ATTACHMENT A – WELD 2978 NWA OPPORTUNITY

MAY, 2023

Xcel Energy®

Project Description

The infrastructure supplied by the Weld and Greeley distribution substations serves the majority of Greeley, Colorado. Based on the Company's analysis, this area is projected to see new load growth over the next five years that will require additional infrastructure investment.

The traditional utility solution identified to support this growth is to extend a new distribution feeder from Weld substation by 12/31/2025. In addition to distribution feeder overloads related to load growth, the traditional utility solutions would provide load relief under N-1 conditions. The project is estimated at $4.1M and has an in-service date of 12/31/2025.

This solicitation is seeking cost-effective Non-Wires Alternatives solution to defer the need for the New Weld Feeder project through 2031.

System Risk Type

N-0	Yes
N-1	Yes

Table 1: Risk Types Mitigated by the Project

Equipment at Risk

Risk Definition:

The Company defines N-0 and N-1 risks as:

1. **N-0 Overloads:** This risk represents an overloaded distribution feeder or substation transformer when the distribution system is operating in the normal configuration. Normal configuration means all feeders and transformers are in operation and supporting the capacity of the distribution system. If a distribution feeder or substation transformer were to fail or become unavailable for operation, the distribution system would be in an N-1 state.
2. **N-1 Contingencies:** This risk occurs when a distribution feeder or substation transformer is removed from operation, whether planned or unplanned. N-1 risks occur when the load normally served by the inoperable asset is not able to be restored through feeder and/or transformer ties without overloading equipment. The customers subjected to this N-1 outage would be without power until repairs are made and the system is restored to an N-0 state.

The Company has calculated the magnitude and duration of the System Risk Relief Requirement (SRRR) needed to successfully defer the New Weld Feeder Project through 2031[1].

[1] The SRRR includes the 25% safety margins for the SRRR.

N-0 Risk Evaluation

Device at Risk	System Load Relief (MW)	Consecutive Hours at Risk	Peak Hour
WELD1611 (2031)	4.6	10	15:00

Table 2: System Risk Relief Requirements for N-0 Risks

N-1 Risk Evaluation

Device at Risk	System Load Relief (MW)	Consecutive Hours at Risk	Peak Hour
WELD1611 (2031)	11.5	20	15:00
GRLY1032 (2031)	7.0	21	15:00

Table 3: System Risk Relief Requirements for N-1 Risks

Load Forecast[2]

The forecast below shows the peak demand for each of the distribution feeders with an N-0 or N-1 risk forecasted through 2031. The distribution system in this area is summer peaking.

Asset	Rating (kVA)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
GRLY_TR3	54219	36601	39693	39693	39693	39882	40681	42079	43272	44478	45575
WELD_TR5	46976	22593	23693	24193	24193	24296	24764	25208	25836	26313	26857
ARRL1472	12958	9696	11416	11886	11886	11906	11967	12026	12056	12114	12175
GRLY1032	12829	9328	9328	9328	9328	9333	9372	9396	9446	9482	9520
GRLY1035	12829	7981	8424	8424	8424	8432	8465	8513	8578	8657	8694
GRLY1038	12829	12225	12225	12225	12225	12231	12249	12258	12282	12290	12303
WELD1610	12958	10989	12089	12589	12589	12607	12626	12665	12691	12712	12746
WELD1611	12613	13799	13799	13799	13799	13889	14348	14758	15363	15822	16325
WELD1612	12613	12589	12589	12589	12589	12604	12641	12711	12797	12876	12977

Table 4: Distribution System Summer Peak Forecast

Asset Mapping

The asset mapping is intended to help Non-Wires Alternative developers identify where solutions can be placed on the distribution system to mitigate the identified risks.

For N-0 risks, NWA solutions must be placed on the feeder or bank experiencing the N-0 risk. The NWA must be sized to meet the SRRR (MW) and the Consecutive Hours at Risk (MWh) to reduce the peak demand below the asset's rating. Care must be given to ensure that the solution does not overload the transformer serving the feeder.

[2] Forecasted demands are in kilowatts (kW)

Transformer	GRLY_TR3	WELD_TR5
Associated Feeders	GRLY1031	WELD1610
	GRLY1032	WELD1611
	GRLY1033	
	GRLY1034	

Table 5: Feeder and Transformer Mapping Under N-0 Conditions

In an N-1 state, NWA solutions may be placed on the Associated Tie Assets or the Device at Risk to reduce the peak demand below the asset's rating. As with N-0 risks, care must be given to ensure that the solution does not overload the transformer serving the feeder.

