Section

A

Appendix A: Structural Capacity Assessments

McKinstry
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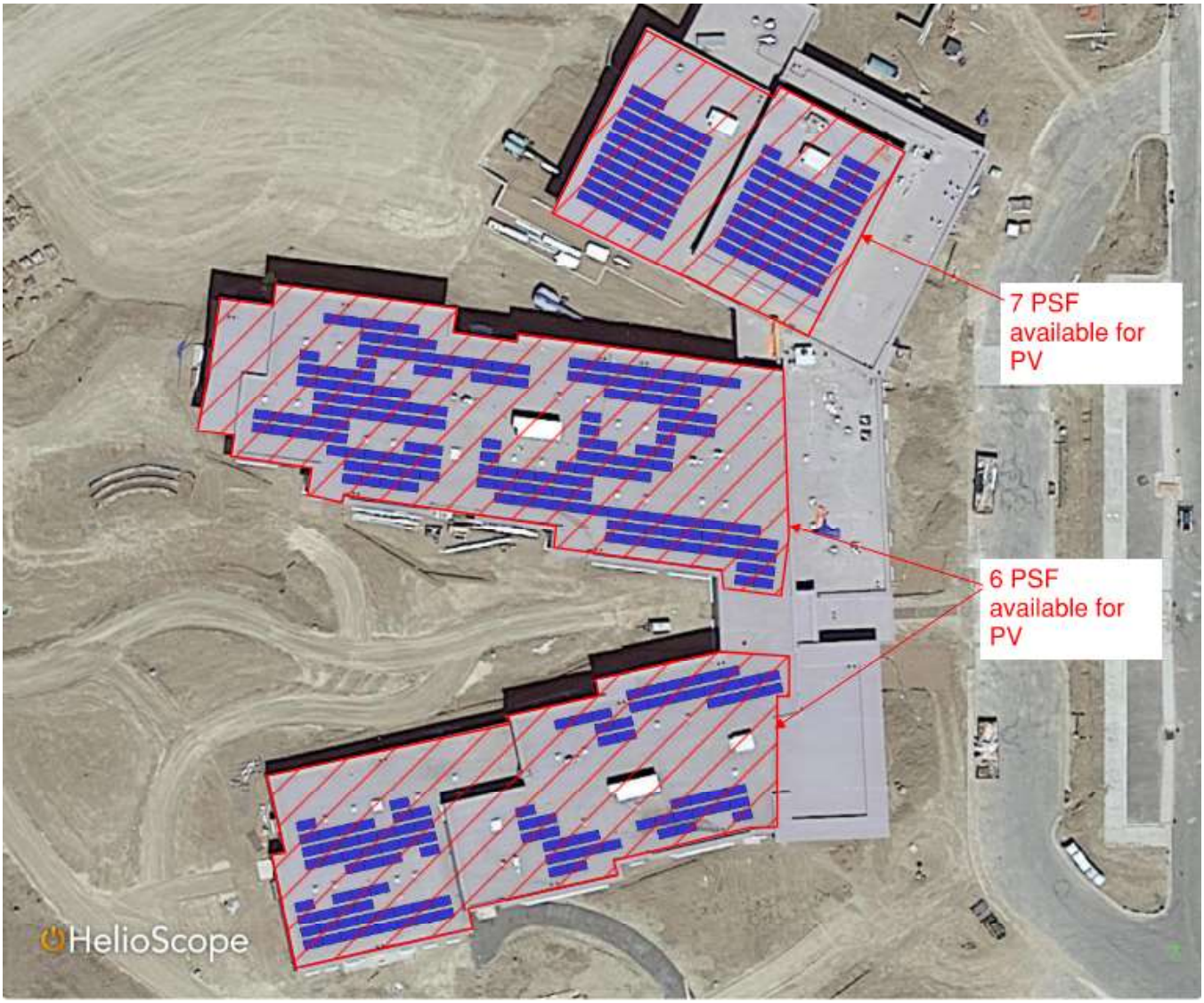
Appendix: Structural Capacity Assessments

McKinstry contracted JVA Inc. to complete the rooftop structural capacity assessments provided in this appendix. Roof capacity assessments were performed on all technically and financially feasible roofs. The minimum capacity needed for rooftop PV on a flat roof is typically 4 psf, while a flush mount roof system needs a minimum of 3 psf. As seen below, all the roofs in this study have enough available capacity for the recommended solar systems.

Roof structural capacity assessments were not performed for sites that were deemed technically not feasible due to roof age.

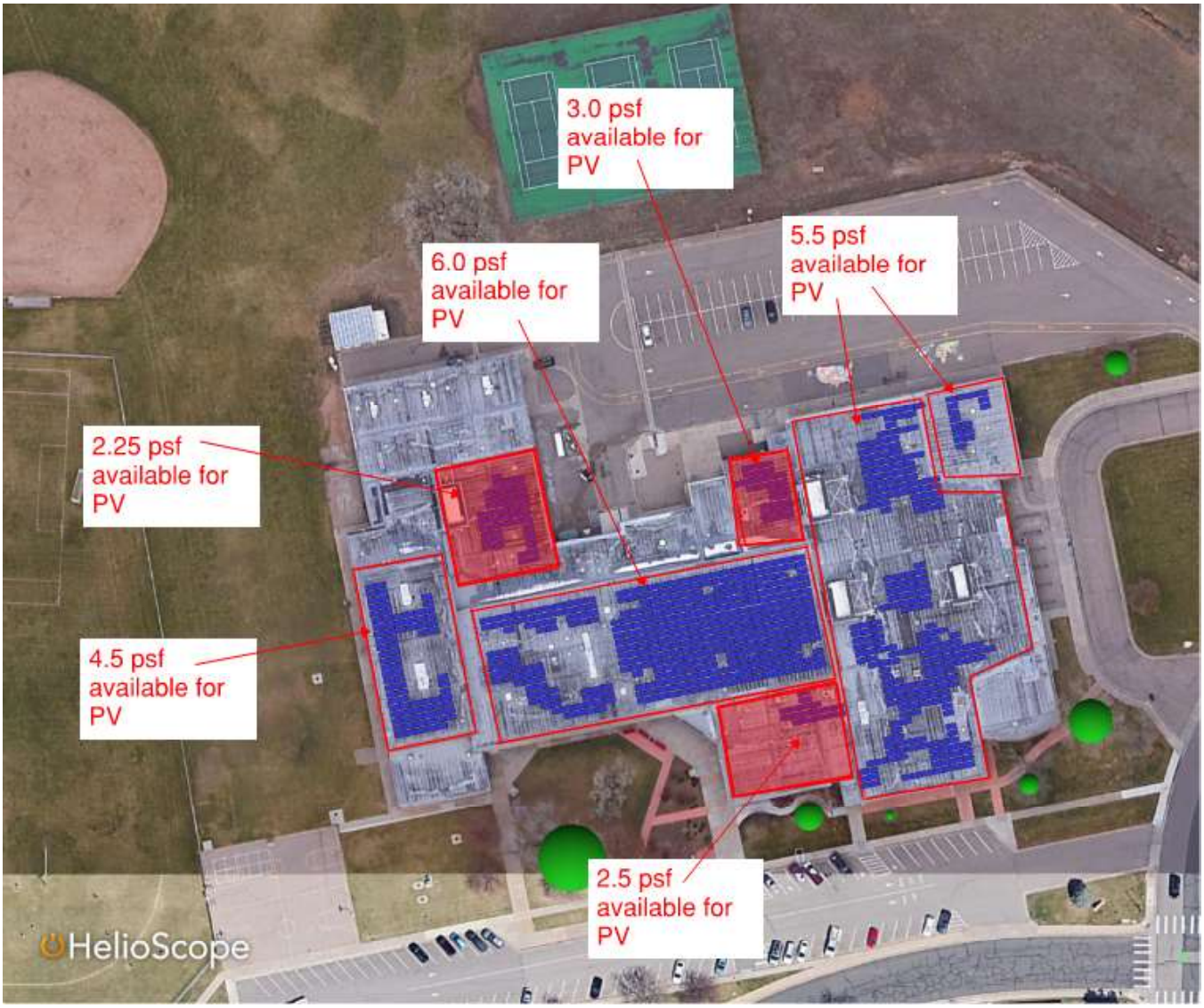
BAMFORD ELEMENTARY SCHOOOL



Appendix: Structural Capacity Assessments

BOLTZ MIDDLE SCHOOOL

At the request of PSD, Boltz MS was assessed for available roof capacity. The layout below was designed to provide the maximum sized PV system while avoiding PV on shaded areas of the roof. As seen below, the red highlighted roof sections would not support the added weight of the PV system. The maximum PV system size for this site given roof capacity limitations would be ~388 kWDC.



Appendix: Structural Capacity Assessments

CACHE LA POUDRE ELEMENTARY SCHOOOL

The system layout was revised to align with available structural capacity.

Appendix: Structural Capacity Assessments

EYESTONE NORTH ELEMENTARY SCHOOL

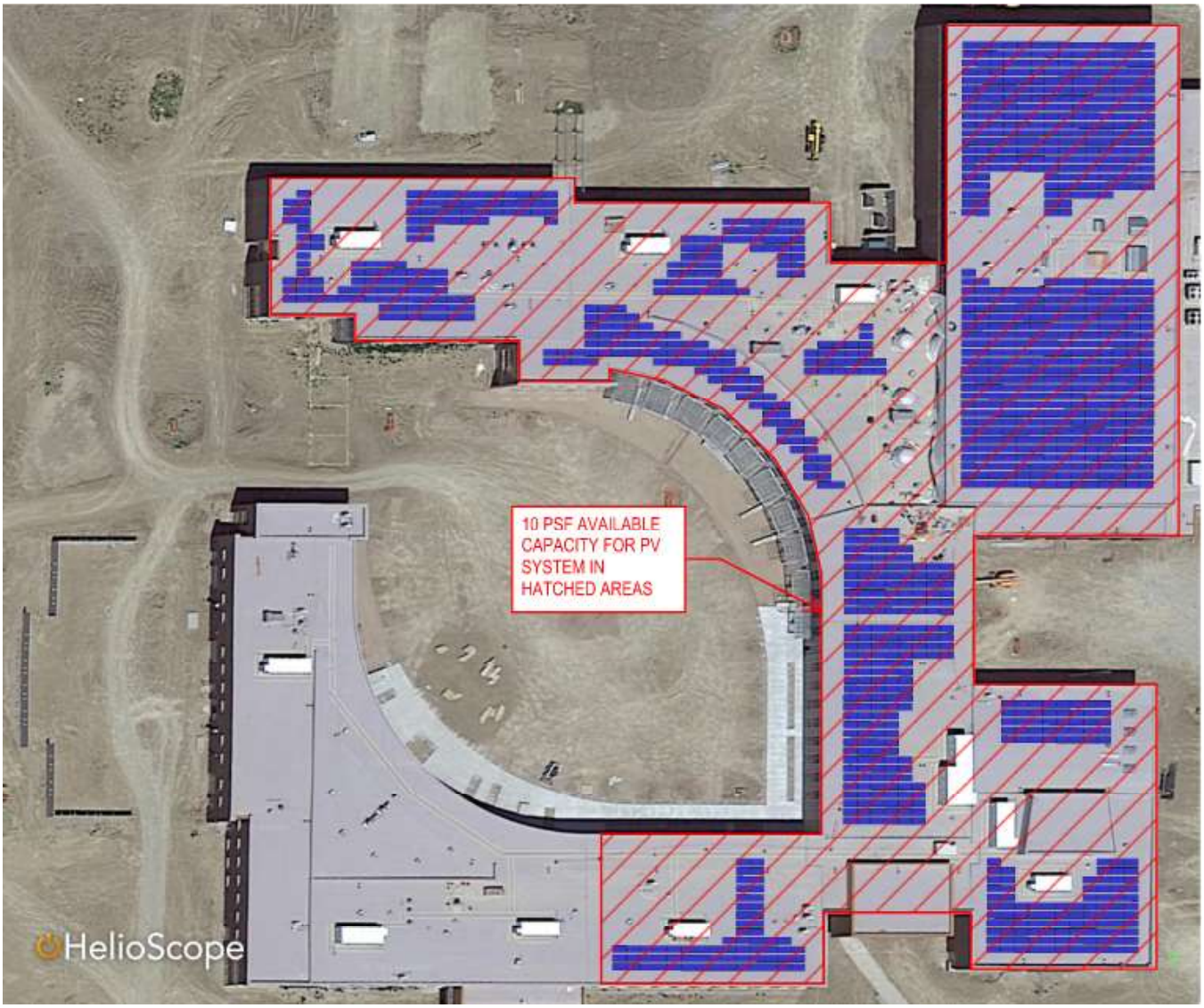
The system layout was revised to align with available structural capacity.

