2005 – 2009
DISTRIBUTION SYSTEM PLAN
AREA D

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Area D

2003 PEAK DEMAND – 639.4 MW
SUBSTATION CAPACITY – 868.7 MW

GENERAL AREA BOUNDARIES

North: Sacramento County line/Consumnes River Blvd./Calvine Rd./Elk Grove Florin Rd./American River/Hwy 50/ White Rock Rd.
South: Sacramento/San Joaquin County line
East: Sacramento/El Dorado & Sacramento/Amador County Lines
West: Sacramento/Yolo County Line

Figure 1: Area D General Boundaries & Regions
Current Status

The 2003 peak demand for Area D was 639.4 MW. The temperature adjusted peak demand was 681 MW, which is 78.4% of the available substation capacity. Twenty-three of the sixty-five substation transformers in this area were loaded greater than 80% of their nameplate rating. Of these twenty-three transformers, three of the smaller substations were loaded at or above their nameplate rating. The three stations were Lambert, Eschinger-Bruceville, and Goethe-Mayhew with loads of 4.8 MW (123%), 3.8 MW (101%), and 12.5 MW (100%). The three highest loaded 20 MVA transformers were Bond-Elk Grove-Florin, Sunco-Trade Center, and Citrus-Coloma experiencing loads of 18.2 MW (91%), 18.2 MW (91%), and 17.4 MW (87%) respectively.

2003 Forecast Review

Area D’s temperature adjusted forecasted peak load for 2003 in the 2004 – 2008 System Plan was 656 MW. The actual peak load was 639 MW, which occurred on July 22, 2003 with a peak temperature of 105 degrees. The temperature-adjusted load is 681 MW. It is computed using factors generated by the District’s Business Planning and Budget Department to forecast what the peak would have been if the temperature had reached 110 degrees and occurred on the fourth consecutive day above 100 degrees. The temperature-adjusted peak can then be compared to the forecasted peak, since the forecasted peak is computed using the same temperature adjustment factors.

The temperature-adjusted peak for 2003 was 25 MW higher than the forecasted peak. Several factors account for this higher number. The peak dependency on temperature is more complex than the single factor applied to measured load. The weather trend for the week that the peak occurred significantly affects the system peak. The 2003 peak occurred on the seventh consecutive day above 100 degrees, and the five previous evening temperatures never dropped below 70 degrees. Whereas the forecasted peak is based on the fourth consecutive day above 100 degrees with higher than normal evening and early morning temperatures the adjustment is linear and does not account for variations as experienced in recent years. Furthermore, the conservation due to the power shortage threats of 2001 are believed to have become less effective thus loads are returning.

Table 1: 2003 Forecasted & Actual Peaks

<table>
<thead>
<tr>
<th>Peak</th>
<th>% Utilization</th>
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<tr>
<td>2003 Forecasted Peak(^1)</td>
<td>76%</td>
</tr>
<tr>
<td>Adjusted 2003 Peak(^2)</td>
<td>78%</td>
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</tbody>
</table>

\(^1\) Based on 2004 – 2008 System Plan
\(^2\) Actual peak adjusted for temperature

Substation and feeder peak loads were gathered from the demand meter reads and compared to available MV-90 and RTU data. This provides non-coincident peak load data over a two-week read cycle.
Per the method described in the 69 kV System Plan, the annual load growth for Area D is approximately 60% of the District’s annual growth (refer to Table 4 for Area D’s annual growth rates). Using this information, substation and feeder loads were projected for a minimum of two years to identify any deficiencies in the distribution system. Adjustments were made to compensate for load transfers in and out of the area.

**General Description**
In 2003, sixty-five distribution transformers in fifty distribution substations provided the electric distribution capacity. Overhead distribution lines serve older, well-established neighborhoods north of Highway 50 and rural areas, like Sheldon, Wilton, Rancho Murieta, parts of Galt, and Franklin extensively. The Laguna and Elk Grove areas are predominately served via underground distribution lines. New developments, residential and commercial, are primarily served via underground distribution lines with exceptions occurring in rural areas.

Opportunities for significant development exist throughout Area D since a large portion of the area is not developed. Most of the development in the next five years is expected to occur in the City of Elk Grove, the Rancho Cordova Area and the area east of Sunrise Boulevard and south of Douglas Road, which has two planning areas called the Sunrise-Douglas Community and the Sun Ridge Community respectively.

**Load Characteristics**
Area D serves a diversified load because it encompasses such a large geographical area. As a result, Area D has been subdivided into three separate regions. The North Region consists of the Rancho Cordova, Gold River, and Mather areas. South Sacramento, Elk Grove, Laguna, and Franklin comprise the Mid Region. Finally, the South Region consists of Galt, Rancho Murieta, and Wilton.

The North Region contains a mix of urban and suburban lands with a majority of the electrical load stemming from residential use. North of Highway 50 is mostly developed with residential and strip commercial. The Franchise Tax Board located at Folsom Boulevard and Butterfield Road, which is the largest single load in the area, is served from the 69 kV systems with partial backup capability from the 12 kV distribution system.

