CITY OF LAKE CITY

Agenda
Lake City Utility Board Meeting
April 17, 2024
5:30 PM
City Hal 1st Floor Conference

1. Call to Order/Introductions
2. Review and adopt/amend agenda
3. Public Forum
4. Consent Agenda
    a. Utility Board Minutes February 29, 2024
    b. Financials through March 2024
5. Informational Reports
    a. DGR Electric System Study Update
    b. Block 15 Project Update
6. New Business
7. Next Regular Meeting: May 15, 2024
8. Adjourn

REQUEST FOR
Utility Board Meeting, April 17, 2024

Agenda Item Description: Utility Board Minutes February 29, 2024

Meeting: Utility Board Meeting, 4/17/2024

Originating Department: Utility

Action Requested:
Utility Board minutes February 29, 2024.

Background:
None

Budgetary/Fiscal Impact:
None

Reviewed By: Public Works

Preparer: Public Works Director Scott Jensen

ATTACHMENTS:

	Description
🗋	**Minutes**

Minutes
Lake City Utility Board Meeting
February 29, 2024
5:30 PM
City Hall 1st Floor Conference

1. Call to Order/Introductions/Disclose conflicts
   Chair Hawryluk called the meeting to order at 5:40pm with a quorum present.
   Members present: Justin Hawryluk, Peter Coyle, Brent Blattner.
   Others present: Council liaison Megan Kramer, Assistant Public Works Director Travis Dunn, Public Works Director Scott Jensen.
2. Review and adopt/amend agenda
   Motion Coyle, second Blattner to approve agenda as presented. All ayes, motion carried.
3. Public Forum
   None
4. Consent Agenda
   a. Utility Board Minutes January 17, 2024
   b. 2023 Year-End Financials
      Jensen reviewed the 2023 financials with the board. It was noted that actual revenues came in above those budgeted throughout all funds while expenses came in below budget in all funds. Only the Water fund came in with expenses exceeding revenues for the year.
      Motion Hawryluk, second Coyle to approve the consent agenda. All ayes, motion carried.
5. Informational Reports
   a. Xcel Energy Proposed Rate Structure
      Jensen shared Xcel Energy's proposed time of use (TOU) rates that have been submitted to the MPUC. Under this structure summer peak rates (3pm to 8pm M-F) would go from approximately 13 cents per kWh to 28 cents per kWh. This is to incentivize customers to use less energy when the electric grid is reaching capacity. Jensen stated that he has looked to put TOU rates in place for Lake City. Increased energy use, such as charging electric vehicles, should be directed toward off peak hours that TOU rates provide.
   b. DGR Electric System Study
      Jensen provided an update on the study stating that all requested information has been provided to DGR. They are beginning their modeling processes and should have a list of

deficiencies in 2 to 4 weeks. Further system details and recommended actions will come in the following months.

6. New Business

   a. Designate Chair and Vice Chair
      Motion Coyle, second Blattner to designate Hawryluk as chair and Blattner as vice chair. All ayes, motion carried.

   b. Annual Distributed Energy Resources (DER) Reporting
      Jensen shared the attached documents that are to be reported to the board annually.
      Motion Coyle, second Hawryluk to accept the annual DER reporting. All ayes, motion carried.

7. Next Regular Meeting: March 20, 2024

8. Adjourn
   Motion Blattner, second Coyle to adjourn at 6:09pm. All ayes, motion carried.

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Justin Hawryluk, Chair

Minutes submitted by Public Works Director Scott Jensen

REQUEST FOR
Utility Board Meeting, April 17, 2024

Agenda Item Description: Financials through March 2024

Meeting: Utility Board Meeting, 4/17/2024

Originating Department: Utility

Action Requested:
Review financials through March 2024.

Background:
None

Budgetary/Fiscal Impact:
None

Reviewed By: Public Works

Preparer: Public Works Director Scott Jensen

ATTACHMENTS:

	Description
🗋	**Financials**

CITY OF LAKE CITY

Electric Fund
Balance Sheet
March 31, 2024

	ASSETS			
701-11010	Cash & Investments		7,705,079.31	
701-11150	Special Assessments-Current		4,931.61	
701-11190	Accounts Receivable		994,533.60	
701-11220	Due from Other Funds		20,000.00	
701-11250	Inventories		414,001.72	
701-11450	Prepaid Insurance		51,864.54	
701-11610	Capital-Land		9,899.85	
701-11611	Capital-Land Improvements		33,166.80	
701-11618	Capital-Dist/Collect System		13,565,676.50	
701-11620	Capital-Buildings		2,151,254.27	
701-11642	Capital-Machinery/Equipment		1,905,116.68	
701-11661	Accumulated Depreciation		(12,213,395.47)	
701-18600	Deferred Pension Outflows		137,896.00	
	Total Assets			14,780,025.41
	LIABILITIES AND EQUITY			
	LIABILITIES			
701-22040	Accounts Payable		706,290.43	
701-22100	PTO Liability		29,441.40	
701-22300	Refundable Customer Deposits		59,995.20	
701-22326	Sales Tax Payable		25,219.38	
701-22550	Unavailable Revenue		(59.14)	
701-22835	Net Pension Liability		409,860.00	
701-25300	Deferred Pension Inflows		150,480.00	
	Total Liabilities			1,381,227.27
	FUND EQUITY			
701-22602	Assigned Fund Balance		787,500.00	
701-26100	Net Invest in Capital Assets		5,451,718.63	
	Unappropriated Fund Balance:			
701-22600	Unrestricted Net Position	7,019,130.69		
	Revenue over Expenditures - YTD	140,448.82		
	Balance - Current Date		7,159,579.51	
	Total Fund Equity			13,398,798.14
	Total Liabilities and Equity			14,780,025.41

CITY OF LAKE CITY
Revenues with Comparison to Budget
For the 3 Months Ending March 31, 2024

Electric Fund

		Period Actual	YTD Actual	Budget	Unearned	Pcnt
	ELECTRIC REVENUES					
701-37010-33091	Transfers In	.00	.00	10,000.00	10,000.00	.0
701-37010-33130	Interest on Investments	.00	.00	100,000.00	100,000.00	.0
701-37010-33180	Miscellaneous Refund/Reimb	.00	100.00	5,000.00	4,900.00	2.0
701-37010-33190	Insurance Dividend	.00	.00	5,000.00	5,000.00	.0
701-37010-33501	Residential Revenue	189,693.40	619,422.57	2,450,000.00	1,830,577.43	25.3
701-37010-33502	Commercial Revenue	188,056.41	569,556.85	2,100,000.00	1,530,443.15	27.1
701-37010-33503	Industrial Revenue	398,013.54	1,249,864.52	5,040,000.00	3,790,135.48	24.8
701-37010-33504	Rural Residential Revenue	691.60	2,022.93	6,500.00	4,477.07	31.1
701-37010-33505	Rural Commercial Revenue	67.18	201.54	800.00	598.46	25.2
701-37010-33506	Renewable Energy	5,592.00	11,184.00	50.00	(11,134.00)	22368.
701-37010-33507	Penalty	2,720.34	10,198.56	15,000.00	4,801.44	68.0
701-37010-33508	Electric Car Chargers	262.51	1,561.14	2,500.00	938.86	62.5
701-37010-33510	Internal Use Chargebacks	19,117.32	61,353.69	240,000.00	178,646.31	25.6
701-37010-33511	SMMPA Rebate Revenue	290.00	3,747.97	100,000.00	96,252.03	3.8
701-37010-33520	Service Line Protection	533.50	2,134.50	12,000.00	9,865.50	17.8
701-37010-33722	Materials Sold	.00	.00	1,000.00	1,000.00	.0
701-37010-33724	Tapping & Connection Fees	925.00	3,115.00	18,000.00	14,885.00	17.3
701-37010-33728	Rental Revenue	.00	.00	2,000.00	2,000.00	.0
701-37010-33737	NSF Check Charge	140.00	315.00	350.00	35.00	90.0
701-37010-33774	Surcharges	200.00	600.00	4,500.00	3,900.00	13.3
701-37010-33952	Substation Surcharges	10,758.80	12,775.19	27,500.00	14,724.81	46.5
	Total ELECTRIC REVENUES	817,061.60	2,548,153.46	10,140,200.00	7,592,046.54	25.1
	Total Fund Revenue	817,061.60	2,548,153.46	10,140,200.00	7,592,046.54	25.1

Electric Fund

		Period Actual	YTD Actual	Budget	Unexpended	Pcnt
	Electric Fund					
701-41401-391	Electric SMMPA Power Contract	646,276.54	2,016,723.06	8,250,000.00	6,233,276.94	24.5
	Total Electric Fund	646,276.54	2,016,723.06	8,250,000.00	6,233,276.94	24.5
	ELECTRIC ADMINISTRATION					
701-41920-100	Electric Salaries-Regular	42,911.74	134,819.52	674,210.00	539,390.48	20.0
701-41920-110	Electric Salaries-Overtime	526.70	526.70	15,000.00	14,473.30	3.5
701-41920-130	Electric Salaries-On Call	3,200.00	9,624.32	36,500.00	26,875.68	26.4
701-41920-140	Electric PERA	3,497.91	10,872.84	54,625.00	43,752.16	19.9
701-41920-150	Electric FICA	3,299.44	10,290.97	55,725.00	45,434.03	18.5
701-41920-160	Electric Group Health Ins	6,894.15	20,639.33	111,300.00	90,660.67	18.5
701-41920-170	Electric Longevity	.00	.00	2,523.00	2,523.00	.0
701-41920-210	Electric Operating Supplies	26,110.21	49,840.10	125,000.00	75,159.90	39.9
701-41920-230	Electric Tools/Equip	539.61	4,269.52	25,000.00	20,730.48	17.1
701-41920-300	Electric Professional Svcs	13,499.60	13,879.92	70,000.00	56,120.08	19.8
701-41920-310	Electric Communication	429.24	1,114.38	13,000.00	11,885.62	8.6
701-41920-320	Electric Travel, Conf, School	1,299.42	15,568.11	20,000.00	4,431.89	77.8
701-41920-340	Electric Printing/Publish	43.75	43.75	500.00	456.25	8.8
701-41920-360	Electric Utilities	7,148.19	21,380.14	75,000.00	53,619.86	28.5
701-41920-370	Electric Maint/Repair	285.63	11,573.13	80,000.00	68,426.87	14.5
701-41920-371	Electric Service Lines	.00	.00	7,500.00	7,500.00	.0
701-41920-381	Electric Admin Allocation	.00	.00	130,000.00	130,000.00	.0
701-41920-390	Electric Contractual	6,622.00	43,154.34	127,000.00	83,845.66	34.0
701-41920-400	Electric Miscellaneous	124.56	314.70	.00	(314.70)	.0
701-41920-410	Electric Workers Comp Ins	3,459.00	3,459.00	14,000.00	10,541.00	24.7
701-41920-420	Electric Vehicle Insurance	.00	.00	3,000.00	3,000.00	.0
701-41920-430	Electric General Liability	.00	.00	68,000.00	68,000.00	.0
701-41920-530	Electric Capital-Machin/Equip	.00	27,652.84	439,500.00	411,847.16	6.3
701-41920-700	Transfers Out	.00	8,000.00	218,000.00	210,000.00	3.7
701-41920-830	Electric Rebate Payments	210.00	3,957.97	100,000.00	96,042.03	4.0
	Total ELECTRIC ADMINISTRATION	120,101.15	390,981.58	2,465,383.00	2,074,401.42	15.9
	Total Fund Expenditures	766,377.69	2,407,704.64	10,715,383.00	8,307,678.36	22.5
	Net Revenue Over Expenditures	50,683.91	140,448.82	(575,183.00)	(715,631.82)	24.4

CITY OF LAKE CITY

Water Fund
Balance Sheet
March 31, 2024

	ASSETS			
702-11010	Cash & Investments		509,983.34	
702-11150	Special Assessments-Current		1,273.88	
702-11170	Special Assessments-Deferred		5,470.49	
702-11190	Accounts Receivable		120,236.08	
702-11450	Prepaid Insurance		7,003.84	
702-11610	Capital-Land		4,273.30	
702-11612	Capital-CIP		224,513.10	
702-11613	Capital-Land Improvements		34,892.16	
702-11618	Capital-Dist/Collect Systems		5,258,692.29	
702-11620	Capital-Buildings		49,744.09	
702-11642	Capital-Machinery/Equipment		368,244.63	
702-11661	Accumulated Depreciation		(3,106,100.82)	
702-18600	Deferred Pension Outflows		43,178.00	
	Total Assets			3,521,404.38
	LIABILITIES AND EQUITY			
	LIABILITIES			
702-22040	Accounts Payable		226.53	
702-22100	PTO Liability		13,887.88	
702-22250	Bonds Payable-Current		45,000.00	
702-22260	Accrued Interest Payable		2,155.50	
702-22326	Sales Tax Payable		1,034.50	
702-22333	MDH Safe Water Payable		2,189.03	
702-22350	Bonds Payable-Non Current		347,750.00	
702-22351	Discount on Bonds		(1,448.00)	
702-22352	Premium on Bonds		17,033.51	
702-22550	Deferred Revenue		(37.76)	
702-22835	Net Pension Liability		162,326.00	
702-25300	Deferred Pension Inflows		62,625.00	
	Total Liabilities			652,742.19
	FUND EQUITY			
702-22602	Assigned Fund Balance		295,232.90	
702-26100	Net Invest in Capital Assets		2,425,923.24	
	Unappropriated Fund Balance:			
702-22600	Unrestricted Net Position	124,073.32		
	Revenue over Expenditures - YTD	23,432.73		
	Balance - Current Date		147,506.05	
	Total Fund Equity			2,868,662.19
	Total Liabilities and Equity			3,521,404.38

CITY OF LAKE CITY
Revenues with Comparison to Budget
For the 3 Months Ending March 31, 2024

Water Fund

		Period Actual	YTD Actual	Budget	Unearned	Pcnt
	WATER REVENUES					
702-37020-33130	Interest on Investments	.00	.00	3,000.00	3,000.00	.0
702-37020-33160	Water Sale of Property	.00	3,050.00	.00	(3,050.00)	.0
702-37020-33180	Miscellaneous Refund/Reimb	180.00	2,995.82	.00	(2,995.82)	.0
702-37020-33190	Insurance Dividend	.00	.00	500.00	500.00	.0
702-37020-33501	Residential Revenue	35,308.98	112,936.61	585,000.00	472,063.39	19.3
702-37020-33502	Commercial Revenue	10,235.84	29,468.21	130,000.00	100,531.79	22.7
702-37020-33503	Industrial Revenue	8,378.78	34,246.97	215,000.00	180,753.03	15.9
702-37020-33507	Penalty	503.56	1,548.89	3,500.00	1,951.11	44.3
702-37020-33510	Internal Use Chargebacks	792.16	2,507.65	9,150.00	6,642.35	27.4
702-37020-33520	Service Line Protection	3,687.25	10,535.00	40,000.00	29,465.00	26.3
702-37020-33724	Tapping & Connection Fees	860.00	3,450.00	10,000.00	6,550.00	34.5
	Total WATER REVENUES	59,946.57	200,739.15	996,150.00	795,410.85	20.2
	Total Fund Revenue	59,946.57	200,739.15	996,150.00	795,410.85	20.2

Water Fund

		Period Actual	YTD Actual	Budget	Unexpended	Pcnt
	WATER ADMINISTRATION					
702-42920-100	Water Admin Salaries-Regular	13,750.57	44,061.22	240,350.00	196,288.78	18.3
702-42920-110	Water Admin Salaries-Overtime	1,053.49	3,648.21	15,000.00	11,351.79	24.3
702-42920-130	Water Admin Salaries-On Call	570.46	2,014.97	9,250.00	7,235.03	21.8
702-42920-140	Water Admin PERA	1,153.13	3,729.47	19,925.00	16,195.53	18.7
702-42920-150	Water Admin FICA	1,064.99	3,470.45	20,325.00	16,854.55	17.1
702-42920-160	Water Admin Group Health Ins	2,740.68	8,221.71	50,750.00	42,528.29	16.2
702-42920-170	Water Admin Longevity	.00	.00	1,503.00	1,503.00	.0
702-42920-210	Water Admin Operating Supplies	950.02	3,027.84	40,000.00	36,972.16	7.6
702-42920-230	Water Admin Tools/Equip	.00	219.21	4,000.00	3,780.79	5.5
702-42920-300	Water Admin Professional Svcs	161.00	335.90	25,000.00	24,664.10	1.3
702-42920-310	Water Admin Communication	176.04	500.37	8,000.00	7,499.63	6.3
702-42920-320	Water Admin Travel, Conf, Sch	.00	1,750.21	4,500.00	2,749.79	38.9
702-42920-340	Water Admin Printing/Publish	43.75	43.75	1,500.00	1,456.25	2.9
702-42920-360	Water Admin Utilities	3,640.34	10,748.44	55,000.00	44,251.56	19.5
702-42920-370	Water Admin Maint/Repair	18,853.64	19,698.35	80,000.00	60,301.65	24.6
702-42920-371	Water Admin Service Lines	.00	469.50	40,000.00	39,530.50	1.2
702-42920-381	Water Admin Allocation	.00	.00	30,000.00	30,000.00	.0
702-42920-390	Water Admin Contractual	948.34	6,886.01	25,500.00	18,613.99	27.0
702-42920-410	Water Admin Workers Comp Ins	3,549.00	3,549.00	6,100.00	2,551.00	58.2
702-42920-420	Water Admin Vehicle Insurance	.00	.00	1,100.00	1,100.00	.0
702-42920-430	Water Admin General Liability	.00	.00	7,300.00	7,300.00	.0
702-42920-530	Water Capital-Machin/Equip	5,453.42	13,345.87	87,432.90	74,087.03	15.3
702-42920-601	Debt Service-Principal Payment	.00	45,000.00	78,250.00	33,250.00	57.5
702-42920-610	Debt Service-Interest Payment	.00	2,585.94	10,050.00	7,464.06	25.7
702-42920-620	Debt Service-Paying Agent Fee	.00	.00	500.00	500.00	.0
702-42920-700	Transfers Out	.00	4,000.00	89,000.00	85,000.00	4.5
	Total WATER ADMINISTRATION	54,108.87	177,306.42	950,335.90	773,029.48	18.7
	Total Fund Expenditures	54,108.87	177,306.42	950,335.90	773,029.48	18.7
	Net Revenue Over Expenditures	5,837.70	23,432.73	45,814.10	22,381.37	51.2