Appendix: Structural Capacity Assessments

EYESTONE SOUTH ELEMENTARY SCHOOL

Appendix: Structural Capacity Assessments

TIMNATH AND WELLINGTON MIDDLE/ HIGH SCHOOL



Appendix: Structural Capacity Assessments

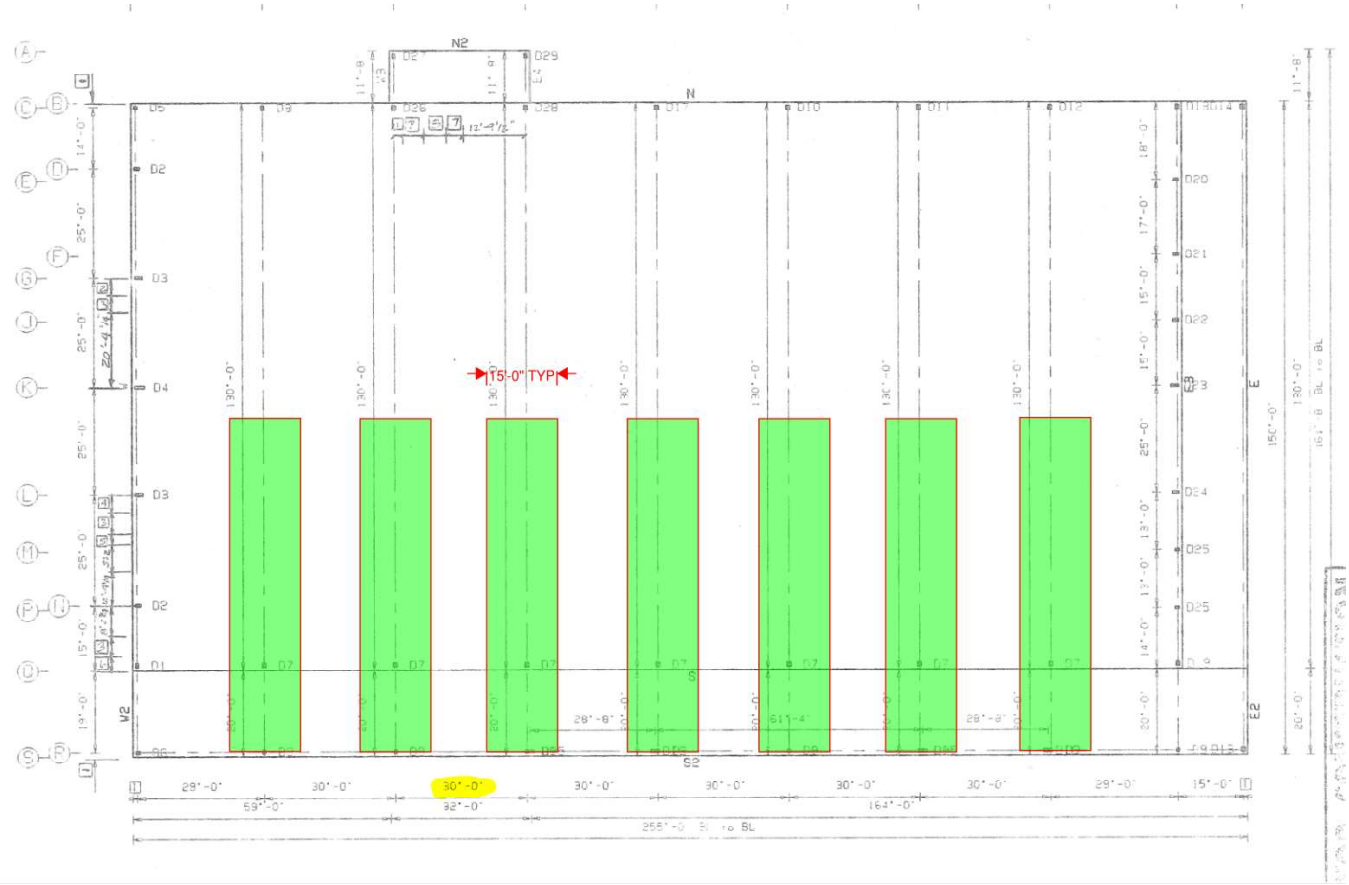
SOUTH BUS TERMINAL

Appendix: Structural Capacity Assessments

WAREHOUSE 5

JVA Notes:

"We ran the calculations on the roof structure for Warehouse 5 and came up with really no available capacity for PV—by analysis, the existing structure is right at capacity with the existing loads. We can use the IEBC provision allowing additional load on the roof if it doesn't increase the forces to any member by more than 5%--if we do that, we can add up to 3 psf of PV in 15' wide strips centered on the existing building frames (see image below). "



Section

B

Appendix B: Interconnection Assessments

McKinstry
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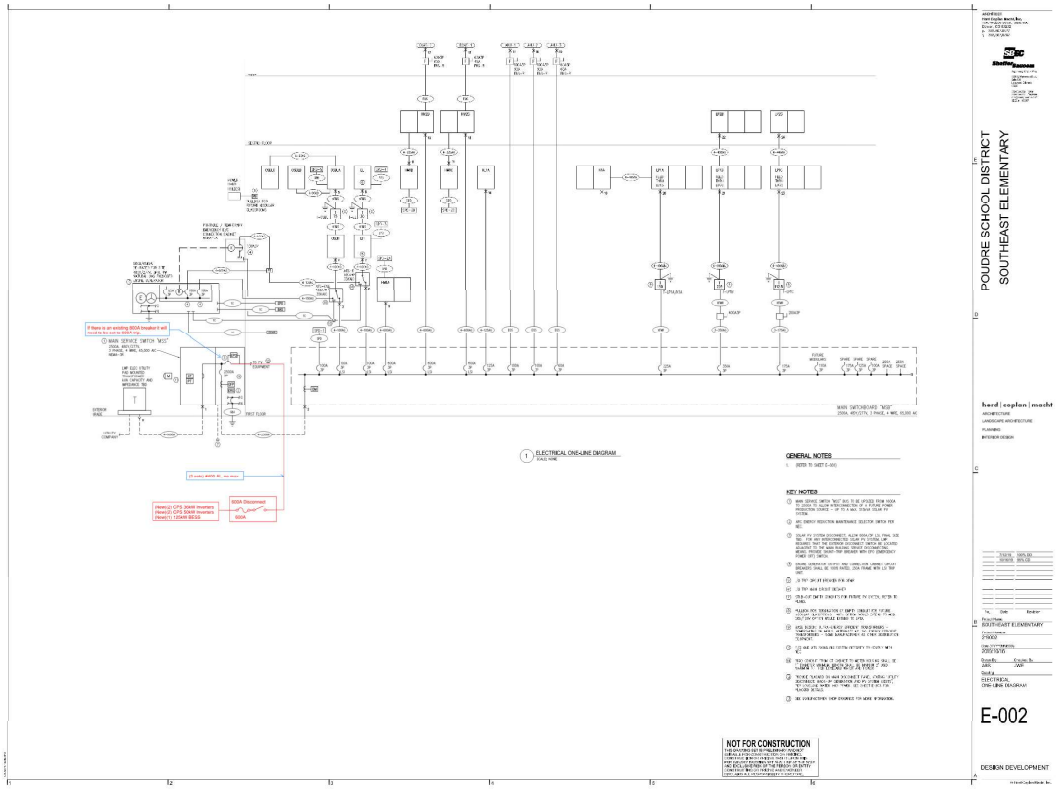
Appendix: Interconnection Assessments

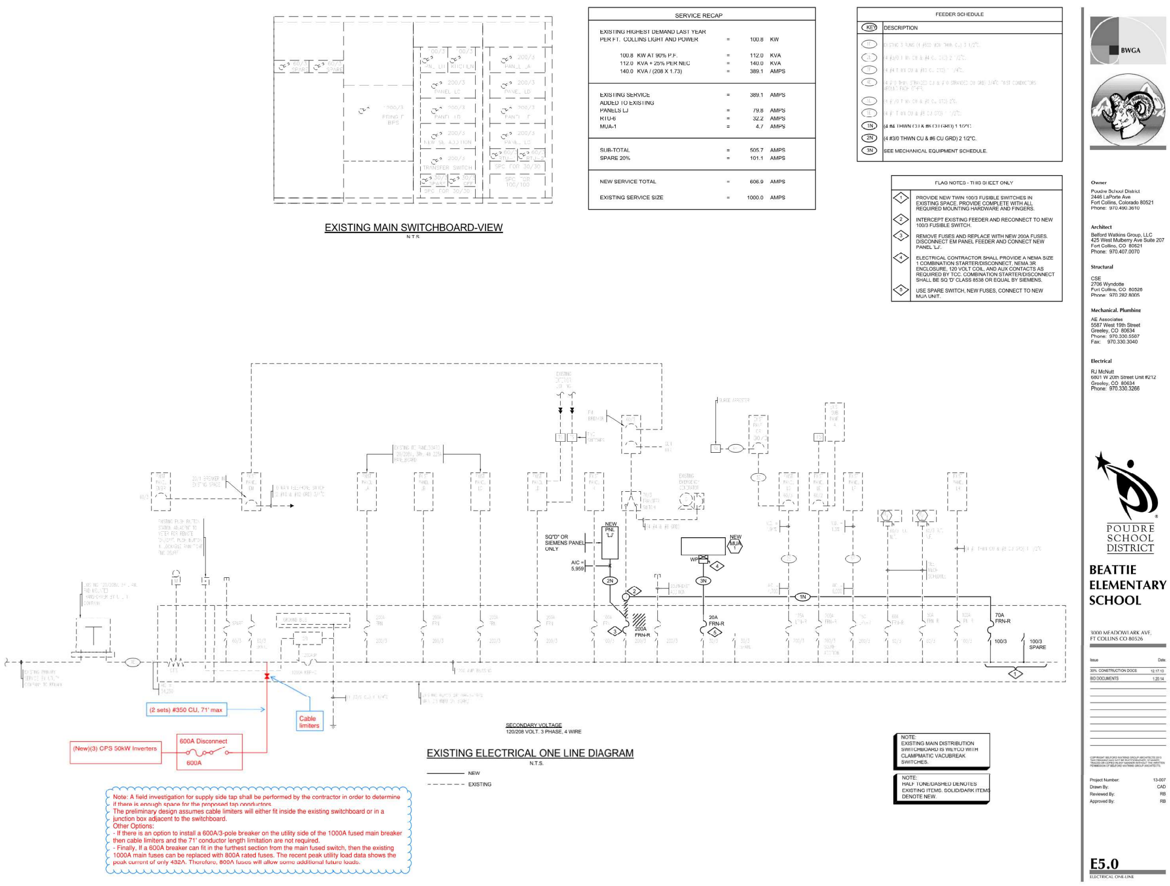
McKinstry contracted McCalmont Engineering to perform the interconnection assessments provided in this appendix. McCalmont determined the interconnection options by reviewing the site Helioscope reports, record drawings, equipment specifications, utility data, and site photos. In some cases, an electrical field investigation would be needed to further access interconnection methodology, which consists of an electrician suiting up in arc flash gear and removing the switchboard dead fronts to better assess the available space within the switchboard.

