Washington City
Where Dixie Began

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Washington City Power Board
Regular Meeting Agenda
June 4, 2024

PUBLIC NOTICE is hereby given that the Washington City Power Board will hold a Public Electronic Regular Meeting on **Tuesday, June 4, 2024 at 5:00 P.M.** hosted at the Washington City Office located at 111 North 100 East, Washington, Utah The meeting will be broadcast via Youtube Live linked online at https://washingtoncity.org/meetings

1. **APPROVAL OF AGENDA**

2. **APPROVAL OF MINUTES**

    a. Approval of the minutes from 05/07/2024.

3. **NEW BUSINESS**

    a. Recommendation to the City Council to accept the 2024 Draft Capital Facilities Plan (CFP) Update - Rick Hansen

    b. 2024 Draft Impact Fee Facilities Plan (IFFP) Update - Rick Hansen

4. **REGULAR BUSINESS**

    a. Operations Report & Generation Update. Power Director Rick Hansen

5. **UAMPS REPORT**

6. **ADJOURNMENT**

POSTED this 30th day of May, 2024
Rachel Hess, Administrative Assistant

In accordance with the Americans with Disabilities Act, Washington City will make reasonable accommodations to participate in the meeting. Requests for assistance can be made by calling the City Recorder at 656-6308 at least 24 hours in advance of the meeting to be held.

Washington City
Where Dixie Begins

Washington City
Capital Facilities Plan - Update

DRAFT

April 2024

ICPE
CONSULTING ENGINEERS

Intermountain Consumer Professional Engineers, Inc.
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INTRODUCTION AND SUMMARY

Intermountain Consumer Professional Engineers ("ICPE") has prepared this electrical system study and Capital Facilities Plan ("CFP") update at the request of Washington City. This plan updates the 2019 plan previously prepared for the Washington Electrical system. The intent of the plan is to anticipate future demand for electricity and evaluate the capacity of the City's electrical system to supply it. Improvements to the system are proposed to ensure that capacity is in place to supply power to customers when needed. Where appropriate, improvements to safety, reliability, and efficiency of the electric system are recommended. This report has been prepared to provide Washington City information for budgeting and planning purposes. Detailed design work is not included as part of this study.

The general findings and recommendations of the CFP update are presented in the proposed improvements section of this report. The proposed improvements section lists major projects that are proposed in the plan, the general estimated timeframe when these projects should be completed, and the estimated cost of the projects in 2023 dollars. The actual timeframe may be sooner or later depending on load growth experienced in each area.

System Model and Assumptions

This CFP contains results of load flow analysis of the Washington City electrical system. The system load flows provide insight on substation transformer loading, distribution circuit loading, and system voltage drop. The study includes analyzing N-1 outage conditions. An N-1 outage condition is the loss of a major system component such as loss of a substation transformer or loss of a main line section. The existing substations that were studied include Staheli, Main Street, Coral Canyon, Buena Vista, Sienna Hills, and Parkway. Seventeen existing 12.47 kV circuits were studied. The CFP proposes changes to circuit boundaries, the addition of one new substation and the addition of four new circuits.

To perform load flow analysis a system computer model was developed. System model development and analysis were performed on Paladin DesignBase 4.0 software. System modeling data was developed from data provided by Washington City. System load was modeled based on 2022 peak values since they were available at the time. The actual 2023 peak value is close to the projected 2023 peak value. Circuit models are based on the assumption that provided circuit maps and data (conductor sizes, circuit configurations, line lengths, etc.) are reflective of actual field conditions.

Service Area

This study considers the electrical load growth within the Washington City Power service area. Washington City Power serves the area north of the Virgin River and within the Washington City limits. The north side of the I-15 Freeway corridor is also served by Washington City Power. The Tortoise Habitat area provides the northern and western boundaries to this portion of the service area. The plan does not provide any information or evaluation for the loads on the south side of the Virgin River which is served by Dixie Escalante Electric.

Substation and Distribution

Approximately 32 MW of new load is projected over the next ten years in Washington City. Main Street circuits will be heavily impacted since the area currently served by Main Street is projected to grow by 12.3 MW. A significant load for Main Street circuits is expected to occur in the area surrounding I-15 Exit 13 and in the Solente area lands. Additionally, Sienna Hills circuits will need to feed several projects for apartment buildings and hotels that are currently in the planning and construction stages. Without upgrades, the Main Street circuit 202 and Main Street transformer T2 will become overloaded. It is proposed to add a new Grapevine Substation. Three new circuits for the Grapevine substation are proposed. It is proposed to add a third circuit to the Parkway substation to help feed some of the Solente Area.

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Approximately 12.9 MW of load is projected for the Solente area lands. A new Grapevine substation, as described above, will help serve this load. Additionally, Parkway circuits will also help serve the new load in this area. Several new distribution lines will be required in the Solente area lands. Three new lines are proposed to be built by Washington City to tie the Solente area lands into existing circuits. The rest of the new lines in the Solente area are proposed to be built by developers as the area is developed.

During N-1 contingencies such as loss of a substation transformer, recloser, or main line segment it becomes necessary to be able to back up circuits with adjacent circuits. In some cases system upgrades are necessary to help with N-1 conditions. These projects are shown in the proposed improvements table.

There are three mobile home parks that have aging electrical systems. The electrical systems for these mobile home parks consist of old direct buried cable. There are a significant number of outages due to the old direct buried cable and other aging electrical components. It is proposed to rebuild the electrical systems in these mobile home parks over the next several years. The three mobile home parks that need the electrical system rebuild are Cherokee Springs, Kings Row, and Winter Haven. The new electrical system in these mobile home parks will include new cable in conduit, new vaults, new secondary boxes, and new transformers. Half of the electrical system for Kings Row has already been updated.

The original downtown portion of the system is generally served by overhead distribution lines. While several lines have been rebuilt in the past several years, a large portion of the overhead system is over 30 years old and is reaching the end of its useful life. In addition to the various projects listed in this study, the City should budget as part of its annual system maintenance to replace aging poles, wire, secondaries & transformers on an ongoing basis. This will apply to both three phase and single phase lines. Pole testing and line inspections should be used to identify the system components that need to be replaced and to prioritize the needed replacements. By replacing portions of the system each year, it will help level the annual maintenance costs and improve overall system reliability.

Transmission

It is proposed to install Grapevine substation by approximately 2025. Significant load is expected to occur in the area surrounding I-15 Exit 13 and in the Solente area lands. The new substation will be required to serve this load. A new 69 kV transmission line will be required to feed Grapevine substation. It is also proposed to install a new 69 kV tie line from the intersection at Main St. and Parkway that feeds the Parkway Substation to the new line feeding Grapevine substation. This will create a 69 kV loop so that both substations can be fed from more than one location in the event of a line outage or for system maintenance. This versatility will enhance the City's ability to operate the electrical system and will improve service reliability to City customers.

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SYSTEM LOAD HISTORY AND FORECAST

Management of an electric utility system requires careful planning. Load forecasts are essential to planning. New facilities must be designed, ordered, and installed in time to meet the needs of new residences and businesses; power resource contracts must be in place to supply growing demand at the most economical rate. In addition, budgetary estimates for new facilities need to be created for both short-term and long range financial planning.

Load History

Load history is the obvious indicator of what load to expect in the future. During the eighties, Washington City load growth was low (due to the introduction of natural gas) but began growing at about an average of 5% per year from 1987 to 1991. From 1992 until 2007, the rate of growth was very high, averaging just over 12% per year.

During the economic downturn that started in 2007 load growth was almost eliminated for the period of 2007 to 2011. Load growth in the years from 2011 to 2012 was over 8%. Growth slowed again for 2013 and 2014. Growth for most years since then has been strong. The average annual growth rate for the last ten years was 5% per year and the average annual growth rate for the last five years was 6% per year.

Load Forecast

It is anticipated that the system load will continue to grow for the CFP timeframe. Washington City is projected to grow by 15 MW over the next five years and another 17 MW in the five years after that. The area with the largest expected growth over the next five years is land near I-15 Exit 13. This land is mostly open space at the moment but is expected to fill in over the next five years. Growth in this area will mainly be commercial. The area with the largest expected growth between five years and ten years is the Solente area lands. Growth in this area will mainly be housing.

Historical city load is listed in Table 1 and shown graphically in Graph 1. City forecast load data for Washington City is listed in Table 2 and shown graphically in Graph 2. Table 3 contains projected Washington City circuit and substation loads based on the existing electrical system with no system upgrades. As can be seen from the table, Main Street T2 transformer and Main Street circuit 202 will become over loaded if no system upgrades occur. Table 4 contains projected Washington City load circuit and substation loads if proposed upgrades are installed. Load growth has been based on a list of future proposed loads (provided by Washington City) which are expected to occur. These include known projects that are in the planning and construction stages as well as general load growth that is expected to occur in certain areas of the city. ICPE developed projected load values for each of the proposed loads which are shown in Table 5. Proposed load increases by circuit are shown in Table 6. The project loads in Table 6 are extended beyond 10 years to achieve a 10 year 5% load growth rate.

In planning for additions to Washington City's electrical system, summer peak loads are used. Washington City's load has been summer peaking since 1994. Loading of all system equipment, such as transformers and lines, is more critical in summer due to the higher ambient temperatures.

Many factors may cause variation in the annual kilowatt peak including weather, construction schedules of developers and businesses, annexations, and factors affecting the general economy of the region. The short-term forecasts are most reliable. Longer-term forecasts need to be periodically updated based on current information and forecast trends. Load forecasts should be reviewed, evaluated and compared to actual load levels at the end of each peak loading season.

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Rooftop Solar

The peak system load happens around 6:00 PM which would include solar generation since it is before the sun starts to set. The peak at 10:00 PM (which would not have solar generation) is 90% of the peak at 6:00 PM so solar does not appear to have a large impact on load magnitude. The metered data of the peak system load used in the study is net actual peak, so it already includes the benefit of the solar panels on the system. The impact of solar panel generation on the system is minimal at peak load and can be detrimental to the system during bad weather when solar production is low since conventional generation will need to be used to make up the difference. There are existing rooftop solar panels on the system which have solar generation between 1.5-2 MW.

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Table 1

WASHINGTON CITY
ELECTRICAL LOAD HISTORY

	PEAK kW			
Year	Summer Peak	% Growth (Summer)	Winter Peak	% Growth (Winter)
1987	3,639		6,498	
1988	3,840	5.52%	6,146	-5.42%
1989	4,360	13.54%	6,851	11.47%
1990	4,514	3.53%	6,520	-4.83%
1991	4,433	-1.79%	6,500	-0.31%
1992	5,121	15.52%	5,616	-13.60%
1993	5,615	9.65%	6,083	8.32%
1994	6,514	16.01%	6,268	3.04%
1995	6,984	7.22%	6,376	1.72%
1996	8,112	16.15%	6,436	0.94%
1997	8,590	5.89%	6,665	3.56%
1998	9,883	15.05%	6,410	-3.83%
1999	10,646	7.72%	7,154	11.61%
2000	11,956	12.31%	6,976	-2.49%
2001	14,490	21.19%	8,144	16.74%
2002	15,638	7.92%	8,930	9.65%
2003	17,782	13.71%	8,714	-2.42%
2004	19,840	11.57%	9,716	11.50%
2005	23,971	20.82%	11,302	16.32%
2006	25,093	4.68%	12,966	14.72%
2007	28,542	13.74%	14,854	14.56%
2008	27,852	-2.42%	15,216	2.44%
2009	28,176	1.16%	14,374	-5.53%
2010	29,005	2.94%	14,731	2.48%
2011	29,035	0.10%	14,332	-2.71%
2012	31,518	8.55%	15,332	6.98%
2013	32,117	1.90%	16,614	8.36%
2014	31,714	-1.25%	15,377	-7.45%
2015	34,025	7.29%	14,893	-3.15%
2016	36,134	6.20%	14,945	0.35%
2017	37,943	5.01%	14,906	-0.26%
2018	38,494	1.45%	16,183	8.57%
2019	40,414	4.99%	16,770	3.63%
2020	45,665	12.99%	17,890	6.68%
2021	51,708	13.23%	18,440	3.07%
2022	51,028	-1.32%	18,990	2.98%
2023	52,511	2.91%		

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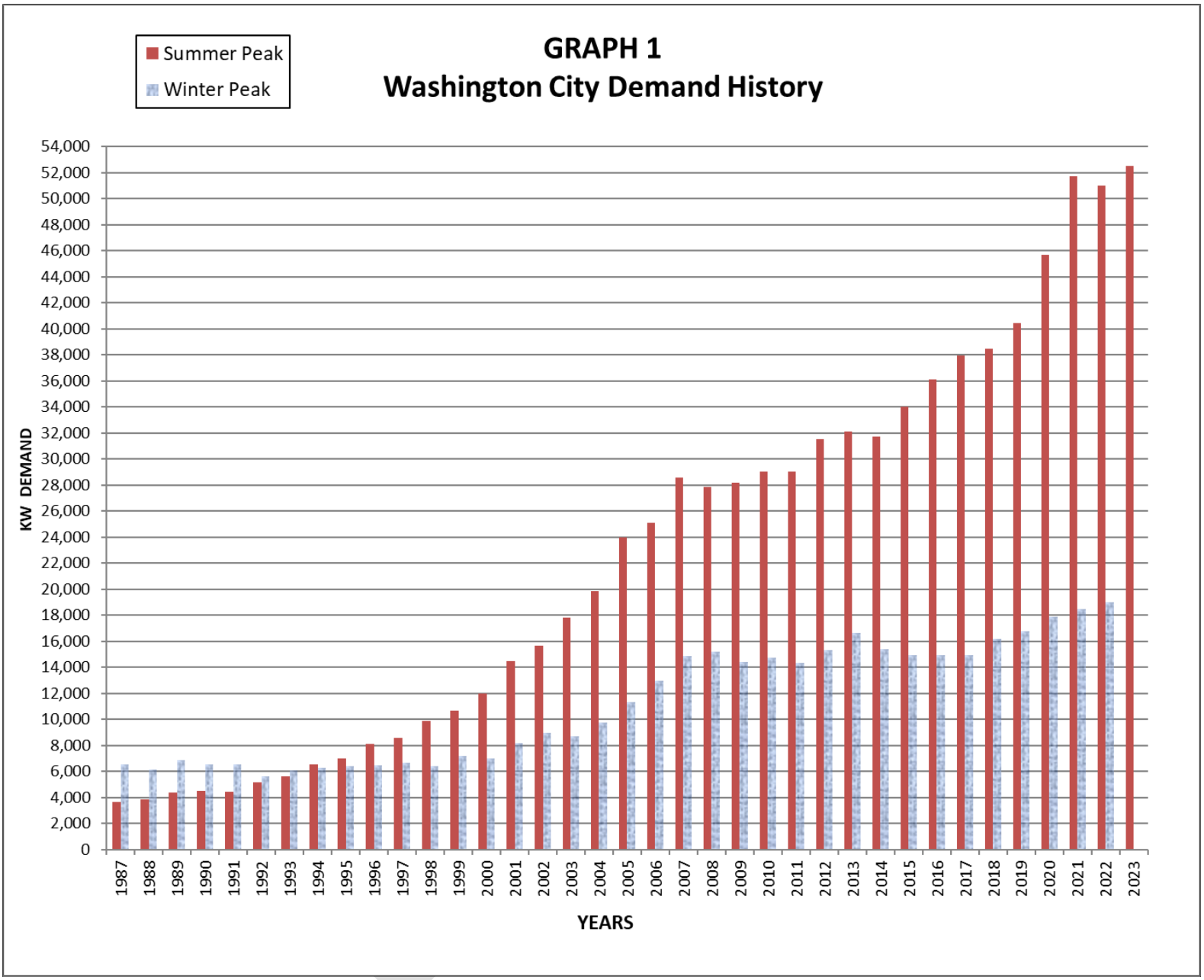
GRAPH 1
Washington City Demand History
Summer Peak
Winter Peak
KW DEMAND
54,000
52,000
50,000
48,000
46,000
44,000
42,000
40,000
38,000
36,000
34,000
32,000
30,000
28,000
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
YEARS

Table 2

WASHINGTON CITY DEMAND PROJECTION

PEAK kW		
Year	Historical	Projected
1990	4,514	
1991	4,433	
1992	5,121	
1993	5,615	
1994	6,514	
1995	6,984	
1996	8,112	
1997	8,590	
1998	9,883	
1999	10,646	
2000	11,956	
2001	14,490	
2002	15,638	
2003	17,782	
2004	19,840	
2005	23,971	
2006	25,093	
2007	28,542	
2008	27,852	
2009	28,176	
2010	29,005	
2011	29,035	
2012	31,518	
2013	32,117	
2014	31,714	
2015	34,025	
2016	36,134	
2017	37,943	
2018	38,494	
2019	40,414	
2020	45,665	
2021	51,708	
2022	51,028	
2023	52,511	52,511
2024		54,882
2025		58,449
2026		62,230
2027		66,073
2028		69,996
2029		73,921
2030		77,355
2031		80,345
2032		83,279