CITY OF LAKE CITY

Sewer Fund
Balance Sheet
March 31, 2024

	ASSETS			
703-11010	Cash & Investments		371,130.44	
703-11150	Special Assessments-Current		2,639.32	
703-11190	Accounts Receivable		130,795.45	
703-11450	Prepaid Insurance		28,149.92	
703-11612	Capital-CIP		223,417.10	
703-11618	Capital-Dist/Collection System		5,225,294.26	
703-11620	Capital-Buildings		6,357,340.13	
703-11642	Capital-Machinery/Equipment		1,108,233.59	
703-11661	Accumulated Depreciation		(9,978,807.27)	
703-18600	Deferred Pension Outflows		53,154.00	
	Total Assets			3,521,346.94
	LIABILITIES AND EQUITY			
	LIABILITIES			
703-22040	Accounts Payable		228.53	
703-22100	PTO Liability		22,719.38	
703-22350	Bonds Payable-Non Current		250,250.00	
703-22352	Premium on Bonds		17,033.51	
703-22835	Net Pension Liability		197,188.00	
703-25300	Deferred Pension Inflows		75,884.00	
	Total Liabilities			563,303.42
	FUND EQUITY			
703-22602	Assigned Fund Balance		303,382.90	
703-26100	Net Invest in Capital Assets		2,668,194.30	
	Unappropriated Fund Balance:			
703-22600	Unrestricted Net Position	(100,022.35)		
	Revenue over Expenditures - YTD	86,488.67		
	Balance - Current Date		(13,533.68)	
	Total Fund Equity			2,958,043.52
	Total Liabilities and Equity			3,521,346.94

CITY OF LAKE CITY
Revenues with Comparison to Budget
For the 3 Months Ending March 31, 2024

Sewer Fund

		Period Actual	YTD Actual	Budget	Unearned	Pcnt
	SEWER REVENUES					
703-37030-33130	Interest on Investments	.00	.00	4,000.00	4,000.00	.0
703-37030-33180	Miscellaneous Refund/Reimb	150.00	300.00	2,500.00	2,200.00	12.0
703-37030-33190	Insurance Dividend	.00	.00	2,500.00	2,500.00	.0
703-37030-33501	Residential Revenue	67,578.93	222,002.81	965,000.00	742,997.19	23.0
703-37030-33502	Commercial Revenue	26,140.10	78,196.61	335,000.00	256,803.39	23.3
703-37030-33503	Industrial Revenue	18,093.83	50,224.81	295,000.00	244,775.19	17.0
703-37030-33507	Penalty	1,016.55	3,226.37	7,500.00	4,273.63	43.0
703-37030-33510	Internal Use Chargebacks	95.94	258.28	3,400.00	3,141.72	7.6
703-37030-33724	Tapping & Connection Fees	2,510.00	10,030.00	35,000.00	24,970.00	28.7
	Total SEWER REVENUES	115,585.35	364,238.88	1,649,900.00	1,285,661.12	22.1
	Total Fund Revenue	115,585.35	364,238.88	1,649,900.00	1,285,661.12	22.1

Sewer Fund

		Period Actual	YTD Actual	Budget	Unexpended	Pcnt
	WASTE WATER TREATMENT PLANT					
703-43500-210	Treatment Operating Supplies	2,127.74	2,726.93	30,000.00	27,273.07	9.1
703-43500-230	Treatment Tools/Equip	33.99	33.99	2,500.00	2,466.01	1.4
703-43500-300	Treatment Professional Svcs	.00	3,012.82	20,000.00	16,987.18	15.1
703-43500-310	Treatment Communication	188.44	458.80	3,000.00	2,541.20	15.3
703-43500-320	Treatment Travel, Conf, School	250.00	250.00	2,500.00	2,250.00	10.0
703-43500-360	Treatment Utilities	13,204.52	39,393.64	165,000.00	125,606.36	23.9
703-43500-370	Treatment Maint/Repair	8,996.83	11,816.94	65,000.00	53,183.06	18.2
703-43500-390	Treatment Contractual	31,819.70	86,802.96	278,000.00	191,197.04	31.2
	Total WASTE WATER TREATMENT PLANT	56,621.22	144,496.08	566,000.00	421,503.92	25.5
	SEWER ADMINISTRATION					
703-43920-100	Sewer Admin Salaries-Regular	17,341.96	57,384.25	287,050.00	229,665.75	20.0
703-43920-110	Sewer Admin Salaries-Overtime	1,821.52	5,619.82	20,000.00	14,380.18	28.1
703-43920-130	Sewer Admin Salaries-On Call	913.30	2,837.78	9,250.00	6,412.22	30.7
703-43920-140	Sewer Admin PERA	1,505.70	4,937.95	23,825.00	18,887.05	20.7
703-43920-150	Sewer Admin FICA	1,394.53	4,612.94	24,275.00	19,662.06	19.0
703-43920-160	Sewer Admin Group Health Ins	3,657.74	10,972.81	61,925.00	50,952.19	17.7
703-43920-170	Sewer Admin Longevity	.00	.00	1,628.00	1,628.00	.0
703-43920-210	Sewer Admin Operating Supplies	698.14	2,191.13	12,000.00	9,808.87	18.3
703-43920-230	Sewer Admin Tools/Equip	.00	299.22	2,500.00	2,200.78	12.0
703-43920-300	Sewer Admin Professional Svcs	17.00	47.90	13,000.00	12,952.10	.4
703-43920-310	Sewer Admin Communication	176.05	644.23	6,500.00	5,855.77	9.9
703-43920-320	Sewer Admin Travel, Conf, Sch	.00	133.33	3,500.00	3,366.67	3.8
703-43920-340	Sewer Admin Printing/Publish	43.75	43.75	500.00	456.25	8.8
703-43920-360	Sewer Admin Utilities	1,513.33	4,511.38	18,500.00	13,988.62	24.4
703-43920-370	Sewer Admin Maint/Repair	6,803.97	8,434.21	70,000.00	61,565.79	12.1
703-43920-381	Sewer Admin Allocation	.00	.00	60,000.00	60,000.00	.0
703-43920-390	Sewer Admin Contractual	900.63	8,450.37	26,000.00	17,549.63	32.5
703-43920-410	Sewer Admin Workers Comp Ins	4,962.00	4,962.00	9,200.00	4,238.00	53.9
703-43920-420	Sewer Admin Vehicle Insurance	.00	.00	1,250.00	1,250.00	.0
703-43920-430	Sewer Admin General Liability	.00	.00	37,250.00	37,250.00	.0
703-43920-530	Sewer Capital-Machin/Equip	5,453.44	13,171.06	85,582.90	72,411.84	15.4
703-43920-601	Debt Service-Principal Payment	.00	.00	33,250.00	33,250.00	.0
703-43920-610	Debt Service-Interest	.00	.00	5,550.00	5,550.00	.0
703-43920-703	Transfers Out	.00	4,000.00	119,000.00	115,000.00	3.4
	Total SEWER ADMINISTRATION	47,203.06	133,254.13	931,535.90	798,281.77	14.3
	Total Fund Expenditures	103,824.28	277,750.21	1,497,535.90	1,219,785.69	18.6
	Net Revenue Over Expenditures	11,761.07	86,488.67	152,364.10	65,875.43	56.8

CITY OF LAKE CITY

Storm Water Fund
Balance Sheet
March 31, 2024

ASSETS

706-11010	Cash & Investments		206,876.63	
706-11150	Special Assessments-Current		133.70	
706-11170	Special Assessments-Deferred		5,470.49	
706-11190	Accounts Receivable		23,435.63	
706-11450	Prepaid Insurance		1,087.29	
706-11610	Capital-Land		97,400.00	
706-11618	Capital-Dist/Collect Systems		2,920,687.98	
706-11642	Capital-Machinery/Equipment		360,637.84	
706-11661	Accumulated Depreciation		(1,831,532.80)	
706-18600	Deferred Pension Outflows		4,627.00	
	Total Assets			1,788,823.76

LIABILITIES AND EQUITY

LIABILITIES

706-22040	Accounts Payable		70.92	
706-22210	Due to Other Funds		20,000.00	
706-22250	Bonds Payable-Current		45,000.00	
706-22260	Accrued Interest Payable		2,155.50	
706-22350	Bonds Payable-Non Current		312,000.00	
706-22351	Discount on Bonds		(1,448.00)	
706-22352	Premium on Bonds		14,600.15	
706-22835	Net Pension Liability		11,232.00	
706-25300	Deferred Pension Inflows		4,043.00	
	Total Liabilities			407,653.57

FUND EQUITY

706-22602	Assigned Fund Balance		113,725.00	
706-26100	Net Invest in Capital Assets		1,177,040.87	
	Unappropriated Fund Balance:			
706-22600	Unrestricted Net Position	98,205.46		
	Revenue over Expenditures - YTD	(7,801.14)		
	Balance - Current Date		90,404.32	
	Total Fund Equity			1,381,170.19
	Total Liabilities and Equity			1,788,823.76

CITY OF LAKE CITY
Revenues with Comparison to Budget
For the 3 Months Ending March 31, 2024

Storm Water Fund

		Period Actual	YTD Actual	Budget	Unearned	Pcnt
	STORM WATER REVENUES					
706-37060-33018	Special Assessments-Current	.00	.00	1,000.00	1,000.00	.0
706-37060-33130	Interest on Investments	.00	.00	500.00	500.00	.0
706-37060-33190	Insurance Dividend	.00	.00	100.00	100.00	.0
706-37060-33507	Penalty	162.19	493.79	1,250.00	756.21	39.5
706-37060-33721	Collections from Billing	19,222.11	57,581.47	250,000.00	192,418.53	23.0
	Total STORM WATER REVENUES	19,384.30	58,075.26	252,850.00	194,774.74	23.0
	Total Fund Revenue	19,384.30	58,075.26	252,850.00	194,774.74	23.0

Storm Water Fund

		Period Actual	YTD Actual	Budget	Unexpended	Pcnt
	STORM WATER EXPENDITURES					
706-47706-100	Storm Water Salaries-Regular	251.29	251.29	18,500.00	18,248.71	1.4
706-47706-140	Storm Water PERA	18.84	18.84	1,400.00	1,381.16	1.4
706-47706-150	Storm Water FICA	17.56	17.56	1,450.00	1,432.44	1.2
706-47706-160	Storm Water Group Health Ins	3.23	3.23	3,850.00	3,846.77	.1
706-47706-210	Storm Water Operating Supplies	410.98	784.24	8,000.00	7,215.76	9.8
706-47706-220	Storm Water Maint/Repair	141.10	2,249.43	13,000.00	10,750.57	17.3
706-47706-230	Storm Water Tools/Equip	.00	.00	700.00	700.00	.0
706-47706-300	Storm Water Professional Svcs	405.00	435.90	11,000.00	10,564.10	4.0
706-47706-320	Storm Water Travel, Conf, Sch	.00	863.34	1,000.00	136.66	86.3
706-47706-340	Storm Water Printing/Publish	.00	.00	150.00	150.00	.0
706-47706-381	Storm Water Admin Allocation	.00	.00	5,000.00	5,000.00	.0
706-47706-390	Storm Water Contractual	6,250.14	13,101.63	65,000.00	51,898.37	20.2
706-47706-420	Storm Water Vehicle Insurance	.00	.00	600.00	600.00	.0
706-47706-430	Storm Water General Liability	.00	.00	1,000.00	1,000.00	.0
706-47706-500	Storm Water Capital-Land	453.00	565.00	14,750.00	14,185.00	3.8
706-47706-601	Debt Service-Principal Payment	.00	45,000.00	73,575.00	28,575.00	61.2
706-47706-610	Debt Service-Interest Payment	.00	2,585.94	10,150.00	7,564.06	25.5
706-47706-620	Debt Service-Paying Agent Fee	.00	.00	250.00	250.00	.0
706-47706-700	Repayment of Prior Yr Advance	.00	.00	10,000.00	10,000.00	.0
	Total STORM WATER EXPENDITURES	7,951.14	65,876.40	239,375.00	173,498.60	27.5
	Total Fund Expenditures	7,951.14	65,876.40	239,375.00	173,498.60	27.5
	Net Revenue Over Expenditures	11,433.16	(7,801.14)	13,475.00	21,276.14	(57.9)

CITY OF LAKE CITY

Garbage Fund
Balance Sheet
March 31, 2024

ASSETS

720-11010	Cash & Investments		218,741.33	
720-11140	Special Assessments-Current		124.19	
720-11190	Accounts Receivable		15,790.03	
720-11450	Prepaid Insurance		506.13	
720-18600	Deferred Pension Outflows		3,581.00	
	Total Assets			238,742.68

LIABILITIES AND EQUITY

LIABILITIES

720-22326	Sales Tax Payable		557.72	
720-22835	Net Pension Liability		11,591.00	
720-25300	Deferred Pension Inflows		4,341.00	
	Total Liabilities			16,489.72

FUND EQUITY

Unappropriated Fund Balance:

720-22600	Unrestricted Net Position	186,765.15		
	Revenue over Expenditures - YTD	35,487.81		
	Balance - Current Date		222,252.96	
	Total Fund Equity			222,252.96
	Total Liabilities and Equity			238,742.68

CITY OF LAKE CITY
Revenues with Comparison to Budget
For the 3 Months Ending March 31, 2024

Garbage Fund

		Period Actual	YTD Actual	Budget	Unearned	Pcnt
	GARBAGE REVENUES					
720-37200-33180	Miscellaneous Refund/Reimb	.00	.00	5,000.00	5,000.00	.0
720-37200-33720	Bag Stickers	34.75	69.50	.00	(69.50)	.0
720-37200-33722	Compost/Leaf Vac	6,201.72	18,630.36	77,000.00	58,369.64	24.2
720-37200-33723	Clean Up Days	5,468.60	16,428.02	65,000.00	48,571.98	25.3
720-37200-33725	Compost Site Permits	.00	.00	8,500.00	8,500.00	.0
	Total GARBAGE REVENUES	11,705.07	35,127.88	155,500.00	120,372.12	22.6
	Total Fund Revenue	11,705.07	35,127.88	155,500.00	120,372.12	22.6

Garbage Fund

		Period Actual	YTD Actual	Budget	Unexpended	Pcnt
	CLEAN UP					
720-47500-210	Clean Up Day Operating Supplie	.00	.00	500.00	500.00	.0
720-47500-220	Clean Up Day Maint/Repair	.00	.00	250.00	250.00	.0
720-47500-340	Clean Up Day Printing/Publish	.00	.00	2,500.00	2,500.00	.0
720-47500-390	Clean Up Day Contractual	.00	.00	37,500.00	37,500.00	.0
	Total CLEAN UP	.00	.00	40,750.00	40,750.00	.0
	COMPOST					
720-47720-100	Compost/Leaf Vac-Salaries Reg	.00	317.24	15,000.00	14,682.76	2.1
720-47720-140	Compost/Leaf Vac PERA	.00	.00	1,200.00	1,200.00	.0
720-47720-150	Compost/Leaf Vac FICA	.00	23.56	1,150.00	1,126.44	2.1
720-47720-160	Compost/Leaf Vac Group Health	.00	6.25	1,000.00	993.75	.6
720-47720-210	Compost/Leaf Vac Operating Sup	.00	15.62	2,500.00	2,484.38	.6
720-47720-220	Compost/Leaf Vac Maint/Repair	.00	.00	3,500.00	3,500.00	.0
720-47720-230	Compost/Leaf Vac Small Tools	.00	.00	50.00	50.00	.0
720-47720-340	Compost/Leaf Vac Print/Publish	.00	.00	800.00	800.00	.0
720-47720-360	Compost/Leaf Vac Utilities	.00	23.40	500.00	476.60	4.7
720-47720-381	Compost/Leaf Vac Admin Allocat	.00	.00	10,000.00	10,000.00	.0
720-47720-390	Compost/Leaf Vac Contractual	.00	.00	20,000.00	20,000.00	.0
720-47720-410	Compost/Leaf Vac Work Comp Ins	(746.00)	(746.00)	1,450.00	2,196.00	(51.5)
720-47720-430	Compost/Leaf Vac Gen Liability	.00	.00	500.00	500.00	.0
	Total COMPOST	(746.00)	(359.93)	57,650.00	58,009.93	(.6)
	Total Fund Expenditures	(746.00)	(359.93)	98,400.00	98,759.93	(.4)
	Net Revenue Over Expenditures	12,451.07	35,487.81	57,100.00	21,612.19	62.2

CITY OF LAKE CITY

REQUEST FOR

Utility Board Meeting, April 17, 2024

Agenda Item Description: DGR Electric System Study Update

Meeting: Utility Board Meeting, 4/17/2024

Originating Department: Utility

Action Requested:
Staff update on the system study.