BAMFORD ELEMENTARY SCHOOL – PV AND BESS



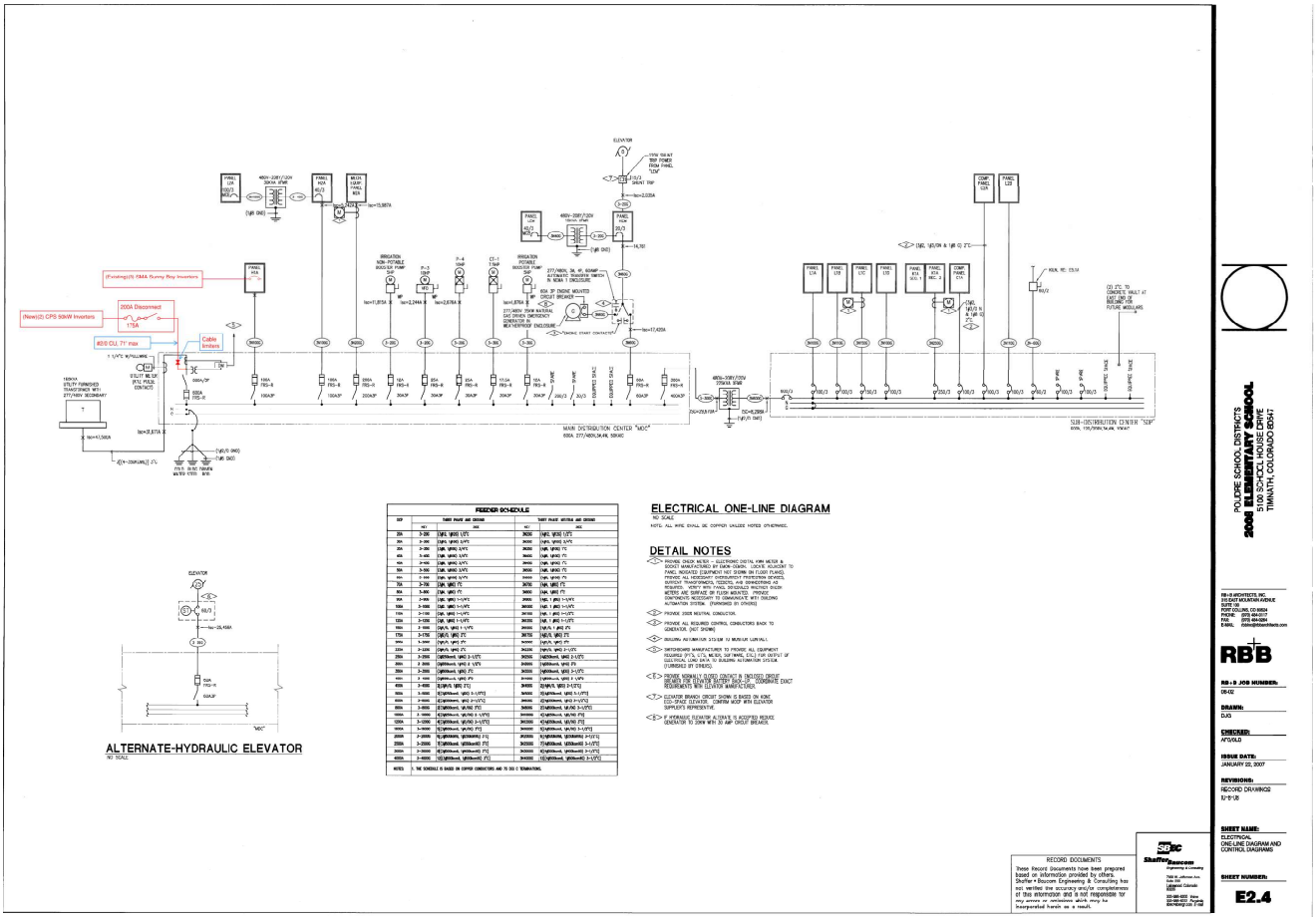
Appendix: Interconnection Assessments

BEATTIE ELEMENTARY SCHOOL



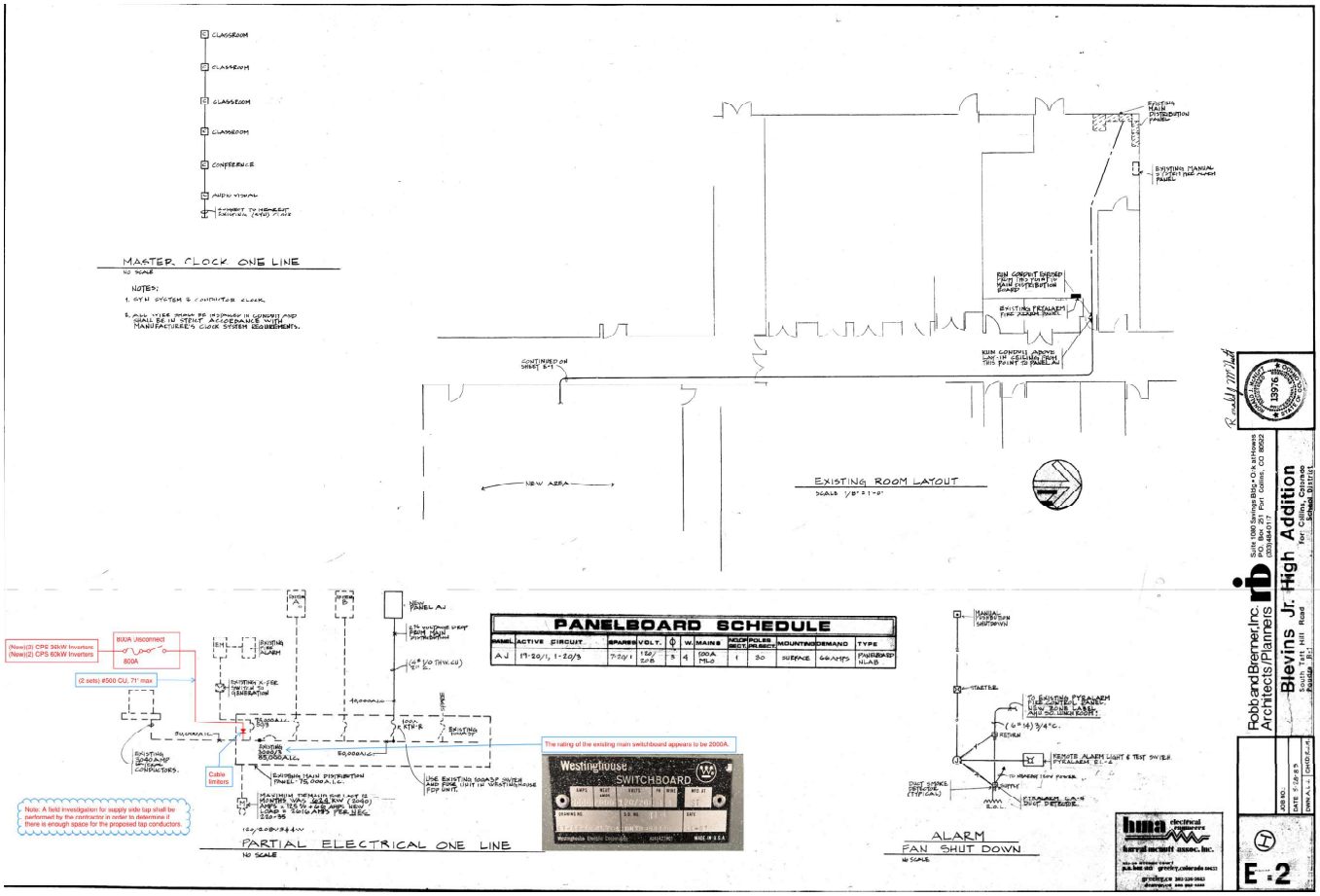
Appendix: Interconnection Assessments

BETHKE ELEMENTARY SCHOOL



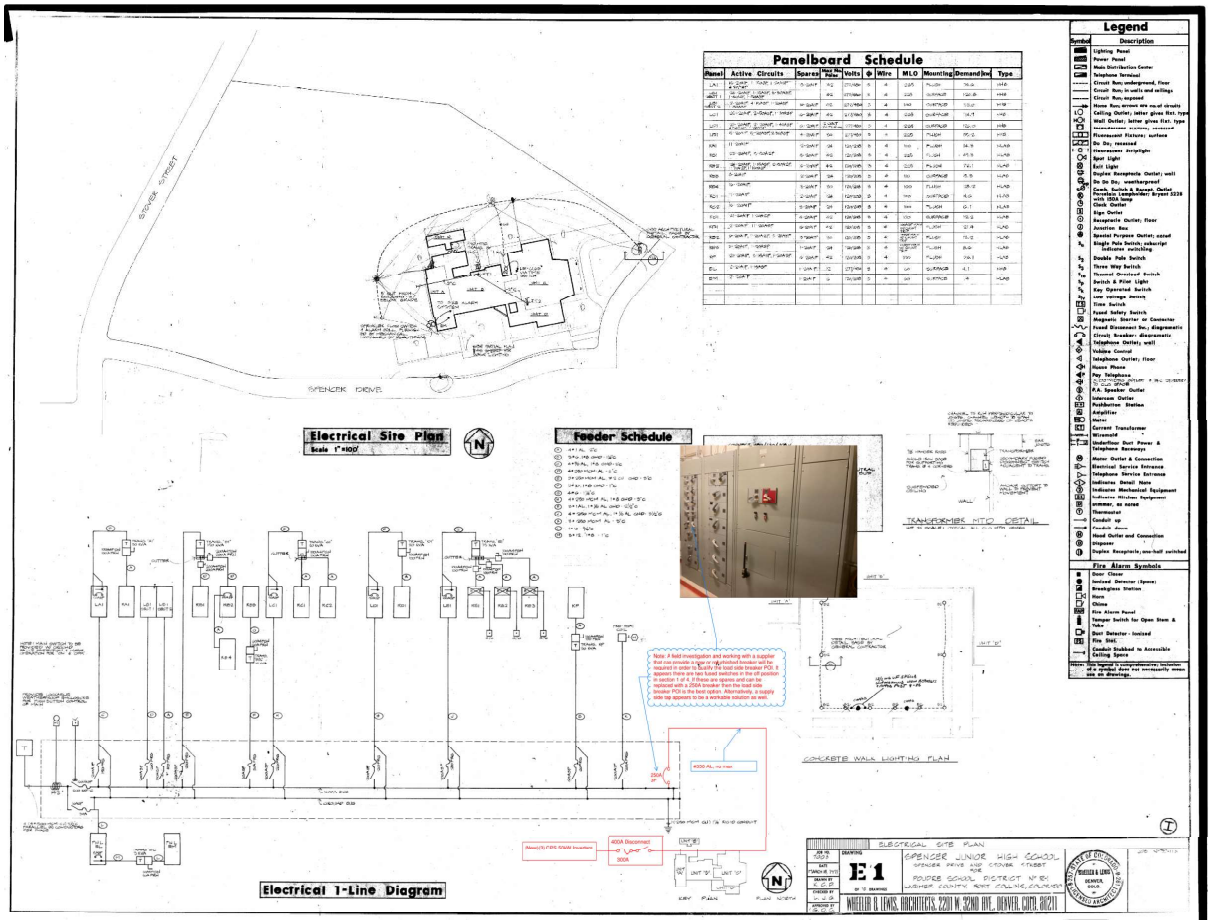
Appendix: Interconnection Assessments

BLEVINS MIDDLE SCHOOL



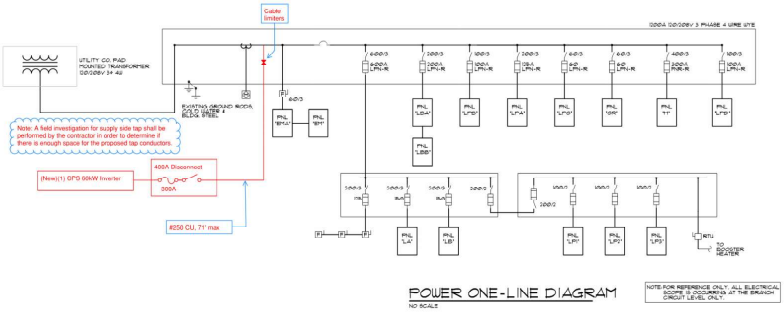
Appendix: Interconnection Assessments

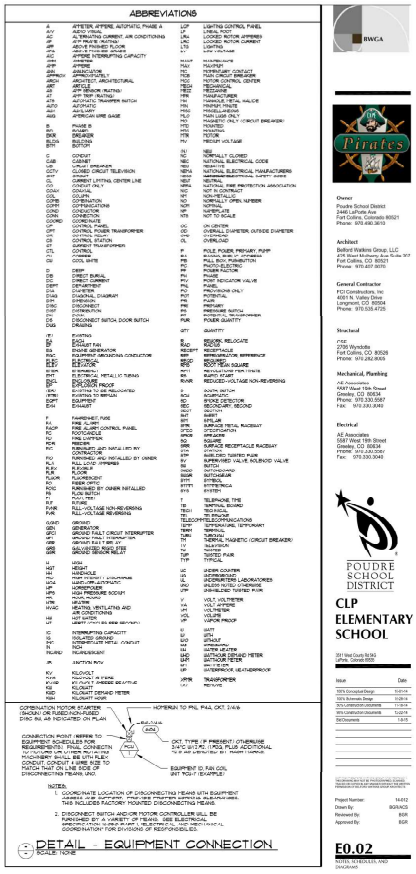
BOLTZ ELEMENTARY SCHOOL



Appendix: Interconnection Assessments

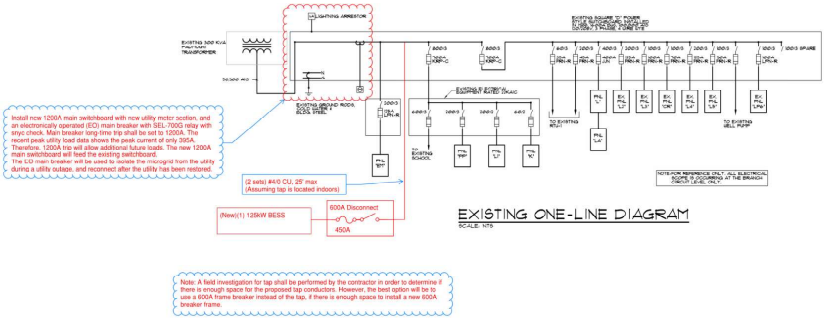
CACHE LA POUDRE ELEMENTARY SCHOOL

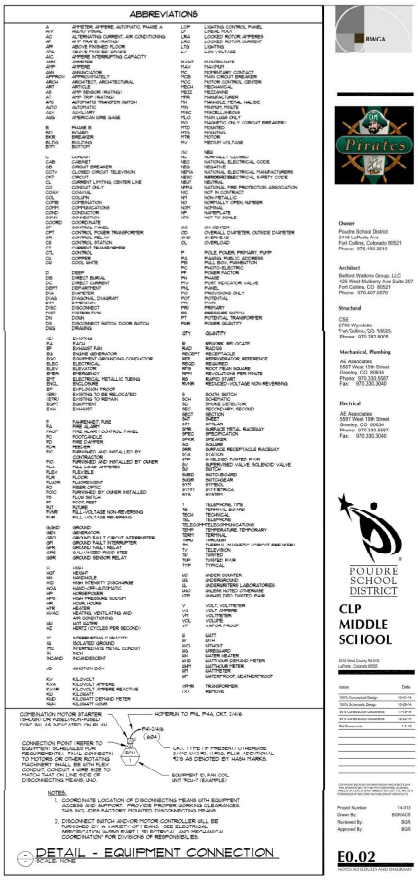




Appendix: Interconnection Assessments

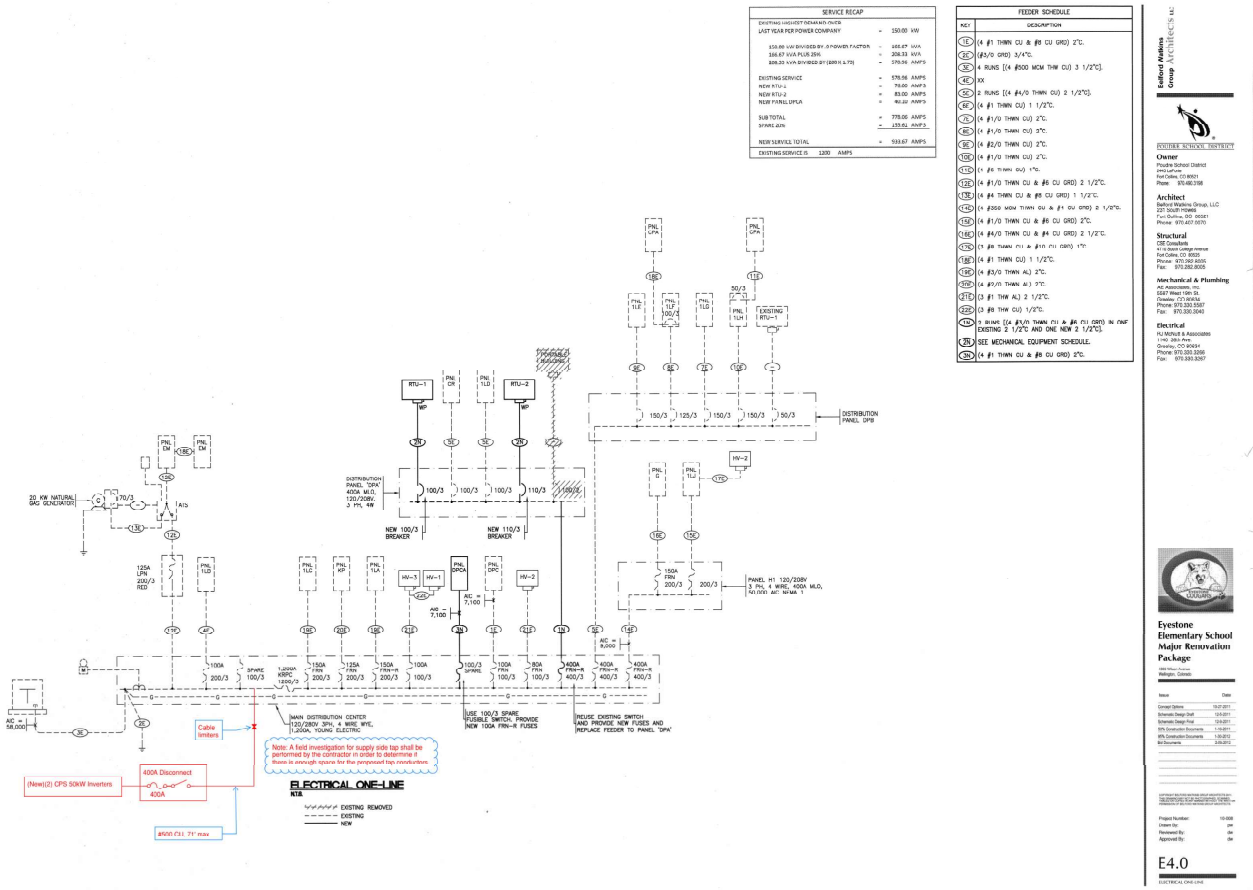
CACHE LA POUDRE MIDDLE SCHOOL - BESS





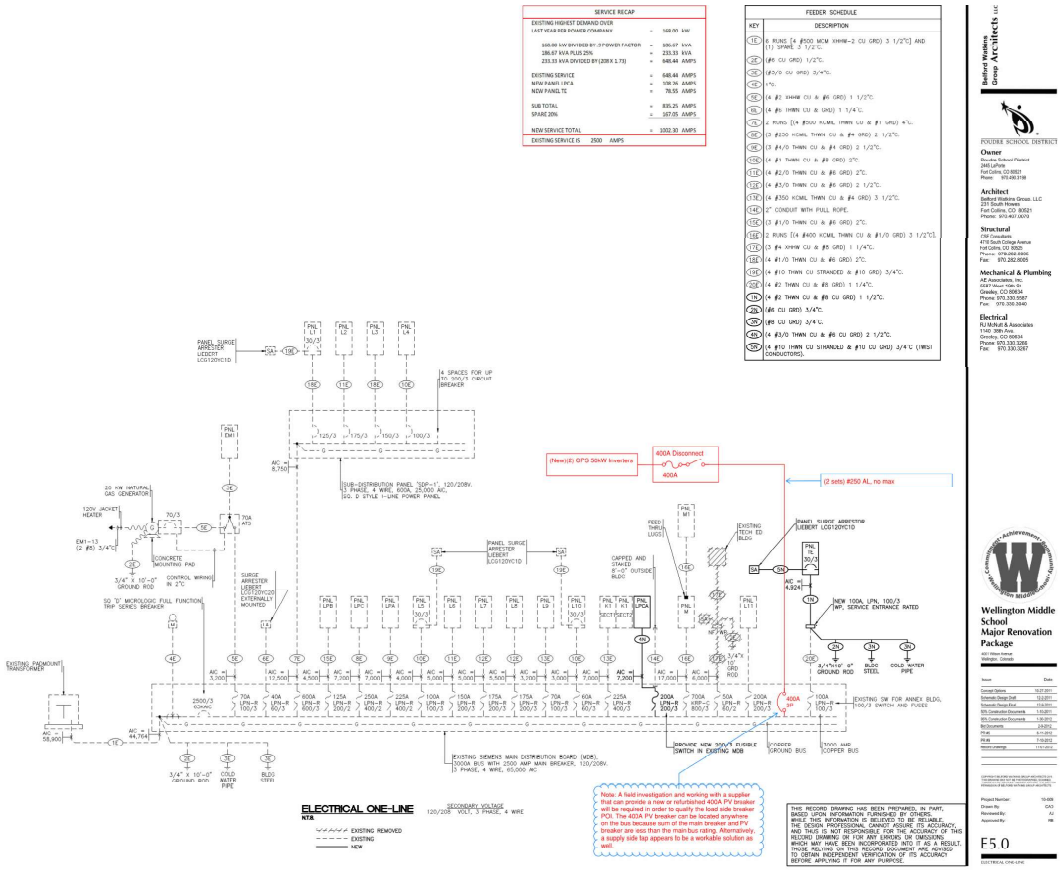
Appendix: Interconnection Assessments

EYESTONE NORTH ELEMENTARY SCHOOL



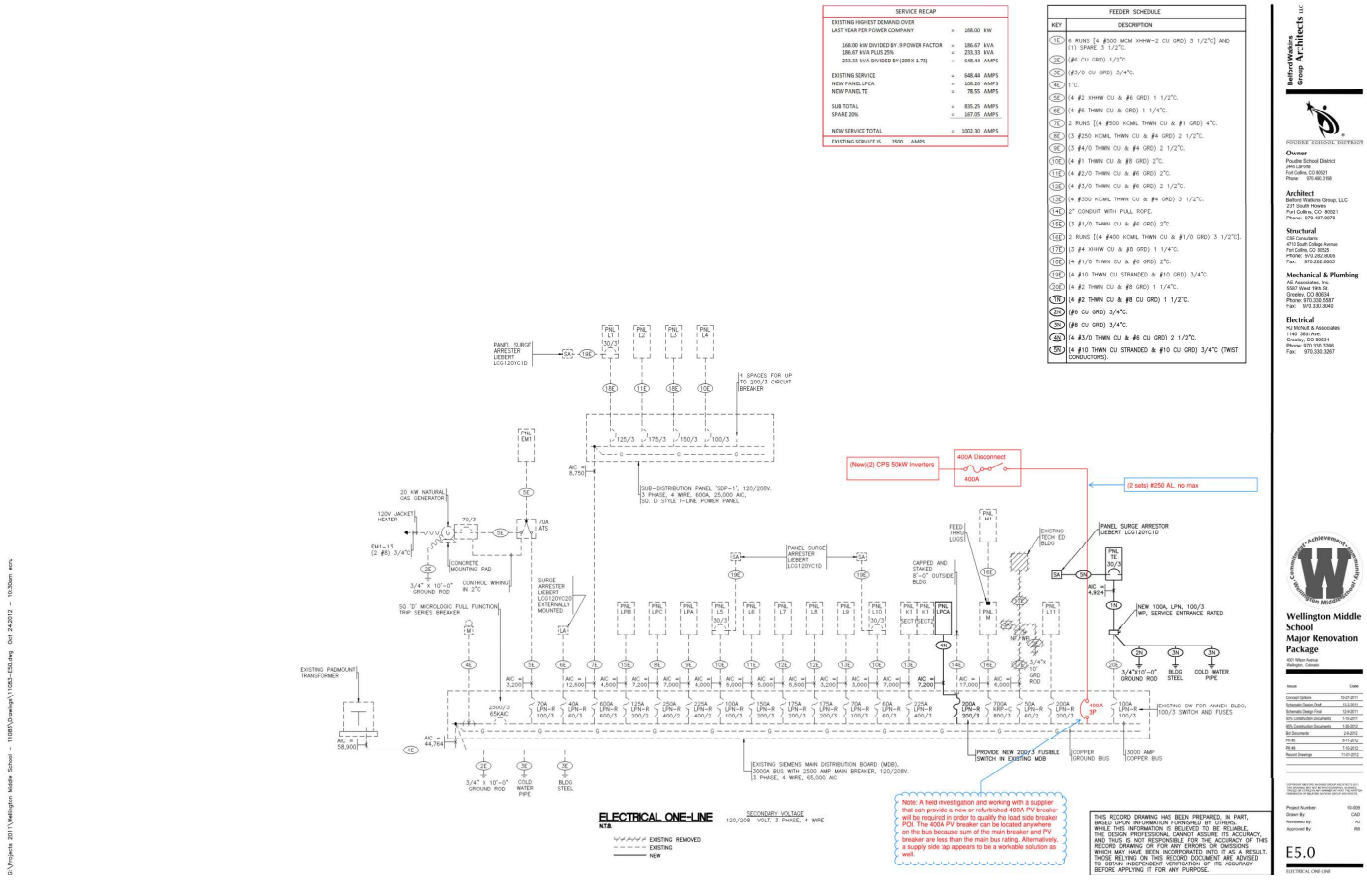
Appendix: Interconnection Assessments

EYESTONE SOUTH ELEMENTARY SCHOOL – GROUND MOUNT PV SYSTEM



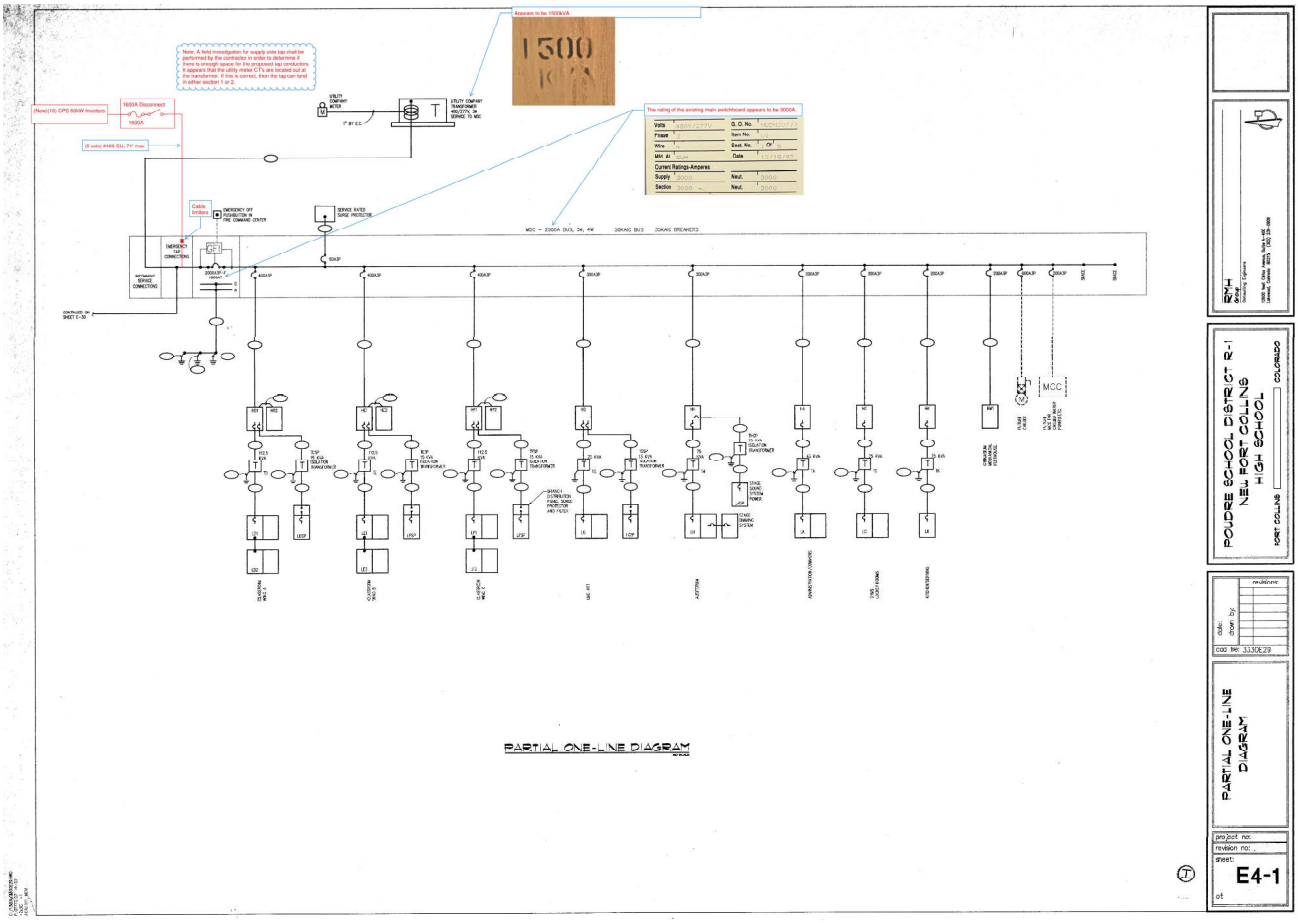
Appendix: Interconnection Assessments

EYESTONE SOUTH ELEMENTARY SCHOOL – ROOF MOUNT PV SYSTEM



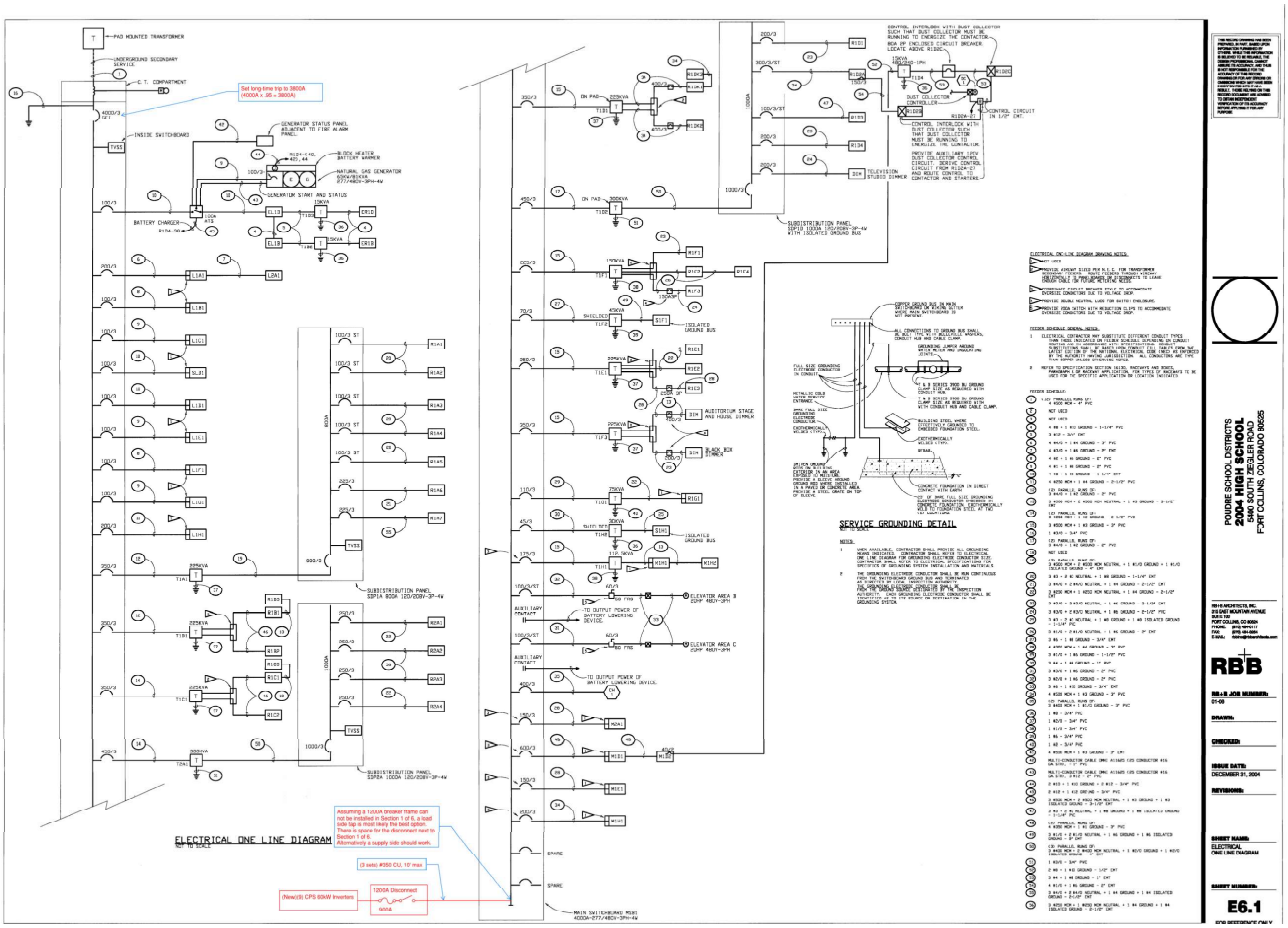
Appendix: Interconnection Assessments

FORT COLLINS HIGH SCHOOL



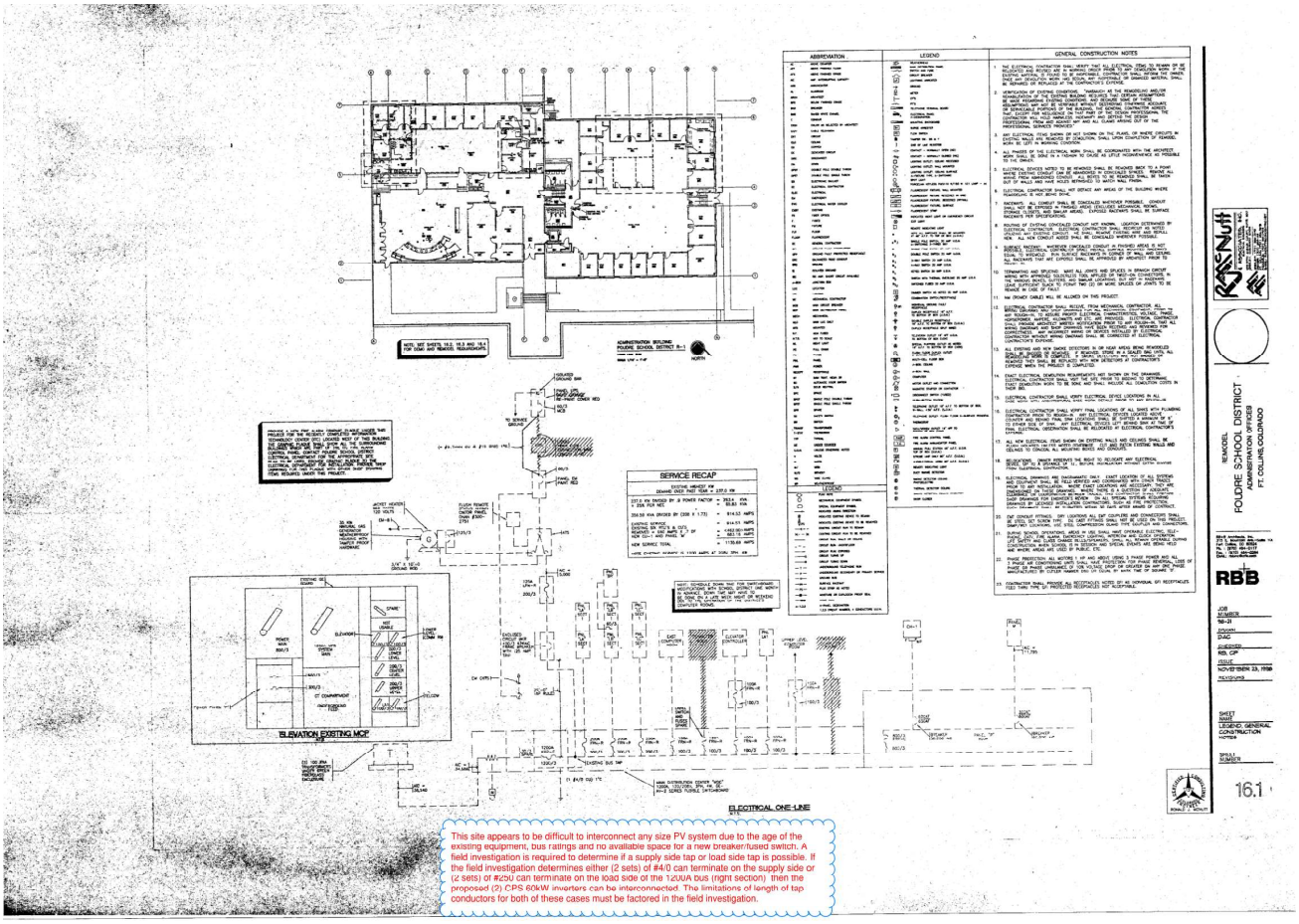
Appendix: Interconnection Assessments

FOSSIL RIDGE HIGH SCHOOL



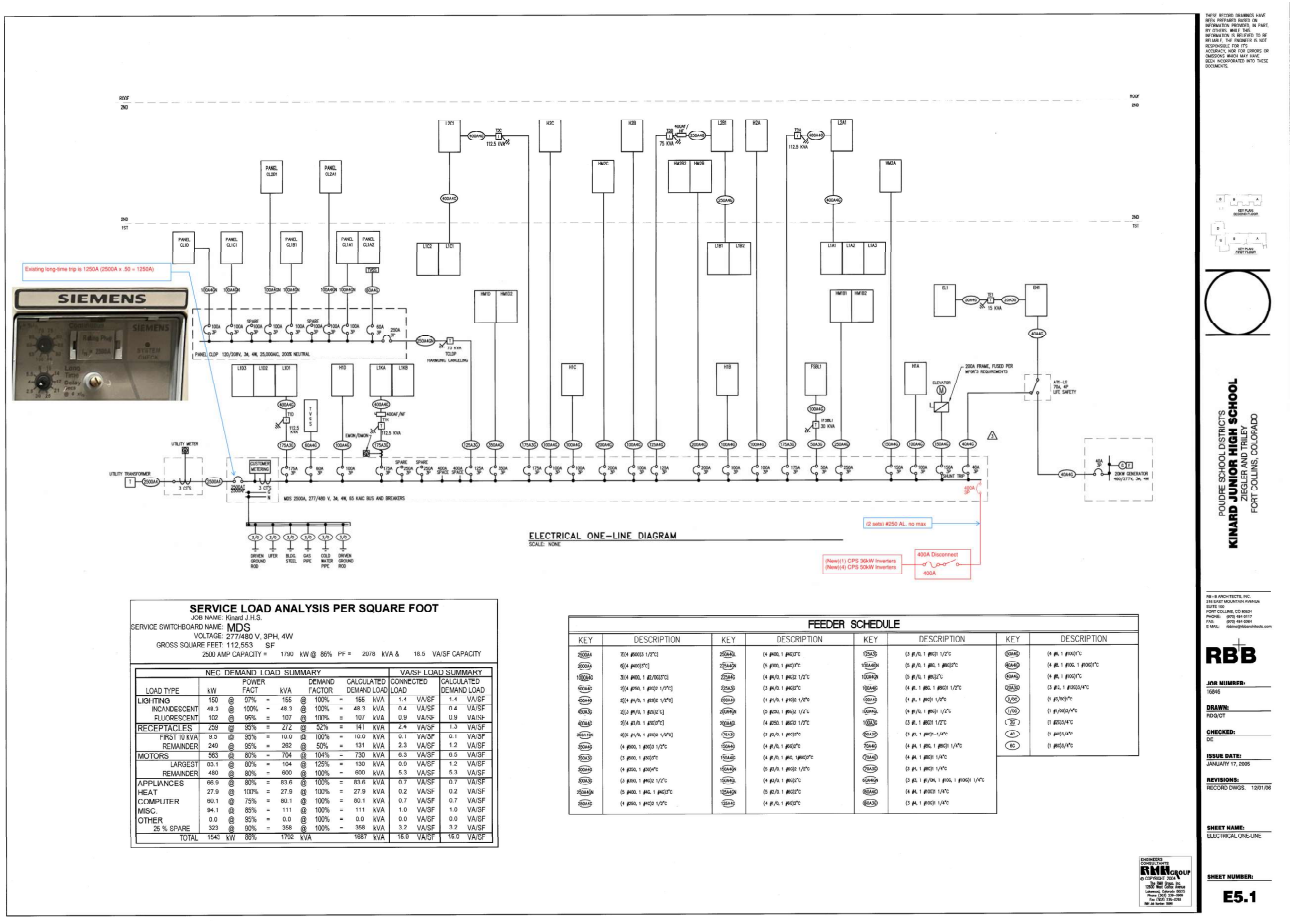
Appendix: Interconnection Assessments

JOHANNSEN SUPPORT SERVICES CENTER



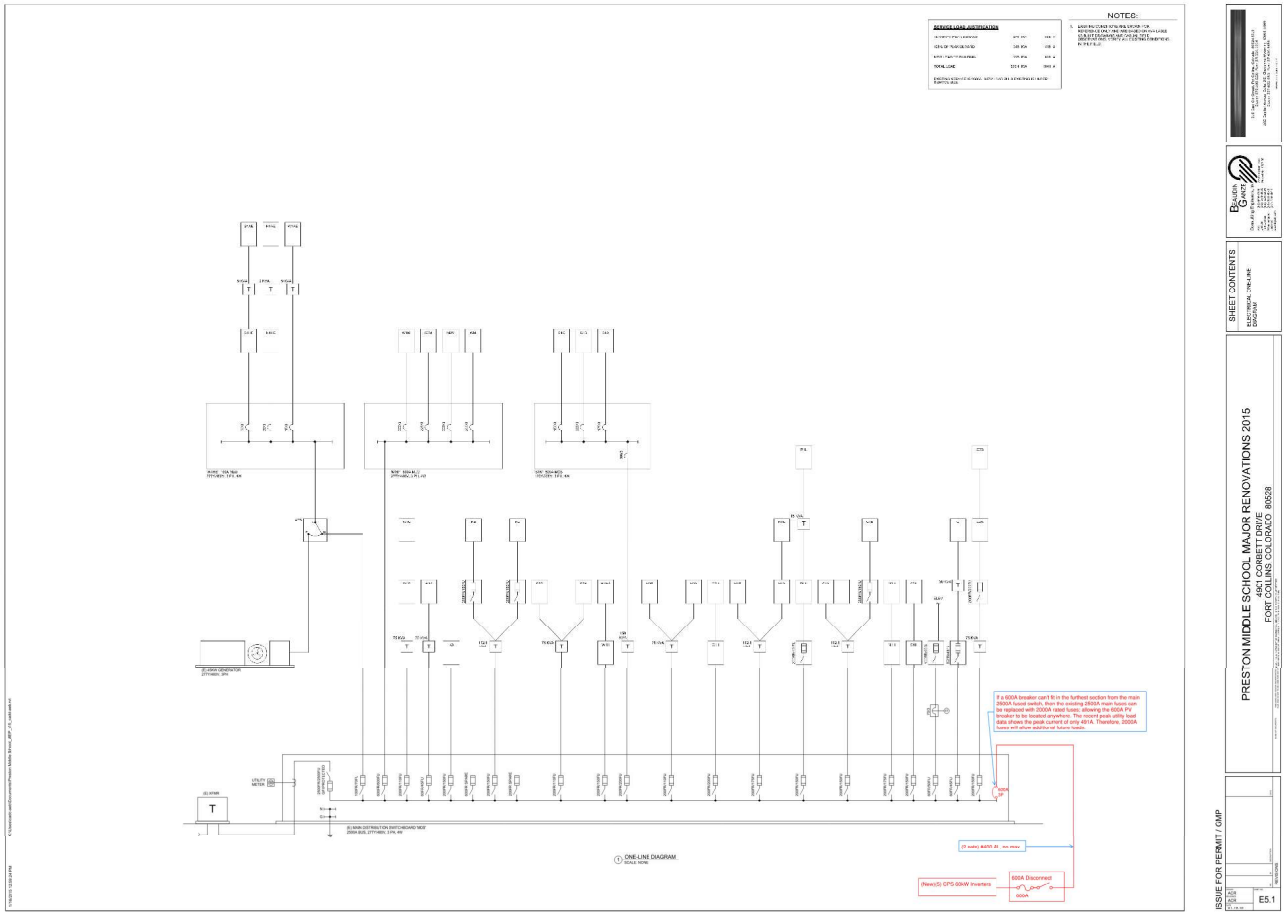
Appendix: Interconnection Assessments

KINARD CORE KNOWLEDGE MIDDLE SCHOOL



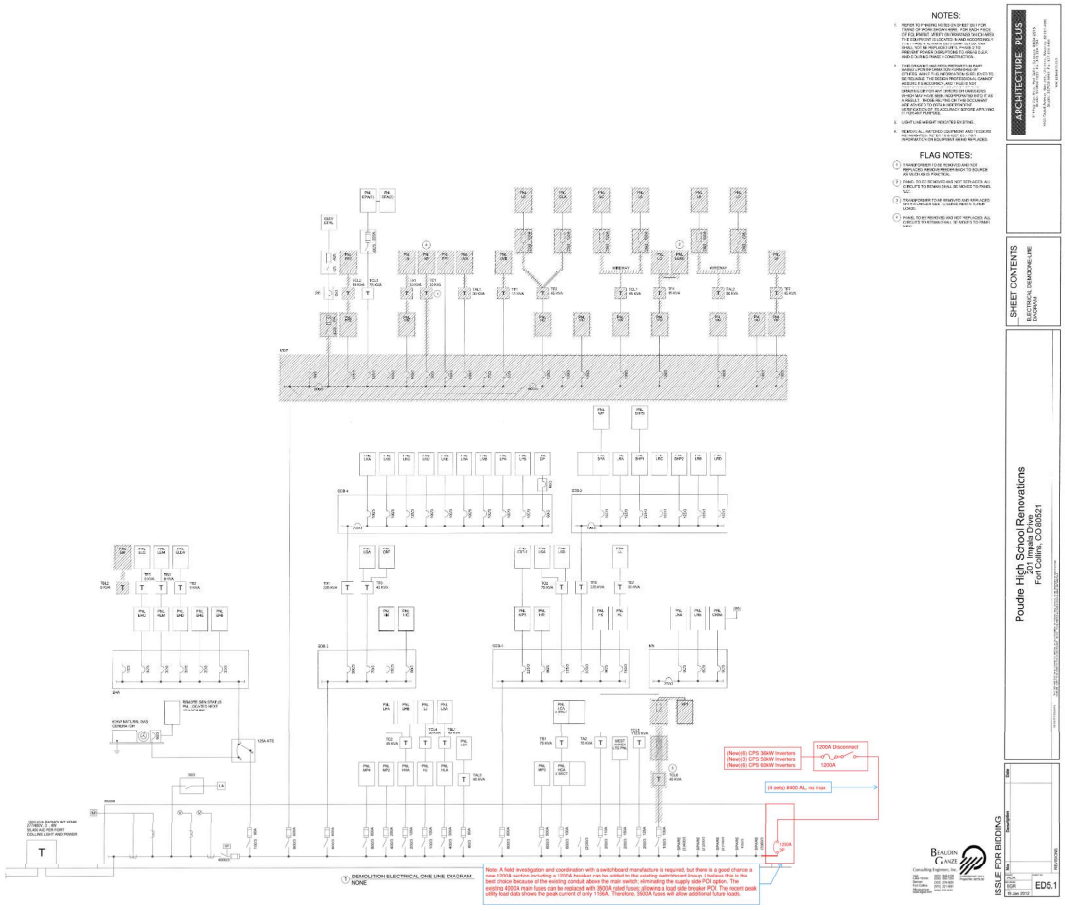
Appendix: Interconnection Assessments

PRESTON MIDDLE SCHOOL



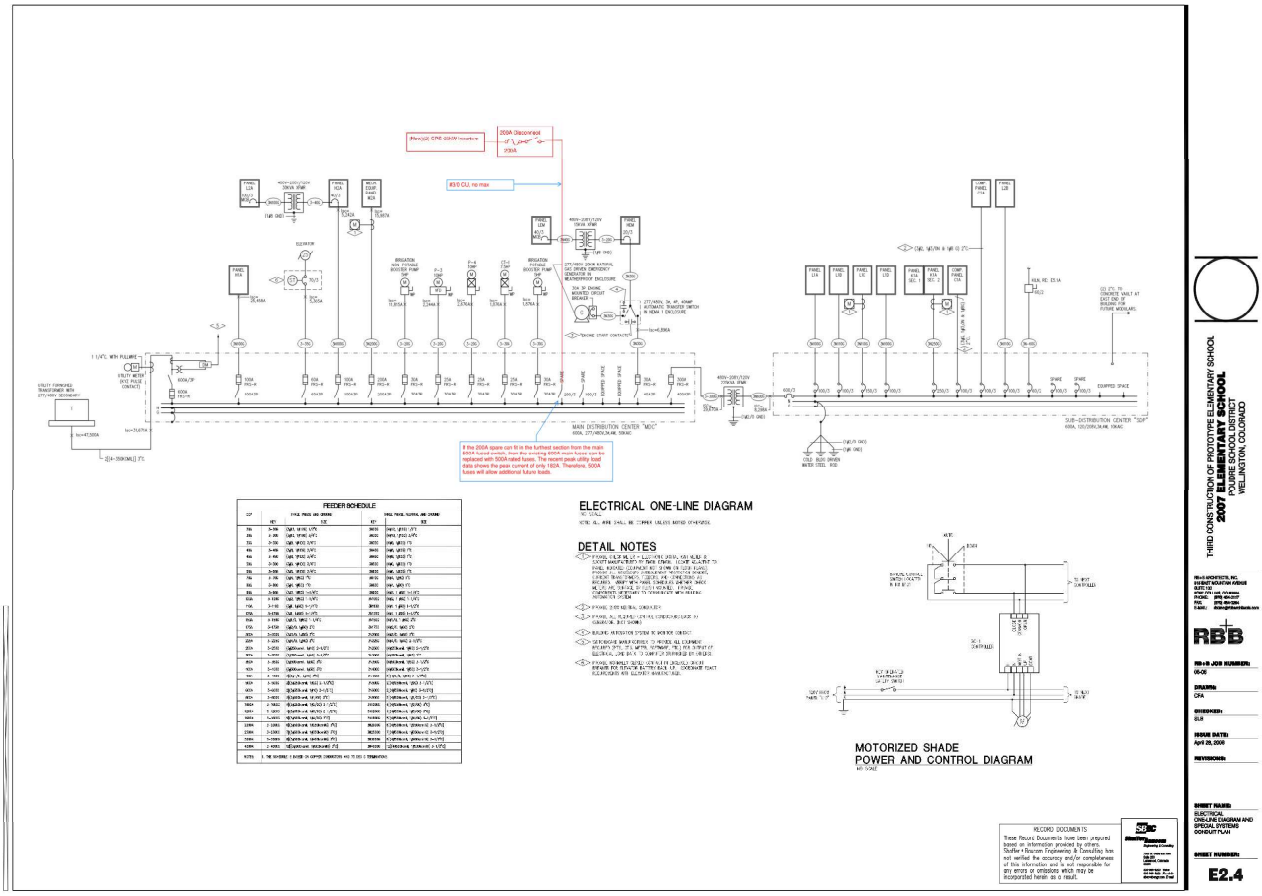
Appendix: Interconnection Assessments

POUDRE HIGH SCHOOL



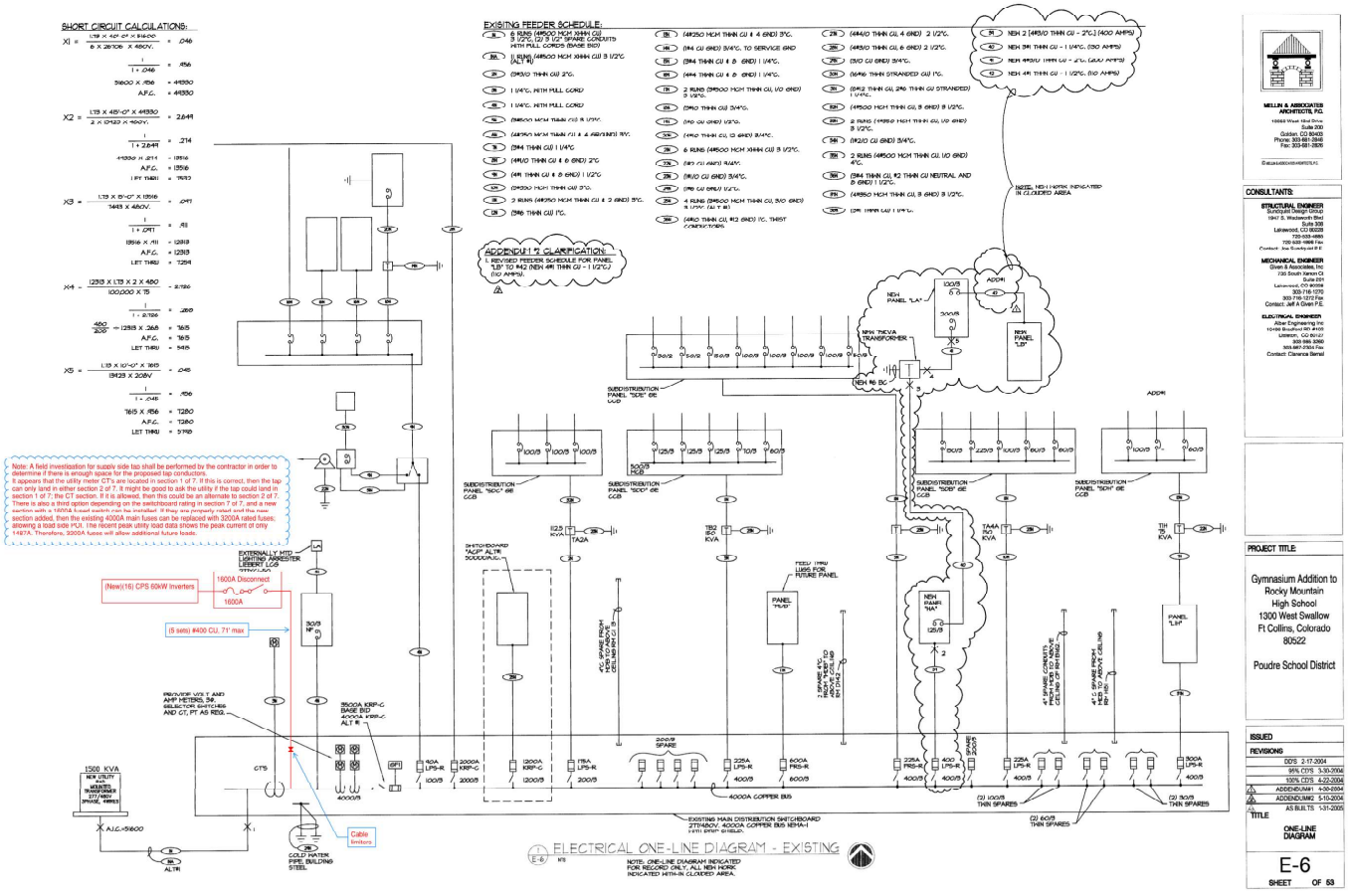
Appendix: Interconnection Assessments

RICE ELEMENTARY SCHOOL



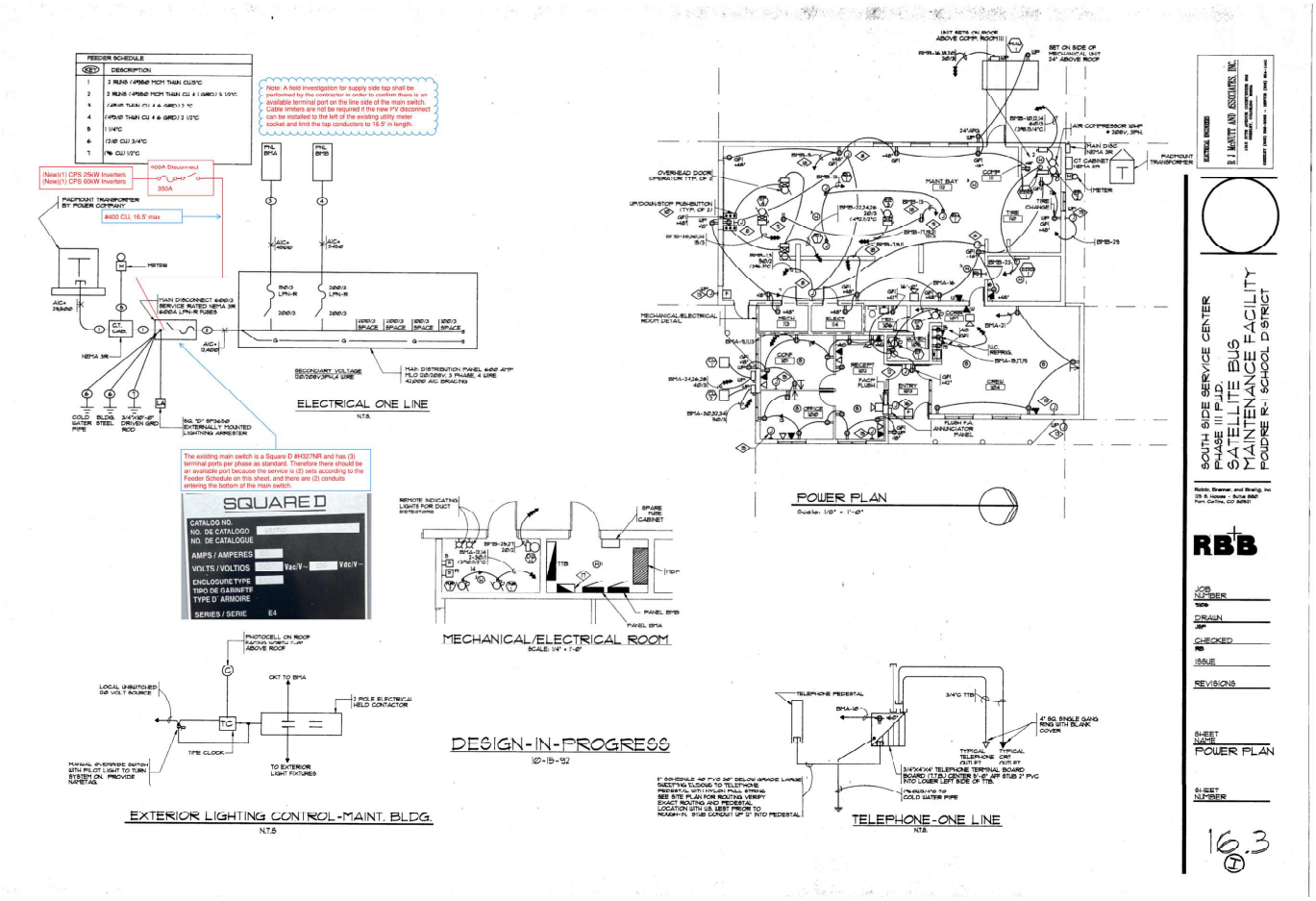