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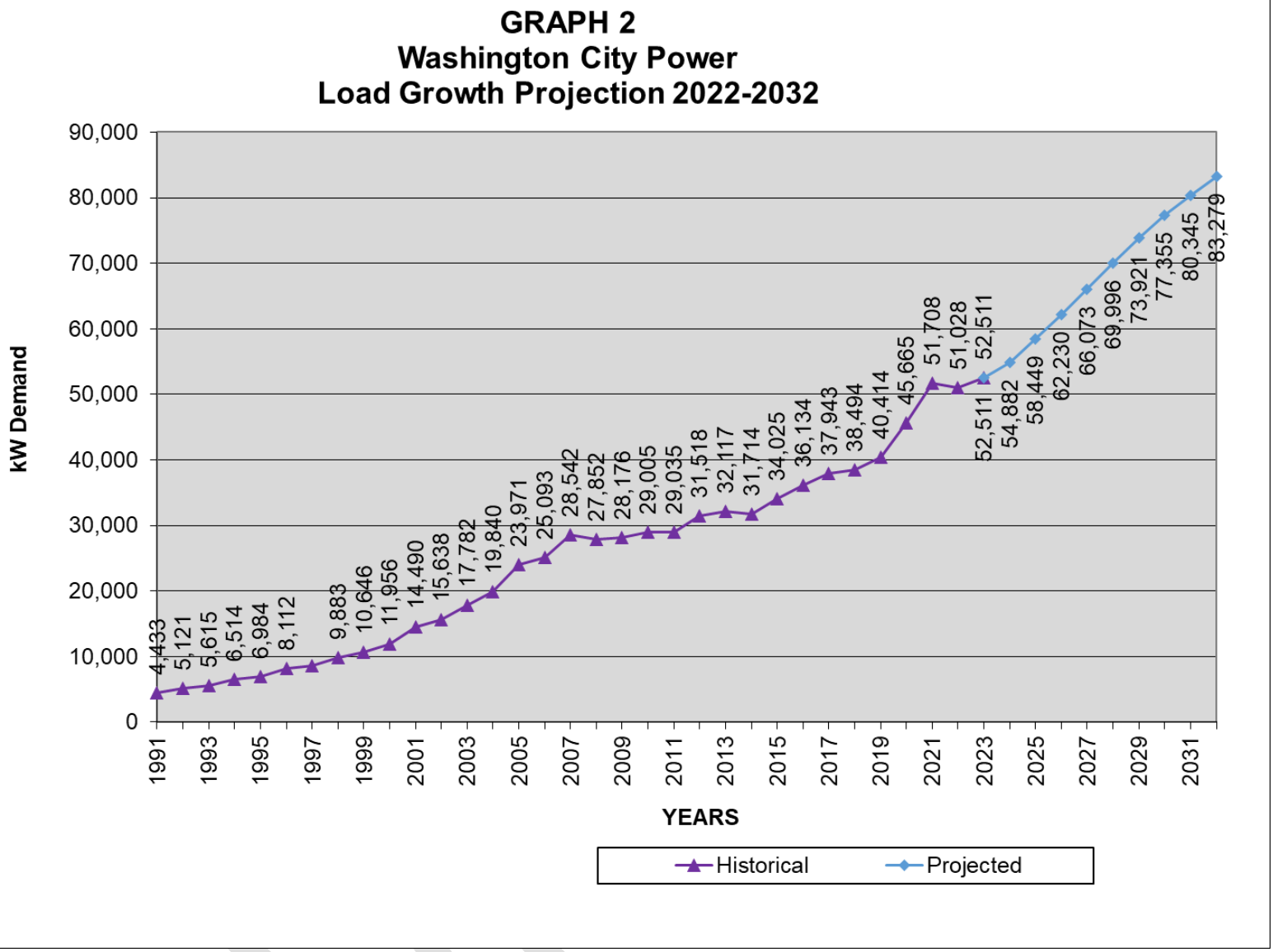
GRAPH 2
Washington City Power
Load Growth Projection 2022-2032
kW Demand
YEARS
Historical
Projected
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
4,433
5,121
5,615
6,514
6,984
8,112
9,883
10,646
11,956
14,490
15,638
17,782
19,840
23,971
25,093
28,542
27,852
28,176
29,005
29,035
31,518
32,117
31,714
34,025
36,134
37,943
38,494
40,414
45,665
51,708
51,028
52,511
52,511
54,882
58,449
62,230
66,073
69,996
73,921
77,355
80,345
83,279

TABLE 3
WASHINGTON CITY
SUBSTATION LOAD FORECAST
Projected Loads 2022-2032

Existing System

Substation	Circuit	YEAR Projected Load - kW																						Approx. Power Factor	Transformer Base Rating kVA	Transformer Top Rating kVA
		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032				
		Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA			
Main Street																										
Trans #1	101	109	2,360	111	2,407	114	2,456	114	2,473	116	2,498	117	2,527	118	2,555	120	2,586	122	2,625	123	2,664	125	2,696			
	102	89	1,931	91	1,970	93	2,009	94	2,023	95	2,044	96	2,068	97	2,091	98	2,122	100	2,154	101	2,186	102	2,213			
Trans #1 Total		199	4,292	203	4,377	207	4,465	208	4,496	210	4,541	213	4,596	215	4,646	218	4,708	221	4,779	225	4,850	227	4,909	99	10,000	14,400
Trans #2	201	131	2,829	134	2,886	136	2,943	137	2,964	138	2,979	140	3,014	141	3,048	143	3,081	145	3,127	147	3,174	149	3,222			
	202	154	3,321	157	3,387	166	3,587	232	5,007	298	6,426	363	7,846	429	9,265	495	10,684	560	12,104	633	13,673	706	15,243			
Trans #2 Total		285	6,150	290	6,273	302	6,531	369	7,971	435	9,405	503	10,860	570	12,313	637	13,766	705	15,231	780	16,848	855	18,465	99	10,000	14,400
Main Street Total		483	10,442	493	10,650	509	10,996	577	12,467	646	13,946	716	15,456	785	16,959	855	18,474	926	20,010	1005	21,698	1082	23,373		20,000	28,800
Staheli																										
Trans #1	301	122	2,629	124	2,682	127	2,735	127	2,746	128	2,760	129	2,793	131	2,821	132	2,852	134	2,895	136	2,927	137	2,962			
	302	95	2,042	100	2,152	117	2,517	135	2,920	154	3,323	174	3,760	195	4,214	211	4,552	226	4,890	229	4,948	232	5,013			
	303	126	2,721	129	2,775	135	2,924	142	3,073	151	3,261	157	3,394	163	3,527	172	3,715	175	3,771	178	3,847	182	3,924			
Staheli Total		342	7,392	352	7,609	379	8,177	405	8,740	433	9,345	461	9,947	489	10,562	515	11,119	535	11,555	543	11,721	551	11,898	99	12,000	22,400
Coral Canyon																										
Trans #1	401	220	4,749	224	4,844	230	4,960	235	5,077	240	5,193	246	5,310	257	5,543	267	5,776	273	5,892	278	6,009	282	6,099			
	402	213	4,607	218	4,699	228	4,926	244	5,266	265	5,729	290	6,260	318	6,861	346	7,463	361	7,789	367	7,934	367	7,934			
Coral Canyon Total		433	9,356	442	9,543	458	9,887	479	10,343	506	10,923	536	11,570	574	12,404	613	13,239	633	13,681	646	13,943	650	14,033	93	12,000	22,400
Buena Vista																										
Trans #1	501	43	926	47	1,016	54	1,166	60	1,296	66	1,436	70	1,516	71	1,533	72	1,550	73	1,573	74	1,596	75	1,620			
	502	172	3,706	175	3,780	179	3,856	179	3,875	180	3,894	182	3,941	184	3,981	187	4,040	191	4,121	194	4,183	197	4,246			
	503	136	2,933	139	2,992	165	3,558	179	3,874	182	3,940	185	4,006	192	4,138	198	4,270	204	4,402	207	4,468	210	4,535			
Buena Vista Total		350	7,565	361	7,788	397	8,579	419	9,045	429	9,270	438	9,463	447	9,651	456	9,859	467	10,095	474	10,247	482	10,401	97	12,000	22,400
Sienna Hills																										
Trans #1	601	111	2,400	113	2,448	116	2,497	116	2,512	117	2,525	118	2,555	120	2,583	121	2,614	123	2,653	125	2,693	127	2,734			
	602	148	3,201	151	3,265	170	3,670	187	4,040	204	4,410	227	4,900	250	5,390	272	5,880	289	6,250	301	6,500	313	6,750			
	603	148	3,201	150	3,246	165	3,556	178	3,851	202	4,370	225	4,857	247	5,331	268	5,798	290	6,265	312	6,732	333	7,199			
Sienna Hills Total		408	8,803	415	8,960	450	9,724	482	10,403	523	11,305	570	12,312	616	13,304	662	14,292	702	15,169	737	15,925	772	16,683	98	12,000	22,400
Parkway																										
Trans #1	701	239	5,166	244	5,269	246	5,322	247	5,325	249	5,378	252	5,442	255	5,497	257	5,557	260	5,624	264	5,708	267	5,777			
	703	174	3,750	177	3,825	181	3,902	181	3,913	183	3,953	185	4,000	187	4,048	189	4,093	192	4,142	195	4,204	197	4,254			
Parkway Total		413	8,916	421	9,095	427	9,224	428	9,238	432	9,331	437	9,442	442	9,545	447	9,650	452	9,766	459	9,912	464	10,031	97	12,000	22,400
Total KVA		2,430	52,473	2,484	53,644	2,620	56,586	2,789	60,236	2,969	64,119	3,157	68,190	3,353	72,425	3,548	76,633	3,717	80,276	3,864	83,447	4,001	86,419			
Total KW			51,026		52,166		55,034		58,607		62,406		66,386		70,519		74,624		78,192		81,305		84,231		80,000	140,800
Growth Percentage					2%		5%		6%		6%		6%		6%		6%		5%		4%		4%			

Exceeds 80% of Base Transformer KVA Rating or 80% Circuit Rating

Exceeds Base Transformer KVA Rating

Exceeds 80% of Top Transformer KVA Rating or 100% Circuit Rating

TABLE 4
WASHINGTON CITY
SUBSTATION LOAD FORECAST
Projected Loads 2022-2032

Grapevine Addition

Substation	Circuit	YEAR Projected Load - kW																						Approx. Power Factor	Transformer Base Rating kVA	Transformer Top Rating kVA
		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032				
		Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA	Amps	kVA			
Main Street																										
Trans #1	101	109	2,360	111	2,407	114	2,456	114	2,468	115	2,493	117	2,517	118	2,555	120	2,594	122	2,645	124	2,672	125	2,699			
	102	89	1,931	91	1,970	93	2,009	94	2,029	95	2,050	96	2,072	97	2,103	99	2,135	101	2,178	102	2,210	103	2,232			
Trans #1 Total		199	4,292	203	4,377	207	4,465	208	4,497	210	4,542	213	4,590	216	4,659	219	4,728	223	4,823	226	4,882	228	4,931	99	10,000	14,400
Trans #2	201	131	2,829	134	2,886	136	2,943	138	2,973	139	3,002	141	3,047	143	3,084	145	3,130	148	3,193	150	3,241	152	3,276			
	202	154	3,321	157	3,387	166	3,587	157	3,387	158	3,421	161	3,473	163	3,514	165	3,567	168	3,621	170	3,675	172	3,715			
Trans #2 Total		285	6,150	290	6,273	302	6,531	294	6,360	297	6,424	302	6,520	306	6,598	310	6,697	315	6,813	320	6,916	324	6,992	99	10,000	14,400
Main Street Total		483	10,442	493	10,650	509	10,996	503	10,857	508	10,966	514	11,110	521	11,257	529	11,426	539	11,636	546	11,798	552	11,923		20,000	28,800
Staheli																										
Trans #1	301	122	2,629	124	2,682	127	2,735	128	2,763	129	2,790	131	2,832	133	2,866	135	2,926	138	2,985	140	3,030	142	3,063			
	302	95	2,042	100	2,152	117	2,517	135	2,920	154	3,323	174	3,760	195	4,214	211	4,552	226	4,890	230	4,963	232	5,012			
	303	126	2,721	129	2,775	135	2,924	142	3,073	151	3,261	157	3,394	163	3,527	172	3,715	175	3,771	176	3,809	178	3,847			
Staheli Total		342	7,392	352	7,609	379	8,177	405	8,756	434	9,375	462	9,986	491	10,607	518	11,193	539	11,645	546	11,801	552	11,922	99	12,000	22,400
Coral Canyon																										
Trans #1	401	220	4,749	224	4,844	229	4,941	231	4,990	233	5,040	237	5,116	239	5,172	243	5,250	245	5,302	248	5,355	250	5,409			
	402	213	4,607	218	4,699	228	4,926	244	5,266	265	5,729	290	6,260	318	6,861	346	7,463	361	7,789	367	7,934	367	7,934			
Coral Canyon Total		433	9,356	442	9,543	457	9,867	475	10,256	499	10,769	527	11,375	557	12,033	589	12,712	606	13,091	615	13,289	618	13,343	93	12,000	22,400
Buena Vista																										
Trans #1	501	43	926	47	1,016	54	1,166	60	1,296	66	1,436	70	1,516	71	1,539	73	1,570	74	1,601	75	1,625	77	1,657			
	502	172	3,706	175	3,780	179	3,856	180	3,894	181	3,914	184	3,972	186	4,012	189	4,072	190	4,113	192	4,154	194	4,196			
	503	136	2,933	139	2,992	165	3,558	179	3,874	182	3,940	185	4,006	192	4,138	198	4,270	204	4,402	206	4,446	208	4,490			
Buena Vista Total		350	7,565	361	7,788	397	8,579	420	9,064	430	9,289	440	9,494	449	9,689	459	9,912	468	10,116	473	10,225	479	10,343	97	12,000	22,400
Sienna Hills																										
Trans #1	601	111	2,400	113	2,448	116	2,497	117	2,525	118	2,550	120	2,588	121	2,619	124	2,672	126	2,725	127	2,752	130	2,807			
	602	148	3,201	151	3,265	170	3,670	170	3,670	172	3,707	174	3,763	176	3,800	179	3,857	182	3,934	184	3,974	186	4,021			
	603	148	3,201	150	3,246	165	3,556	178	3,851	202	4,370	225	4,857	247	5,331	268	5,798	290	6,265	312	6,732	333	7,199			
Sienna Hills Total		408	8,803	415	8,960	450	9,724	465	10,046	492	10,627	519	11,207	544	11,750	571	12,327	598	12,924	623	13,458	649	14,028	98	12,000	22,400
Parkway																										
Trans #1	701	239	5,166	244	5,269	246	5,322	247	5,333	248	5,359	251	5,413	253	5,467	257	5,549	259	5,605	262	5,661	265	5,717			
	702							37	810	70	1,519	103	2,229	136	2,939	169	3,649	202	4,358	238	5,143	274	5,928			
	703	174	3,750	177	3,825	181	3,902	182	3,925	183	3,945	184	3,984	186	4,024	189	4,084	191	4,125	193	4,167	195	4,208			
Parkway Total		413	8,916	421	9,095	427	9,224	466	10,068	501	10,824	538	11,626	576	12,430	615	13,282	652	14,088	693	14,970	734	15,853	97	12,000	22,400
Grapevine																										
Trans #1	801							37	810	70	1,519	103	2,229	136	2,939	169	3,649	202	4,358	238	5,143	274	5,928			
	802							17	370	34	740	57	1,230	80	1,720	102	2,210	119	2,580	131	2,830	143	3,080			
	803*																									
Grapevine Total								55	1,180	105	2,259	160	3,459	216	4,659	271	5,859	321	6,938	369	7,973	417	9,008	96	12,000	22,400
Total KVA		2,430	52,473	2,484	53,644	2,619	56,566	2,789	60,227	2,968	64,109	3,160	68,258	3,353	72,425	3,552	76,710	3,724	80,439	3,867	83,514	4,001	86,419		92,000	163,200
Total KW			51,026		52,166		55,016		58,588		62,378		66,427		70,490		74,668		78,313		81,321		84,169			
Growth Percentage					2%		5%		6%		6%		6%		6%		6%		5%		4%		4%			

*Grapevine 803 Circuit is a proposed improvement to serve as a backup circuit

Projects	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
1. Cherokee Springs Rebuild											
2, Kings Row Rebuild											
3. Winter Haven Rebuild											
4. New Circuit 702 (By Developers)											
5. New Circuit 801											
6. Circuit 801 Extension (By Developers)											
7. New Solente Lines (By Developers)											
8. New Grapevine Susbtation											
9. 69kV Line Extension w/ Circuit 802											
10. 69kV Line Extension w/ Underbuild											
11. New Circuit 803											
12. Circuit 803 Extension (By Developers)											
13. Circuit 803 to Circuit 402 Tie											
14. Circuit 402 Extension (By Developers)											
15. East Well Line Upgrade											
16. West Well Line Upgrade											
17. Circuit 102 to Circuit 603 Tie											
18. Circuit 302 to Circuit 303 Tie											
19. Circuit 302 to Circuit 301 Tie (By Developers)											

Exceeds 80% of Base Transformer KVA Rating or 80% Circuit Rating
Exceeds Base Transformer KVA Rating
Exceeds 80% of Top Transformer KVA Rating or 100% Circuit Rating