Background:
Public Works staff met with DGR staff members Dan Messner and Chad Rasmussen to walk through the draft study results on Thursday, April 4, 2024. This meeting was very valuable to city staff regarding priority improvements and assistance with current challenges.

Budgetary/Fiscal Impact:
Priority projects and improvements will be taken from the system deficiencies document attached. Staff will present information on a few known needs that DGR staff assisted us with to identify solutions.

Reviewed By: Public Works

Preparer: Public Works Director Scott Jensen

ATTACHMENTS:

Description

- **Load Analysis**
- **System Deficiencies**

Table of Contents
- City of Lake City - Lake City, MN
- DGR Project No.: 429301

DGR ENGINEERING

Scenario Legend

Scenario	Existing System & Loading
0	System Intact - Peak Loading
1	Loss of Underwood Transformer
2	Loss of 10th St T1 Transformer
3	Loss of 10th St T2 Transformer
4	Loss of 10th St East Bus
5	Loss of 10th St West Bus
6	Loss of Jewel 4.16 kV Transformer
7	Loss of Lakeside 4.16 kV Transformer
8	Loss of 8th St. 4.16 kV Transformer
9	Loss fo Old Shop 4.16 kV Transformer
10	Loss of W1 Fed from E3
11	Loss of E3 Fed from W1

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

0	Scenario Selection
System Intact - Peak Loading	

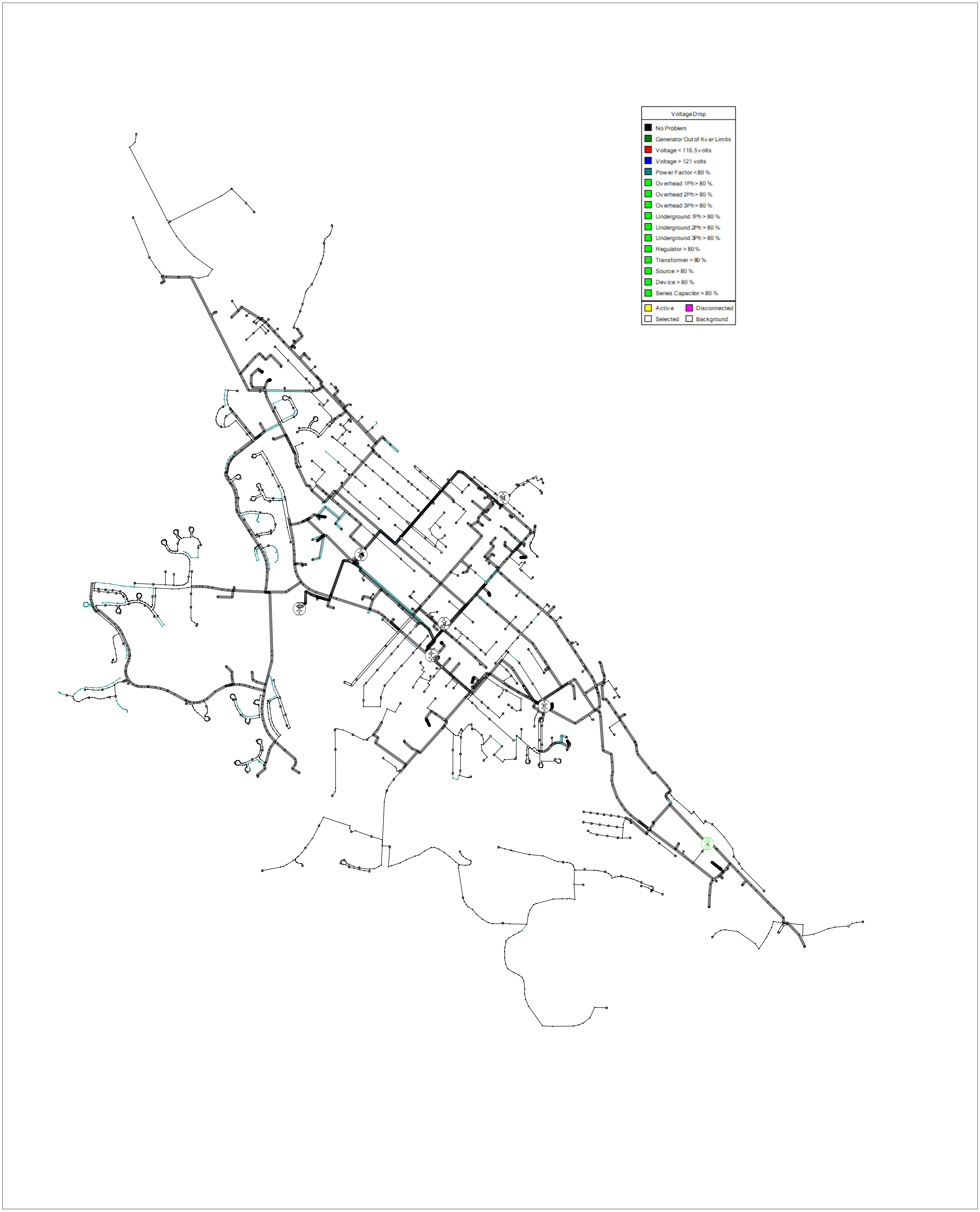
System Analysis Configuration

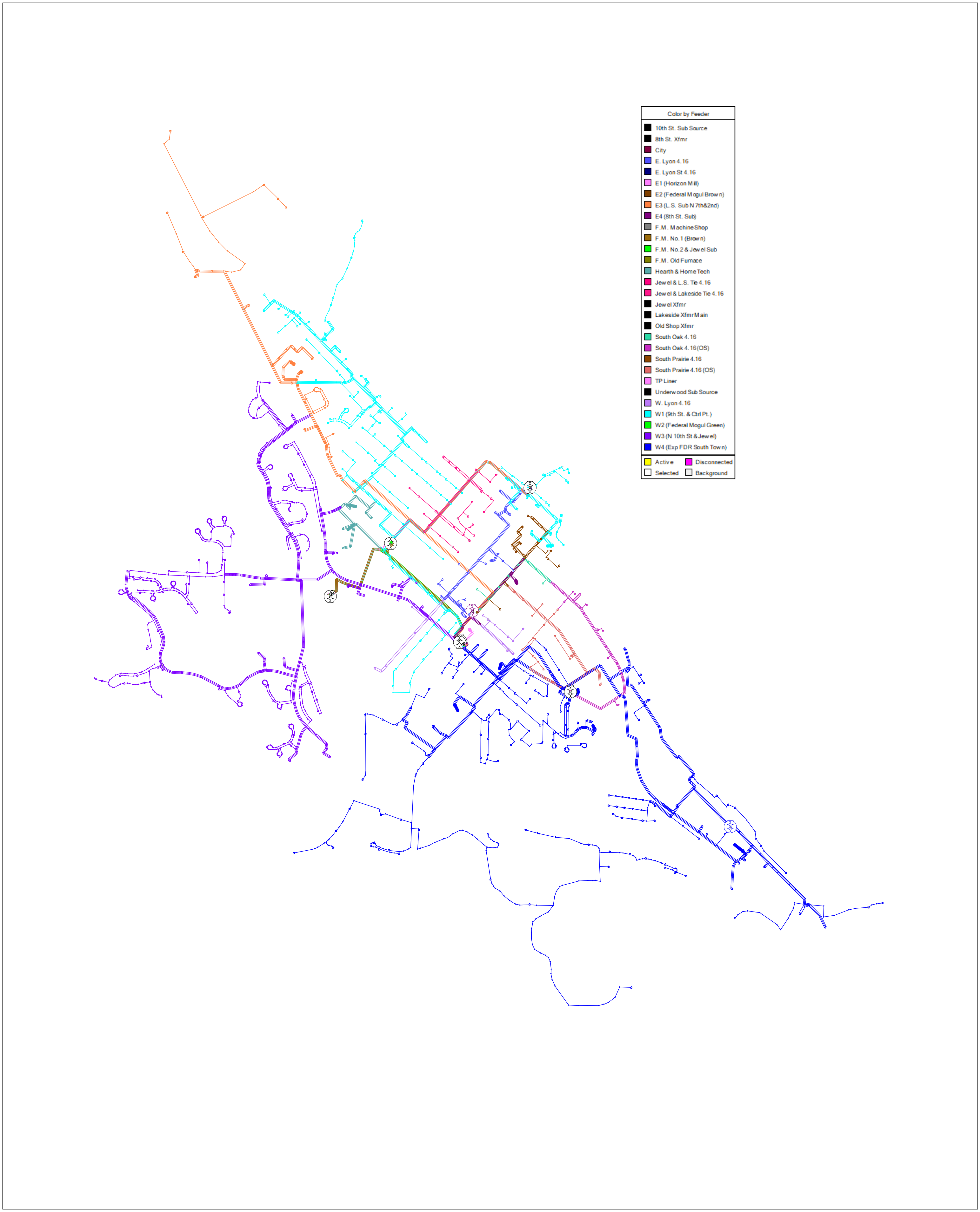
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
0	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
0	10th St. Sub T1	15,000	28,000	10th St. Sub T1	277	277	277	0.73	0.65	0.64	5,947	5,788	1,366	97.3%
0	10th St. Sub T2	15,000	28,000	10th St. Sub T2	375	375	375	2.55	2.39	2.37	8,100	8,020	1,134	99.0%
0	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
0	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.26	1.22	1,072	1,061	150	99.0%
0	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
0	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.96	586	577	103	98.4%
				TOTALS	1382	1382	1382	2.55	2.39	2.37	22,566	21,570	6,628	94.9%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
0	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
0	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
0	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
0	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
0	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
0	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
0	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
0	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	59	59	59	0.73	0.65	0.64	1,265	1,252	179	99.00%
0	E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.12	0.12	0.12	1,615	1,600	225	99.03%
0	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.15	1.09	1.07	3,168	3,137	448	99.00%
0	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
0	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.64	1,253	1,241	177	99.00%
0	W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.37	3,678	3,643	509	99.04%
0	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	0	100.00%
0	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
0	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	(0)	100.00%
0	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
0	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
0	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.26	1.22	587	581	82	99.02%
0	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
0	South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
0	South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.66	277	274	39	98.99%
0	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.96	314	309	56	98.39%
0	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.23	1.12	1.08	272	268	47	98.48%


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background

System Analysis Configuration

Existing System & Loading

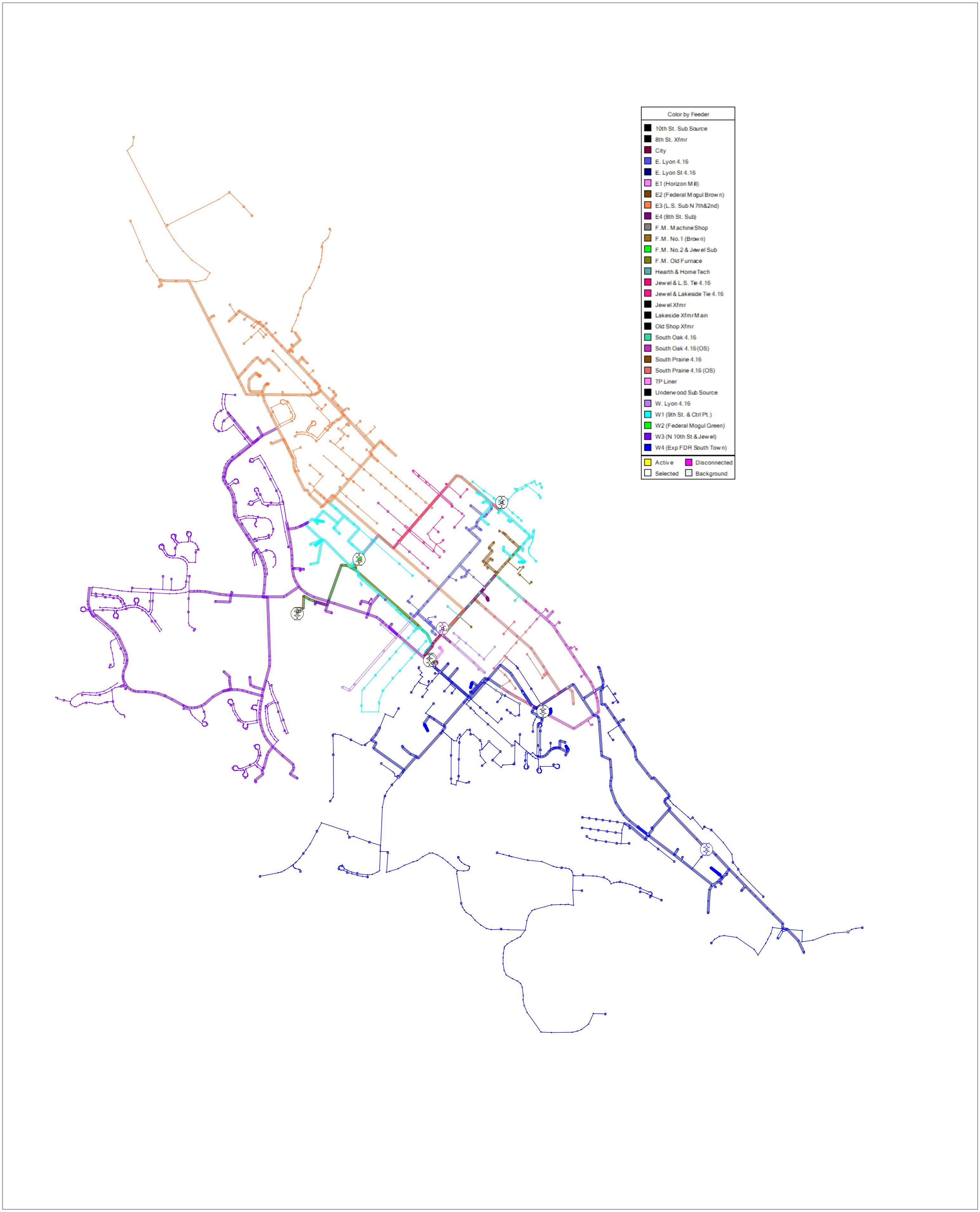
80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

1	Scenario Selection
Loss of Underwood Transformer	

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
1	Underwood T1	15,000	28,000	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1	10th St. Sub T1	15,000	28,000	10th St. Sub T1	450	450	450	1.78	1.71	1.71	9,558	9,151	2,762	95.7%
1	10th St. Sub T2	15,000	28,000	10th St. Sub T2	611	611	611	2.56	2.40	2.37	13,080	12,483	3,908	95.4%
1	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
1	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.25	1.22	1,072	1,061	150	99.0%
1	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
1	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.18	2.06	1.97	586	577	103	98.4%
				TOTALS	1381	1381	1381	2.56	2.40	2.37	22,638	21,633	6,670	95.9%

				Phase Amps			Max V Drop						
Scenario		Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
1		F.M. No.1 (Brown)	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1		TP Liner	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1		F.M. No.2 & Jewel Sub	**Underwood Sub T1**	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1		Hearth & Home Tech	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1		City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
1		E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
1		E2 (Federal Mogul Brown)	10th St. Sub T1	99	99	99	0.29	0.29	0.29	2,119	1,772	1,162	83.62%
1		E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	133	133	133	1.78	1.71	1.71	2,873	2,843	412	98.97%
1		E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.13	0.13	0.13	1,615	1,600	225	99.03%
1		W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	353	353	353	1.78	1.75	1.75	7,624	6,978	3,071	91.53%
1		W2 (Federal Mogul Green)	10th St. Sub T2	30	30	30	0.10	0.09	0.09	639	622	151	97.19%
1		W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.95	0.65	0.64	1,253	1,241	177	99.00%
1		W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.56	2.40	2.37	3,678	3,643	509	99.04%
1		F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	0.00	0.00	115	115	(0)	100.00%
1		Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
1		F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	0.00	0.00	240	240	(0)	100.00%
1		E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
1		Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
1		E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.25	1.22	587	581	82	99.02%
1		W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
1		South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
1		South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.65	277	274	39	98.99%
1		South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.18	2.06	1.97	314	309	56	98.39%
1		South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.24	1.13	1.09	272	268	47	98.48%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16(OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

