis, but should not be considered a long-term solution.

1.4.6 Circuit Conversions

The City has embarked on a program of converting certain 4.16 kV lines to 12.47 kV. Sufficient voltage conversions shall be planned each year to reduce 4.16 kV circuit/substation overloads down to rated capacity.

1.4.7 Circuit Maintenance & Replacement

- A line section that requires more than 2 repairs per span per mile should be replaced.
- Conductor that is either copper or steel wire should be replaced. Large copper conductor, however, will be evaluated on an individual basis.
- Conductor that is over 40 years old should be replaced.

1.4.8 Lateral Fusing

As new load is added, fusing of laterals should be considered during the design process. The instantaneous trip unit on the substation circuit breaker should be used on circuits with fusing in order to avoid unnecessarily lengthy outage times for temporary faults. Line fuses should not exceed 75% capacity.

1.4.9 Loop-Feed Service

Non-loop underground laterals that serve 500 kW or more shall be considered for loop feed. Reliability is to be weighed against the capital cost to complete the loop.

1.5 Line Reclosers

Recloser capacity should not exceed 75%. A limit of 80% may be allowed in slow growth areas.

1.5.1 Phase Imbalance and Additions

The imbalance between phases should not exceed a range of 10% to 15%. Multiphasing of distribution lines is recommended in the following situations:

- Voltage levels do not conform to Criteria in Section 1.4.3.
- The peak load current on a single-phase tap exceeds 50 ampere and load transfer is not possible or advantageous.
- The number of consumers exceeds 60 on a single-phase tap.
- Circuit phase imbalance in excess of 15% cannot be resolved by changing phases on single-phase lines.

1.6 Reliability of Service

1.6.1 Reliability Standards

Reliability shall consider single contingency planning. The system shall have the ability to maintain adequate service with loss of a major system element. Three-phase feeder capacity between two adjoining substations shall be adequate to allow backfeeding during non-extreme load conditions.

1.6.2 Distribution Line and Equipment Costs

The distribution line, equipment, and voltage conversion costs are given in Tables 1-3, and 1-4. The estimated costs include engineering, overheads, and tree trimming for overhead lines.

Table 1-3
Overhead Costs/Mile

Conductor Size	Estimated Cost (2004 $'s)
Reconductor	
3ϕ 336 kcmil ACSR - 34 kV	$68,000
3ϕ 336 kcmil ACSR - 12 kV	$68,000
3ϕ 336 kcmil ACSR (Rebuild) - 12 kV (1)	$148,000
New Construction	
3ϕ Dbl Ckt 336 kcmil ACSR - 115 kV	$393,000
3ϕ 336 kcmil ACSR - 34 kV	$250,000
3ϕ 336 kcmil ACSR - 12 kV	$148,000
4kV to 12 kV Conversion (2)	
1ϕ Re-insulation	$3,200
3ϕ Re-insulation	$12,000

(1) For existing conductors smaller than #3/0 ACSR, it was assumed that the existing overhead lines would be rebuilt to support the recommended conductor.
(2) Does not include transformer replacement costs.

Table 1-4
Underground Costs/Mile

Conductor Size	Estimated Cost (2004 $'s)
Reconductor	
3ϕ 750 MCM Cu - 12 kV	$262,000
3ϕ 500 MCM Al - 12 kV	$234,000
3ϕ #1/0 Al - 12 kV	$181,800
1ϕ #1/0 Al - 12 kV	$60,600
New Construction	
3ϕ 750 MCM Cu - 34 kV	$874,000
3ϕ 750 MCM Cu - 12 kV	$356,000

Exhibit 1-1
Substation and Feeder Forecast

Exhibit 1-1
SUMMER SUBSTATION AND FEEDER LOAD PROJECTIONS

SUBSTATION / FEEDER NAME	TOTAL OA CAPACITY (MVA)	RELATIVE GROWTH FACTOR	2004 PEAK (MW)	PROJECTED LOADS (kW)										COMP. ANNUAL GROWTH
				LL1 2005	LL2 2006	LL3 2007	LL4 2008	LL5 2009	LL6 2010	LL7 2011	LL8 2012	LL9 2013	LL10 2014	
PROJECTED SYSTEM COINCIDENT PEAK			**45.60**	**47.79**	**50.08**	**52.49**	**55.01**	**57.65**	**60.41**	**63.31**	**66.35**	**69.54**	**72.88**	**4.80%**
San Gorgonio Total	**20.00**		**13.48**	**14.73**	**15.50**	**16.31**	**17.15**	**18.03**	**18.95**	**19.91**	**20.91**	**21.95**	**23.04**	**5.51%**
San Gorgonio Bank One	**10.00**	**3.50**	6.74	7.54	8.04	8.56	9.12	9.70	**10.32**	**10.97**	**11.65**	**12.37**	**13.12**	6.89%
Ckt 51	**8.60**	**1.00**	4.37	5.40	5.75	6.13	6.53	6.95	7.39	7.85	8.34	**8.85**	**9.39**	7.95%
Ckt 52	**8.60**	**1.00**	1.74	2.14	2.28	2.43	2.59	2.76	2.93	3.12	3.31	3.52	3.73	7.95%
Total Feeder Load			**6.11**	**7.54**	**8.04**	**8.56**	**9.12**	**9.70**	**10.32**	**10.97**	**11.65**	**12.37**	**13.12**	**-----**
Substation Growth Factors				0.235	0.066	0.066	0.065	0.064	0.064	0.063	0.062	0.062	0.061	-----
Substation Coincident Factor			110.38%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
San Gorgonio Bank Two	**10.00**	**2.00**	6.74	7.20	7.47	7.75	8.03	8.33	8.63	8.94	9.26	9.59	9.92	3.94%
Ckt 53	**8.60**	**4.50**	2.29	3.80	4.02	4.26	4.50	4.75	5.01	5.28	5.55	5.84	6.13	10.35%
Ckt 54	**8.60**	**1.00**	2.97	3.40	3.44	3.49	3.53	3.58	3.62	3.66	3.71	3.75	3.79	2.48%
Total Feeder Load			**5.26**	**7.20**	**7.47**	**7.75**	**8.03**	**8.33**	**8.63**	**8.94**	**9.26**	**9.59**	**9.92**	**-----**
Substation Growth Factors				0.146	0.013	0.013	0.013	0.012	0.012	0.012	0.012	0.011	0.011	-----
Substation Coincident Factor			128.22%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Alola Total	**9.50**		**4.08**	**4.19**	**4.26**	**4.32**	**4.39**	**4.46**	**4.52**	**4.59**	**4.66**	**4.72**	**4.79**	**1.62%**
Alola Bank One	**3.75**	**0.75**	2.93	3.00	3.04	3.09	3.13	3.17	3.22	3.26	3.30	3.35	3.39	1.48%
Ckt 1	**2.90**	**1.00**	1.87	1.90	1.92	1.94	1.97	1.99	2.01	2.04	2.06	2.08	2.10	1.18%
Ckt 2	**2.90**	**1.50**	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.22	1.24	1.27	1.29	1.77%
Total Feeder Load			**2.95**	**3.00**	**3.04**	**3.09**	**3.13**	**3.17**	**3.22**	**3.26**	**3.30**	**3.35**	**3.39**	**-----**
Substation Growth Factors				0.014	0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	-----
Substation Coincident Factor			99.19%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Alola Bank Two	**3.75**	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Ckt 3	**2.90**	**1.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Ckt 4	**2.90**	**1.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load			**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-----**
Substation Growth Factors				0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-----
Substation Coincident Factor			0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Alola Bank Three	**2.00**	**1.00**	1.15	1.19	1.21	1.24	1.26	1.28	1.31	1.33	1.35	1.38	1.40	1.97%
Ckt 0	**2.90**	**1.00**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Ckt 8	**2.90**	**1.00**	1.20	1.19	1.21	1.24	1.26	1.28	1.31	1.33	1.35	1.38	1.40	1.56%
Total Feeder Load			**1.20**	**1.19**	**1.21**	**1.24**	**1.26**	**1.28**	**1.31**	**1.33**	**1.35**	**1.38**	**1.40**	**-----**
Substation Growth Factors				(0.008)	0.019	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.017	-----
Substation Coincident Factor			96.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----

Exhibit 1-1
SUMMER SUBSTATION AND FEEDER LOAD PROJECTIONS

SUBSTATION / FEEDER NAME	TOTAL OA CAPACITY (MVA)	RELATIVE GROWTH FACTOR	2004 PEAK (MW)	PROJECTED LOADS (kW) LL1 2005	LL2 2006	LL3 2007	LL4 2008	LL5 2009	LL6 2010	LL7 2011	LL8 2012	LL9 2013	LL10 2014	COMP. ANNUAL GROWTH
PROJECTED SYSTEM COINCIDENT PEAK			45.60	47.79	50.08	52.49	55.01	57.65	60.41	63.31	66.35	69.54	72.88	4.80%
Midway Total	15.00		13.82	15.23	16.12	17.06	18.06	19.13	20.26	21.46	22.74	24.10	25.55	6.33%
Midway Bank One	7.50	1.75	8.50	9.00	9.30	9.60	9.91	10.23	10.56	10.89	11.23	11.57	11.93	3.45%
Ckt 21	8.60	1.25	3.66	3.67	3.76	3.86	3.95	4.04	4.13	4.23	4.33	4.42	4.52	2.14%
Ckt 22	8.60	2.00	5.29	5.32	5.53	5.75	5.97	6.19	6.42	6.66	6.90	7.15	7.40	3.43%
Total Feeder Load			8.94	9.00	9.30	9.60	9.91	10.23	10.56	10.89	11.23	11.57	11.93	-----
Substation Growth Factors				0.004	0.020	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.018	-----
Substation Coincident Factor			95.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Midway Bank Two	7.50	5.00	5.33	6.23	6.82	7.46	8.15	8.90	9.70	10.57	11.51	12.53	13.62	9.84%
Ckt 23	8.60	3.00	3.26	3.53	4.00	4.52	5.08	5.71	6.39	7.13	7.94	8.82	9.78	11.60%
Ckt 24	8.60	1.00	2.63	2.70	2.82	2.94	3.06	3.19	3.32	3.44	3.58	3.71	3.84	3.87%
Total Feeder Load			5.89	6.23	6.82	7.46	8.15	8.90	9.70	10.57	11.51	12.53	13.62	-----
Substation Growth Factors				0.027	0.044	0.043	0.042	0.041	0.040	0.039	0.038	0.037	0.036	-----
Substation Coincident Factor			90.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Airport	3.75	1.00	2.57	2.65	2.71	2.76	2.81	2.86	2.91	2.96	3.02	3.07	3.12	1.97%
Ckt 9	2.90	0.50	1.92	1.95	1.96	1.98	2.00	2.01	2.02	2.04	2.05	2.07	2.08	0.81%
Ckt 10	2.90	3.00	0.65	0.71	0.74	0.78	0.81	0.85	0.89	0.92	0.96	1.00	1.04	4.85%
Total Feeder Load			2.57	2.65	2.71	2.76	2.81	2.86	2.91	2.96	3.02	3.07	3.12	-----
Substation Growth Factors				0.030	0.016	0.016	0.015	0.015	0.015	0.014	0.014	0.014	0.013	-----
Substation Coincident Factor			100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
22nd Street	15.00	2.50	10.12	10.98	11.50	12.04	12.59	13.17	13.77	14.39	15.03	15.69	16.37	4.93%
Ckt 63	8.60	2.00	6.63	7.35	7.78	8.24	8.72	9.21	9.73	10.26	10.82	11.39	11.99	6.10%
Ckt 64	8.60	0.75	3.49	3.63	3.71	3.80	3.88	3.96	4.04	4.13	4.21	4.30	4.38	2.29%
Ckt 65	8.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load			10.12	10.98	11.50	12.04	12.59	13.17	13.77	14.39	15.03	15.69	16.37	-----
Substation Growth Factors				0.054	0.030	0.029	0.029	0.028	0.028	0.028	0.027	0.027	0.026	-----
Substation Coincident Factor			100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
COINCIDENT SYSTEM PEAK			45.60	47.79	50.08	52.49	55.01	57.65	60.41	63.31	66.35	69.54	72.88	-----
TOT. NON-COINCIDENT SUB. PEAK			44.07	47.79	50.08	52.49	55.01	57.65	60.41	63.31	66.35	69.54	72.88	-----
SYSTEM GROWTH FACTORS				0.034	0.019	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.017	-----
SYSTEM COINCIDENT FACTOR			103.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----

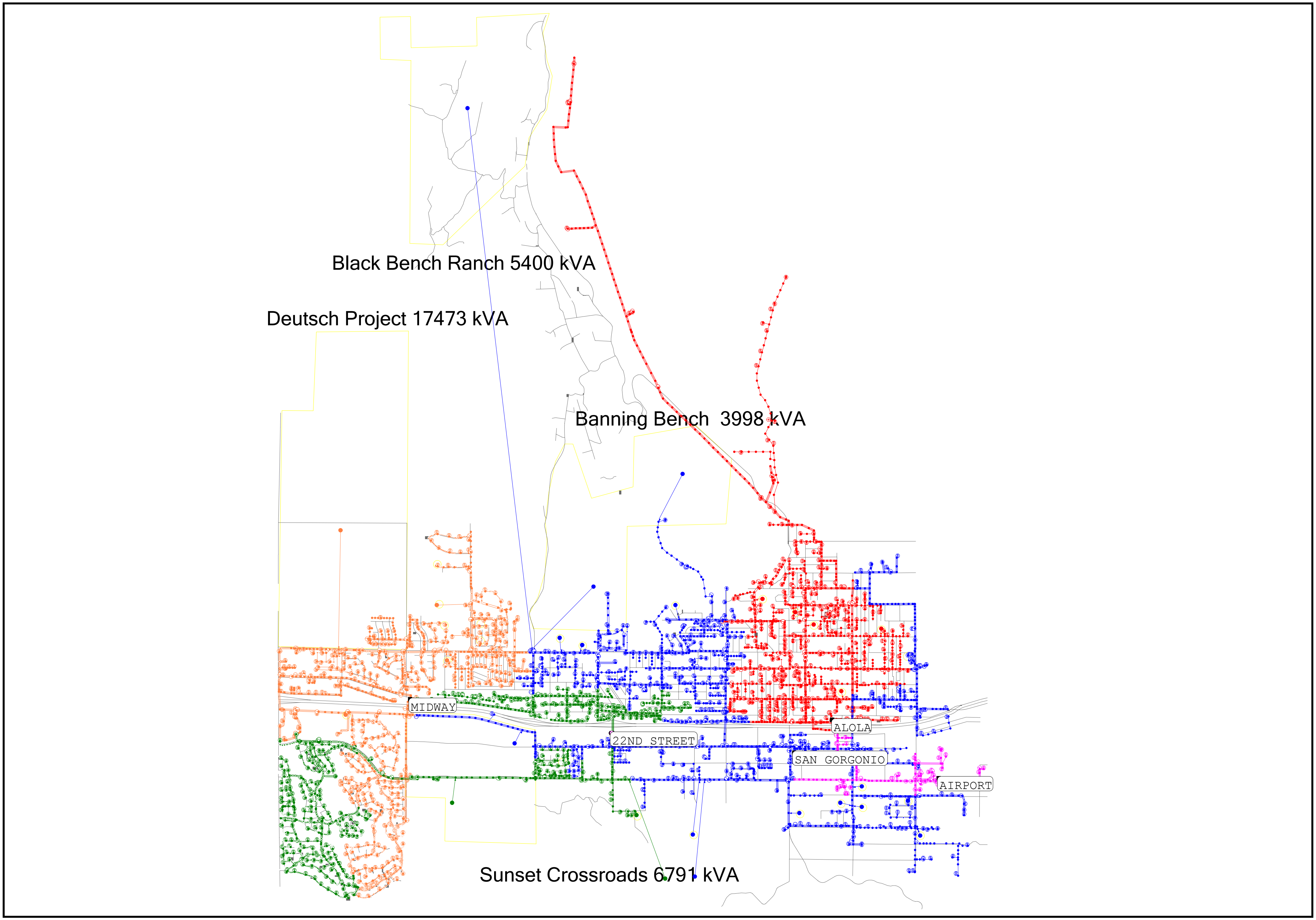
Assumed based on 400 Amp breaker trip setting.

Projected load exceeds 65% of capacity rating.

Projected load exceed 100% of capacity rating

Relative Growth Factor adjusts growth of substations and feeders relative to the projected system load.

Exhibit 1-2
Proposed Developments for the City of Banning


Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
Banning Bench 3998 kVA
MIDWAY
22ND STREET
ALOLA
SAN GORGONIO
AIRPORT
Sunset Crossroads 6791 kVA

City of Banning Development Projects							
Development Lot	Zone	Developable Acres	Units or sq. ft./acre	kVA/sq. ft. or unit	kVA/acre	Demand Factor	Diverified Total (kVA)
Sunset Crossroads							
SFR		1408	1	6	6	0.60	5,069
MFR		873	1	2	2	0.60	1,048
C		18	1	50	50	.75	675
Subtotal		2299					6,791
Banning Bench Specific Plan							
SFR		944	1	6	6	0.60	3,398
MFR		0	1	2	2	0.60	-
C		16	1	50	50	.75	600
Subtotal		960					3,998
Deutsch Property							
SFR-Estates		878	1	10	10	0.60	5,268
SFR		1068	1	6	6	0.60	3,845
SFR-Patio Homes		1950	1	4	4	0.60	4,680
MFR		1504	1	2	2	0.60	1,805
C		50	1	50	50	.75	1,875
Subtotal		5450					17,473
Black Bench Ranch							
SFR		1500	1	6	6	0.60	5,400
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		1500					5,400
3 Wilson Homes 1							
SFR		107	1	6	6	0.60	385
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		107					385
4 Wilson Homes 2							
SFR		121	1	6	6	0.60	436
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		121					436
5 Evergreen							
SFR		24	1	6	6	0.60	86
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		24					86
6 Brickman							
SFR		42	1	6	6	0.60	151
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		42					151

City of Banning Development Projects							
Development Lot	Zone	Developable Acres	Units or sq. ft./acre	kVA/sq. ft. or unit	kVA/acre	Demand Factor	Diverified Total (kVA)
7 Ford							
SFR		21	1	6	6	0.60	76
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		21					76
8 Rocehell & Oberg							
SFR		10	1	6	6	0.60	36
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		10					36
9 Century Crowell-Fair Oaks							
SFR		70	1	6	6	0.60	252
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		70					252
10 Action Surveys							
SFR		53	1	6	6	0.60	191
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		53					191
11 LTV Builders							
SFR		38	1	6	6	0.60	137
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		38					137
12 Madrid							
SFR		44	1	6	6	0.60	158
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		44					158
13 Roa							
SFR		10	1	6	6	0.60	36
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		10					36
14 HLCD							
SFR		26	1	6	6	0.60	94
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		26					94

City of Banning Development Projects							
Development Lot	Zone	Developable Acres	Units or sq. ft./acre	kVA/sq. ft. or unit	kVA/acre	Demand Factor	Diverified Total (kVA)
15 Stallion Estates							
SFR		213	1	6	6	0.60	767
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		213					767
16 Fiesta Homes							
SFR		43	1	6	6	0.60	155
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		43					155
17 Banning Family Apartments							
SFR		0	1	6	6	0.60	-
MFR		81	1	2	2	0.60	97
C		0	1	50	50	.75	-
Subtotal		81					97
18 Pepper Tree Apartments							
SFR		0	1	6	6	0.60	-
MFR		81	1	2	2	0.60	97
C		0	1	50	50	.75	-
Subtotal		81					97
19 Charter Management / Galleher							
SFR		9	1	6	6	0.60	32
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		9					32
20 Silver Oaks							
SFR		152	1	6	6	0.60	547
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		152					547
21 Century Crowell							
SFR		17	1	6	6	0.60	61
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		17					61
22 Century Crowell							
SFR		18	1	6	6	0.60	65
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		18					65

City of Banning Development Projects							
Development Lot	**Zone**	**Developable Acres**	**Units or sq. ft./acre**	**kVA/sq. ft. or unit**	**kVA/acre**	**Demand Factor**	**Diverified Total (kVA)**
23 Century Crowell							
SFR		33	1	6	6	0.60	119
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		33					119
24 Fiesta Development							
SFR		303	1	6	6	0.60	1,091
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		303					1,091
25 Careage Development - Independent Living Apartments							
SFR		0	1	6	6	0.60	-
MFR		72	1	2	2	0.60	86
C		0	1	50	50	.75	-
Subtotal		72					86
26 Tahiti Group							
SFR		30	1	6	6	0.60	108
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		30					108
27 Carri Constructiont							
SFR		303	1	6	6	0.60	1,091
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		303					1,091
28 C. W. Tefft							
SFR		484	1	6	6	0.60	1,742
MFR		0	1	2	2	0.60	-
C		0	1	50	50	.75	-
Subtotal		484					1,742
Total							**41,759**

Section 2
ANALYSIS OF EXISTING SYSTEM

2.1 Summary of Analysis and Conclusions

2.1.1 Transmission and Substation Analysis

The City electric system as illustrated in Exhibit 2-3 was modeled on Milsoft's Windmil™ software. Load-flows were prepared at existing and projected substation loads to evaluate conductor loading and voltage under normal and single contingency conditions. The load-flow information from the computer model was compared to the criteria outlined in this report. Recommendations were then based on these results.

The analysis revealed that the SCE Banning to Midway 34 kV line will be overloaded by load level 10 under normal conditions. SCE Banning to San Gorgonio and SCE Banning to Alola are also overloaded during single contingency conditions.

To address the overloads, a new 34 kV transmission line is proposed from SCE Banning to Midway Substation. This line would also serve the proposed Sunset substation. To improve reliability to 22nd Street Substation, now fed from a radial tap, the new 34 kV line can be tapped to provide a second feed to 22nd Substation. To provide single contingency reliability to all substations, a 2nd feed to Airport Substation is also proposed.

Existing 34 kV conductor upgrades will also be required to serve the projected loads. These projects are detailed in the Preferred Plan in Section 3.

Substation transformer capacities and historical and projected peak demands are summarized in Table 2-1. Midway Bank One is loaded above the OA rating in 2004, and San Gorgonio, Midway and 22nd Street substations are also projected to be loaded above capacity within the ten year planning period. Expansion and upgrades will be required to serve existing and future loads including the following:

- New Sunset 115-34-12 kV Substation
- New Deutsch 115-12 kV Substation
- Upgrade of Alola, Airport and Midway Substations

Table 2-1
Substation Transformer Bank Loading

Substation	Capacity (OA MVA)	2004 Load (MW)	Percent Loaded (2004)	Load Level 10 (MW)	Percent Loaded (LL10)	Load Level of 1st Overload
Alola #1	3.75	2.93	78%	3.39	90%	-
Alola #2	3.75	0.0	0%	0.0	0%	-
Alola #3	2.00	1.15	58%	1.4	70%	-
22nd Street	15.00	10.12	67%	16.37	**109%**	8
Airport	3.75	2.57	69%	3.12	83%	-
Midway #1	7.50	8.50	**113%**	11.93	**159%**	Existing
Midway #2	7.50	5.33	71%	13.62	**182%**	4
San Gorgonio #1	10.00	6.74	67%	13.12	**131%**	6
San Gorgonio #2	10.00	6.74	67%	9.92	99%	-

The distribution system is served through eleven (11) 12.5/7.2 kV breakers and eight (8) 4.2/2.4 kV breakers. Breaker loading is limited to 400 Amps. Table 2-2 summarizes existing and projected feeder loads. By load level ten, three feeders have projected loads exceeding 400 Amps.

Table 2-2
Feeder Loading

Feeders	400 Amp Capacity (MVA)	2004 Load (MW)	Percent Loaded (2004)	Load Level 10 (MW)	Percent Loaded (LL10)	Load Level of 1st Overload
Alola Ckt 1	2.9	1.87	65%	2.10	72%	-
Alola Ckt 2	2.9	1.08	37%	1.29	45%	-
Alola Ckt 3	2.9	0	0%	0	0%	-
Alola Ckt 4	2.9	0	0%	0	0%	-
Alola Ckt 0	2.9	0	0%	0	0%	-
Alola Ckt 8	2.9	1.20	41%	1.40	48%	-
22nd Street Ckt 63	8.6	6.63	77%	11.99	**139%**	4
22nd Street Ckt 64	8.6	3.49	41%	4.38	51%	-
22nd Street Ckt 65	8.6	0	0%	0	0%	-
Airport Ckt 9	2.9	1.92	66%	2.08	72%	-
Airport Ckt 10	2.9	.65	22%	1.04	36%	-

Feeders	400 Amp Capacity (MVA)	2004 Load (MW)	Percent Loaded (2004)	Load Level 10 (MW)	Percent Loaded (LL10)	Load Level of 1st Overload
Midway Ckt 21	8.6	3.66	43%	4.52	53%	-
Midway CKt 22	8.6	5.29	62%	7.40	86%	-
Midway Ckt 23	8.6	3.26	38%	9.78	**114%**	9
Midway Ckt 24	8.6	2.63	31%	3.84	45%	-
San Gorgonio Ckt 51	8.6	4.37	51%	9.39	**109%**	9
San Gorgonio Ckt 52	8.6	1.74	20%	3.73	43%	-
San Gorgonio Ckt 53	8.6	2.29	27%	6.13	71%	-
San Gorgonio Ckt 54	8.6	2.97	35%	3.79	44%	-

2.1.2 Existing Circuit Analysis

Each of the circuits was analyzed at existing 2004 peak loads with respect to adequate voltage and loading conditions with line regulation. As shown in and Exhibit 2-1 and Exhibit 2-4, the computer analysis of the peak reveals the following:

- 1 Existing load level circuit exceeded 5% or 6 volts drop.
- 3 Existing load level circuits had 3ϕ line sections that exceeded 60% of the conductor rating.
- 2 Existing load level circuits had 1ϕ line sections loaded greater than 50 amps.

The existing system was then analyzed at projected loads with respect to adequate voltage and loading conditions with line regulation. As shown in Exhibit 2-2 and Exhibit 2-5, the computer analysis of the peak reveals the following:

- 2 Load Level 10 circuits exceeded 5% or 6 volts drop.
- 7 Load Level 10 circuits had 3ϕ line sections that exceeded 60% of the conductor rating.
- 6 Load Level 10 circuits had 1ϕ line sections loaded greater than 50 amps.

Conversion from single-phase to three-phase is recommended for the single-phase taps loaded greater than 50 amps. This will provide greater reliability and load balance to the system.

The existing system provides adequate capacity and system performance for existing loads with the exception of 3 circuits with conductor loaded above 60% and 1 circuit with low voltage; by load level 10, 7 circuits are expected to have conductor loading above 60% and 2 circuits are anticipated to have voltage deficiencies.

2.2 Capacity of Existing System

2.2.1 Service to Present Loads

2.2.1.1 Transmission and Substation Capacity

All power purchased by the City is delivered by SCE at the SCE Banning Substation at 34.5 kV. SCE also serves loads other than the City from its Banning Substation. The SCE Banning Substation contains a 36.6/44.8/56 MVA and (2) 16.8/22.4/28 MVA, three-phase, 115/34.5 kV LTC power transformers. Assuming the other loads served by SCE from the Banning Substation are less than 15 MVA, the capacity is adequate for the Banning load under normal conditions, but does not provide single contingency reliability for loss of one of the SCE transformers.

The power received by the City at the SCE Banning Substation is delivered to five distribution substations by the City's 34.5 kV subtransmission lines which provide two-way service to three of the five substations; the Airport and 22nd Street Substations are served via a single subtransmission line. The 34.5 kV subtransmission system serves two 4.16 kV substations and three 12.47 kV substations. The five City substations serve eleven (11) 12.47 kV distribution feeders and eight (8) 4.16 kV distribution feeders.

The total non-coincident 2004 summer peak power load on the five distribution substations was estimated to be 50.55 MW. The total coincident load, as metered at SCE Banning Substation, was 42.42 MW. The 2004 transformer loads compared to the OA rating of each bank are summarized in Table 2-4. The Midway #1 transformer loads exceed the OA rating, but are within the FA rating.

Table 2-3
Substation Voltages, Capacities, and Historical Peak Demands

Substation	Voltage (kV)	Capacity (OA/FA MVA)	2004 Load (MW)	Percent Loaded (2004 Load/OA Capacity)
Alola #1	34.5-2.4/4.16Y	3.75/4.67	2.93	78%
Alola #2	34.5-2.4/4.16Y	3.75/4.67	0	0%
Alola #3	34.5-2.4/4.16Y	2.00/2.30	1.15	58%
22nd Street	34.5-7.4/12.47Y	15.00/20.00	10.12	67%
Airport	34.5-2.4/4.16Y	3.75/4.67	2.57	69%
Midway #1	34.5-7.4/12.47Y	7.50/10.00	8.50	113%
Midway #2	34.5-7.4/12.47Y	7.50/10.00	5.33	71%
San Gorgonio #1	34.5-7.4/12.47Y	10.00/14.00	6.74	67%
San Gorgonio #2	34.5-7.4/12.47Y	10.00/14.00	6.74	67%

The 600 Amp substation feeder breakers are set to trip at 400 Amps. Table 2-5 illustrates that at 2004 loads, no feeder breakers exceed 400 Amps.

Table 2-4
Feeder Breaker Loading

Feeders	400 Amp Capacity (MVA)	2004 Load (MW)	Percent Loaded (2004)
Alola Ckt 1	2.9	1.87	65%
Alola Ckt 2	2.9	1.08	37%
Alola Ckt 3	2.9	0	0%
Alola Ckt 4	2.9	0	0%
Alola Ckt 0	2.9	0	0%
Alola Ckt 8	2.9	1.2	41%
22nd Street Ckt 63	8.6	6.63	77%
22nd Street Ckt 64	8.6	3.49	41%
22nd Street Ckt 65	8.6	0	0%
Airport Ckt 9	2.9	1.92	66%
Airport Ckt 10	2.9	.65	22%
Midway Ckt 21	8.6	3.66	43%
Midway Ckt 22	8.6	5.29	62%
Midway Ckt 23	8.6	3.26	38%
Midway Ckt 24	8.6	2.63	31%
San Gorgonio Ckt 51	8.6	4.37	51%
San Gorgonio Ckt 52	8.6	1.74	20%
San Gorgonio Ckt 53	8.6	2.29	27%
San Gorgonio Ckt 54	8.6	2.97	35%

2.2.1.2 Circuit Capacity and Loads

The City electric system as illustrated in Exhibit 2-3 was modeled on Milsoft Utility Solutions' Windmil™ software. Load data were obtained from historical circuit readings. Loading on the system was assumed to be proportional to connected distribution transformer kVA in each line section. Metered circuit demand was included as spot load where available.

Load-flows were prepared at existing loads to provide information such as the percent conductor loading to its capacity, calculated line losses, and voltage drop along line sections. The load-flow information from the computer model was compared to the criteria outlined in this report. Recommendations were then based on these results.

Exhibit 2-1 summarizes the existing distribution system deficiencies at the existing peak loads. The information contained in Exhibit 2-1 and illustrated in Exhibit 2-4 is based on the load-flow and voltage-drop results from the 2004 WindMil electric system model.

2.2.2 Service to Future Loads

The long-range planning load of the system was prepared by R. W. Beck, Inc. ("R. W. Beck"). This load was allocated to areas of the system based on City Staff's knowledge of the area and available information on proposed developments.

2.2.2.1 Transmission, Substation and Circuit Capacity

The long-range planning load was allocated to each substation, transformer bank and feeder as given in Exhibit 1-1. Exhibit 1-1 was used to identify the load level at which a substation transformer or breaker was overloaded. The rated capacity of each transformer was used to determine when the substation would be overloaded. The following substations and feeders are loaded above rated capacity during the ten year planning period:

Table 2-5
Substation Transformer Bank and Feeder Overloads

Transformer Bank/Feeder	Capacity (OA MVA)/400 Amp (MVA)	Load Level of OA/400 Amp Overload	Capacity (FA MVA)/600 Amp (MVA)	Load Level of FA/600 Amp Overload
Midway #1	7.50	Existing	10.00	5
Midway #2	7.50	4	10.00	7
Circuit 23	8.6	9	12.96	-
22nd Street	15.00	8	20.00	-
Circuit 63	8.6	4	12.96	-
San Gorgonio #1	10.00	6	14.00	-
Circuit 51	8.6	9	12.96	-

2.2.3 System Performance

2.2.3.1 Voltage level

For the design load, a six volt drop was assumed to be the maximum allowable voltage drop from the substation to the end of the distribution feeders with line regulators. Feeder voltage drops for future loads were calculated and deficiencies are summarized in Exhibit 2-2 and illustrated in Exhibit 2-5.

Voltage regulation was assumed for each substation such that a voltage drop could be experienced on the transmission system at peak loads and 126 volts could be supplied from the substation secondary bus. Any proposed substations were assumed to contain transformers with load tap changers.

2.2.3.2 Demand and Energy Losses

Table 2-8 is a three-year history of transmission line losses outside of the city and distribution losses within the city expressed as a percentage of the total energy purchases.

Table 2-6
Percent Energy Losses

Calendar Year	Distribution Losses	Transmission Line Losses	Total Losses
2001	8.2%	4.0%	12.2%
2002	8.9%	6.7%	15.6%
2003	10.3%	7.1%	17.4%

2.3 Overcurrent Protection and SCADA

Based on the information provided by the City of Banning, the substation transformer and distribution system protection is provided by a combination of electromechanical and electronic relays located at the substations. The existing relays and settings were reviewed based on the present configuration of the system, and no adjustments to the existing devices were recommended. However, maintenance and testing are recommended to insure that the relays respond according to the manufacturer's specifications.

Based on the age of the existing electromechanical relays and the strategic direction desired by the City of Banning, new electronic relay are recommended for all new substations and substation upgrades included in the Preferred Plan. It is also recommended that the remaining electromechanical relays be replaced by the end of the planning period.

The City of Banning is pursuing the addition of a Supervisory Control and Data Acquisition (SCADA) system to gather important system data for planning and maintenance purposes, and help locate outages and speed up the system restoration process. The three areas that must be addressed in order to plan for the implementation of a SCADA system are the master station, the communications system and the remote subsystems. These areas are discussed in Appendix A of this report.

2.4 Environmentally Sensitive Areas

When distribution lines were assumed to be constructed or reconductored to a larger conductor size, existing distribution line routing was planned to be used where possible. Environmentally sensitive areas were considered in cases where new substation, transmission or distribution lines were required. Such areas were avoided, if possible, or locations/routes were selected to minimize the impact of the new construction.

2.5 Adequacy of Basic Data

The historical, financial, and load data provided by City were adequate to sufficiently analyze the system for a long-range analysis for the Master Plan.