TABLE 5
WASHINGTON CITY
LOAD FORECAST
Projected Loads 2023-2034

Projected Future Loads - Load Type

Project	Acres	Units per Acre	# Units	kW per Unit	kW XFMR Total	Future Load kW	Approx. Install Date
100 East Area							
840 south storage	5.1				400	160	2024-2027
Cherry Orchards	2.4		21	5		105	2025-2027
Falcon Storage Condos					1,445	578	2024-2028
Sandy Creek					350	175	2024-2027
FM Medical					100	40	2023
LJ Secure Storage					75	30	2024-2026
Geneva Upgrade					75	30	2023
Thurston Industrial					100	40	2023
Kirkland homes	7.6		98	5		490	
Kirkland industrial	10.5		6	100		600	
Kirkland commercial	4.5		6	100		600	
Kirkland total						1,690	2024-2030
Subtotal						**2,848**	
Coral Canyon							
Solis			233	5		1,165	2024-2031
The Club			115		725	290	2026-2031
The Isle			91	5		455	2024-2030
The Rise			130	5		650	2024-2029
Amara at CC	4.1		135	5		675	2025-2030
Subtotal						**3,235**	
Downtown							
Residences			194		1,650	660	2024-2030
Tesla						750	2024-2025
Subtotal						**1,410**	
Exit 10							
Maverik					225	90	2023
Hilton Suites					500	200	2024-2027
Primavera						100	2024-2026
Residence Inn					500	200	2024-2026
Hospital					2,500	1,500	2025-2032
Subtotal						**2,090**	
Exit 13							
Automall						1,200	2024-2030
Grapevine Crossing	40					2,500	2024-2030
Subtotal						**3,700**	
900 - 1100 E Telegraph							
Bella Vista Phase 2	7.28					550	2024-2029
Desert Ridge						75	2023-2024
Desert Ridge 2						75	2024-2028
Hamilton Motors					50	35	2024
Laurel Ridge	1.75	4	7	7		49	2025-2027
The Ash					975	390	2024-2029
Subtotal						**1,174**	
Turner Turf Farm							
Stacked Homes			493	4		1,972	
Alley Load Towns			266	4		1,064	
Front Load Towns			150	4		600	
Single Family			39	5		195	
Retail			6	100		600	
Grocery Store			1	300		300	
Subtotal						**4,731**	2024-2034
Solente							
Low Density	294.8	4	1,179	6		7,074	
Medium Density	74	6	444	5		2,220	
Resort						500	
School	12		1	500		500	
Park	21.1		5	50		250	
Church	4		1	300		300	
Retail/ Commercial						2,000	
Cemetary	8.2		1	50		50	
Subtotal	414.1		1,631			**12,894**	
Total						**32,082**	2024-2034

TABLE 6
WASHINGTON CITY
LOAD FORECAST
Projected Loads 2023-2034

Projected Future Loads - Circuit Location

Circuit	Project	Total kW	kW Per Year											
			2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
202	Solente			200	1,269	1,269	1,269	1,269	1,269	1,269	1,269	1,269	1,269	1,269
202	Hospital				150	150	150	150	150	150	300	300		
202 Total		14,394	0	200	1,419	1,419	1,419	1,419	1,419	1,419	1,569	1,569	1,269	1,269
302	840 Storage Units			40	40	40	40							
302	Cherry Orchards				31.5	31.5	42							
302	Falcon Storage Condos			115.6	115.6	115.6	115.6	115.6						
302	Sandy Creek			35	35	35	70							
302	FM Medical		40											
302	LJ Secure Storage			6	12	12								
302	Geneva Upgrade		30											
302	Thurston Industrial		40											
302	Kirkland			169	169	169	169	338	338	338				
302 Total		2848	110	365.6	403.1	403.1	436.6	453.6	338	338	0	0	0	0
303	Bella Vista			110	110	110	55	55	110					
303	The Ash			39	39	78	78	78	78					
303 Total		940	0	149	149	188	133	133	188	0	0	0	0	0
401	Solis			116.5	116.5	116.5	116.5	233	233	116.5	116.5			
402	Amara at CC				67.5	67.5	135	135	135	135				
402	The Club					58	58	58	58	29	29			
402	The Isle			46	91	91	91	46	46	46				
402	The Rise			65	65	130	130	130	130					
402 Total		3235	0	227	340	463	530.5	601.5	601.5	326	145.5	0	0	0
501	Maverik		90											
501	Hilton Suites			40	40	60	60							
501	Primavera			30	30	20	20							
501	Residence Inn			80	60	60								
501 Total		590	90	150	130	140	80	0	0	0	0	0	0	0
503	Tesla			500	250									
503	Residences			66	66	66	66	132	132	132				
503 Total		1,410	0	566	316	66	66	132	132	132	0	0	0	0
602	Hamiliton Motors			35										
602	Automall			120	120	120	240	240	240	120				
602	Grapvine Crossing			250	250	250	250	250	250	250	250	250	250	
602 Total		3,735	0	405	370	370	490	490	490	370	250	250	250	0
603	Desert Ridge Phase 1		45	30										
603	Desert Ridge Phase 2			15.0	15.0	22.5	15.0	7.5						
603	Laurel Ridge				14.7	29.4	4.9							
603	Turner Turf Farm			264.9	264.9	466.9	466.9	466.9	466.9	466.9	466.9	466.9	466.9	466.9
603 Total		4931.4	45.0	309.9	294.6	518.8	486.8	474.4	466.9	466.9	466.9	466.9	466.9	466.9
City Total		**32,084**	**245**	**2,373**	**3,422**	**3,568**	**3,642**	**3,704**	**3,636**	**3,052**	**2,432**	**2,286**	**1,986**	**1,736**

PROPOSED IMPROVEMENTS

Proposed system improvements are summarized in the following table. A brief description of each improvement is given along with a brief listing of the issues that the improvement helps to solve. The estimated costs are in 2023 dollars. System maps showing the location for each proposed improvement are in the appendix. Improvements are numbered the same in the improvements tables and on the maps. A more detailed explanation of load flow results can be found in the Load Flow – Outage Cases section of the report. That section explains what outages were studied and what the results were for the outage cases.

Proposed System Improvements			
Proposed Improvement	**Reason/Explanation**	**Estimated Timeframe**	**Estimated Cost**
1. Cherokee Springs Rebuild	Improvement: Rebuild electrical system for Cherokee Springs mobile home park. Issues the improvement helps solve: The electrical system for Cherokee Springs mobile home park is aged directed buried cable. It needs to be replaced to improve reliability. There are a lot of outages now due to the old direct buried cable.	2026-2027	$240,000* *Cost was estimated by Washington City
2. Kings Row Rebuild	Improvement: Rebuild electrical system for Kings Row mobile home park. Issues the improvement helps solve: The electrical system for Kings Row mobile home park is aged directed buried cable. It needs to be replaced to improve reliability. There are a lot of outages now due to the old direct buried cable. Half of Kings Row electrical system has been rebuilt.	2024-2025	$120,000* *Cost was estimated by Washington City
3. Winter Haven Rebuild	Improvement: Rebuild electrical system for Winter Haven mobile home park. Issues the improvement helps solve: The electrical system for Winter Haven mobile home park is aged directed buried cable. It needs to be replaced to improve reliability. There are a lot of outages now due to the old direct buried cable.	2028-2029	$240,000* *Cost was estimated by Washington City

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4. New circuit 702 to the east as new load is built in the Solente area. (By Developers)	Improvement: It is proposed to install new circuit 702 to the east as new load is built in that area.	2024-2027	NA
	Issues the improvement helps solve: Circuit 702 can feed part of Solente area loads.		
5. New Circuit 801	Improvement: Add new circuit 801 to feed Solente area along Washington Parkway. New 750 kcmil main feeder along Washington Parkway is approximately 1,800 feet.	2024-2025	$349,624
	Issues the improvement helps solve: Solente area loads cannot be fed without adding lines to the load area.		
6. Circuit 801 extension. (By Developers)	Improvement: Extend circuit 801 to feed new Solente loads and new Hospital. New line is approximately 2,000 feet.	2024-2025	NA
	Issues the improvement helps solve: Solente area loads cannot be fed without adding lines to the load area.		
7. Developer installed new lines for Solente Area (By Developers)	Improvement: New lines for Solente area. Lines will be installed by the developer as the Solente area develops.	2024-2029	NA
	Issues the improvement helps solve: Solente loads cannot be fed without adding lines to the load area.		
8. New Grapevine Substation	Improvement: Install new Grapevine single bay substation. Recommend putting the substation on 1 acre to allow for a future second bay.	2024-2025	$6,238,646
	Issues the improvement helps solve: New substation is required due to load growth.		

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9. 69 kV line extension to Grapevine w/ 12.47 kV Circuit 802 underbuild	Improvement: Add new 795 ACSR 69 kV line with 477 ACSR 12.47 kV underbuild to feed Grapevine. Add new 69 kV line with underbuild to between Parkway and Grapevine. New line is approximately 9,600 feet.	2024-2025	$1,724,365
	Issues the improvement helps solve: A new substation is required to load growth. A 69 kV line to feed it is required. Parkway and Grapevine are both radially fed. Adding a 69 kV line between them will create a 69 kV loop so that the substations can be fed from two directions which will improve reliability. Underbuild circuit is required as part of Grapevine circuits.		
10. 69 kV line extension to Grapevine w/ 12.47kV underbuild	Improvement: Add new 69 kV line with underbuild to between Main and Grapevine. Add 12.47 kV underbuild to tie into circuit 802. New line is approximately 3,100 feet.	2024-2025	$886,660
	Issues the improvement helps solve: Creates a loop to feed the Grapevine substation from either Parkway or Main. The underbuild allows for more options to connect circuit 802.		
11. New Circuit 803	Improvement: Add new underground circuit 803. New line is approximately 2,600 feet.	2029-2030	$668,794
	Issues the improvement helps solve: New circuit 803 can tie into Sienna Hills circuit 603.		
12. Circuit 803 line extension. (By Developers)	Improvement: Add new underground circuit 803. New line is approximately 3,400 feet.	2030-2031	NA
	Issues the improvement helps solve: New circuit 803 can tie into Sienna Hills circuit 601.		

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13. Circuit 601 (Future 803) to circuit 402 tie cable installation.	Improvement: Add underground conductor on circuit (601/803). New line is approximately 2,000 feet. Issues the improvement helps solve: New circuit 803 can tie into Coral Canyon circuit 402.	2024-2025	$199,893
14. Circuit 402 line extension. (By Developers)	Improvement: Extend underground circuit 402. New line is approximately 1,700 feet. Issues the improvement helps solve: Circuit 402 can tie into Main circuit 202.	2030-2031	NA
15. East Well Line Upgrade	Improvement: Rebuild East Well line from Grapevine Substation to the end of the line. Line is approximately 14,140 feet. Issues the improvement helps solve: Improves reliability of line.	2028-2029	$479,602* *Cost was estimated by Washington City
16. West Well Line Upgrade	Improvement: Rebuild West Well line from HCA boundary to the end of line. Line is approximately 9,400 feet. Issues the improvement helps solve: Improves reliability of line.	2026-2027	$351,890* *Cost was estimated by Washington City
17. Circuit 102 to Circuit 603 tie.	Improvement: Add a new underground line from approximately 600 North 300 E to 800 East Bluff View Drive. The new line will be underground 750 kcmil for approximately 1,430 feet and overhead 477 ACSR for approximately 1,760 feet. Issues the improvement helps solve: Creates tie to feed circuit 603 from circuit 102.	2030-2031	$477,562

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18. Circuit 302 to Circuit 303 tie.	Improvement: Add a new underground 750 kcmil line from approximately 200 South 100 East to 200 South Bella Vista Drive. New line is approximately 3,400 feet. This requires a new underground 750 kcmil lime from approximately Ricky Road Telegraph Street to Horizons West Road Telegraph Street. New line is approximately 650 feet.	2030-2031	$760,484
	Issues the improvement helps solve: Creates tie to feed circuit 603 from circuit 102.		
19. Circuit 302 to Circuit 301 tie. (By Developers)	Improvement: Add a new overhead 477 ACSR line to tie circuit 302 and circuit 301. New line is approximately 2,800 feet.	2031-2032	NA
	Issues the improvement helps solve: Creates tie to feed circuit 302 from circuit 301.		
		Total Cost	**$12,737,520**

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LOAD FLOW – OUTAGE CASES

System load flow studies were performed for the existing system, the system in five years, and the system in ten years. To accomplish this load flows were performed for years 2022, 2027, and 2032. The load flow studies were utilized to assess line and transformer loading conditions and system voltage conditions. Tables shown in the System Load History and Forecast section of the report contain projected Washington City system load and projected circuit loads for years that were analyzed.

N-1 loss of substation transformers, reclosers, and lines were considered. Load flows were ran with outages taken one at a time. Loads from the equipment that was out of service were transferred to adjacent circuits. In a few outage cases, it became apparent that system improvements were necessary. The table below lists the load flow results and discusses required system improvements. Results are based on projected peak (summer) load levels. During winter load levels the outages would not have as great of an effect.

The Comments/Results column of the following tables lists ways to restore load during a recloser, line or transformer outage. It also discusses proposed solutions if the outage creates problems. In some cases more than one option of restoring load could be possible. Washington City may have developed load transfer schemes that differ from the ones shown.

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2022 Outage Cases	Comments/Results
Base Case	**Houses, apartments, hotels, Strip Mall, Auto Mall, Grape Vine Commercial, Signal Peak Health, and Solente are projected to start being built by 2024-2025 and need to be fed from new circuits.**
Base Case Proposed Solutions	**New circuit 801 will feed the north part of circuit 102 including Signal Peak Health and new Solente loads. Solente loads will require new lines. See Project 5.** **New circuit 802 will feed part of Solente load. See Project 6.** **Circuit 702 will feed part of new Solente load. Solente load will require new lines. See Project 4.**
69 kV	69 kV line out of service: Most substations can be fed from more than one direction. If one of the substations that cannot be fed from another direction loses its 69 kV feed then the substation will need to be backed up at the 12.47 kV level. Parkway and Buena Vista are only fed from one direction. **It is beneficial to get the radial substations on a 69 kV loop. Once Grapevine is installed it makes sense add a 69 kV line between Parkway and Grapevine.**
69 kV Proposed Solutions	**Install new 69kV line to new GrapeVine Substation and extend 69kV line to create loop for GrapeVine and Parkway. See Project 9.** **This will allow Grapevine and Parkway to be fed from more than one direction.**
Main Street T1 Outage Conditions	Main Street T1 line or recloser out of service: Circuit 101 can be backed up by circuit 301. Circuit 102 can be backed up by circuit 303.
	Main Street T1 transformer out of service: Same conditions as above.
Main Street T1 Proposed Solutions	None
Main Street T2 Outage Conditions	Main Street T2 line or recloser out of service: Circuit 201 can be backed up by circuit 102. Circuit 202 can be backed up by circuit 703.
	Main Street T2 transformer out of service: Same conditions as above.
Main Street T2 Proposed Solutions	None

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2022 Outage Cases	Comments/Results
Staheli Outage Conditions	Staheli line or recloser out of service: Circuit 301 can be backed up by circuit 503. Circuit 302 can be backed up by circuit 503. Circuit 303 can be backed up by circuit 102.
	Staheli transformer out of service: Same conditions as above.
Staheli Proposed Solutions	None
Coral Canyon Outage Conditions	Coral Canyon line or recloser out of service: Circuit 401 can be backed up by circuit 601 and circuit 202. Load needs to be shifted from circuit 601 to circuit 602. Required switching is complicated and should be simplified. Circuit 402 can be backed up by circuit 601.
	Coral Canyon transformer out of service: Same conditions as above.
Coral Canyon Proposed Solutions	**Install Grapevine Substation to back up circuit 401 with Grapevine circuit 802. Circuit 401 can be backed up but it is a complicated process. See Project 8.**
Buena Vista Outage Conditions	Buena Vista line or recloser out of service: Circuit 501 can be backed up by circuit 701. Circuit 502 can be backed up by circuit 201 and 701. Circuit 503 can be backed up by circuit 301.
	Buena Vista transformer out of service: Same conditions as above.
Buena Vista Proposed Solutions	None
Sienna Hills Outage Conditions	Sienna Hills line or recloser out of service: Circuit 601 can be backed up by circuit 402. Circuit 602 can be backed up by circuit 202. Circuit 603 can be backed up by circuit 303.
	Sienna Hills transformer out of service: Same conditions as above.
Sienna Hills Proposed Solutions	None

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2022 Outage Cases	Comments/Results
Parkway Outage Conditions	Parkway line or recloser out of service: Circuit 701 can be backed up by circuit 502. Circuit 703 can be backed up by circuit 201.
	Parkway transformer out of service: Same conditions as above.
Parkway Proposed Solutions	None

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2027 Outage Cases (Includes 2022 Upgrades)	Comments/Results
Base Case	**Projected loads will increase by 15 MW between 2023 and 2027.** **The 2027 outage cases below assume that Base Case proposed solutions are completed.**
Base Case Proposed Solutions	None
69 kV	69 kV line out of service: None
69 kV Proposed Solutions	None
Main Street T1 Outage Conditions	Main Street T1 line or recloser out of service: Circuit 101 can be backed up by circuit 301. Circuit 102 can be backed up by circuit 303.
Main Street T1 Outage Conditions	Main Street T1 transformer out of service: Same conditions as above.
Main Street T1 Proposed Solutions	None
Main Street T2 Outage Conditions	Main Street T2 line or recloser out of service: Circuit 201 can be backed up by circuit 703. Circuit 202 can be backed up by circuit 102.
Main Street T2 Outage Conditions	Main Street T2 transformer out of service: Same conditions as above.
Main Street T2 Proposed Solutions	None
Staheli Outage Conditions	Staheli line or recloser out of service: Circuit 301 can be backed up by circuit 503. Circuit 302 can be backed up by circuit 503. Circuit 303 can be backed up by circuit 102.
Staheli Outage Conditions	Staheli transformer out of service: Same conditions as above.
Staheli Proposed Solutions	None
Coral Canyon Outage Conditions	Coral Canyon line or recloser out of service: Circuit 401 can be backed up by circuit 802. Circuit 402 can be backed up by circuit 601. Transfer some load from circuit 601 to circuit 602.