2	Scenario Selection
Loss of 10th St T1 Transformer	

System Analysis Configuration

Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
2	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
2	10th St. Sub T1	15,000	28,000	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
2	10th St. Sub T2	15,000	28,000	10th St. Sub T2	652	652	652	2.55	2.39	2.37	14,033	13,808	2,500	98.4%
2	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
2	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.25	1.22	1,072	1,061	150	99.0%
2	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	0	100.0%
2	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.96	586	577	103	98.4%
				TOTALS	1382	1382	1382	2.55	2.39	2.37	22,566	21,570	6,629	94.9%

		Phase Amps			Max V Drop							
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
2	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
2	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
2	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
2	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,579	2,018	87.1%
2	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
2	E1 (Horizon Mill)	10th St. Sub T2	143	143	143	0.11	0.11	0.10	3,090	2,936	963	95.0%
2	E2 (Federal Mogul Brown)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
2	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T2**	59	59	59	0.74	0.66	0.65	1,265	1,252	179	99.00%
2	E4 (8th St. Sub)	**10th St. Sub T2**	75	75	75	0.13	0.13	0.13	1,615	1,600	225	99.03%
2	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.15	1.09	1.07	3,168	3,137	448	99.00%
2	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
2	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.64	1,253	1,241	177	99.00%
2	W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.37	3,678	3,643	509	99.04%
2	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	0.00	-0.01	115	115	0	100.00%
2	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
2	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	0.00	-0.01	240	240	0	100.00%
2	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
2	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
2	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.25	1.22	587	581	82	99.02%
2	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.14	153	151	21	99.01%
2	South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
2	South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.65	277	274	39	98.99%
2	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.96	314	309	56	98.39%
2	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.23	1.12	1.08	272	268	47	98.48%

- City of Lake City - Lake City, MN
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3	Scenario Selection
Loss of 10th St T2 Transformer	

System Analysis Configuration

Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
3	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
3	10th St. Sub T1	15,000	28,000	10th St. Sub T1	652	652	652	2.57	2.40	2.37	14,033	13,808	2,500	98.4%
3	10th St. Sub T2	15,000	28,000	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
3	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
3	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.26	1.22	1,072	1,061	150	99.0%
3	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
3	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.18	2.06	1.97	586	577	103	98.4%
				TOTALS	1382	1382	1382	2.57	2.40	2.37	22,566	21,570	6,628	94.9%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
3	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
3	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
3	F.M. No.2 & Jewel Sub	Underwood Sub T1	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
3	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
3	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
3	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
3	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
3	E3 (L.S. Sub N 7th&2nd)	10th St. Sub T1	59	59	59	0.73	0.65	0.64	1,265	1,252	179	99.00%
3	E4 (8th St. Sub)	10th St. Sub T1	75	75	75	0.12	0.12	0.12	1,615	1,600	225	99.03%
3	W1 (9th St. & Ctrl Pt.)	10th St. Sub T1	147	147	147	1.17	1.10	1.08	3,169	3,137	448	99.00%
3	W2 (Federal Mogul Green)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
3	W3 (N 10th St & Jewel)	10th St. Sub T1	58	58	58	0.96	0.65	0.65	1,253	1,241	177	99.00%
3	W4 (Exp FDR South Town)	10th St. Sub T1	170	170	170	2.57	2.40	2.37	3,678	3,643	509	99.04%
3	F.M. Machine Shop	Jewel Sub 4.16	16	16	16	0.00	0.00	-0.01	115	115	(0)	100.00%
3	Jewel & L.S. Tie 4.16	Jewel Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
3	F.M. Old Furnace	Jewel Sub 4.16	33	33	33	0.00	0.00	-0.01	240	240	(0)	100.00%
3	E. Lyon St 4.16	Lakeside Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
3	Jewel & Lakeside Tie 4.16	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.15%
3	E. Lyon 4.16	8th St. Sub 4.16	81	81	81	1.28	1.26	1.22	587	581	82	99.02%
3	W. Lyon 4.16	8th St. Sub 4.16	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
3	South Oak 4.16	8th St. Sub 4.16	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
3	South Prairie 4.16	8th St. Sub 4.16	38	38	38	0.82	0.70	0.66	277	274	39	98.99%
3	South Oak 4.16 (OS)	Old Shop Sub 4.16	44	44	44	2.18	2.06	1.97	314	309	56	98.39%
3	South Prairie 4.16 (OS)	Old Shop Sub 4.16	38	38	38	1.25	1.14	1.09	272	268	47	98.48%

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

4	Scenario Selection
Loss of 10th St East Bus	

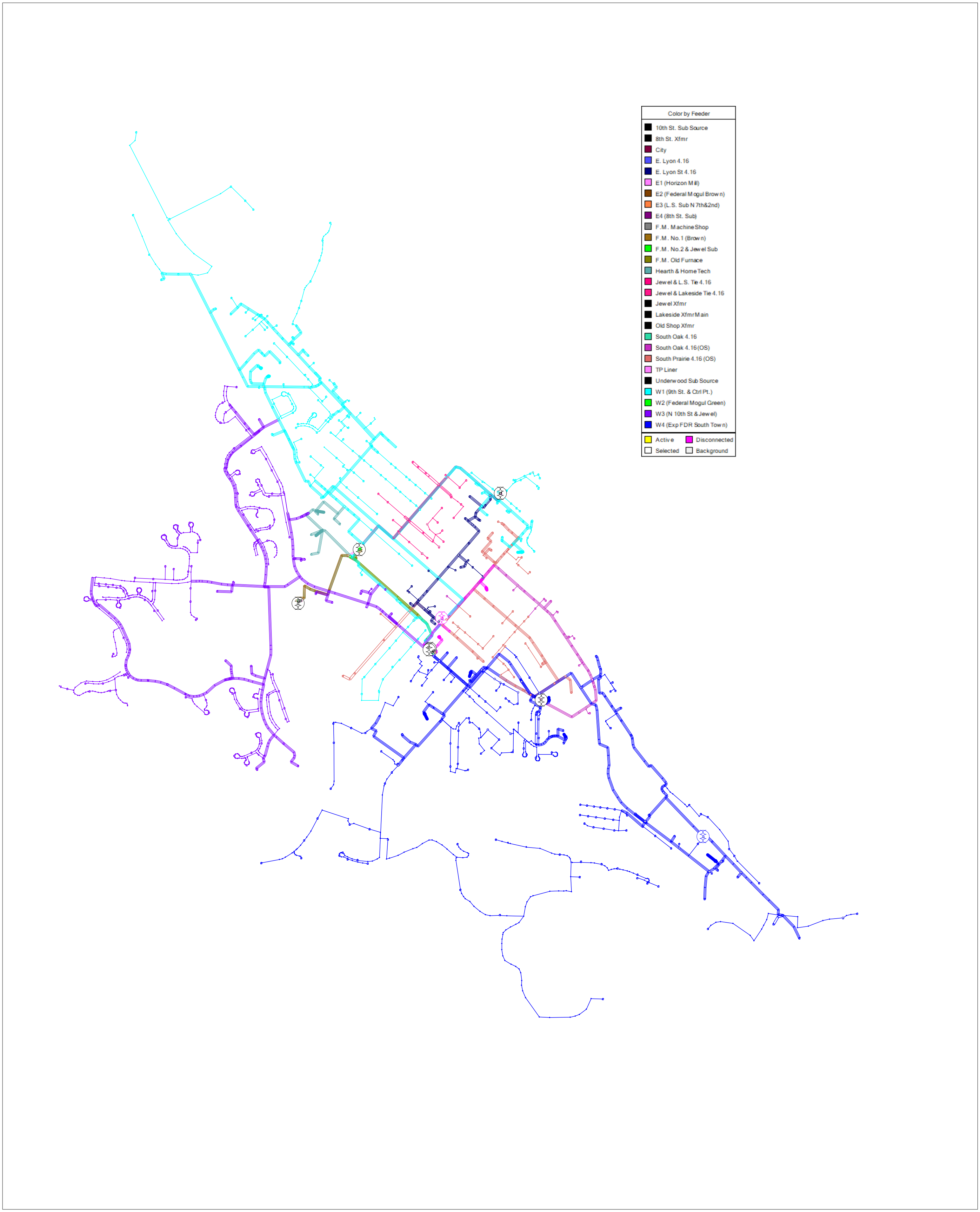
System Analysis Configuration

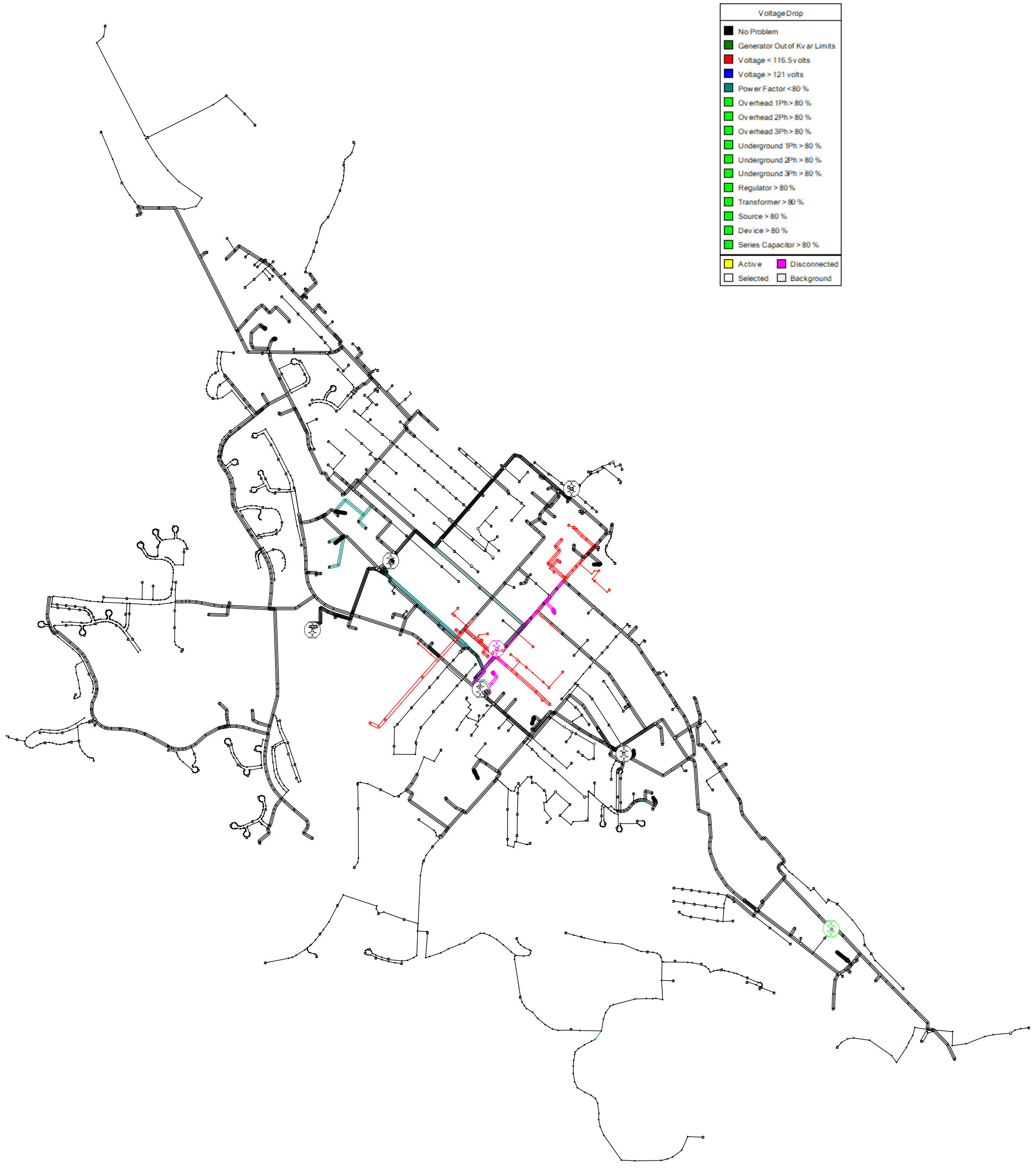
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
4	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
4	10th St. Sub T1	15,000	28,000	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
4	10th St. Sub T2	15,000	28,000	10th St. Sub T2	487	487	487	2.86	2.81	2.78	10,522	10,408	1,551	98.9%
4	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	123	123	123	3.90	3.74	3.56	886	875	145	98.7%
4	8th St. Sub	5,000	6,250	8th St. Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
4	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
4	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	152	152	152	4.24	3.98	3.78	1,082	1,067	181	98.6%
				TOTALS	1222	1222	1222	4.24	3.98	3.78	19,036	18,170	5,679	94.6%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
4	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
4	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
4	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
4	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
4	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
4	E1 (Horizon Mill)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
4	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	E4 (8th St. Sub)	**10th St. Sub T1**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	236	236	236	2.86	2.81	2.78	5,088	5,030	765	98.86%
4	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.95	0.64	0.64	1,253	1,241	177	99.00%
4	W4 (Exp FDR South Town)	**10th St. Sub T2**	194	194	194	2.56	2.39	2.37	4,182	4,137	609	98.94%
4	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	(0)	100.00%
4	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	(0)	100.00%
4	E. Lyon St 4.16	**Lakeside Sub 4.16**	83	83	83	3.90	3.74	3.56	599	593	90	98.87%
4	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.48	0.14	287	282	55	98.14%
4	E. Lyon 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	W. Lyon 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	South Oak 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	South Prairie 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
4	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	52	52	52	3.18	3.03	2.90	371	365	65	98.45%
4	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	100	100	100	4.24	3.98	3.78	711	702	116	98.66%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
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5	Scenario Selection
Loss of 10th St West Bus	