Appendix: Interconnection Assessments

ROCKY MOUNTAIN HIGH SCHOOL



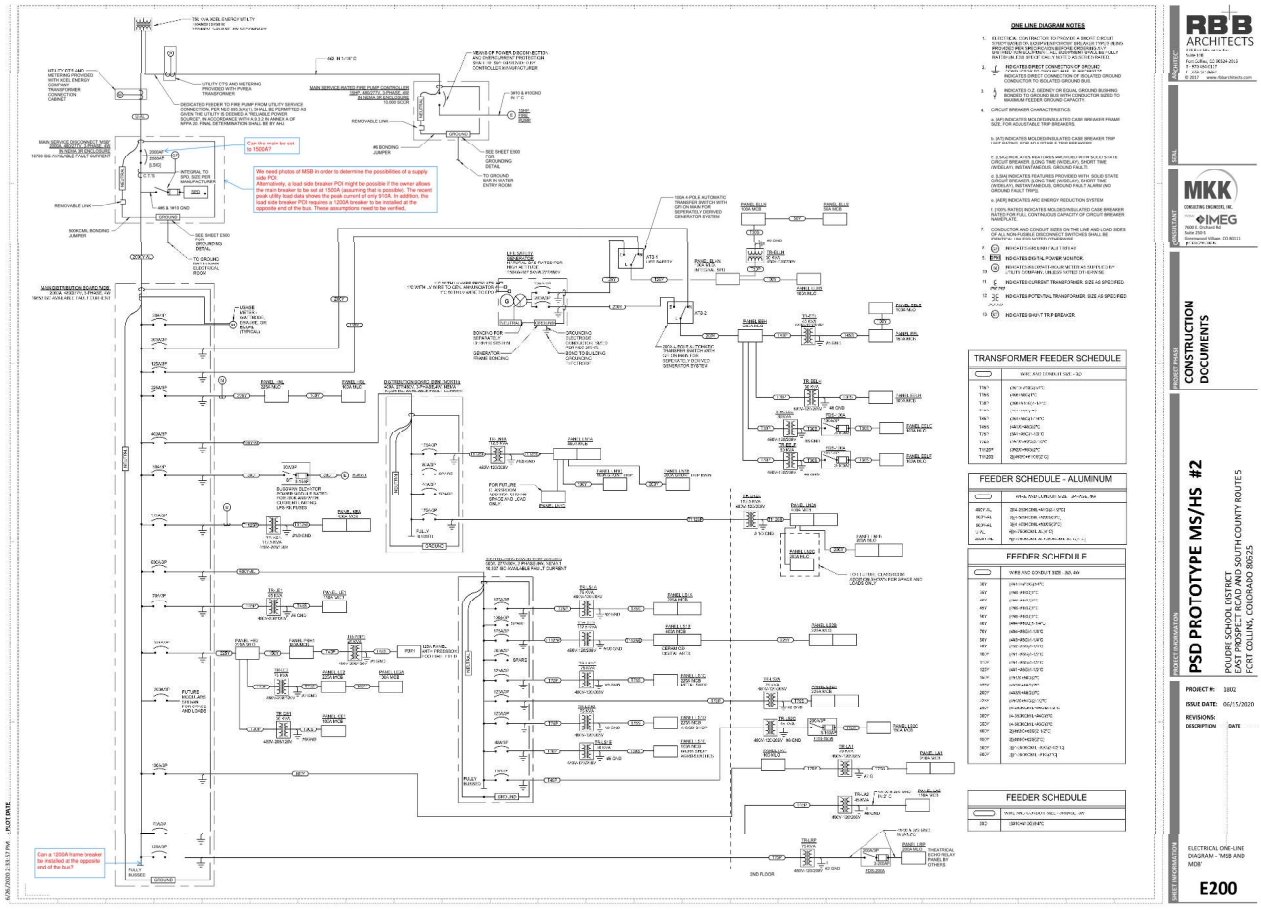
Appendix: Interconnection Assessments

SOUTH BUS TERMINAL



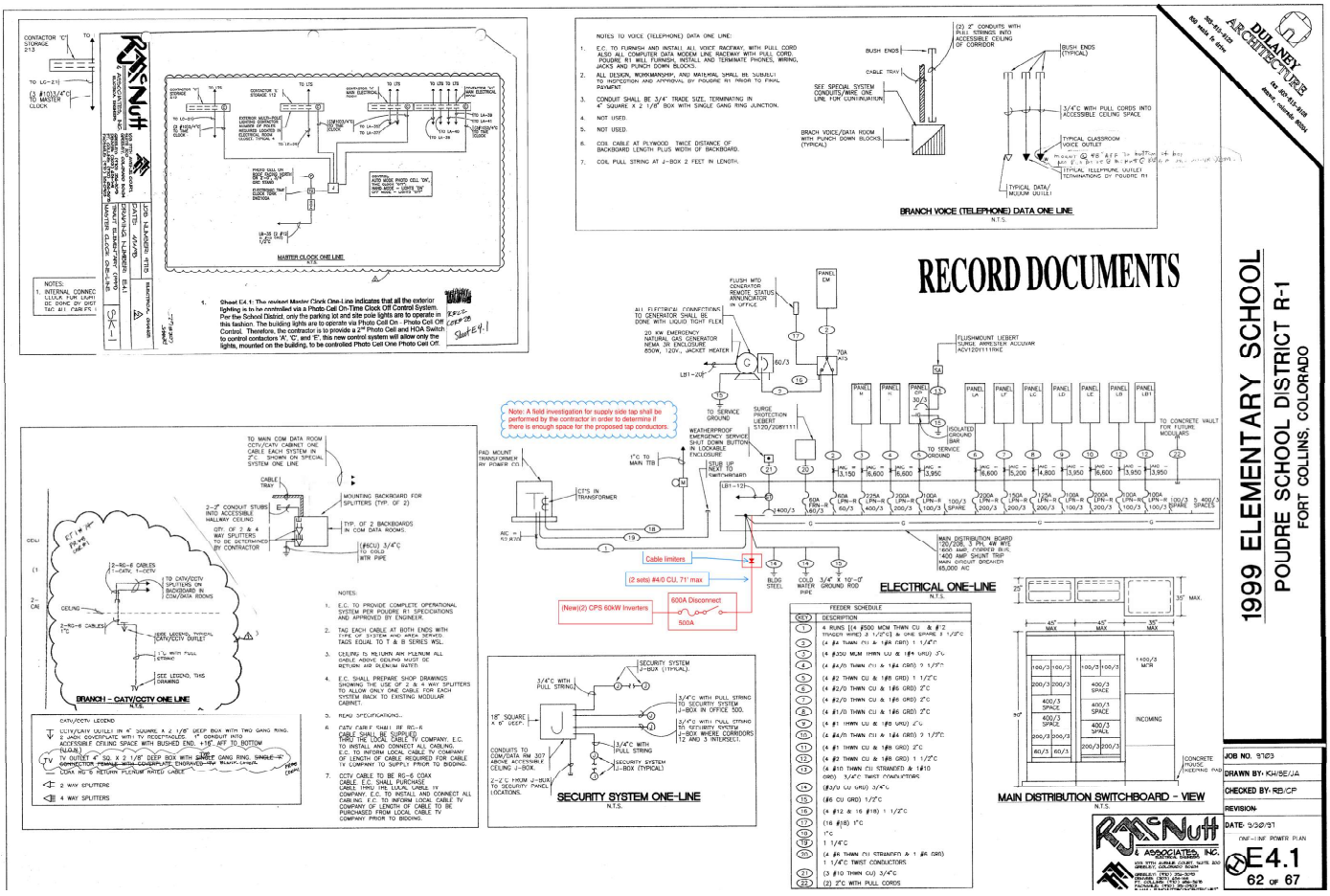
Appendix: Interconnection Assessments

TIMNATH MS/HS



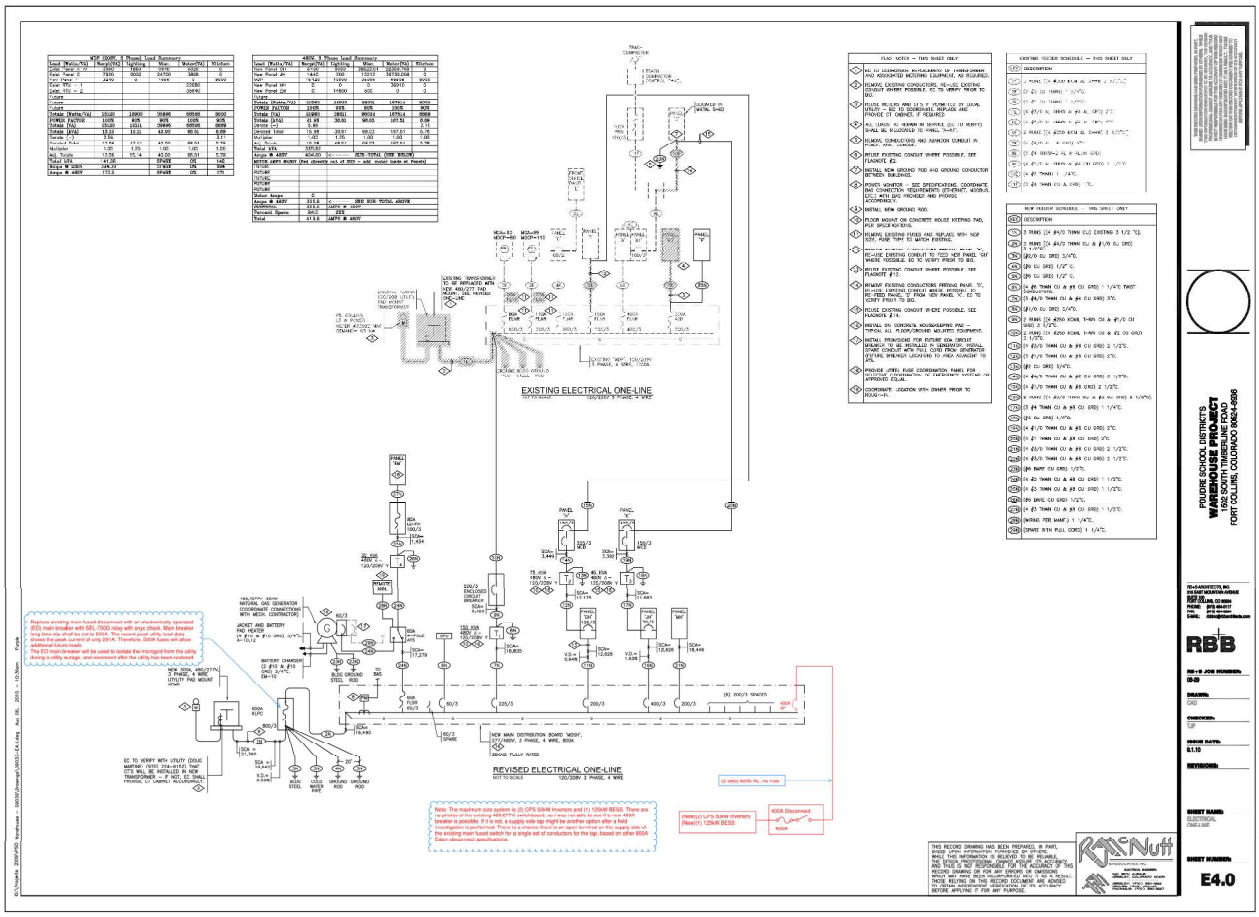
Appendix: Interconnection Assessments

TRAUT CORE KNOWLEDGE ELEMENTARY SCHOOL



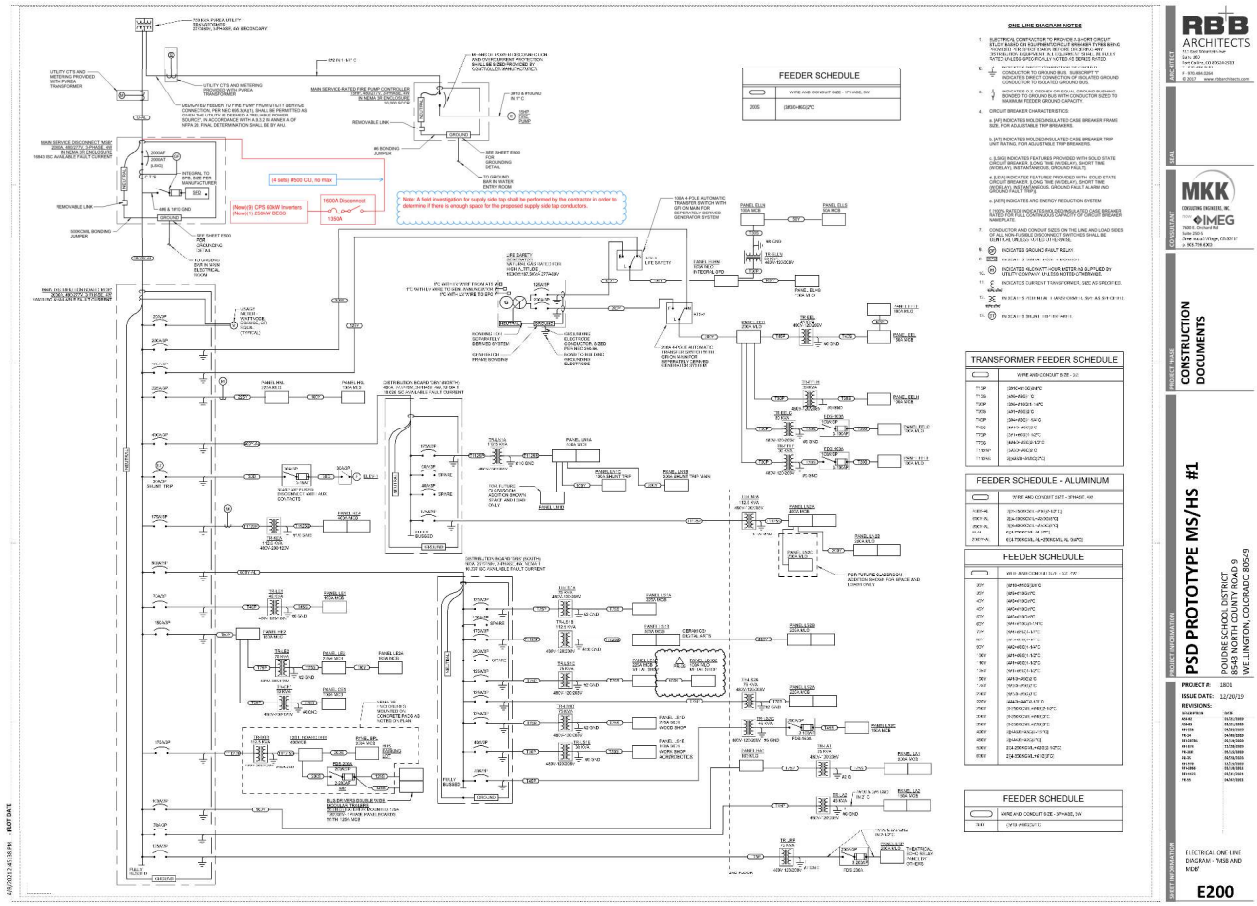
Appendix: Interconnection Assessments

WAREHOUSE 5 - PV AND BESS



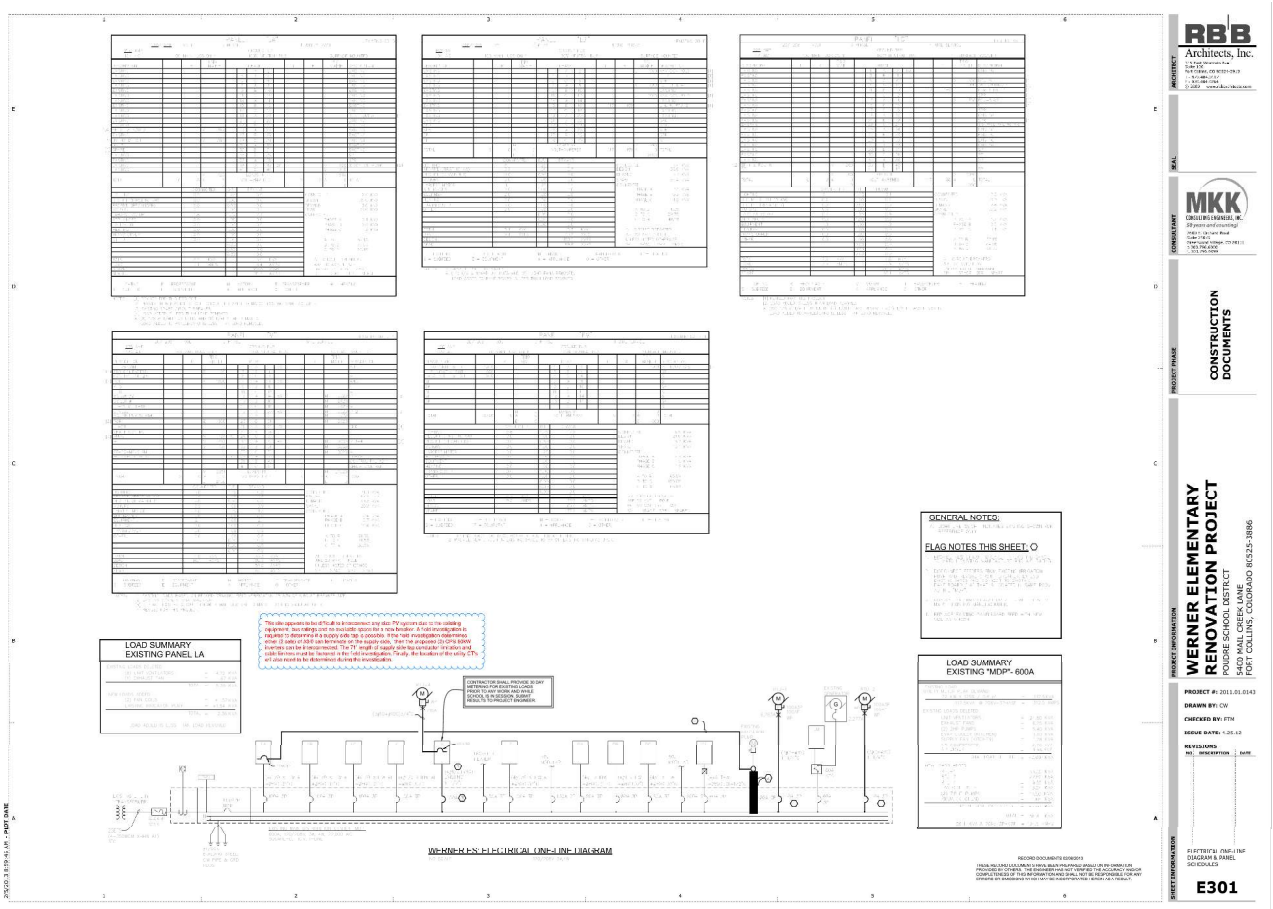
Appendix: Interconnection Assessments

WELLINGTON MS/HS -PV AND BESS



Appendix: Interconnection Assessments

WERNER ELEMENTARY SCHOOL



Addendum

1

Addendum 1

McKinstry

For The Life Of Your Building

Addendum 1

ADDENDUM NARRATIVE

At the request of PSD, McKinstry has investigated the feasibility of three additional rooftop system sites that are supplied by Xcel Energy (the utility with the most economically feasible rate structures and available incentives). All three sites have roof ages which are out of alignment with a PV system lifespan, and re-roofing would need to occur prior to PV system installation to avoid a de-install/re-install event. For this reason, these sites were initially dropped from the study. This addendum outlines the feasibility of these systems assuming the roofs are replaced. If the roofs are not replaced, these sites would remain technically infeasible.

These sites were assessed based on the same direct ownership models provided in Section 3.2:

- 25-year cashflow model
- 3% utility escalator
- Inverter replacement at year 15
- 0.6% annual module degradation
- 3% inflation rate
- 30% IRA contribution

Addendum 1

Cache La Poudre Elementary School

SITE DESCRIPTION

This ballasted flat roof system was designed as an array on multiple sections of the roof where an economic system layout and azimuth were taken into consideration.

Cache la Poudre Elementary School

Addendum 1