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2027 Outage Cases (Includes 2022 Upgrades)	**Comments/Results**
Coral Canyon Outage Conditions	Coral Canyon transformer out of service: Same conditions as above.
Coral Canyon Proposed Solutions	None
Buena Vista Outage Conditions	Buena Vista line or recloser out of service: Circuit 501 can be backed up by circuit 701. Circuit 502 can be backed up by circuit 201. Circuit 503 can be backed up by new circuit 301.
Buena Vista Outage Conditions	Buena Vista transformer out of service: Same conditions as above.
Buena Vista Proposed Solutions	None
Sienna Hills Outage Conditions	Sienna Hills line or recloser out of service: Circuit 601 can be backed up by circuit 402. Circuit 602 can be backed up by circuit 202. Circuit 603 can be backed up by circuit 303.
Sienna Hills Outage Conditions	Sienna Hills transformer out of service: Same conditions as above.
Sienna Hills Proposed Solutions	None
Parkway Outage Conditions	Parkway line or recloser out of service: Circuit 701 can be backed up by circuit 502. Circuit 702 can be backed up by circuit 801. Circuit 703 can be backed up by circuit 201.
Parkway Outage Conditions	Parkway transformer out of service: Same conditions as above.
Parkway Proposed Solutions	None

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2027 **Outage Cases** **(Includes 2022 Upgrades)**	**Comments/Results**
Grapevine Outage Conditions	Grapevine line or recloser out of service: Circuit 801 can be backed up by circuit 702. Circuit 802 can be backed up by circuit 202.
Grapevine Outage Conditions	Grapevine transformer out of service: Same conditions as above.
Grapevine Proposed Solutions	None

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2032 Outage Cases (Includes 2027 Upgrades)	Comments/Results
Base Case	**Projected loads will increase by 17 MW between 2028 and 2032.** **The Sienna Hills transformer is projected to be loaded beyond the 12 MVA base rating.** **The Parkway transformer is projected to be loaded beyond the 12 MVA base rating.** **The Coral Canyon transformer is projected to be loaded beyond the 12 MVA base rating.** **Even though transformer loading is getting high, loads are still able to be backed up during N-1 conditions.**
Base Case Proposed Solutions	None
69 kV	69 kV line out of service: None
69 kV Proposed Solutions	None
Main Street T1 Outage Conditions	Main Street T1 line or recloser out of service: Circuit 101 can be backed up by circuit 301. Circuit 102 can be backed up by circuit 303.
	Main Street T1 transformer out of service: Same conditions as above.
Main Street T1 Proposed Solutions	None
Main Street T2 Outage Conditions	Main Street T2 line or recloser out of service: Circuit 201 can be backed up by circuit 703. Circuit 202 can be backed up by circuit 102.
	Main Street T2 transformer out of service: Same conditions as above.
Main Street T2 Proposed Solutions	None
Staheli Outage Conditions	Staheli line or recloser out of service: Circuit 301 can be backed up by circuit 101. Circuit 302 can be backed up by circuit 503. Circuit 303 can be backed up by circuit 102.

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2032 Outage Cases (Includes 2027 Upgrades)	**Comments/Results**
	Staheli transformer out of service: Same conditions as above.
Staheli Proposed Solutions	None
Coral Canyon Outage Conditions	Coral Canyon line or recloser out of service: Circuit 401 can be backed up by circuit 801 and 601. **Circuit 402 cannot be backed up.**
	Coral Canyon transformer out of service: Same conditions as above.
Coral Canyon Proposed Solutions	**Add new Grape Vine circuit 803 to back up circuit 402. See Projects 11, 12, and 13.** **Transfer some load from circuit 601 to circuit 602.**
Buena Vista Outage Conditions	Buena Vista line or recloser out of service: Circuit 501 can be backed up by circuit 701. Circuit 502 can be backed up by circuit 201. Circuit 503 can be backed up by circuit 301.
	Buena Vista transformer out of service: Same conditions as above.
Buena Vista Proposed Solutions	None
Sienna Hills Outage Conditions	Sienna Hills line or recloser out of service: Circuit 601 can be backed up by circuit 402. **Circuit 602 cannot be backed up.** Circuit 603 can be backed up by circuit 202.
Sienna Hills Outage Conditions	Sienna Hills transformer out of service: Same conditions as above.
Sienna Hills Proposed Solutions	**Add new Grape Vine circuit 803 to back up circuit 602. See Projects 11 and 12.**
Parkway Outage Conditions	Parkway line or recloser out of service: Circuit 701 can be backed up by circuit 501 and 502. Circuit 702 can be backed up by circuit 801. Circuit 703 can be backed up by circuit 202.

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2032 Outage Cases (Includes 2027 Upgrades)	**Comments/Results**
Parkway Outage Conditions	Parkway transformer out of service: Same conditions as above.
Parkway Proposed Solutions	None
Grapevine Outage Conditions	Grapevine line or recloser out of service: Circuit 801 can be backed up by circuit 702. Circuit 802 can be backed up by circuit 202.
Grapevine Outage Conditions	Grapevine transformer out of service: Same conditions as above.
Grapevine Proposed Solutions	None

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EQUIPMENT RATINGS

TABLE 6
WASHINGTON CITY SUBSTATION EQUIPMENT RATINGS

SUBSTATION	TRANSFORMER	REGULATOR	RECLOSERS
Main Street Trans #1	10/12.5 MVA @55°C(OA/FA) 14.4 MVA @ 65°C (OA/FA) 67,000 – 12,470Y/7,200 volts	3-509 kVA (15.3 MVA)	**Circuit #101:** Cooper VWE w/ SEL-651RA 800 Amp Rating **Circuit #102:** Cooper VWE w/ SEL-651RA 800 Amp Rating
Main Street Trans #2	10/12.5 MVA @55°C (OA/FA) 14.4 MVA @ 65°C (OA/FA) 67,000 – 12,470Y/7,200 volts	3-509 kVA (15.3 MVA)	**Circuit #201:** Cooper VWE w/ SEL-651RA 800 Amp Rating **Circuit #202:** Cooper VWE w/ SEL-651RA 800 Amp Rating
Staheli Sub Trans #1	12/16/20 MVA @55°C (OA/FA/FA) 22.4 MVA @ 65°C (OA/FA/FA) 67,000 – 12,470Y/7,200 volts	3-887 kVA (26.6 MVA)	**Circuit #301:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #302:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #303:** G&W Solid Dielectric Sw. 800 Amp continuous
Coral Canyon Trans #1	12/16/20 MVA @55°C (OA/FA/FA) 22.4 MVA @ 65°C (OA/FA/FA) 67,000 – 12,470Y/7200 volts	3-887 kVA (26.6 MVA)	**Circuit #401:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #402:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #403:** G&W Solid Dielectric Sw. 800 Amp continuous

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SUBSTATION	TRANSFORMER	REGULATOR	RECLOSERS
Buena Vista Trans #1	12/16/20 MVA @55°C (OA/FA/FA) 22.4 MVA @ 65°C (OA/FA/FA) 67,000 – 12,470Y/7,200 volts	3-887 kVA (26.6 MVA)	**Circuit #501:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #502:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #503:** G&W Solid Dielectric Sw. 800 Amp continuous
Sienna Hills Trans #1	12/16/20 MVA @55°C (OA/FA/FA) 22.4 MVA @ 65°C (OA/FA/FA) 67,000 – 12,470Y/7,200 volts	3-887 kVA (26.6 MVA)	**Circuit #601:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #602:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #603:** G&W Solid Dielectric Sw. 800 Amp continuous
Parkway Trans #1	12/16/20 MVA @55°C (OA/FA/FA) 22.4 MVA @ 65°C (OA/FA/FA) 67,000 – 12,470Y/7,200 volts	3-889 kVA (26.6 MVA)	**Circuit #701:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #702:** G&W Solid Dielectric Sw. 800 Amp continuous **Circuit #703:** G&W Solid Dielectric Sw. 800 Amp continuous

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TABLE 7
SUBSTATION CAPACITY RATINGS

SUBSTATION	TOTAL CAPACITY (MVA)[1]			CAPACITY OF CIRCUITS LEAVING THE SUBSTATION (AMPS)		
	NORMAL (BASE)	MAXIMUM	LIMITING ELEMENT	CIRCUIT	CONDUCTOR	MAXIMUM[2] AMPS
MAIN STREET TRANS #1 (South Unit)	10	14.4 @ 65°C OA/FA Regulators: 15.3 MVA @ 65°C	Transformer or regulators	#101	750 AL CN	497
				#102	750 AL CN / 477 ACSR	497
MAIN STREET TRANS #2 (South Unit)	10	14.4 @ 65°C OA/FA Regulators: 15.3 MVA @ 65°C	Transformer or regulators	#201	750 AL CN	497
				#202	750 AL CN	497
STAHELI TRANS #1	12	22.4 @ 65°C OA/FA/FA Regulators: 26.6 MVA @ 55°C	Transformer	#301	750 AL CN / 477 ACSR	497
				#302	750 AL CN / 477 ACSR	497
				#303	750 AL CN / 4/0 ACSR	340
CORAL CANYON TRANS #1	12	22.4 @ 65°C OA/FA/FA Regulators: 26.6 MVA @ 55°C	Transformer	#401	750 AL CN	497
				#402	750 AL CN	497
				#403	750 AL CN	497
BUENA VISTA TRANS #1	12	22.4 @ 65°C OA/FA/FA Regulators: 26.6 MVA @ 55°C	Transformer	#501	750 AL CN	497
				#502	750 AL CN	497
				#503	750 AL CN	497
SIENNA HILLS TRANS #1	12	22.4 @ 65°C OA/FA/FA Regulators: 26.6 MVA @ 55°C	Transformer	#601	750 AL CN	497
				#602	750 AL CN	497
				#603	750 AL CN	497
PARKWAY TRANS #1	12	22.4 @ 65°C OA/FA/FA Regulators: 26.6 MVA @ 55°C	Transformer	#701	750 AL CN	497
				#702	750 AL CN	497
				#703	750 AL CN	497

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NOTES:

(1) Normal capacity of the substation should be exceeded only temporarily for emergencies or maintenance. The normal rating is based on the ability to backup loss of a transformer using another transformer within the substation or using adjacent substations and lines. The maximum capacity is based on transformer forced air rating at 65° C rise. This is the maximum load that should be placed on the substation transformer and should be used only when necessary to backup loss of another transformer or system element. In cold weather, maximum rating can be increased in accordance with ANSI Standard C57.92. For example, if average daily temperature is 30° F, the transformer can be loaded to about 120% of the nameplate rating. However, if the average daily temperature is over 100° F, the loading of the transformer should be at or less than the nameplate rating for a 65° C rise above ambient.

(2) Ampacity ratings for overhead lines given are for extreme summer conditions (100° F). Underground cable ampacity ratings given are for earth at 68° F. Conservative loading of underground three phase circuits is recommended where single cables are run in metallic conduits. Circuit MVA ratings assume 10% imbalance of phase currents.

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TABLE 8

DISTRIBUTION LINE CAPACITY RATINGS[1]
THREE PHASE 12.47 kV SERVICE

LINE CONDUCTOR	OVERHEAD LINES[2] (AMPS or MVA)	UNDERGROUND LINES[2]		SUMMER RATING[3] (MVA)	PLANNING RATING[4] (MVA)
		3 Conductors in 1 Duct	3 Conductors in 3 PVC Ducts		
750 AL CN Cable		497 or 10.7	601 or 12.9	9.8	5.0
4/0 AL CN Cable		230 or 5.0	268 or 5.8	4.6	2.5
477 ACSR	670 or 14.4			12.0	7.0
4/0 ACSR	340 or 7.3			6.0	3.5
1/0 ACSR	230 or 4.9			4.0	2.5
2 ACSR	180 or 3.8			3.1	2.0
6 Copper	120 or 2.5			2.0	1.5

NOTES:
(1) Thermal overload ratings are listed. Capacity to supply power over specific lines in the City may be restricted by voltage drop or other constraints.
(2) Ampacities for underground cable: 194°F conductor, 68°F earth, 75% load factor. From Okonite Engineering data book. Ampacities for overhead conductor: 77°F air, 167°F conductor, wind 1.4 mph.
(3) Summer rating for overhead conductor: 100°F air, 176°F conductor. Wind 1.4 mph. Underground conductor: 3 cables in single direct-buried conduit, 194°F conductor, 68°F earth, 75% load factor.
(4) Planning rating is established at approximately 50% loading.

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APPENDICES

1. System Maps
2. Cost Estimates
3. Load Flow Studies

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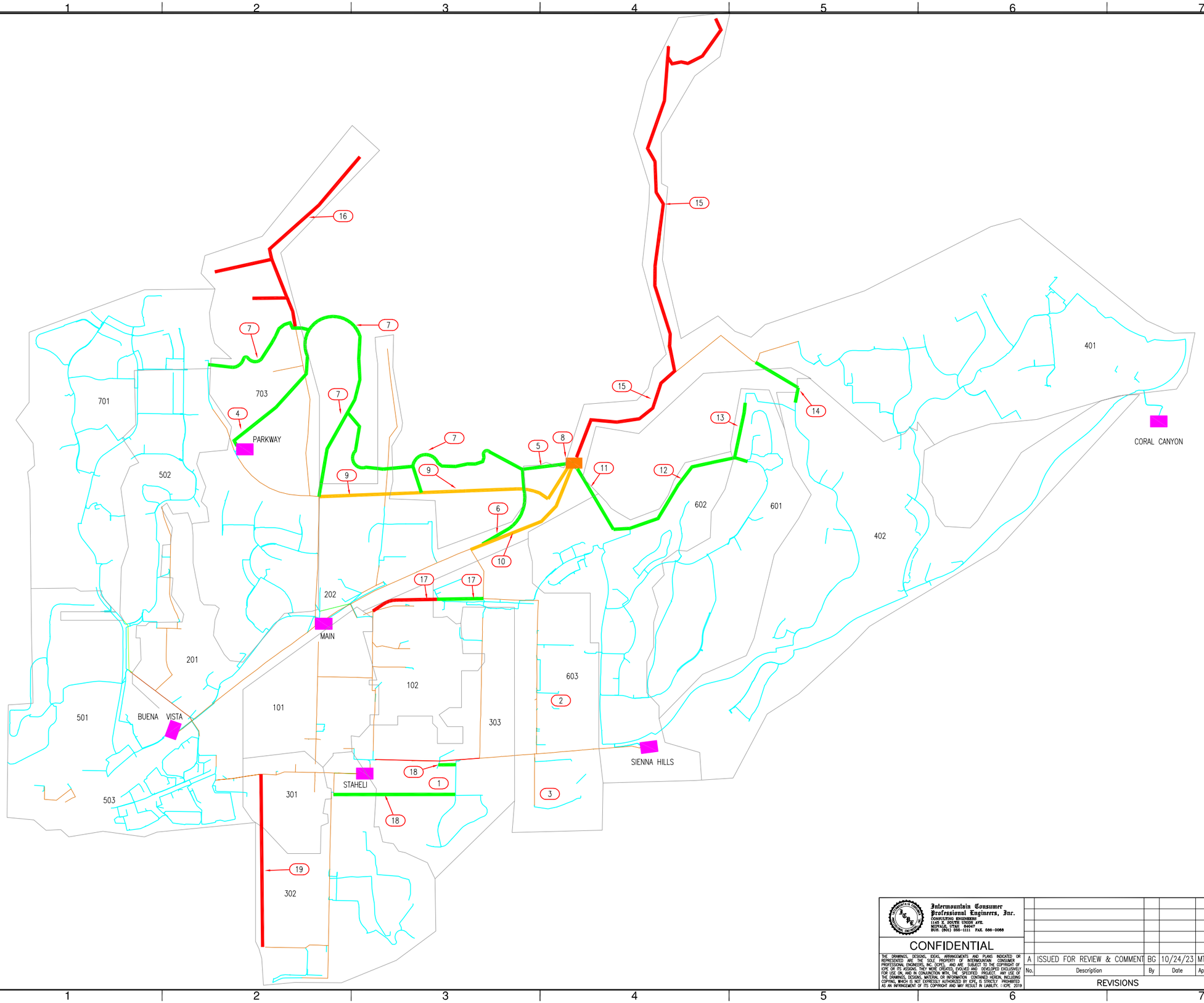

LEGEND

- NEW SUBSTATION
- EXISTING SUBSTATION
- EXISTING 12.47 kV OVERHEAD DISTRIBUTION LINE
- EXISTING 12.47 kV UNDERGROUND DISTRIBUTION FEEDER
- EXISTING 69 kV TRANSMISSION LINE
- EXISTING CIRCUIT BOUNDARIES
- PROPOSED 12.47 kV OVERHEAD IMPROVEMENTS
- PROPOSED 12.47 kV UNDERGROUND IMPROVEMENTS
- PROPOSED 69 kV OVERHEAD IMPROVEMENTS
- KEYED NOTE CALL-OUT

