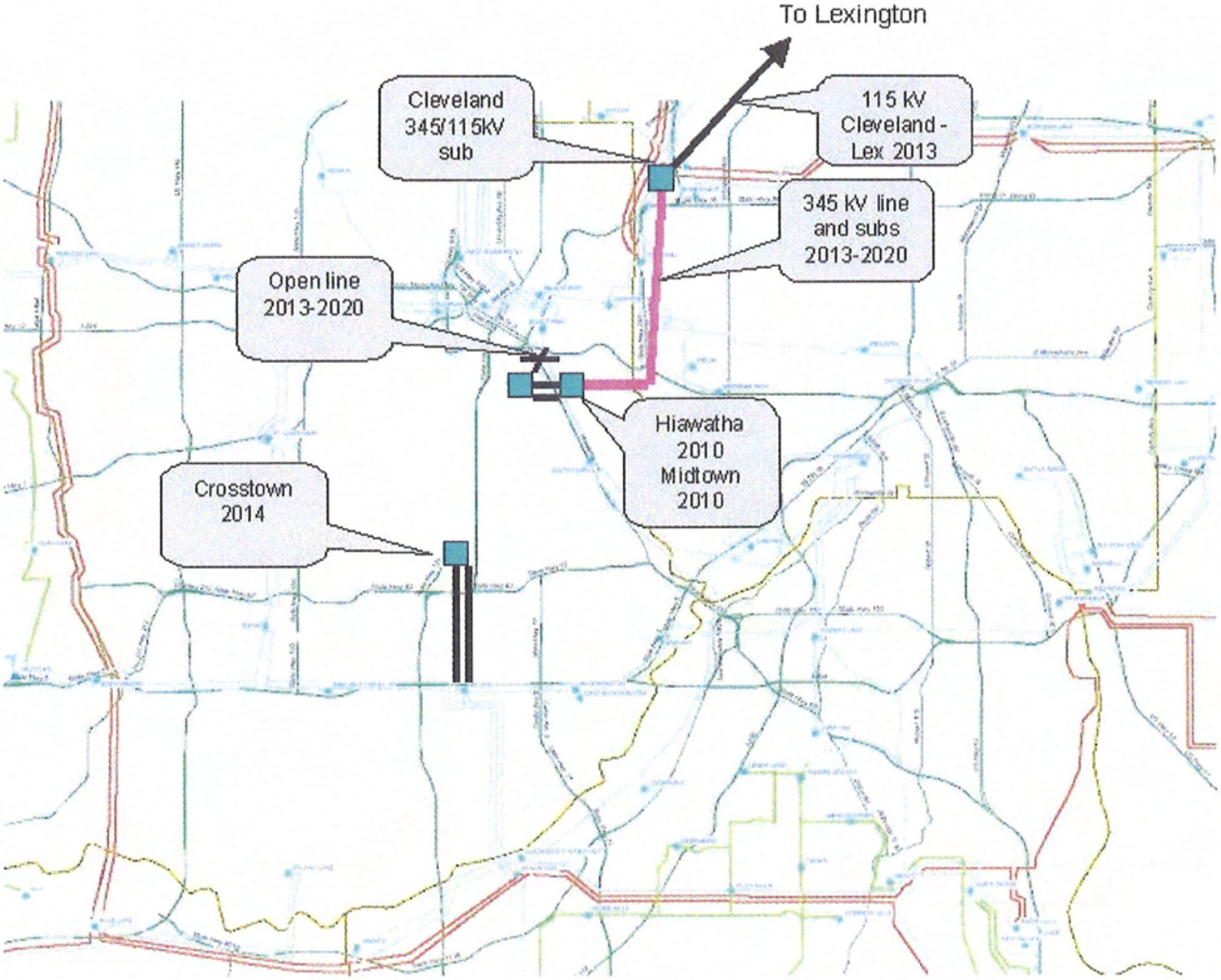
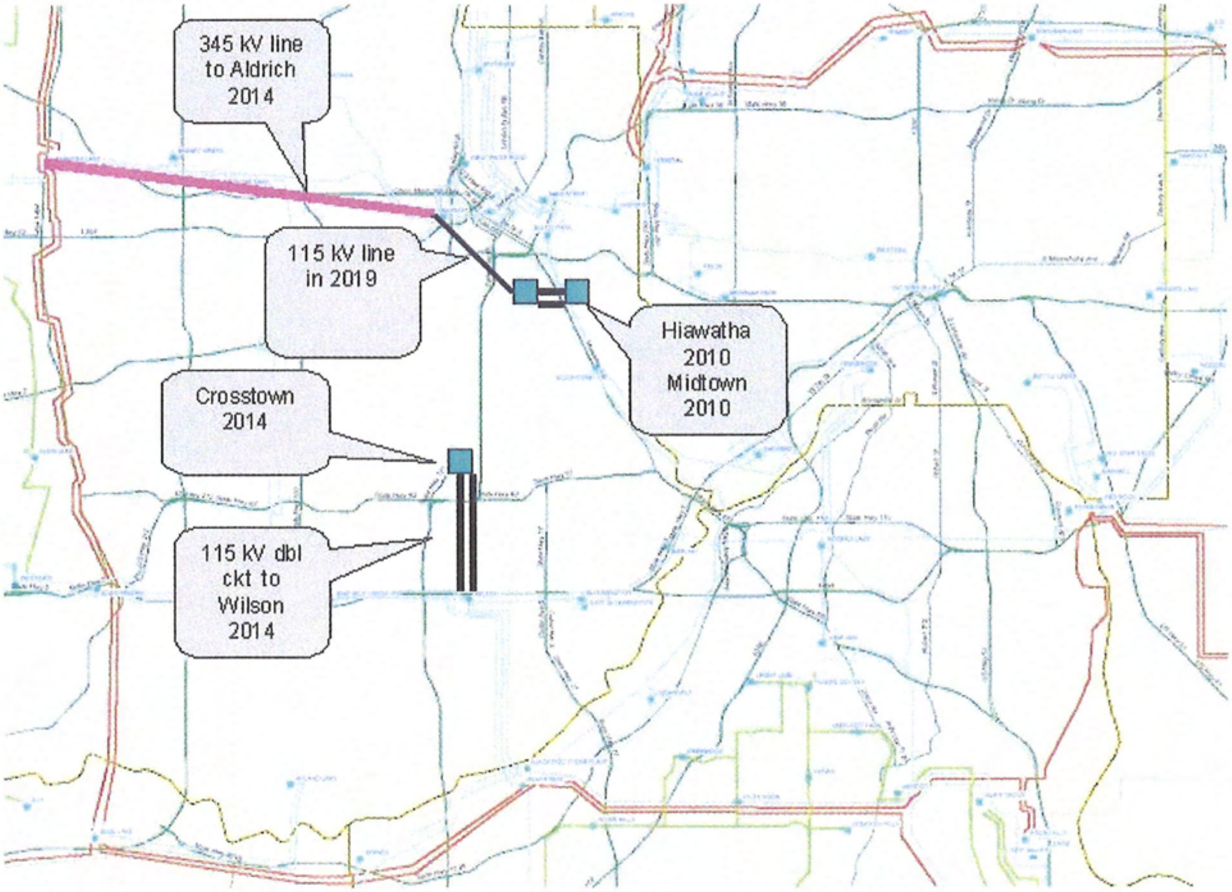