Exhibit 2-1
Distribution System Deficiencies at 2004 Peak

Banning Existing System
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG2984	ABC	350AL	0.11	7.20	119.94
22ND STREET	CKT 63	UG3160	ABC	350AL	0.07	7.20	119.92
22ND STREET	CKT 63	UG3213	ABC	350AL	0.06	7.19	119.90
22ND STREET	CKT 63	UG4457	B	1/0 AL	0.13	7.19	119.84
22ND STREET	CKT 63	UG4456	B	1/0 AL	0.10	7.19	119.80
22ND STREET	CKT 63	UG4460	B	1/0 AL	0.02	7.19	119.80
22ND STREET	CKT 63	UG4462	B	1/0 AL	0.09	7.19	119.79
22ND STREET	CKT 63	UG4461	B	1/0 AL	0.05	7.19	119.80
22ND STREET	CKT 63	UG4463	B	1/0 AL	0.05	7.19	119.80
22ND STREET	CKT 63	UG4466	C	4/0 AL	0.08	7.19	119.89
22ND STREET	CKT 63	UG4469	C	1/0 AL	0.03	7.19	119.88
22ND STREET	CKT 63	UG4471	C	1/0 AL	0.07	7.19	119.88
22ND STREET	CKT 63	UG4467	C	1/0 AL	0.09	7.19	119.88
22ND STREET	CKT 63	UG2431	ABC	350AL	0.09	7.19	119.89
22ND STREET	CKT 63	UG4473	ABC	2/0AL	0.05	7.19	119.89
22ND STREET	CKT 63	UG2430	C	2 AL	0.11	7.19	119.82
22ND STREET	CKT 63	UG2428	C	2 AL	0.06	7.19	119.79
22ND STREET	CKT 63	UG2422	C	2 AL	0.06	7.19	119.79
22ND STREET	CKT 63	UG2424	C	2 AL	0.06	7.19	119.79
22ND STREET	CKT 63	UG2426	C	2 AL	0.02	7.19	119.79
22ND STREET	CKT 63	UG2470	A	2 AL	0.06	7.19	119.85
22ND STREET	CKT 63	UG2476	A	2 AL	0.07	7.19	119.81
22ND STREET	CKT 63	UG2479	A	2 AL	0.06	7.19	119.79
22ND STREET	CKT 63	UG2482	A	2 AL	0.07	7.19	119.78
22ND STREET	CKT 63	UG4546	ABC	350AL	0.13	7.19	119.89
22ND STREET	CKT 63	UG2434	ABC	2/0AL	0.04	7.19	119.89
22ND STREET	CKT 63	UG2435	A	2 AL	0.02	7.19	119.89
22ND STREET	CKT 63	UG2438	ABC	2/0AL	0.10	7.19	119.87
22ND STREET	CKT 63	UG2440	B	2 AL	0.01	7.19	119.87
22ND STREET	CKT 63	UG2443	ABC	2/0AL	0.04	7.19	119.86
22ND STREET	CKT 63	UG2446	C	2 AL	0.05	7.19	119.86
22ND STREET	CKT 63	UG2449	B	2 AL	0.03	7.19	119.84
22ND STREET	CKT 63	UG2451	B	2 AL	0.04	7.19	119.82
22ND STREET	CKT 63	UG4464	B	2 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG2453	B	2 AL	0.07	7.19	119.81
22ND STREET	CKT 63	UG2458	A	2 AL	0.03	7.19	119.86
22ND STREET	CKT 63	UG2464	A	2 AL	0.06	7.19	119.85
22ND STREET	CKT 63	UG2472	A	2 AL	0.03	7.19	119.89
22ND STREET	CKT 63	UG3186	ABC	350AL	0.06	7.20	119.92
22ND STREET	CKT 63	UG4251	ABC	350AL	0.15	7.19	119.88
22ND STREET	CKT 63	UG3187	ABC	350AL	0.01	7.19	119.88
22ND STREET	CKT 63	UG4478	ABC	350AL	0.12	7.19	119.88
22ND STREET	CKT 63	UG4235	ABC	2/0AL	0.06	7.19	119.87
22ND STREET	CKT 63	UG2589	B	2 AL	0.08	7.19	119.83
22ND STREET	CKT 63	UG2591	B	2 AL	0.06	7.19	119.82
22ND STREET	CKT 63	UG2595	B	2 AL	0.09	7.19	119.81
22ND STREET	CKT 63	UG2588	ABC	2/0AL	0.09	7.19	119.87
22ND STREET	CKT 63	UG2602	B	2 AL	0.07	7.19	119.87

Banning Existing System
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG2599	C	2 AL	0.01	7.19	119.87
22ND STREET	CKT 63	UG4236	A	2 AL	0.01	7.19	119.88
22ND STREET	CKT 63	UG1964	ABC	1/0 AL	0.07	7.19	119.83
22ND STREET	CKT 63	UG1905	ABC	1/0 AL	0.09	7.19	119.79
22ND STREET	CKT 63	UG1814	ABC	2 AL	0.10	7.18	119.74
22ND STREET	CKT 63	UG3198	ABC	2/0AL	0.12	7.18	119.71
22ND STREET	CKT 63	UG1755	B	2 AL	0.05	7.18	119.70
22ND STREET	CKT 63	UG1764	B	2 AL	0.07	7.18	119.69
22ND STREET	CKT 63	UG1770	A	2 AL	0.05	7.18	119.67
22ND STREET	CKT 63	UG1776	A	2 AL	0.03	7.18	119.66
22ND STREET	CKT 63	UG1782	A	2 AL	0.05	7.18	119.66
22ND STREET	CKT 63	UG1789	A	2 AL	0.07	7.18	119.66
22ND STREET	CKT 63	UG1797	A	2 AL	0.04	7.18	119.65
22ND STREET	CKT 63	UG1800	A	2 AL	0.04	7.18	119.70
22ND STREET	CKT 63	UG1809	A	2 AL	0.04	7.18	119.70
22ND STREET	CKT 63	UG1820	A	2 AL	0.02	7.18	119.73
22ND STREET	CKT 63	UG1829	A	2 AL	0.04	7.18	119.73
22ND STREET	CKT 63	UG1848	B	2 AL	0.04	7.18	119.73
22ND STREET	CKT 63	UG1855	B	2 AL	0.04	7.18	119.73
22ND STREET	CKT 63	UG1881	C	2 AL	0.03	7.18	119.73
22ND STREET	CKT 63	UG1896	C	2 AL	0.03	7.18	119.73
22ND STREET	CKT 63	UG1917	C	2 AL	0.04	7.19	119.77
22ND STREET	CKT 63	UG1922	C	2 AL	0.06	7.19	119.75
22ND STREET	CKT 63	UG1932	C	2 AL	0.03	7.19	119.75
22ND STREET	CKT 63	UG1908	A	2 AL	0.02	7.19	119.79
22ND STREET	CKT 63	UG19731	A	2 AL	0.02	7.19	119.82
22ND STREET	CKT 63	UG1993	A	2 AL	0.05	7.19	119.81
22ND STREET	CKT 63	UG2002	A	2 AL	0.08	7.19	119.81
22ND STREET	CKT 63	UG1965	A	2 AL	0.03	7.19	119.83
22ND STREET	CKT 63	UG2010	A	2 AL	0.02	7.19	119.83
22ND STREET	CKT 63	UG2026	A	2 AL	0.01	7.19	119.82
22ND STREET	CKT 63	UG2029	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2036	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2038	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2039	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2041	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2042	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2043	A	2 AL	0.03	7.19	119.82
22ND STREET	CKT 63	UG2045	A	2 AL	0.03	7.19	119.82
22ND STREET	CKT 63	UG2046	A	2 AL	0.01	7.19	119.82
22ND STREET	CKT 63	UG2047	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2048	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2049	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2050	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2051	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2052	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2053	A	2 AL	0.00	7.19	119.82
22ND STREET	CKT 63	UG2054	A	2 AL	0.00	7.19	119.82

Banning Existing System
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG2055	A	2 AL	0.02	7.19	119.82
22ND STREET	CKT 63	UG4234	A	1/0 AL	0.12	7.19	119.87
22ND STREET	CKT 63	UG2995	A	1/0 AL	0.06	7.19	119.86
22ND STREET	CKT 63	UG2992	A	1/0 AL	0.05	7.19	119.85
22ND STREET	CKT 63	UG2988	A	1/0 AL	0.01	7.19	119.85
22ND STREET	CKT 63	UG2998	A	1/0 AL	0.05	7.19	119.84
22ND STREET	CKT 63	UG2987	A	1/0 AL	0.09	7.19	119.84
22ND STREET	CKT 63	UG3184	ABC	350 CU	0.06	7.19	119.92
22ND STREET	CKT 63	UG1682	ABC	350 CU	0.05	7.19	119.90
22ND STREET	CKT 63	UG1680	ABC	350 CU	0.08	7.19	119.86
22ND STREET	CKT 63	UG2663	B	1/0 AL	0.02	7.19	119.85
22ND STREET	CKT 63	UG4250	B	1/0 AL	0.03	7.19	119.84
22ND STREET	CKT 63	UG4247	B	1/0 AL	0.08	7.19	119.82
22ND STREET	CKT 63	UG4244	B	1/0 AL	0.08	7.19	119.81
22ND STREET	CKT 63	UG4524	B	1/0 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG4429	ABC	500 AL	0.09	7.19	119.82
22ND STREET	CKT 63	UG2608	ABC	1/0 AL	0.05	7.19	119.82
22ND STREET	CKT 63	UG1880	ABC	1/0 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG1879	ABC	1/0 AL	0.06	7.19	119.81
22ND STREET	CKT 63	UG1873	ABC	1/0 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG1872	ABC	1/0 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG1868	ABC	1/0 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1854	ABC	1/0 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG1856	ABC	1/0 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1857	ABC	1/0 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1862	ABC	1/0 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG2932	ABC	1/0 AL	0.07	7.19	119.81
22ND STREET	CKT 63	UG4514	ABC	1/0 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG4517	ABC	1/0 AL	0.12	7.19	119.81
22ND STREET	CKT 63	UG3189	ABC	1/0 AL	0.10	7.19	119.81
22ND STREET	CKT 63	UG1885	ABC	500 AL	0.01	7.19	119.82
22ND STREET	CKT 63	UG1886	ABC	500 AL	0.01	7.19	119.82
22ND STREET	CKT 63	UG2953	C	1/0 AL	0.05	7.19	119.82
22ND STREET	CKT 63	UG1887	ABC	500 AL	0.03	7.19	119.82
22ND STREET	CKT 63	UG2841	ABC	500 AL	0.05	7.19	119.82
22ND STREET	CKT 63	UG2948	ABC	500 AL	0.09	7.19	119.81
22ND STREET	CKT 63	UG1927	ABC	500 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG1940	ABC	500 AL	0.01	7.19	119.81
22ND STREET	CKT 63	UG1947	ABC	500 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG1949	ABC	500 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1633	ABC	500 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1673	ABC	500 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG1632	ABC	500 AL	0.02	7.19	119.81
22ND STREET	CKT 63	UG2831	ABC	500 AL	0.03	7.19	119.81
22ND STREET	CKT 63	UG4419	ABC	500 AL	0.02	7.19	119.80
22ND STREET	CKT 63	UG4422	ABC	4/0 AL	0.10	7.19	119.80
22ND STREET	CKT 63	UG1674	C	1/0 AL	0.01	7.19	119.79
22ND STREET	CKT 63	UG4537	C	1/0 AL	0.11	7.19	119.79

Banning Existing System
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG4542	C	1/0 AL	0.06	7.19	119.79
22ND STREET	CKT 63	UG4536	C	1/0 AL	0.02	7.19	119.79
22ND STREET	CKT 63	UG2833	B	1/0 AL	0.05	7.19	119.79
22ND STREET	CKT 63	UG2945	C	1/0 AL	0.02	7.19	119.79
22ND STREET	CKT 63	UG1808	C	1/0 AL	0.08	7.18	119.75
22ND STREET	CKT 63	UG1813	C	1/0 AL	0.06	7.18	119.73
22ND STREET	CKT 63	UG1819	C	1/0 AL	0.07	7.18	119.71
22ND STREET	CKT 63	UG1828	C	1/0 AL	0.07	7.18	119.70
22ND STREET	CKT 63	UG1843	C	1/0 AL	0.07	7.18	119.69
22ND STREET	CKT 63	UG1638	ABC	500 AL	0.02	7.19	119.80
22ND STREET	CKT 63	UG4549	ABC	500 AL	0.01	7.19	119.80
22ND STREET	CKT 63	UG4550	ABC	500 AL	0.07	7.19	119.80
22ND STREET	CKT 63	UG4518	AC	1/0 AL	0.09	7.18	119.73
22ND STREET	CKT 63	UG4433	C	1/0 AL	0.02	7.18	119.73
22ND STREET	CKT 63	UG4431	C	1/0 AL	0.02	7.18	119.73
22ND STREET	CKT 63	UG4520	C	1/0 AL	0.05	7.18	119.72
22ND STREET	CKT 63	UG1986	C	1/0 AL	0.09	7.18	119.71
22ND STREET	CKT 63	UG2930	C	1/0 AL	0.06	7.18	119.70
22ND STREET	CKT 63	UG2921	C	1/0 AL	0.05	7.18	119.70
22ND STREET	CKT 63	UG2920	C	1/0 AL	0.07	7.18	119.70
22ND STREET	CKT 63	UG4539	C	1/0 AL	0.07	7.18	119.70
22ND STREET	CKT 63	UG4519	C	1/0 AL	0.04	7.18	119.73
22ND STREET	CKT 63	UG4434	C	1/0 AL	0.05	7.18	119.73
22ND STREET	CKT 63	UG4494	C	1/0 AL	0.01	7.18	119.73
22ND STREET	CKT 63	UG4496	C	1/0 AL	0.07	7.18	119.73
22ND STREET	CKT 63	UG4521	A	1/0 AL	0.09	7.17	119.55
22ND STREET	CKT 63	UG4522	A	1/0 AL	0.10	7.16	119.34
22ND STREET	CKT 63	UG2933	A	1/0 AL	0.01	7.16	119.34
22ND STREET	CKT 63	UG1861	A	1/0 AL	0.06	7.16	119.28
22ND STREET	CKT 63	UG1958	A	1/0 AL	0.07	7.15	119.22
22ND STREET	CKT 63	UG1961	A	1/0 AL	0.02	7.15	119.22
22ND STREET	CKT 63	UG2934	A	1/0 AL	0.06	7.15	119.17
22ND STREET	CKT 63	UG4513	A	1/0 AL	0.01	7.15	119.17
22ND STREET	CKT 63	UG2939	A	1/0 AL	0.04	7.15	119.16
22ND STREET	CKT 63	UG1969	A	1/0 AL	0.05	7.15	119.16
22ND STREET	CKT 63	UG2937	A	1/0 AL	0.05	7.15	119.14
22ND STREET	CKT 63	UG2935	A	1/0 AL	0.01	7.15	119.14
22ND STREET	CKT 63	UG1975	A	1/0 AL	0.07	7.15	119.13
22ND STREET	CKT 63	UG1977	A	1/0 AL	0.04	7.15	119.13
22ND STREET	CKT 63	UG4512	A	1/0 AL	0.06	7.15	119.13
22ND STREET	CKT 63	UG2936	A	1/0 AL	0.07	7.15	119.14
22ND STREET	CKT 63	UG4523	A	1/0 AL	0.07	7.16	119.28
22ND STREET	CKT 63	UG1801	A	1/0 AL	0.06	7.15	119.23
22ND STREET	CKT 63	UG1790	A	1/0 AL	0.09	7.15	119.16
22ND STREET	CKT 63	UG1783	A	1/0 AL	0.08	7.15	119.11
22ND STREET	CKT 63	UG1777	A	1/0 AL	0.07	7.14	119.08
22ND STREET	CKT 63	UG1771	A	1/0 AL	0.07	7.14	119.06
22ND STREET	CKT 63	UG1765	A	1/0 AL	0.07	7.14	119.04

Banning Existing System
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG4269	A	1/0 AL	0.08	7.14	119.03
22ND STREET	CKT 63	UG4270	A	1/0 AL	0.04	7.14	119.03
22ND STREET	CKT 63	UG1761	A	1/0 AL	0.01	7.14	119.03
22ND STREET	CKT 63	UG1668	A	1/0 AL	0.01	7.14	119.03
22ND STREET	CKT 63	UG4511	A	1/0 AL	0.06	7.14	119.03
22ND STREET	CKT 63	UG4526	B	1/0 AL	0.02	7.19	119.78
22ND STREET	CKT 63	UG2951	B	1/0 AL	0.03	7.18	119.71
22ND STREET	CKT 63	UG2950	B	1/0 AL	0.05	7.18	119.68
22ND STREET	CKT 63	UG4426	B	1/0 AL	0.09	7.18	119.66
22ND STREET	CKT 63	UG4423	B	1/0 AL	0.07	7.18	119.66
22ND STREET	CKT 63	UG2947	B	1/0 AL	0.09	7.18	119.66
22ND STREET	CKT 63	UG4424	B	1/0 AL	0.01	7.18	119.66
22ND STREET	CKT 63	UG1920	B	1/0 AL	0.06	7.18	119.68
22ND STREET	CKT 63	UG1914	B	1/0 AL	0.03	7.18	119.68
22ND STREET	CKT 63	UG4535	B	1/0 AL	0.06	7.18	119.68
22ND STREET	CKT 63	UG1888	B	1/0 AL	0.04	7.18	119.70
22ND STREET	CKT 63	UG1891	B	1/0 AL	0.06	7.18	119.69
22ND STREET	CKT 63	UG1897	B	1/0 AL	0.05	7.18	119.69
22ND STREET	CKT 63	UG1906	B	1/0 AL	0.04	7.18	119.66
22ND STREET	CKT 63	UG1909	B	1/0 AL	0.05	7.18	119.59
22ND STREET	CKT 63	UG2865	B	1/0 AL	0.07	7.17	119.57
22ND STREET	CKT 63	UG4427	B	1/0 AL	0.06	7.17	119.55
22ND STREET	CKT 63	UG2605	B	1/0 AL	0.07	7.17	119.55
22ND STREET	CKT 63	UG2603	B	1/0 AL	0.06	7.17	119.55
22ND STREET	CKT 63	UG1916	B	1/0 AL	0.01	7.18	119.59
22ND STREET	CKT 63	UG1918	B	1/0 AL	0.02	7.17	119.57
22ND STREET	CKT 63	UG1919	B	1/0 AL	0.02	7.17	119.55
22ND STREET	CKT 63	UG1928	B	1/0 AL	0.02	7.17	119.54
22ND STREET	CKT 63	UG1930	B	1/0 AL	0.02	7.17	119.53
22ND STREET	CKT 63	UG1933	B	1/0 AL	0.02	7.17	119.52
22ND STREET	CKT 63	UG1936	B	1/0 AL	0.02	7.17	119.51
22ND STREET	CKT 63	UG1939	B	1/0 AL	0.05	7.17	119.49
22ND STREET	CKT 63	UG4416	B	1/0 AL	0.06	7.17	119.48
22ND STREET	CKT 63	UG4417	B	1/0 AL	0.03	7.17	119.47
22ND STREET	CKT 63	UG2834	B	1/0 AL	0.06	7.17	119.46
22ND STREET	CKT 63	UG4421	B	1/0 AL	0.01	7.17	119.46
22ND STREET	CKT 63	UG4530	B	1/0 AL	0.01	7.17	119.46
22ND STREET	CKT 63	UG1640	B	1/0 AL	0.01	7.17	119.46
22ND STREET	CKT 63	UG4532	B	1/0 AL	0.07	7.17	119.46
22ND STREET	CKT 63	UG4531	B	1/0 AL	0.08	7.17	119.46

Banning Existing System
Conductor Loading

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	% Cap
22ND STREET	CKT 63	OH2064	ABC	4/0ACSR	0.04	7.51	84
22ND STREET	CKT 63	OH2065	ABC	4/0ACSR	0.05	7.50	84
22ND STREET	CKT 63	OH2066	ABC	4/0ACSR	0.04	7.50	84
22ND STREET	CKT 63	OH2067	ABC	4/0ACSR	0.04	7.49	84
22ND STREET	CKT 63	OH2068	ABC	4/0ACSR	0.04	7.48	84
22ND STREET	CKT 63	OH2069	ABC	4/0ACSR	0.03	7.47	85
22ND STREET	CKT 63	UG3149	ABC	350AL	0.09	7.25	74
22ND STREET	CKT 63	UG3151	ABC	350AL	0.06	7.25	74
22ND STREET	CKT 63	UG4379	ABC	350AL	0.05	7.24	74
22ND STREET	CKT 63	UG3177	ABC	2/0AL	0.00	7.24	129
22ND STREET	CKT 63	UG3156	ABC	350AL	0.21	7.22	67
22ND STREET	CKT 63	UG4479	ABC	350AL	0.13	7.21	67
AIRPORT	CKT 9	OH1460	ABC	2ACSR	0.02	2.52	101
AIRPORT	CKT 9	OH1461	ABC	2ACSR	0.02	2.51	101
AIRPORT	CKT 9	OH1661	ABC	2ACSR	0.01	2.51	78
AIRPORT	CKT 9	OH1572	ABC	2ACSR	0.01	2.51	78
SAN GORGONIO	CKT 51	OH177	ABC	3/0ACSR	0.02	7.55	64
SAN GORGONIO	CKT 51	OH178	ABC	3/0ACSR	0.04	7.54	64
SAN GORGONIO	CKT 51	OH181	ABC	3/0ACSR	0.04	7.53	64
SAN GORGONIO	CKT 51	OH182	ABC	3/0ACSR	0.03	7.53	64
SAN GORGONIO	CKT 51	OH197	ABC	3/0ACSR	0.03	7.53	64
SAN GORGONIO	CKT 51	OH198	ABC	3/0ACSR	0.03	7.52	64
SAN GORGONIO	CKT 51	OH199	ABC	3/0ACSR	0.03	7.52	64
SAN GORGONIO	CKT 51	OH1380	ABC	3/0ACSR	0.04	7.51	64
SAN GORGONIO	CKT 51	OH1381	ABC	3/0ACSR	0.03	7.51	64
SAN GORGONIO	CKT 51	OH1382	ABC	3/0ACSR	0.04	7.50	64
SAN GORGONIO	CKT 51	OH1383	ABC	3/0ACSR	0.03	7.50	64
SAN GORGONIO	CKT 51	OH1384	ABC	3/0ACSR	0.04	7.49	64
SAN GORGONIO	CKT 51	OH1385	ABC	3/0ACSR	0.02	7.49	64
SAN GORGONIO	CKT 51	OH1386	ABC	3/0ACSR	0.03	7.48	64

Banning Existing System
1ph Loading

Substation	Feeder	Section	Phase	Equipment	Length(mi)	Primary kV	Thru Amps Bal
22ND STREET	CKT 63	UG4521	A	1/0 AL	0.09	7.17	81.13
22ND STREET	CKT 63	UG4522	A	1/0 AL	0.10	7.16	81.15
22ND STREET	CKT 63	UG4526	B	1/0 AL	0.02	7.19	87.07
22ND STREET	CKT 63	UG2951	B	1/0 AL	0.03	7.18	87.08
22ND STREET	CKT 63	UG1906	B	1/0 AL	0.04	7.18	56.02
MIDWAY	CKT 24	UG4572	A	1/0 AL	0.19	7.51	50.24
MIDWAY	CKT 24	UG4573	A	1/0 AL	0.01	7.51	50.28

Exhibit 2-2
Distribution System Deficiencies at Projected Loads

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	OH3345	ABC	336ACSR	0.05	7.20	119.99
22ND STREET	CKT 63	OH3344	ABC	336ACSR	0.06	7.19	119.77
22ND STREET	CKT 63	OH3343	ABC	336ACSR	0.06	7.17	119.57
22ND STREET	CKT 63	OH3342	ABC	336ACSR	0.05	7.16	119.40
22ND STREET	CKT 63	OH3372	ABC	336ACSR	0.02	7.16	119.40
22ND STREET	CKT 63	OH3373	ABC	336ACSR	0.03	7.16	119.40
22ND STREET	CKT 63	UG3374	ABC	1/0 AL	0.01	7.16	119.39
22ND STREET	CKT 63	OH3341	ABC	336ACSR	0.04	7.16	119.29
22ND STREET	CKT 63	OH3340	ABC	336ACSR	0.04	7.15	119.16
22ND STREET	CKT 63	OH3339	ABC	336ACSR	0.05	7.14	119.01
22ND STREET	CKT 63	OH3338	ABC	336ACSR	0.05	7.14	119.01
22ND STREET	CKT 63	UG1183	ABC	750 AL	0.02	7.14	118.96
22ND STREET	CKT 63	UG1184	ABC	750 AL	0.12	7.12	118.72
22ND STREET	CKT 63	UG3120	ABC	750 AL	0.07	7.11	118.58
22ND STREET	CKT 63	UG1588	ABC	750 AL	0.04	7.11	118.51
22ND STREET	CKT 63	UG3114	ABC	750 AL	0.05	7.10	118.41
22ND STREET	CKT 63	UG3123	ABC	750 AL	0.16	7.09	118.11
22ND STREET	CKT 63	UG4318	A	2 AL	0.03	7.09	118.11
22ND STREET	CKT 63	UG4317	ABC	750 AL	0.15	7.07	117.82
22ND STREET	CKT 63	UG4552	ABC	1/0 AL	0.02	7.07	117.82
22ND STREET	CKT 63	UG4320	ABC	750 AL	0.28	7.04	117.28
22ND STREET	CKT 63	UG3149	ABC	350AL	0.09	7.02	117.01
22ND STREET	CKT 63	UG3151	ABC	350AL	0.06	7.01	116.84
22ND STREET	CKT 63	UG4379	ABC	350AL	0.05	7.00	116.70
22ND STREET	CKT 63	UG3177	ABC	2/0AL	0.00	7.00	116.69
22ND STREET	CKT 63	UG3156	ABC	350AL	0.21	6.97	116.15
22ND STREET	CKT 63	UG4479	ABC	350AL	0.13	6.95	115.81
22ND STREET	CKT 63	UG4482	ABC	2 AL	0.11	6.94	115.71
22ND STREET	CKT 63	UG4483	A	2 AL	0.02	6.94	115.71
22ND STREET	CKT 63	UG4480	ABC	2 AL	0.14	6.94	115.67
22ND STREET	CKT 63	UG4594	B	2 AL	0.13	6.94	115.59
22ND STREET	CKT 63	UG4597	B	2 AL	0.02	6.93	115.57
22ND STREET	CKT 63	UG4661	B	2 AL	0.06	6.93	115.57
22ND STREET	CKT 63	UG4599	B	2 AL	0.04	6.93	115.54
22ND STREET	CKT 63	UG4601	B	2 AL	0.08	6.93	115.53
22ND STREET	CKT 63	UG4600	B	2 AL	0.07	6.93	115.51
22ND STREET	CKT 63	UG4604	B	2 AL	0.11	6.93	115.50
22ND STREET	CKT 63	UG4595	B	2 AL	0.03	6.94	115.59
22ND STREET	CKT 63	UG3157	ABC	350AL	0.12	6.93	115.55
22ND STREET	CKT 63	UG2984	ABC	350AL	0.11	6.92	115.31
22ND STREET	CKT 63	UG3160	ABC	350AL	0.07	6.92	115.27
22ND STREET	CKT 63	UG3213	ABC	350AL	0.06	6.91	115.24
22ND STREET	CKT 63	UG4457	B	1/0 AL	0.13	6.91	115.13
22ND STREET	CKT 63	UG4456	B	1/0 AL	0.10	6.90	115.06
22ND STREET	CKT 63	UG4460	B	1/0 AL	0.02	6.90	115.06
22ND STREET	CKT 63	UG4462	B	1/0 AL	0.09	6.90	115.05
22ND STREET	CKT 63	UG4461	B	1/0 AL	0.05	6.90	115.05
22ND STREET	CKT 63	UG4463	B	1/0 AL	0.05	6.90	115.06

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG4466	C	4/0 AL	0.08	6.91	115.21
22ND STREET	CKT 63	UG4469	C	1/0 AL	0.03	6.91	115.21
22ND STREET	CKT 63	UG4471	C	1/0 AL	0.07	6.91	115.20
22ND STREET	CKT 63	UG4467	C	1/0 AL	0.09	6.91	115.21
22ND STREET	CKT 63	UG2431	ABC	350AL	0.09	6.91	115.22
22ND STREET	CKT 63	UG4473	ABC	2/0AL	0.05	6.91	115.22
22ND STREET	CKT 63	UG2430	C	2 AL	0.11	6.91	115.10
22ND STREET	CKT 63	UG2428	C	2 AL	0.06	6.90	115.05
22ND STREET	CKT 63	UG2422	C	2 AL	0.06	6.90	115.05
22ND STREET	CKT 63	UG2424	C	2 AL	0.06	6.90	115.04
22ND STREET	CKT 63	UG2426	C	2 AL	0.02	6.90	115.05
22ND STREET	CKT 63	UG2470	A	2 AL	0.06	6.91	115.14
22ND STREET	CKT 63	UG2476	A	2 AL	0.07	6.90	115.08
22ND STREET	CKT 63	UG2479	A	2 AL	0.06	6.90	115.04
22ND STREET	CKT 63	UG2482	A	2 AL	0.07	6.90	115.03
22ND STREET	CKT 63	UG4546	ABC	350AL	0.13	6.91	115.22
22ND STREET	CKT 63	UG2434	ABC	2/0AL	0.04	6.91	115.22
22ND STREET	CKT 63	UG2435	A	2 AL	0.02	6.91	115.22
22ND STREET	CKT 63	UG2438	ABC	2/0AL	0.10	6.91	115.18
22ND STREET	CKT 63	UG2440	B	2 AL	0.01	6.91	115.18
22ND STREET	CKT 63	UG2443	ABC	2/0AL	0.04	6.91	115.18
22ND STREET	CKT 63	UG2446	C	2 AL	0.05	6.91	115.17
22ND STREET	CKT 63	UG2449	B	2 AL	0.03	6.91	115.14
22ND STREET	CKT 63	UG2451	B	2 AL	0.04	6.91	115.10
22ND STREET	CKT 63	UG4464	B	2 AL	0.03	6.91	115.08
22ND STREET	CKT 63	UG2453	B	2 AL	0.07	6.90	115.07
22ND STREET	CKT 63	UG2458	A	2 AL	0.03	6.91	115.17
22ND STREET	CKT 63	UG2464	A	2 AL	0.06	6.91	115.15
22ND STREET	CKT 63	UG2472	A	2 AL	0.03	6.91	115.21
22ND STREET	CKT 63	UG3186	ABC	350AL	0.06	6.92	115.28
22ND STREET	CKT 63	UG4251	ABC	350AL	0.15	6.91	115.20
22ND STREET	CKT 63	UG3187	ABC	350AL	0.01	6.91	115.20
22ND STREET	CKT 63	UG4478	ABC	350AL	0.12	6.91	115.20
22ND STREET	CKT 63	UG4235	ABC	2/0AL	0.06	6.91	115.19
22ND STREET	CKT 63	UG2589	B	2 AL	0.08	6.91	115.12
22ND STREET	CKT 63	UG2591	B	2 AL	0.06	6.91	115.09
22ND STREET	CKT 63	UG2595	B	2 AL	0.09	6.90	115.08
22ND STREET	CKT 63	UG2588	ABC	2/0AL	0.09	6.91	115.19
22ND STREET	CKT 63	UG2602	B	2 AL	0.07	6.91	115.19
22ND STREET	CKT 63	UG2599	C	2 AL	0.01	6.91	115.19
22ND STREET	CKT 63	UG4236	A	2 AL	0.01	6.91	115.20
22ND STREET	CKT 63	UG1964	ABC	1/0 AL	0.07	6.91	115.12
22ND STREET	CKT 63	UG1905	ABC	1/0 AL	0.09	6.90	115.04
22ND STREET	CKT 63	UG1814	ABC	2 AL	0.10	6.90	114.94
22ND STREET	CKT 63	UG3198	ABC	2/0AL	0.12	6.89	114.90
22ND STREET	CKT 63	UG1755	B	2 AL	0.05	6.89	114.87
22ND STREET	CKT 63	UG1764	B	2 AL	0.07	6.89	114.86
22ND STREET	CKT 63	UG1770	A	2 AL	0.05	6.89	114.83

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG1776	A	2 AL	0.03	6.89	114.81
22ND STREET	CKT 63	UG1782	A	2 AL	0.05	6.89	114.80
22ND STREET	CKT 63	UG1789	A	2 AL	0.07	6.89	114.80
22ND STREET	CKT 63	UG1797	A	2 AL	0.04	6.89	114.80
22ND STREET	CKT 63	UG1800	A	2 AL	0.04	6.89	114.88
22ND STREET	CKT 63	UG1809	A	2 AL	0.04	6.89	114.88
22ND STREET	CKT 63	UG1820	A	2 AL	0.02	6.90	114.94
22ND STREET	CKT 63	UG1829	A	2 AL	0.04	6.90	114.93
22ND STREET	CKT 63	UG1848	B	2 AL	0.04	6.90	114.93
22ND STREET	CKT 63	UG1855	B	2 AL	0.04	6.90	114.93
22ND STREET	CKT 63	UG1881	C	2 AL	0.03	6.90	114.93
22ND STREET	CKT 63	UG1896	C	2 AL	0.03	6.90	114.92
22ND STREET	CKT 63	UG1917	C	2 AL	0.04	6.90	115.01
22ND STREET	CKT 63	UG1922	C	2 AL	0.06	6.90	114.98
22ND STREET	CKT 63	UG1932	C	2 AL	0.03	6.90	114.97
22ND STREET	CKT 63	UG1908	A	2 AL	0.02	6.90	115.04
22ND STREET	CKT 63	UG19731	A	2 AL	0.02	6.91	115.10
22ND STREET	CKT 63	UG1993	A	2 AL	0.05	6.91	115.08
22ND STREET	CKT 63	UG2002	A	2 AL	0.08	6.90	115.07
22ND STREET	CKT 63	UG1965	A	2 AL	0.03	6.91	115.11
22ND STREET	CKT 63	UG2010	A	2 AL	0.02	6.91	115.11
22ND STREET	CKT 63	UG2026	A	2 AL	0.01	6.91	115.10
22ND STREET	CKT 63	UG2029	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2036	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2038	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2039	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2041	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2042	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2043	A	2 AL	0.03	6.91	115.10
22ND STREET	CKT 63	UG2045	A	2 AL	0.03	6.91	115.10
22ND STREET	CKT 63	UG2046	A	2 AL	0.01	6.91	115.10
22ND STREET	CKT 63	UG2047	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2048	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2049	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2050	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2051	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2052	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2053	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2054	A	2 AL	0.00	6.91	115.10
22ND STREET	CKT 63	UG2055	A	2 AL	0.02	6.91	115.10
22ND STREET	CKT 63	UG4234	A	1/0 AL	0.12	6.91	115.17
22ND STREET	CKT 63	UG2995	A	1/0 AL	0.06	6.91	115.17
22ND STREET	CKT 63	UG2992	A	1/0 AL	0.05	6.91	115.14
22ND STREET	CKT 63	UG2988	A	1/0 AL	0.01	6.91	115.14
22ND STREET	CKT 63	UG2998	A	1/0 AL	0.05	6.91	115.14
22ND STREET	CKT 63	UG2987	A	1/0 AL	0.09	6.91	115.13
22ND STREET	CKT 63	UG3184	ABC	350 CU	0.06	6.92	115.27
22ND STREET	CKT 63	UG1682	ABC	350 CU	0.05	6.91	115.23

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Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG1680	ABC	350 CU	0.08	6.91	115.17
22ND STREET	CKT 63	UG2663	B	1/0 AL	0.02	6.91	115.15
22ND STREET	CKT 63	UG4250	B	1/0 AL	0.03	6.91	115.13
22ND STREET	CKT 63	UG4247	B	1/0 AL	0.08	6.91	115.10
22ND STREET	CKT 63	UG4244	B	1/0 AL	0.08	6.91	115.08
22ND STREET	CKT 63	UG4524	B	1/0 AL	0.03	6.91	115.08
22ND STREET	CKT 63	UG4429	ABC	500 AL	0.09	6.91	115.10
22ND STREET	CKT 63	UG2608	ABC	1/0 AL	0.05	6.91	115.09
22ND STREET	CKT 63	UG1880	ABC	1/0 AL	0.01	6.91	115.09
22ND STREET	CKT 63	UG1879	ABC	1/0 AL	0.06	6.91	115.08
22ND STREET	CKT 63	UG1873	ABC	1/0 AL	0.01	6.91	115.08
22ND STREET	CKT 63	UG1872	ABC	1/0 AL	0.03	6.90	115.08
22ND STREET	CKT 63	UG1868	ABC	1/0 AL	0.02	6.90	115.08
22ND STREET	CKT 63	UG1854	ABC	1/0 AL	0.03	6.90	115.08
22ND STREET	CKT 63	UG1856	ABC	1/0 AL	0.02	6.90	115.08
22ND STREET	CKT 63	UG1857	ABC	1/0 AL	0.02	6.90	115.08
22ND STREET	CKT 63	UG1862	ABC	1/0 AL	0.01	6.90	115.08
22ND STREET	CKT 63	UG2932	ABC	1/0 AL	0.07	6.90	115.08
22ND STREET	CKT 63	UG4514	ABC	1/0 AL	0.01	6.90	115.08
22ND STREET	CKT 63	UG4517	ABC	1/0 AL	0.12	6.90	115.08
22ND STREET	CKT 63	UG3189	ABC	1/0 AL	0.10	6.90	115.08
22ND STREET	CKT 63	UG1885	ABC	500 AL	0.01	6.91	115.10
22ND STREET	CKT 63	UG1886	ABC	500 AL	0.01	6.91	115.10
22ND STREET	CKT 63	UG2953	C	1/0 AL	0.05	6.91	115.09
22ND STREET	CKT 63	UG1887	ABC	500 AL	0.03	6.91	115.10
22ND STREET	CKT 63	UG2841	ABC	500 AL	0.05	6.91	115.09
22ND STREET	CKT 63	UG2948	ABC	500 AL	0.09	6.90	115.08
22ND STREET	CKT 63	UG1927	ABC	500 AL	0.01	6.90	115.08
22ND STREET	CKT 63	UG1940	ABC	500 AL	0.01	6.90	115.08
22ND STREET	CKT 63	UG1947	ABC	500 AL	0.03	6.90	115.08
22ND STREET	CKT 63	UG1949	ABC	500 AL	0.02	6.90	115.08
22ND STREET	CKT 63	UG1633	ABC	500 AL	0.02	6.90	115.08
22ND STREET	CKT 63	UG1673	ABC	500 AL	0.02	6.90	115.07
22ND STREET	CKT 63	UG1632	ABC	500 AL	0.02	6.90	115.07
22ND STREET	CKT 63	UG2831	ABC	500 AL	0.03	6.90	115.07
22ND STREET	CKT 63	UG4419	ABC	500 AL	0.02	6.90	115.07
22ND STREET	CKT 63	UG4422	ABC	4/0 AL	0.10	6.90	115.05
22ND STREET	CKT 63	UG1674	C	1/0 AL	0.01	6.90	115.05
22ND STREET	CKT 63	UG4537	C	1/0 AL	0.11	6.90	115.05
22ND STREET	CKT 63	UG4542	C	1/0 AL	0.06	6.90	115.05
22ND STREET	CKT 63	UG4536	C	1/0 AL	0.02	6.90	115.05
22ND STREET	CKT 63	UG2833	B	1/0 AL	0.05	6.90	115.05
22ND STREET	CKT 63	UG2945	C	1/0 AL	0.02	6.90	115.04
22ND STREET	CKT 63	UG1808	C	1/0 AL	0.08	6.90	114.97
22ND STREET	CKT 63	UG1813	C	1/0 AL	0.06	6.90	114.93
22ND STREET	CKT 63	UG1819	C	1/0 AL	0.07	6.89	114.90
22ND STREET	CKT 63	UG1828	C	1/0 AL	0.07	6.89	114.88
22ND STREET	CKT 63	UG1843	C	1/0 AL	0.07	6.89	114.87