KEYED NOTES

1. CHEROKEE SPRINGS REBUILD.
2. KINGS ROW REBUILD.
3. WINTER HAVEN REBUILD.
4. NEW CIRCUIT 702 TO THE EAST AS NEW LOAD IS BUILT IN THE SOLENTE AREA. (BY DEVELOPERS)
5. NEW CIRCUIT 801.
6. CIRCUIT 801 LINE EXTENSION. (BY DEVELOPERS)
7. NEW LINES FOR SOLENTE AREA. (BY DEVELOPERS)
8. INSTALL NEW GRAPEVINE SUBSTATION.
9. 69KV LINE EXTENSION TO GRAPEVINE WITH CIRCUIT 802 UNDERBUILD.
10. 69KV LINE EXTENSION TO GRAPEVINE WITH UNDERBUILD.
11. NEW CIRCUIT 803.
12. CIRCUIT 803 LINE EXTENSION. (BY DEVELOPERS)
13. CIRCUIT 601/803 TO CIRCUIT 402 TIE CABLE INSTALLATION.
14. CIRCUIT 402 LINE EXTENSION. (BY DEVELOPERS)
15. EAST WELL LINE UPGRADE.
16. WEST WELL LINE UPGRADE.
17. CIRCUIT 102 TO CIRCUIT 603 TIE
18. CIRCUIT 302 TO CIRCUIT 303 TIE.
19. CIRCUIT 302 TO CIRCUIT 301 TIE. (BY DEVELOPERS)

Intermountain Consumer Professional Engineers, Inc.
CONSULTING ENGINEERS
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MIDVALE, UTAH 84047
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No.	Description	By	Date	App.
A	ISSUED FOR REVIEW & COMMENT	BG	10/24/23	MTF

REVISIONS

Title:

WASHINGTON CITY

ELECTRICAL
CAPITAL FACILITIES PLAN
PROPOSED IMPROVEMENTS 2022-2032

Dwn.	MB	Date	12/16/19	Drawing No.	Rev.
Engr.	CBM	Date	12/16/19	E100	A
Chk.	MTF	Date	12/16/19		
App.	APP	Date	APP_DT		
Proj. No	071-076	Scale	NTS		

Q:\ONE-LINER DATA\MACF-WORKFILES\WASHINGTON CITY\071-076 CFP & IFFP UPDATE 2023\AUTOCAD DWG\071-076_E100.DWG

COST ESTIMATE			DATE PREPARED: 4/15/2024				SHEET 1 of 1	
PROJECT Project 5: New Circuit 801 (Washington Parkway)						BASIS FOR ESTIMATE CODE A (Schematic Design)		
DESCRIPTION New 15 kV 750 AL Main Feeder						CODE B (Preliminary Design) CODE C (Final Design) 100%		
ENGINEER : Benny Garcia						OTHER (NO DESIGN)		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
UNDERGROUND								
Primary Risers								
Three Phase - Primary Riser Large Conductor	1	EA	27.50	27.50	3,712.50	2,994.00	2,994.00	6,706.50
Primary Cable Installation (Cable Only)								
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	5940	FT	0.015	89.10	12,028.50	12.00	71,280.00	83,308.50
15 kV Terminator	3	EA	1.00	3.00	405.00	100.00	300.00	705.00
Trenching								
Utility Trench for Multiple Conduit - Good Soil	1800	LF	0.150	270.00	36,450.00	0.00	2,500.00	38,950.00
Conduit Installation								
3" PVC Conduits - 10 ft.	180	EA	0.040	7.20	972.00	70.00	12,600.00	13,572.00
Sectionalizer								
Ground Sleeve Base for - Three Phase Sectionalizer	2	EA	4.00	8.00	1,080.00	400.00	800.00	1,880.00
Sectionalizer - Three Phase - 4-600 Amp Positions	2	EA	24.00	48.00	6,480.00	10,500.00	21,000.00	27,480.00
Switchgear								
Concrete Basement for Three Phase Switch PMH Switchgear	1	EA	8.00	8.00	1,080.00	5,700.00	5,700.00	6,780.00
PMH-10 Switchgear (4-600 Amp Sw.)	1	EA	48.00	48.00	6,480.00	25,000.00	25,000.00	31,480.00
Subtotal				508.80	68,688.00		142,174.00	
Avg. Labor Rate	135.00							
Subtotal Labor					$68,688.00			$68,688.00
Subtotal Material							$142,174.00	$142,174.00
Sales Tax Material	7.80%							$11,089.57
Subtotal Labor, Material & Tax								$221,951.57
Equipment & Trucks	169.60					$ 125.00		$21,200.00
Restoration	15.00%							$35,000.00
Contingency	20.00%							$48,600.00
Engineering	7.00%							$22,872.61
TOTAL ESTIMATE								$349,624.18

Notes & Comments:

1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE

DATE PREPARED: 4/29/2024

PROJECT:
Project 8: New Grapevine Substation (One Bay)

DESCRIPTION:
Install New Grapevine Substation

ENGINEER : Benny Garcia

BASIS FOR ESTIMATE
CODE A (Schematic Design)
CODE B (Preliminary Design)
CODE C (Final Design) 100%
OTHER--Conceptual Configuration

ESTIMATOR: Benny Garcia
CHECKED: Matt Levorsen

DESCRIPTION	QUANTITY NO. UNITS	QUANTITY UNIT MEAS	Avg. Labor Rate: $135.00 LABOR PER UNIT	LABOR TOTAL Man Hr.	LABOR TOTAL LABOR ($)	MATERIAL ($) PER UNIT	MATERIAL ($) TOTAL MATERIAL	TOTAL ESTIMATE
Major Equipment								
69 kV - 12.47kV Transformer 12/16/20 MVA	1	EA	280	280.00	$37,800.00	$850,000.00	$850,000.00	$887,800.00
12.47 kV Regulators	3	EA	60	180.00	$24,300.00	$147,000.00	$441,000.00	$465,300.00
69 kV Breaker	1	EA	60	60.00	$8,100.00	$72,000.00	$72,000.00	$80,100.00
69 kV Group Operated Switch	4	EA	60	240.00	$32,400.00	$16,500.00	$66,000.00	$98,400.00
15 kV Reclosers	3	EA	40	120.00	$16,200.00	$32,000.00	$96,000.00	$112,200.00
15 kV Group Operated Switch	2	EA	60	120.00	$16,200.00	$11,000.00	$22,000.00	$38,200.00
15 kV Padmount PME-10 Switches	3	EA	80	240.00	$32,400.00	$27,500.00	$82,500.00	$114,900.00
							Total	**$1,796,900.00**
Metering / Relaying / SCADA								
15 kV Metering (PTs & CTs)	1	LS	60	60.00	$8,100.00	$10,800.00	$10,800.00	$18,900.00
Relay Panel - Transformer Diff (Installation & Wire Terminations)	1	LS	80	80.00	$10,800.00	$42,000.00	$42,000.00	$52,800.00
Relay Panel - Recloser Control (Installation & Wire Terminations	1	LS	80	80.00	$10,800.00	$36,000.00	$36,000.00	$46,800.00
Relay Panel - Meter Panel (Installation & Wire Terminations)	1	LS	40	40.00	$5,400.00	$24,000.00	$24,000.00	$29,400.00
SCADA Equipment & Programming	1	LS	200	200.00	$27,000.00	$90,000.00	$90,000.00	$117,000.00
							Total	**$264,900.00**
Steel Structures								
69 kV Deadend Structure	1	EA	60.00	60.00	$8,100.00	$59,640.00	$59,640.00	$67,740.00
69 kV Switch Structure	3	EA	20.00	60.00	$8,100.00	$14,850.00	$44,550.00	$52,650.00
15 kV Metering / Regulator Structure	1	EA	80.00	80.00	$10,800.00	$31,515.00	$31,515.00	$42,315.00
15 kV Switch Structure	2	EA	16.00	32.00	$4,320.00	$5,032.50	$10,065.00	$14,385.00
15 kV Recloser Structure	3	EA	16.00	48.00	$6,480.00	$5,940.00	$17,820.00	$24,300.00
Static Wire Pole	4	EA	8.00	32.00	$4,320.00	$9,570.00	$38,280.00	$42,600.00
Switch Platform	6	EA	4.00	24.00	$3,240.00	$1,320.00	$7,920.00	$11,160.00
69 kV Bus Support (1-Phase)	9	EA	6.00	54.00	$7,290.00	$1,595.00	$14,355.00	$21,645.00
15 kV Bus Support (1-Phase)	3	EA	6.00	18.00	$2,430.00	$1,571.63	$4,714.88	$7,144.88
							Total	**$283,939.88**
Concrete Foundations								
69 kV Deadend Structure	2	EA	16	32.00	$4,320.00	$11,088.00	$22,176.00	$26,496.00
69 kV Switch Structure	2	EA	16	32.00	$4,320.00	$11,088.00	$22,176.00	$26,496.00
15 kV Switch Structure	4	EA	8	32.00	$4,320.00	$4,356.00	$17,424.00	$21,744.00
15 kV Recloser Structure	3	EA	8	24.00	$3,240.00	$4,620.00	$13,860.00	$17,100.00
Static Wire Pole	4	EA	4	16.00	$2,160.00	$5,676.00	$22,704.00	$24,864.00
Transformer Pad & Containment	1	EA	80	80.00	$10,800.00	$119,280.00	$119,280.00	$130,080.00
69 kV Breaker Pad	1	EA	8	8.00	$1,080.00	$5,040.00	$5,040.00	$6,120.00
Control Building Pad	1	EA	24	24.00	$3,240.00	$28,896.00	$28,896.00	$32,136.00
PME-10 Switch Concrete Basement	3	EA	8	24.00	$3,240.00	$5,700.00	$17,100.00	$20,340.00
69 kV Bus Support (1-Phase)	9	EA	4	36.00	$4,860.00	$4,030.00	$36,270.00	$41,130.00
15 kV Bus Support (1-Phase)	3	EA	4	12.00	$1,620.00	$4,610.00	$13,830.00	$15,450.00
							Total	**$361,956.00**
Control Building								
Control Building - 14' x 20' - Blockwall Type	1	EA	160	160.00	$21,600.00	$200,000.00	$200,000.00	$221,600.00
Control Building Mech. Equipment	1	LS	40	40.00	$5,400.00	$35,000.00	$35,000.00	$40,400.00
125 VDC Battery System	1	EA	80	80.00	$10,800.00	$38,500.00	$38,500.00	$49,300.00
Control Building AC Systems	1	LS	80	80.00	$10,800.00	$25,000.00	$25,000.00	$35,800.00
							Total	**$347,100.00**
Substation Bus & Material								
69 kV Bus & Fittings	1	LS	120	120.00	$16,200.00	$45,000.00	$45,000.00	$61,200.00
15 kV Bus & Fittings	1	LS	240	240.00	$32,400.00	$60,000.00	$60,000.00	$92,400.00
Regulator Bypass Switches	3	EA	4	12.00	$1,620.00	$3,000.00	$9,000.00	$10,620.00
Recloser Bypass Switches	18	EA	4	72.00	$9,720.00	$960.00	$17,280.00	$27,000.00
Recloser Fused Switches	9	EA	4	36.00	$4,860.00	$2,520.00	$22,680.00	$27,540.00
Station Lightning Protection	1	LS	32	32.00	$4,320.00	$8,500.00	$8,500.00	$12,820.00
69 kV Lightning Arresters	3	EA	4	12.00	$1,620.00	$1,800.00	$5,400.00	$7,020.00
9 kV Lightning Arresters	9	EA	2	18.00	$2,430.00	$800.00	$7,200.00	$9,630.00
							Total	**$248,230.00**
Substation Conduit & Cable								
600 Volt Conduit & Cable	1	LS	240	240.00	$32,400.00	$75,000.00	$75,000.00	$107,400.00
15 kV 6" Conduit - 10 ft. (15 kV cable not included)	19	EA	0.05	160.00	$21,600.00	$130.00	$2,470.00	$24,070.00
Station Service (Transformer, Disconnect, Conduit/Cable)	1	LS	60	60.00	$8,100.00	$45,000.00	$45,000.00	$53,100.00
							Total	**$184,570.00**
Substation Grounding								
Station Ground Grid	1	LS	320	320.00	$43,200.00	$90,000.00	$90,000.00	$133,200.00
							Total	**$133,200.00**
Substation Site Work								
Site Work & Block Wall (Estimate provided by Washington City)								$1,180,000.00
Land Costs								$316,000.00
							Total	**$1,496,000.00**
Miscellaneous								
Contractor Mobilization	1	LS	0	0.00	$0.00	$12,000.00	$12,000.00	$12,000.00
Contractor Bonding	1	LS	0	0.00	$0.00	$8,400.00	$8,400.00	$8,400.00
Substation Testing & Commissioning	1	LS	0	0.00	$0.00	$78,000.00	$78,000.00	$78,000.00
							Total	**$98,400.00**
	Subtotals			**4,110.0**	**$554,850.00**		**$3,164,345.88**	
Subtotal Labor + Material								**$5,215,195.88**
Equipment				822		70		**$57,540.00**
Contingency (15%)								**$790,910.38**
Engineering								**$175,000.00**
TOTAL ESTIMATE								**$6,238,646.26**

Notes:
1 - Foundation estimate is based on the site having good soil conditions without water.
2 - Incoming 69 kV Line & 15kV Distribution Circuits are not included.
3 - Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4 - Estimate assumes the substation land is owned by the City and initial site grading has been completed.

COST ESTIMATE

DATE PREPARED: 4/29/2024 | SHEET 1 of 1

PROJECT
Project 9: Main St. to Grapevine Substation 69 kV Line w/ Circuit 802 Underbuild

DESCRIPTION
Complete 69 kV Loop along Washington Parkway

ENGINEER : Benny Garcia

BASIS FOR ESTIMATE
CODE A (Schematic Design)
CODE B (Preliminary Design)
CODE C (Final Design) 100%
OTHER (NO DESIGN)_____

ESTIMATOR: Benny Garcia

CHECKED: Matt Levorsen

DESCRIPTION	QUANTITY NO. UNITS	UNIT MEAS	LABOR PER UNIT	LABOR TOTAL MH	Labor ($)	MATERIAL ($) PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
OVERHEAD								
Poles & Guys								
80' Steel Transmission Pole	1	EA	24.00	24.00	3,240.00	33,250.00	33,250.00	36,490.00
75' Steel Transmission Pole	22	EA	24.00	528.00	71,280.00	8,500.00	187,000.00	258,280.00
72' Steel Transmission Pole	1	EA	24.00	24.00	3,240.00	29,750.00	29,750.00	32,990.00
70' Steel Transmission Pole	1	EA	24.00	24.00	3,240.00	28,700.00	28,700.00	31,940.00
Pole Top Assemblies								
69 kV Pole Top Assembly	16	EA	15.00	240.00	32,400.00	4,800.00	76,800.00	109,200.00
69 kV Angle Top Assembly	6	EA	25.00	150.00	20,250.00	6,000.00	36,000.00	56,250.00
69 kV Deadend Heavy Angle Pole Top Assembly	4	EA	35.00	140.00	18,900.00	7,200.00	28,800.00	47,700.00
15 kV Pole Top Assembly	16	EA	3.50	56.00	7,560.00	166.00	2,656.00	10,216.00
15 kV Angle Top Assembly	6	EA	7.00	42.00	5,670.00	207.50	1,245.00	6,915.00
15 kV Deadend Heavy Angle Pole Top Assembly	4	EA	8.50	34.00	4,590.00	1,491.05	5,964.20	10,554.20
Overhead Primary Conductor								
Three Phase Primary Conductor (795 kcmil ACSR) Trans.	19515	FT	0.020	390.300	52,690.50	2.75	53,666.25	106,356.75
OPGW Wire	6750	FT	0.015	101.250	13,668.75	2.50	16,875.00	30,543.75
Fiber Splices	1	EA	8.00	8.000	1,080.00	8,500.00	8,500.00	9,580.00
Three Phase Primary Conductor (477 kcmil ACSR) Dist.	26020	FT	0.015	390.300	52,690.50	2.50	65,050.00	117,740.50
Concrete Foundation								
80' Steel Transmission Pole	1	EA	32.000	32.000	4,320.00	78,354.63	78,354.63	82,674.63
72' Steel Transmission Pole	1	EA	32.000	32.000	4,320.00	72,086.26	72,086.26	76,406.26
70' Steel Transmission Pole	1	EA	32.000	32.000	4,320.00	65,817.89	65,817.89	70,137.89
Subtotal				2,247.85	303,459.75		790,515.23	
Avg. Labor Rate	135.00							
Subtotal Labor					$303,459.75			$303,459.75
Subtotal Material							$790,515.23	$790,515.23
Sales Tax Material	7.80%							$61,660.19
Subtotal Labor, Material & Tax								$1,155,635.17
Equipment & Trucks	1,498.57					$ 125.00		$187,320.83
Contingency	20.00%							$268,600.00
Engineering	7.00%							$112,808.92
TOTAL ESTIMATE								$1,724,364.92