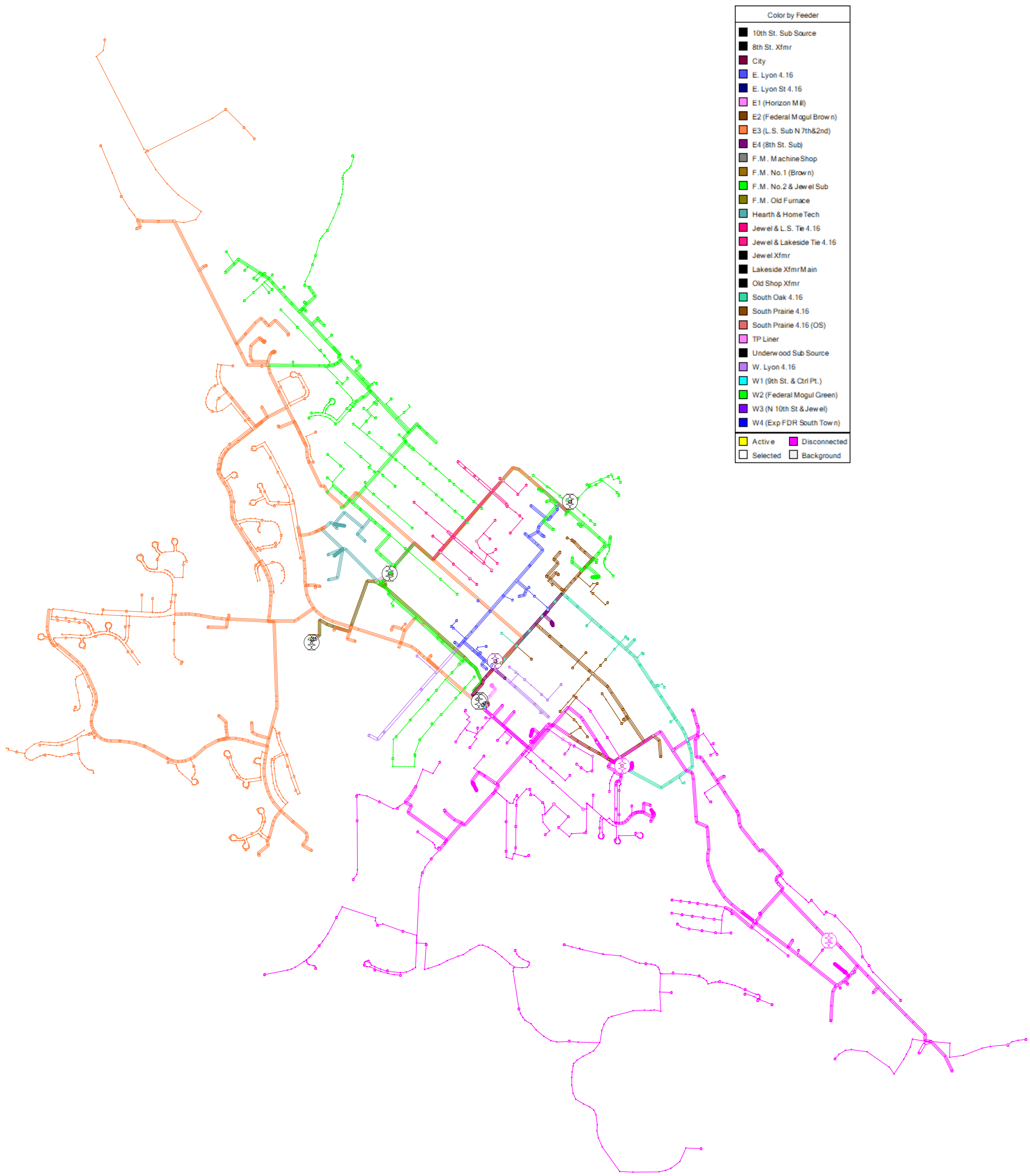
System Analysis Configuration

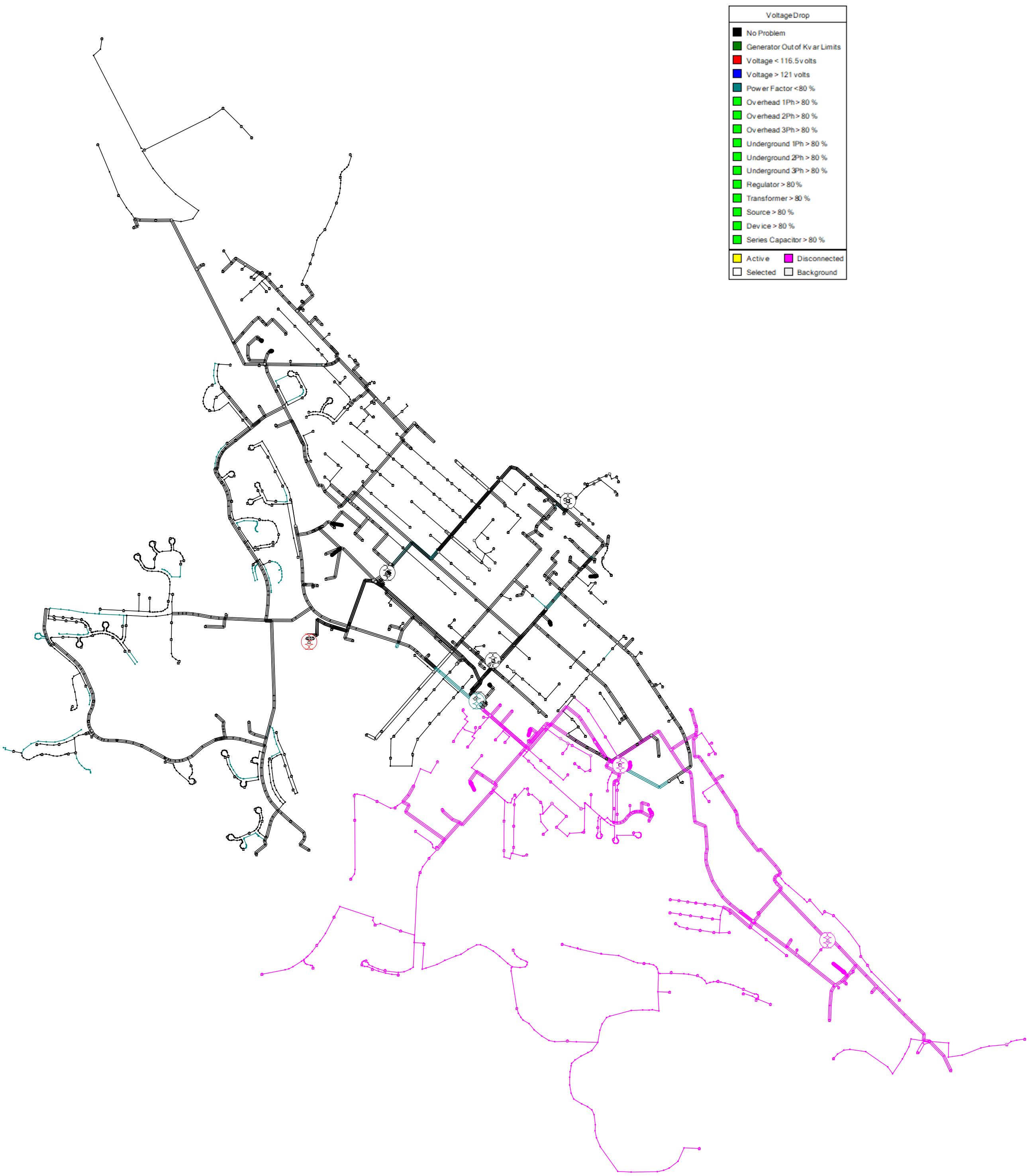
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
5	Underwood T1	15,000	28,000	Underwood Sub T1	557	557	557	0.95	0.88	0.86	11,817	10,895	4,576	92.2%
5	10th St. Sub T1	15,000	28,000	10th St. Sub T1	363	363	363	1.78	1.73	1.73	7,807	7,624	1,682	97.7%
5	10th St. Sub T2	15,000	28,000	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
5	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
5	8th St. Sub	5,000	6,250	8th St. Sub 4.16	230	230	230	1.71	1.42	1.33	1,660	1,640	257	98.8%
5	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	0	100.0%
5	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
				TOTALS	1239	1239	1239	1.78	1.73	1.73	19,548	18,519	6,258	94.8%

		Phase Amps			Max V Drop							
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
5	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.21	0.19	0.19	2,118	1,771	1,162	83.6%
5	TP Liner	Underwood Sub T1	91	91	91	0.16	0.15	0.15	1,960	1,790	798	91.3%
5	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	176	176	176	0.95	0.88	0.86	3,802	3,754	599	98.8%
5	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
5	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
5	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
5	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	117	117	117	1.78	1.73	1.73	2,535	2,508	369	98.94%
5	E4 (8th St. Sub)	**10th St. Sub T1**	102	102	102	0.13	0.13	0.13	2,208	2,180	351	98.73%
5	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	W3 (N 10th St & Jewel)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	W4 (Exp FDR South Town)	**10th St. Sub T2**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	0	100.00%
5	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	0	100.00%
5	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
5	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.29	1.26	1.22	587	581	82	99.02%
5	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
5	South Oak 4.16	**8th St. Sub 4.16**	51	51	51	1.25	1.13	1.04	369	363	65	98.45%
5	South Prairie 4.16	**8th St. Sub 4.16**	77	77	77	1.71	1.42	1.33	552	545	89	98.69%
5	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
5	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

6	Scenario Selection
Loss of Jewel 4.16 kV Transformer	

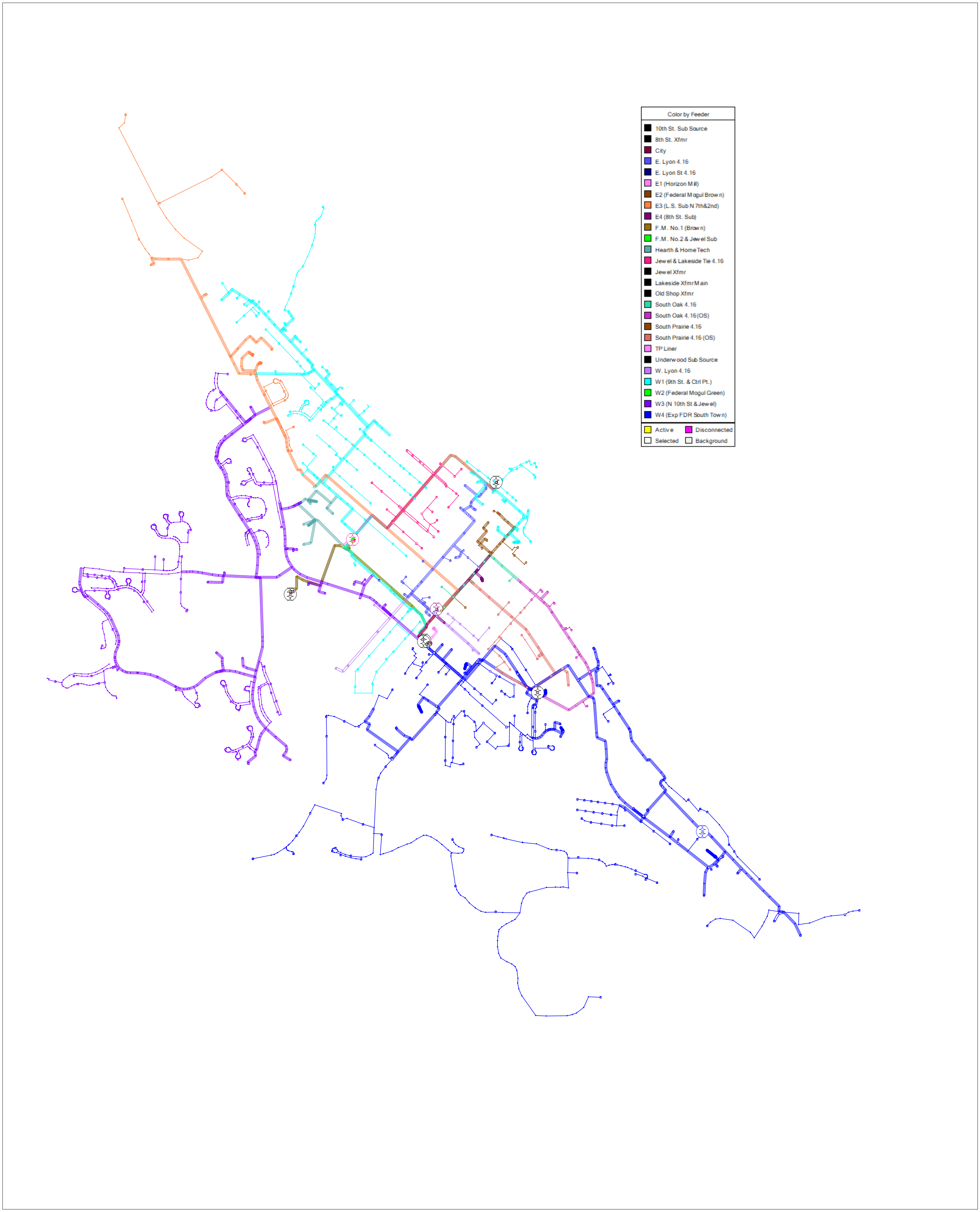
System Analysis Configuration

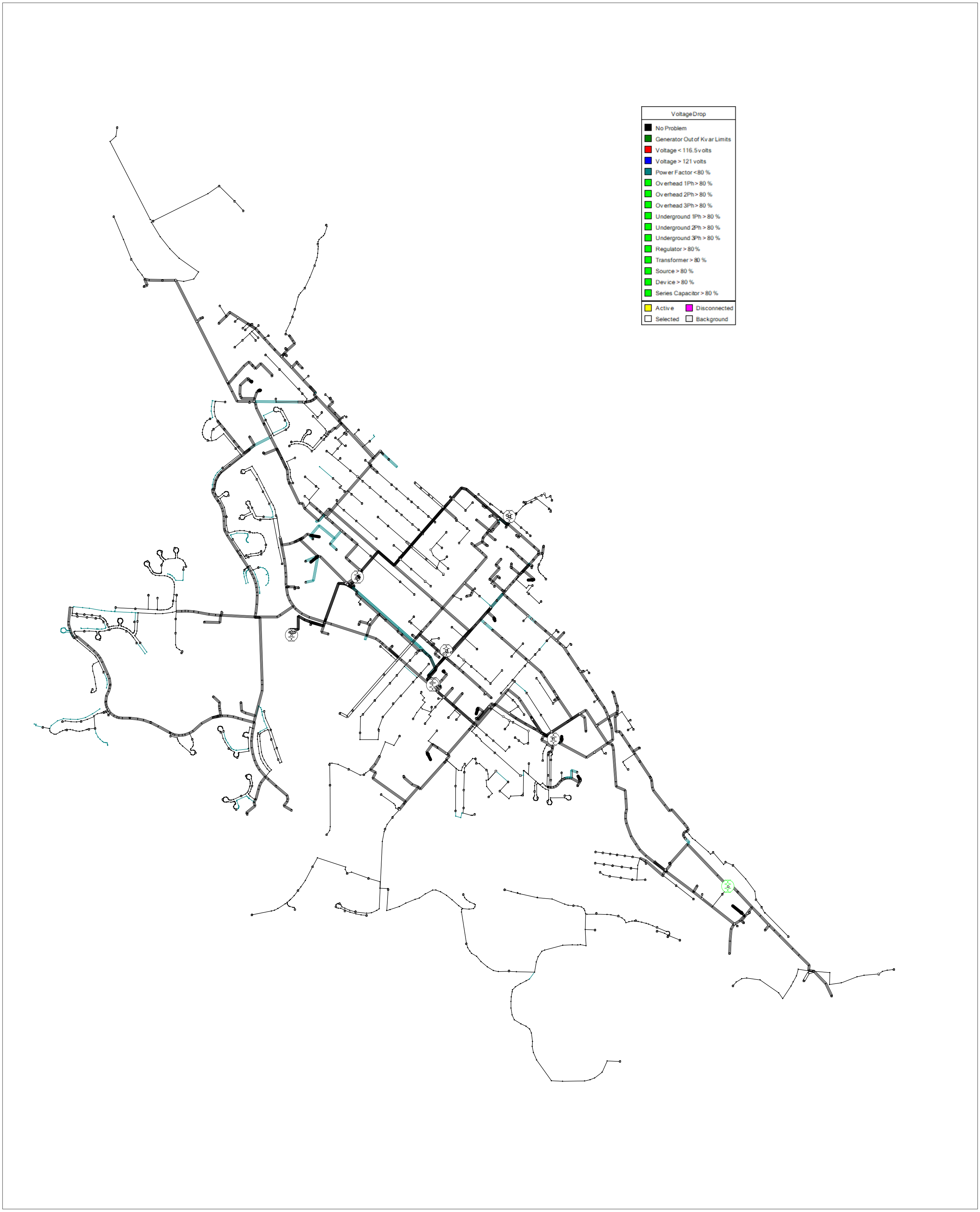
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
6	Underwood T1	15,000	28,000	Underwood Sub T1	395	395	395	0.79	0.78	0.78	8,479	7,407	4,126	87.4%
6	10th St. Sub T1	15,000	28,000	10th St. Sub T1	293	293	293	0.78	0.70	0.69	6,299	6,147	1,374	97.6%
6	10th St. Sub T2	15,000	28,000	10th St. Sub T2	375	375	375	2.55	2.39	2.37	8,100	8,020	1,134	99.0%
6	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	89	89	89	1.00	0.78	0.61	642	639	58	99.6%
6	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.26	1.22	1,072	1,061	150	99.0%
6	Jewel Sub	5,000	6,250	Jewel Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
6	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.97	586	577	103	98.4%
				TOTALS	1383	1383	1383	2.55	2.39	2.37	22,571	21,574	6,635	94.7%

				Phase Amps			Max V Drop						
Scenario		Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
6		F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
6		TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
6		F.M. No.2 & Jewel Sub	**Underwood Sub T1**	15	15	15	0.03	0.03	0.03	305	266	149	87.3%
6		Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,579	2,018	87.1%
6		City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
6		E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
6		E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	75	75	75	0.78	0.70	0.69	1,622	1,612	187	99.34%
6		E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.12	0.12	0.12	1,615	1,600	225	99.03%
6		W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.15	1.09	1.07	3,168	3,137	448	98.99%
6		W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.64	1,253	1,241	177	99.00%
6		W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.37	3,678	3,643	509	99.04%
6		F.M. Machine Shop	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		F.M. Old Furnace	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
6		Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	89	89	89	1.00	0.78	0.61	642	639	58	99.60%
6		E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.26	1.22	587	581	82	99.02%
6		W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
6		South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
6		South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.66	277	274	39	98.99%
6		South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.97	314	309	56	98.39%
6		South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.23	1.13	1.09	272	268	47	98.48%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
Hearth & Home Tech
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