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG1638	ABC	500 AL	0.02	6.90	115.07
22ND STREET	CKT 63	UG4549	ABC	500 AL	0.01	6.90	115.07
22ND STREET	CKT 63	UG4550	ABC	500 AL	0.07	6.90	115.07
22ND STREET	CKT 63	UG4518	AC	1/0 AL	0.09	6.90	114.94
22ND STREET	CKT 63	UG4433	C	1/0 AL	0.02	6.90	114.94
22ND STREET	CKT 63	UG4431	C	1/0 AL	0.02	6.90	114.94
22ND STREET	CKT 63	UG4520	C	1/0 AL	0.05	6.90	114.92
22ND STREET	CKT 63	UG1986	C	1/0 AL	0.09	6.89	114.90
22ND STREET	CKT 63	UG2930	C	1/0 AL	0.06	6.89	114.88
22ND STREET	CKT 63	UG2921	C	1/0 AL	0.05	6.89	114.88
22ND STREET	CKT 63	UG2920	C	1/0 AL	0.07	6.89	114.88
22ND STREET	CKT 63	UG4539	C	1/0 AL	0.07	6.89	114.88
22ND STREET	CKT 63	UG4519	C	1/0 AL	0.04	6.90	114.93
22ND STREET	CKT 63	UG4434	C	1/0 AL	0.05	6.90	114.93
22ND STREET	CKT 63	UG4494	C	1/0 AL	0.01	6.90	114.93
22ND STREET	CKT 63	UG4496	C	1/0 AL	0.07	6.90	114.93
22ND STREET	CKT 63	UG4521	A	1/0 AL	0.09	6.88	114.61
22ND STREET	CKT 63	UG4522	A	1/0 AL	0.10	6.85	114.23
22ND STREET	CKT 63	UG2933	A	1/0 AL	0.01	6.85	114.23
22ND STREET	CKT 63	UG1861	A	1/0 AL	0.06	6.85	114.12
22ND STREET	CKT 63	UG1958	A	1/0 AL	0.07	6.84	114.01
22ND STREET	CKT 63	UG1961	A	1/0 AL	0.02	6.84	114.01
22ND STREET	CKT 63	UG2934	A	1/0 AL	0.06	6.84	113.93
22ND STREET	CKT 63	UG4513	A	1/0 AL	0.01	6.83	113.92
22ND STREET	CKT 63	UG2939	A	1/0 AL	0.04	6.83	113.90
22ND STREET	CKT 63	UG1969	A	1/0 AL	0.05	6.83	113.90
22ND STREET	CKT 63	UG2937	A	1/0 AL	0.05	6.83	113.87
22ND STREET	CKT 63	UG2935	A	1/0 AL	0.01	6.83	113.87
22ND STREET	CKT 63	UG1975	A	1/0 AL	0.07	6.83	113.85
22ND STREET	CKT 63	UG1977	A	1/0 AL	0.04	6.83	113.84
22ND STREET	CKT 63	UG4512	A	1/0 AL	0.06	6.83	113.84
22ND STREET	CKT 63	UG2936	A	1/0 AL	0.07	6.83	113.86
22ND STREET	CKT 63	UG4523	A	1/0 AL	0.07	6.85	114.12
22ND STREET	CKT 63	UG1801	A	1/0 AL	0.06	6.84	114.03
22ND STREET	CKT 63	UG1790	A	1/0 AL	0.09	6.83	113.91
22ND STREET	CKT 63	UG1783	A	1/0 AL	0.08	6.83	113.82
22ND STREET	CKT 63	UG1777	A	1/0 AL	0.07	6.83	113.76
22ND STREET	CKT 63	UG1771	A	1/0 AL	0.07	6.82	113.72
22ND STREET	CKT 63	UG1765	A	1/0 AL	0.07	6.82	113.69
22ND STREET	CKT 63	UG4269	A	1/0 AL	0.08	6.82	113.67
22ND STREET	CKT 63	UG4270	A	1/0 AL	0.04	6.82	113.67
22ND STREET	CKT 63	UG1761	A	1/0 AL	0.01	6.82	113.67
22ND STREET	CKT 63	UG1668	A	1/0 AL	0.01	6.82	113.66
22ND STREET	CKT 63	UG4511	A	1/0 AL	0.06	6.82	113.66
22ND STREET	CKT 63	UG4526	B	1/0 AL	0.02	6.90	115.02
22ND STREET	CKT 63	UG2951	B	1/0 AL	0.03	6.89	114.90
22ND STREET	CKT 63	UG2950	B	1/0 AL	0.05	6.89	114.85
22ND STREET	CKT 63	UG4426	B	1/0 AL	0.09	6.89	114.82

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG4423	B	1/0 AL	0.07	6.89	114.81
22ND STREET	CKT 63	UG2947	B	1/0 AL	0.09	6.89	114.82
22ND STREET	CKT 63	UG4424	B	1/0 AL	0.01	6.89	114.81
22ND STREET	CKT 63	UG1920	B	1/0 AL	0.06	6.89	114.84
22ND STREET	CKT 63	UG1914	B	1/0 AL	0.03	6.89	114.85
22ND STREET	CKT 63	UG4535	B	1/0 AL	0.06	6.89	114.84
22ND STREET	CKT 63	UG1888	B	1/0 AL	0.04	6.89	114.88
22ND STREET	CKT 63	UG1891	B	1/0 AL	0.06	6.89	114.86
22ND STREET	CKT 63	UG1897	B	1/0 AL	0.05	6.89	114.85
22ND STREET	CKT 63	UG1906	B	1/0 AL	0.04	6.89	114.80
22ND STREET	CKT 63	UG1909	B	1/0 AL	0.05	6.88	114.68
22ND STREET	CKT 63	UG2865	B	1/0 AL	0.07	6.88	114.64
22ND STREET	CKT 63	UG4427	B	1/0 AL	0.06	6.88	114.62
22ND STREET	CKT 63	UG2605	B	1/0 AL	0.07	6.88	114.61
22ND STREET	CKT 63	UG2603	B	1/0 AL	0.06	6.88	114.61
22ND STREET	CKT 63	UG1916	B	1/0 AL	0.01	6.88	114.67
22ND STREET	CKT 63	UG1918	B	1/0 AL	0.02	6.88	114.65
22ND STREET	CKT 63	UG1919	B	1/0 AL	0.02	6.88	114.62
22ND STREET	CKT 63	UG1928	B	1/0 AL	0.02	6.88	114.59
22ND STREET	CKT 63	UG1930	B	1/0 AL	0.02	6.87	114.57
22ND STREET	CKT 63	UG1933	B	1/0 AL	0.02	6.87	114.55
22ND STREET	CKT 63	UG1936	B	1/0 AL	0.02	6.87	114.54
22ND STREET	CKT 63	UG1939	B	1/0 AL	0.05	6.87	114.51
22ND STREET	CKT 63	UG4416	B	1/0 AL	0.06	6.87	114.48
22ND STREET	CKT 63	UG4417	B	1/0 AL	0.03	6.87	114.47
22ND STREET	CKT 63	UG2834	B	1/0 AL	0.06	6.87	114.45
22ND STREET	CKT 63	UG4421	B	1/0 AL	0.01	6.87	114.45
22ND STREET	CKT 63	UG4530	B	1/0 AL	0.01	6.87	114.45
22ND STREET	CKT 63	UG1640	B	1/0 AL	0.01	6.87	114.45
22ND STREET	CKT 63	UG4532	B	1/0 AL	0.07	6.87	114.45
22ND STREET	CKT 63	UG4531	B	1/0 AL	0.08	6.87	114.45
22ND STREET	CKT 63	UG3197	ABC	2/0AL	0.10	6.95	115.79
22ND STREET	CKT 63	UG2058	A	2 AL	0.05	6.95	115.78
22ND STREET	CKT 63	UG2914	A	2 AL	0.04	6.95	115.77
22ND STREET	CKT 63	UG2057	ABC	2/0AL	0.06	6.95	115.78
22ND STREET	CKT 63	UG2152	ABC	2/0AL	0.11	6.95	115.78
22ND STREET	CKT 63	UG2153	A	2 AL	0.02	6.95	115.78
22ND STREET	CKT 63	UG2157	A	2 AL	0.02	6.95	115.78
22ND STREET	CKT 63	UG2159	A	2 AL	0.06	6.94	115.74
22ND STREET	CKT 63	UG2162	A	2 AL	0.05	6.94	115.72
22ND STREET	CKT 63	UG2169	A	2 AL	0.05	6.94	115.71
22ND STREET	CKT 63	UG2150	A	2 AL	0.05	6.95	115.78
22ND STREET	CKT 63	UG2181	A	2 AL	0.03	6.95	115.79
22ND STREET	CKT 63	UG2184	A	2 AL	0.05	6.95	115.79
22ND STREET	CKT 63	UG2186	A	2 AL	0.02	6.95	115.78
22ND STREET	CKT 63	UG2188	A	2 AL	0.03	6.95	115.78
22ND STREET	CKT 63	UG2190	A	2 AL	0.10	6.95	115.78
22ND STREET	CKT 63	UG2192	A	2 AL	0.06	6.95	115.77

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
22ND STREET	CKT 63	UG4384	ABC	2/0AL	0.07	7.00	116.68
22ND STREET	CKT 63	UG4387	A	2 AL	0.07	7.00	116.66
22ND STREET	CKT 63	UG4388	A	2 AL	0.09	7.00	116.64
22ND STREET	CKT 63	UG4391	A	2 AL	0.05	7.00	116.66
22ND STREET	CKT 63	UG4395	A	2 AL	0.07	7.00	116.65
22ND STREET	CKT 63	UG4383	ABC	2/0AL	0.12	7.00	116.69
22ND STREET	CKT 63	UG3146	ABC	2/0AL	0.04	7.00	116.68
22ND STREET	CKT 63	UG2564	ABC	2/0AL	0.07	7.00	116.65
22ND STREET	CKT 63	UG2561	B	2 AL	0.03	7.00	116.65
22ND STREET	CKT 63	UG2559	ABC	2/0AL	0.07	7.00	116.63
22ND STREET	CKT 63	UG2537	ABC	2/0AL	0.09	7.00	116.63
22ND STREET	CKT 63	UG2538	ABC	2/0AL	0.13	7.00	116.63
22ND STREET	CKT 63	UG2539	A	2 AL	0.03	7.00	116.62
22ND STREET	CKT 63	UG2541	B	2 AL	0.06	7.00	116.61
22ND STREET	CKT 63	UG2543	B	2 AL	0.06	7.00	116.60
22ND STREET	CKT 63	UG2545	C	2 AL	0.03	7.00	116.63
22ND STREET	CKT 63	UG2547	C	2 AL	0.03	7.00	116.63
22ND STREET	CKT 63	UG2549	C	2 AL	0.03	7.00	116.62
22ND STREET	CKT 63	UG2551	C	2 AL	0.05	7.00	116.60
22ND STREET	CKT 63	UG2556	C	2 AL	0.03	7.00	116.60
22ND STREET	CKT 63	UG2566	C	2 AL	0.05	7.00	116.62
22ND STREET	CKT 63	UG2568	C	2 AL	0.06	7.00	116.61
22ND STREET	CKT 63	UG2571	C	2 AL	0.04	7.00	116.61
22ND STREET	CKT 63	UG2576	B	2 AL	0.05	7.00	116.65
22ND STREET	CKT 63	UG2579	B	2 AL	0.06	7.00	116.63
22ND STREET	CKT 63	UG2581	B	2 AL	0.06	7.00	116.63
22ND STREET	CKT 63	UG2583	C	2 AL	0.07	7.00	116.67
22ND STREET	CKT 63	UG3118	ABC	750 AL	0.15	7.04	117.28
22ND STREET	CKT 63	UG3115	ABC	750 AL	0.02	7.04	117.28
22ND STREET	CKT 63	UG2585	ABC	750 AL	0.06	7.04	117.28
22ND STREET	CKT 63	UG2586	ABC	2/0AL	0.02	7.04	117.28
22ND STREET	CKT 63	UG4492	A	2 AL	0.18	7.04	117.27
SAN GORGONIO	CKT 51	OH547	ABC	336ACSR	0.04	7.20	120.00
SAN GORGONIO	CKT 51	OH548	ABC	336ACSR	0.04	7.20	119.99
SAN GORGONIO	CKT 51	OH549	ABC	336ACSR	0.03	7.20	119.99
SAN GORGONIO	CKT 51	OH550	ABC	336ACSR	0.03	7.20	119.99
SAN GORGONIO	CKT 51	OH552	ABC	336ACSR	0.03	7.20	119.99
SAN GORGONIO	CKT 51	OH553	ABC	336ACSR	0.02	7.20	119.99
SAN GORGONIO	CKT 51	OH554	ABC	336ACSR	0.04	7.20	119.99
SAN GORGONIO	CKT 51	OH555	ABC	336ACSR	0.03	7.20	119.98
SAN GORGONIO	CKT 51	OH563	ABC	336ACSR	0.03	7.20	119.98
SAN GORGONIO	CKT 51	OH569	ABC	336ACSR	0.05	7.20	119.97
SAN GORGONIO	CKT 51	OH623	ABC	336ACSR	0.01	7.20	119.97
SAN GORGONIO	CKT 51	OH3556	ABC	336ACSR	0.01	7.20	119.97
SAN GORGONIO	CKT 51	OH613	ABC	336ACSR	0.03	7.20	119.97
SAN GORGONIO	CKT 51	OH697	ABC	336ACSR	0.03	7.20	119.97
SAN GORGONIO	CKT 51	OH698	ABC	336ACSR	0.05	7.20	119.96
SAN GORGONIO	CKT 51	OH699	ABC	336ACSR	0.03	7.20	119.95

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
SAN GORGONIO	CKT 51	OH700	ABC	336ACSR	0.03	7.20	119.95
SAN GORGONIO	CKT 51	OH720	A	4ACSR	0.02	7.20	119.95
SAN GORGONIO	CKT 51	UG721	A	1/0 AL	0.02	7.20	119.95
SAN GORGONIO	CKT 51	OH701	ABC	336ACSR	0.03	7.20	119.95
SAN GORGONIO	CKT 51	OH702	ABC	336ACSR	0.03	7.20	119.94
SAN GORGONIO	CKT 51	OH736	B	4ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH737	B	4ACSR	0.03	7.20	119.93
SAN GORGONIO	CKT 51	OH738	B	4ACSR	0.03	7.20	119.92
SAN GORGONIO	CKT 51	OH739	B	4ACSR	0.03	7.20	119.92
SAN GORGONIO	CKT 51	OH740	B	4ACSR	0.03	7.20	119.92
SAN GORGONIO	CKT 51	OH703	ABC	336ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH727	ABC	336ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH673	C	4ACSR	0.02	7.20	119.92
SAN GORGONIO	CKT 51	OH676	C	4ACSR	0.03	7.19	119.88
SAN GORGONIO	CKT 51	OH679	C	4ACSR	0.03	7.19	119.85
SAN GORGONIO	CKT 51	OH684	C	4ACSR	0.04	7.19	119.81
SAN GORGONIO	CKT 51	OH685	C	4ACSR	0.03	7.19	119.79
SAN GORGONIO	CKT 51	OH686	C	4ACSR	0.02	7.19	119.77
SAN GORGONIO	CKT 51	OH704	C	4ACSR	0.03	7.19	119.77
SAN GORGONIO	CKT 51	OH687	C	4ACSR	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH688	C	4ACSR	0.01	7.19	119.76
SAN GORGONIO	CKT 51	OH689	C	4ACSR	0.03	7.19	119.75
SAN GORGONIO	CKT 51	OH690	C	4ACSR	0.03	7.18	119.75
SAN GORGONIO	CKT 51	OH691	C	4ACSR	0.01	7.18	119.75
SAN GORGONIO	CKT 51	UG695	C	1/0 AL	0.02	7.19	119.76
SAN GORGONIO	CKT 51	UG706	C	1/0 AL	0.06	7.19	119.78
SAN GORGONIO	CKT 51	OH680	C	4ACSR	0.03	7.19	119.84
SAN GORGONIO	CKT 51	OH728	ABC	336ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH732	B	4ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH733	B	4ACSR	0.03	7.20	119.93
SAN GORGONIO	CKT 51	OH734	B	4ACSR	0.03	7.20	119.93
SAN GORGONIO	CKT 51	OH729	ABC	336ACSR	0.04	7.20	119.94
SAN GORGONIO	CKT 51	OH730	ABC	336ACSR	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH574	B	6Cu	0.01	7.20	119.97
SAN GORGONIO	CKT 51	OH575	B	6Cu	0.05	7.19	119.91
SAN GORGONIO	CKT 51	OH579	B	6Cu	0.03	7.19	119.88
SAN GORGONIO	CKT 51	OH580	B	6Cu	0.02	7.19	119.85
SAN GORGONIO	CKT 51	OH606	B	6Cu	0.04	7.19	119.83
SAN GORGONIO	CKT 51	OH607	B	6Cu	0.04	7.19	119.80
SAN GORGONIO	CKT 51	OH735	B	6Cu	0.03	7.19	119.79
SAN GORGONIO	CKT 51	OH741	B	6Cu	0.04	7.19	119.78
SAN GORGONIO	CKT 51	OH742	B	6Cu	0.03	7.19	119.77
SAN GORGONIO	CKT 51	OH743	B	6Cu	0.04	7.19	119.76
SAN GORGONIO	CKT 51	OH746	B	6Cu	0.02	7.19	119.76
SAN GORGONIO	CKT 51	OH744	B	6Cu	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH616	B	6Cu	0.02	7.19	119.80
SAN GORGONIO	CKT 51	OH617	B	6Cu	0.02	7.19	119.80
SAN GORGONIO	CKT 51	OH595	B	6Cu	0.03	7.19	119.84

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
SAN GORGONIO	CKT 51	OH596	B	6Cu	0.03	7.19	119.82
SAN GORGONIO	CKT 51	OH725	B	6Cu	0.02	7.19	119.82
SAN GORGONIO	CKT 51	OH726	B	6Cu	0.05	7.19	119.81
SAN GORGONIO	CKT 51	OH731	B	6Cu	0.03	7.19	119.81
SAN GORGONIO	CKT 51	OH597	B	6Cu	0.03	7.19	119.81
SAN GORGONIO	CKT 51	OH598	B	6Cu	0.03	7.19	119.81
SAN GORGONIO	CKT 51	OH599	B	6Cu	0.03	7.19	119.80
SAN GORGONIO	CKT 51	UG2219	A	1/0 AL	0.04	7.20	119.99
SAN GORGONIO	CKT 51	UG4217	A	1/0 AL	0.04	7.20	119.98
SAN GORGONIO	CKT 51	UG2220	A	1/0 AL	0.04	7.20	119.98
SAN GORGONIO	CKT 51	UG2215	ABC	1/0 AL	0.08	7.20	119.99
SAN GORGONIO	CKT 51	UG2217	A	1/0 AL	0.04	7.20	119.99
SAN GORGONIO	CKT 51	UG4219	ABC	1/0 AL	0.07	7.20	119.98
SAN GORGONIO	CKT 51	UG2227	ABC	4/0 AL	0.05	7.20	119.97
SAN GORGONIO	CKT 51	UG2245	ABC	1/0 AL	0.08	7.20	119.97
SAN GORGONIO	CKT 51	UG2251	C	1/0 AL	0.12	7.20	119.97
SAN GORGONIO	CKT 51	UG2248	ABC	1/0 AL	0.07	7.20	119.96
SAN GORGONIO	CKT 51	UG2252	ABC	1/0 AL	0.05	7.20	119.96
SAN GORGONIO	CKT 51	UG2253	C	1/0 AL	0.03	7.20	119.96
SAN GORGONIO	CKT 51	UG4222	C	1/0 AL	0.07	7.20	119.96
SAN GORGONIO	CKT 51	UG4224	C	1/0 AL	0.05	7.20	119.96
SAN GORGONIO	CKT 51	UG2241	C	1/0 AL	0.02	7.20	119.97
SAN GORGONIO	CKT 51	UG2233	A	1/0 AL	0.04	7.20	119.97
SAN GORGONIO	CKT 51	UG3172	C	1/0 AL	0.20	7.20	120.00
SAN GORGONIO	CKT 51	UG2173	ABC	1/0 AL	0.08	7.20	120.00
SAN GORGONIO	CKT 51	UG4225	ABC	1/0 AL	0.06	7.20	119.99
SAN GORGONIO	CKT 51	UG4226	ABC	1/0 AL	0.08	7.20	119.98
SAN GORGONIO	CKT 51	UG4230	B	1/0 AL	0.01	7.20	119.97
SAN GORGONIO	CKT 51	UG4231	B	1/0 AL	0.06	7.20	119.97
SAN GORGONIO	CKT 51	UG4229	ABC	1/0 AL	0.01	7.20	119.98
SAN GORGONIO	CKT 51	UG4228	ABC	1/0 AL	0.03	7.20	119.97
SAN GORGONIO	CKT 51	OH2178	BC	4ACSR	0.07	7.20	119.96
SAN GORGONIO	CKT 51	OH2180	BC	4ACSR	0.05	7.20	119.96
SAN GORGONIO	CKT 51	OH2181	BC	4ACSR	0.05	7.20	119.95
SAN GORGONIO	CKT 51	OH2182	BC	4ACSR	0.04	7.20	119.95
SAN GORGONIO	CKT 51	OH2183	BC	4ACSR	0.04	7.20	119.94
SAN GORGONIO	CKT 51	OH2189	BC	4ACSR	0.03	7.20	119.94
SAN GORGONIO	CKT 51	UG4227	B	1/0 AL	0.02	7.20	119.99
SAN GORGONIO	CKT 51	UG4213	ABC	1/0 AL	0.03	7.20	120.00
SAN GORGONIO	CKT 51	OH4214	ABC	1/0ACSR	0.07	7.20	120.00
SAN GORGONIO	CKT 51	UG4232	ABC	1/0 AL	0.03	7.20	120.00
SAN GORGONIO	CKT 51	UG501	ABC	2 AL	0.14	7.20	119.99
SAN GORGONIO	CKT 51	OH455	A	6Cu	0.02	7.20	119.99
SAN GORGONIO	CKT 51	OH456	A	6Cu	0.02	7.20	119.97
SAN GORGONIO	CKT 51	OH457	A	6Cu	0.02	7.20	119.94
SAN GORGONIO	CKT 51	OH458	A	6Cu	0.02	7.20	119.92
SAN GORGONIO	CKT 51	OH459	A	6Cu	0.02	7.19	119.90
SAN GORGONIO	CKT 51	OH460	A	6Cu	0.03	7.19	119.88

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
SAN GORGONIO	CKT 51	OH461	A	6Cu	0.03	7.19	119.87
SAN GORGONIO	CKT 51	OH462	A	6Cu	0.03	7.19	119.86
SAN GORGONIO	CKT 51	OH463	A	6Cu	0.02	7.19	119.85
SAN GORGONIO	CKT 51	OH464	A	6Cu	0.02	7.19	119.85
SAN GORGONIO	CKT 51	OH469	A	6Cu	0.04	7.19	119.84
SAN GORGONIO	CKT 51	OH476	A	6Cu	0.02	7.19	119.84
SAN GORGONIO	CKT 51	OH477	A	6Cu	0.02	7.19	119.84
SAN GORGONIO	CKT 51	OH3572	A	6Cu	0.03	7.19	119.88
SAN GORGONIO	CKT 51	OH119	ABC	1/0ACSR	0.03	7.20	119.95
SAN GORGONIO	CKT 51	OH120	ABC	1/0ACSR	0.02	7.19	119.89
SAN GORGONIO	CKT 51	OH121	ABC	1/0ACSR	0.02	7.19	119.85
SAN GORGONIO	CKT 51	OH47	ABC	1/0ACSR	0.02	7.19	119.81
SAN GORGONIO	CKT 51	OH882	ABC	1/0ACSR	0.02	7.19	119.80
SAN GORGONIO	CKT 51	OH879	ABC	1/0ACSR	0.02	7.19	119.79
SAN GORGONIO	CKT 51	OH878	ABC	1/0ACSR	0.04	7.19	119.76
SAN GORGONIO	CKT 51	OH877	ABC	1/0ACSR	0.04	7.19	119.76
SAN GORGONIO	CKT 51	OH874	ABC	1/0ACSR	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH873	ABC	1/0ACSR	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH868	ABC	1/0ACSR	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH867	ABC	1/0ACSR	0.03	7.19	119.76
SAN GORGONIO	CKT 51	OH866	ABC	1/0ACSR	0.04	7.19	119.76
SAN GORGONIO	CKT 51	UG1901	ABC	2 AL	0.06	7.18	119.74
SAN GORGONIO	CKT 51	OH1254	ABC	1/0ACSR	0.01	7.19	119.79
SAN GORGONIO	CKT 51	OH1255	ABC	1/0ACSR	0.03	7.18	119.75
SAN GORGONIO	CKT 51	OH1256	ABC	1/0ACSR	0.03	7.18	119.71
SAN GORGONIO	CKT 51	OH1257	ABC	1/0ACSR	0.03	7.18	119.67
SAN GORGONIO	CKT 51	OH1258	ABC	1/0ACSR	0.04	7.18	119.63
SAN GORGONIO	CKT 51	OH1222	C	2ACSR	0.03	7.18	119.63
SAN GORGONIO	CKT 51	OH1223	C	2ACSR	0.02	7.18	119.62
SAN GORGONIO	CKT 51	OH1224	C	2ACSR	0.02	7.18	119.62
SAN GORGONIO	CKT 51	OH1225	C	2ACSR	0.01	7.18	119.62
SAN GORGONIO	CKT 51	OH3438	C	2ACSR	0.01	7.18	119.62
SAN GORGONIO	CKT 51	OH1221	ABC	1/0ACSR	0.03	7.18	119.61
SAN GORGONIO	CKT 51	OH1220	ABC	1/0ACSR	0.03	7.18	119.58
SAN GORGONIO	CKT 51	OH1219	ABC	1/0ACSR	0.03	7.17	119.56
SAN GORGONIO	CKT 51	OH1218	ABC	1/0ACSR	0.03	7.17	119.54
SAN GORGONIO	CKT 51	OH1217	ABC	1/0ACSR	0.03	7.17	119.52
SAN GORGONIO	CKT 51	OH1216	ABC	1/0ACSR	0.03	7.17	119.49
SAN GORGONIO	CKT 51	OH1215	ABC	1/0ACSR	0.03	7.17	119.47
SAN GORGONIO	CKT 51	OH1970	B	4Cu	0.03	7.17	119.47
SAN GORGONIO	CKT 51	OH1971	B	4Cu	0.03	7.17	119.46
SAN GORGONIO	CKT 51	OH1972	B	4Cu	0.03	7.17	119.46
SAN GORGONIO	CKT 51	OH1231	ABC	1/0ACSR	0.03	7.17	119.45
SAN GORGONIO	CKT 51	OH1232	ABC	1/0ACSR	0.02	7.17	119.43
SAN GORGONIO	CKT 51	OH1909	ABC	1/0ACSR	0.05	7.16	119.41
SAN GORGONIO	CKT 51	OH2321	ABC	1/0ACSR	0.03	7.16	119.40
SAN GORGONIO	CKT 51	OH804	ABC	1/0ACSR	0.03	7.16	119.38
SAN GORGONIO	CKT 51	OH805	ABC	1/0ACSR	0.06	7.16	119.37

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
SAN GORGONIO	CKT 51	OH806	ABC	1/0ACSR	0.06	7.16	119.36
SAN GORGONIO	CKT 51	UG814	A	1/0 AL	0.02	7.16	119.34
SAN GORGONIO	CKT 51	UG1208	A	1/0 AL	0.09	7.16	119.32
SAN GORGONIO	CKT 51	UG1209	A	1/0 AL	0.05	7.16	119.32
SAN GORGONIO	CKT 51	UG1915	A	1/0 AL	0.03	7.16	119.33
SAN GORGONIO	CKT 51	UG1982	A	1/0 AL	0.11	7.16	119.31
SAN GORGONIO	CKT 51	UG3544	A	1/0 AL	0.12	7.16	119.30
SAN GORGONIO	CKT 51	UG807	A	1/0 AL	0.06	7.16	119.33
SAN GORGONIO	CKT 51	UG809	A	1/0 AL	0.11	7.16	119.26
SAN GORGONIO	CKT 51	UG811	A	1/0 AL	0.04	7.15	119.23
SAN GORGONIO	CKT 51	OH1286	A	2ACSR	0.05	7.15	119.19
SAN GORGONIO	CKT 51	OH1287	A	2ACSR	0.06	7.15	119.15
SAN GORGONIO	CKT 51	OH1288	A	2ACSR	0.07	7.15	119.09
SAN GORGONIO	CKT 51	OH1289	A	2ACSR	0.03	7.14	119.08
SAN GORGONIO	CKT 51	OH1290	A	2ACSR	0.05	7.14	119.04
SAN GORGONIO	CKT 51	OH1291	A	2ACSR	0.04	7.14	119.01
SAN GORGONIO	CKT 51	OH1292	A	2ACSR	0.02	7.14	118.99
SAN GORGONIO	CKT 51	OH1293	A	2ACSR	0.02	7.14	118.97
SAN GORGONIO	CKT 51	OH1294	A	2ACSR	0.01	7.14	118.97
SAN GORGONIO	CKT 51	OH3427	A	2ACSR	0.01	7.14	118.97
SAN GORGONIO	CKT 51	OH1295	A	2ACSR	0.03	7.14	118.96
SAN GORGONIO	CKT 51	OH1296	A	2ACSR	0.06	7.14	118.96
SAN GORGONIO	CKT 51	OH1297	A	2ACSR	0.05	7.14	118.95
SAN GORGONIO	CKT 51	OH1298	A	2ACSR	0.04	7.14	118.95
SAN GORGONIO	CKT 51	OH1299	A	2ACSR	0.05	7.14	118.94
SAN GORGONIO	CKT 51	OH1300	A	2ACSR	0.04	7.14	118.94
SAN GORGONIO	CKT 51	OH1301	A	2ACSR	0.05	7.14	118.94
SAN GORGONIO	CKT 51	OH1302	A	2ACSR	0.04	7.14	118.93
SAN GORGONIO	CKT 51	OH1303	A	2ACSR	0.04	7.14	118.93
SAN GORGONIO	CKT 51	OH1304	A	2ACSR	0.04	7.14	118.93
SAN GORGONIO	CKT 51	OH1305	A	2ACSR	0.06	7.14	118.92
SAN GORGONIO	CKT 51	UG3428	A	1/0 AL	0.01	7.14	118.97
SAN GORGONIO	CKT 51	OH797	ABC	1/0ACSR	0.05	7.16	119.40
SAN GORGONIO	CKT 51	OH794	ABC	1/0ACSR	0.05	7.16	119.39
SAN GORGONIO	CKT 51	OH791	ABC	1/0ACSR	0.04	7.16	119.39
SAN GORGONIO	CKT 51	OH790	ABC	1/0ACSR	0.05	7.16	119.39
SAN GORGONIO	CKT 51	OH784	ABC	1/0ACSR	0.05	7.16	119.39
SAN GORGONIO	CKT 51	UG1978	A	1/0 AL	0.03	7.16	119.39
SAN GORGONIO	CKT 51	OH1240	B	6Cu	0.03	7.16	119.37
SAN GORGONIO	CKT 51	OH1241	B	6Cu	0.03	7.16	119.30
SAN GORGONIO	CKT 51	OH1242	B	6Cu	0.03	7.15	119.24
SAN GORGONIO	CKT 51	OH1243	B	6Cu	0.03	7.15	119.18
SAN GORGONIO	CKT 51	OH1244	B	6Cu	0.02	7.15	119.14
SAN GORGONIO	CKT 51	OH1245	B	6Cu	0.02	7.15	119.09
SAN GORGONIO	CKT 51	OH1246	B	6Cu	0.03	7.14	119.08
SAN GORGONIO	CKT 51	OH439	B	6Cu	0.04	7.14	119.01
SAN GORGONIO	CKT 51	UG1476	B	1/0 AL	0.03	7.14	118.98
SAN GORGONIO	CKT 51	UG1479	B	1/0 AL	0.06	7.14	118.93

Banning LL10
Low Voltage

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Base Volts Bal
SAN GORGONIO	CKT 51	UG1483	B	1/0 AL	0.05	7.13	118.89
SAN GORGONIO	CKT 51	UG1929	B	1/0 AL	0.05	7.13	118.86
SAN GORGONIO	CKT 51	UG1962	B	1/0 AL	0.05	7.13	118.84
SAN GORGONIO	CKT 51	UG1468	B	1/0 AL	0.05	7.13	118.83
SAN GORGONIO	CKT 51	UG1465	B	1/0 AL	0.08	7.13	118.82
SAN GORGONIO	CKT 51	UG1461	B	1/0 AL	0.03	7.13	118.82
SAN GORGONIO	CKT 51	UG1469	B	1/0 AL	0.05	7.13	118.83
SAN GORGONIO	CKT 51	UG1950	B	1/0 AL	0.03	7.13	118.82
SAN GORGONIO	CKT 51	OH1251	B	6Cu	0.03	7.13	118.82
SAN GORGONIO	CKT 51	OH1234	B	6Cu	0.02	7.17	119.42
SAN GORGONIO	CKT 51	OH1236	B	6Cu	0.03	7.17	119.42
SAN GORGONIO	CKT 51	OH1237	B	6Cu	0.03	7.16	119.41
SAN GORGONIO	CKT 51	OH1238	B	6Cu	0.03	7.16	119.41
SAN GORGONIO	CKT 51	UG2755	ABC	1/0 AL	0.01	7.18	119.67
SAN GORGONIO	CKT 51	UG1890	ABC	1/0 AL	0.04	7.18	119.67
SAN GORGONIO	CKT 51	UG2758	ABC	1/0 AL	0.09	7.18	119.73