Notes & Comments:
1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE			DATE PREPARED: 4/29/2024				SHEET 1 of 1	
PROJECT						BASIS FOR ESTIMATE		
Project 10: Buena Vista to Grapevine Substation 69 kV Line w/ Underbuild						CODE A (Schematic Design)		
DESCRIPTION						CODE B (Preliminary Design)		
Complete 69 kV Loop along I-15						CODE C (Final Design) 100%		
ENGINEER : Benny Garcia						OTHER (NO DESIGN)_____		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
OVERHEAD								
Poles & Guys								
75' Steel Transmission Pole	8	EA	24.00	192.00	25,920.00	8,500.00	68,000.00	93,920.00
65.5' Steel Transmission Pole	2	EA	24.00	48.00	6,480.00	26,250.00	52,500.00	58,980.00
Pole Top Assemblies								
69 kV Pole Top Assembly	6.5	EA	15.00	97.50	13,162.50	4,800.00	31,200.00	44,362.50
69 kV Angle Top Assembly	4	EA	25.00	100.00	13,500.00	6,000.00	24,000.00	37,500.00
15 kV Pole Top Assembly	6.5	EA	3.50	22.75	3,071.25	166.00	1,079.00	4,150.25
15 kV Angle Top Assembly	4	EA	5.00	20.00	2,700.00	207.50	830.00	3,530.00
Overhead Primary Conductor								
Three Phase Primary Conductor (795 kcmil ACSR) Trans.	10890	FT	0.020	217.800	29,403.00	2.75	29,947.50	59,350.50
OPGW Wire	3500	FT	0.015	52.500	7,087.50	2.00	7,000.00	14,087.50
Fiber Splices	1	EA	8.00	8.000	1,080.00	8,500.00	8,500.00	9,580.00
Three Phase Primary Conductor (477 kcmil ACSR) Dist.	14000	FT	0.015	210.000	28,350.00	2.50	35,000.00	63,350.00
Major Equipment								
69 kV Group Operated Switch	2	EA	60.00	120.000	16,200.00	15,000.00	30,000.00	46,200.00
Concrete Foundation								
65.5' Steel Transmission Pole	2	EA	32.000	64.000	8,640.00	59,549.52	119,099.04	127,739.04
Subtotal				1,152.55	155,594.25		407,155.54	
Avg. Labor Rate	135.00							
Subtotal Labor					$155,594.25			$155,594.25
Subtotal Material							$407,155.54	$407,155.54
Sales Tax Material	7.80%							$31,758.13
Subtotal Labor, Material & Tax								$594,507.92
Equipment & Trucks	768.37					$ 125.00		$96,045.83
Contingency	20.00%							$138,100.00
Engineering	7.00%							$58,005.76
TOTAL ESTIMATE								$886,659.51

Notes & Comments:

1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE			DATE PREPARED: 4/15/2024				SHEET 1 of 1	
PROJECT						BASIS FOR ESTIMATE		
Project 11: New Circuit 803						CODE A (Schematic Design)		
DESCRIPTION						CODE B (Preliminary Design)		
New 15 kV 750 AL Underground						CODE C (Final Design) 100%		
ENGINEER : Benny Garcia						OTHER (NO DESIGN)_____		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
UNDERGROUND								
Primary Cable Installation (Cable Only)								
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	7800	FT	0.015	117.00	15,795.00	12.00	93,600.00	109,395.00
15 kV Terminator	3	EA	1.00	3.00	405.00	100.00	300.00	705.00
Trenching								
Utility Trench for Multiple Conduits - Good Soil	1100	LF	0.150	165.00	22,275.00	0.00	2,500.00	24,775.00
Conduit Installation			0.04					
3" PVC Conduits - 10 ft.	110	EA	0.035	3.85	519.75	70.00	7,700.00	8,219.75
Installed Freeway Crossing Conduits (Provided by Washington City)							221,312.88	221,312.88
Sectionalizer								
Ground Sleeve Base for - Three Phase Sectionalizer	2	EA	4.00	8.00	1,080.00	400.00	800.00	1,880.00
Sectionalizer - Three Phase - 4-600 Amp Positions	2	EA	23.00	46.00	6,210.00	10,500.00	21,000.00	27,210.00
Switchgear								
Concrete Basement for Three Phase Switch PMH Switchgear	2	EA	8.00	16.00	2,160.00	5,700.00	11,400.00	13,560.00
PMH-10 Switchgear (4-600 Amp Sw.)	2	EA	48.00	96.00	12,960.00	25,000.00	50,000.00	62,960.00
Subtotal				454.85	61,404.75		408,612.88	
Avg. Labor Rate	135.00							
Subtotal Labor					$61,404.75			$61,404.75
Subtotal Material							$408,612.88	$408,612.88
Sales Tax Material	7.80%							$31,871.80
Subtotal Labor, Material & Tax								$501,889.43
Equipment & Trucks	151.62					$ 125.00		$18,952.08
Contingency	20.00%							$104,200.00
Engineering	7.00%							$43,752.91
TOTAL ESTIMATE								$668,794.42

Notes & Comments:

1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE			DATE PREPARED: 4/15/2024					SHEET 1 of 1
PROJECT Project 13: Circuit 601/803 to 402 tie cable installation						BASIS FOR ESTIMATE CODE A (Schematic Design) CODE B (Preliminary Design) CODE C (Final Design) 100%		
DESCRIPTION New 15 kV 750 AL Underground								
ENGINEER : Benny Garcia						OTHER (NO DESIGN)_____		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
UNDERGROUND								
Primary Cable Installation (Cable Only)								
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	9600	FT	0.015	144.00	19,440.00	12.00	115,200.00	134,640.00
15 kV Terminator	18	EA	1.00	18.00	2,430.00	150.00	2,700.00	5,130.00
Subtotal				162.00	21,870.00		117,900.00	
Avg. Labor Rate	135.00							
Subtotal Labor					$21,870.00			$21,870.00
Subtotal Material							$117,900.00	$117,900.00
Sales Tax Material	7.80%							$9,196.20
Subtotal Labor, Material & Tax								$148,966.20
Equipment & Trucks	54.00					$ 125.00		$6,750.00
Contingency	20.00%							$31,100.00
Engineering	7.00%							$13,077.13
TOTAL ESTIMATE								$199,893.33

Notes & Comments:
1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE

DATE PREPARED: 2/20/2024 | SHEET 1 of 1

PROJECT
EAST WELL LINE REBUILD COST ESTIMATE

DESCRIPTION
Rebuild the East Well Line from the new Grapevine Substation to the End of the Line

ENGINEER :

ESTIMATOR:

BASIS FOR ESTIMATE
CODE A (Schematic Design)
CODE B (Preliminary Design)
CODE C (Final Design) 100%
OTHER (NO DESIGN)_____

CHECKED BY:

DESCRIPTION	QUANTITY NO. UNITS	UNIT MEAS	LABOR PER UNIT	LABOR TOTAL MH	Labor ($)	MATERIAL ($) PER UNIT	MATERIAL ($) TOTAL	TOTAL COST
REMOVALS								
35' Pole	0	EA	7.00	0.00	0.00	0.00	0.00	0.00
40' Pole	50	EA	7.00	350.00	26,600.00	0.00	0.00	26,600.00
45' Pole	0	EA	8.00	0.00	0.00	0.00	0.00	0.00
50' Pole	0	EA	9.50	0.00	0.00	0.00	0.00	0.00
15 kV Tap - 1 Phase	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
15 kV Tangent - 1 Phase	38	EA	2.50	95.00	7,220.00	0.00	0.00	7,220.00
15 kV Single Deadend - 1 Phase	0	EA	3.00	0.00	0.00	0.00	0.00	0.00
15 kV Heavy Angle - 1 Phase	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
15 kV Tap - 3 Phase	1	EA	9.00	9.00	684.00	0.00	0.00	684.00
15 kV Tangent - 3 Phase	0	EA	3.50	0.00	0.00	0.00	0.00	0.00
15 kV Single Deadend - 3 Phase	4	EA	6.00	24.00	1,824.00	0.00	0.00	1,824.00
15 kV Heavy Angle - 3 Phase	8	EA	8.50	68.00	5,168.00	0.00	0.00	5,168.00
15 kV Riser - 1 Phase	0	EA	12.50	0.00	0.00	0.00	0.00	0.00
15 kV Riser - 3 Phase	4	EA	22.50	90.00	6,840.00	0.00	0.00	6,840.00
3 Phase Transformer Bank (OVHD)	0	EA	30.00	0.00	0.00	0.00	0.00	0.00
Single Phase Transformer (OVHD)	0	EA	10.00	0.00	0.00	0.00	0.00	0.00
3 Phase Overhead Conductor	14140	CKT FT	0.03	452.48	34,388.48	0.00	0.00	34,388.48
3 Phase URD 15 kV Conductor	0	CKT FT	0.03	0.00	0.00	0.00	0.00	0.00
Single Phase OVHD Service	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
Single Phase URD Service	0	EA	2.80	0.00	0.00	0.00	0.00	0.00
Guys	40	EA	4.25	170.00	12,920.00	0.00	0.00	12,920.00
INSTALLATIONS								
OVERHEAD								
Poles & Guys								
35' CL 3 Pole	0	EA	7.00	0.00	0.00	785.00	0.00	0.00
35' CL 2 Pole	0	EA	7.00	0.00	0.00	860.00	0.00	0.00
40' CL 2 Pole	38	EA	7.00	266.00	20,216.00	1,120.00	42,560.00	62,776.00
40' CL 1 Pole	12	EA	7.00	84.00	6,384.00	1,260.00	15,120.00	21,504.00
45' CL 2 Pole	0	EA	8.00	0.00	0.00	1,360.00	0.00	0.00
Guy & Anchor	40	EA	4.25	170.00	12,920.00	347.90	13,916.00	26,836.00
Transformers								
Three Phase Transformer Bank Installation (3) 25 kVA	0	EA	30.00	0.00	0.00	6,347.85	0.00	0.00
Three Phase Transformer Bank Installation (3) 50 kVA	0	EA	30.00	0.00	0.00	8,907.85	0.00	0.00
Pole Top Assemblies								
Three Phase Primary Tap Pole Top Assembly	3	EA	9.00	27.00	2,052.00	895.05	2,685.15	4,737.15
Three Phase Primary Tangent Pole Top Assembly	25	EA	3.50	87.50	6,650.00	166.00	4,150.00	10,800.00
Three Phase Primary Single Deadend Pole Top Asse	6	EA	6.00	36.00	2,736.00	740.70	4,444.20	7,180.20
Three Phase Primary DDE Heavy Angle Pole Top Ass	1	EA	8.50	8.50	646.00	1,491.05	1,491.05	2,137.05
Overhead Primary Conductor								
Three Phase Primary Conductor (#1/0 ACSR)	14140	CKT FT	0.032	452.480	34,388.48	1.60	22,624.00	57,012.48
Three Phase Primary Conductor (#4/0 ACSR)	0	CKT FT	0.040	0.000	0.00	3.00	0.00	0.00
Three Phase Primary Conductor (477 kcmil ACSR)	0	CKT FT	0.044	0.000	0.00	6.80	0.00	0.00
UNDERGROUND								
Primary Risers								
Single Phase - Primary Riser	0	EA	12.50	0.00	0.00	768.45	0.00	0.00
Three Phase - Primary Riser	4	EA	22.50	90.00	6,840.00	1,523.35	6,093.40	12,933.40
Three Phase - Primary Riser Large Conductor	0	EA	27.50	0.00	0.00	2,994.00	0.00	0.00
Primary Cable Instalation (Cable Only)								
1-Phase 15 kV Cable (#1/0 AL w/ Full Con. Neutral)	0	CKT FT	0.015	0.00	0.00	3.40	0.00	0.00
3-Phase 15 kV Cable (#1/0 AL w/ 1/3 Con. Neutral)	400	CKT FT	0.027	10.80	820.80	10.20	4,080.00	4,900.80
3-Phase 15 kV Cable (#4/0 AL w/ 1/3 Con. Neutral)	0	CKT FT	0.033	0.00	0.00	12.75	0.00	0.00
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	0	CKT FT	0.040	0.00	0.00	28.35	0.00	0.00
Trenching								
Utility Trench for Single Conduit - Good Soil	0	LF	0.070	0.00	0.00	0.00	0.00	0.00
Utility Trench for Multiple Conduits - Good Soil	400	LF	0.110	44.00	3,344.00	0.00	0.00	3,344.00
Conduit Installation								
Three 3" PVC Conduits	400	LF	0.035	14.00	1,064.00	20.25	8,100.00	9,164.00
Miscellaneous								
Testing	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
GIS Mapping	1	EA	20.00	20.00	1,520.00	0.00	0.00	1,520.00
Asphalt Restoration	0	SQ FT	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Restoration	0	YDS	0.00	0.00	0.00	0.00	0.00	0.00
Other	0	LS	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal				2,568.76	195,225.76		125,263.80	
Avg. Labor Rate	76.00							
Subtotal Labor					$195,225.76			$195,225.76
Subtotal Material							$125,263.80	$125,263.80
Sales Tax Material	0.00%							$0.00
Subtotal Labor, Material & Tax								$320,489.56
Equipment & Trucks	856.25					$ 50.00		$42,812.67
Contingency	20.00%							$72,700.00
Engineering	10.00%							$43,600.22
TOTAL ESTIMATE								$479,602.45

Notes & Comments:
The above estimate is based on preliminary information
NO engineering has been conducted.
Estimate is based on current City costs. Actual project costs to be paid by developer.

COST ESTIMATE

DATE PREPARED 2/20/2024 | SHEET 1 of 1

PROJECT
WEST WELL LINE REBUILD COST ESTIMATE

DESCRIPTION
Rebuild the West Well Line from the HCA boundary to the End of the Line

ENGINEER :

ESTIMATOR:

BASIS FOR ESTIMATE
CODE A (Schematic Design)
CODE B (Preliminary Design)
CODE C (Final Design) 100%
OTHER (NO DESIGN)_____

CHECKED BY:

DESCRIPTION	QUANTITY NO. UNITS	UNIT MEAS	LABOR PER UNIT	LABOR TOTAL MH	Labor ($)	MATERIAL ($) PER UNIT	MATERIAL ($) TOTAL	TOTAL COST
REMOVALS								
35' Pole	0	EA	7.00	0.00	0.00	0.00	0.00	0.00
40' Pole	32	EA	7.00	224.00	17,024.00	0.00	0.00	17,024.00
45' Pole	0	EA	8.00	0.00	0.00	0.00	0.00	0.00
50' Pole	0	EA	9.50	0.00	0.00	0.00	0.00	0.00
15 kV Tap - 1 Phase	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
15 kV Tangent - 1 Phase	25	EA	2.50	62.50	4,750.00	0.00	0.00	4,750.00
15 kV Single Deadend - 1 Phase	0	EA	3.00	0.00	0.00	0.00	0.00	0.00
15 kV Heavy Angle - 1 Phase	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
15 kV Tap - 3 Phase	3	EA	9.00	27.00	2,052.00	0.00	0.00	2,052.00
15 kV Tangent - 3 Phase	0	EA	3.50	0.00	0.00	0.00	0.00	0.00
15 kV Single Deadend - 3 Phase	6	EA	6.00	36.00	2,736.00	0.00	0.00	2,736.00
15 kV Heavy Angle - 3 Phase	1	EA	8.50	8.50	646.00	0.00	0.00	646.00
15 kV Riser - 1 Phase	0	EA	12.50	0.00	0.00	0.00	0.00	0.00
15 kV Riser - 3 Phase	0	EA	22.50	0.00	0.00	0.00	0.00	0.00
3 Phase Transformer Bank (OVHD)	4	EA	30.00	120.00	9,120.00	0.00	0.00	9,120.00
Single Phase Transformer (OVHD)	0	EA	10.00	0.00	0.00	0.00	0.00	0.00
3 Phase Overhead Conductor	9355	CKT FT	0.03	299.36	22,751.36	0.00	0.00	22,751.36
3 Phase URD 15 kV Conductor	0	CKT FT	0.03	0.00	0.00	0.00	0.00	0.00
Single Phase OVHD Service	0	EA	5.00	0.00	0.00	0.00	0.00	0.00
Single Phase URD Service	0	EA	2.80	0.00	0.00	0.00	0.00	0.00
Guys	16	EA	4.25	68.00	5,168.00	0.00	0.00	5,168.00
INSTALLATIONS								
OVERHEAD								
Poles & Guys								
35' CL 3 Pole	0	EA	7.00	0.00	0.00	785.00	0.00	0.00
35' CL 2 Pole	0	EA	7.00	0.00	0.00	860.00	0.00	0.00
40' CL 2 Pole	25	EA	7.00	175.00	13,300.00	1,120.00	28,000.00	41,300.00
40' CL 1 Pole	7	EA	7.00	49.00	3,724.00	1,260.00	8,820.00	12,544.00
45' CL 2 Pole	0	EA	8.00	0.00	0.00	1,360.00	0.00	0.00
45' CL 1 Pole	0	EA	8.00	0.00	0.00	1,550.00	0.00	0.00
50' CL 2 Pole	0	EA	9.50	0.00	0.00	1,635.00	0.00	0.00
50' CL 1 Pole	0	EA	9.50	0.00	0.00	1,835.00	0.00	0.00
Guy & Anchor	16	EA	4.25	68.00	5,168.00	347.90	5,566.40	10,734.40
Transformers								
Three Phase Transformer Bank Installation (3) 25 kVA	0	EA	30.00	0.00	0.00	6,347.85	0.00	0.00
Three Phase Transformer Bank Installation (3) 50 kVA	4	EA	30.00	120.00	9,120.00	8,907.85	35,631.40	44,751.40
Pole Top Assemblies								
Three Phase Primary Tap Pole Top Assembly	3	EA	9.00	27.00	2,052.00	895.05	2,685.15	4,737.15
Three Phase Primary Tangent Pole Top Assembly	25	EA	3.50	87.50	6,650.00	166.00	4,150.00	10,800.00
Three Phase Primary Single Deadend Pole Top Asse	6	EA	6.00	36.00	2,736.00	740.70	4,444.20	7,180.20
Three Phase Primary DDE Heavy Angle Pole Top Ass	1	EA	8.50	8.50	646.00	1,491.05	1,491.05	2,137.05
Overhead Primary Conductor								
Three Phase Primary Conductor (#1/0 ACSR)	9355	CKT FT	0.032	299.360	22,751.36	1.60	14,968.00	37,719.36
Three Phase Primary Conductor (#4/0 ACSR)	0	CKT FT	0.040	0.000	0.00	3.00	0.00	0.00
Three Phase Primary Conductor (477 kcmil ACSR)	0	CKT FT	0.044	0.000	0.00	6.80	0.00	0.00
Miscellaneous								
Testing	0	EA	0.00	0.00	0.00	0.00	0.00	0.00
GIS Mapping	1	EA	20.00	20.00	1,520.00	0.00	0.00	1,520.00
Asphalt Restoration	0	SQ FT	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Restoration	0	YDS	0.00	0.00	0.00	0.00	0.00	0.00
Other	0	LS	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal				1,735.72	131,914.72		105,756.20	
Avg. Labor Rate	76.00							
Subtotal Labor					$131,914.72			$131,914.72
Subtotal Material							$105,756.20	$105,756.20
Sales Tax Material	0.00%							$0.00
Subtotal Labor, Material & Tax								$237,670.92
Equipment & Trucks	578.57					$ 50.00		$28,928.67
Contingency	20.00%							$53,300.00
Engineering	10.00%							$31,989.96
TOTAL ESTIMATE								$351,889.55

Notes & Comments:
The above estimate is based on preliminary information
NO engineering has been conducted.
Estimate is based on current City costs. Actual project costs to be paid by developer.