7	Scenario Selection
Loss of Lakeside 4.16 kV Transformer	

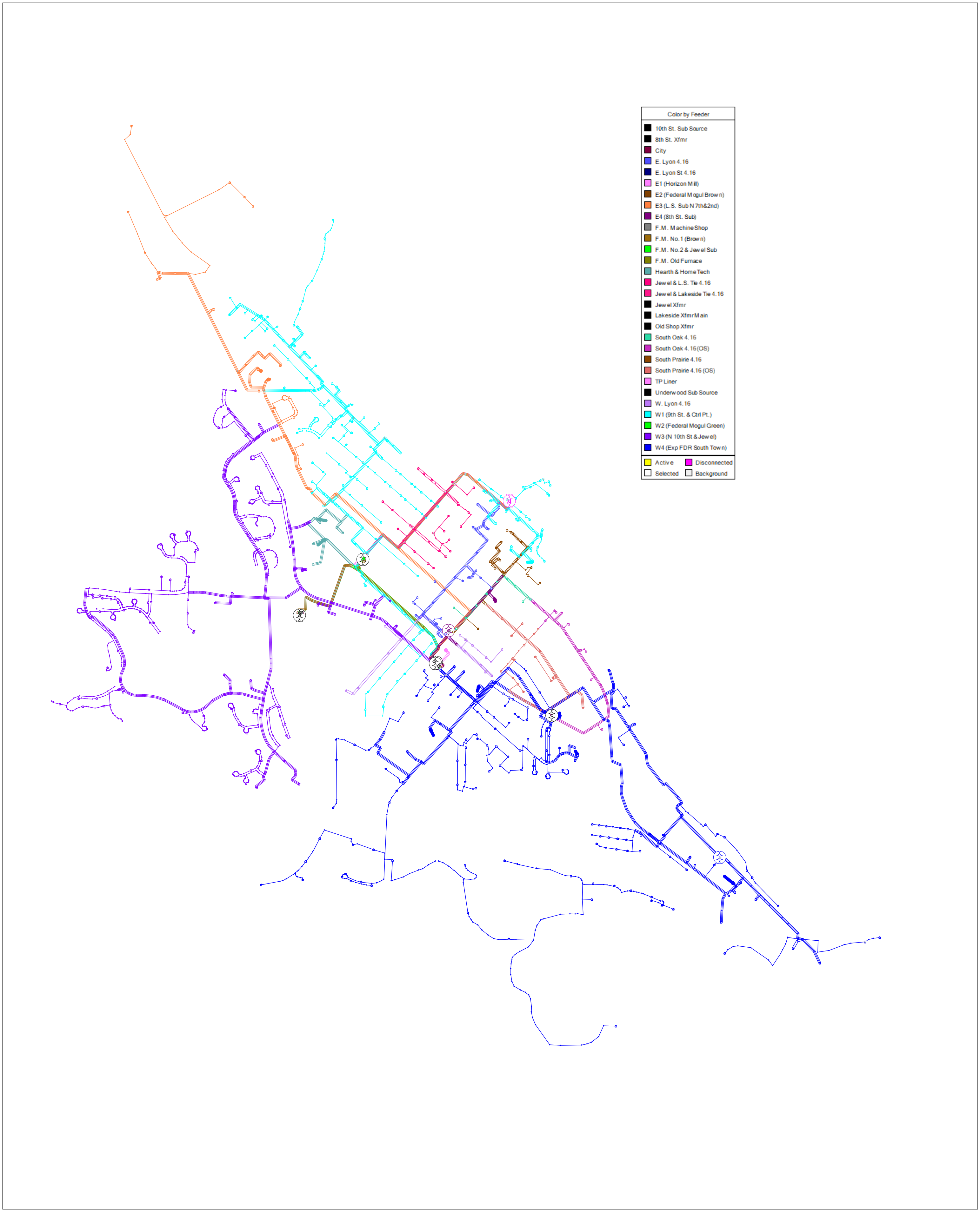
System Analysis Configuration

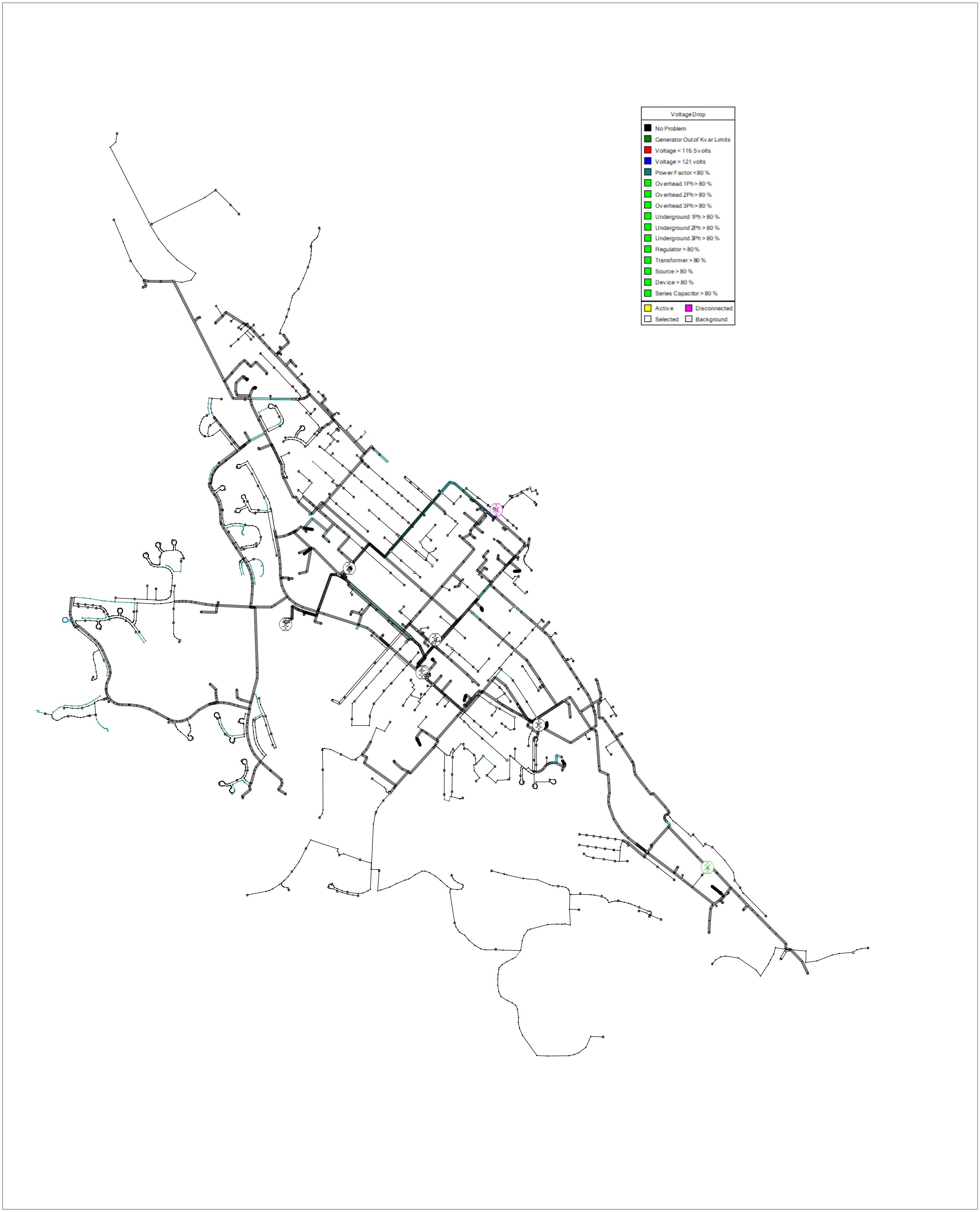
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
7	Underwood T1	15,000	28,000	Underwood Sub T1	424	424	424	0.79	0.78	0.78	9,069	8,044	4,187	88.7%
7	10th St. Sub T1	15,000	28,000	10th St. Sub T1	263	263	263	0.69	0.60	0.59	5,659	5,505	1,310	97.3%
7	10th St. Sub T2	15,000	28,000	10th St. Sub T2	375	375	375	2.55	2.39	2.37	8,100	8,020	1,134	99.0%
7	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
7	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.26	1.22	1,072	1,061	150	99.0%
7	Jewel Sub	5,000	6,250	Jewel Sub 4.16	89	89	89	0.67	0.44	0.20	642	637	55	99.2%
7	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.96	586	577	103	98.4%
				TOTALS	1382	1382	1382	2.55	2.39	2.37	22,566	21,570	6,630	94.9%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
7	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.19	2,118	1,771	1,162	83.6%
7	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
7	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	43	43	43	0.07	0.07	0.07	928	904	209	97.4%
7	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
7	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
7	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
7	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
7	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	45	45	45	0.69	0.60	0.59	977	970	122	99.22%
7	E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.12	0.12	0.12	1,615	1,600	225	99.03%
7	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.15	1.09	1.07	3,168	3,137	448	99.00%
7	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
7	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.64	1,253	1,241	177	99.00%
7	W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.37	3,678	3,643	509	99.04%
7	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	0.00	0.00	115	115	(0)	100.00%
7	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	40	40	40	0.67	0.44	0.20	287	282	55	98.15%
7	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	0.00	0.00	240	240	(0)	100.00%
7	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
7	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
7	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.26	1.22	587	581	82	99.02%
7	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
7	South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
7	South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.66	277	274	39	98.99%
7	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.96	314	309	56	98.39%
7	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.23	1.12	1.08	272	268	47	98.48%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

8	Scenario Selection
Loss of 8th St. 4.16 kV Transformer	

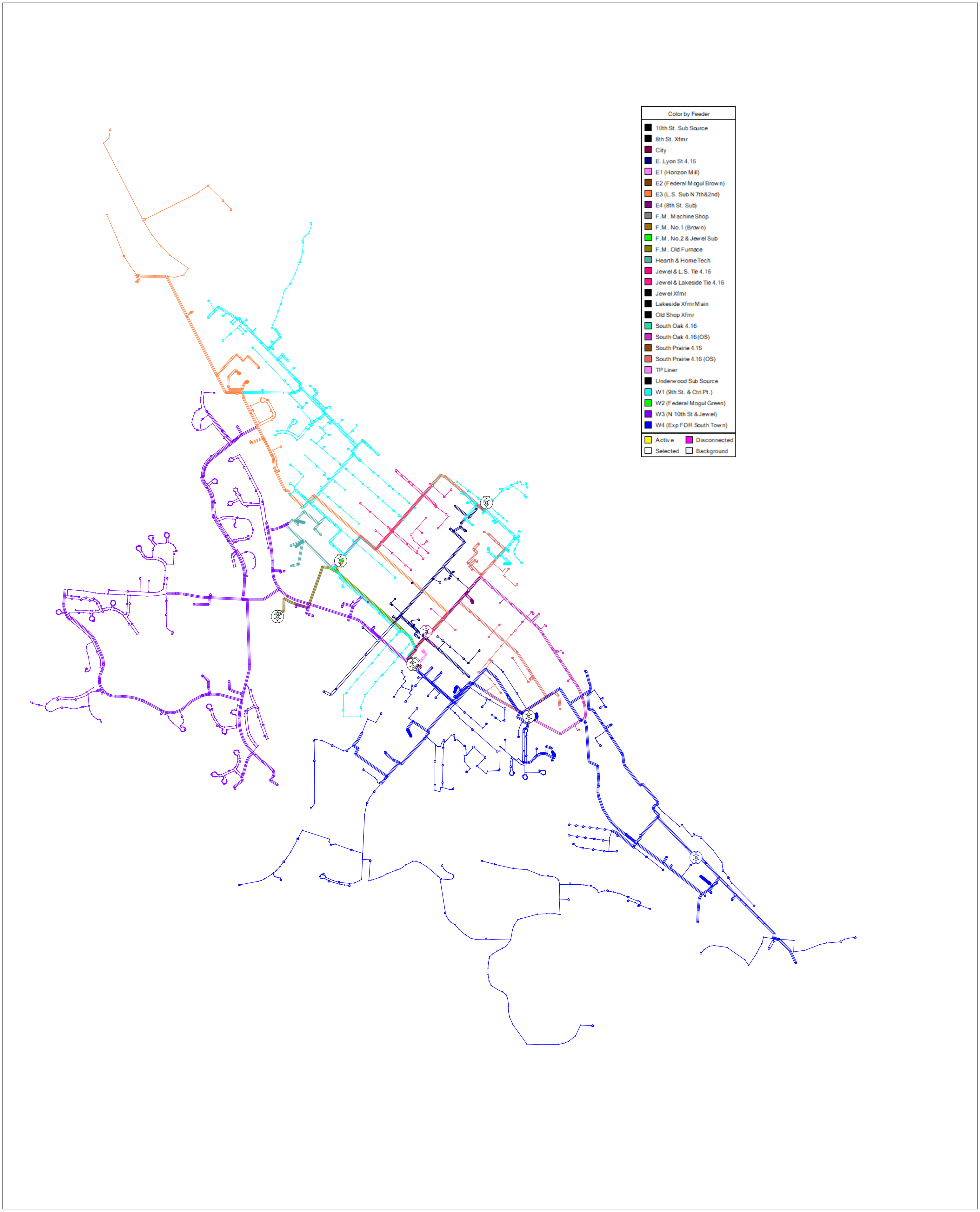
System Analysis Configuration

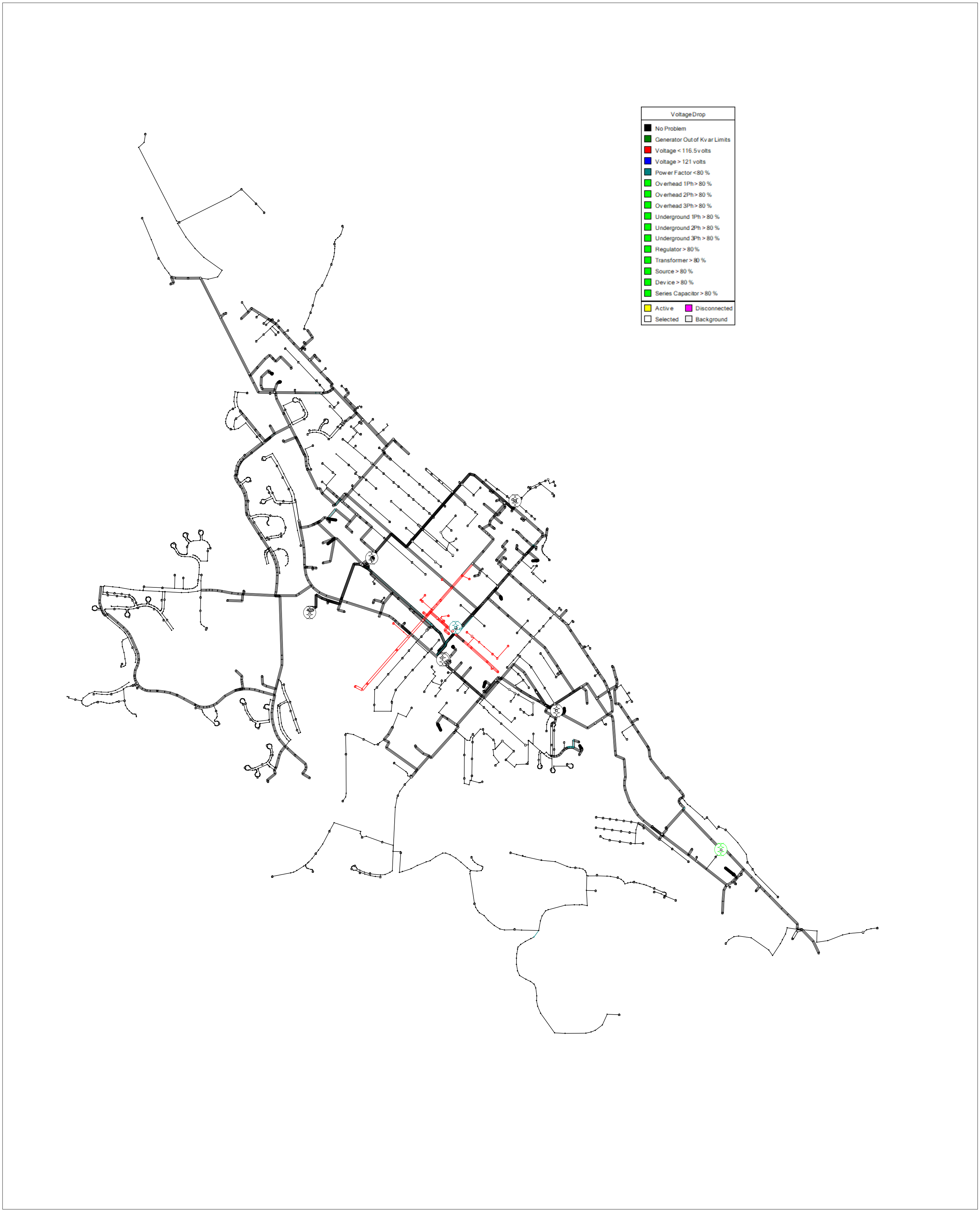
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
8	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
8	10th St. Sub T1	15,000	28,000	10th St. Sub T1	263	263	263	0.85	0.76	0.76	5,645	5,485	1,335	97.2%
8	10th St. Sub T2	15,000	28,000	10th St. Sub T2	391	391	391	2.55	2.39	2.37	8,442	8,357	1,199	99.0%
8	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	146	146	146	5.51	5.25	5.05	1,051	1,037	173	98.6%
8	8th St. Sub	5,000	6,250	8th St. Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
8	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
8	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	129	129	129	3.33	3.12	2.96	924	911	155	98.6%
				TOTALS	1388	1388	1388	5.51	5.25	5.05	22,608	21,604	6,662	94.8%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
8	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
8	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
8	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
8	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
8	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
8	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
8	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	94	94	94	0.85	0.76	0.76	2,036	2,012	312	98.82%
8	E4 (8th St. Sub)	**10th St. Sub T1**	25	25	25	0.11	0.11	0.10	541	537	61	99.36%
8	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.16	1.09	1.07	3,168	3,137	448	99.00%
8	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.95	0.64	0.64	1,253	1,241	177	99.00%
8	W4 (Exp FDR South Town)	**10th St. Sub T2**	186	186	186	2.55	2.39	2.37	4,021	3,980	574	98.98%
8	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	0.00	-0.01	115	115	(0)	100.00%
8	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	0.00	-0.01	240	240	(0)	100.00%
8	E. Lyon St 4.16	**Lakeside Sub 4.16**	106	106	106	5.51	5.25	5.05	764	755	118	98.81%
8	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.15%
8	E. Lyon 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	W. Lyon 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	South Oak 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	South Prairie 4.16	**8th St. Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
8	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	52	52	52	2.97	2.83	2.71	371	365	65	98.45%
8	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	77	77	77	3.33	3.12	2.96	553	546	90	98.67%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