Banning LL10
Conductor Loading

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	% Cap Bal
22ND STREET	CKT 63	UG2040	ABC	750 CU	0.00757576	7.5593	89
22ND STREET	CKT 63	OH2042	ABC	477ACSR	0.0278409	7.55346	84
22ND STREET	CKT 63	OH2043	ABC	477ACSR	0.0357955	7.54596	84
22ND STREET	CKT 63	OH2044	ABC	477ACSR	0.0314394	7.53939	84
22ND STREET	CKT 63	OH2045	ABC	477ACSR	0.0101498	7.53727	84
22ND STREET	CKT 63	OH3505	ABC	477ACSR	0.0286759	7.53129	84
22ND STREET	CKT 63	OH2046	ABC	477ACSR	0.0280303	7.52546	84
22ND STREET	CKT 63	OH2047	ABC	477ACSR	0.0291667	7.51941	84
22ND STREET	CKT 63	OH2048	ABC	477ACSR	0.0285985	7.51349	84
22ND STREET	CKT 63	OH2049	ABC	477ACSR	0.0361742	7.50603	84
22ND STREET	CKT 63	OH2050	ABC	477ACSR	0.0392045	7.49796	84
22ND STREET	CKT 63	OH2051	ABC	477ACSR	0.019697	7.49392	84
22ND STREET	CKT 63	OH2052	ABC	477ACSR	0.0291667	7.48794	84
22ND STREET	CKT 63	OH2053	ABC	477ACSR	0.00965909	7.48596	84
22ND STREET	CKT 63	OH2064	ABC	4/0ACSR	0.0405303	7.47235	153
22ND STREET	CKT 63	OH2065	ABC	4/0ACSR	0.0481061	7.45623	153
22ND STREET	CKT 63	OH2066	ABC	4/0ACSR	0.0393939	7.44305	152
22ND STREET	CKT 63	OH2067	ABC	4/0ACSR	0.0431818	7.42866	152
22ND STREET	CKT 63	OH2068	ABC	4/0ACSR	0.038447	7.41586	152
22ND STREET	CKT 63	OH2069	ABC	4/0ACSR	0.0291667	7.40602	153
22ND STREET	CKT 63	OH1226	ABC	336ACSR	0.0157907	7.40223	100
22ND STREET	CKT 63	OH2070	ABC	336ACSR	0.0198864	7.39746	100
22ND STREET	CKT 63	OH2071	ABC	336ACSR	0.0407197	7.38771	100
22ND STREET	CKT 63	OH2073	ABC	336ACSR	0.0217433	7.38251	100
22ND STREET	CKT 63	OH1712	ABC	336ACSR	0.0237112	7.37684	100
22ND STREET	CKT 63	OH2074	ABC	336ACSR	0.0337121	7.36881	100
22ND STREET	CKT 63	OH2075	ABC	336ACSR	0.0354167	7.36038	100
22ND STREET	CKT 63	OH2076	ABC	336ACSR	0.0295455	7.35336	100
22ND STREET	CKT 63	OH2077	ABC	336ACSR	0.0503788	7.34141	100
22ND STREET	CKT 63	OH2078	ABC	336ACSR	0.0367424	7.33271	100
22ND STREET	CKT 63	OH2095	ABC	336ACSR	0.0179924	7.32846	100
22ND STREET	CKT 63	OH2094	ABC	336ACSR	0.0142045	7.3251	100
22ND STREET	CKT 63	OH3357	ABC	336ACSR	0.00899502	7.32312	93
22ND STREET	CKT 63	OH1729	ABC	336ACSR	0.0105126	7.3208	93
22ND STREET	CKT 63	OH3356	ABC	336ACSR	0.036553	7.31274	93
22ND STREET	CKT 63	OH3355	ABC	336ACSR	0.0454545	7.30311	90
22ND STREET	CKT 63	OH3354	ABC	336ACSR	0.0602273	7.29038	90
22ND STREET	CKT 63	OH3353	ABC	336ACSR	0.0522727	7.27935	90
22ND STREET	CKT 63	OH3352	ABC	336ACSR	0.0554924	7.26767	90
22ND STREET	CKT 63	OH3351	ABC	336ACSR	0.04375	7.25875	88
22ND STREET	CKT 63	OH3350	ABC	336ACSR	0.05	7.24857	88
22ND STREET	CKT 63	OH3349	ABC	336ACSR	0.0534091	7.23773	88
22ND STREET	CKT 63	OH3348	ABC	336ACSR	0.0628788	7.22499	88
22ND STREET	CKT 63	OH3347	ABC	336ACSR	0.0386364	7.21718	88
22ND STREET	CKT 63	OH3346	ABC	336ACSR	0.0424242	7.20862	88
22ND STREET	CKT 63	OH3345	ABC	336ACSR	0.0473485	7.19909	88
22ND STREET	CKT 63	OH3344	ABC	336ACSR	0.0645833	7.18612	88
22ND STREET	CKT 63	OH3343	ABC	336ACSR	0.0604167	7.17402	88
22ND STREET	CKT 63	OH3342	ABC	336ACSR	0.0494318	7.16414	88

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Conductor Loading

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	% Cap Bal
22ND STREET	CKT 63	OH3341	ABC	336ACSR	0.0359848	7.15726	85
22ND STREET	CKT 63	OH3340	ABC	336ACSR	0.0401515	7.1496	85
22ND STREET	CKT 63	OH3339	ABC	336ACSR	0.0482955	7.1404	85
22ND STREET	CKT 63	UG1183	ABC	750 AL	0.0233178	7.13767	90
22ND STREET	CKT 63	UG1184	ABC	750 AL	0.122952	7.1233	90
22ND STREET	CKT 63	UG3120	ABC	750 AL	0.0723619	7.11485	90
22ND STREET	CKT 63	UG1588	ABC	750 AL	0.0359338	7.11066	90
22ND STREET	CKT 63	UG3114	ABC	750 AL	0.0510796	7.1047	90
22ND STREET	CKT 63	UG3123	ABC	750 AL	0.156528	7.08646	90
22ND STREET	CKT 63	UG4317	ABC	750 AL	0.147939	7.06929	90
22ND STREET	CKT 63	UG4320	ABC	750 AL	0.280233	7.03684	90
22ND STREET	CKT 63	UG3149	ABC	350AL	0.0926871	7.02071	135
22ND STREET	CKT 63	UG3151	ABC	350AL	0.0585323	7.01052	135
22ND STREET	CKT 63	UG4379	ABC	350AL	0.04933	7.00194	135
22ND STREET	CKT 63	UG3177	ABC	2/0AL	0.00116102	7.00152	233
22ND STREET	CKT 63	UG3156	ABC	350AL	0.210426	6.96874	120
22ND STREET	CKT 63	UG4479	ABC	350AL	0.127658	6.94885	120
22ND STREET	CKT 63	UG3157	ABC	350AL	0.120895	6.93324	100
22ND STREET	CKT 63	UG2984	ABC	350AL	0.113586	6.91857	100
22ND STREET	CKT 63	UG4521	A	1/0 AL	0.0875489	6.87661	88
22ND STREET	CKT 63	UG4522	A	1/0 AL	0.101112	6.85366	88
22ND STREET	CKT 63	UG4526	B	1/0 AL	0.0193099	6.90128	94
22ND STREET	CKT 63	UG2951	B	1/0 AL	0.0310296	6.89375	94
22ND STREET	CKT 63	UG1906	B	1/0 AL	0.0389035	6.88801	61
AIRPORT	CKT 9	OH1460	ABC	2ACSR	0.0179924	2.51536	112
AIRPORT	CKT 9	OH1461	ABC	2ACSR	0.0183819	2.50942	112
AIRPORT	CKT 9	OH1661	ABC	2ACSR	0.0116797	2.50652	87
AIRPORT	CKT 9	OH1572	ABC	2ACSR	0.00554444	2.50514	87
ALOLA	CKT 1	OH2356	C	UKN WIRE	0.0094697	2.40494	488
MIDWAY	CKT 22	UG283	ABC	750 AL	0.0210227	7.55801	69
MIDWAY	CKT 22	UG1231	ABC	750 AL	0.0129073	7.55678	69
MIDWAY	CKT 22	UG284	ABC	750 AL	0.0721591	7.54995	69
MIDWAY	CKT 22	UG1230	ABC	750 AL	0.0314318	7.54697	69
MIDWAY	CKT 22	UG285	ABC	750 AL	0.0765152	7.53973	69
MIDWAY	CKT 22	UG303	ABC	750 AL	0.0867424	7.53251	61
MIDWAY	CKT 23	UG307	ABC	750 AL	0.0208333	7.55739	91
MIDWAY	CKT 23	UG1232	ABC	750 AL	0.0128538	7.55578	91
MIDWAY	CKT 23	UG308	ABC	750 AL	0.0723485	7.54672	91
MIDWAY	CKT 23	UG309	ABC	750 AL	0.0488589	7.5406	91
MIDWAY	CKT 23	UG1385	ABC	750 AL	0.0274669	7.53716	91
MIDWAY	CKT 23	OH310	ABC	336ACSR	0.0261364	7.5317	86
MIDWAY	CKT 23	OH311	ABC	336ACSR	0.0232955	7.52683	86
MIDWAY	CKT 23	OH312	ABC	336ACSR	0.0244318	7.52174	86
MIDWAY	CKT 23	OH313	ABC	336ACSR	0.0267045	7.51619	86
MIDWAY	CKT 23	OH314	ABC	336ACSR	0.025947	7.5108	86
MIDWAY	CKT 23	OH317	ABC	336ACSR	0.0318182	7.50421	86
MIDWAY	CKT 23	OH320	ABC	336ACSR	0.0268939	7.49882	83
MIDWAY	CKT 23	OH321	ABC	336ACSR	0.0403409	7.49075	83
MIDWAY	CKT 23	OH322	ABC	336ACSR	0.0524621	7.48027	83

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Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	% Cap Bal
MIDWAY	CKT 23	OH323	ABC	336ACSR	0.0337121	7.47356	83
MIDWAY	CKT 23	OH324	ABC	336ACSR	0.0297348	7.46765	83
MIDWAY	CKT 23	OH325	ABC	336ACSR	0.0356061	7.46058	83
MIDWAY	CKT 23	OH326	ABC	336ACSR	0.0335227	7.45393	83
MIDWAY	CKT 23	OH329	ABC	336ACSR	0.00662879	7.45261	83
MIDWAY	CKT 23	OH372	ABC	336ACSR	0.0435606	7.445	73
MIDWAY	CKT 23	OH373	ABC	336ACSR	0.0395833	7.4381	73
MIDWAY	CKT 23	OH374	ABC	336ACSR	0.025947	7.43359	73
MIDWAY	CKT 23	OH375	ABC	336ACSR	0.0257576	7.42911	73
MIDWAY	CKT 23	OH376	ABC	336ACSR	0.0229167	7.42518	72
MIDWAY	CKT 23	OH377	ABC	336ACSR	0.0306818	7.41992	72
MIDWAY	CKT 23	OH378	ABC	336ACSR	0.0214015	7.41626	72
MIDWAY	CKT 23	OH379	ABC	336ACSR	0.0287879	7.41135	72
MIDWAY	CKT 23	OH395	ABC	336ACSR	0.0195076	7.40803	72
MIDWAY	CKT 23	OH398	ABC	336ACSR	0.0344697	7.40245	68
MIDWAY	CKT 23	OH399	ABC	336ACSR	0.0291667	7.39798	65
MIDWAY	CKT 23	OH400	ABC	336ACSR	0.0352273	7.39259	65
MIDWAY	CKT 23	OH401	ABC	336ACSR	0.0297348	7.38805	65
MIDWAY	CKT 23	UG410	ABC	750 AL	0.069697	7.3816	69
MIDWAY	CKT 23	UG413	ABC	750 AL	0.0274621	7.37906	69
MIDWAY	CKT 23	UG4000	A	2 AL	0.0297912	7.33075	86
MIDWAY	CKT 23	UG4002	A	2 AL	0.0259955	7.32635	63
SAN GORGONIO	CKT 51	UG1335	ABC	750 AL	0.0363636	7.55563	88
SAN GORGONIO	CKT 51	UG1336	ABC	750 AL	0.0136364	7.554	88
SAN GORGONIO	CKT 51	UG1337	ABC	750 AL	0.0030303	7.55364	88
SAN GORGONIO	CKT 51	OH1359	ABC	336ACSR	0.0168561	7.55026	82
SAN GORGONIO	CKT 51	OH1362	ABC	336ACSR	0.0126894	7.54772	82
SAN GORGONIO	CKT 51	OH1363	ABC	336ACSR	0.0390152	7.53991	82
SAN GORGONIO	CKT 51	OH177	ABC	3/0ACSR	0.0244318	7.53212	138
SAN GORGONIO	CKT 51	OH178	ABC	3/0ACSR	0.0420455	7.51871	138
SAN GORGONIO	CKT 51	OH181	ABC	3/0ACSR	0.0401515	7.50591	138
SAN GORGONIO	CKT 51	OH182	ABC	3/0ACSR	0.0304924	7.49621	138
SAN GORGONIO	CKT 51	OH197	ABC	3/0ACSR	0.0316288	7.48614	138
SAN GORGONIO	CKT 51	OH198	ABC	3/0ACSR	0.0337121	7.47542	138
SAN GORGONIO	CKT 51	OH199	ABC	3/0ACSR	0.0255682	7.4673	138
SAN GORGONIO	CKT 51	OH1380	ABC	3/0ACSR	0.0375	7.45539	138
SAN GORGONIO	CKT 51	OH1381	ABC	3/0ACSR	0.0339015	7.44463	138
SAN GORGONIO	CKT 51	OH1382	ABC	3/0ACSR	0.0412879	7.43153	138
SAN GORGONIO	CKT 51	OH1383	ABC	3/0ACSR	0.0267045	7.42307	138
SAN GORGONIO	CKT 51	OH1384	ABC	3/0ACSR	0.0356061	7.4118	138
SAN GORGONIO	CKT 51	OH1385	ABC	3/0ACSR	0.0229167	7.40454	138
SAN GORGONIO	CKT 51	OH1386	ABC	3/0ACSR	0.0299242	7.39508	138
SAN GORGONIO	CKT 51	UG1792	ABC	750 AL	0.0109848	7.39378	88
SAN GORGONIO	CKT 51	UG1794	ABC	750 AL	0.0496212	7.3879	88
SAN GORGONIO	CKT 51	UG1795	ABC	750 AL	0.0465909	7.38238	88
SAN GORGONIO	CKT 51	UG1796	ABC	750 AL	0.0998106	7.37056	88
SAN GORGONIO	CKT 51	UG3483	ABC	750 AL	0.0147554	7.36881	88
SAN GORGONIO	CKT 51	OH1713	ABC	336ACSR	0.0306818	7.36385	69
SAN GORGONIO	CKT 51	OH1714	ABC	336ACSR	0.0189394	7.36081	69

Banning LL10
Conductor Loading

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	% Cap Bal
SAN GORGONIO	CKT 51	OH1715	ABC	336ACSR	0.0248106	7.35693	67
SAN GORGONIO	CKT 51	OH1716	ABC	336ACSR	0.0325758	7.35184	67
SAN GORGONIO	CKT 51	OH1717	ABC	336ACSR	0.0373106	7.34601	67
SAN GORGONIO	CKT 51	OH1718	ABC	336ACSR	0.0242424	7.34223	67
SAN GORGONIO	CKT 51	OH1719	ABC	336ACSR	0.0356061	7.33672	67
SAN GORGONIO	CKT 51	OH1720	ABC	336ACSR	0.0232955	7.33313	67
SAN GORGONIO	CKT 51	OH1721	ABC	336ACSR	0.0361742	7.32756	66
SAN GORGONIO	CKT 51	OH1722	ABC	336ACSR	0.0265152	7.32366	62
SAN GORGONIO	CKT 51	OH1723	ABC	336ACSR	0.0268939	7.31971	62
SAN GORGONIO	CKT 51	OH1724	ABC	336ACSR	0.0373106	7.31428	62
SAN GORGONIO	CKT 51	OH1684	ABC	336ACSR	0.0263258	7.31045	62
SAN GORGONIO	CKT 51	OH1908	ABC	4Cu	0.0399621	7.23027	89
SAN GORGONIO	CKT 51	OH1910	ABC	4Cu	0.0157197	7.22651	89
SAN GORGONIO	CKT 51	OH1911	ABC	4Cu	0.0268939	7.22007	89
SAN GORGONIO	CKT 53	OH3206	ABC	2ACSR	0.030303	7.45093	85
SAN GORGONIO	CKT 53	OH3205	ABC	2ACSR	0.0193182	7.4463	85
SAN GORGONIO	CKT 53	OH3204	ABC	2ACSR	0.0261364	7.44005	85
SAN GORGONIO	CKT 53	OH3203	ABC	2ACSR	0.0282197	7.4333	85
SAN GORGONIO	CKT 53	OH3202	ABC	2ACSR	0.0164773	7.42936	85
SAN GORGONIO	CKT 53	OH3164	ABC	2ACSR	0.0395833	7.42004	83
SAN GORGONIO	CKT 53	OH3163	ABC	2ACSR	0.0441288	7.40965	83
SAN GORGONIO	CKT 53	OH3162	ABC	2ACSR	0.0344697	7.40153	83

Banning LL10
1ph Loading

Substation	Feeder	Section	Phase	Equipment	Length (mi)	Primary kV	Thru Amps Bal
22ND STREET	CKT 63	UG4521	A	1/0 AL	0.0875489	6.87661	147.14
22ND STREET	CKT 63	UG4522	A	1/0 AL	0.101112	6.85366	147.15
22ND STREET	CKT 63	UG1861	A	1/0 AL	0.0576927	6.84745	75.46
22ND STREET	CKT 63	UG1958	A	1/0 AL	0.0666904	6.84085	64.15
22ND STREET	CKT 63	UG2934	A	1/0 AL	0.0637611	6.83565	56.62
22ND STREET	CKT 63	UG4523	A	1/0 AL	0.068507	6.84688	67.94
22ND STREET	CKT 63	UG1801	A	1/0 AL	0.06173	6.84149	60.41
22ND STREET	CKT 63	UG1790	A	1/0 AL	0.0925975	6.83447	52.88
22ND STREET	CKT 63	UG4526	B	1/0 AL	0.0193099	6.90128	157.38
22ND STREET	CKT 63	UG2951	B	1/0 AL	0.0310296	6.89375	157.38
22ND STREET	CKT 63	UG1906	B	1/0 AL	0.0389035	6.88801	101.27
22ND STREET	CKT 63	UG1909	B	1/0 AL	0.0507688	6.88095	90.03
22ND STREET	CKT 63	UG1916	B	1/0 AL	0.00687245	6.88038	60.04
ALOLA	CKT 8	OH2805	A	6Cu	0.0323864	2.46426	57.12
ALOLA	CKT 8	OH2806	A	6Cu	0.0314394	2.45917	57.12
ALOLA	CKT 8	OH2807	A	6Cu	0.0282197	2.4546	57.12
ALOLA	CKT 8	OH2808	A	6Cu	0.0244318	2.45073	57.12
ALOLA	CKT 8	OH2809	A	6Cu	0.0198864	2.44765	54.70
MIDWAY	CKT 22	UG619	A	1/0 AL	0.0147727	7.47131	54.16
MIDWAY	CKT 22	UG624	A	1/0 AL	0.0348485	7.46867	51.16
MIDWAY	CKT 22	UG670	B	1/0 AL	0.0814394	7.46065	64.78
MIDWAY	CKT 22	UG672	B	1/0 AL	0.0335227	7.45799	55.76
MIDWAY	CKT 22	UG188	C	1/0 AL	0.00863181	7.47574	61.69
MIDWAY	CKT 22	UG192	C	1/0 AL	0.0203882	7.47403	57.17
MIDWAY	CKT 23	UG226	B	2 AL	0.0619318	7.32446	66.26
MIDWAY	CKT 23	UG228	B	2 AL	0.0554924	7.31775	57.64
MIDWAY	CKT 23	UG230	B	2 AL	0.0543561	7.31187	51.89
MIDWAY	CKT 23	UG4000	A	2 AL	0.0297912	7.33075	109.63
MIDWAY	CKT 23	UG4002	A	2 AL	0.0259955	7.32635	80.92
MIDWAY	CKT 23	UG4005	A	2 AL	0.114582	7.30879	72.30
MIDWAY	CKT 23	UG4007	A	2 AL	0.0657105	7.29956	66.56
MIDWAY	CKT 23	UG4009	A	2 AL	0.111682	7.28528	60.80
MIDWAY	CKT 23	UG4013	A	2 AL	0.0866881	7.27558	55.04
MIDWAY	CKT 24	UG4346	B	1/0 AL	0.0499873	7.50943	58.62
MIDWAY	CKT 24	UG4347	B	1/0 AL	0.0410295	7.5061	54.41
MIDWAY	CKT 24	UG4348	B	1/0 AL	0.0520129	7.5023	50.20
MIDWAY	CKT 24	UG4572	A	1/0 AL	0.189389	7.48941	73.68
MIDWAY	CKT 24	UG4573	A	1/0 AL	0.0089901	7.48841	73.72
MIDWAY	CKT 24	UG4574	A	1/0 AL	0.0896235	7.47875	69.49
MIDWAY	CKT 24	UG4370	A	1/0 AL	0.0401858	7.47481	65.30
MIDWAY	CKT 24	UG4368	A	1/0 AL	0.0411367	7.47091	61.06
MIDWAY	CKT 24	UG4367	A	1/0 AL	0.0237191	7.46893	56.84
MIDWAY	CKT 24	UG4366	A	1/0 AL	0.0772254	7.46288	50.47
SAN GORGONIO	CKT 51	OH1240	B	6Cu	0.0265152	7.16196	53.06
SAN GORGONIO	CKT 51	OH1241	B	6Cu	0.0263258	7.15823	53.06

Exhibit 2-3
Existing Distribution System;
Color by Substation

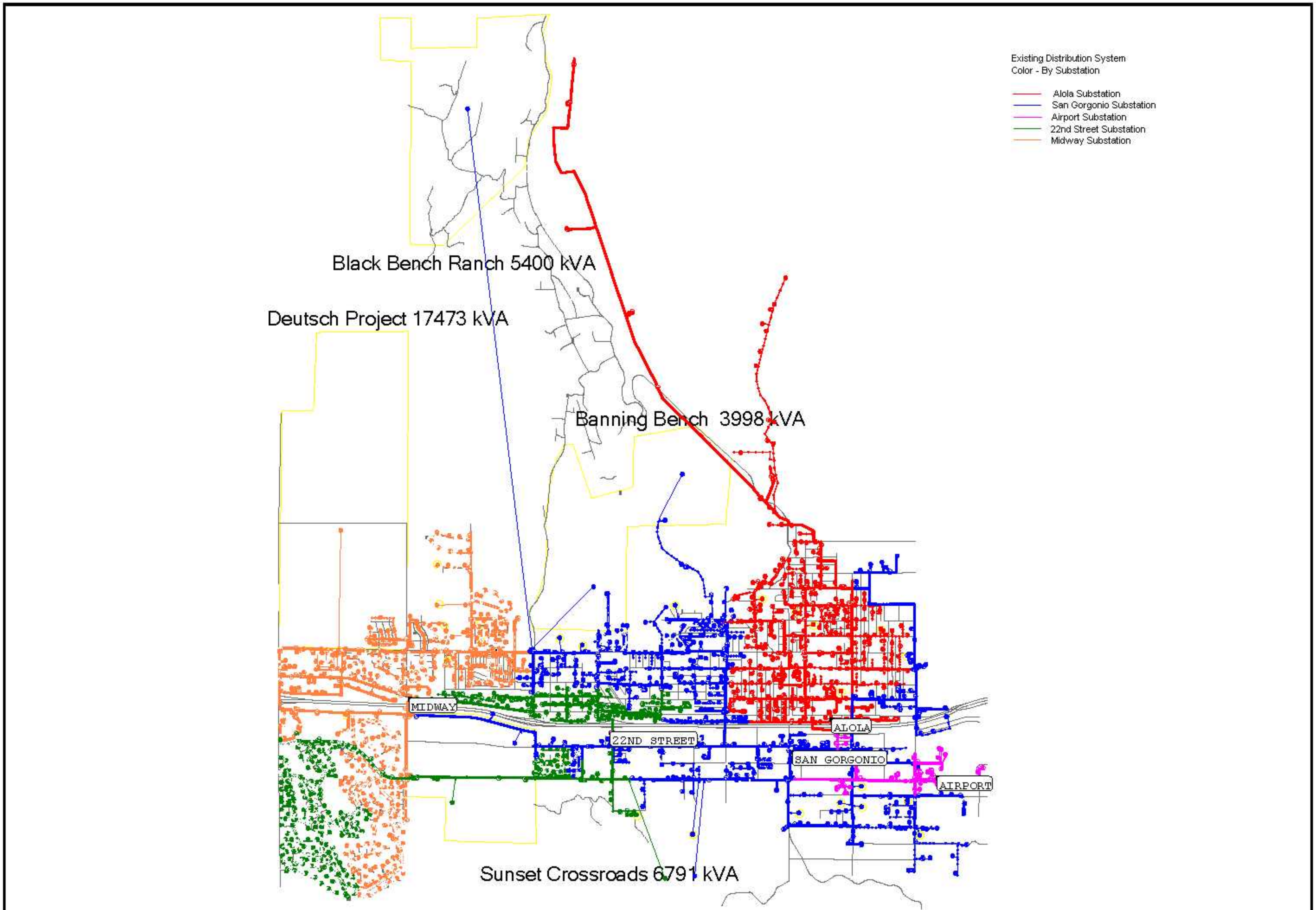
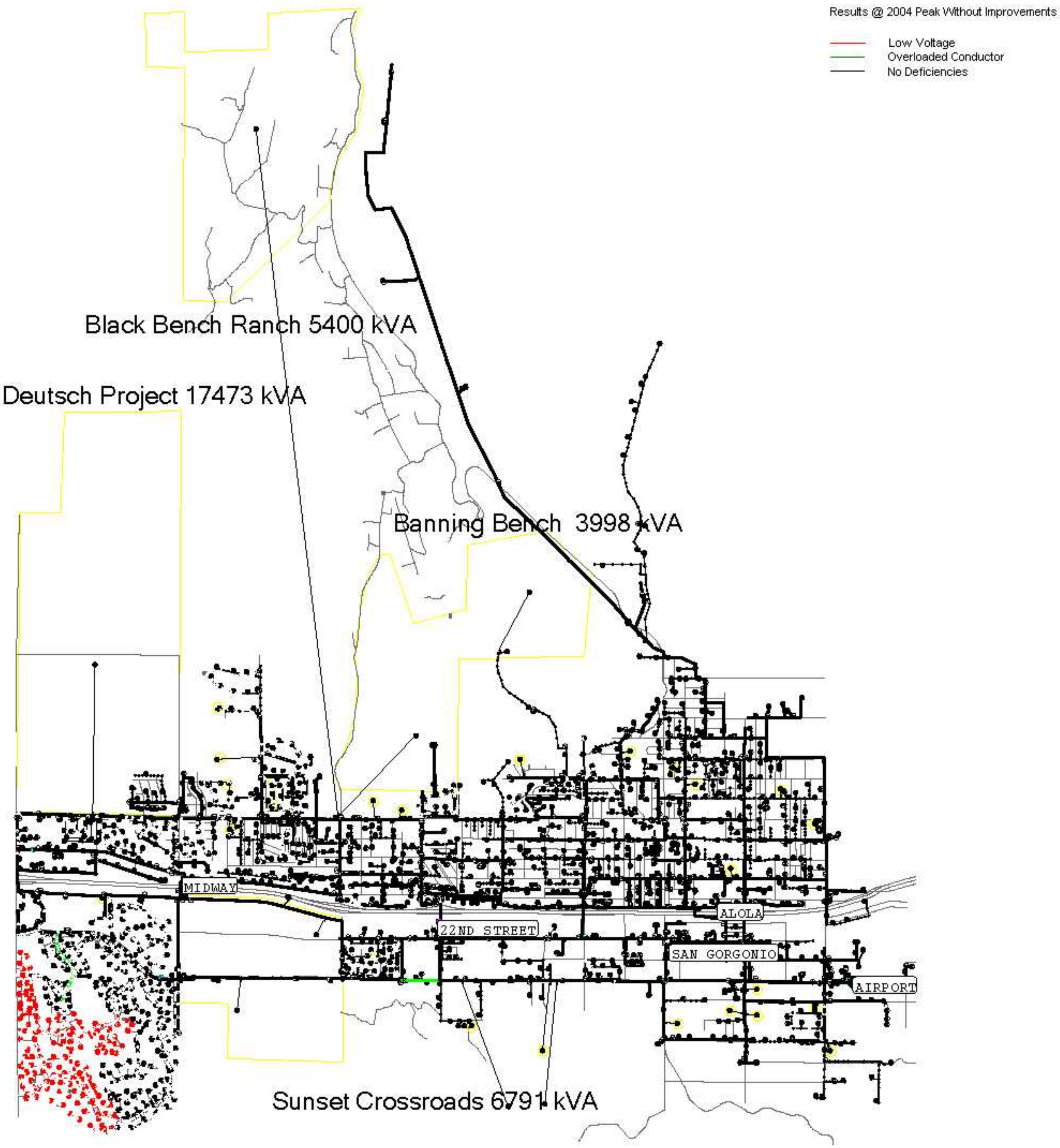
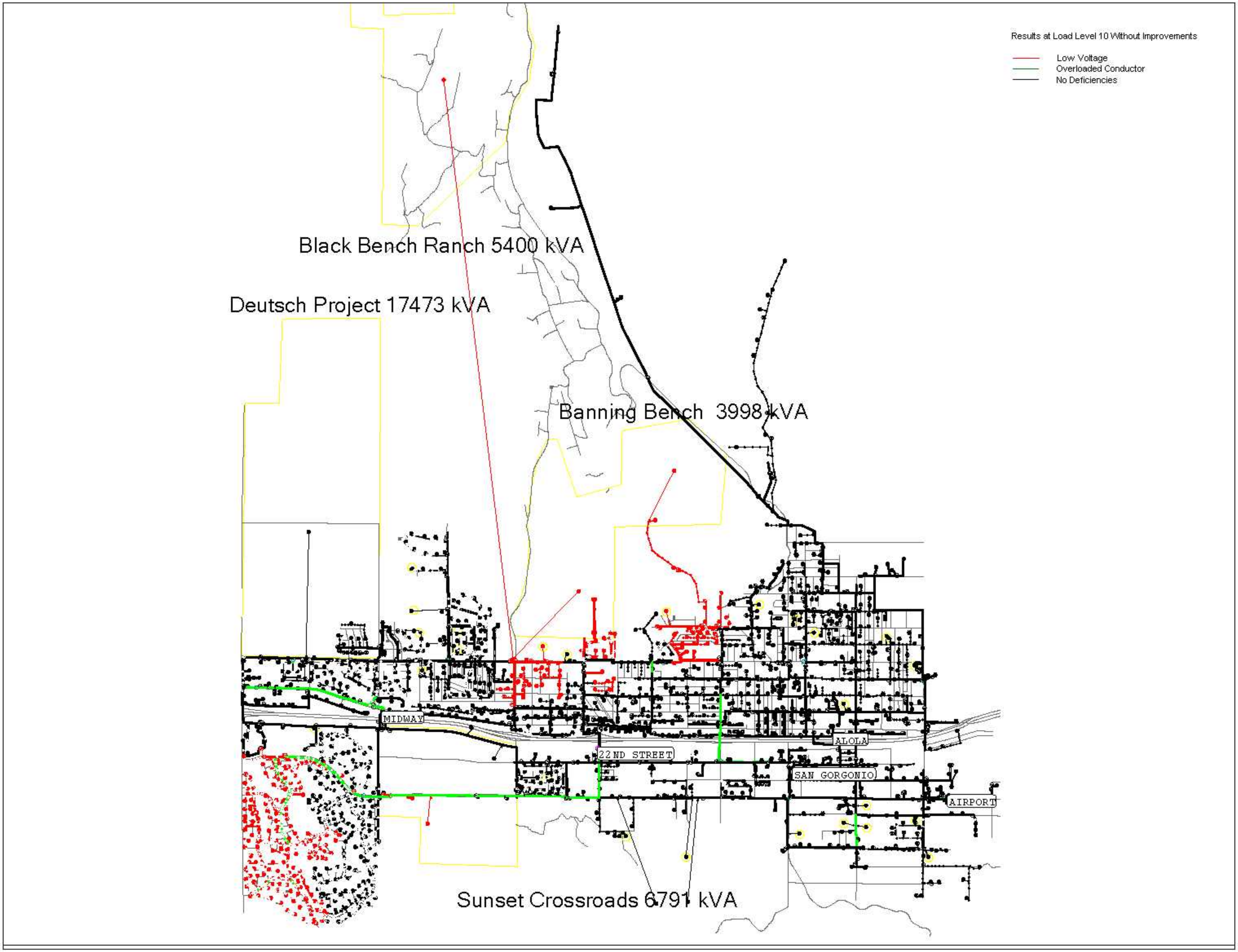

Existing Distribution System
Color - By Substation
Alola Substation
San Gorgonio Substation
Airport Substation
22nd Street Substation
Midway Substation
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
Banning Bench 3998 kVA
Sunset Crossroads 6791 kVA
MIDWAY
ALOLA
22ND STREET
SAN GORGONIO
AIRPORT

Exhibit 2-4
Distribution System Deficiencies at 2004 Peak



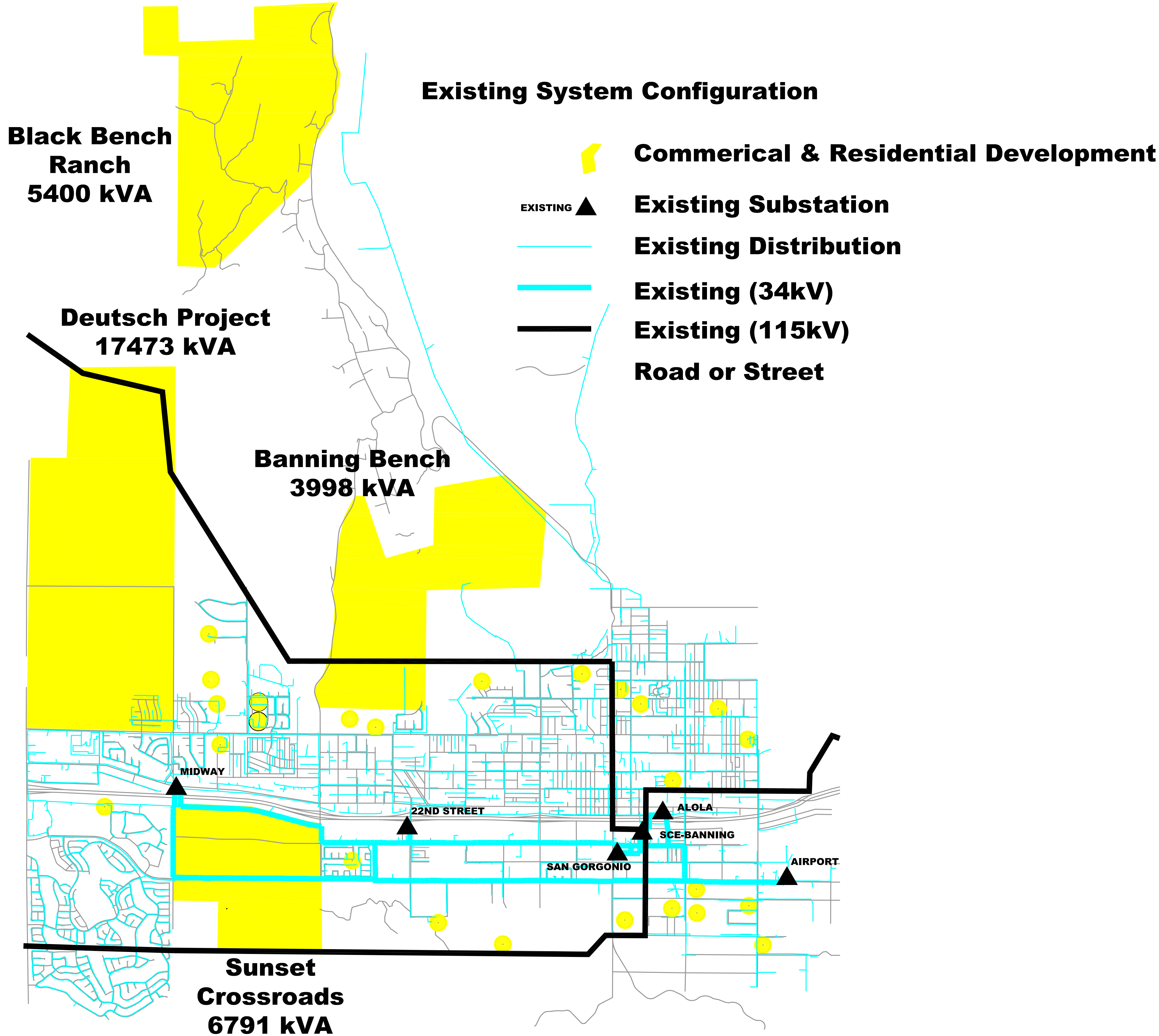
Results @ 2004 Peak Without Improvements
Low Voltage
Overloaded Conductor
No Deficiencies
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
Banning Bench 3998 kVA
Sunset Crossroads 6791 kVA
MIDWAY
22ND STREET
ALOLA
SAN GORGONIO
AIRPORT

Exhibit 2-5
Distribution System Deficiencies at Projected Loads



Results at Load Level 10 Without Improvements
Low Voltage
Overloaded Conductor
No Deficiencies
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
Banning Bench 3998 kVA
MIDWAY
22ND STREET
ALOLA
SAN GORGONIO
AIRPORT
Sunset Crossroads 6791 kVA

Exhibit 2-6
Existing Transmission System



Existing System Configuration
Commerical & Residential Development
EXISTING
Existing Substation
Existing Distribution
Existing (34kV)
Existing (115kV)
Road or Street
Black Bench
Ranch
5400 kVA
Deutsch Project
17473 kVA
Banning Bench
3998 kVA
Sunset
Crossroads
6791 kVA
MIDWAY
22ND STREET
ALOLA
SCE-BANNING
SAN GORGONIO
AIRPORT