Asset at Risk	WELD1611	GRLY1032
Associated Feeder Ties for N-1 System Risk Relief Requirements	GRLY1032	GRLY1035
	ARRL1472	WELD1611
	WELD1612	WELD1612
	WELD1610	GRLY1038

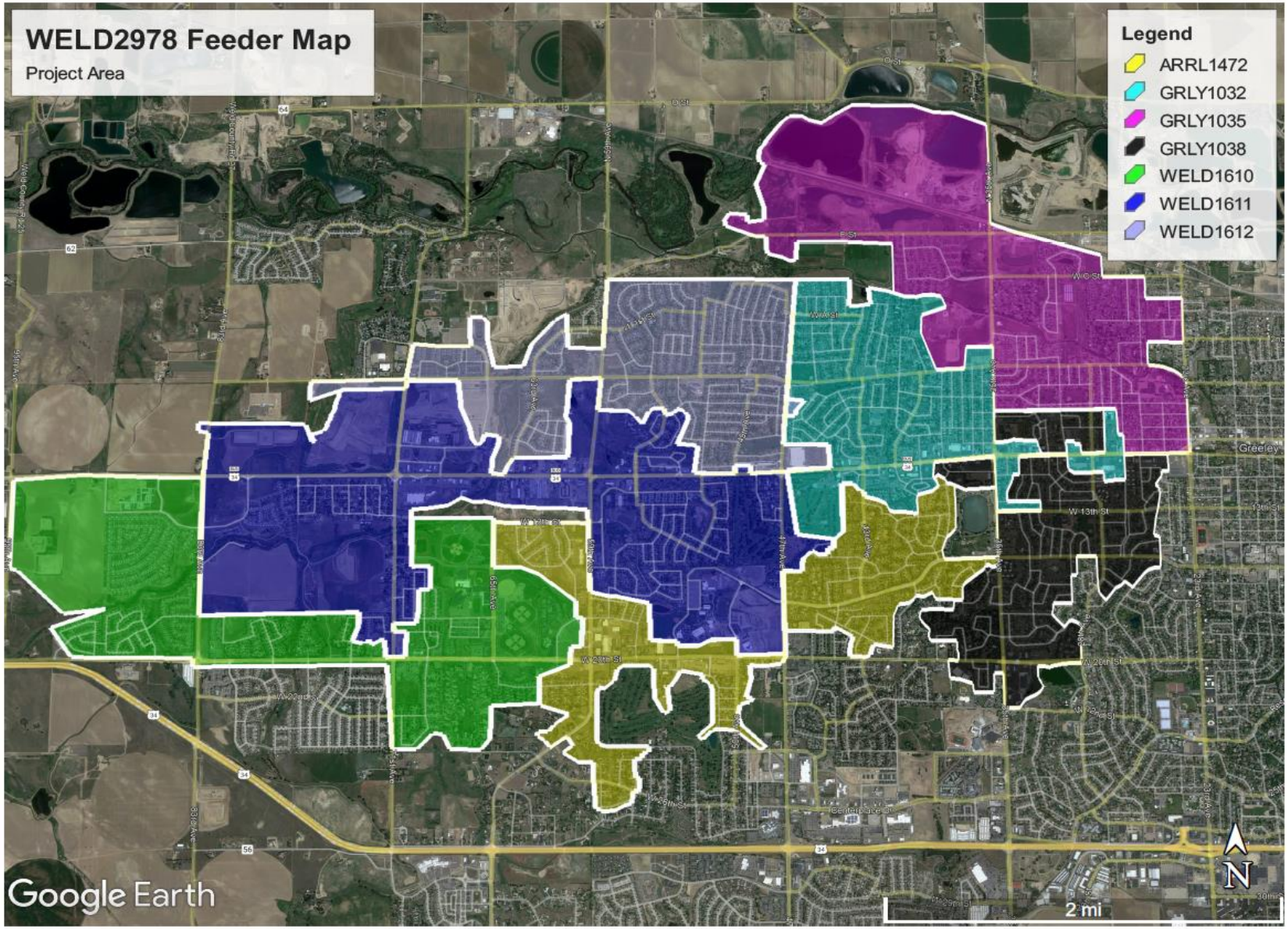
Table 6:Distribution Feeder Tie Support Under N-1 Conditions