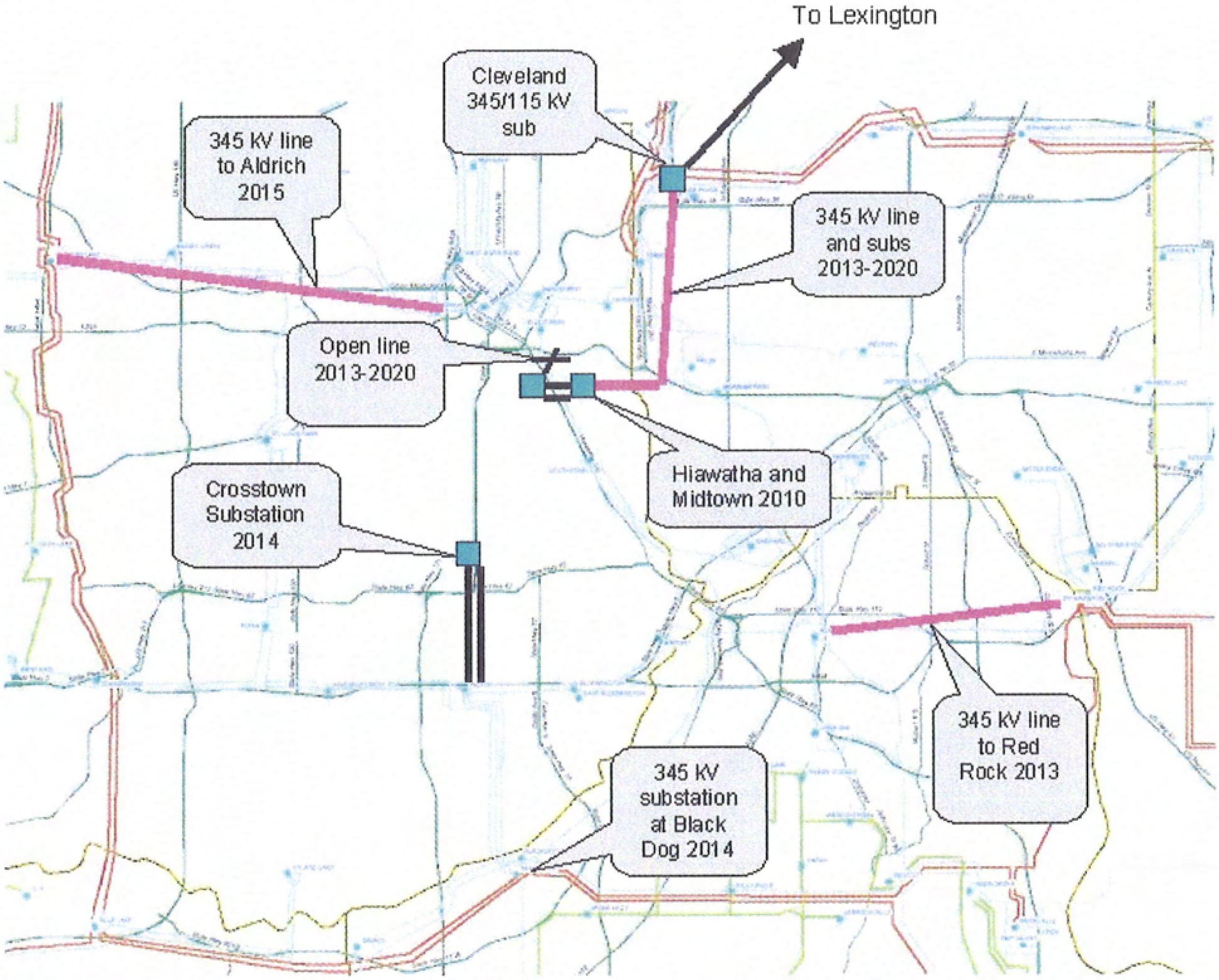
"345 kV Hiawatha Plan"