Exhibit 2-7
Transmission System Deficiencies at Projected Loads

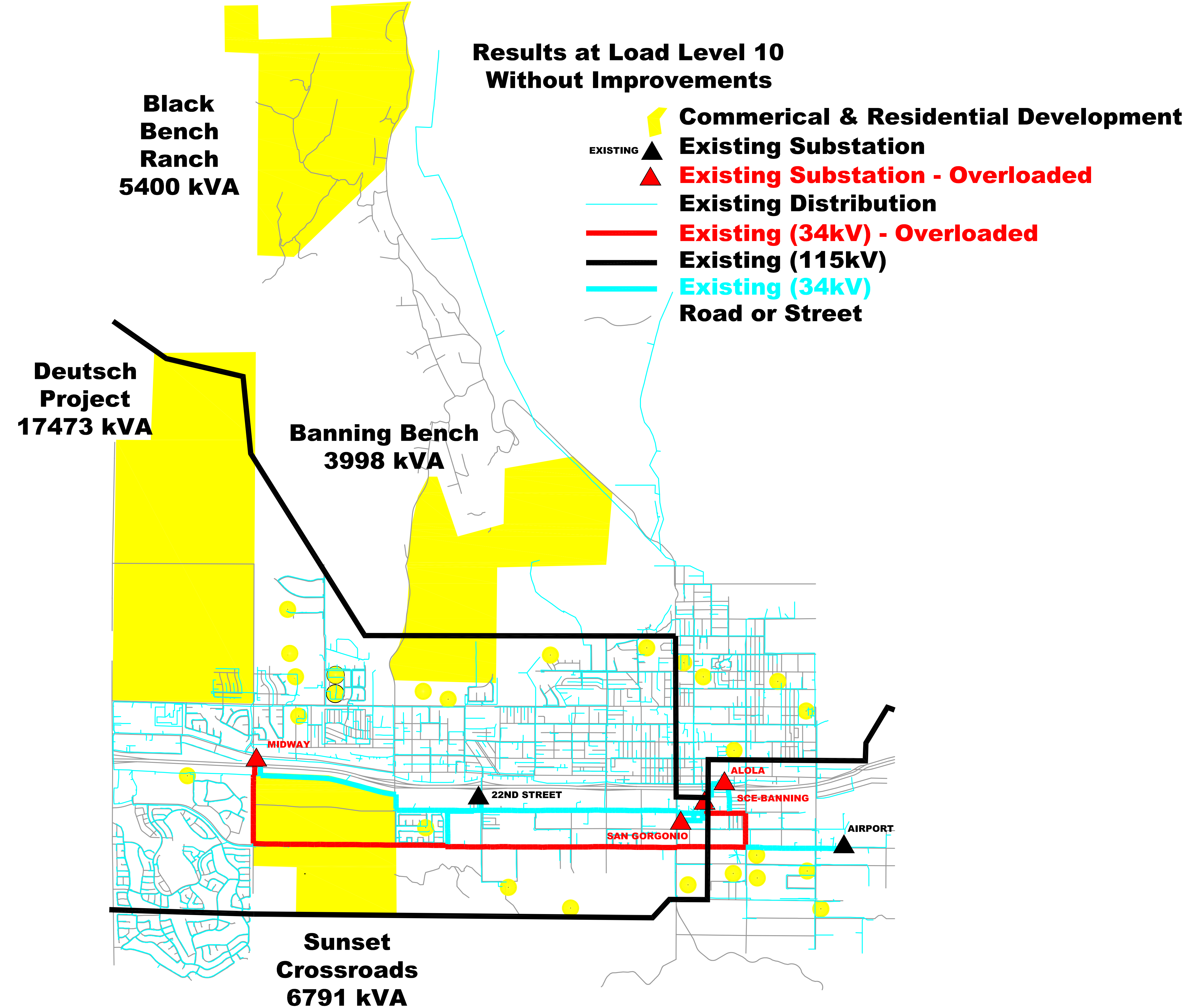
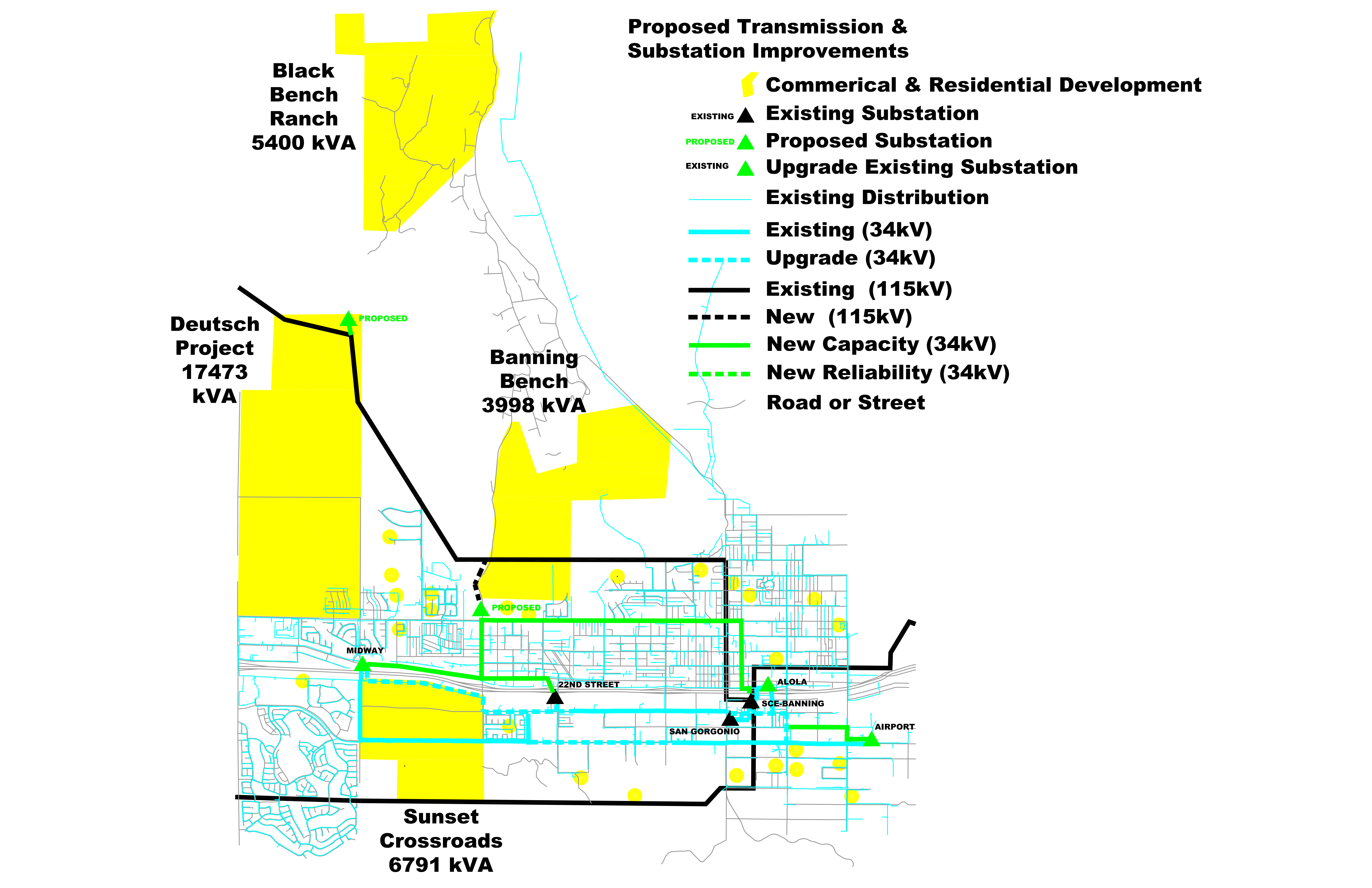

Results at Load Level 10
Without Improvements
Commerical & Residential Development
EXISTING
Existing Substation
Existing Substation - Overloaded
Existing Distribution
Existing (34kV) - Overloaded
Existing (115kV)
Existing (34kV)
Road or Street
Black
Bench
Ranch
5400 kVA
Deutsch
Project
17473 kVA
Banning Bench
3998 kVA
Sunset
Crossroads
6791 kVA
MIDWAY
22ND STREET
ALOLA
SCE-BANNING
SAN GORGONIO
AIRPORT

Exhibit 2-8
Recommended Transmission and Substation Improvements



Proposed Transmission & Substation Improvements
Commerical & Residential Development
EXISTING
Existing Substation
PROPOSED
Proposed Substation
EXISTING
Upgrade Existing Substation
Existing Distribution
Existing (34kV)
Upgrade (34kV)
Existing (115kV)
New (115kV)
New Capacity (34kV)
New Reliability (34kV)
Road or Street
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
PROPOSED
Banning Bench 3998 kVA
PROPOSED
MIDWAY
22ND STREET
ALOLA
SCE-BANNING
SAN GORGONIO
AIRPORT
Sunset Crossroads 6791 kVA

Section 3
THE PREFERRED PLAN

3.1 Preferred Plan

The existing system was analyzed at existing and projected loads with respect to adequate voltage and loading conditions under normal and contingency conditions as outlined in Section 2 of this report. The basis for the Preferred Plan improvements is the projected customer and load growth. The actual load may develop quicker or slower than anticipated. To avoid the impression that facilities are required in a given year, each improvement was assigned to a specific load level. Therefore, the Preferred Plan improvements should be constructed as the load requires.

These upgrades and resulting analysis results are illustrated in Exhibit 3-1 and Exhibit 3-2. Substation cost estimates are detailed in Exhibit 3-1. The system improvements for the Preferred Plan are as follows:

Project: Sunlakes Load Balance
Load Level: 1
Estimated 2004 Cost: $0

Description: To balance loading and improve feeder voltage in Sunlakes, OPEN the switch serving backbone to the East of the cabinet at Country Club Drive and Gleneagles Drive and CLOSE the circuit at vault near the corner of Country Club Drive and Long Cove Road. The recommended switching will transfer approximately 30 Amps (685 kVA) from CKT63 to CKT21.

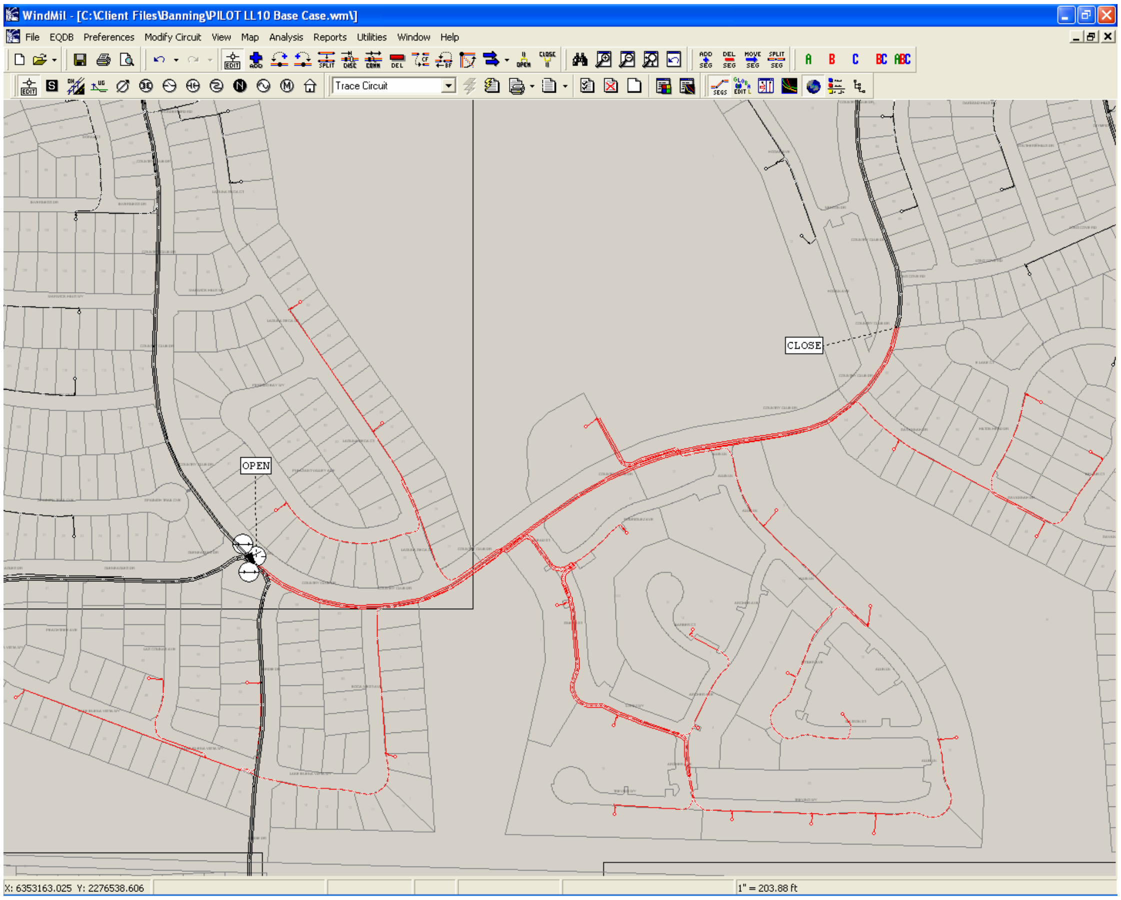


Figure 3-1: Sunlakes Load Balance

Project: Westward Avenue at Airport Upgrade
Load Level: 1
Estimated 2004 Cost: $28,120

Description: Rebuild the existing 0.19 miles of #2 ACSR on Westward Avenue (CKT 9) from the East corner of Airport Substation to Hathaway Street with 336 ACSR to relieve conductor loading.

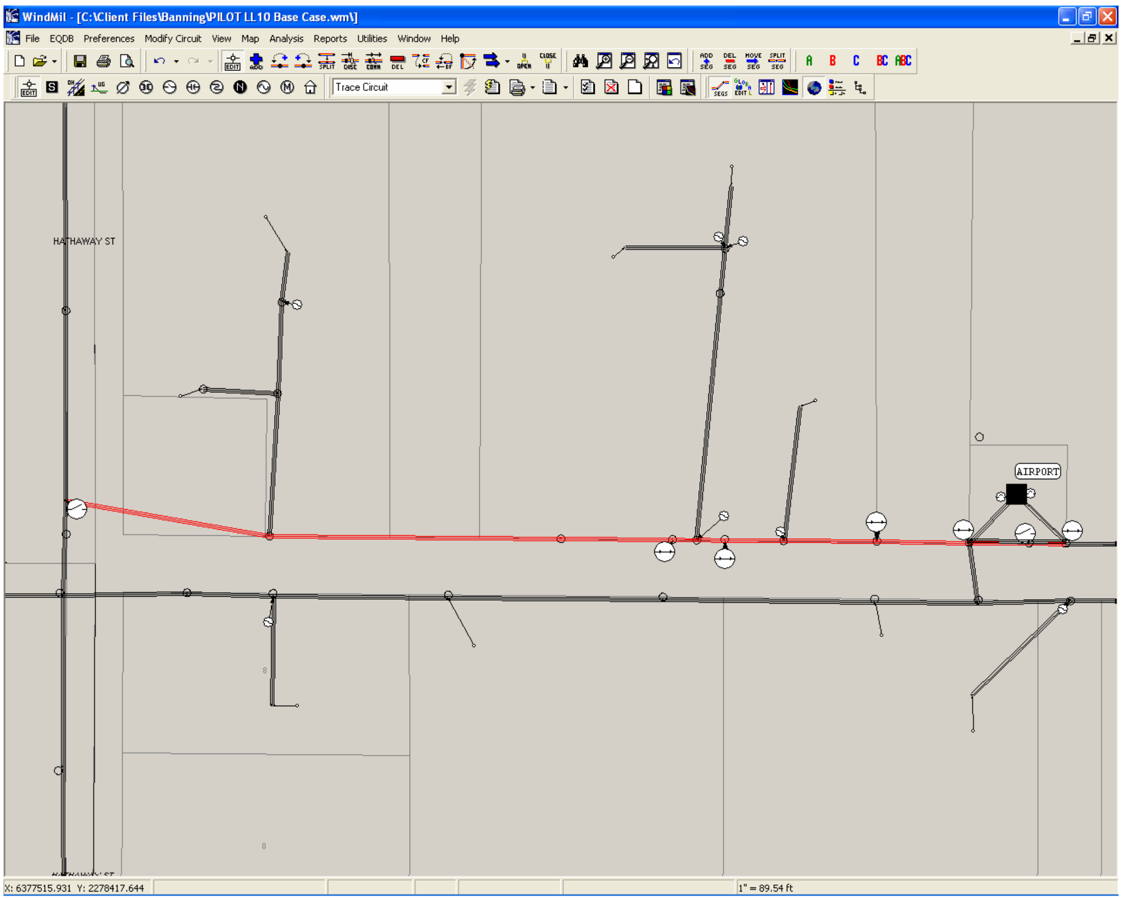


Figure 3-2: Westward Avenue at Airport Upgrade

Project: Westward Avenue Upgrade
Load Level: 1
Estimated 2004 Cost: $27,880

Description: Reconductor 0.41 miles of #4/0 ACSR on Westward Avenue (CKT 63) from Switch SW12-155 to Woodland Avenue with 336 ACSR to relieve conductor loading.

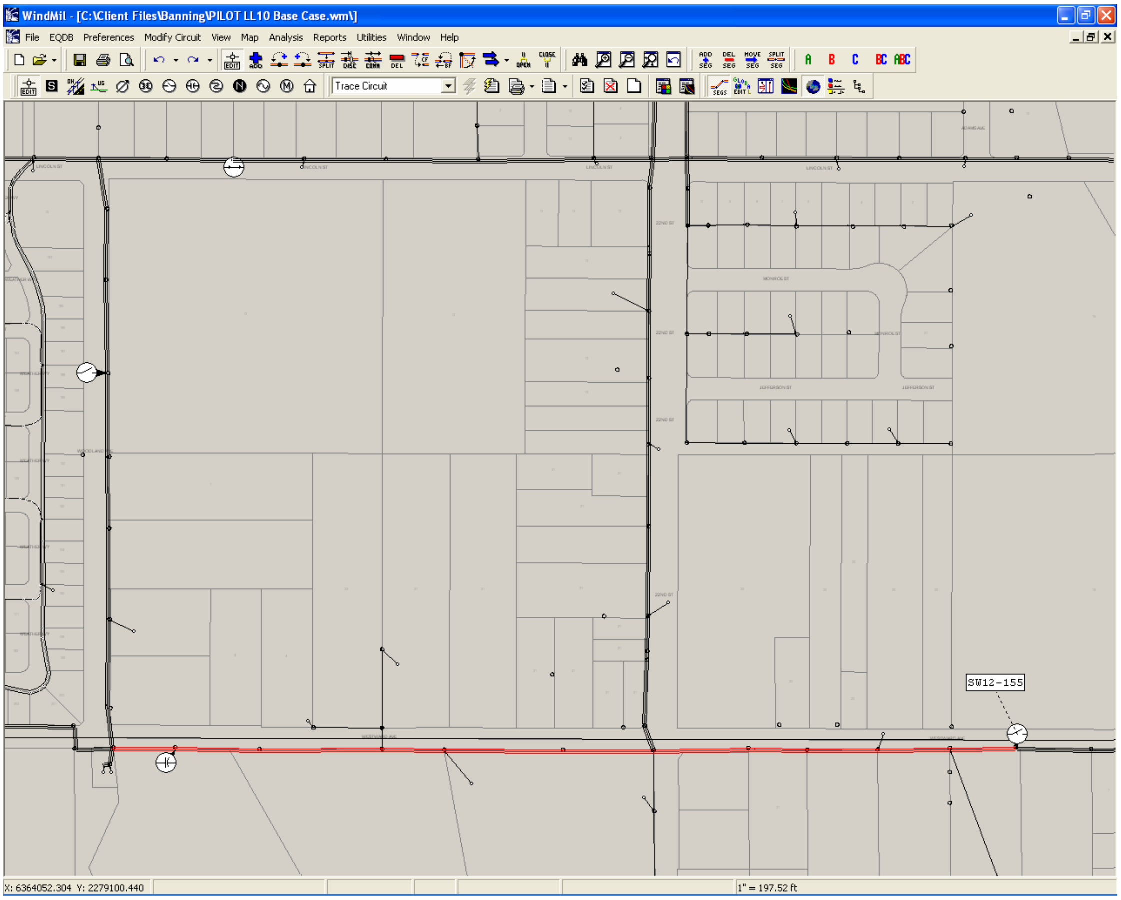


Figure 3-3: Westward Avenue Upgrade

Project: 34 kV Breaker Addition
Load Level: 1
Estimated 2004 Cost: $50,000

Description: Add 3rd 1200A breaker in spare 34 kV bay # 7 at the SCE Banning Substation for the new CKT T-3.

Project: Tie for New CKT T-3
Load Level: 1
Estimated 2004 Cost: $12,500

Description: Construct approximately 0.05 miles of 3-phase, 336 ACSR at 34 kV from the new CKT T-3 breaker at Banning Substation to tap the North tap of existing CKT T-1. Once the new circuit is completed, OPEN switch SW34-17.

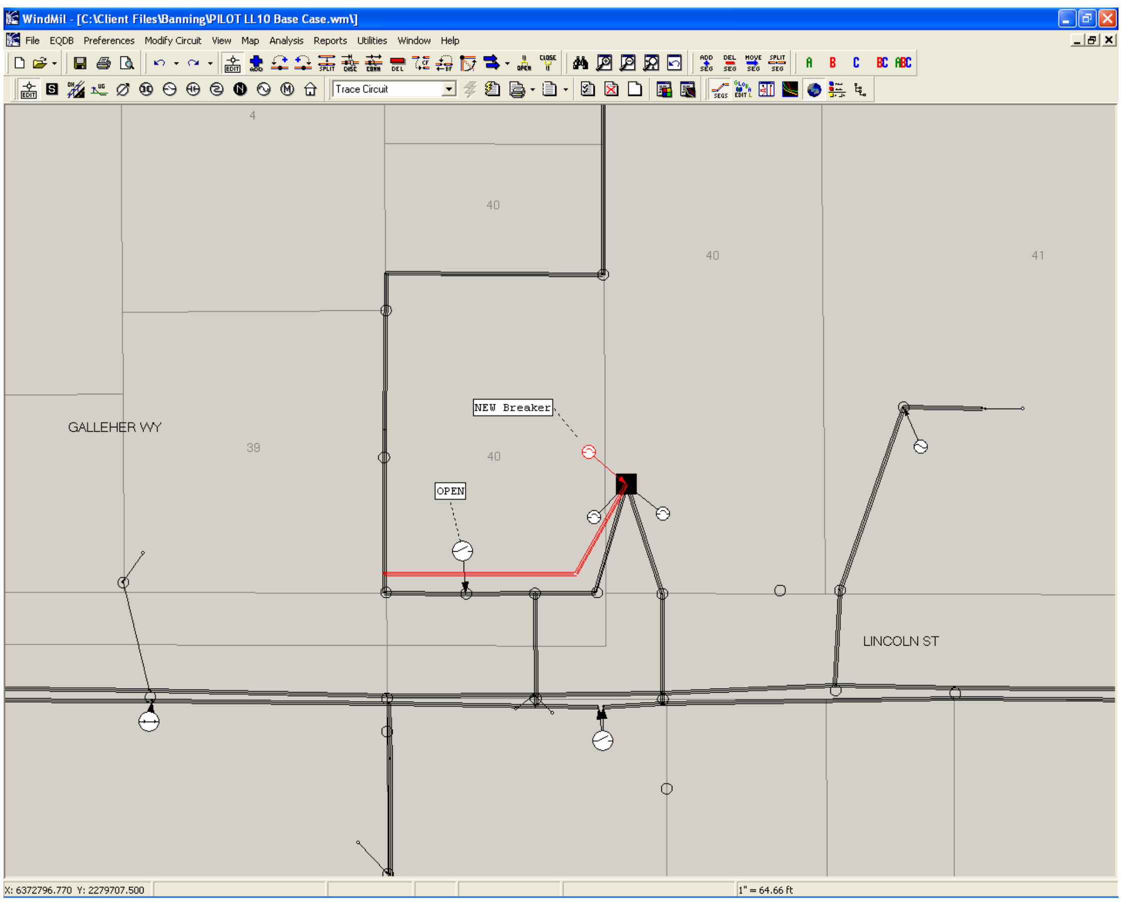


Figure 3-4: Tie for New CKT T-3

Project: Alola/CKT T-3 Upgrade
Load Level: 1
Estimated 2004 Cost: $18,360

Description: Reconductor 0.27 miles of 4/0 ACSR 34 kV exiting Alola Substation to the west, across I-10 to 336 ACSR to improve conductor loading.

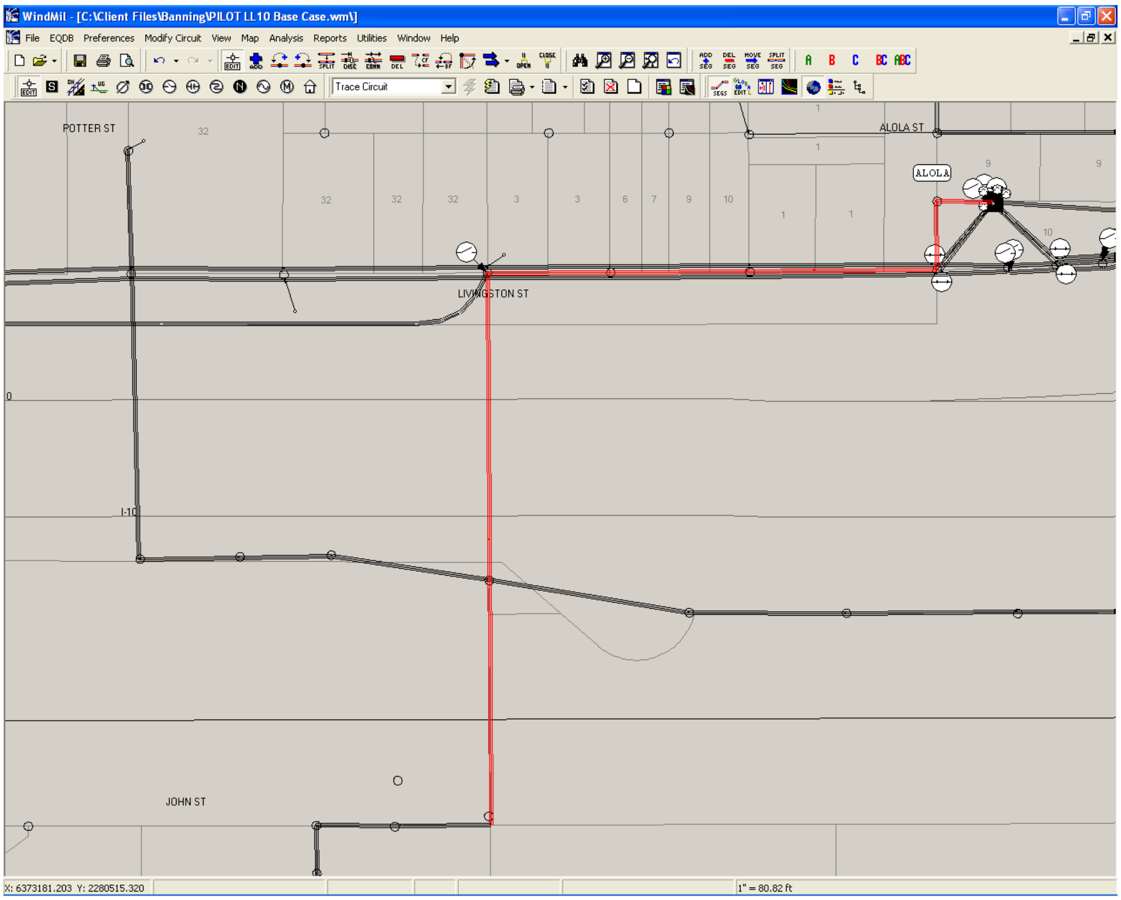


Figure 3-5: Alola/CKT T-3 Upgrade

Project: CKT T-2 Upgrade – Part 1
Load Level: 1
Estimated 2004 Cost: $36,040

Description: Reconductor 0.53 miles of 4/0 ACSR 34 kV to 336 ACSR on Lincoln Street from the switch SW34-49 (located between the two feeds to San Gorgonio Substation) to Hargrave Street; then down Hargrave Street between Lincoln Street and Westward Avenue. Project is required to relieve conductor loading.

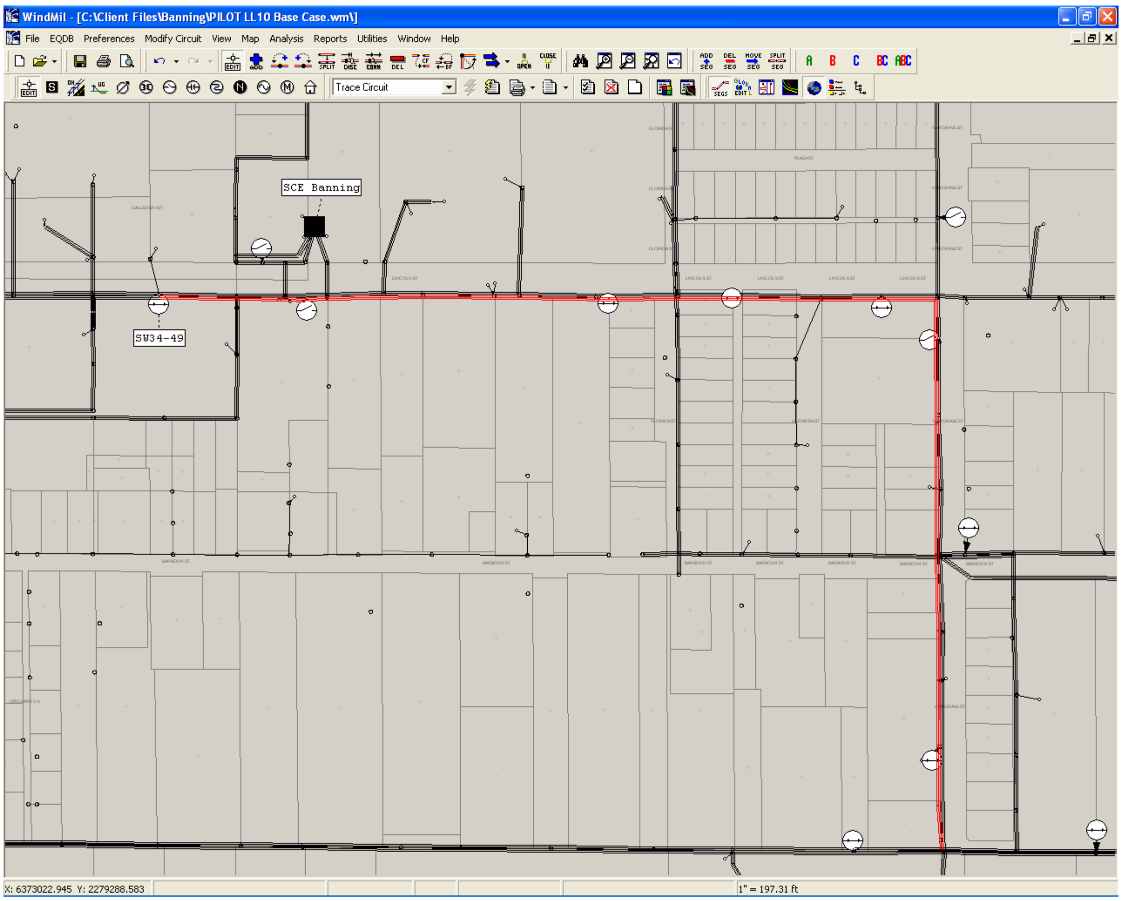


Figure 3-6: CKT T-2 Upgrade – Part 1

Project: Sunset 12 kV Substation
Load Level: 1 & 2
Estimated 2004 Cost: $2,616,000

Description: Construct Sunset Substation 34-12 kV with (2) 12/16/20 MVA transformers and (4) 12 kV breakers at the corner of Sunset and Wilson to relieve San Gorgonio, 22nd Street, and Midway Substations. This site was selected over an alternate site off of Highland Home Road because the Sunset Site is closer to the existing 115 kV Transmission line, and interconnection to the existing 12 kV distribution system will be more economical and provide more flexibility.

Project: Sunset Distribution Circuits
Load Level: 2
Estimated 2004 Cost: $192,240

Description: Construct (4) 12 kV 750 Cu underground circuits from the new Sunset Substation. The first circuit will cross Wilson to the south side of the street and extend west to the first pole after switch SW12-14. Total length of the first circuit is approximately 0.13 mile.

The second circuit will cross Wilson and extend South on Sunset to the second pole south of the intersection of Sunset and Wilson. Total length of the second circuit is approximately 0.1 mile.

The third circuit will cross Wilson and extend east to the first pole on Wilson. Total length of the third circuit is approximately 0.06 mile.

The fourth circuit will be dedicated to serve Banning Bench. With this circuit, exit west out of the substation to the west side of Sunset Avenue, and extend north into the Banning Bench development. The fourth circuit should also tie into the existing 3-phase on the northwest corner of Sunset and Wilson. Total length of the fourth circuit is approximately 0.25 mile.

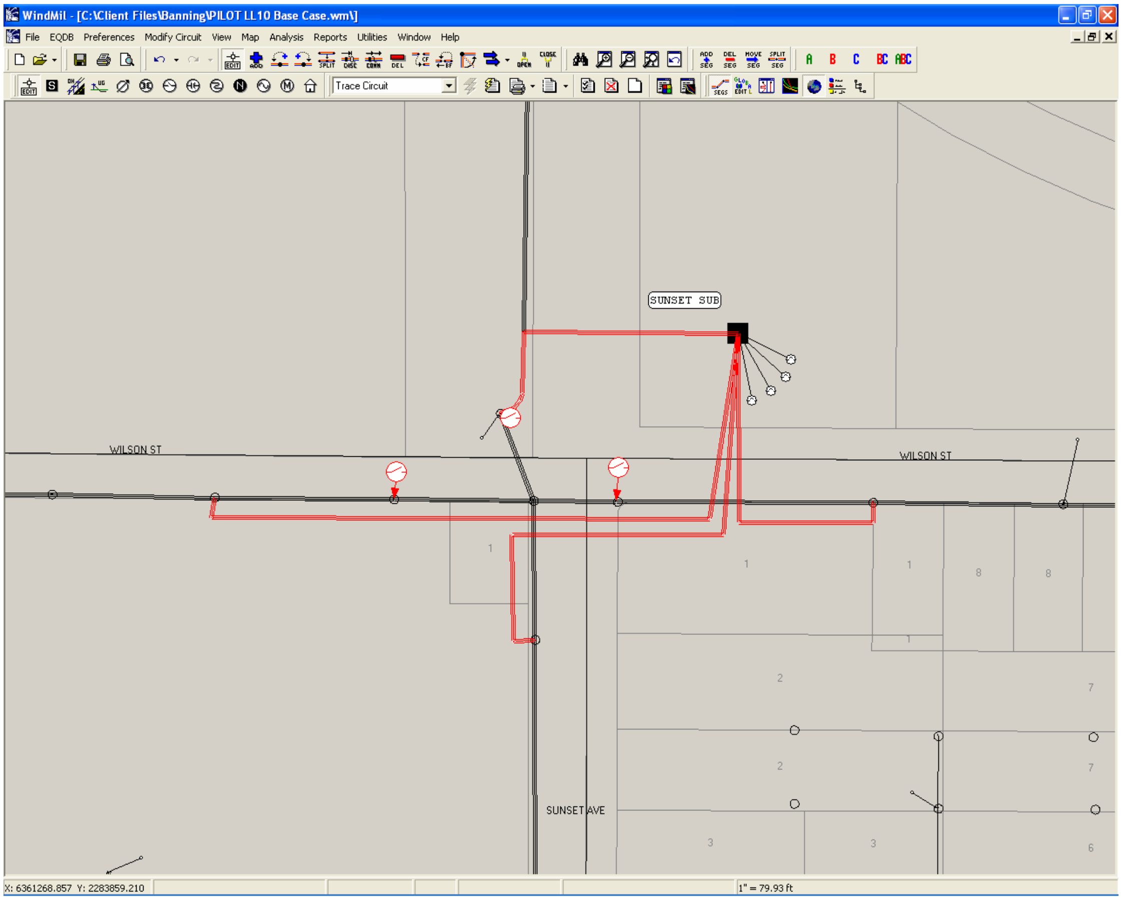


Figure 3-7: Sunset Substation & Distribution Circuits

Project: Sunset-to-Alola 34 kV Circuit
Load Level: 2
Estimated 2004 Cost: $2,517,120

Description: Construct underground 34 kV circuit with 750 Cu for North loop to Sunset Substation from Alola Substation. Project is estimated at 2.88 miles. The proposed route includes the following:

- Attach to the corner pole West of Alola Substation on the North side of Livingston Street. From the corner pole, install 750 Cu underground west along Livingston Street to San Gorgonio Avenue
- Then, up San Gorgonio Avenue between Livingston Street and Wilson Street.
- Continue west along Wilson Street with 750 Cu underground between San Gorgonio Avenue to the Sunset Substation 34 kV bus.

Project: Sunset-to-Midway 34 kV Circuit
Load Level: 2
Estimated 2004 Cost: $1,363,440

Description: Construct 1.56 miles of 750 Cu conductor underground 34 kV circuit for north loop from Sunset Substation to Midway Substation. The proposed route includes the following:

- Exit the 34 kV bus at Sunset Substation South along Sunset Avenue to Ramsey Street.
- Then continue west along Ramsey Street from Sunset Avenue to the corner pole on the east side of Midway Substation.