The area south of Highway 50 has several concentrations of commercial developments. The more significant commercial loads are in the area called Prospect Park and the Capital Center business parks that are bounded by Highway 50 on the north, White Rock Road on the west, Sunrise Boulevard on the east, and Mather Field (formerly the Mather Air Force Base) and the Villages of Zinfandel on the south. These two business parks include many Fortune 500 companies such as MCI WorldCom, Sprint, Mercy, Kaiser, Vision Service Plan, EDS, and Bank of America. There is over 10 million square feet of developed office space employing nearly 45,000 people with available land for future development. Strip commercial development extends the length of Folsom Boulevard and along Sunrise Boulevard. Teichert Aggregates and Granite Construction Company conduct mining operations in the region south of Highway 50. Mather Field is a major air cargo/civilian airport with a developing business park and residential developments. The major air cargo carriers currently operating...
at Mather Field are UPS, Airborne Express, and Emery. The Mather Commerce Center is being developed by private enterprises into a business park. Finally, the residential and commercial/light industrial developments in the area are Independence at Mather (former military housing) and the Villages of Zinfandel.

The Mid Region contains three distinct areas of development: the City of Elk Grove, Laguna, and South Sacramento. As build-out occurs these areas will merge and distinctions are expected to lessen. This region was primarily agricultural until residential development began in South Sacramento in the late 1960’s. Residential development began in Laguna in the mid-1980’s. Development of Elk Grove has been sporadic in the past, but has increased dramatically the past three years. Based on the number of subdivisions that have been proposed in this region, residential growth is expected to maintain the same levels as seen in 2002. Large commercial customers in the region include Apple Computers, Polyclad, and Cosumnes River College. Another region of commercial importance is the Highway 99 corridor: Laguna Gateway, Marketplace-99, Laguna-99, Elk Grove Village Center, and the Elk Grove Automall.

The South Region is typically agricultural land with two exceptions. The first exception is the Rancho Murieta area, which is comprised of up-scale housing developments similar to those being constructed in the Folsom area of SMUD's service territory. The second exception is the area around the City of Galt. This area is experiencing growth, not only in small residential developments, but also in industrial and commercial parks. The City is marketing their area as a prime region for new business opportunities.

Factors Influencing Load Growth

Until recently, the North Region was experiencing sporadic growth in small residential and commercial developments. However, over the past few years, resurgence has occurred primarily in the areas around Mather Field, the Prospect Park and Capital Center business parks, and the Villages of Zinfandel, which is a development east of Mather Field and south of the aforementioned business parks. In addition, development within the Sunrise Douglas Community Plan is moving forward with over 1700 residential lots at various stages of design within SMUD. Following are the major developments in the North Region:

The Mather Commerce Center is approximately 800 acres of the former Air Force Base that have been transitioned to private enterprises such as McCuen Properties to develop several thousand square feet of commercial office space.

The Villages of Zinfandel development is designed to have approximately 1,269 homes and over 300 acres zoned commercial and light industrial customers, resulting in an estimated 31 MVA of electrical load. Construction of homes in the Villages of Zinfandel began in 2001. Thus far, 1053 single-family residential lots have been processed.

The Sunrise-Douglas Community Plan area lies east of the Villages of Zinfandel with a majority of the area bounded by Douglas Road, Sunrise Boulevard, Grantline Road, and the Jackson Highway. The area covers approximately 6,000 acres with 22,503 residential lots.
planned and over 1,000 acres for commercial, parks, schools, open spaces, and wetland preserve. Approximately 2,600 acres of the Sunrise-Douglas Community Plan is designated as the Sunridge Specific Plan. This Plan accounts for nearly half the residential lots (10,020) and 800 acres of the land allocated for commercial, parks, schools, open spaces, and wetland preserve use. The total estimated load for the Sunrise-Douglas Community Plan area is 116 MVA at build out. Most of the issues with water quality and supply have been resolved enabling preliminary grading for the Anatolia development, which is the first subdivision, proposed within the Planned Community. Approximately 3,200 single-family residential lots and 300 apartments units comprise the Anatolia Development that covers 762 acres.

A new planning area called Rio Del Oro is in the planning process and is located east of Sunrise and North of Douglas. This community will encompass 3,800 acres with approximately 11,000 residences and over 600 acres of commercial and industrial business. The total projected load is 95 MVA at build out.

The Mid Region includes the Elk Grove and Laguna areas, continues to experience a very high load growth. In 2003, 4,483 single-family residential lots were submitted to System Engineering for electrical design. Following are the major areas of development in the Mid Region:

The Laguna Stonelake Development is located south of Elk Grove Boulevard and east of Interstate 5. SMUD has processed all 1499 single-family residential lots. Many of the homes were constructed prior to the 2002 peak, and build-out is expected to be complete by the end of 2003. Additionally, the Laguna Stonelake Development has nearly 60 acres planned for commercial use.

The East Elk Grove Specific Plan includes the following developments: East Park, Clarke Farms, Tributary Point, Waterman Ranch, Fieldstone, Bishop Ranch, Windsor Downs, Windsor Glen, and Sonoma Creek. 3,011 single-family residential lots have been processed for this area since development began in 1999. Of these residential lots, it is estimated that approximately 83% are inhabited.

The area that is bounded by Elk Grove Boulevard to the north, US 99 to the east, Kammerer and Bilby Roads to the south, and Franklin Road to the west includes the East Franklin Specific Plan Area, Laguna Ridge Specific Plan Area, Southeast Study Area, and the Lent Ranch General Plan. These developments all combined cover approximately eight square miles. The estimated electrical demand for these areas at build out (10+ years) are shown in the following table:

| Table 2: Forecasted Demands for Specific Plans in the Mid Region | March 31, 2004 | DISTRIBUTION SYSTEM PLAN | D - 5 | 2005-2009 | Area D |
Prior to the City of Elk Grove granting the re-zone of this eight square mile area to residential and commercial use, the land zoning was agriculture. Construction of East Franklin High School and several subdivisions in the East Franklin Specific Plan area will contribute to the 2004 peak. As of yet, no residential lots or commercial development has been submitted to System Engineering for the Laguna Ridge Specific Plan Area, the Southeast Study Area, and the Lent Ranch General Plan. However, it is expected that development within the Laguna Ridge Specific Plan will begin this year (2004). The Lent Ranch Regional Mall has cleared the legal holds due to opposition from environmentalist groups but likely will still be delayed pending the construction of the new Highway 99 and Grantline Road interchange.