Timing of the Need

Asset	Capacity Need (MW)	Need Period (Hours)	Peak Hours	Deferral Period (Years)	120-Day Load Relief Period
WELD1611 (N-0)	4.6	10 hours	11:00 – 20:00	2025 - 2031	June 1st – September 28th
WELD1611 (N-1)	11.5	20 hours	4:00 – 23:00	2025 - 2031	
GRLY1032 (N-1)	7.0	21 hours	3:00 – 23:00	2025 - 2031	

Table 7: Timing for System Risk Relief Requirements

Area of Need


WELD2978 Feeder Map
Project Area
Legend
ARRL1472
GRLY1032
GRLY1035
GRLY1038
WELD1610
WELD1611
WELD1612
Google Earth
2 mi
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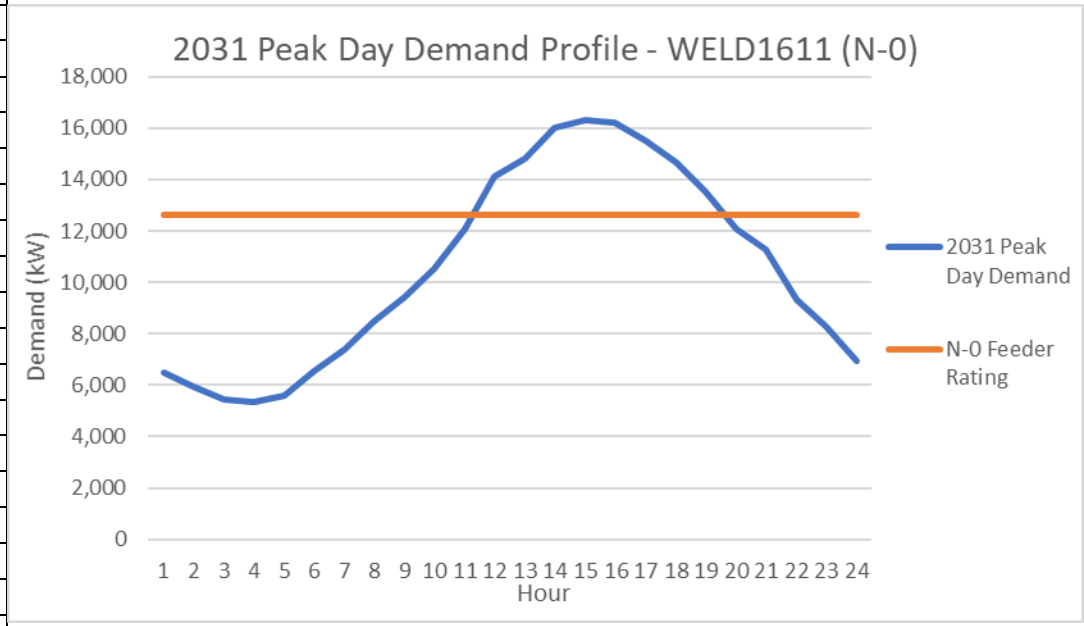
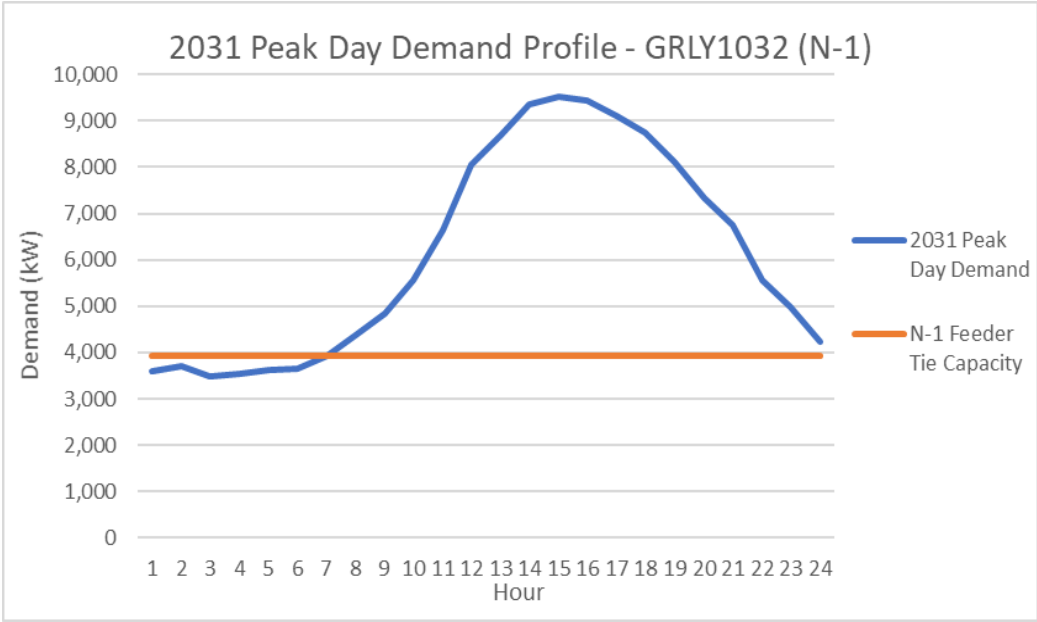
Peak Day Demand Curves[3]