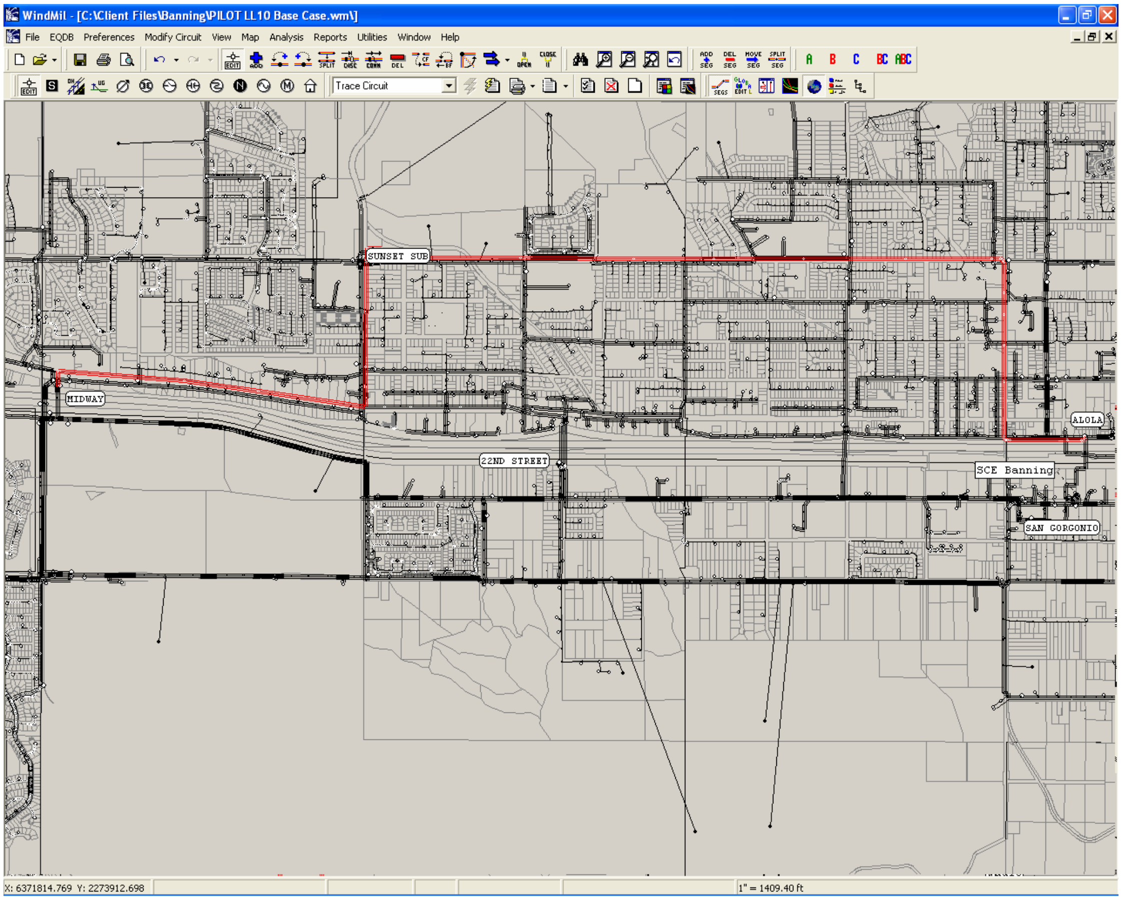


Figure 3-8: North Loop 34 kV Lines

Note:

After the addition of the North Loop, the normal configuration of 34 kV transmission system is as follows:

- Midway Bank 1 on T-3
- Midway Bank 2 on T-2
- Sunset on T-3
- San Gorginio Banks 1 and 2 on T-1
- 22nd Street on T-1
- Alola Banks 1,2 and 3 on T-2
- Airport on T-2

Project: Switching for Sunset Distribution
Load Level: 2
Estimated 2004 Cost: $0

Description: Tie existing distribution to new circuits out of Sunset Substation and transfer 12.2 MVA initially in Load Level 2 from San Gorgonio, 22nd Street, and Midway Substations with the following switching:

- OPEN the switch that serves east tap in the switchgear located at the intersection of Wilson Street and Highland Home Road.
- CLOSE into new circuit from Sunset Substation at the intersection of Sunset and Wilson.

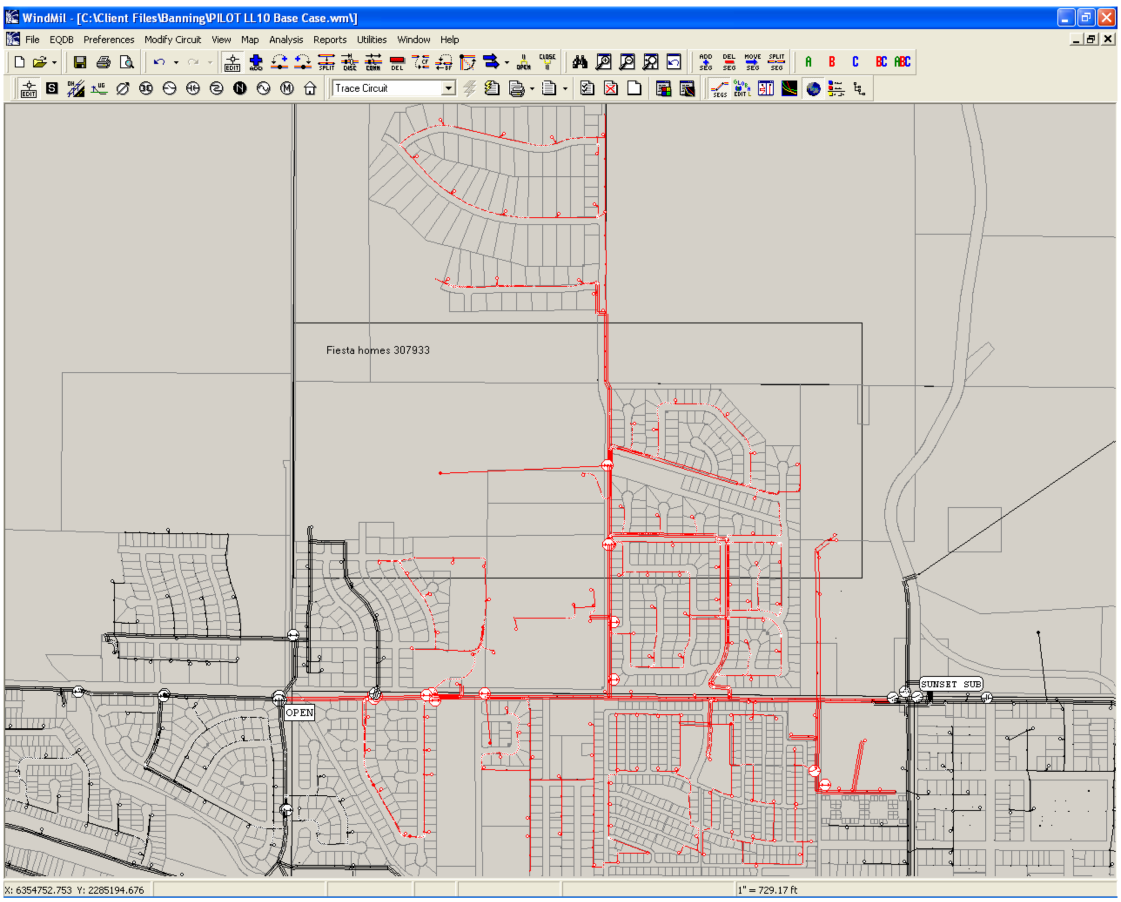


Figure 3-9: Switching for Sunset Distribution – Part 1

- Install an OPEN switch at corner of 8th and George Street.
- CLOSE into new circuit from Sunset Substation at the intersection of Sunset and Wilson.

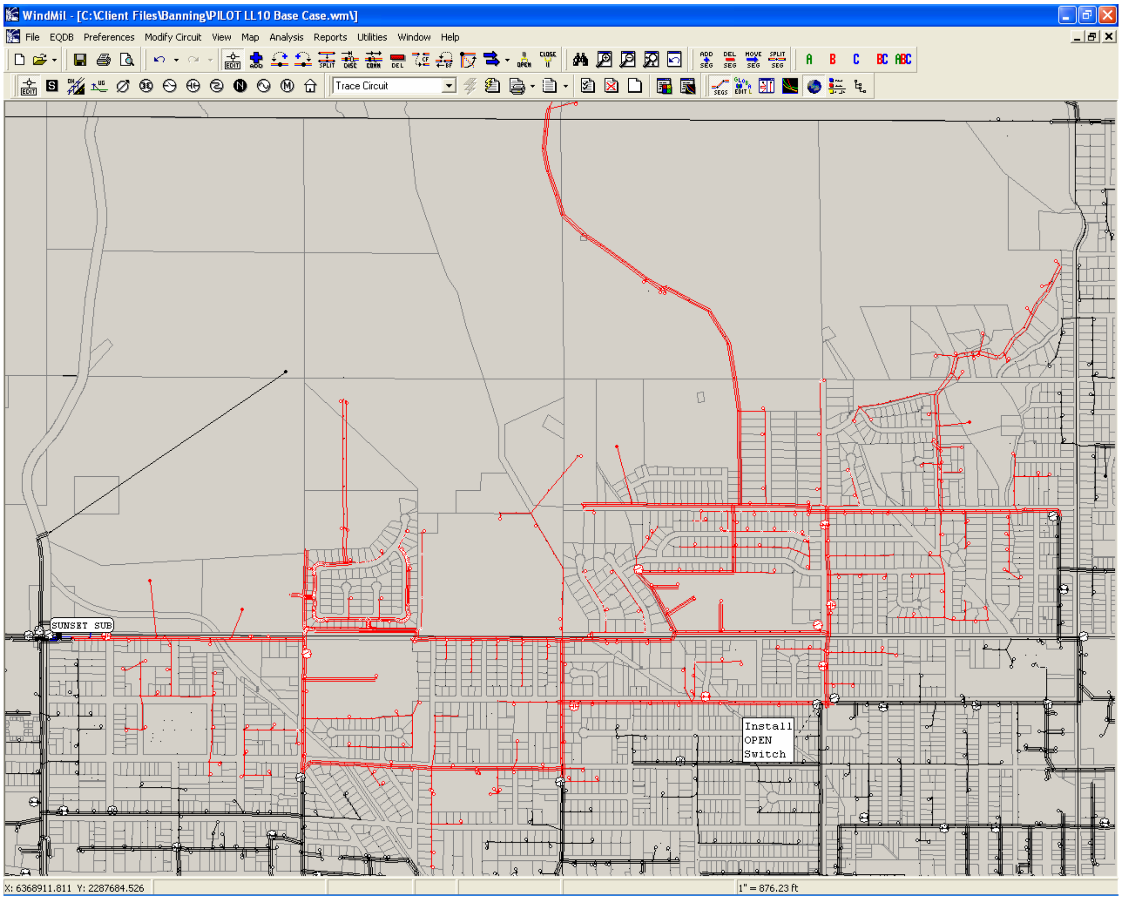


Figure 3-10: Switching for Sunset Distribution – Part 2

- OPEN switch SW12-20.
- CLOSE into new circuit from Sunset Substation at the intersection of Sunset and Wilson.
- OPEN at riser on CKT64 on the corner of 22nd and Ramsey.
- CLOSE switch SW12-19.

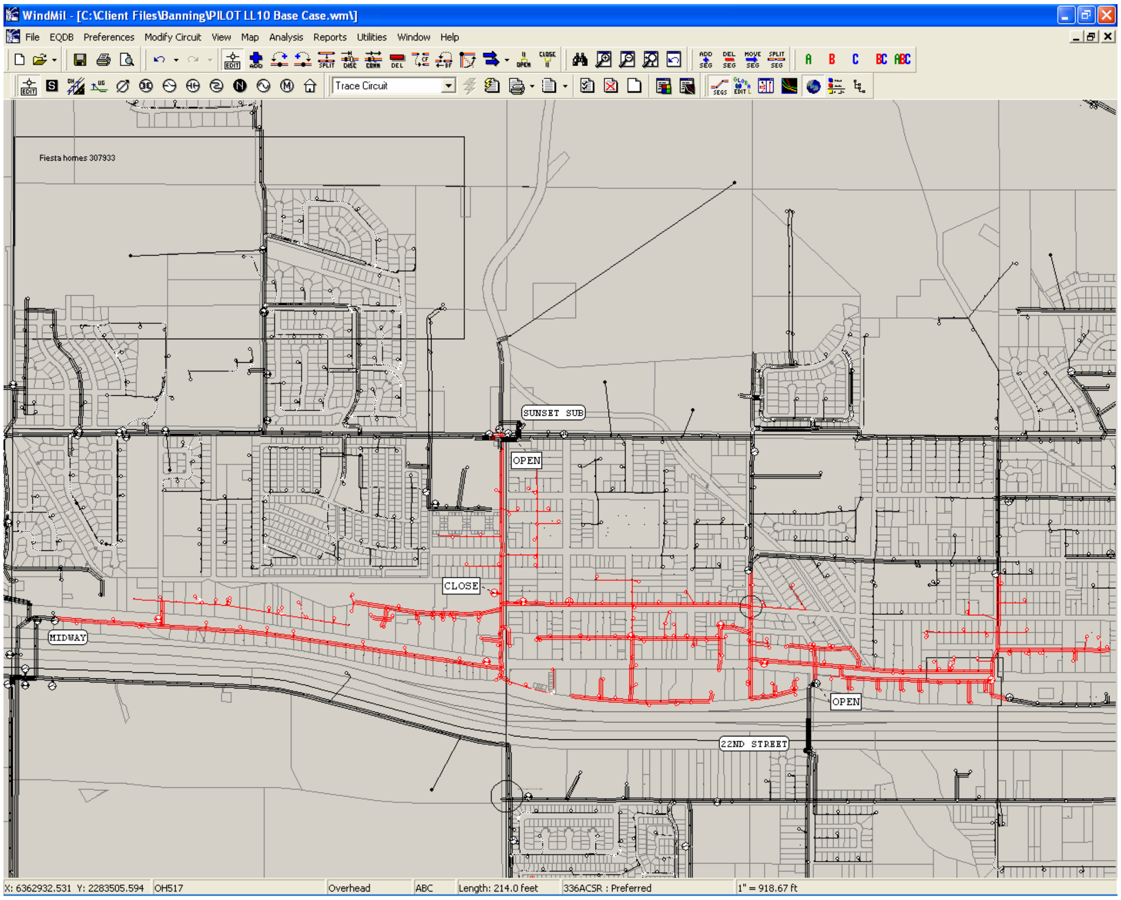


Figure 3-11: Switching for Sunset Distribution – Part 3

Project: CKT T-2 Upgrade – Part 2
Load Level: 3
Estimated 2004 Cost: $122,400

Description: Reconductor #4/0 ACSR 34 kV on Westward Avenue between Hargrave Street and Woodland Avenue to 336 ACSR due to conductor loading during contingency operations. Total project length is approximately 1.8 miles.

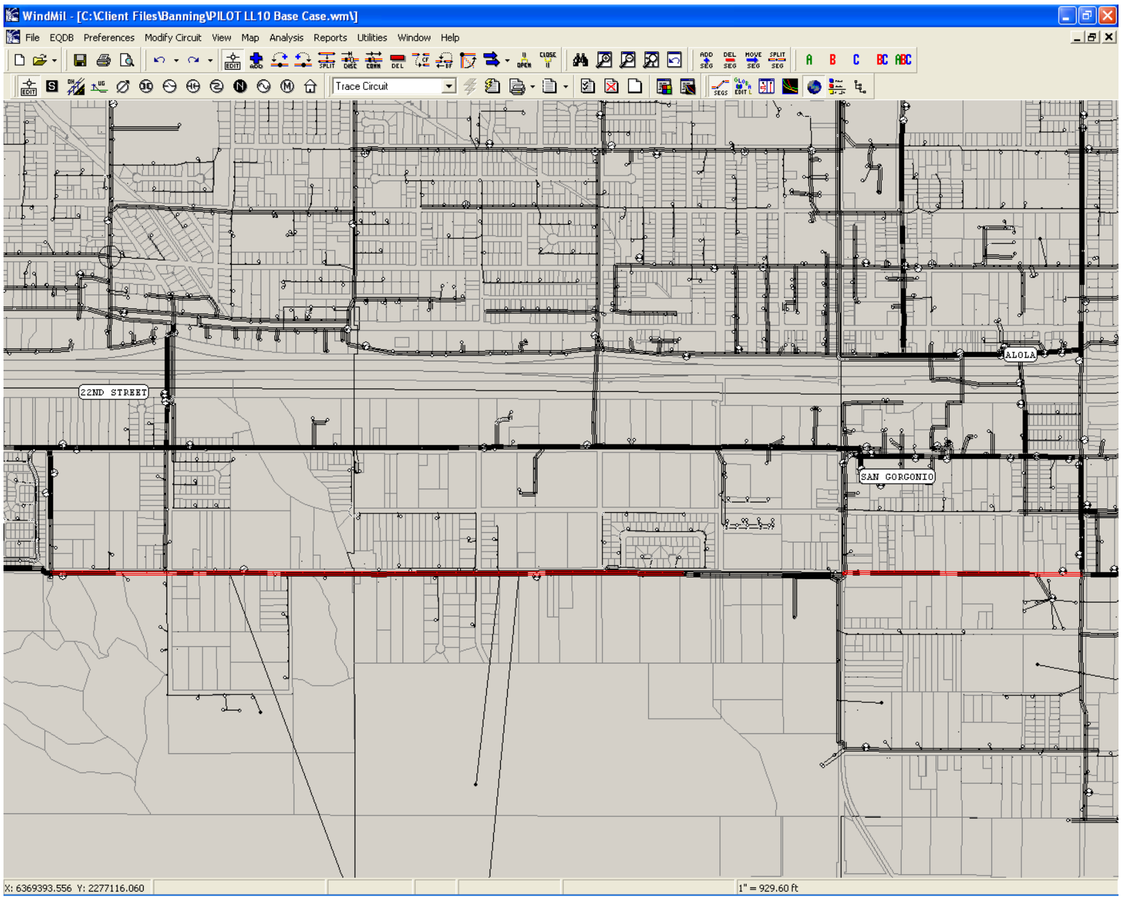


Figure 3-12: CKT T-2 Upgrade – Part 2

Project: Wilson Tie
Load Level: 3
Estimated 2004 Cost: $85,440

Description: Install a 750 Cu underground tie between existing overhead circuits on Wilson Street between Sunrise Avenue and 20th Street to provide a second circuit to serve the Banning Bench development. Total project length is approximately 0.24 miles. Project also requires the following switching:

- OPEN Switch SW12-18
- CLOSE end of 336 ACSR circuit at 20th Street and Wilson to new underground tie.
- OPEN Switch SW4-84
- CLOSE Switch SW12-152

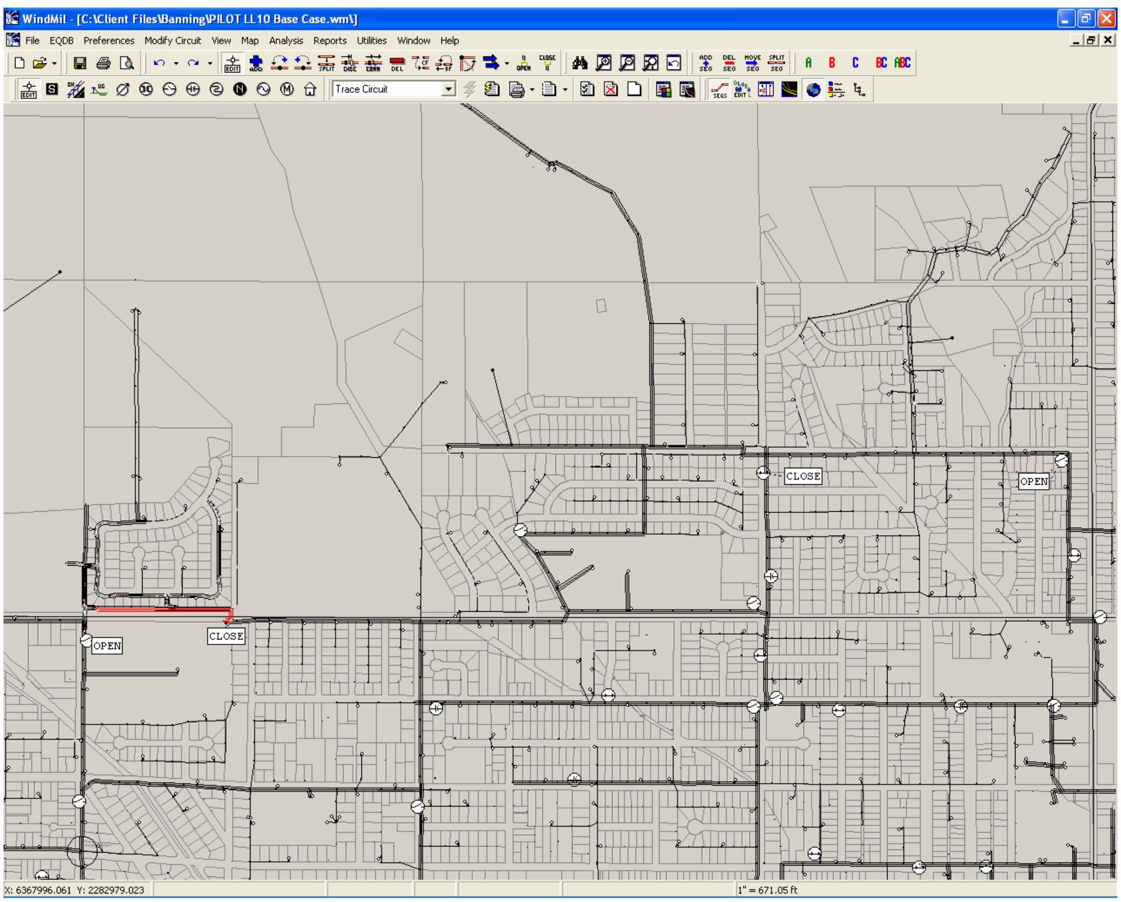


Figure 3-13: Wilson Tie

Project: Gilman Street Upgrade
Load Level: 3
Estimated 2004 Cost: $69,560

Description: Rebuild the existing 0.47 miles of 3-phase, #1/0 ACSR with 336 ACSR on Gilman Street from 8th Street west to the end of the line to provide a second circuit to serve the Banning Bench development. Project also requires a single span tie of 3-phase, 336 ACSR across Gilman Street at 8th Street and the following switching:

- OPEN switch near the intersection of Via Panorama and Hoffer Street
- CLOSE existing overhead at Gilman and 8th Street to new overhead tie.

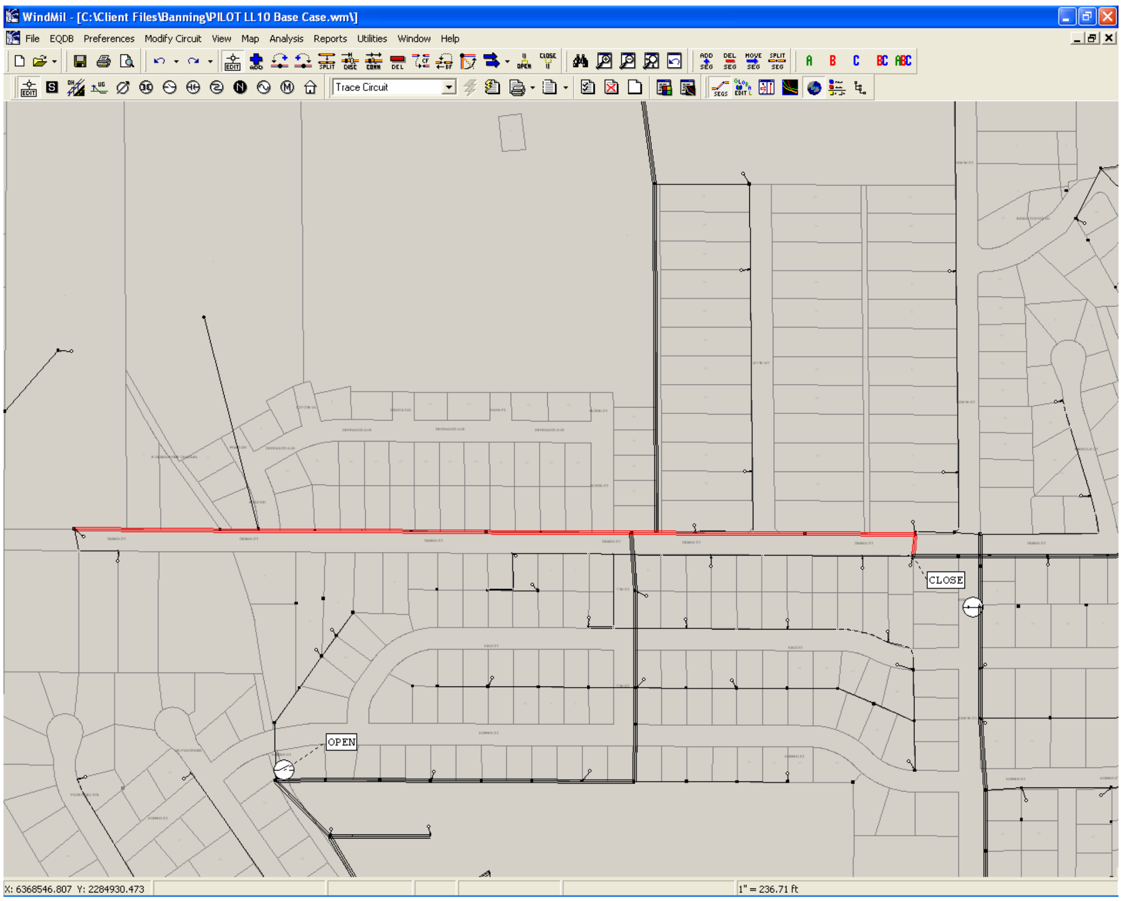


Figure 3-14: Gilman Street Upgrade

Project: Banning Bench Tie
Load Level: 3
Estimated 2004 Cost: $28,120

Description: Construct new 3-phase 336 ACSR on the back lot-lines of the homes on Florin Street and Wyte Way from the existing overhead on Gilman Street north to the existing single phase. Total length of overhead tie is approximately 0.19 miles. With the completion of the new tie, transfer the single phase extending north to the new overhead tie. Project is required for the second circuit to serve the Banning Bench development.

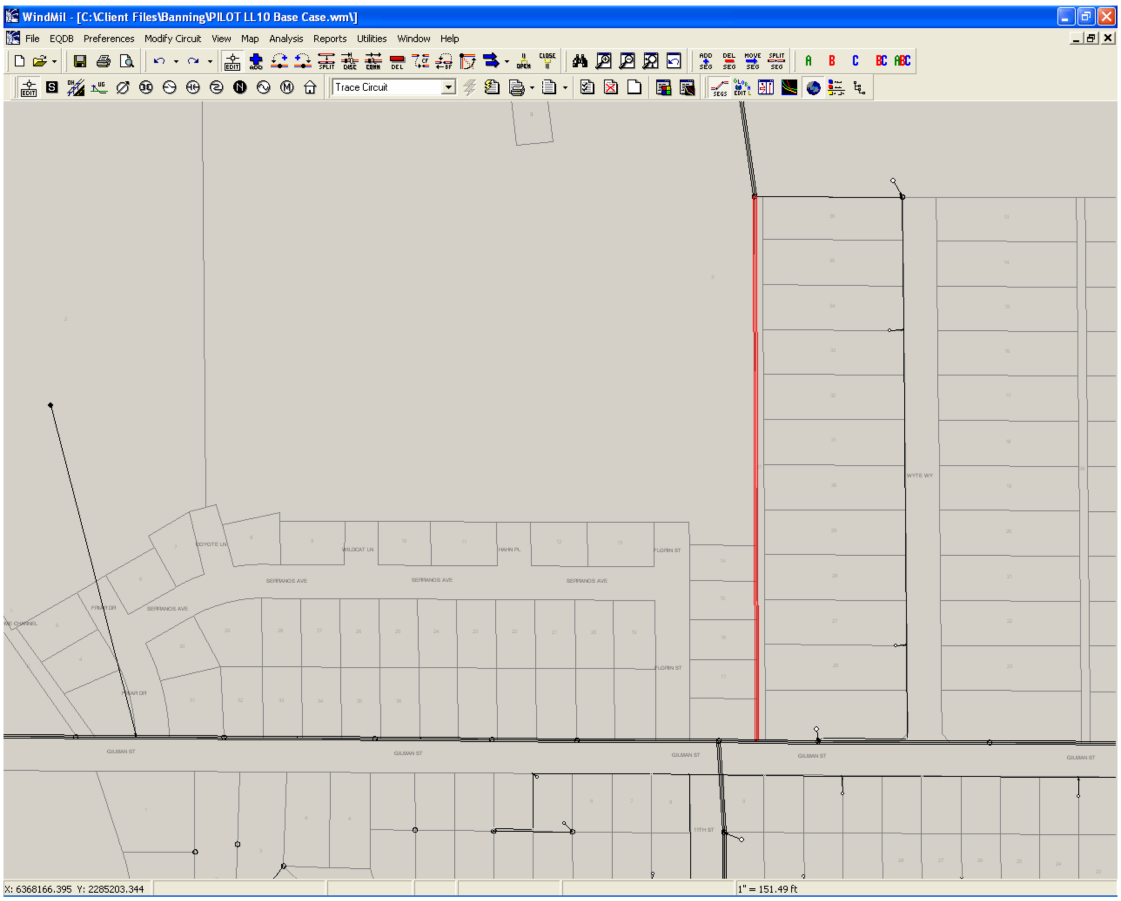


Figure 3-15: Banning Bench Tie

Project: Banning Bench 2nd Feed
Load Level: 3
Estimated 2004 Cost: $115,440

Description: Rebuild the existing 0.78 miles of the single phase extending north into the Banning Bench development with 3-phase, 336 ACSR to provide a second circuit.

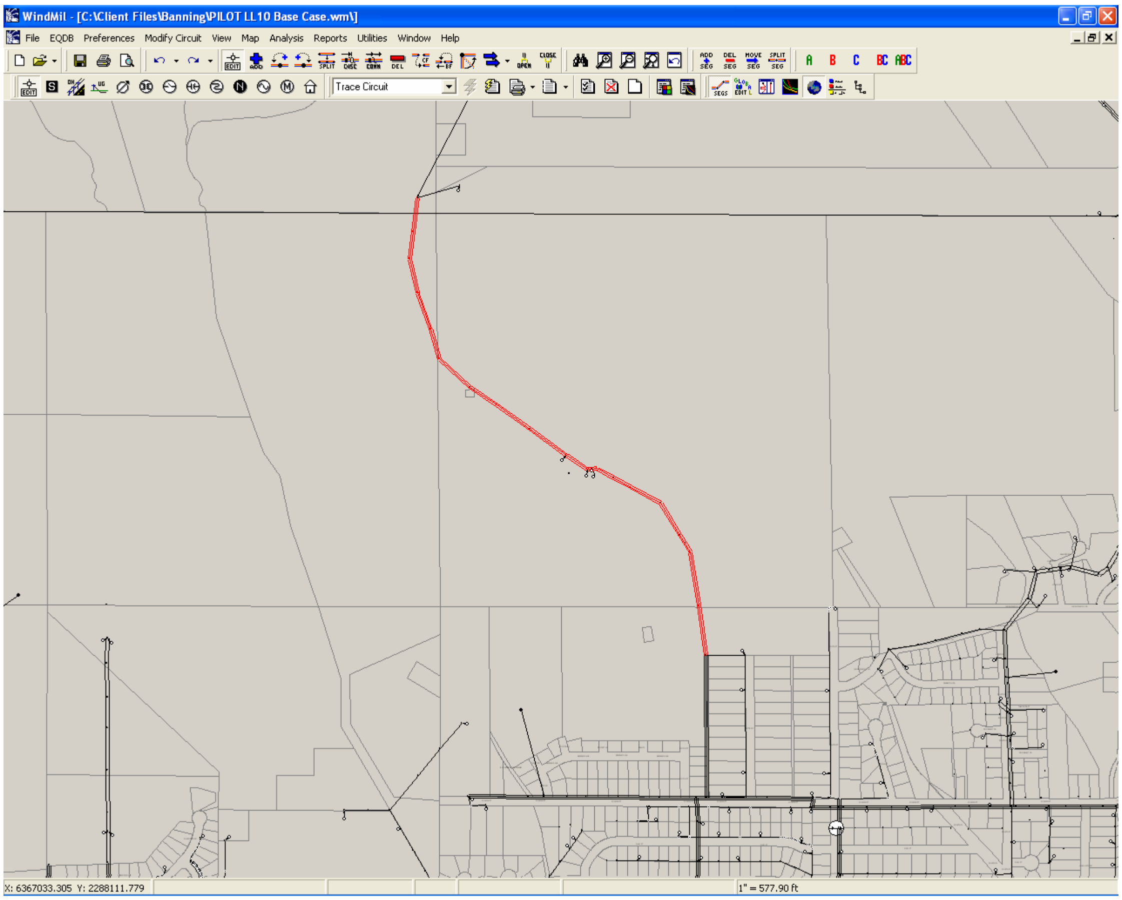


Figure 3-16: Banning Bench 2nd Feed

Project: Alola 4 kV Distribution Conversion
Load Level: 3 & 4
Estimated 2004 Cost: $1,028,360

Description: Convert approximately 27.5 miles 4 kV distribution presently on Alola Substation to 12 kV, and progressively transfer converted distribution to Sunset and San Gorgonio. Based on the distribution maps and engineering model, the Table 3-1 and Table 3-2 summarize the distribution lines and transformers included in this conversion project:

Table 3-1
Alola Distribution Line Conversion

Method	Phasing	Type	Miles
Re-Insulate	1-Phase	Overhead	12.4
Re-Insulate	3-Phase	Overhead	13.1
Replace	1-Phase	Underground	1.3
Replace	3-Phase	Underground	0.7
TOTALS			**27.5**

Table 3-2
Alola Distribution Transformers

Type	Phasing	Size (kVA)	Quantity
Overhead	1-Phase	2	6
Overhead	1-Phase	5	8
Overhead	1-Phase	7.5	4
Overhead	1-Phase	10	35
Overhead	1-Phase	15	91
Overhead	1-Phase	25	139
Overhead	1-Phase	37.5	26
Overhead	1-Phase	50	13
Overhead	1-Phase	75	2
Overhead	1-Phase	100	2
Overhead	1-Phase	167	1
Pad-Mounted	1-Phase	10	2
Pad-Mounted	1-Phase	15	1
Pad-Mounted	1-Phase	25	19

Type	Phasing	Size (kVA)	Quantity
Pad-Mounted	1-Phase	37.5	6
Pad-Mounted	1-Phase	50	15
Pad-Mounted	1-Phase	75	9
Pad-Mounted	1-Phase	100	2
Pad-Mounted	3-Phase	75	1
Pad-Mounted	3-Phase	100	1
Pad-Mounted	3-Phase	112.5	2
Pad-Mounted	3-Phase	150	3
Pad-Mounted	3-Phase	225	2
Pad-Mounted	3-Phase	300	2
Pad-Mounted	3-Phase	500	2
TOTALS			**394**

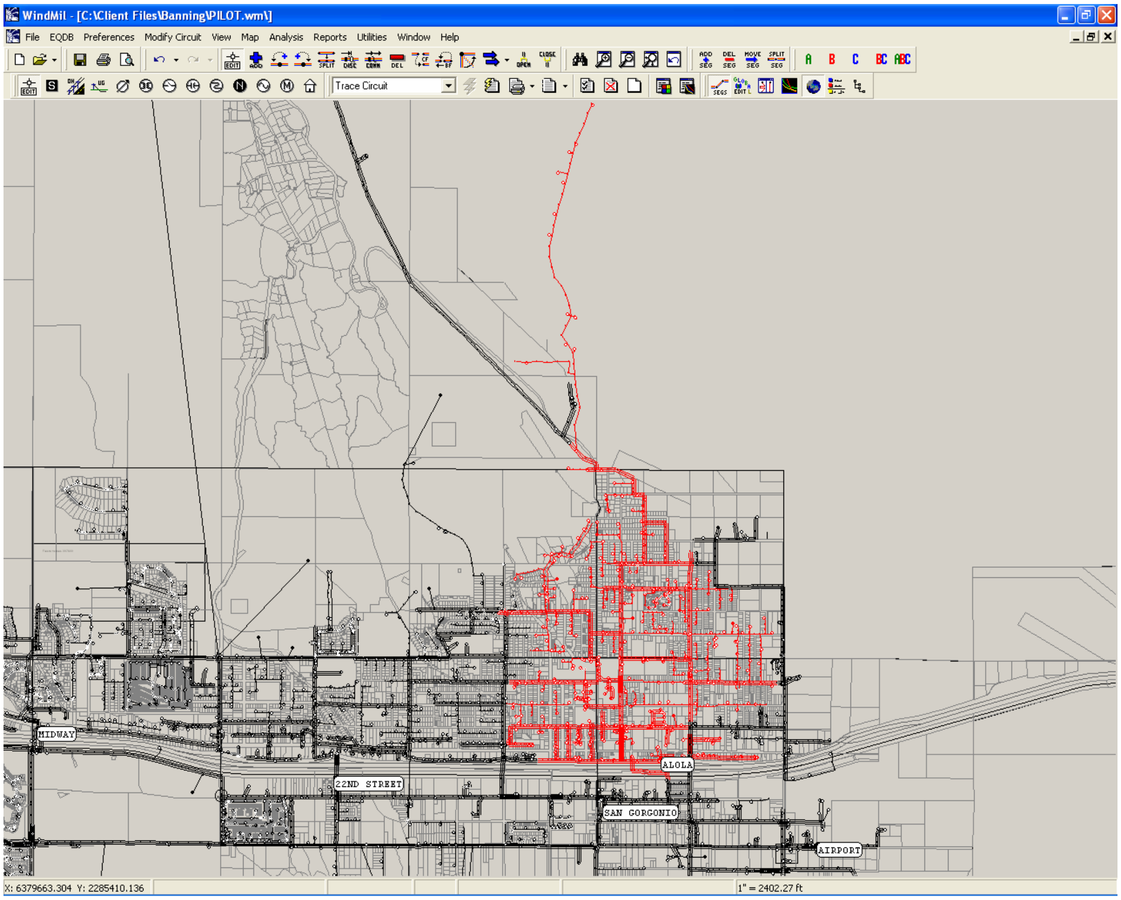


Figure 3-17: Alola 4 kV Distribution Conversion

Note:

The following transfers are recommended for the Alola 4 kV distribution conversion:

- Transfer Alola CKT 1 to San Gorgonio CKT 51 with CLOSE at physical opening on Livingston between 4th and 6th
- Transfer Alola CKT 2 to Sunset #3 with CLOSE at Switch SW4-84
- Transfer Alola CKT 8 to San Gorgonio CKT 54 with CLOSE at physical opening at Hargrave and I-10

Project: Midway Upgrade
Load Level: 3 & 4
Estimated 2004 Cost: $1,085,840

Description: Upgrade Midway Substation by replacing the existing transformers with (2) 12/16/20 MVA for additional capacity. Also, replace the existing 750 AL underground get-a-ways with 750 Cu with the recommended substation improvements. The existing underground conductors are approaching the 20-year life expectancy. The total estimated length of underground required is approximately 0.32 miles.