Growth in the South Region is expected in three areas, Rancho Murieta, Galt, and the area served by Clay Station Twin Cities. In the Rancho Murieta area, 57 lots were committed in 2003. Growth in the City of Galt is mainly expected in the KMS Industrial Park, located in the northeast part of the City, and on the east side of Highway 99 south of Twin Cities Road. In 2003, 276 single-family residential lots were processed for the Galt area. The Consumnes Power Plant project will increase the need for distribution capacity in the area. There is also a large lot development of approximately 200 homes called Clay Station 1200 in the area.

**Forecast Analysis**

Due to the size of Area D, it has been divided into three separate regions for analysis purposes. The three regions are the North Region, the Mid Region, and the South Region.

As described earlier, an alternative method to linear regression for determining the District’s annual growth rate for 2005 through 2009 was used for this System Plan. The District-wide growth rates were allocated to each of the four planning areas based on their percentage of the total number of residential lots committed during the period from July 1, 2002 to June 30, 2003. As a result, Area D was allocated approximately 60% of the District’s annual growth. Similarly, each region in Area D was allocated a portion of the total Area growth based on the percentage of residential and commercial load committed over the same period. The proportioned growth rates were applied to the substation and feeders to generate a five-year forecast for each region. Based on these forecasts, individual components of the distribution system were analyzed to identify deficiencies.
For the summer of 2004, Area D’s projected load is 683.1 MW. Clay Station Twin Cities #2 is the only new substation capacity project scheduled for completion prior to summer peak. The addition of this transformer will provide the needed distribution capacity for the load created by the new Cosumnes power plant.

In the Mid Region, there is one proposed 2005 substation capacity projects. The Mid Region requires the completion of Calvine Waterman Substation and Bruceville Poppy Ridge Substation prior to the summer peak of 2003. The installation of Calvine Waterman will provide capacity in the area served by Cresswell Heathermist, Elk Grove Florin Gerber, Grantline Siefker, and Bradshaw Grantline Substations. In addition, this substation will also improve end of line voltage due to long circuits loaded to 88% of the feeder capacity. Bruceville Poppy Ridge will support the growth within the East Franklin Development and avoid overloads on Seasons Bruceville and Franklin Substations.

For the summer of 2005, Area D’s projected load is 700 MW. There will be a need for two substation projects in Area D. These projects are, Sunrise-Chrysanthy and Franklin-Elk Grove. This will increase Area D’s substation capacity to 920 MW, resulting in the forecasted area utilization being 79%. There are three line projects when combined with the substation capacity projects and load transfers within the area, none of the substation transformers or feeders will be loaded beyond their normal capacity.
For project years 2006 – 2009, five additional capacity projects are planned

- Three substations are proposed to be completed by the summer of 2006.
  - The Lent Ranch Substation project is a project that is directly tied to the construction of the Lent Ranch Regional Mall proposed in the Mid Region of Area D. As a result, the installation of this substation has been on hold due to the Mall's legal issues. In early 2004, the courts have given the go ahead for the Mall. As of March 2004 no formal request for service has been received by the District. The expectation is that this substation will be needed in 2006.
  - A second unit at Sunco Trade Center is required due to area growth for N – 1 Contingency situation in the North Region.
  - The North Vineyard Substation is required to serve the North Vineyard Specific Plan Area located in the Mid Region. If this development does not proceed, this substation will be delayed.
- Poppy Ridge Highway 99 Substation, also located in the Mid Region, is required to serve the Laguna Ridge Development. This substation is proposed to be energized by the summer of 2007; however, the actual date is dependent upon how quickly the area develops.
- Zinfandel Baroque Substation is proposed in 2008. This substation will serve new load in the Villages of Zinfandel Development. Currently, International Reserve is serving the existing customers. The need for Zinfandel Baroque is dependent upon when the commercial and industrial portions of the Villages of Zinfandel develop.
### Table 3: Annual Peak Loads and Growth Rates (2005 – 2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tr>
<td>Area D Annual Peak Loads (MW)</td>
<td>681.0</td>
<td>717.7</td>
<td>754.4</td>
<td>794.0</td>
<td>830.1</td>
<td>866.9</td>
<td>903.4</td>
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<tr>
<td>Area D Growth/Yr (MW)</td>
<td>36.7</td>
<td>36.7</td>
<td>37.5</td>
<td>36.1</td>
<td>36.8</td>
<td>36.5</td>
<td>36.5</td>
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<tr>
<td>Mid Region Growth/Yr (MW)</td>
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<td>23.5</td>
<td>24.0</td>
<td>23.1</td>
<td>23.5</td>
<td>23.3</td>
<td>23.3</td>
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<tr>
<td>North Region Growth/Yr (MW)</td>
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<td>10.3</td>
<td>10.6</td>
<td>10.2</td>
<td>10.4</td>
<td>10.3</td>
<td>10.3</td>
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<td>South Region Growth/Yr (MW)</td>
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<td>2.9</td>
<td>2.9</td>
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</tr>
</tbody>
</table>

**Figure 2: 2004 – 2009 Area D Load Projection**

Following are summaries for each of the 2005 Projects.