PV SYSTEM DETAILS

System technical and performance details are outlined in the table below.

Cache la Poudre Elementary	Roof System
Utility and Current Rate	Xcel; SG
Annual Usage (kWh)	125,120
System Size (kWDC/kWAC)	82.6/ 60.0
Production, Year 1 (kWh-AC)	121,500
Solar Offset, Year 1	97.1%
GHG Reduction, Year 1 (MT CO2e)	50.2

FINANCIAL DIRECT OWNERSHIP DETAILS

Financial performance details are provided in the table below. See Section 6 for PPA/ Funding details. This site qualifies for a rate switch from SG to SPVTOU. As shown below, the rate switch has a positive impact on the financial outcome.

Cache la Poudre ES – Direct Ownership	SG Rate	SPVTOU Rate
Total Project Cost**	$363,200	Same as SG Rate
Total Project Cost with 30% IRA Contribution	$254,200	Same as SG Rate
Bill Savings, Year 1	$8,400	$14,800
REC/ Incentive, Year 1*	$4,800	Same as SG Rate
Payback (years)	13.9	10.3
25-year Total Lifetime Savings	$429,800	$635,000
End of Life Decommissioning Cost	$14,500	Same as SG Rate

**Xcel Energy Solar Rewards Commercial/Industrial pay credits at $0.04/kWh of PV generation for systems larger than 8kW, and small than 250kW, for a period of 20 years.*

***Financial summary above assumes projects are contracted as a portfolio.*

Addendum 1

MAJOR PV EQUIPMENT INCLUDED IN PERFORMANCE MODELING AND COST ESTIMATES

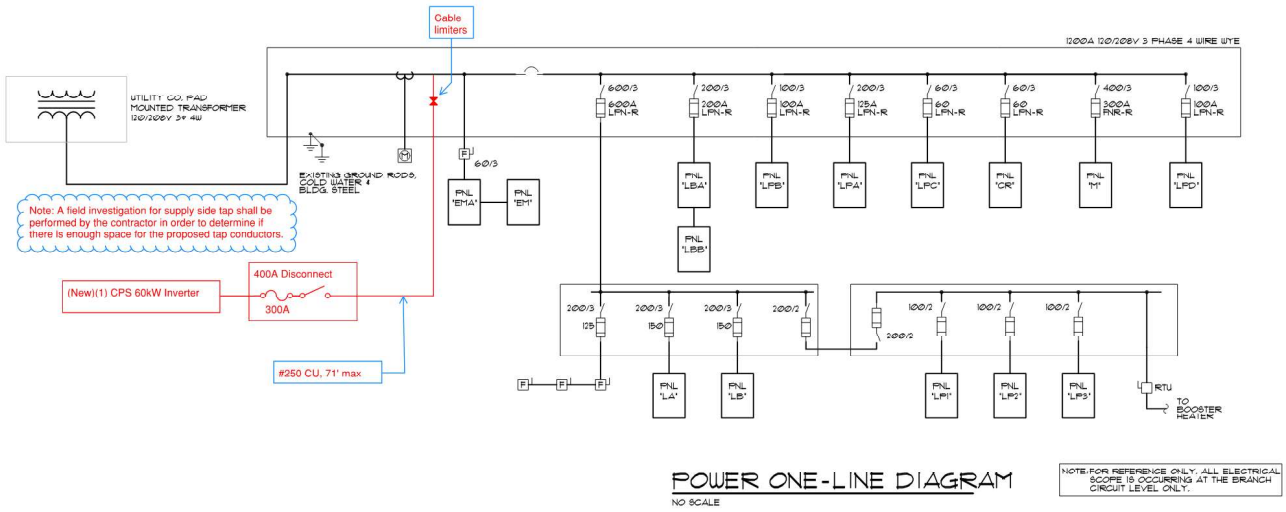
Our technical modeling and cost estimates incorporate the specifications and expected performance of the equipment outlined below. For the products listed, there are fungible alternatives with similar cost and performance characteristics available, and thus the exact specification of equipment is not expected to materially impact our estimates of capacity possible, costs, or system performance at the sites analyzed.

Equipment Type	QTY	Equipment Description
PV Modules	153	JA Solar 540-Watt Bifacial Module
Inverter	1	CPS 60kW-AC
Data Acquisition System	1	AlsoEnergy Data Acquisition System