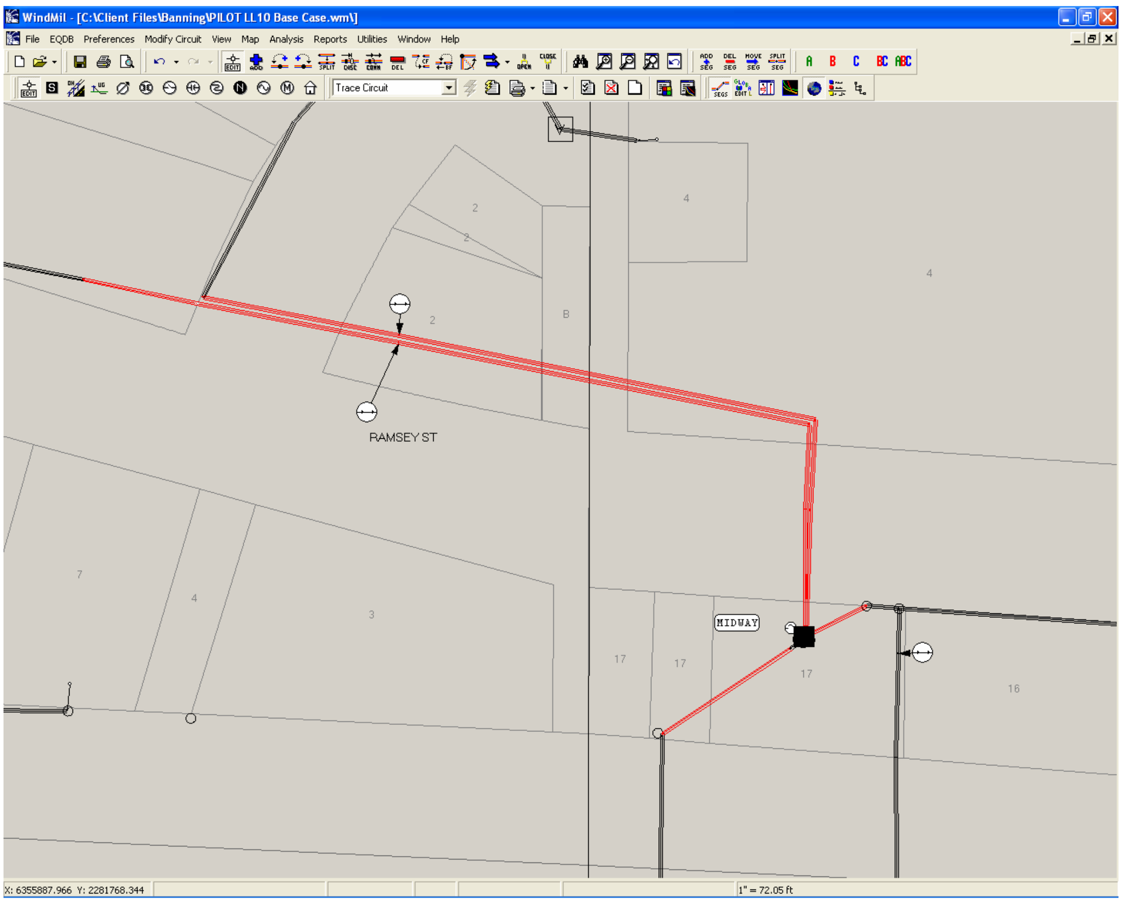


Figure 3-18: Midway Upgrade

Project: 22nd-to-Midway 34 kV Upgrade
Load Level: 4
Estimated 2004 Cost: $109,480

Description: Reconductor # 4/0 ACSR on CKT T-1 (34 kV) to 336 ACSR from switch SW34-32 to Midway Substation to relieve conductor loading. The total length of the project is approximately 1.61 miles.

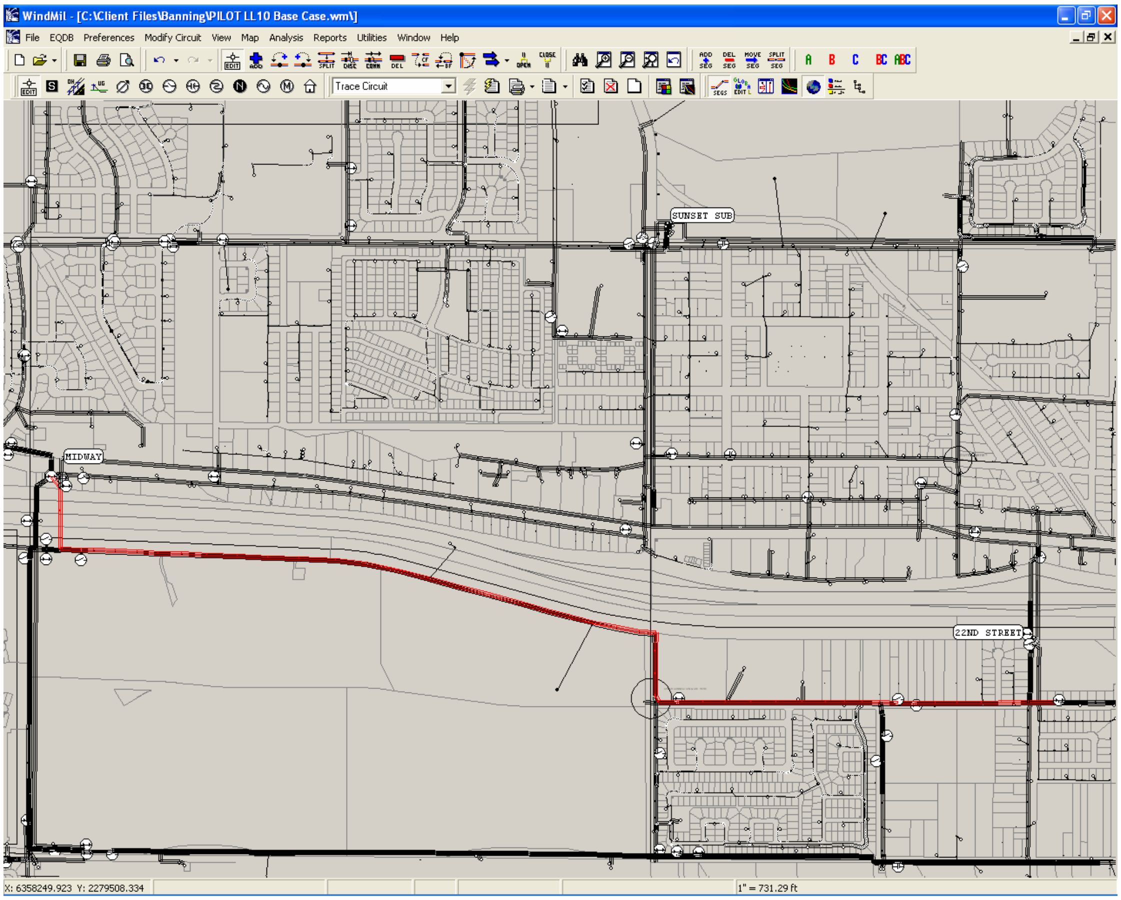


Figure 3-19: 22nd-to-Midway 34 kV Upgrade

Project: Sunset Delivery Point
Load Level: 4 & 5
Estimated 2004 Cost: $3,264,670

Description: Complete the Sunset Substation by adding (1) 115-34 kV, 56 MVA transformer (like the transformer at Banning), and (4) 34 kV breakers. Timing of addition is dependant on the inability of the three 34 kV circuits out of Banning Substation to serve the projected load during the loss of a single 34 kV circuit. Delivery point will require approximately 0.19 miles of double circuit 336 ACSR, 115 kV. Switches are required to tie into SCE's existing line north of the proposed substation site.

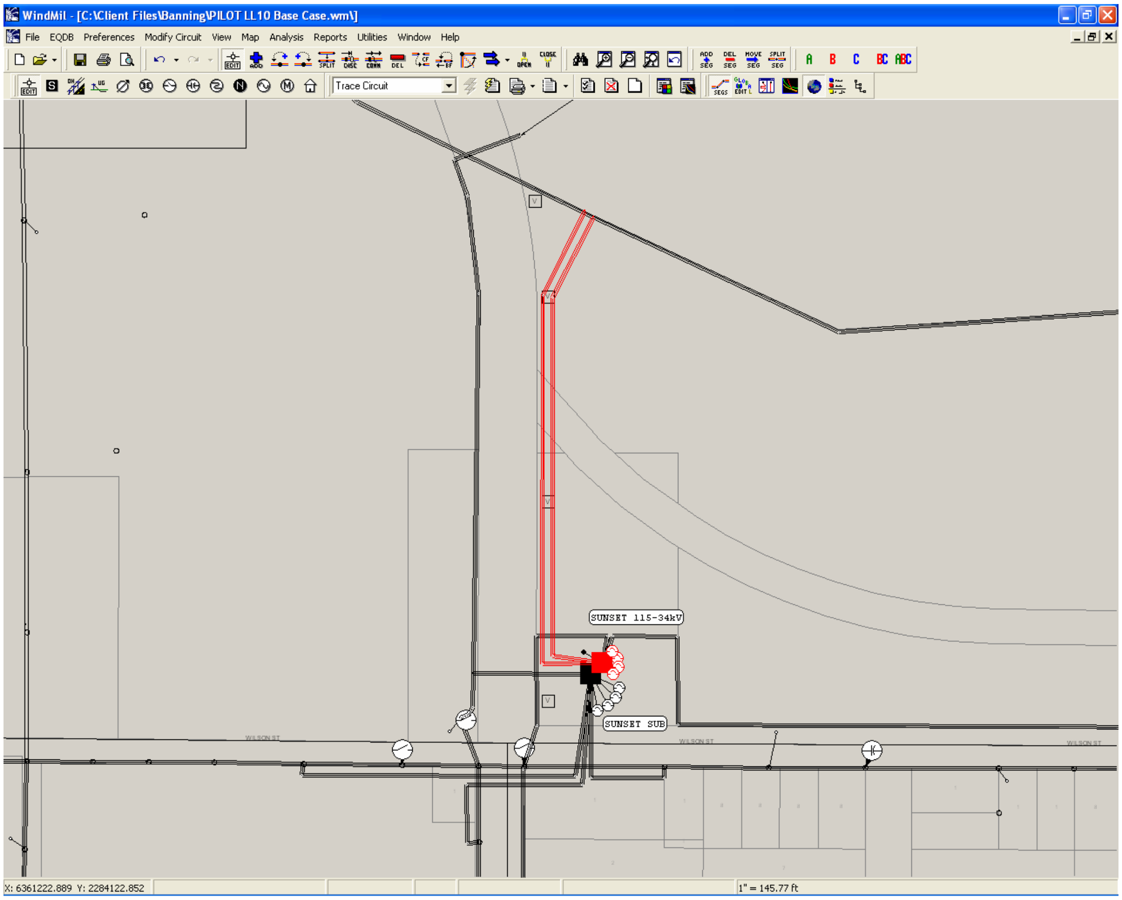


Figure 3-20: Sunset Delivery Point

Note:

The normal configuration of the 34 kV transmission after the addition of the Sunset 115-34 kV delivery point is as follows:

- Midway Banks 1 and 2 on T-4 (New Sunset)
- Sunset on T-6 and 7 (New Sunset)
- San Gorgonio Banks 1 and 2 on T-1
- 22nd Street on T-1
- Alola and Airport on T-2

Project: Deutsch Substation
Load Level: 4 & 5
Estimated 2004 Cost: $3,047,000

Description: Construct the new 115-12 kV Deutsch Substation near the existing SCE transmission line adjacent to the northern border of the Deutsch Project. The proposed substation will serve the Deutsch Project and the Black Bench Ranch with (2) 15/20/25 MVA transformers and (4) 12 kV breakers development. Timing will be dependant on the development of the Black Bench Ranch, since the City of Banning has no existing distribution in the area.

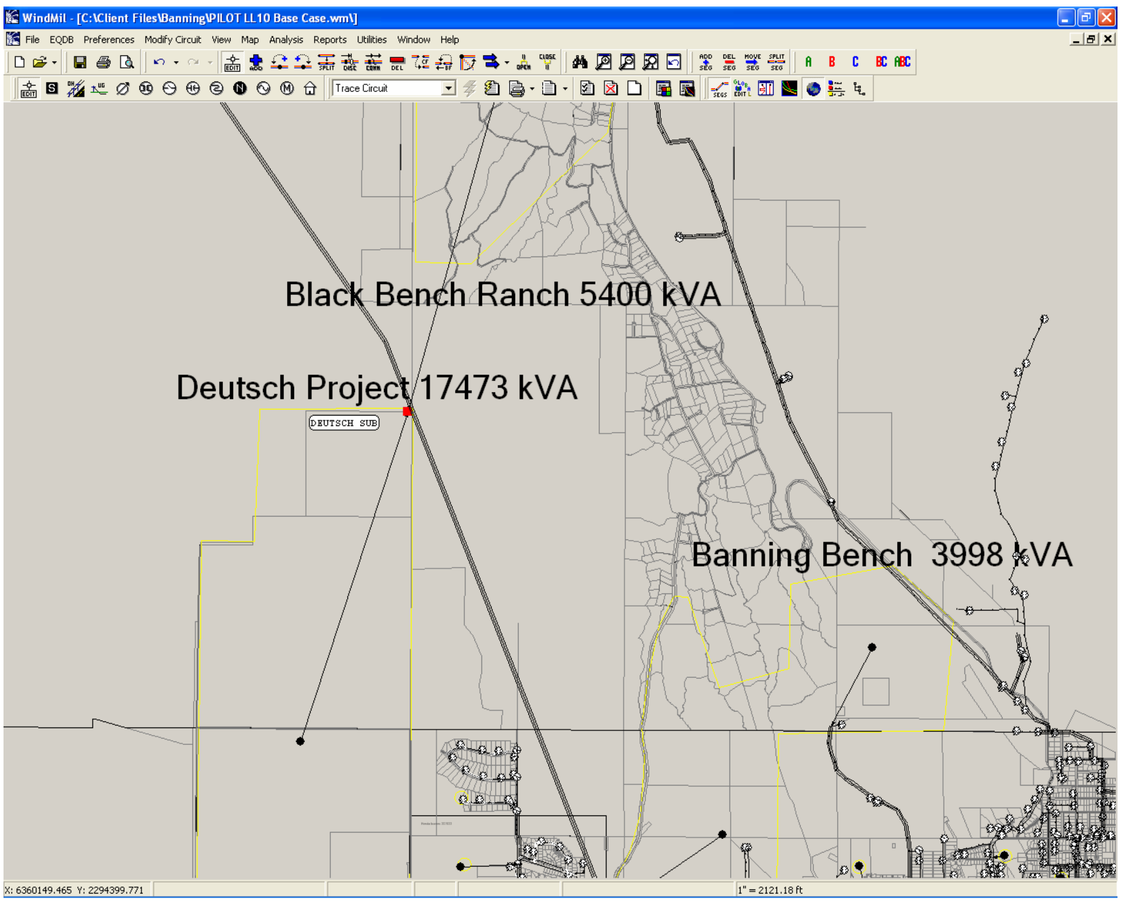


Figure 3-21: Deutsch Substation

Project: Airport Substation Upgrade
Load Level: 5
Estimated 2004 Cost: $355,000

Description: Relocate the recently rebuilt 34-4 kV, 3.75 MVA transformer at Alola Substation (Bank #2) to the Airport Substation to provide back-up to the existing transformer. Improvements for oil containment and the addition of a second 34 kV feed to the Airport Substation are included in the estimated cost.

Project: Airport 34 kV Loop
Load Level: 5
Estimated 2004 Cost: $207,500

Description: Construct the Airport 34 kV loop by adding to the existing transmission as follows:

- With 336 ACSR, construct a new 34 kV line from the intersection of Barbour Street and Hargrave Street, east down Barbour Street to Hathway Street
- Then, south along Hathway between Barbour Street and Westward Avenue
- Then, east down Westward from Hathway to the Airport Substation.

Timing was based on the conversion of Alola to 12 kV which is presently the only 4 kV back-up for the critical loads on Airport Substation. The total length of the project is approximately 0.83 miles. The project will provide an alternate feed to Airport Substation for improved reliability and provide a point of interconnection for the generation proposed near the substation site.

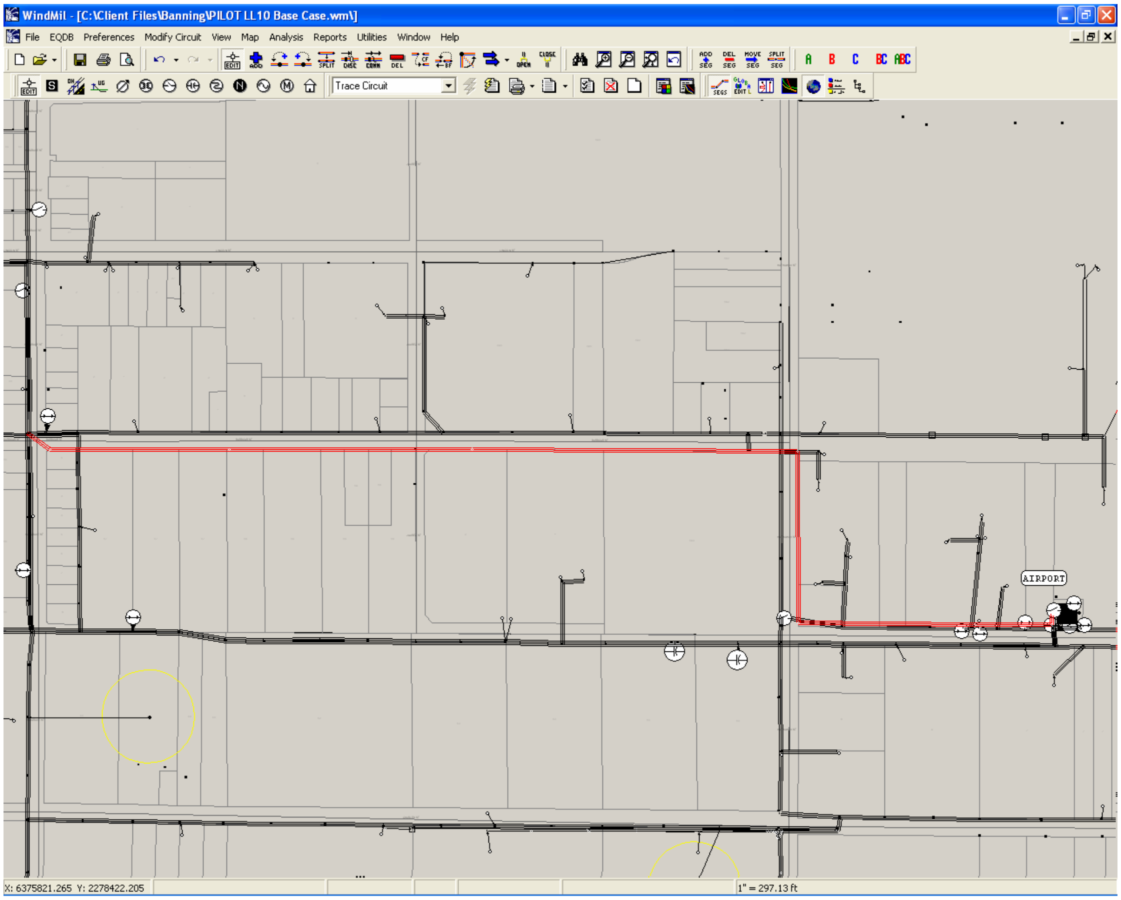


Figure 3-22: Airport 34 kV Loop

Project: Alola Rebuild
Load Level: 5 & 6
Estimated 2004 Cost: $1,371,000

Description: Rebuild Alola Substation at 12 kV with all load removed from substation. Substation will include (2) 10/12/14 MVA transformers and (4) 12 kV distribution breakers in enclosed metal-clad switchgear.

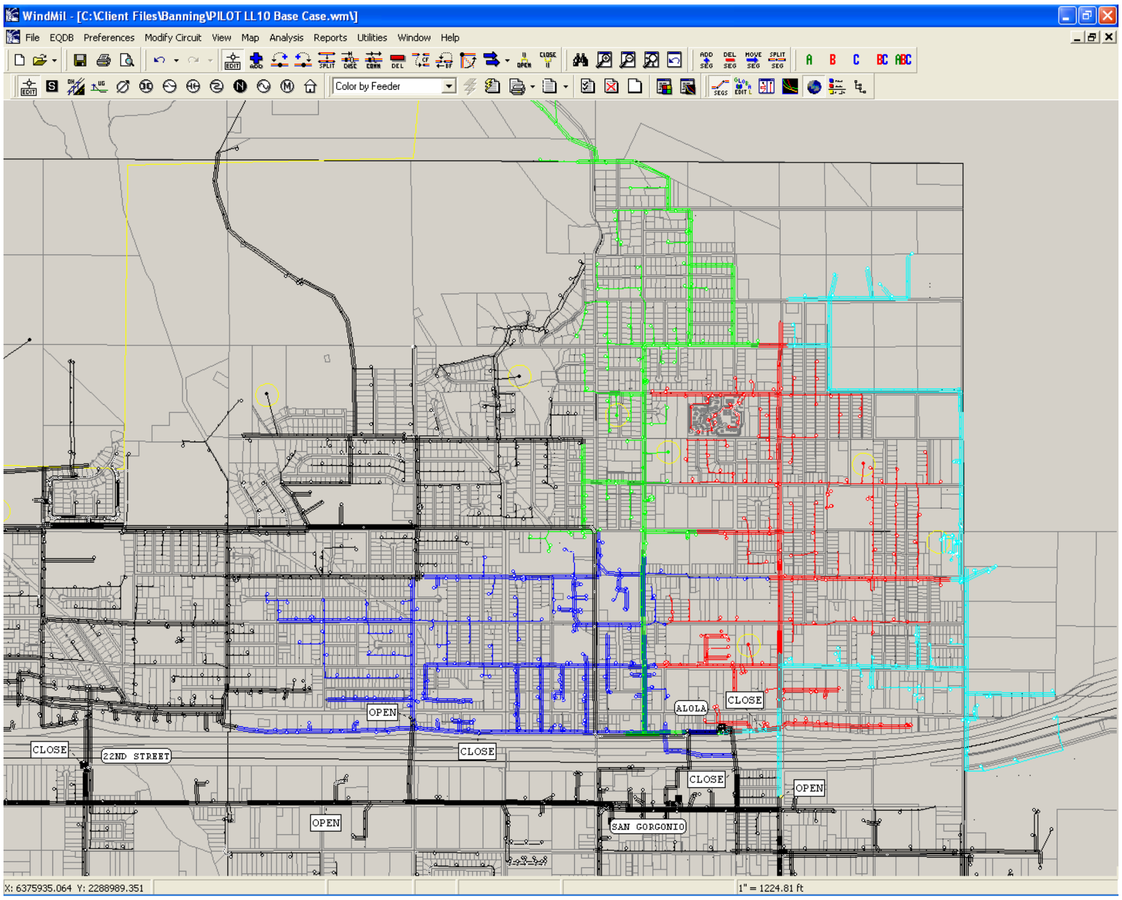


Figure 3-23: Alola Rebuild

Note:

New configuration of Alola

- Old CKT 1 ⇨ New CKT 1
- Old CKT 2 ⇨ New CKT 2
- Old CKT 3 ⇨ Removed
- Old CKT 4 ⇨ New CKT 4
- Old CKT 8 ⇨ New CKT 3

After the conversion of Alola Substation, reverse the switching required to unload the substation to San Gorgonio and Sunset, and perform the following additional switching:

- OPEN Switch SW12-91 at Hargrave and Lincoln Street
- CLOSE physical opening at Hargrave and I-10 to connect CKT 4 out of Alola to San Gorgonio CKT 54
- CLOSE switch SW4-135
- OPEN at Riser pole at 8th and Ramsey
- CLOSE on Livingston between 4th and 6th Street
- OPEN Switch SW12-62
- CLOSE CKT 65 at 22nd Street Substation

Project: Midway CKT 24 Tie
Load Level: 5
Estimated 2004 Cost: $92,320

Description: Construct a 3-phase, 336ACSR circuit on the East side of Highland Home Road between I-10 and Westward Avenue. The new CKT will extend Midway CKT 24 to serve the Sunlakes load presently on 22nd Street CKT 63. Project is required to provide additional capacity at 22nd Street to serve Sunset Crossroads and the 2,000 Home development south of Westward Avenue. The proposed new circuit is approximately 0.59 miles. The following switching is required to complete this project:

- Install OPEN switch one span east of the riser on Westward on CKT 63
- CLOSE new express feeder from Midway CKT 24 to riser pole serving Sunlakes on Westward Avenue
- OPEN switch SW12-82
- CLOSE switch in pad-mounted gear at the corner of Highland Springs Avenue and Ramsey Street to pick-up the commercial development in the front of Sunlakes

- OPEN switch in pad-mounted gear at the corner of Highland Springs Avenue and Ramsey Street serving the backbone continuing north on Highland Springs Avenue
- CLOSE the switch in the pad-mounted gear at the corner of Highland Home Road and Wilson Street to transfer load from Midway CKT 23 and CKT 22.

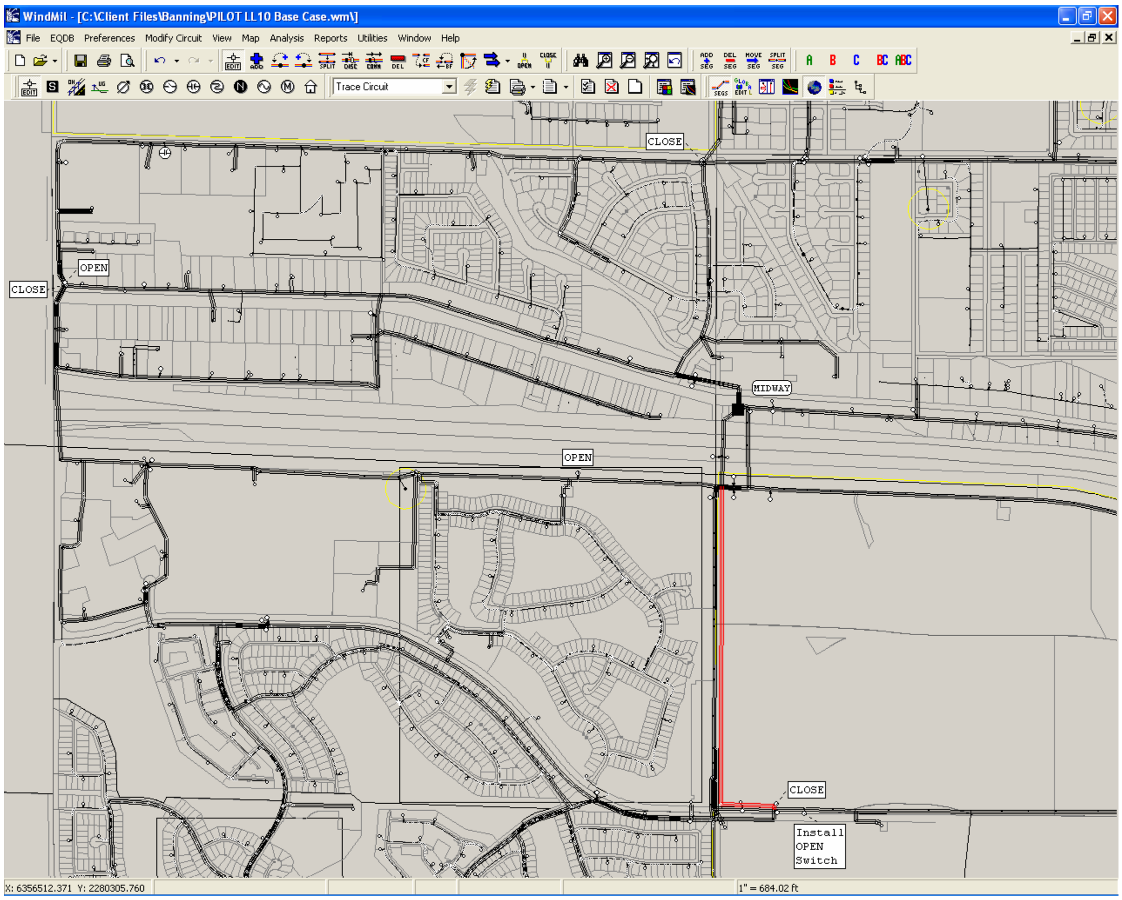


Figure 3-24: Midway CKT 24 Tie

Project: 16th Street Upgrade
Load Level: 6
Estimated 2004 Cost: $13,320

Description: Reconductor 3-phase, # 4 Cu to 3-phase, 336 ACSR on 16th Street between Wilson and George Street. Total length of project is approximately 0.09 miles. Project is required to relieve conductor loading.

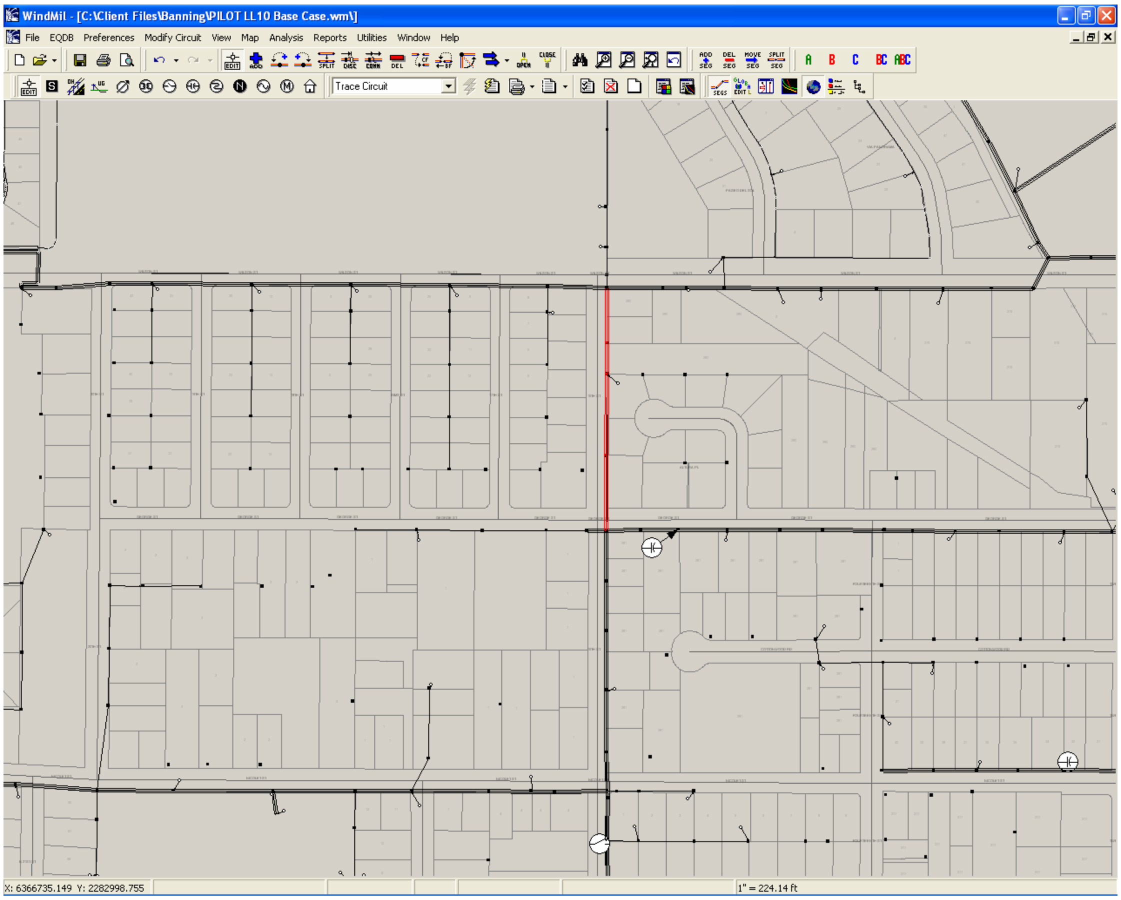


Figure 3-25: 16th Street Upgrade

Project: Hargrave Street Upgrade
Load Level: 9
Estimated 2004 Cost: $47,360

Description: Reconductor 3-phase, # 2 ACSR to 3-phase, 336ACSR on Hargrave Street between Westward to Westley Street. The total length of the project is approximately 0.32 miles. Project is required to relieve conductor loading.

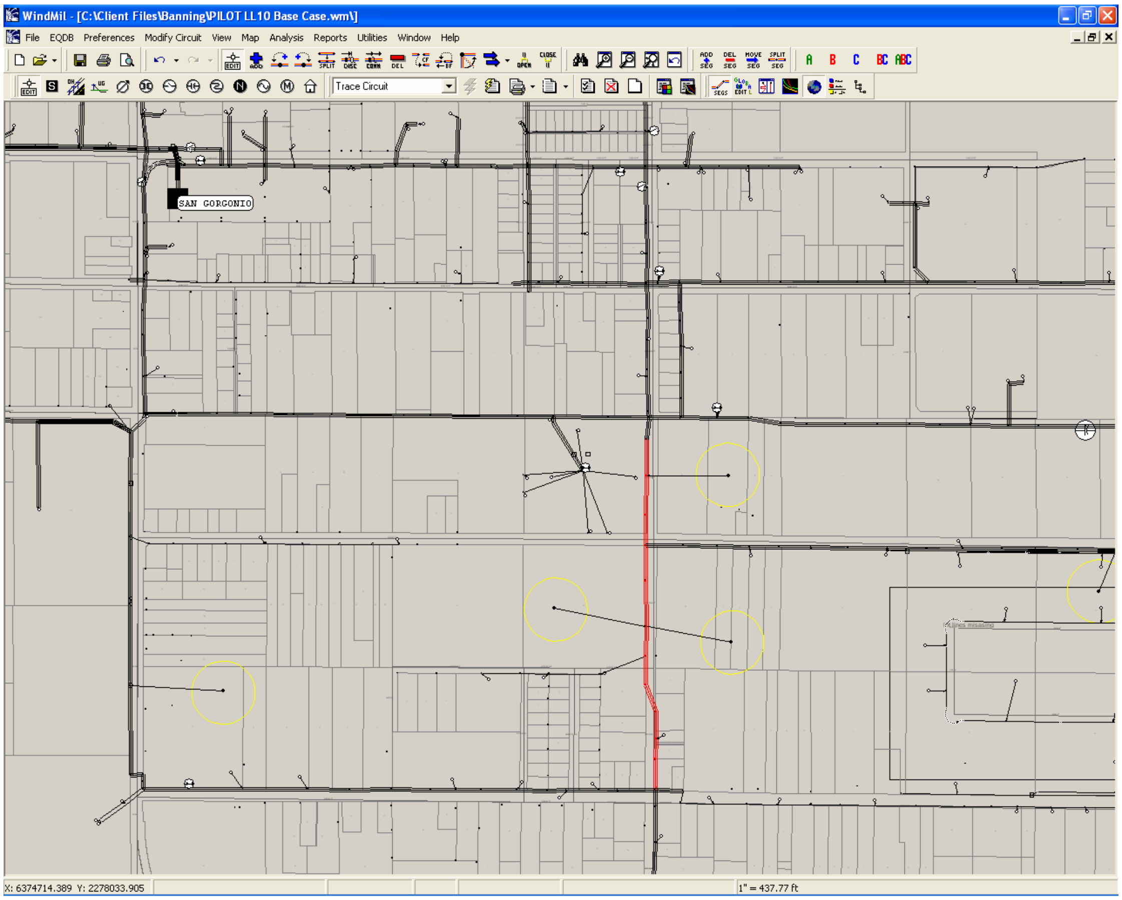


Figure 3-26: Hargrave Street Upgrade

Project: 22nd Street 34 kV Loop
Load Level: 10
Estimated 2004 Cost: $707,940

Description: Extend 34 kV underground 750 Cu from the intersection of Sunset and Ramsey to 22nd Street to provide an alternate feed to 22nd Street Substation for improved reliability. The total length of the project is approximately 0.81 miles. The proposed route will be as follows:

- From new underground 34 kV Circuit, extend new circuit on Ramsey between Sunset and 22nd Street
- Then, south on 22nd Street to the 34 kV corner pole at the entrance of the 22nd Street Substation.