**2005 Projects**

**Project Number:** D-120  
**Project Name:** Franklin-Laguna/Seasons-Bruceville Feeder Tie  
**Classification:** N – 1 Contingency  
**Preliminary Estimate:** $106,000  
**Projected Start/End Date:** 1/2005 – 6/2005  
**Problem to be solved:**

The Franklin Laguna 1201 is the only feeder that has a tie to the Seasons Bruceville 1201. As a result, if the Seasons Bruceville 1201 feeder getaway fails (or a transformer failure occurs), the existing distribution system will not be able to restore power to all the customers served by this feeder without exceeding the emergency rating of the Franklin Laguna 1201 feeder getaway (500 copper). Approximately 1.3 MVA of residential load will be without power during peak conditions until the damage is repaired.

**Recommended Solution:**

Install approximately 4,000 feet of 3 – 500 Al cable along Laguna Boulevard between Laguna Oaks Drive and Laguna Park Drive and associated equipment in order to provide the necessary feeder ties so that power can be restored to all customers in the event the Seasons Bruceville 1201 feeder getaway (or transformer) is damaged.

**Project Number:** D-447  
**Project Name:** Dillard Orange 1201 Feeder Improvements  
**Classification:** Normal  
**Preliminary Estimate:** $116,800  
**Projected Start/End Date:** 1/2005 – 6/2005  
**Problem to be solved:**

Eliminate an overload of approximately 40 amps on #4 AAAC and #6 CU wire, 150 amps total load, 90 amps resulting from new development.

**Recommended Solution:**

Reconduct the existing #6 CU and #4 AAAC on Lee School Cross Rd, Tavernor Rd, and Clay Station Rd: Construction of this project will provide capacity to serve existing and future load without exceeding the rating of the #6 CU and #4 AL conductors. Reconductoring and adding the third phase to two spans along Lee School Cross Rd and reconductoring along Tavernor Rd and Clay Station Rd are required. The total circuit foot is approximately 4,800 feet. Fused cutouts at 3 locations will also be required in addition to an overhead 12kV switch on Dillard Rd north of Shorthorn Rd.
Project Number: D-448
Project Name: Waterman Grantline 1203 Feeder Improvements
Classification: Normal
Preliminary Estimate: $134,200
Projected Start/End Date: 1/2005 – 12/2005

Problem to be solved:
The area south of Hampton Oak Way between East Stockton Blvd and the Union Pacific Railroad tracks is comprised of commercial and industrial-type customers. The two largest customers in the area are Georgia Pacific and Suburban Propane. The current source for this area is Waterman Grantline 1203. There are overhead and underground facilities in this area. One of the routes through this commercial/industrial area is via #4 ACSR conductor. The current connected KVA on this conductor is 4465 KVA. Assuming a load factor of 65%, the estimated demand is 140 amps, which is well above the normal rating for #4 ACSR. Therefore, system improvements are required in order to alleviate overloads on existing facilities and accommodate additional demand due to future development.

Recommended Solution:
Install underground facilities, reconfigure existing system, and reconductor highway crossing: Doing the proposed work will alleviate overloads on existing facilities by removing load from the #4 ACSR and serving it via underground facilities. The new underground facilities will be installed in existing infrastructure. This project will also accommodate future growth. Approximately 4,800 feet of 3-500 Al must be installed in existing conduit. A 3-way switch with 1 fuse bay and a 2-way switch with 2 fuse bays are required. Two local circuits will be removed from the #4 ACSR and terminated in one of the new cubicles to reduce the loading on the #4 ACSR conductor. In addition, 350 feet of 2/4 AAAC that crosses Highway 99 must be reconducted to 3-477 Al & 1-1/0 CN.

Project Number: D-238
Project Name: North Vineyard Substation Site Purchase
Classification: Normal
Preliminary Estimate: $315,000
Projected Start/End Date: 1/2005 – 12/2005

Problem to be solved:
As the result of future growth, the substations currently serving the North Vineyard area will not be able to support the additional load as it develops. It is forecasted that Elk Grove Florin Gerber, Calvine Waterman, and Mayhew Jackson will be loaded to approximately 90% of their nameplate capacity by 2006. Planning has seen tentative maps for this area, but no subdivisions or commercial properties have been submitted for design at present.

Recommended Solution:
Purchase a substation site now so that an optimal site will be used to construct the future North Vineyard Substation for serving projected growth in the area.

Project Number: D-240
**Project Name:** Douglas Bulk Substation Site Purchase  
**Classification:** Normal  
**Preliminary Estimate:** $856,000  
**Projected Start/End Date:** 1/2005 – 12/2005  
**Problem to be solved:**
An estimated increase in demand resulting from new developments in the Sunrise-Douglas Community Plan is forecasted to result in overloads on the Hedge #3 Bulk Substation transformer and the Hedge Line 7 and Lake Line 7 feeders and a lack of N-1 solutions for Lake and Hedge Bulk Substations.

**Recommended Solution:**
Purchase the substation site now, when land is available and development is in the early stages, to negotiate an optimal site for the Douglas Bulk Substation. This will supply the capacity to provide N-1 solutions, eliminate forecasted overloads, and serve future growth.

**Project Number:** D-241  
**Project Name:** Franklin Bulk Substation Site Purchase  
**Classification:** Normal  
**Preliminary Estimate:** $856,000  
**Projected Start/End Date:** 1/2005 – 12/2005  
**Problem to be solved:**
An estimated increase in demand resulting from new developments is forecasted to result in overloads on the Elk Grove transformers and a lack of N-1 solutions for Elk Grove and Pocket Substations.