Module Shutdown Unit	81	Tigo TS4-A-2F – Tigo PV Module Rapid Shutdown Unit

INTERCONNECTION

The SLD below illustrates the way the proposed PV system would be interconnected to the site's electrical infrastructure. Cache la Poudre's proposed PV system would be interconnected via a supply side tap on the Main Distribution Panel, a field investigation would be needed to ensure there is enough space for this interconnection method. See Appendix B for full SLD mark-ups.

Cache la Poudre ES PV System Proposed Interconnection Method



Addendum 1

Eyestone North Elementary School

SITE DESCRIPTION

This ballasted flat roof system was designed as an array on multiple sections of the roof where an economic system layout and azimuth were taken into consideration.

Eyestone North Elementary School

Addendum 1

PV SYSTEM DETAILS

System technical and performance details are outlined in the table below.

Eyestone North Elementary	Roof System
Utility and Current Rate	Xcel; SG
Annual Usage (kWh)	187,880
System Size (kWDC/kWAC)	124.2/ 100.0
Production, Year 1 (kWh-AC)	186,000
Solar Offset, Year 1	99.0%
GHG Reduction, Year 1 (MT CO2e)	76.8

FINANCIAL DIRECT OWNERSHIP DETAILS

Financial performance details are provided in the table below. See Section 6 for PPA/ Funding details. This site qualifies for a rate switch from SG to SPVTOU. As shown below, the rate switch has a positive impact on the financial outcome.

Eyestone North ES – Direct Ownership	SG Rate	SPVTOU Rate
Total Project Cost**	$533,500	Same as SG Rate
Total Project Cost with 30% IRA Contribution	$373,500	Same as SG Rate
Bill Savings, Year 1	$12,500	$22,100
REC/ Incentive, Year 1*	$7,300	Same as SG Rate
Payback (years)	19.0	13.0
25-year Total Lifetime Savings	$409,200	$683,600
End of Life Decommissioning Cost	$21,700	Same as SG Rate

**Xcel Energy Solar Rewards Commercial/Industrial pay credits at $0.04/kWh of PV generation for systems larger than 8kW, and small than 250kW, for a period of 20 years.*

***Financial summary above assumes projects are contracted as a portfolio.*

Addendum 1