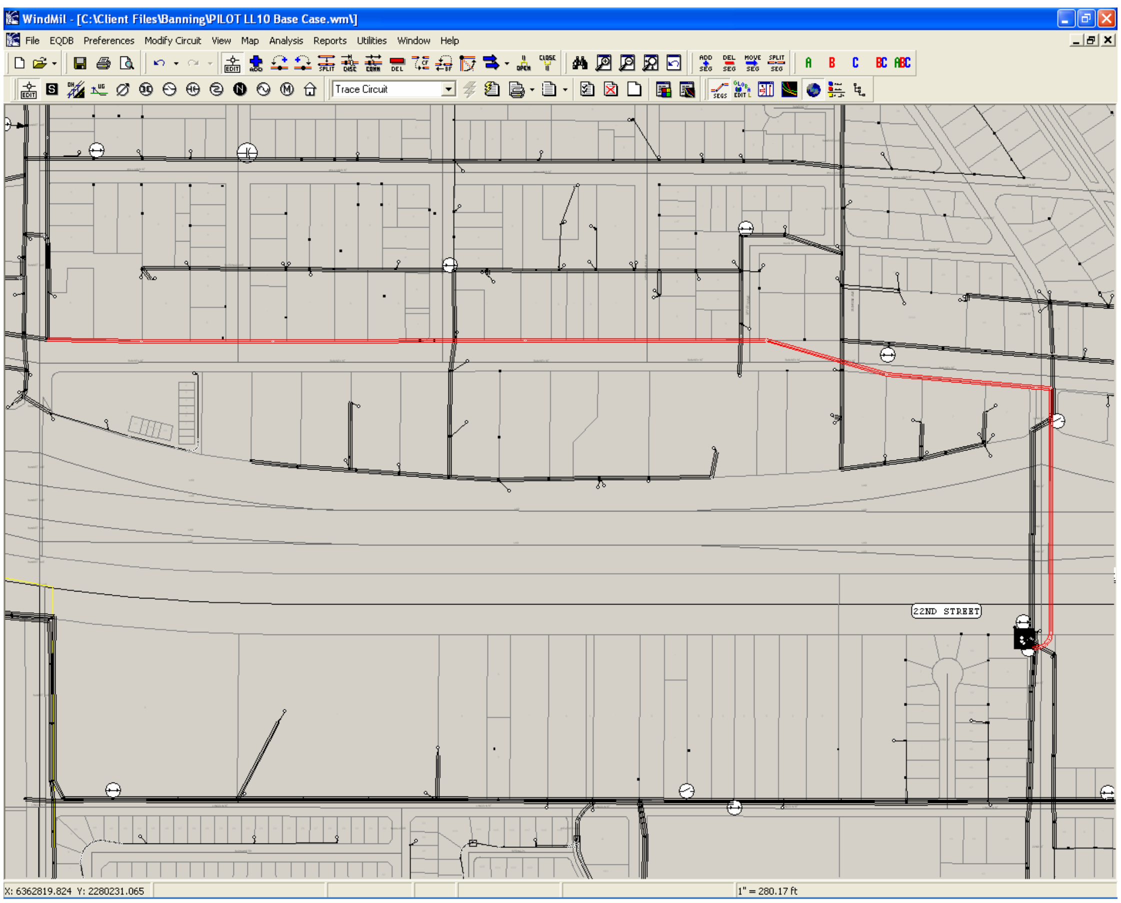


Figure 3-27: 22nd Street 34 kV Loop

Project: San Gorgonio Get-a-Way Replacement
Load Level: 10
Estimated 2004 Cost: $89,080

Description: At San Gorgonio, replace the existing 750 underground with 750 Cu get-a-ways as they are approaching the 20-year life expectancy. The total estimated length of underground required is approximately 0.34 miles.

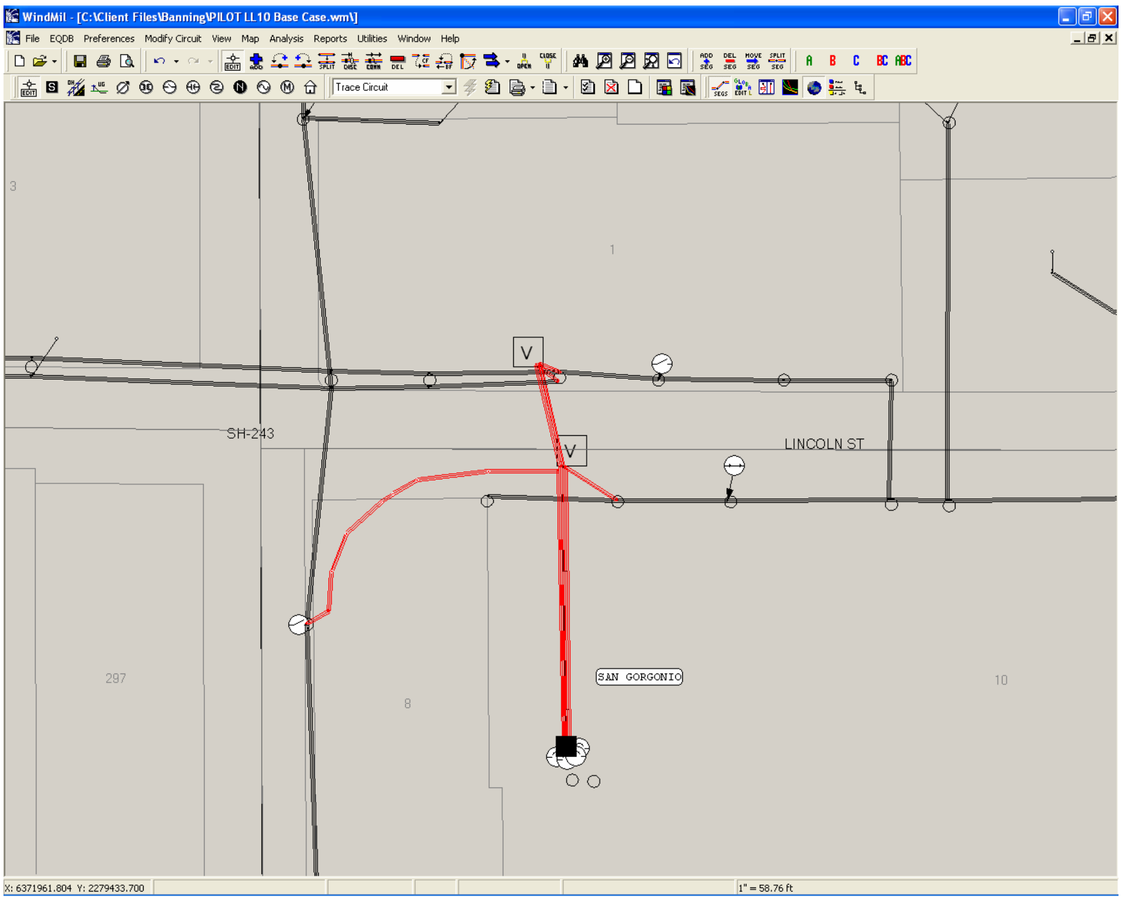


Figure 3-28: San Gorgonio Get-a-Way Replacement

Project: SCADA Implementation and Relay Replacement
Load Level: 1 – 3
Estimated 2004 Cost: $400,000

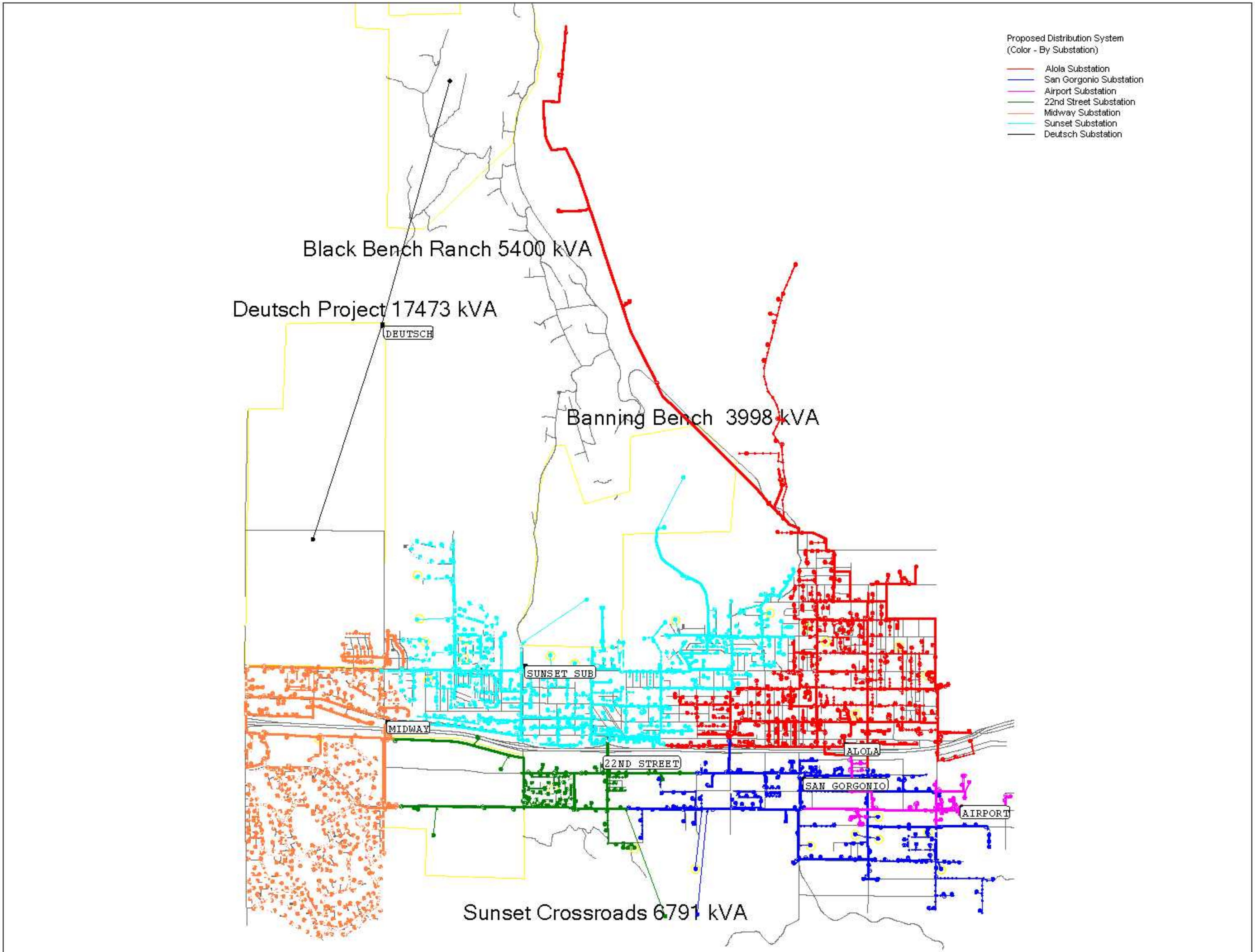
Description: The existing electromechanical relays at Alola, Airport, and Midway substations will be replaced with the recommended substation upgrades included in the Preferred Plan. Wit h the implementation of the recommended SCADA system outlined in Appendix A of this report, replace the existing electromechanical relays San Gorgonio Substation.

3.2 Summary

In the recommended configuration from the Preferred Plan outlined in this section, the projected transformer loading at Load Level 10 is as follows:

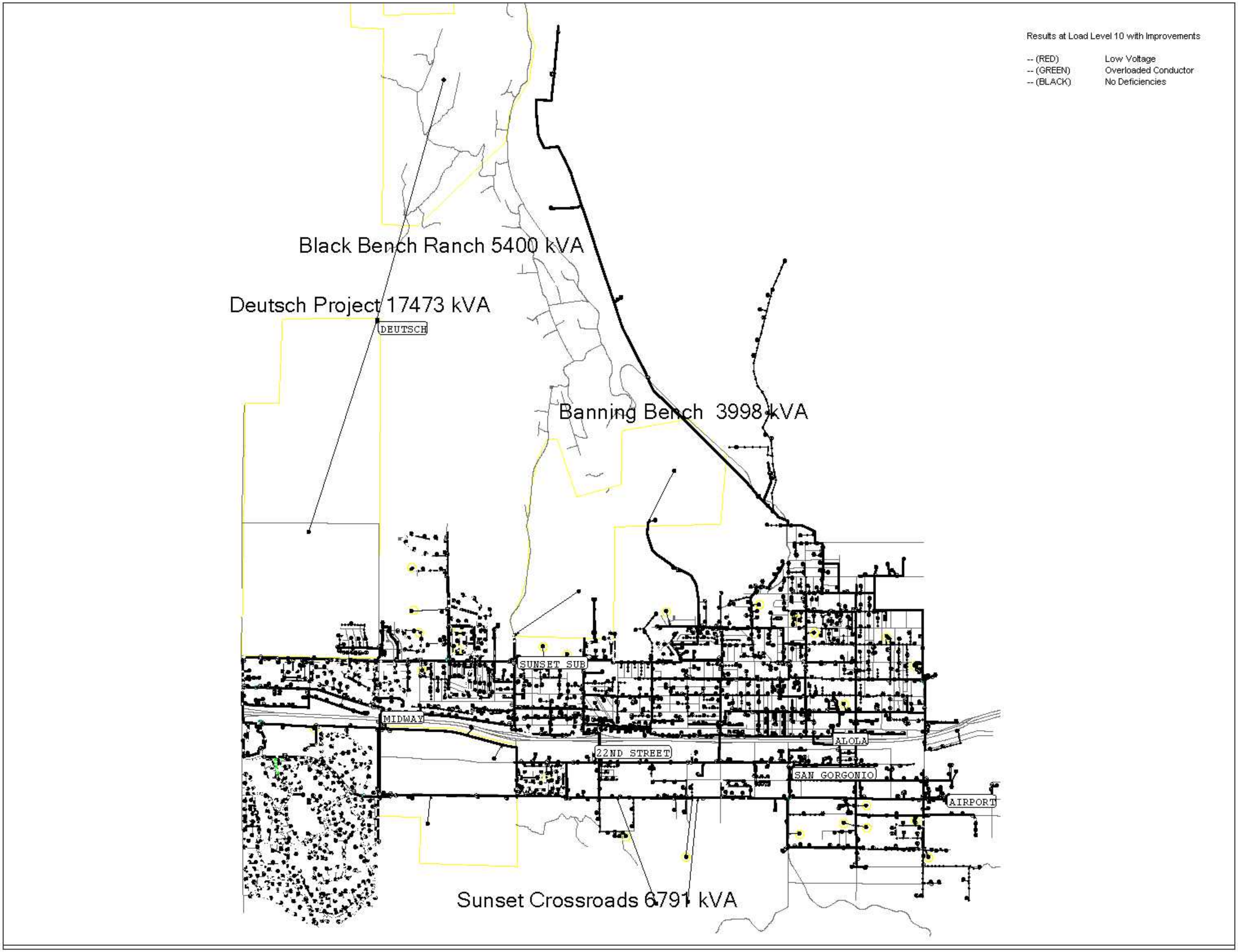
- Sunset Bank 1 (CKT 1 & CKT 4) ⇨ 6,860 kVA
- Sunset Bank 2 (CKT 2 & CKT 3) ⇨ 9,583 kVA
- Midway Bank 1 ⇨ 9,263 kVA
- Midway Bank 2 ⇨ 10,047 kVA
- 22nd Street ⇨ 7,647 kVA
- San Gorgonio Bank 1 ⇨ 2,047 kVA
- San Gorgonio Bank 2 ⇨ 7,314 kVA
- Alola Bank 1 (CKT 1 & CKT 2) ⇨ 3,825 kVA
- Alola Bank 2 (CKT 3 & CKT 4) ⇨ 4,278 kVA
- Airport ⇨ 2,718 kVA
- Deutsch ⇨ 10,238 kVA

Exhibit 3-1
Preferred Plan Configuration
Color by Substation



Proposed Distribution System
(Color - By Substation)
Alola Substation
San Gorgonio Substation
Airport Substation
22nd Street Substation
Midway Substation
Sunset Substation
Deutsch Substation
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
DEUTSCH
Banning Bench 3998 kVA
SUNSET SUB
MIDWAY
22ND STREET
ALOLA
SAN GORGONIO
AIRPORT
Sunset Crossroads 6791 kVA

Exhibit 3-2
Preferred Plan Calculated Results at Projected Loads



Results at Load Level 10 with Improvements
-- (RED) Low Voltage
-- (GREEN) Overloaded Conductor
-- (BLACK) No Deficiencies
Black Bench Ranch 5400 kVA
Deutsch Project 17473 kVA
DEUTSCH
Banning Bench 3998 kVA
SUNSET SUB
MIDWAY
22ND STREET
ALOLA
SAN GORGONIO
AIRPORT
Sunset Crossroads 6791 kVA

Exhibit 3-3
Substation Cost Estimates

City of Banning CA
Alola Substation Rebuild
Substation Cost Estimate Summary

Line	Item	FERC Code	Quantity	Capital Fund Estimate Unit Price	Capital Fund Estimate Total Price	
	(a)	(b)	(c)	(d)	(e)	
1	Power Transformer					1
2	69x34.5-13 kV, 3 PH. 10/12/14 MVA, with LTC	362	2	$ 235,000	$ 470,000	2
3						3
4	Switchgear					4
5	7 cubicles, 7 breakers with building and relays	362	1	$ 250,000	$ 250,000	5
6						6
7	Power Circuit Breakers					7
8	69 kV, 1200 A / 20 kA	362	2	$ 35,000	$ 70,000	8
9	Structures and Equipment	362	1	$ 10,000	$ 10,000	9
10						10
11	**SUBTOTAL EQUIPMENT**				**$ 800,000**	11
12						12
13	Sitework	362	1	$ 10,000	$ 10,000	13
14	Construction	362	1	$ 175,000	$ 175,000	14
15	Land	380			$ -	15
16	**SUBTOTAL CONSTRUCTION**				**$ 185,000**	16
17						17
18	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 985,000**	18
19						19
20	Pricing and Construction Allowance		15.0%		$ 147,750	20
21						21
22	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 1,132,750**	22
23						23
24	Design and Construction Engineering		7.0%		$ 79,293	24
25	**SUBTOTAL ENGINEERING FEES**				**$ 79,293**	25
26						26
27	Construction Management (by Owner)		4.0%		$ 45,310	27
28	Owner's Overhead Expense		3.0%		$ 33,983	28
29	Allowance for Funds Used during Const.		7.0%		$ 79,293	29
30	**SUBTOTAL OTHER FEES AND COSTS**				**$ 158,585**	30
31						31
32	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 237,878**	32
33						33

City of Banning CA
Midway Substation Modifications
Substation Cost Estimate Summary

Line	Item	FERC Code	Quantity	Capital Fund Estimate Unit Price	Capital Fund Estimate Total Price	
	(a)	(b)	(c)	(d)	(e)	
1	Power Transformer					1
2	69x34.5-13 kV, 3 PH. 12/16/20 MVA, with LTC	362	2	$ 235,000	$ 470,000	2
3						3
4						4
5	Relay Modifications	362	1	$ 25,000	$ 25,000	5
6	Power Circuit Breakers					6
7	69 kV, 1200 A / 20 kA	362	2	$ 35,000	$ 70,000	7
8						8
9	Structures and Equipment	362	1	$ 50,000	$ 50,000	9
10						10
11	**SUBTOTAL EQUIPMENT**				**$ 615,000**	11
12						12
13	Sitework	362	1	$ 5,000	$ 5,000	13
14	Construction	362	1	$ 100,000	$ 100,000	14
15	Land	380			$ -	15
16	**SUBTOTAL CONSTRUCTION**				**$ 105,000**	16
17						17
18	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 720,000**	18
19						19
20	Pricing and Construction Allowance		15.0%		$ 108,000	20
21						21
22	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 828,000**	22
23						23
24	Design and Construction Engineering		7.0%		$ 57,960	24
25	**SUBTOTAL ENGINEERING FEES**				**$ 57,960**	25
26						26
27	Construction Management (by Owner)		4.0%		$ 33,120	27
28	Owner's Overhead Expense		3.0%		$ 24,840	28
29	Allowance for Funds Used during Const.		7.0%		$ 57,960	29
30	**SUBTOTAL OTHER FEES AND COSTS**				**$ 115,920**	30
31						31
32	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 173,880**	32
33						33

City of Banning CA
Airport Substation Expansion
Substation Cost Estimate Summary

				Capital Fund Estimate		
Line	Item	FERC Code	Quantity	Unit Price	Total Price	
	(a)	(b)	(c)	(d)	(e)	
1						1
2						2
3						3
4						4
5						5
6						6
7						7
8						8
9	Structures and Equipment	362	1	$ 100,000	$ 100,000	9
10						10
11	**SUBTOTAL EQUIPMENT**				**$ 100,000**	11
12						12
13	Sitework	362	1	$ 5,000	$ 5,000	13
14	Construction	362	1	$ 150,000	$ 150,000	14
15	Land	380			$ -	15
16	**SUBTOTAL CONSTRUCTION**				**$ 155,000**	16
17						17
18	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 255,000**	18
19						19
20	Pricing and Construction Allowance		15.0%		$ 38,250	20
21						21
22	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 293,250**	22
23						23
24	Design and Construction Engineering		7.0%		$ 20,528	24
25	**SUBTOTAL ENGINEERING FEES**				**$ 20,528**	25
26						26
27	Construction Management (by Owner)		4.0%		$ 11,730	27
28	Owner's Overhead Expense		3.0%		$ 8,798	28
29	Allowance for Funds Used during Const.		7.0%		$ 20,528	29
30	**SUBTOTAL OTHER FEES AND COSTS**				**$ 41,055**	30
31						31
32	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 61,583**	32
33						33

City of Banning CA
Sunset Substation
Substation Cost Estimate Summary

				Capital Fund Estimate		
Line	Item	FERC Code	Quantity	Unit Price	Total Price	
	(a)	(b)	(c)	(d)	(e)	
1	Power Transformer					1
2	69x34.5-13 kV, 3 PH. 15/20/25 MVA, with LTC	362	2	$ 350,000	$ 700,000	2
3	Power Circuit Breakers					3
4	69 kV, 1200 A / 20 kA	362	2	$ 35,000	$ 70,000	4
5	Control Building with Relays and Batteries	362	1	$ 175,000	$ 175,000	5
6	Power Circuit Breakers, 4 feeders, 2 mains					6
7	15 kV, 1200 A / 20 kA	362	6	$ 25,000	$ 150,000	7
8						8
9	Structures and Equipment	362	1	$ 250,000	$ 250,000	9
10						10
11	**SUBTOTAL EQUIPMENT**				**$ 1,345,000**	11
12						12
13	Sitework	362	1	$ 35,000	$ 35,000	13
14	Construction	362	1	$ 450,000	$ 450,000	14
15	Land	380	1	$ 50,000	$ 50,000	15
16	**SUBTOTAL CONSTRUCTION**				**$ 535,000**	16
17						17
18	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 1,880,000**	18
19						19
20	Pricing and Construction Allowance		15.0%		$ 282,000	20
21						21
22	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 2,162,000**	22
23						23
24	Design and Construction Engineering		7.0%		$ 151,340	24
25	**SUBTOTAL ENGINEERING FEES**				**$ 151,340**	25
26						26
27	Construction Management (by Owner)		4.0%		$ 86,480	27
28	Owner's Overhead Expense		3.0%		$ 64,860	28
29	Allowance for Funds Used during Const.		7.0%		$ 151,340	29
30	**SUBTOTAL OTHER FEES AND COSTS**				**$ 302,680**	30
31						31
32	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 454,020**	32
33						33

City of Banning CA
Sunset Primary Substation
Substation Cost Estimate Summary

Line	Item	FERC Code	Quantity	Capital Fund Estimate Unit Price	Capital Fund Estimate Total Price	
	(a)	(b)	(c)	(d)	(e)	
1	Power Circuit Breakers					1
2	115 kV, 1200A / 20 kA	362	2	$ 65,000	$ 130,000	2
3						3
4	Power Transformer					4
5	115-69x34.5 kV, 3 PH. 34/45/56 MVA	362	2	$ 431,250	$ 862,500	5
6						6
7	Power Circuit Breakers, 6 feeders, 2 mains					7
8	69 kV, 1200 A / 20 kA	362	4	$ 35,000	$ 140,000	8
9						9
10	Control Building with Relays and Batteries	362	1	$ 175,000	$ 175,000	10
11						11
12						12
13	Structures and Equipment	362	1	$ 400,000	$ 400,000	13
14						14
15	**SUBTOTAL EQUIPMENT**				**$ 1,707,500**	15
16						16
17	Sitework	362	1	$ 35,000	$ 35,000	17
18	Construction	362	1	$ 500,000	$ 500,000	18
19	Land	380	1	$ 50,000	$ 50,000	19
20	**SUBTOTAL CONSTRUCTION**				**$ 585,000**	20
21						21
22	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 2,292,500**	22
23						23
24	Pricing and Construction Allowance		15.0%		$ 343,875	24
25						25
26	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 2,636,375**	26
27						27
28	Design and Construction Engineering		7.0%		$ 184,546	28
29	**SUBTOTAL ENGINEERING FEES**				**$ 184,546**	29
30						30
31	Construction Management (by Owner)		4.0%		$ 105,455	31
32	Owner's Overhead Expense		3.0%		$ 79,091	32
33	Allowance for Funds Used during Const.		7.0%		$ 184,546	33
34	**SUBTOTAL OTHER FEES AND COSTS**				**$ 369,093**	34
35						35
36	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 553,639**	36

City of Banning CA
Deutch Substation
Substation Cost Estimate Summary

Line	Item	FERC Code	Quantity	Capital Fund Estimate Unit Price	Capital Fund Estimate Total Price	
	(a)	(b)	(c)	(d)	(e)	
1	Power Transformer					1
2	115-69 kV, 3 PH. 34/45/56 MVA	362	2	$ 375,000	$ 750,000	2
3	Power Circuit Breakers, 6 feeders, 2 mains					3
4	115 kV, 1200 A / 20 kA	362	2	$ 65,000	$ 130,000	4
5	Control Building with Relays and Batteries	362	1	$ 175,000	$ 175,000	5
6	Power Circuit Breakers					6
7	15 kV, 1200 A / 20 kA	362	6	$ 25,000	$ 150,000	7
8						8
9	Structures and Equipment	362	1	$ 400,000	$ 400,000	9
10						10
11	**SUBTOTAL EQUIPMENT**				**$ 1,605,000**	11
12						12
13	Sitework	362	1	$ 35,000	$ 35,000	13
14	Construction	362	1	$ 500,000	$ 500,000	14
15	Land	380	1	$ 50,000	$ 50,000	15
16	**SUBTOTAL CONSTRUCTION**				**$ 585,000**	16
17						17
18	**SUBTOTAL EQUIPMENT & CONSTRUCTION**				**$ 2,190,000**	18
19						19
20	Pricing and Construction Allowance		15.0%		$ 328,500	20
21						21
22	**SUBTOTAL EQUIP., CONST., & ALLOWANCE**				**$ 2,518,500**	22
23						23
24	Design and Construction Engineering		7.0%		$ 176,295	24
25	**SUBTOTAL ENGINEERING FEES**				**$ 176,295**	25
26						26
27	Construction Management (by Owner)		4.0%		$ 100,740	27
28	Owner's Overhead Expense		3.0%		$ 75,555	28
29	Allowance for Funds Used during Const.		7.0%		$ 176,295	29
30	**SUBTOTAL OTHER FEES AND COSTS**				**$ 352,590**	30
31						31
32	**SUBTOTAL ENGINEERING & OTHER FEES**				**$ 528,885**	32
33						33

Appendix A
SCADA Overview

Current technology has provided avenues in automation to distribution systems which can enhance operations. Many electric utilities are turning to Supervisory Control and Data Acquisition (SCADA) systems to gather important system data for planning and maintenance purposes, to help locate outages and speed up the system restoration process. Three areas that must be addressed in order to plan the implementation of a SCADA system are the master station, the communications system and the remote subsystems.

Master Station

The key components of a SCADA system are the master station hardware and software. The system requirements and the available technologies should be considered to determine the type of system utilized. The first decision to be made in preparing to select a master station is that of choosing which operating systems to allow vendors to propose. Traditional systems have utilized high-end workstations with operating systems such as UNIX, and Open VMS. The current generation of personal computer technology has produced high end PC workstations and servers which are also suitable for use as the hardware platform for a master station using the Windows or Linux operating systems.

Some experts in the SCADA field insist that the Windows operating system is not as robust or stable as other operating systems and is more susceptible to malicious attack from hackers and viruses. We have found that recent advances in hardware and software have advanced the Windows/PC platform to a level of stability such that, if properly implemented, a Windows based system can serve the needs of a small to medium sized utility as a SCADA master and that the use of a more obscure operating system is not guarantee against unauthorized attack. The advantages of the Windows operating system include ease of integration with other systems, the wider availability of add-on and replacement hardware and the ability to use the expertise of those who already maintain the other computer systems within the utility. The advantages of Unix and Open VMS systems include less frequent need to apply operating system patches and a somewhat more streamlined system.

We recommend that the selection of master station vendor not be limited to certain operating systems but rather the implications of operating system selection be considered along with the capabilities and performance of the system in order to select a system with the appropriate level of performance, cost and sustainability.

Other factors to consider when specifying a master station include the ancillary services desired such as remote access, paging capabilities, and other extensions such as Troublecall analysis, GIS integration, automated meter reading integration, and integration to system modeling programs.

Traditional SCADA vendors for utilities include:

- Advanced Control Systems
- Novatech
- OSI
- QEI
- Survalent
- Telegyr
- Telvent

Each of the above vendors market systems ranging from simple, single computer master stations which also serve as the operator workstation to complex redundant master systems with several workstations, historical database servers and numerous additional features.

Communications:

One of the most important decisions related to the design and implementation of a SCADA system and the one that usually has the greatest impact on the cost is the type of communications to utilize for the Remote to Master communications. The communications system should be capable of providing suitable transmission speed for the desired data for the present as well as the duration of the equipment life. Traditionally, the life cycle for communication equipment is 7-10 years due to the development of better, less expensive equipment. Typical types of communication include licensed radio, unlicensed radio, fiber optic and telephone. Each option has certain advantages and disadvantages. Typically, the communications should be capable of providing 2-4 second scan times of the remote devices. For the size and type of system to be implemented all of the above options should be capable of supporting these speeds. Some of the options can provide additional benefits such as additional bandwidth for other uses. This discussion is limited; however, to the needs of the proposed SCADA system and the additional benefits are only identified and not quantified.

The licensed radio system has limits based on the maximum speed available in current technology and requires an application process from the FCC to obtain a permitted frequency.

The telephone option has some limits on speed, depending on the type of line requested and typically the reliability with the standard phone circuits is not acceptable for this application. In many areas, leased telephone lines have proven to be very expensive over the life of a typical system.

We will, therefore, concentrate on the fiber optic and the unlicensed radio systems. Factors to consider are as follows:

Fiber System

- Nearly unlimited bandwidth, allowing voice, video and third party data transfers in addition to system data transmission
- Expensive to tap
- Vulnerable to damage from storms, traffic, etc
- Requires specialist to repair
- Difficult to obtain unauthorized access
- Can easily be used to transmit video surveillance for remote sites such as substations
- Works well to provide a backbone system for other applications such as Automated Meter reading, Trouble Call Systems

Radio

- Modular – reasonably easy to expand system with incremental investment
- Not vulnerable to same types of damage as fiber
- Relatively inexpensive to store spare components
- Less expensive than fiber
- Not nearly as much bandwidth
- Adequate bandwidth for SCADA but other applications should be carefully evaluated
- Potential for interference
- Infrastructure could be used for other similar applications such as wireless internet service, depending upon the system selected.

Unless other uses can be developed for the fiber optic system, we recommend the radio data solution (wireless) based on the relative cost of the two alternatives for all substations except the San Gorgonio Substation. Due to its close proximity to the office, short range fiber optic communications should be considered as a cost saving measure.

The master to remote communication protocol should be determined initially. Most new electric SCADA systems are now utilizing a non-proprietary protocol for this communication link. This allows the use of products from different manufacturers for the field devices and creates an open, flexible and competitive environment for future additions. The most common protocol for electric utility communications is DNP 3.0. It provides the required security and time stamping needed for a Utility SCADA system. Other protocols include MODBUS, 2179, and UCA. The Modbus protocol is mainly used in the industrial environment and does not easily provide for time stamping of gathered data. The UCA protocol is relatively new and is not supported by all of the vendors. Its advantage includes universal tagging nomenclature independent of the device being integrated. Its disadvantages include very high overhead on the communication bandwidth. The UCA protocol could become the protocol of the future but is currently being implemented only by early adopters who have the budgets and flexibility to explore the latest technologies. For the size and type of system under consideration, the DNP 3.0 protocol is the recommended solution.

Remote Subsystems

Traditional methods for implementing the remote subsystems often referred to as Remote Terminal Units (RTUs) include a device located in the remote facilities to gather a multitude of hardwired status, analog and control signals. This approach requires a large amount of field wiring, transducers, and interposing relays to gather the desired information and perform control actions. The current generation of technology utilizes a different approach. The use of microprocessor devices in the remote facilities digitally connected to a ***data concentrator*** can accomplish the same objectives as well as gathering many other parameters. Typically these microprocessor devices would be the substation relays with a digital link to a data concentrator to sort and collect data. The current 22nd St. substation already utilizes relays and equipment capable of digital communications. Additionally, the San Gorgonio and Midway Substations contain some devices that would be suitable for use in implementing SCADA in those stations.

There are no devices in the Alola and Airport Substations that are suitable for integration. Existing relays are electromechanical which precludes the use of digital communications. Some feeder breakers at Midway and San Gorgonio Substations also contain electromechanical relays. Three options exist for the implementation of the system. The options for the conversion are as follows:

> **Hardwired system** - Addition of transducers and control devices could be added to facilitate the SCADA system. This would require extensive modification to the existing relay panels and circuit breakers. Some disadvantages of this option include additional elements to maintain, additional investment of capital in old equipment, and only basic data will be available.
>
> **Relay replacement** - the existing relay system could be replaced with microprocessor relays. The existing breakers could be retrofitted with microprocessor relays to facilitate the SCADA system. This option should be considered for distribution breakers that are in good working

order and are not scheduled for replacement or removal in the substation improvement plans.

Breaker Replacement – This option would include the complete replacement of the distribution breakers with new breakers with factory installed microprocessor relays. This method should be considered for the Alola Substation as part of the substation improvement plan.

In the relay or breaker option, the microprocessor relays could be utilized to capture the miscellaneous hardwire status such as trip cutout position through the additional inputs available on the relays. Using a relay with built-in operator controls can greatly simplify the problem of resolving remote versus local control.

In addition to equipment in the substations, the next level of remote capabilities would involve the integrating devices on the distribution system to gather information and perform control functions. The wireless approach to communications can help facilitate this process if it becomes necessary. Distribution devices can include motor operated switches, circuit reclosers and distribution capacitor banks. This equipment can be specified SCADA ready, requiring only the addition of a radio package to integrate it into the system.

Distribution Switches – Some utilities have found that the ability to remotely control a distribution switch could greatly reduce outage timely providing information and operating the switch from the office. Typical installations are estimated at $20,000 each.

Circuit Reclosers – If necessary, existing reclosers can be added to the SCADA system by replacing the existing control and adding a radio package. New reclosers can be specified with SCADA ready controls.

Within the confines of the substation fence, communications between devices should take into account the possibility of stray voltage within the substation yard during system faults. Devices located in separate cabinets can best be connected using inexpensive, short range, plastic fiber optic cable and transceivers. Devices within the same enclosure such as relays within the control building may be connected with copper cables.