**Recommended Solution:**
Purchase the substation site now, when land is available and development is in the early stages, to negotiate an optimal site for the Franklin Bulk Substation. This will supply the capacity to provide N-1 solutions, eliminate forecasted overloads, and serve future growth.
**Project Number:** D-307  
**Project Name:** Franklin Elk Grove Substation (includes 69 kV & 12 kV)  
**Classification:** Normal  
**Preliminary Estimate:** $1,669,000  
**Projected Start/End Date:** 6/2004 – 6/2005  
**Problem to be solved:**  
In the event that one of the 20 MVA transformers at Maritime Harbor Point, Bruceville Poppy Ridge, or Dwight Laguna fails during peak conditions of 2004, the existing distribution system will not be able to restore power without exceeding the emergency rating of several pieces of the District’s equipment. The overload issues are the result of insufficient transformer capacity in the area. Construction of the Franklin Elk Grove Substation and its associated feeder work will allow power restoration to all customers. In addition, Franklin Elk Grove will provide enough normal capacity to eliminate forecasted overloads in 2005. If the Maritime Harbour Point transformer fails, approximately 9 MW of load will be out of service due to overloads on the Dwight Laguna and Franklin Laguna transformers. Eighty-nine percent of this load is estimated to be 1,600 residential customers. The remaining 12% is commercial customers. If the Bruceville Poppy Ridge transformer fails, approximately 6.5 MW of load will be out of service due to overloads on the Franklin and Maritime Harbour Point transformers. Eighty-five percent of this load is estimated to be 1,100 residential customers, while the remaining 15% is commercial customers. Finally, if the Dwight Laguna transformer fails, 10.5 MW of load will be out of service due to overloads on the Franklin Laguna and Maritime Harbour Point transformers and the Big Horn Meadow Springs 1202 feeder getaway. Sixty-two percent of this load is estimated to be 1,300 residential customers, and the remaining 38% is commercial customers. Each scenario would be out of service during peak conditions until the transformer is repaired or replaced.  

**Recommended Solution:**  
Note: This Project was a 2004 N-1 project and now is a 2005 System Normal Project  
Construct the Franklin Elk Grove Substation and associated feeder work in order to provide enough transformer capacity in the area to serve all customers in the event that the Maritime Harbour Point, Bruceville Poppy Ridge or Dwight Laguna substation transformer fails without experiencing any overloads. Approximately 14,000 circuit feet of 3-1000 Al, 300 circuit feet of 3-500 Al, and associated facilities must be installed to tie the new substation into the existing distribution system. In addition, 1,700 circuit feet of 4/0 Al must be reconductored to 3-477 Al & 1-1/0 CN.

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**Project Number:** D-308
<table>
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<th>Project Name:</th>
<th>Rancho Cordova Circuit Reinforcement</th>
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<tbody>
<tr>
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<tr>
<td>Preliminary Estimate:</td>
<td>$185,500</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 6/2005</td>
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</table>

**Problem to be solved:**
In the event that the 20 MVA transformer at Gold Country Blue Ledge Substation fails, the existing distribution system will not be able to restore power to all customers without exceeding the emergency rating of the Citrus Coloma 1203 and 1206 getaways. At a minimum, approximately 1.4 MW of load, estimated to be 280 residential customers, on the Gold Country Blue Ledge 1201 feeder and 5.7 MW of load, estimated to be 1325 residential customers (single-family and condos) and 1 well site, on the Gold Country Blue Ledge 1202 feeder will be without power during peak conditions until the transformer is replaced or repaired.

**Recommended Solution:**
Construct the Rancho Cordova Circuit Reinforcement project to enable the surrounding substations and feeders to restore power to all customers without exceeding emergency ratings on any District equipment in the event the Gold Country Blue Ledge substation transformer fails in 2004 during peak conditions. Approximately 1,500 feet of 4/0 Al must be reconducted to 477 Al between S-1521 and S-2024. Approximately 150 feet of 500 Al must be reconducted to 500 Cu from the substation to S-1521. Approximately 200 feet of 397 Al must be reconducted to 477 Al between switch 511 and the first tap at the intersection of Citrus and Coloma Roads. Install 700’ of 3-500 Al (trenching required) along Sunrise Blvd. Install approximately 2,000 feet of CN on existing overhead line between S-S-1200 and S-1214.

<table>
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<td>Project Name:</td>
<td>Recloser Installation – Phase 1</td>
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<td>Projected Start/End Date:</td>
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**Problem to be solved:**
Rural customers have been experiencing extended outages due to either no fuse coordination or fuses blowing due to momentary outages on long tap lines.

**Recommended Solution:**
Install three-phase reclosers on three rural area circuits to improve the ability to coordinate with line fuses and source side circuit breakers. Installing reclosers at these locations will reduce the number of customers affected during outages. In addition, these reclosers will clear momentary faults without locking out the circuit breaker or sectionalize the outage to reduce the number of customers involved in the outage.

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<tr>
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<tbody>
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<td>Project Name:</td>
<td>Zinfandel Baroque Substation Site Purchase</td>
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</table>
Classification: Normal  
Preliminary Estimate: $315,000  
Projected Start/End Date: 1/2005 – 12/2005  

**Problem to be solved:**
The Villages of Zinfandel is a planned development zoned for residential, retail/commercial, business/professional and light industrial customers. The forecasted load for this development is 31 MVA. As the result of future growth, Mather #1 and Sunrise Pyramid are forecasted to be loaded above nameplate in 2008 with 104% and 107% loading, respectively. In addition, International Reserve is projected to be loaded at 94% of nameplate.