COST ESTIMATE			DATE PREPARED: 4/15/2024				SHEET 1 of 1	
PROJECT						BASIS FOR ESTIMATE		
Project 17: Circuit 102 to 603 Tie						CODE A (Schematic Design)		
DESCRIPTION						CODE B (Preliminary Design)		
New 15 kV 750 AL and 477 ACSR Overhead line						CODE C (Final Design) 100%		
ENGINEER : Benny Garcia						OTHER (NO DESIGN)_____		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
OVERHEAD								
Poles & Guys								
45' CL 1 Pole	8	EA	8.00	64.00	8,640.00	2,500.00	20,000.00	28,640.00
Guy & Anchor	6	EA	4.30	25.80	3,483.00	350.00	2,100.00	5,583.00
Pole Top Assemblies								
Three Phase Primary Tangent Pole Top Assembly	5	EA	5.50	27.50	3,712.50	166.00	830.00	4,542.50
Three Phase Primary Single Deadend Pole Top Assembly	2	EA	6.00	12.00	1,620.00	740.70	1,481.40	3,101.40
Three Phase Primary DDE Heavy Angle Pole Top Assembly	1	EA	10.00	10.00	1,350.00	1,491.05	1,491.05	2,841.05
Overhead Primary Conductor								
Three Phase Primary Conductor (477 kcmil ACSR)	7400	FT	0.015	111.000	14,985.00	2.50	18,500.00	33,485.00
UNDERGROUND								
Primary Risers								
Three Phase - Primary Riser Large Conductor	2	EA	27.50	55.00	7,425.00	3,500.00	7,000.00	14,425.00
Primary Cable Instalation (Cable Only)								
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	4710	FT	0.015	70.65	9,537.75	12.00	56,520.00	66,057.75
15 kV Terminator	3	EA	1.00	3.00	405.00	100.00	300.00	705.00
Trenching								
Utility Trench for Multiple Conduits - Good Soil	1430	LF	0.150	214.50	28,957.50	0.00	2,500.00	31,457.50
Conduit Installation								
3" PVC Conduits - 10 ft.	143	EA	0.040	5.72	772.20	70.00	10,010.00	10,782.20
Sectionalizer								
Ground Sleeve Base for - Three Phase Sectionalizer	2	EA	4.00	8.00	1,080.00	400.00	800.00	1,880.00
Sectionalizer - Three Phase - 4-600 Amp Positions	2	EA	23.00	46.00	6,210.00	10,500.00	21,000.00	27,210.00
Switchgear								
Concrete Basement for Three Phase Switch PMH Switchgear	2	EA	8.00	16.00	2,160.00	5,700.00	11,400.00	13,560.00
PMH-10 Switchgear (4-600 Amp Sw.)	2	EA	48.00	96.00	12,960.00	25,000.00	50,000.00	62,960.00
Subtotal				765.17	103,297.95		203,932.45	
Avg. Labor Rate	135.00							
Subtotal Labor					$103,297.95			$103,297.95
Subtotal Material							$203,932.45	$203,932.45
Sales Tax Material	7.80%							$15,906.73
Subtotal Labor, Material & Tax								$323,137.13
Equipment & Trucks	255.06					$ 125.00		$31,882.08
Restoration	6.00%							$20,300.00
Contingency	20.00%							$71,000.00
Engineering	7.00%							$31,242.35
TOTAL ESTIMATE								$477,561.56

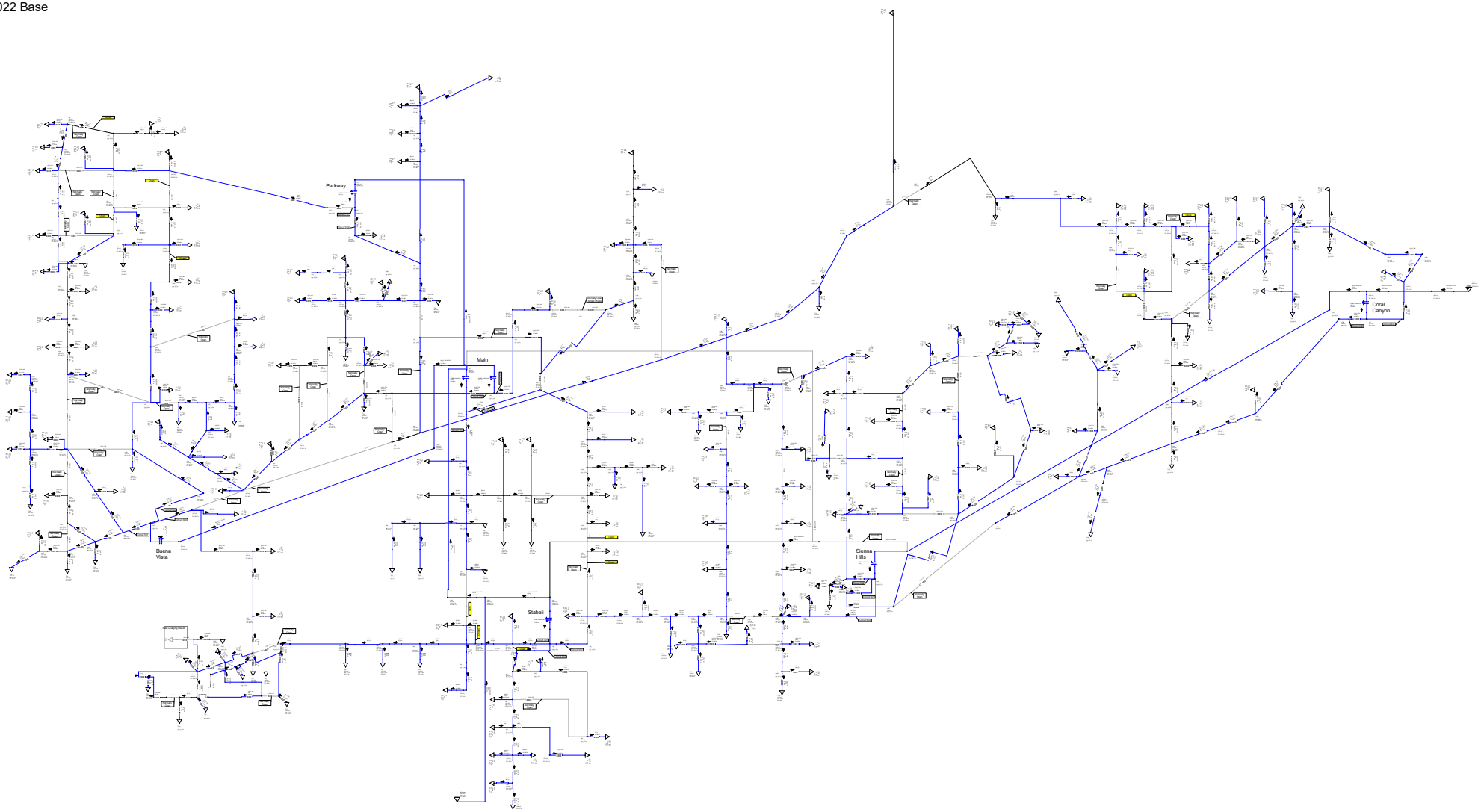
Notes & Comments:

1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

COST ESTIMATE			DATE PREPARED: 4/15/2024				SHEET 1 of 1	
PROJECT						BASIS FOR ESTIMATE		
Project 18: Circuit 302 to 303 Tie						CODE A (Schematic Design)		
DESCRIPTION						CODE B (Preliminary Design)		
New 15 kV 750 AL line						CODE C (Final Design) 100%		
ENGINEER : Mac Fillingim						OTHER (NO DESIGN)_____		
	ESTIMATOR: Benny Garcia					CHECKED: Matt Levorsen		
	QUANTITY		LABOR			MATERIAL ($)		
DESCRIPTION	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL MH	Labor ($)	PER UNIT	TOTAL	TOTAL COST
INSTALLATIONS								
UNDERGROUND								
Primary Cable Installation (Cable Only)								
3-Phase 15 kV Cable (750 AL w/ 1/3 Con. Neutral)	13350	FT	0.015	200.25	27,033.75	12.00	160,200.00	187,233.75
15 kV Terminator	3	EA	1.00	3.00	405.00	100.00	300.00	705.00
Trenching								
Utility Trench for Multiple Conduits - Good Soil	4050	LF	0.150	607.50	82,012.50	0.00	2,500.00	84,512.50
Conduit Installation								
3" PVC Conduits - 10ft.	405	EA	0.040	16.20	2,187.00	70.00	28,350.00	30,537.00
Sectionalizer								
Ground Sleeve Base for - Three Phase Sectionalizer	8	EA	4.00	32.00	4,320.00	400.00	3,200.00	7,520.00
Sectionalizer - Three Phase - 4-600 Amp Positions	8	EA	24.00	192.00	25,920.00	10,500.00	84,000.00	109,920.00
Switchgear								
Concrete Basement for Three Phase Switch PMH Switchgear	1	EA	8.00	8.00	1,080.00	5,700.00	5,700.00	6,780.00
PMH-10 Switchgear (4-600 Amp Sw.)	1	EA	48.00	48.00	6,480.00	25,000.00	25,000.00	31,480.00
Subtotal				1,106.95	149,438.25		309,250.00	
Avg. Labor Rate	135.00							
Subtotal Labor					$149,438.25			$149,438.25
Subtotal Material							$309,250.00	$309,250.00
Sales Tax Material	7.80%							$24,121.50
Subtotal Labor, Material & Tax								$482,809.75
Equipment & Trucks	368.98					$ 125.00		$46,122.92
Restoration	15.00%							$76,000.00
Contingency	20.00%							$105,800.00
Engineering	7.00%							$49,751.29
TOTAL ESTIMATE								$760,483.95

Notes & Comments:
1. The above estimate is based on preliminary information.
2. No engineering has been conducted.
3. Estimate is based on 2023 costs. Market conditions are volatile and can have a significant impact on actual costs at the time of construction.
4. Right of way costs are not included in cost estimate.

2022 Base


Parkway
Main
Buena Vista
Stahelli
Sienna Hills
Coral Canyon

Washington City
Where Dixie Begins

WASHINGTON CITY POWER

Impact Fee Facility Plan

May 2024

ICPE
CONSULTING ENGINEERS

Intermountain Consumer Professional Engineers, Inc.
1145 East South Union Avenue
Midvale, Utah 84047
(801) 255-1111

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SECTION I GENERAL

Introduction

Intermountain Consumer Professional Engineers, Inc. ("ICPE") performed studies and analyses for Washington City Power ("WCP") to update their 2019 Electrical Power Capital Facilities Plan and Impact Fee Facilities Plan.

ICPE utilized load predictions in the studies that were developed using recent load data provided by WCP and load trends observed in Washington City over the past several years. The future loads used in the studies are predictions and do not reflect actual values which prevents ICPE from guaranteeing or assuring that the recommendations reflect actual events that will occur in the future. However, it is believed that all predictions and observations used in the study are reasonable and appropriate for the purpose of the Capital Facilities Plan and Impact Fee Facilities Plan.

Impact Fees - General

Impact fees are generally used by cities to fund infrastructure projects necessary to provide services to new developments within the city's boundary. The new development should bear the additional or incremental capital cost for the services, existing residents who do not benefit from the new development should not bear the costs for services to the new development. Impact fees are not intended for operating expenses or for corrections to existing deficiencies in the services presently being provided by a city. Impact fees are based on anticipated new load increase to the electrical system due to the new developments. The improvements outlined in the plans are required to maintain the present level of service to both new and existing customers.

Impact Fees - Utah

In Utah, impact fees are governed by state statute, specifically U.C.A. 1953 § 11-36a-102. The Statute requires that each governmental agency that imposes an impact fee shall (1) prepare an Impact Fee Facilities Plan (§ 11-36a-301), (2) perform an Impact Fee Analysis (§ 11-36a-303), (3) calculate the Impact Fee(s) (§ 11-36a-305) and (4) certify the Impact Fee Facilities Plan (§ 11-36a-306).

As stated in the Statute, the "Impact Fee Facilities Plan ("IFFP") shall identify (a) demands placed upon existing public facilities by new development activity; and (b) the proposed means by which the political subdivision will meet those demands." The IFFP shall also consider all revenue sources, including impact fees, used to finance impacts on system improvements. This report incorporates the

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most recent WCP Capital Facilities Plan ("CFP"), dated April 2024. In general, the CFP outlines all projects necessary to maintain electrical service to existing customers and the IFFP outlines fees for the improvements necessary to provide service to new developments and customers. Projects identified in the CFP may be due to the correction of an existing deficiency or improvement necessary to maintain reliability and are not included in the IFFP.

The Utah Statute requires the governmental agency that imposes an impact fee to perform an analysis of the impact fee and document the results. The agency is also required to provide a summary document of the analysis that can be understood by a layman. The estimated impacts on the existing electrical system due to the new development are to be included in the Impact Fee Analysis (IFA) along with the costs associated with addressing the impacts. The IFA is also required to include the costs of existing capacity that will be recouped.

Impact Fee calculations may include the following:

(a) The construction cost.
(b) The cost of acquiring land and material.
(c) The cost for planning, surveying, and engineering fees for services provided to design the construction.
(d) Debt service charges, if the impact fees are used to pay the principal and interest on bonds or other obligations to finance the costs of the construction.

Impact Fee calculations are to be based on local industry standard material and labor estimates. The assumptions used to develop the estimates are to be included in the IFA. The IFFP and the IFA area to be certified by the person or entity that prepared the documents.

Washington City

According to the US Census, Washington City is located in Washington County, Utah. The land area is 32.86 square miles and the estimated population in 2023 was about 33,877 persons. The median resident age is 36.3 years, the average household size is 2.99 persons and the median household income is about $94,655.

Washington City Power was formed in 1987 to serve electricity to Washington City. The service area is north of the Virgin River and within the Washington City limits. The CFP and IFFA plans do not include the south side of the Virgin River which is served by Dixie Power.

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Electricity Supply

General

Figure 1 illustrates the three basic components of an electrical system, an electric generator that creates the electricity, a transmission system that carries the electricity to the distribution system; and the distribution system that delivers the electricity to the customer.

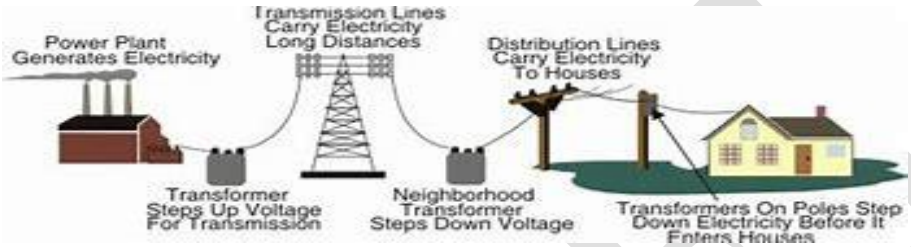

Figure 1

Illustration of a Typical Power Delivery System

Electricity Generation

Electricity is produced by a generator that is powered by a fuel source. The generator can be a steam, hydro, turbine, diesel engine, wind, solar or geothermal. The generated electricity is provided to a utility through purchased power agreements, which can be a firm power agreement (long-term and short-term); unit power (a portion of a specific generating unit) and non-firm (usually short-term). The type and amount of each generating resource that is used by a utility to meet the electrical demand depends on the amount and duration of the demand, the availability of the generating units and the cost of the electricity from the generating units. To meet the hourly demand for electricity, each available generating resource is evaluated according to its availability, capacity and operating cost and then dispatched accordingly to meet the demand for electricity in each hour of the day.

The utility's peak demand is the highest demand for electricity in any one hour. It is during these peak hours that a utility will use multiple generating resources including its own generating resources.

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Electricity Transmission

The electricity leaving the generator is stepped up to a higher voltage by a transformer and delivered to the transmission system. The transmission system consists of transmission power poles or towers, conductors, substations and other equipment necessary to deliver electricity from the generators to the utility.