WELD1611 N-0	2022 Peak Demand[4]	2031 Peak Demand	Feeder Rating (N-0)	2031 N-0 Load at Risk
6/26/2022 1:00	5,504	6,512	12,613	0
6/26/2022 2:00	5,005	5,921	12,613	0
6/26/2022 3:00	4,613	5,457	12,613	0
6/26/2022 4:00	4,536	5,367	12,613	0
6/26/2022 5:00	4,726	5,592	12,613	0
6/26/2022 6:00	5,509	6,518	12,613	0
6/26/2022 7:00	6,233	7,374	12,613	0
6/26/2022 8:00	7,179	8,494	12,613	0
6/26/2022 9:00	7,990	9,453	12,613	0
6/26/2022 10:00	8,889	10,516	12,613	0
6/26/2022 11:00	10,224	12,095	12,613	0
6/26/2022 12:00	11,926	14,109	12,613	1,496
6/26/2022 13:00	12,505	14,794	12,613	2,181
6/26/2022 14:00	13,533	16,011	12,613	3,398
6/26/2022 15:00	13,799	16,325	12,613	3,712
6/26/2022 16:00	13,691	16,197	12,613	3,584
6/26/2022 17:00	13,110	15,510	12,613	2,897
6/26/2022 18:00	12,379	14,646	12,613	2,033
6/26/2022 19:00	11,431	13,523	12,613	910
6/26/2022 20:00	10,190	12,055	12,613	0
6/26/2022 21:00	9,524	11,268	12,613	0
6/26/2022 22:00	7,893	9,338	12,613	0
6/26/2022 23:00	7,008	8,290	12,613	0
6/26/2022 24:00	5,847	6,917	12,613	0

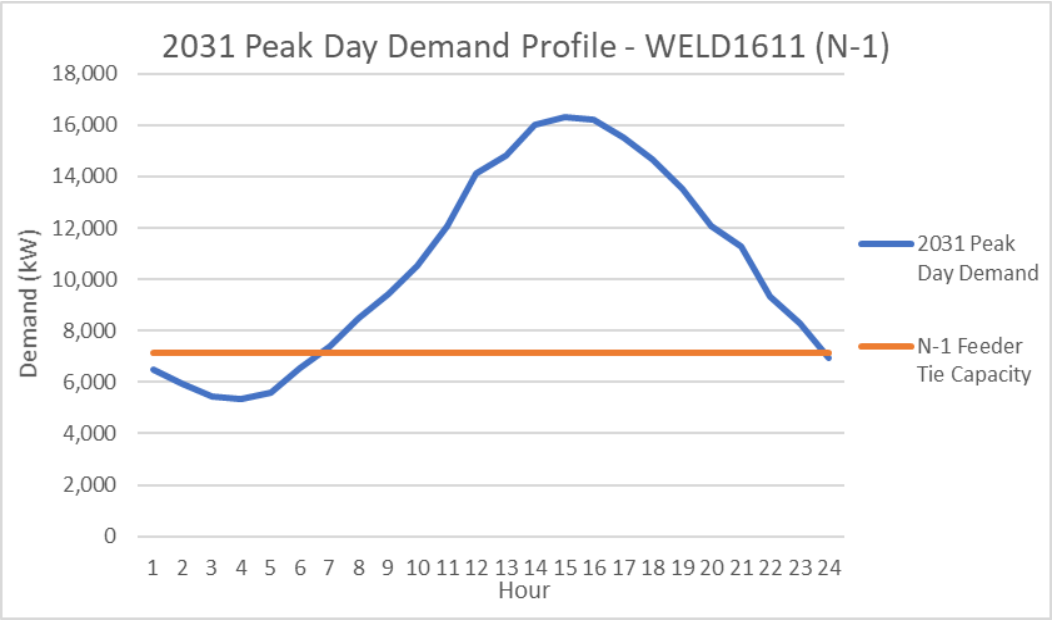


[3] Load curves and Load at Risk do not account for the 25% safety margins for capacity (kilowatts) and duration (consecutive hours)
[4] Peak demands are measured in kilowatts