**Recommended Solution:**
Purchase a substation site so that the District can construct the future Zinfandel Baroque Substation in a location that will best support future growth and alleviate forecasted overloads.

**Project Number:** D-338  
**Project Name:** KMP8 Load Reduction – Gold Canal Drive  
**Classification:** N – 1 Contingency  
**Preliminary Estimate:** $36,250  
**Projected Start/End Date:** 1/2005 – 6/2005

**Problem to be solved:**
There is one local circuit (main route in conduit), which begins at U-6416 and ends at U-6417. This is the only circuit that serves customers along Gold Canal Drive. Currently, the connected kVA of KMP8 on U-6416 (bay 2) is 2982.5 kVA and on U-6417 (bay 2) is 2300 kVA. There are 14 vacant lots that will be served from this circuit when developed. Assuming a load factor of 65%, the estimated load on U-6416 from the KMP8 circuit is 90 amps and on U-6417 is 69 amps. According to Distribution System Engineering’s Fuse Policy (Fuse Application to Loop Designs, 01-07-02), the nameplate rating of a 65E fuse is 90 amp under normal load and 98 amp under emergency conditions. As a result, we would not be able to serve all of the customers under emergency conditions without exceeding the 65E fuses’ emergency rating. If the KMP8 circuit’s source from U-6416 fails, 11 customers (1.5 MVA) will be without power until the damage is repaired. If the opposite source for KMP8 fails (U-6417), 12 customers (1.5 MVA) will be without power until the damage is repaired (estimated loads assuming a 65% load factor on service transformers).

**Recommended Solution:**
Install two new cubicles and split the existing KMP8 circuit into 3 separate circuits, which will enable the District to serve load to all customers if one of the sources fails for each local circuit without exceeding the emergency rating of the 65E fuses. Install one cubicle between existing transformers 10KMP8 and 12KMP8 and the other between transformers 16KMP8 and 17KMP8.

**Project Number:** D-404  
**Project Name:** Laguna West Feeder Ties
**Classification:** N – 1 Contingency

**Preliminary Estimate:** $105,000

**Projected Start/End Date:** 1/2005 – 6/2005

**Problem to be solved:**
In the event the 20 MVA transformer at Dwight Laguna Substation fails, the existing distribution system will not be able to restore power to all customers without exceeding the emergency rating of the 500 Al cable between U-8931-2 (1st cubical) and U-7119-S-3 (2nd cubical) on the Maritime Harbour Point 1203 feeder. Approximately 3 MVA of load (estimated to be about 600 residential customers) will be without power during peak conditions until the transformer is replaced or repaired.

**Recommended Solution:**
Construct the Laguna West Feeder Ties to create ties between the Dwight Laguna 1203, the Franklin Laguna 1203, and the Maritime Harbour Point 1202 feeders. This will allow switching to the adjacent substations without exceeding emergency ratings of the District’s equipment. To build this feeder tie, a 3-way switch (existing well), approximately 750’ of 2 – 6” conduits and 2 runs of 3-500 Al cable, and a 12kV riser would be installed along Lakepoint Drive between Babson Drive and Elliot Ranch Road. In addition, a 12kV overhead switch would need to be installed east of the 12kV riser constructed on Elliot Ranch Road.
**Project Number:** D-430  
**Project Name:** Source for U-9086  
**Classification:** N – 1 Contingency  
**Preliminary Estimate:** $26,500  
**Projected Start/End Date:** 1/2005 – 6/2005

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**Problem to be solved:**

Cubicle U-9086 does not have a source; however, the K4, K5, K6, K8, K9, and K10 circuits terminate at this cubicle. The system is configured so that the open points on these local circuits are at the first transformer out of U-9086. Because U-9086 does not have a source, it cannot be used as an alternate source for the K-circuits. As a result, these local circuits do not have a backup. The total number of residential customers served by the K4, K5, and K6 circuits is 293. There are 287 customers served via the K8, K9, and K10 circuits. According to Distribution System Engineering’s Fuse Policy (Fuse Application to Loop Designs, 01-07-02), the nameplate rating of a 65E fuse is 90 amps under normal load and 98 amps under emergency conditions. Based on the number of customers served on each of the local circuits and assuming 5 kW per residential customer at peak conditions, the District would not be able to serve all of these customers if cubicle U-2312 or U-9087 failed without exceeding the emergency rating of the 65E fuses. If U-2312 fails, approximately 199 residential customers will be out of service during peak conditions until the cubicle is repaired or replaced. If U-9087 fails, approximately 181 residential customers will be out of service under the same conditions. The same results will happen if a cable failure occurs between one of the cubicles and the first transformer on the local circuit. The customers will be out of service until new cable is pulled in the conduit or the cable is repaired.

**Recommended Solution:**

Install approximately 250’ of 3-477 Al and 1-1/0 CN and connect to the underground distribution system via 2 heavy risers at the west end of Mendora Drive. This will provide a source to U-9086, which will enable the District to serve all the residential customers served from the K4, K5, K6, K8, K9, and K10 circuits in the event that one of the normal sources (U-2312 or U-9087) fails during peak conditions without exceeding the emergency rating of the 65E fuses.
Following is a summary list of the 2006 – 2009 Projects organized by project type.