9	Scenario Selection
Loss fo Old Shop 4.16 kV Transformer	

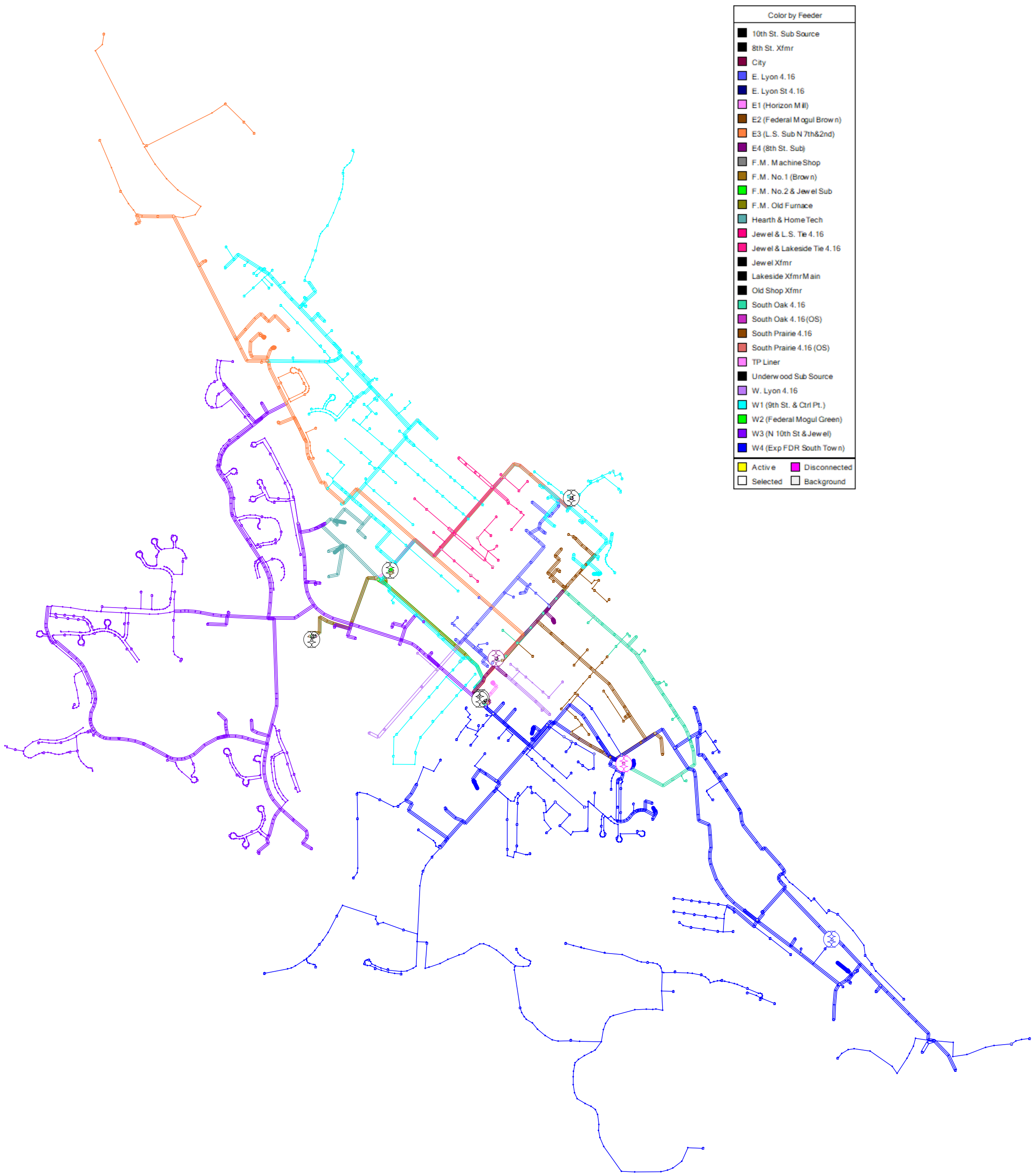
System Analysis Configuration

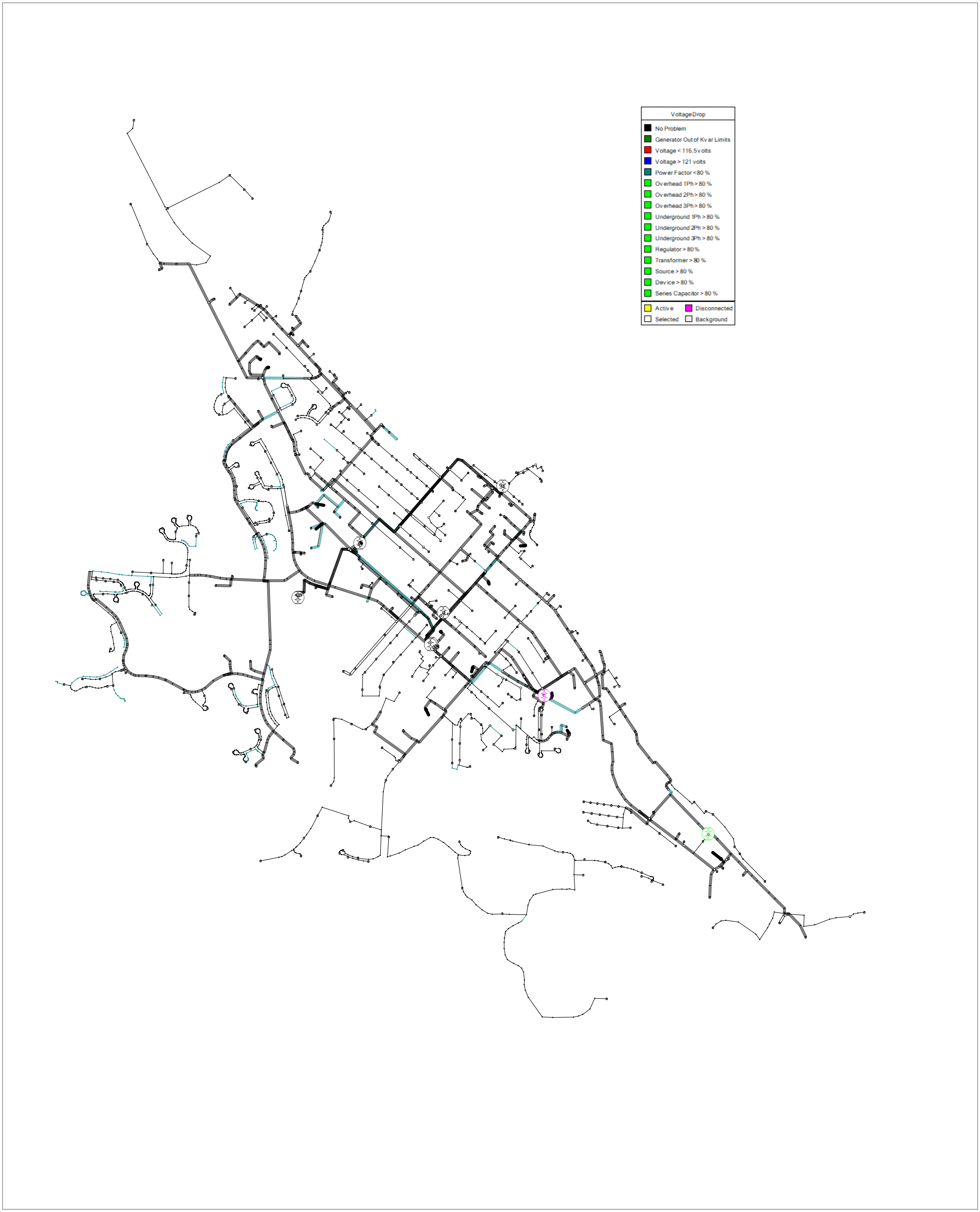
Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	**Transformer**	**Base**	**Top**	**Substation**	**AØ**	**BØ**	**CØ**	**AØ**	**BØ**	**CØ**	**kVA**	**kW**	**kVAR**	**PF**
9	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
9	10th St. Sub T1	15,000	28,000	10th St. Sub T1	304	304	304	0.73	0.65	0.64	6,541	6,368	1,492	97.4%
9	10th St. Sub T2	15,000	28,000	10th St. Sub T2	348	348	348	2.55	2.39	2.36	7,511	7,441	1,021	99.1%
9	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
9	8th St. Sub	5,000	6,250	8th St. Sub 4.16	230	230	230	1.71	1.42	1.33	1,660	1,640	257	98.8%
9	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	0	100.0%
9	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
				TOTALS	1382	1382	1382	2.55	2.39	2.36	22,571	21,572	6,641	94.8%

		Phase Amps			Max V Drop							
Scenario	**Circuit**	**Substation**	**AØ**	**BØ**	**CØ**	**AØ**	**BØ**	**CØ**	**kVA**	**kW**	**kVAR**	**PF**
9	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
9	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
9	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
9	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
9	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
9	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
9	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
9	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	59	59	59	0.73	0.65	0.64	1,265	1,252	179	99.00%
9	E4 (8th St. Sub)	**10th St. Sub T1**	102	102	102	0.13	0.13	0.13	2,208	2,180	351	98.73%
9	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	147	147	147	1.15	1.09	1.07	3,168	3,137	448	99.00%
9	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
9	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.64	1,253	1,241	177	99.00%
9	W4 (Exp FDR South Town)	**10th St. Sub T2**	143	143	143	2.55	2.39	2.36	3,090	3,064	396	99.17%
9	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	0	100.00%
9	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
9	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	0	100.00%
9	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
9	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
9	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.29	1.26	1.22	587	581	82	99.02%
9	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.17	0.15	153	151	21	99.01%
9	South Oak 4.16	**8th St. Sub 4.16**	51	51	51	1.25	1.13	1.04	369	363	65	98.45%
9	South Prairie 4.16	**8th St. Sub 4.16**	77	77	77	1.71	1.42	1.33	552	545	89	98.69%
9	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
9	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

System Analysis Configuration

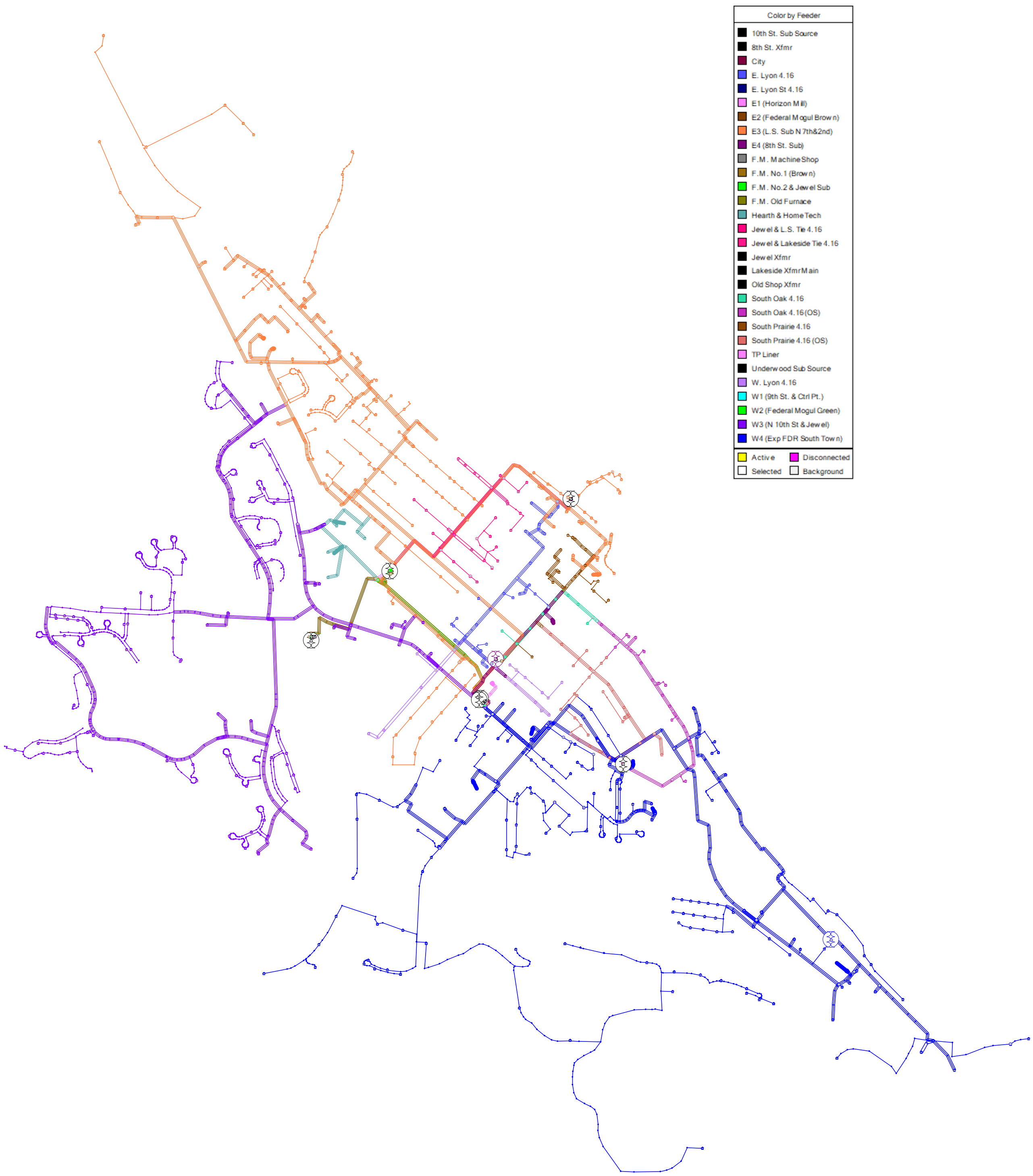
Existing System & Loading

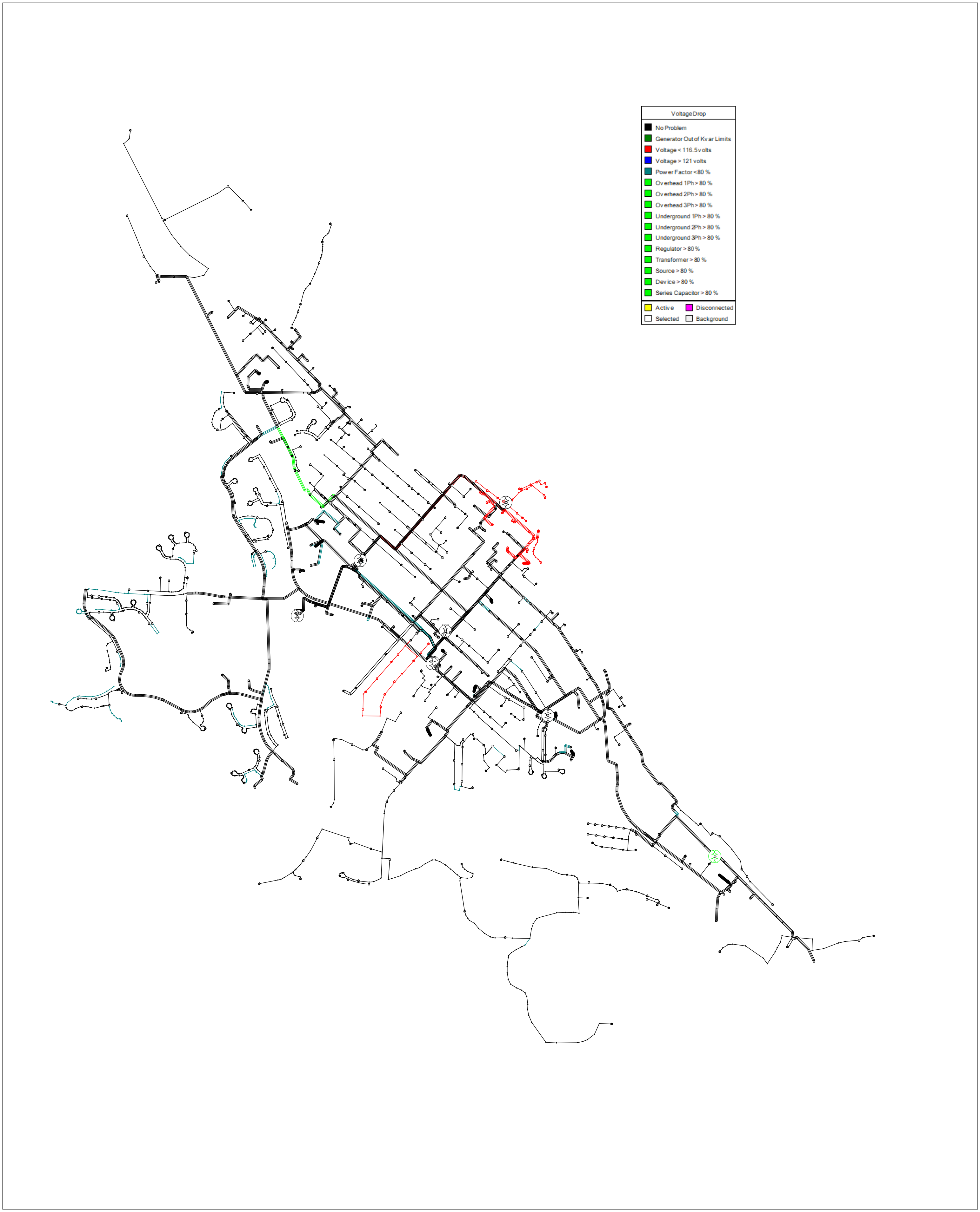
80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