"Parkers Lake-Aldrich 345 kV Plan"

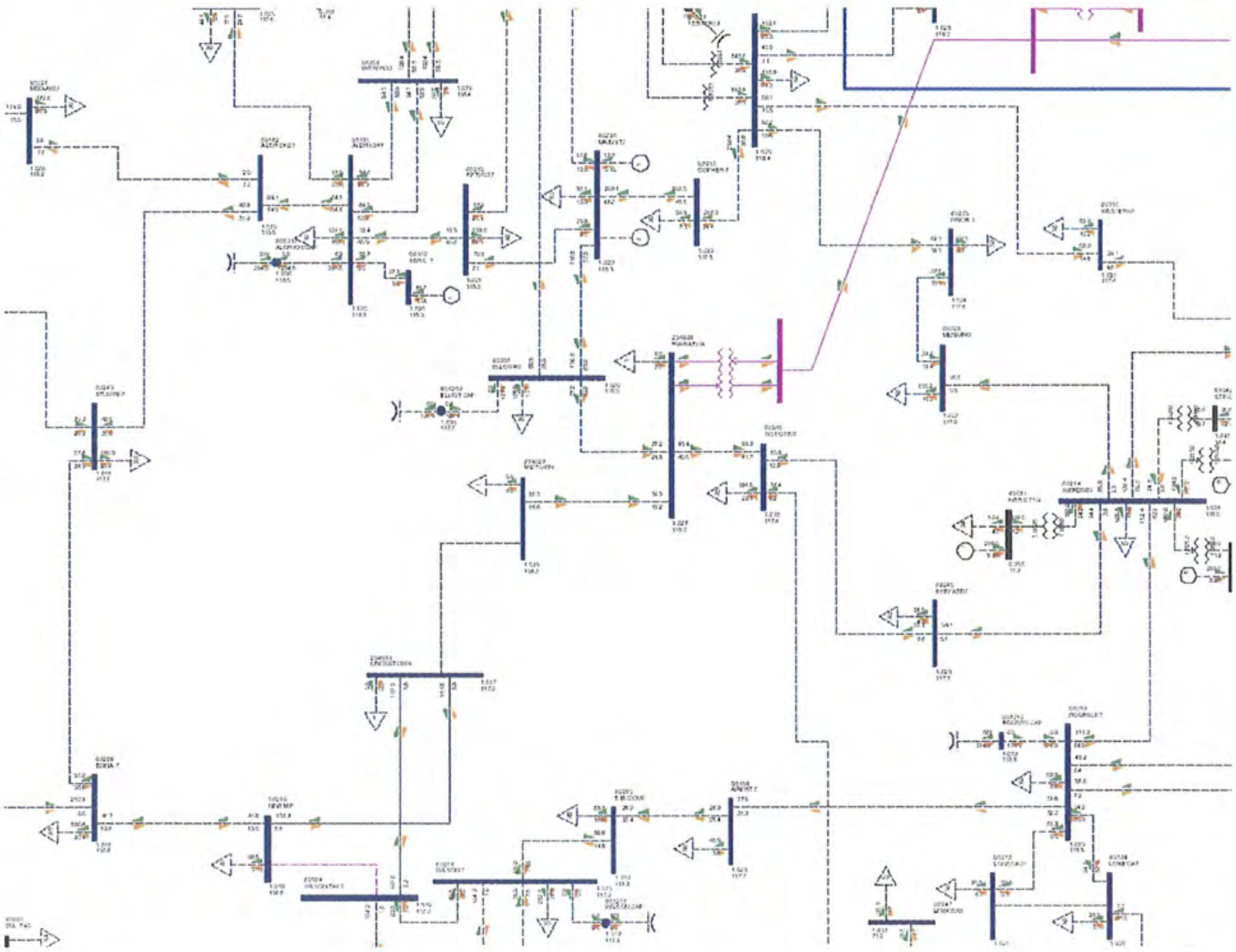


"Quad 345 kV Plan"