**Distribution Substation Site Acquisitions**

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-242</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Lent Ranch Site Acquisition</td>
</tr>
<tr>
<td>Classification:</td>
<td>Normal</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$315,000</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 6/2005</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Acquire a substation site to provide service to the Lent Ranch Mall and surrounding growth.</td>
</tr>
<tr>
<td>Description:</td>
<td>Acquire a double-unit distribution substation site to serve the Lent Ranch Development.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-607</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Poppy Ridge Hwy 99 Site Acquisition</td>
</tr>
<tr>
<td>Classification:</td>
<td>Normal</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$315,000</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Acquire a substation site to support growth in the Laguna Ridge Specific Plan area.</td>
</tr>
<tr>
<td>Description:</td>
<td>Acquire a double-unit distribution substation site to serve load in the Laguna Ridge Specific Plan area.</td>
</tr>
</tbody>
</table>

**Distribution Substation Projects**

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-245</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Lent Ranch Substation</td>
</tr>
<tr>
<td>Classification:</td>
<td>Normal</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$1,200,000 – substation $29,600 – 69 kV $116,000 – 12 kV</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 12/2005 (on hold due to legal issues)</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Construct a distribution substation to serve the Lent Ranch Development.</td>
</tr>
<tr>
<td>Description:</td>
<td>Install a 69/12 kV, 20 MVA substation and associated 69 kV and 12 kV feeder work.</td>
</tr>
</tbody>
</table>

| Project Number: | D-512                  |
**Project Name:** Sunco Trade Center #2  
**Classification:** N – 1 Contingency  
**Preliminary Estimate:**  
- $1,000,000 – substation  
- $21,100 – 69 kV  
- $88,000 – 12 kV  
**Projected Start/End Date:** 6/2005 – 6/2006  
**Purpose:** Add a second transformer to the existing Sunco Trade Center site to maintain service to all customers in the event a neighboring substation transformer fails.  
**Description:** Install a second 20 MVA transformer at Sunco Trade Center Substation and associated 69 kV and 12 kV feeder work.

**Project Number:** D-513  
**Project Name:** North Vineyard Substation  
**Classification:** Normal  
**Preliminary Estimate:**  
- $1,200,000 – substation  
- $18,200 – 69 kV  
- $120,700 – 12 kV  
**Projected Start/End Date:** 6/2005 – 6/2006  
**Purpose:** Construct a distribution substation to serve growth in the North Vineyard Station Specific Plan.  
**Description:** Install a 69/12 kV, 20 MVA substation and associated 69 kV and 12 kV feeder work.

**Project Number:** D-606  
**Project Name:** Douglas Bulk Substation  
**Classification:** Normal  
**Preliminary Estimate:**  
- $10,800,000 – substation  
- $200,000 – 230 kV  
- $1,720,400 – 69 kV  
**Projected Start/End Date:** 1/2006 – 6/2007  
**Purpose:** Construct a bulk substation to accommodate growth due to the Zinfandel and Mather Projects and the Sunrise-Douglas Specific Plan.  
**Description:** Install a 230/69 kV, 224 MVA Substation and associated 230 kV and 69 kV feeder work.

**Project Number:** D-608  
**Project Name:** Poppy Ridge Hwy 99
Classification: Normal
Preliminary Estimate: $1,200,000 – substation
$29,600 – 69 kV
$120,700 – 12 kV
Purpose: Construct a distribution substation to serve growth in the Laguna Ridge Specific Plan.
Description: Install a 69/12 kV, 20 MVA substation and associated 69 kV and 12 kV feeder work.

Project Number: D-705
Project Name: Zinfandel Baroque Substation
Classification: Normal
Preliminary Estimate: $1,200,000 – substation
$510,600 – 69 kV
$87,800 – 12 kV
Purpose: Construct a distribution substation to serve the Villages of Zinfandel Development.
Description: Install a 69/12 kV, 20 MVA substation and associated 69 kV and 12 kV feeder work.

Project Number: D-800
Project Name: Whiterock Sunrise #2 Upgrade
Classification: Normal
Preliminary Estimate: $1,000,000 – substation
$102,900 – 69 kV
$144,500 – 12 kV
Purpose: Increase the capacity of Whiterock Sunrise #2 to support growth and provide backup capability in the event a neighboring substation transformer fails.
Description: Upgrade existing transformer to a 20 MVA transformer and install associated 69 kV and 12 kV feeder work.

69kV Line Projects

Project Number: D-330
Project Name: Elk Grove #3 Reconductor  
Classification: N – 1 Contingency  
Preliminary Estimate: $607,000  
Projected Start/End Date: 1/2005 – 6/2005  
Purpose: Reconductor the Elk Grove #3 69kV feeder.  
Description: Reconductor 20,000 feet of 477 kcmil to 954 kcmil on Bruceville and Kammerer Roads.

Project Number: D-510  
Project Name: Reconductor Elk Grove #6 69 kV  
Classification: Normal  
Preliminary Estimate: $1,026,000  
Projected Start/End Date: 1/2005 – 6/2005  
Purpose: Increase the load carrying capability of the Elk Grove #6 69 kV feeder.  
Description: Reconductor 33,800 feet of 477 kcmil to 954 kcmil along Hwy 99.

Project Number: D-511  
Project Name: Bradshaw 69 kV from Elk Grove to Florin  
Classification: Normal  
Preliminary Estimate: $1,010,000  
Projected Start/End Date: 1/2005 – 12/2005  
Purpose: Complete a 69kV tie from Bradshaw Grantline Substation to Florin Road.  
Description: Install 30,000 feet of 795-kcmil overhead conductor.

Project Number: D-610  
Project Name: Douglas Road Double Circuit 69kV & Grantline Road Tie  
Classification: Normal  
Preliminary Estimate: $475,000  
Purpose: Construct a double circuit 69kV line along Douglas Road.  
Description: Install 12,000 feet of double circuit 954-kcmil overhead conductors.