MAJOR PV EQUIPMENT INCLUDED IN PERFORMANCE MODELING AND COST ESTIMATES

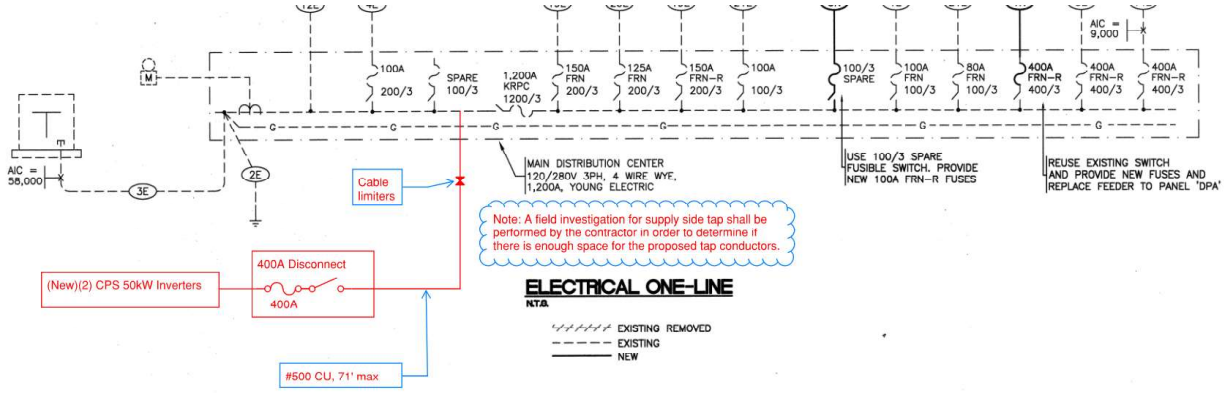
Our technical modeling and cost estimates incorporate the specifications and expected performance of the equipment outlined below. For the products listed, there are fungible alternatives with similar cost and performance characteristics available, and thus the exact specification of equipment is not expected to materially impact our estimates of capacity possible, costs, or system performance at the sites analyzed.

Equipment Type	QTY	Equipment Description
PV Modules	230	JA Solar 540-Watt Bifacial Module
Inverter	2	CPS 50kW-AC
Data Acquisition System	1	AlsoEnergy Data Acquisition System
Module Shutdown Unit	122	Tigo TS4-A-2F – Tigo PV Module Rapid Shutdown Unit

INTERCONNECTION

The SLD below illustrates the way the proposed PV system would be interconnected to the site's electrical infrastructure. Eyestone North's proposed PV system would be interconnected via a supply side tap on the Main Distribution Panel, a field investigation would be needed to ensure there is enough space for this interconnection method. See Appendix B for full SLD mark-ups.

Eyestone North ES PV System Proposed Interconnection Method



Addendum 1

Eyestone South Elementary School

SITE DESCRIPTION

This ballasted flat roof system was designed as an array on multiple sections of the roof where an economic system layout and azimuth were taken into consideration.

Eyestone South Elementary School

Addendum 1

PV SYSTEM DETAILS

System technical and performance details are outlined in the table below.

Eyestone South Elementary	Roof System
Utility and Current Rate	Xcel; SG
Annual Usage (kWh)	187,700
System Size (kWDC/kWAC)	124.2/ 100.0
Production, Year 1 (kWh-AC)	186,900
Solar Offset, Year 1	99.6%
GHG Reduction, Year 1 (MT CO2e)	77.2

FINANCIAL DIRECT OWNERSHIP DETAILS