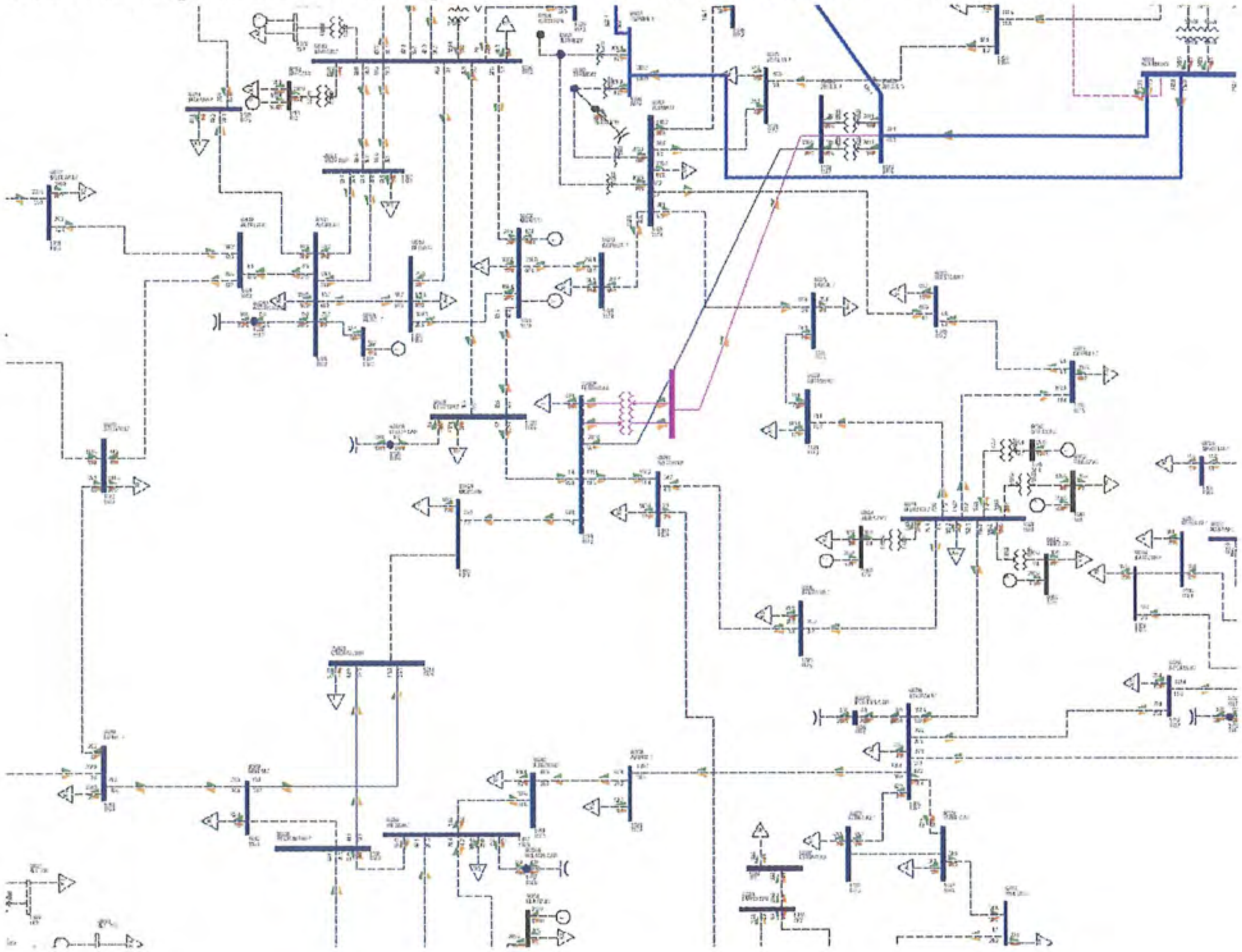


Appendix B: Power Flow maps for 2018 Base Case System Contingencies