10	Scenario Selection
Loss of W1 Fed from E3	

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
10	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
10	10th St. Sub T1	15,000	28,000	10th St. Sub T1	427	427	427	4.03	3.99	3.97	9,190	9,000	1,861	97.9%
10	10th St. Sub T2	15,000	28,000	10th St. Sub T2	228	228	228	2.55	2.39	2.36	4,931	4,883	686	99.0%
10	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.52	0.22	287	282	55	98.1%
10	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.25	1.22	1,072	1,061	150	99.0%
10	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
10	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.96	586	577	103	98.4%
				TOTALS	1386	1386	1386	4.03	3.99	3.97	22,651	21,645	6,674	94.9%

			Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
10	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
10	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
10	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
10	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
10	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
10	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.10	3,090	2,936	963	95.0%
10	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
10	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	209	209	209	4.03	3.99	3.97	4,515	4,464	673	98.88%
10	E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.13	0.13	0.12	1,615	1,600	225	99.03%
10	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
10	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
10	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.94	0.64	0.63	1,253	1,241	177	99.00%
10	W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.36	3,678	3,643	509	99.04%
10	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	(0)	100.00%
10	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
10	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	(0)	100.00%
10	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
10	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.52	0.22	287	282	55	98.14%
10	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.25	1.22	587	581	82	99.02%
10	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
10	South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
10	South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.65	277	274	39	98.99%
10	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.96	314	309	56	98.39%
10	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.23	1.12	1.08	272	268	47	98.48%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No. 1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

- City of Lake City - Lake City, MN
- DGR Project No.: 429301

11	Scenario Selection
Loss of E3 Fed from W1	

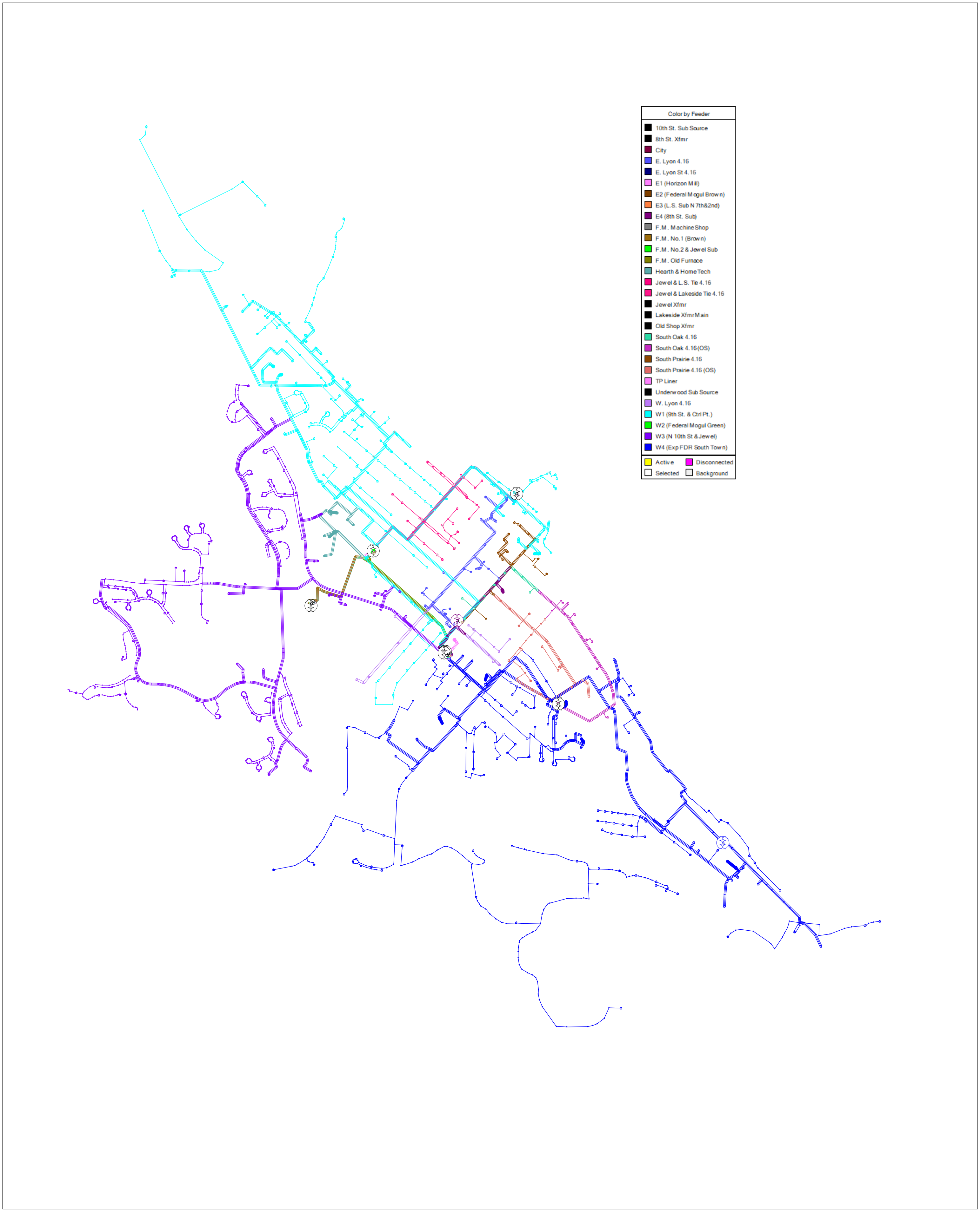
System Analysis Configuration

Existing System & Loading

80	= 80% Capacity Warning
100	= 100% Capacity Violation
+3.5	= +3.5 Voltage Drop Violation

		Ratings (kVA)			Phase Amps			Max V Drop						
Scenario	Transformer	Base	Top	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
11	Underwood T1	15,000	28,000	Underwood Sub T1	410	410	410	0.79	0.78	0.78	8,792	7,762	4,128	88.3%
11	10th St. Sub T1	15,000	28,000	10th St. Sub T1	218	218	218	0.12	0.12	0.12	4,688	4,535	1,188	96.7%
11	10th St. Sub T2	15,000	28,000	10th St. Sub T2	435	435	435	2.55	2.39	2.37	9,392	9,297	1,335	99.0%
11	Lakeside Sub	5,000	7,000	Lakeside Sub 4.16	40	40	40	0.75	0.48	0.16	287	282	55	98.1%
11	8th St. Sub	5,000	6,250	8th St. Sub 4.16	149	149	149	1.28	1.26	1.22	1,072	1,061	150	99.0%
11	Jewel Sub	5,000	6,250	Jewel Sub 4.16	49	49	49	0.00	0.00	0.00	355	355	(0)	100.0%
11	Old Shop Sub	2,500	2,500	Old Shop Sub 4.16	82	82	82	2.17	2.05	1.97	586	577	103	98.4%
				TOTALS	1383	1383	1383	2.55	2.39	2.37	22,596	21,595	6,650	94.8%

		Phase Amps			Max V Drop						
Scenario	Circuit	Substation	AØ	BØ	CØ	AØ	BØ	CØ	kVA	kW	kVAR	PF
11	F.M. No.1 (Brown)	Underwood Sub T1	99	99	99	0.20	0.20	0.20	2,118	1,771	1,162	83.6%
11	TP Liner	Underwood Sub T1	91	91	91	0.16	0.16	0.15	1,960	1,790	798	91.3%
11	F.M. No.2 & Jewel Sub	**Underwood Sub T1**	30	30	30	0.05	0.05	0.05	639	621	150	97.2%
11	Hearth & Home Tech	Underwood Sub T1	191	191	191	0.79	0.78	0.78	4,109	3,580	2,018	87.1%
11	City	Underwood Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.0%
11	E1 (Horizon Mill)	10th St. Sub T1	143	143	143	0.10	0.10	0.09	3,090	2,936	963	95.0%
11	E2 (Federal Mogul Brown)	10th St. Sub T1	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
11	E3 (L.S. Sub N 7th&2nd)	**10th St. Sub T1**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
11	E4 (8th St. Sub)	**10th St. Sub T1**	75	75	75	0.12	0.12	0.12	1,615	1,600	225	99.03%
11	W1 (9th St. & Ctrl Pt.)	10th St. Sub T2	207	207	207	2.11	2.06	2.03	4,461	4,414	649	98.94%
11	W2 (Federal Mogul Green)	10th St. Sub T2	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
11	W3 (N 10th St & Jewel)	10th St. Sub T2	58	58	58	0.95	0.64	0.64	1,253	1,241	177	99.00%
11	W4 (Exp FDR South Town)	**10th St. Sub T2**	170	170	170	2.55	2.39	2.37	3,678	3,643	509	99.04%
11	F.M. Machine Shop	**Jewel Sub 4.16**	16	16	16	0.00	-0.01	-0.01	115	115	(0)	100.00%
11	Jewel & L.S. Tie 4.16	**Jewel Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
11	F.M. Old Furnace	**Jewel Sub 4.16**	33	33	33	0.00	-0.01	-0.01	240	240	(0)	100.00%
11	E. Lyon St 4.16	**Lakeside Sub 4.16**	0	0	0	0.00	0.00	0.00	-	-	-	0.00%
11	Jewel & Lakeside Tie 4.16	**Lakeside Sub 4.16**	40	40	40	0.75	0.48	0.16	287	282	55	98.14%
11	E. Lyon 4.16	**8th St. Sub 4.16**	81	81	81	1.28	1.26	1.22	587	581	82	99.02%
11	W. Lyon 4.16	**8th St. Sub 4.16**	21	21	21	0.27	0.16	0.15	153	151	21	99.01%
11	South Oak 4.16	**8th St. Sub 4.16**	8	8	8	0.06	0.04	0.03	55	55	8	99.03%
11	South Prairie 4.16	**8th St. Sub 4.16**	38	38	38	0.82	0.70	0.66	277	274	39	98.99%
11	South Oak 4.16 (OS)	**Old Shop Sub 4.16**	44	44	44	2.17	2.05	1.97	314	309	56	98.39%
11	South Prairie 4.16 (OS)	**Old Shop Sub 4.16**	38	38	38	1.24	1.13	1.09	272	268	47	98.48%


Color by Feeder
10th St. Sub Source
8th St. Xfmr
City
E. Lyon 4.16
E. Lyon St 4.16
E1 (Horizon Mill)
E2 (Federal Mogul Brown)
E3 (L.S. Sub N 7th&2nd)
E4 (8th St. Sub)
F.M. Machine Shop
F.M. No.1 (Brown)
F.M. No.2 & Jewel Sub
F.M. Old Furnace
Hearth & Home Tech
Jewel & L.S. Tie 4.16
Jewel & Lakeside Tie 4.16
Jewel Xfmr
Lakeside Xfmr Main
Old Shop Xfmr
South Oak 4.16
South Oak 4.16 (OS)
South Prairie 4.16
South Prairie 4.16 (OS)
TP Liner
Underwood Sub Source
W. Lyon 4.16
W1 (9th St. & Ctrl Pt.)
W2 (Federal Mogul Green)
W3 (N 10th St & Jewel)
W4 (Exp FDR South Town)
Active
Disconnected
Selected
Background


Voltage Drop
No Problem
Generator Out of Kvar Limits
Voltage < 116.5 volts
Voltage > 121 volts
Power Factor < 80 %
Overhead 1Ph > 80 %
Overhead 2Ph > 80 %
Overhead 3Ph > 80 %
Underground 1Ph > 80 %
Underground 2Ph > 80 %
Underground 3Ph > 80 %
Regulator > 80 %
Transformer > 80 %
Source > 80 %
Device > 80 %
Series Capacitor > 80 %
Active
Disconnected
Selected
Background

ELECTRIC SYSTEM STUDY

CITY OF LAKE CITY

LAKE CITY, MINNESOTA

DGR Project No. 429301

Rev. 0 – March 2024

Existing Distribution System Deficiencies – Load Flow Analysis

System Intact (No Outages) – Existing Load Levels:

1.) The 300 kVA step-down transformer on W4 on Terrace and Camp Lakeview Rd. is at 85% capacity.

Contingency (Outages) – Existing Load Levels:

2.) Loss of T1 Transformer at Underwood. Need to fix H&H VFI by R.R. tracks use as backup to TP Liners Feeder.

3.) Capacity warning for 200-amp elbows (82%) on W1 Feeder with loss of 10th St. Sub East 15 kV Bus.

4.) Voltage drop violation on A, B and C phase on E Lyon St. 4.16 Feeder with loss of 10th St. Sub East 15 kV Bus.

5.) Voltage drop violation on A, B and C phase on South Prairie 4.16 Old Shop Feeder with loss of 10th St. Sub East 15 kV Bus.

6.) Outage. No backup feed for Horizon Mill Feeder with loss of 10th St. Sub East 15 kV Bus.

7.) Outage. No backup feed for 8th St. 12.5 kV Feeder with loss of 10th St. Sub East 15 kV Bus.

8.) Outage. No backup feed for W4 Feeder with loss of 10th St. Sub West 15 kV Bus.

9.) Voltage drop violation on A, B and C phase on E. Lyon St. 4.16 Feeder with loss of 8th St. Sub 4.16/12.5 kV Transformer.

10.) Voltage drop violation on A, B and C phase on E. Lyon St. 4.16 Feeder with loss of 8th St. Sub 4.16/12.5 kV Transformer.

11.) Outage. No backup feed for W. Lyon St. 4.16 Feeder with loss of 8th St. Sub 4.16 kV Switchgear.

12.) Capacity warning for 200-amp elbows (98%) on E3 Feeder with loss of W1 Feeder.

13.) Voltage drop violation on A, B and C phase on E3 Feeder with loss of W1 Feeder.

System Intact (No Outages) - Projected 2034 (10 year) Loads:

1.) Pending

Contingency (Outages) – Projected 2034 (10 year) Loads:

1.) Pending

Miscellaneous Items:

1.) Sectionalizing needs to be deployed on the underground system. Specifically, Feeders W4 (Express FDR South Town) and W3 (N 10th St & Jewel). The system would perform better at isolating faults to smaller areas and provide better protection to equipment once implemented.

2.) 200 amp load-break elbows are used on some 4/0 AL. circuit mainlines, which significantly reduces the capacity of the circuit.

3.) Unjacketed open concentric cable reliability concern.

4.) Radials. Hearth & Home, W4 Feeder, Horizon Mills, TP Liners.

5.) Age of 4.16 kV and 12.5 kV switchgear at Jewel Substation.

6.) Age of 4.16 kV switchgear at 8th St., Lakeside and Old Shop substations.

7.) Age of 12.5/4.16 kV transformers at all step-down substations.

8.) Jewel Step-Down transformer LTC not working.

9.) Fix Hearth and Home VFI so tie can be used between H&H and TP Liner VFIs.

10.) Primary metering at sub limits/complicates backfeed and tie options.

11.) 8th St. Sub Feeder at 10th St. sub not showing amps. Loss of sensing alarm?

12.) Age of copper overhead conductor.

CITY OF LAKE CITY

REQUEST FOR

Utility Board Meeting, April 17, 2024

Agenda Item Description: Block 15 Project Update

Meeting: Utility Board Meeting, 4/17/2024

Originating Department: Utility

Action Requested:
Staff update on project.

Background:
City staff has been working with surveyors, contractors and other affected utilities in the planning of this project. We are almost ready to approach property owners to secure drainage and utility easements throughout the open alley space.

Budgetary/Fiscal Impact:
With project modifications, the costs to be assessed among the affected properties has been reduced dramatically and apply only to storm water infrastructure.

Reviewed By: Public Works

Preparer: Public Works Director Scott Jensen