Transmission of electricity to Washington City Power is through the Utah Associated Municipal Power Systems (UAMPS) transmission system. UAMPS receives electricity through Rocky Mountain Power's transmission system.

Electricity Distribution

Electricity distribution is the final stage in the delivery of electricity to customers. An electricity distribution system receives electricity from the transmission system and delivers it to consumers. A typical electric distribution system includes medium-voltage (69 kV & 12.47 kV) power lines, substations, transformers, service drops and metering. The distribution system begins where the voltage is stepped down through transformer(s) and ends at the secondary service point at the customer's meter. Distribution circuits begin at the low-voltage side of the transformer located in the City's substation. Conductors for the distribution delivery system are either located overhead on utility poles or buried underground.

Most electric customers are connected to a pole mounted or pad mounted transformer that reduces the distribution voltage to the low voltage used by customers. Each customer has an electrical service connection and a meter.

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SECTION II CAPITAL FACILITIES PLAN AND IMPACT FEE FACILITIES PLAN

General

The Impact Fee Facilities Plan identifies the additional electrical load placed on an existing electrical system by new developments, identifies additions or modifications to the existing electrical system necessary to meet the increased load and provides costs for the system additions or modifications. The Plan will enable the utility to determine how they will fund the projects necessary to meet the load increase to the system.

The following summarizes the results of the Capital Facilities Plan Update that was completed in April 2024 where load increases were identified, projects were proposed to meet the load increase and costs were provided for the proposed projects.

Historical Population and Load Growth

According to the U.S. Census Bureau, the Washington City's population in 2020 was approximately 27,993. The population grew to 33,877 by 2023 for an approximate 20% increase in population over three years. The following table is a summary of the population growth since 1960.

Table 2-1
Washington City Historical Population

Historical population		
Census	**Pop.**	**%±**
1960	445	2.3%
1970	750	68.5%
1980	3,092	312.3%
1990	4,198	35.8%
2000	8,186	95.0%
2010	18,761	129.2%
2020	27,993	49.2%
Est. 2023	33,877	21.0%

Washington City experienced a high growth rate between 1980 and 1990 and between 1990 and 2010. However the electrical load during these periods did not increase as significantly as the population. The annual historical load growth since 1987 is shown in Table 2-2.

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Table 2-2
Washington City
Electrical Load History

	PEAK kW			
Year	Summer Peak	% Growth (Summer)	Winter Peak	% Growth (Winter)
1987	3,639		6,498	
1988	3,840	5.52%	6,146	-5.42%
1989	4,360	13.54%	6,851	11.47%
1990	4,514	3.53%	6,520	-4.83%
1991	4,433	-1.79%	6,500	-0.31%
1992	5,121	15.52%	5,616	-13.60%
1993	5,615	9.65%	6,083	8.32%
1994	6,514	16.01%	6,268	3.04%
1995	6,984	7.22%	6,376	1.72%
1996	8,112	16.15%	6,436	0.94%
1997	8,590	5.89%	6,665	3.56%
1998	9,883	15.05%	6,410	-3.83%
1999	10,646	7.72%	7,154	11.61%
2000	11,956	12.31%	6,976	-2.49%
2001	14,490	21.19%	8,144	16.74%
2002	15,638	7.92%	8,930	9.65%
2003	17,782	13.71%	8,714	-2.42%
2004	19,840	11.57%	9,716	11.50%
2005	23,971	20.82%	11,302	16.32%
2006	25,093	4.68%	12,966	14.72%
2007	28,542	13.74%	14,854	14.56%
2008	27,852	-2.42%	15,216	2.44%
2009	28,176	1.16%	14,374	-5.53%
2010	29,005	2.94%	14,731	2.48%
2011	29,035	0.10%	14,332	-2.71%
2012	31,518	8.55%	15,332	6.98%
2013	32,117	1.90%	16,614	8.36%
2014	31,714	-1.25%	15,377	-7.45%
2015	34,025	7.29%	14,893	-3.15%
2016	36,134	6.20%	14,945	0.35%
2017	37,943	5.01%	14,906	-0.26%
2018	38,494	1.45%	16,183	8.57%
2019	40,414	4.99%	16,777	3.67%
2020	45,665	12.99%	17,890	6.68%
2021	51,708	13.23%	18,440	3.07%
2022	51,028	-1.32%	18,990	2.98%
2023	52,511	2.91%		

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Electric Infrastructure and Future Needs

Transmission

It is proposed to install Grapevine substation by approximately 2025. Significant load is expected to occur in the area surrounding I-15 Exit 13 and in the Solente area lands. The new substation will be required to serve this load. A new 69 kV transmission line will be required to feed Grapevine substation. It is also proposed to install a new 69 kV tie line from the intersection at Main St. and Parkway that feeds the Parkway Substation to the new line feeding Grapevine substation. This will create a 69 kV loop so that both substations can be fed from more than one location in the event of a line outage or for system maintenance. This versatility will enhance the City's ability to operate the electrical system and will improve service reliability to City customers.

Substation & Distribution

Approximately 32 MW of new load is projected over the next ten years in Washington City. Main Street circuits will be heavily impacted since the area currently served by Main Street is projected to grow by 12.3 MW. A significant load for Main Street circuits is expected to occur in the area surrounding I-15 Exit 13 and in the Solente area lands. Additionally, Sienna Hills circuits will need to feed several projects for apartment buildings and hotels that are currently in the planning and construction stages. Without upgrades, the Main Street circuit 202 and Main Street transformer T2 will become overloaded. It is proposed to add a new Grapevine Substation. Three new circuits for the Grapevine substation are proposed. It is proposed to add a third circuit to the Parkway substation to help feed some of the Solente Area.

Approximately 12.9 MW of load is projected for the Solente area lands. A new Grapevine substation, as described above, will help serve this load. Additionally, Parkway circuits will also help serve the new load in this area. Several new distribution lines will be required in the Solente area lands. Three new lines are proposed to be built by Washington City to tie the Solente area lands into existing circuits. The rest of the new lines in the Solente area are proposed to be built by developers as the area is developed.

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Level of Service Standards

Consistent with current practice and level of service, Washington City plans, designs and operates its system based on the following criteria:

- Transformer ratings under varying load levels and loading conditions remain below their base rating.
- The system is capable of adequately serving load under single contingency (N-1) situations, where "N" is a power system elements such as a transformer or line.
- The system switching required under an N-1 contingency is simplified to ensure that switching orders not become unnecessarily complex.
- Distribution circuit loading remains below 90% of its maximum current rating.
- Primary circuit voltage is kept between 95% and 105% of its nominal value.
- Distribution circuit mains are able to serve additional load under N-1 contingencies.

The above criteria was used to determine Washington City's future facility needs based on the amount of new load placed on the existing electrical system over the study period.

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Demands Placed on Existing Facilities

Electrical demand loads on a system are measured in kilowatts (kW) or kilovolt-amperes (kVA) and are indicated as either coincident-peak ("CP") demand or non-coincident peak ("NCP") demand. The system CP demand is the maximum demand for the entire system measured at a point in time where the sum of all demands on the system is the highest for the system as a whole. The NCP demand is the sum of the maximum demands of individual customers or customer classes such as residential, commercial, industrial, measured for a period of time. The CP demand represents the combined loads across all customer classes measured at the system level where the NCP demand represents the total demand the system would be subject to if all customer classes peaked at the same time. The CP demand is usually lower than the NCP demand. For Impact Fees, CP represents the demand placed on the existing system as a whole, while NCP reflects the maximum demand placed on local facilities by individual customer classes. The CP demand is normally the demand that a utility plans for when sizing facilities that will be used to meet future growth on the system. However, each individual piece of equipment must be able to support its own individual peak demand even if that demand does not occur at the same time as the system's CP.

Washington City's projected CP demand between 2023 and 2032 are shown in Table 2-3. The System CP Demands for the planning period (2023 – 2032) were developed by ICPE.

Table 2-3
Summary of CP Demands
For the Period 2023 through 2033

Description	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total System CP Demands (kW)	52,511	54,882	58,449	62,230	66,073	69,996	73,921	77,355	80,345	83,279

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System Modeling for the CFP/IFFP

The recently CFP completed contains results of load flow analysis of the Washington City electrical system. The system load flows provide insight on substation transformer loading, distribution circuit loading, and system voltage drop. The study includes analyzing N-1 outage conditions. An N-1 outage condition is the loss of a major system component such as loss of a substation transformer or loss of a main line section. The existing substations that were studied include Staheli, Main Street, Coral Canyon, Buena Vista, Sienna Hills, and Parkway. Seventeen existing 12.47 kV circuits were studied. The CFP proposes changes to circuit boundaries, the addition of one new substation and the addition of four new circuits.

To perform load flow analysis a system computer model was developed. System model development and analysis were performed on Paladin DesignBase 4.0 software. System modeling data was developed from data provided by Washington City. System load was modeled based on 2022 peak values since they were available at the time. The actual 2023 peak value is close to the projected 2023 peak value. Circuit models are based on the assumption that provided circuit maps and data (conductor sizes, circuit configurations, line lengths, etc.) are reflective of actual field conditions.

Model Results

The following System Improvement Summary from the CFP details the anticipated projects and estimated expenditures necessary to sustain the projected growth rate for Washington City's electrical system for the next 10 years. There is greater confidence in projecting requirements for 2 to 3 years than there is for a 10-year or longer outlook. However it is necessary to forecast future projects due to the magnitude (and cost) of the modifications necessary. Also substation and transmission line projects can take significant time from start to finish due to material lead times and permitting requirements. Substation, distribution, and transmission line requirements need to be addressed to meet future needs of the City in a timely fashion.

The proposed projects will provide a method for Washington City to plan and budget for the facilities necessary to serve the anticipated electrical load growth. Existing electrical facilities as well as new facilities will be used to meet projected load levels. Table 2-4 is a summary of the recommended projects, timing and costs. Detailed cost estimates for the various projects can be found in the appendix of the CFP. Costs shown are based on present 2024 project material and labor pricing.

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Table 2-4
Summary of CFP Improvement Projects
For the Period 2024 through 2032*

Project ID	Description	Project Estimated Cost ($) **	Estimated Timeframe	Impact Fee %	Impact Fee Amount ($)	Revenue Funds %	Revenue Funds Amount ($)
25-PR-03	New Circuit 801	350,000.00	2024-2026	100.00%	350,000.00	0.00%	0.00
23-PR-01***	1100 E to 300 E Underbuild Upgrade	231,250.00	2024-2025	40.00%	92,500.00	60.00%	138,750.00
25-PR-01	New Grapevine Substation	6,239,000.00	2024-2025	100.00%	6,239,000.00	0.00%	0.00
24-PR-02	69kV Line Extension to Grapevine with Circuit 802 Underbuild	1,724,000.00	2024-2025	100.00%	1,724,000.00	0.00%	0.00
25-PR-02	69 kV Line Extension to Grapevine	887,000.00	2024-2025	100.00%	887,000.00	0.00%	0.00
23-PR-02	New Circuit 803	669,000.00	2029-2030	100.00%	669,000.00	0.00%	0.00
	Circuit 601/803 to Circuit 402 750 Tie	200,000.00	2024-2025	100.00%	200,000.00	0.00%	0.00
21-PR-06	Circuit 102 to Circuit 603 Tie	478,000.00	2026-2027	100.00%	478,000.00	0.00%	0.00
23-PR-03	Circuit 302 to Circuit 303 Tie	760,000.00	2031-2032	100.00%	760,000.00	0.00%	0.00
	TOTALS	11,538,250.00			11,399,500.00		138,750.00

* Note: Project timing will vary based on actual load growth amount and location.
** Values have been rounded.
*** Project identified in previous CFP and is 75% completed.

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IFFP Capital Projects and Costs

As previously mentioned, the costs for the above projects are estimated in 2024 dollars. As with most capital facilities plans, the majority of these projects are scheduled to occur in the earlier planning windows. However, growth in demand on the system generally happens in "groups" or "lumps" according to actual commercial and residential development. Actual load growth may be sooner or later than shown based on current economic and development levels. Projects shown in the IFFP may be delayed or accelerated based on actual load growth locations and timing.

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Certification of the IFFP

I certify that the attached Impact Fee Facilities Plan:

1. includes only the costs of public facilities that are:
    a. allowed under the Impact Fees Act; and
    b. actually incurred; or
    c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
    a. costs of operation and maintenance of public facilities;
    b. costs for qualifying public facilities that will raise the level of service for facilities, through impact fees, above the level of service that is supported by existing residents;
    c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement;

CERTIFIED BY:

Signature: 

Name: Mac Fillingim

Title: ICPE, Senior Engineer

Date: May, 2024

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May 2024

Project Meeting Overview Report

CARBON FREE POWER PROJECT (CFPP)

1. Discussed in Executive Session:
    a. Project wind down status, timeline and Department of Energy interactions.

FIRM POWER SUPPLY PROJECT

1. Discussed in Executive Session:
    a. Steel 1A & 1B Project including Commercial Operation Dates (COD), status updates, battery energy storage system (BESS) and next steps.
    b. Red Mesa Tapaha Project including the current status of the project and next steps.
    c. Red Mesa economic curtailment updates including outages.
    d. Prepay for solar including details regarding the prepay, different scenarios and next steps.

2. Details about the Steel 1A & 1B Ribbon Cutting Ceremony scheduled for May 21, 2024.

3. Discussed the Operations Report including output and scheduling from each resource for the month of April.

GOVERNMENT AND PUBLIC AFFAIRS PROJECT (GPA)

1. Discussed Federal & State Legislation including Executive Branch and Congressional Updates:
    a. 2024 presidential election observations.
    b. 2024 congressional election updates.
    c. Progress being made in Congress and current bills.

d. IRA updates including Congressional letter.

e. Utah State Convention including candidate vote percentages and primary election date on June 25th.

f. State updates including special session and related bills.

g. GPA topics for future UAMPS memos.

HORSE BUTTE PROJECT (HBW)

1. Discussed in Executive Session:
    a. Landowner Lease Agreements including active agreements, updated amendments and next steps.
2. Discussed plant operations including plant maintenance/upgrades, photos of the site and site updates.
3. Discussed the Operations Report including production output for the month of April.

HUNTER PROJECT

1. Discussed in Executive Session:
    a. Long-term strategy including recent activities and next steps.
    b. Economic Dispatch for the summer season including dispatch and balancing.
2. Discussed the Operations Report including plant scheduled output for the month of April.

INTERMOUNTAIN POWER PROJECT (IPP)

1. Discussed legislative update referring to the Government and Public Affairs Project (GPA).
2. Discussed IPP updates including the board meeting being held at the plant.
3. Discussed IPP Economic Dispatch including the summer 2024 operating plan overview, operating parameters, inventory and planned usage.
4. Discussed the Operations Report including scheduled output for the month of April.

NEBO PROJECT (PAYSON)

1. Discussed UAMPS Hedging Policy including market participation and prepay analysis.
2. Discussed plant operation including April statistics, operational item highlights, plant maintenance/safety highlights, regulatory items and plant water updates.
3. Discussed the details of the 2024 Spring Outage including highlights and completed maintenance.
4. Discussed the details of the 20-Year Celebration at the Nebo Power Plant on May 14th.
5. Discussed the Operations Report for the month of April including Nebo energy breakdown and Nebo sales margins.

POOL PROJECT

1. Guest Speaker:
    a. Randy Howard, GM of Northern California Power Agency (NCPA), discussed the West-Wide Pathways Initiative including regional markets, pathways initiative overview, differences from the status quo market governance, the implementation of the pathways and next steps.
2. Discussed PX & Scheduling Report including monthly and yearly average gas pricing for Nebo and market buying and selling average pricing.
3. Discussed optimizing the UAMPS energy portfolio including project updates for the ETRM and tagger software, economic dispatch asset optimization, EIM monthly average pricing and current market outlook.
4. Discussed the Operations Report for the month of April including load peak and energy, along with Pool information.

RESOURCE PROJECT

1. Discussed in Executive Session:
    a. Geothermal update including project details, the current status of the project and next steps.
    b. New wind project identified by the Resource Procurement Plan including project details and next steps.

c. Natural Gas Study including the current status of the project, potential project site characteristics and the next phase of work.

d. Fremont Solar update including the status of the project, results of the system impact study, and next steps.

2. **Approved resolution to authorize the creation of the new wind study project and approval of a $120k budget for the development and execution of the new wind energy project PPA.**

BOARD OF DIRECTORS MEETING

1. **Approved using the UAMPS EIM fund to cover the increased costs of $95,000 for more comprehensive financial health reports for the UAMPS members (40).**
2. Discussed the Operations Report:
    a. Natural Gas storage including regional storage and natural gas consumption.
    b. Industry News including CAISO EDAM schedule, PacifiCorp Stakeholder Process and EDAM developments.
    c. Seasonal Outlook including May forecast, prior month, summer outlook, precipitation forecast and La Niña update.
    d. Average residential electricity prices.
    e. PacifiCorp Wildfire Mitigation including Public Safety Power Shutoff (PSPS), the criteria for a PSPS and communication factors.
3. Discussed the FY23 Audit Risk Assessment including background, recommended measures, assessment and score.
4. **Approved the FY23 Audit Risk Assessment.**
5. Discussed the history of the Nebo Project in honor of the project's 20th anniversary.
6. Approved all action items for the Project Meetings.
7. Discussed next month’s board meeting location and details.
8. Discussed Steel 1A & 1B Ribbon Cutting Ceremony details.
9. Discussed Lehi Power’s open house on May 15th.
10. Discussed an electrical license class hosted by Lehi.