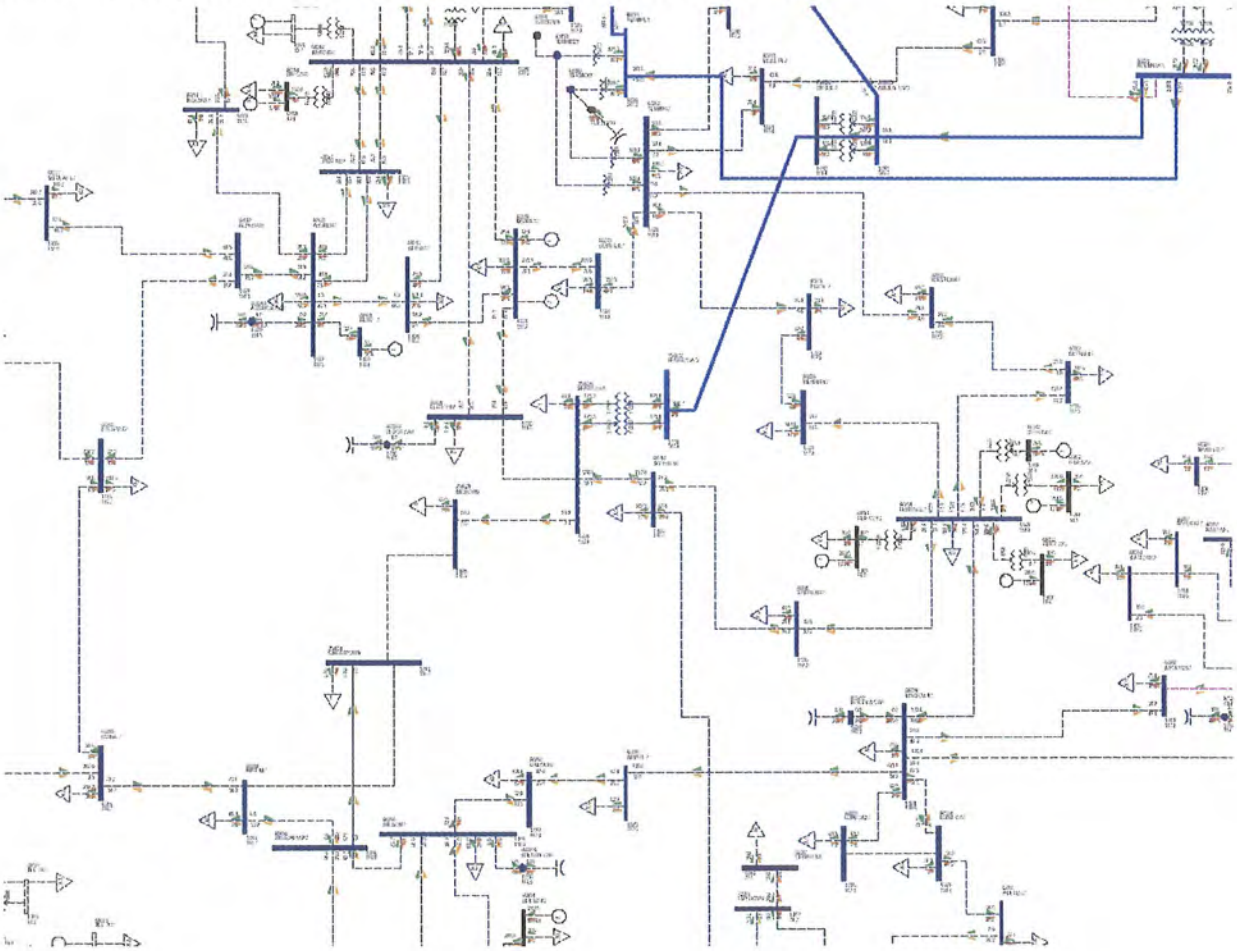
South Minneapolis base 2012 summer peak slider file:



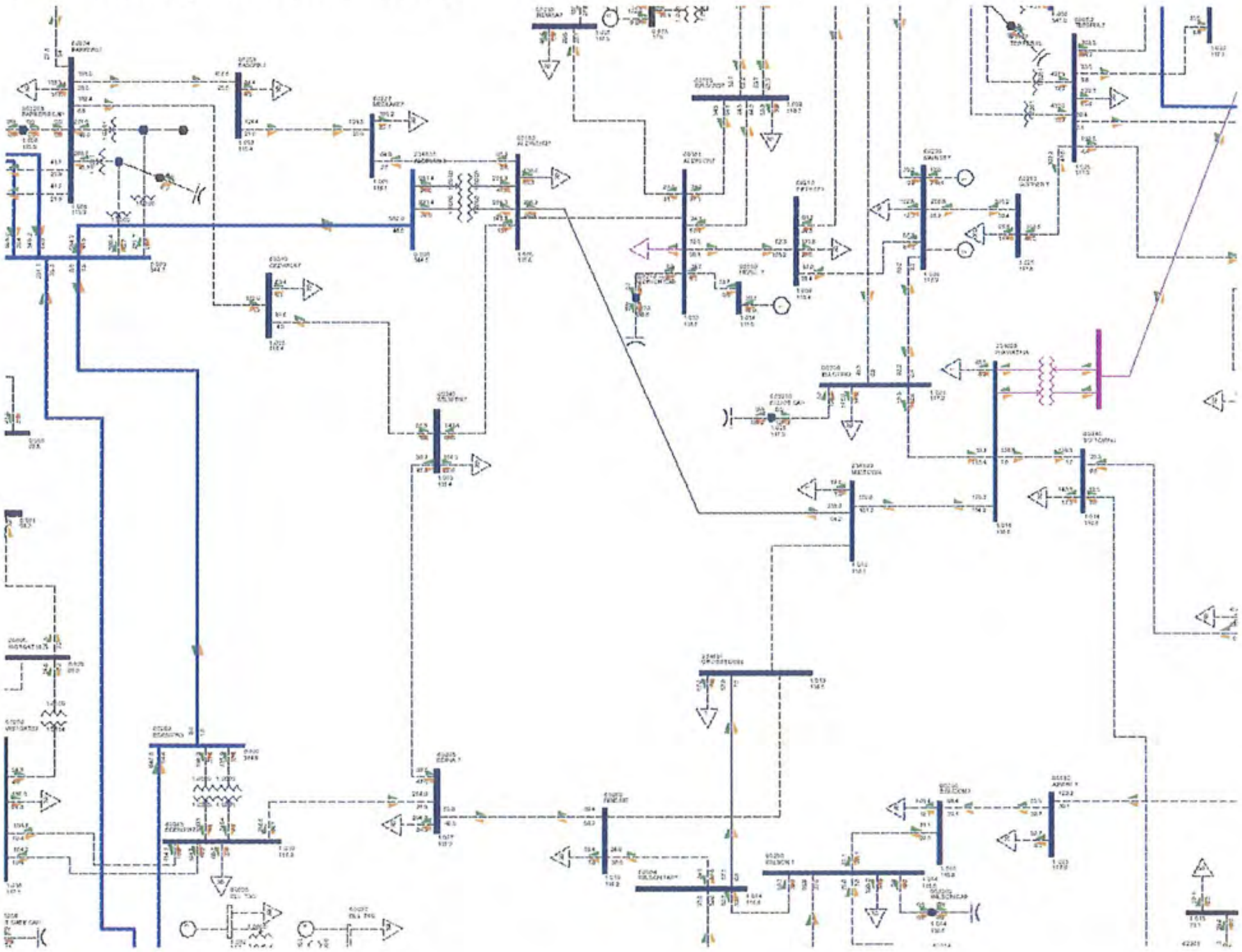
South Minneapolis 2018 summer peak, 115 kV dbl ckt, dbl bundled Hiawatha Plan:



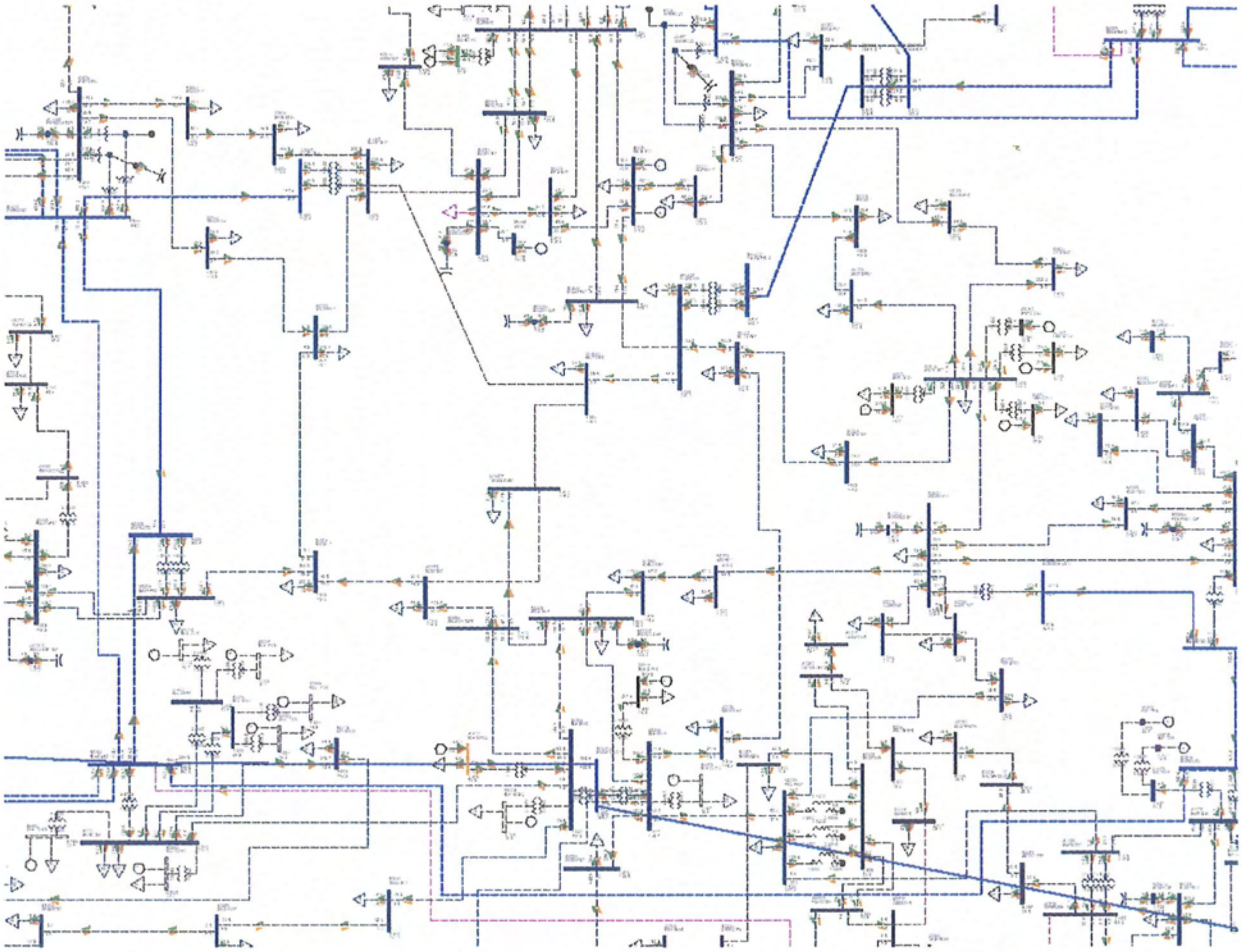
South Minneapolis 2018 summer peak, 345 kV Hiawatha Plan:



South Minneapolis 2018 summer peak, Parkers Lake-Aldrich 345 kV Plan:



South Minneapolis 2018 summer peak, Quad 345 kV Plan:



Appendix C: ACC Analysis Data for 2018 Base Case

Appendix D: Present Worth Analysis

Base Plan Rebuild:

Title: Base Rebuilds for South Minneapolis

Interest Rate	7.42%	Starting year for study	2007		
*Carrying Charge Rate	10.84%	Investments/Expenses	2007		
Investment Escalation	1.88%	Ending Year	2042		35
Expense Escalation	1.88%	*The 35 year totals below were calculated using the rates above.			