Project Number: D-613  
Project Name: Single Circuit tie from Sunrise Blvd to Jaeger along Keifer Road  
Classification: Normal
Preliminary Estimate: $202,000
Purpose: Complete 69kV circuit tie from new Douglas Bulk Substation.
Description: Sunrise Blvd to Jaeger along Kiefer Blvd. Approximately 6,000 feet of 954, this will tie back to the circuit from Douglas Bulk substation that comes southwest along the TL corridor.

Project Number: D-614
Project Name: Single Circuit from TL corridor along Douglas Blvd then south on Grantline to Keifer.
Classification: Normal
Preliminary Estimate: $897,500
Purpose: This will be another circuit from the Douglas Bulk substation connecting to the Southeast area.
Description: Construct circuit tie along Douglas Blvd then south along Grantline to the existing line at Keifer and Grantline (19,000 feet).

Project Number: D-615
Project Name: Hedge Circuit 5 Gerber Road 69kV to Bradshaw.
Classification: Normal
Preliminary Estimate: $178,500
Purpose: This will be the initial source for the new Vineyard Substation.
Description: Construct circuit tie along Gerber Road to Bradshaw 5,280 feet.

Project Number: D-616
Project Name: Single Circuit from Douglas Bulk in Transmission corridor to Jaeger then south to Keifer.
Classification: Normal
Preliminary Estimate: $523,000
Purpose: Extend 69kV along TL corridor southwest to Jaeger Ave then south to Keifer Rd as one of the circuits for new Douglas bulk substation.
Description: Install 15,000 feet of 954-kcmil overhead conductor.
## Distribution Line Projects

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-516</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Recloser Installation – Phase 2</td>
</tr>
<tr>
<td>Classification:</td>
<td>Reliability</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$44,250</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 12/2005</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Reduce or eliminate extended feeder outages on OH Lines with high exposure and improve protection coordination.</td>
</tr>
<tr>
<td>Description:</td>
<td>Install three 3-Phase Reclosers on various rural circuits in Area D.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-517</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Sheldon Road Reconductor &amp; CN installation</td>
</tr>
<tr>
<td>Classification:</td>
<td>Normal</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$67,400</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 6/2005</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Eliminate overload on 3/4 ACSR.</td>
</tr>
<tr>
<td>Description:</td>
<td>Reconductor approximately 1,100’ of 3/4 ACSR and 1,300’ of 3/4 BC with 3-477 Al &amp; 1-1/0 CN between switch 237 and Excelsior Rd. Install approximately 4,700’ of CN between Dillard Oaks Ct and switch 237.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-520</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Jaeger Road Reconductor</td>
</tr>
<tr>
<td>Classification:</td>
<td>Normal</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$115,100</td>
</tr>
<tr>
<td>Projected Start/End Date:</td>
<td>1/2005 – 6/2005</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Provide source to serve the new Anatolia Development.</td>
</tr>
<tr>
<td>Description:</td>
<td>Reconductor approximately 5,000’ of 3/2 ACSR to 3-477 Al &amp; 1-1/0 CN on Jaeger Road south of Douglas Road.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Number:</th>
<th>D-609</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name:</td>
<td>Recloser Installation – Phase 3</td>
</tr>
<tr>
<td>Classification:</td>
<td>Reliability</td>
</tr>
<tr>
<td>Preliminary Estimate:</td>
<td>$44,250</td>
</tr>
<tr>
<td>Purpose:</td>
<td>Reduce or eliminate extended feeder outages on OH Lines with high exposure and improve protection coordination.</td>
</tr>
<tr>
<td>Description:</td>
<td>Install three 3-Phase Reclosers on various rural circuits in Area D.</td>
</tr>
</tbody>
</table>

| Project Number: | D-700 |

March 31, 2004

DISTRIBUTION SYSTEM PLAN

D - 23

2005-2009
Project Name: Waterman Grantline 1203 Reconductor
Classification: Normal
Preliminary Estimate: $144,300
Purpose: Serve load in vicinity of Union Industrial Park.
Description: Replace 4 AAAC paralleling Elkmont Way with 4,500’ of 3 – 500 Al in existing conduit. Install 1,500’ of 3 – 477 Al to tie into the Waterman Grantline 1202 feeder along Grantline Road. Two cubicals and two risers will be required to serve local circuits and tie into existing distribution system.

Project Number: D-701
Project Name: Dwight Laguna 1203 Feeder Completion
Classification: N – 1 Contingency
Preliminary Estimate: $88,750
Purpose: Complete UG feeder and provide second source for U-4905
Description: Replace U-7483 with a 3-way switch with fuse bay. Install approximately 1,400 feet of 3 – 500 Al from feeder coiled at the corner of Welwyn Drive and Elberon Way to new cubical that replaces U-7483. There is some existing conduit along Keefe Drive, but additional trenching is required along Keefe Drive (~300’) andElberon Way (~200’).

Project Number: D-708
Project Name: Recloser Installation – Phase 4
Classification: Reliability
Preliminary Estimate: $44,250
Purpose: Reduce or eliminate extended feeder outages on OH Lines with high exposure and improve protection coordination.
Description: Install three 3-Phase Reclosers on various rural circuits in Area D.

Project Number: D-801
Project Name: Recloser Installation – Phase 5
Classification: Reliability
Preliminary Estimate: $44,250
Projected Start/End Date: 1/2008 – 12/2008
Purpose: Reduce or eliminate extended feeder outages on OH Lines with high exposure and improve protection coordination.

Description: Install three 3-Phase Reclosers on various rural circuits in Area D.