GRLY1032 N-1	2022 Peak Demand	2031 Peak Demand	Feeder Tie Capacity (N-1)	2031 N-1 Load at Risk
6/26/2022 1:00	3,526	3,599	3,919	0
6/26/2022 2:00	3,636	3,711	3,919	0
6/26/2022 3:00	3,403	3,473	3,919	0
6/26/2022 4:00	3,479	3,550	3,919	0
6/26/2022 5:00	3,545	3,618	3,919	0
6/26/2022 6:00	3,591	3,665	3,919	0
6/26/2022 7:00	3,839	3,919	3,919	0
6/26/2022 8:00	4,277	4,365	3,919	446
6/26/2022 9:00	4,743	4,841	3,919	922
6/26/2022 10:00	5,451	5,563	3,919	1,644
6/26/2022 11:00	6,511	6,645	3,919	2,726
6/26/2022 12:00	7,892	8,055	3,919	4,136
6/26/2022 13:00	8,516	8,691	3,919	4,772
6/26/2022 14:00	9,176	9,365	3,919	5,446
6/26/2022 15:00	9,328	9,520	3,919	5,601
6/26/2022 16:00	9,255	9,446	3,919	5,527
6/26/2022 17:00	8,912	9,095	3,919	5,176
6/26/2022 18:00	8,560	8,736	3,919	4,817
6/26/2022 19:00	7,947	8,111	3,919	4,192
6/26/2022 20:00	7,191	7,339	3,919	3,420
6/26/2022 21:00	6,626	6,762	3,919	2,843
6/26/2022 22:00	5,459	5,572	3,919	1,653
6/26/2022 23:00	4,873	4,974	3,919	1,055
6/26/2022 24:00	4,146	4,231	3,919	312



WELD1611 N-1	2022 Peak Demand	2031 Peak Demand	2031 N-1 Load Relief	2031 N-1 Load at Risk
6/26/2022 1:00	5,504	6,512	7,150	0
6/26/2022 2:00	5,005	5,921	7,150	0
6/26/2022 3:00	4,613	5,457	7,150	0
6/26/2022 4:00	4,536	5,367	7,150	0
6/26/2022 5:00	4,726	5,592	7,150	0
6/26/2022 6:00	5,509	6,518	7,150	0
6/26/2022 7:00	6,233	7,374	7,150	224
6/26/2022 8:00	7,179	8,494	7,150	1,344
6/26/2022 9:00	7,990	9,453	7,150	2,303
6/26/2022 10:00	8,889	10,516	7,150	3,366
6/26/2022 11:00	10,224	12,095	7,150	4,945
6/26/2022 12:00	11,926	14,109	7,150	6,959
6/26/2022 13:00	12,505	14,794	7,150	7,644
6/26/2022 14:00	13,533	16,011	7,150	8,861
6/26/2022 15:00	13,799	16,325	7,150	9,175
6/26/2022 16:00	13,691	16,197	7,150	9,047
6/26/2022 17:00	13,110	15,510	7,150	8,360
6/26/2022 18:00	12,379	14,646	7,150	7,496
6/26/2022 19:00	11,431	13,523	7,150	6,373
6/26/2022 20:00	10,190	12,055	7,150	4,905
6/26/2022 21:00	9,524	11,268	7,150	4,118
6/26/2022 22:00	7,893	9,338	7,150	2,188
6/26/2022 23:00	7,008	8,290	7,150	1,140
6/26/2022 24:00	5,847	6,917	7,150	0



Customer Class Breakdown

Customer Class	ARRL1472	GRLY1032	GRLY1035	GRLY1038	WELD1610	WELD1611	WELD1612
SMALL COMMERCIAL	1	5	3	17	11	11	3
SECONDARY GENERAL	2	3	0	2	1	7	0
RESIDENTAL	1707	2102	2039	1744	615	3025	2447
LARGE COMMERCIAL PRIMARY	0	0	1	1	0	2	0
COMMERCIAL/INDUSTRIAL	144	235	117	348	6	472	55

Table 8: Customer Composition for Impacted Distribution Feeders