Year	Cumulative Present Worth	Total Investment		Levelized Annual Cost
2042	98,723,532	163,013,218		7,868,148

Year	New Investments 2007 dollars	Expenses 2007 dollars	Escalated New Investments	Escalated Expenses	Investment Revenue Requirement	Revenue Requirements	Present Worth of Revenue Requirements	Cumulative Present Worth 2007 dollars	Cumulative Investment
2007		0	0	0	0	0	0	0	0
2008		0	0	0	0	0	0	0	0
2009		0	0	0	0	0	0	0	0
2010	18,971,000	0	20,061,206	0	2,174,434	2,174,434	1,633,073	1,633,073	20,061,206
2011		0	0	0	2,174,434	2,174,434	1,520,269	3,153,342	20,061,206
2012	544,000	0	597,095	0	2,239,153	2,239,153	1,457,380	4,610,723	20,658,301
2013	5,047,800	0	5,644,634	0	2,850,975	2,850,975	1,727,418	6,338,141	26,302,935
2014	24,524,000	0	27,939,193	0	5,879,304	5,879,304	3,316,231	9,654,371	54,242,128
2015	12,080,000	0	14,020,982	0	7,399,038	7,399,038	3,885,160	13,539,532	68,263,110
2016	3,774,000	0	4,462,748	0	7,882,756	7,882,756	3,853,245	17,392,777	72,725,857
2017	8,610,000	0	10,372,717	0	9,007,054	9,007,054	4,098,700	21,491,477	83,098,574
2018	9,404,800	0	11,543,244	0	10,258,227	10,258,227	4,345,608	25,837,084	94,641,818
2019		0	0	0	10,258,227	10,258,227	4,045,436	29,882,521	94,641,818
2020	9,709,000	0	12,368,888	0	11,598,890	11,598,890	4,258,184	34,140,704	107,010,706
2021	11,418,400	0	14,820,074	0	13,205,238	13,205,238	4,513,038	38,653,742	121,830,780
2022	11,310,000	0	14,955,352	0	14,826,249	14,826,249	4,717,033	43,370,775	136,786,132
2023	2,035,800	0	2,742,572	0	15,123,516	15,123,516	4,479,250	47,850,025	139,528,704
2024	656,000	0	900,359	0	15,221,106	15,221,106	4,196,754	52,046,779	140,429,063
2025	2,164,800	0	3,027,043	0	15,549,207	15,549,207	3,991,080	56,037,860	143,456,107
2026	8,577,800	0	12,219,845	0	16,873,716	16,873,716	4,031,882	60,069,741	155,675,952
2027	980,200	0	1,422,635	0	17,027,916	17,027,916	3,787,681	63,857,422	157,098,587
2028	4,000,000	0	5,914,631	0	17,669,003	17,669,003	3,658,801	67,516,223	163,013,218
2029	0	0	0	0	17,669,003	17,669,003	3,406,070	70,922,294	163,013,218
2030	0	0	0	0	17,669,003	17,669,003	3,170,797	74,093,091	163,013,218
2031	0	0	0	0	17,669,003	17,669,003	2,951,776	77,044,866	163,013,218
2032	0	0	0	0	17,669,003	17,669,003	2,747,883	79,792,749	163,013,218
2033	0	0	0	0	17,669,003	17,669,003	2,558,074	82,350,823	163,013,218
2034	0	0	0	0	17,669,003	17,669,003	2,381,376	84,732,198	163,013,218
2035	0	0	0	0	17,669,003	17,669,003	2,216,883	86,949,081	163,013,218
2036	0	0	0	0	17,669,003	17,669,003	2,063,752	89,012,834	163,013,218
2037	0	0	0	0	17,669,003	17,669,003	1,921,199	90,934,033	163,013,218
2038	0	0	0	0	17,669,003	17,669,003	1,788,493	92,722,526	163,013,218
2039	0	0	0	0	17,669,003	17,669,003	1,664,954	94,387,480	163,013,218
2040	0	0	0	0	17,669,003	17,669,003	1,549,948	95,937,427	163,013,218
2041	0	0	0	0	17,669,003	17,669,003	1,442,885	97,380,313	163,013,218
2042	0	0	0	0	17,669,003	17,669,003	1,343,219	98,723,532	163,013,218
	0								

*Carrying Charge Rate = (Return Requirement+Depreciation Requirement+Income Tax Requirement)

*Book Life is 35 years.