Financial performance details are provided in the table below. See Section 6 for PPA/ Funding details. This site does not qualify for a rate switch from SG to SPVTOU due to load factor for the trailing 12 months being below the 30% load factor threshold.

Eyestone South ES – Direct Ownership	SG Rate
Total Project Cost**	$533,500
Total Project Cost with 30% IRA Contribution	$373,500
Bill Savings, Year 1	$12,500
REC/ Incentive, Year 1*	$7,300
Payback (years)	19.0
25-year Total Lifetime Savings	$408,800
End of Life Decommissioning Cost	$21,700

**Xcel Energy Solar Rewards Commercial/Industrial pay credits at $0.04/kWh of PV generation for systems larger than 8kW, and small than 250kW, for a period of 20 years.*

***Financial summary above assumes projects are contracted as a portfolio.*

MAJOR PV EQUIPMENT INCLUDED IN PERFORMANCE MODELING AND COST ESTIMATES

Our technical modeling and cost estimates incorporate the specifications and expected performance of the equipment outlined below. For the products listed, there are fungible alternatives with similar cost and performance characteristics available, and thus the exact specification of equipment is not expected to materially impact our estimates of capacity possible, costs, or system performance at the sites analyzed.

Equipment Type	QTY	Equipment Description
PV Modules	230	JA Solar 540-Watt Bifacial Module
Inverter	1	CPS 60kW-AC
Data Acquisition System	1	AlsoEnergy Data Acquisition System
Module Shutdown Unit	122	Tigo TS4-A-2F – Tigo PV Module Rapid Shutdown Unit

INTERCONNECTION

An electrical field investigation and working with a supplier who can provide a refurbished 400-amp breaker will be needed to verify the load side breaker can be used as the interconnection method. These findings would then be relayed to the electrical engineers for a final interconnection method determination. Alternatively, a supply side tap could be utilized. See Appendix B for full SLD mark-ups.

Eyestone South ES PV System Proposed Interconnection Method