

DOCKETED

Docket Number:	24-OPT-05
Project Title:	Corby Battery Energy Storage System Project
TN #:	268539
Document Title:	Basis of Design, Rev B
Description:	Basis of Design Rev B replaced Basis of Design Rev A, included in Project Description Update #2, Part 1, Appendix 2-B
Filer:	Doug Urry
Organization:	Tetra Tech
Submitter Role:	Applicant Consultant
Submission Date:	2/9/2026 12:15:05 PM
Docketed Date:	2/9/2026



Basis of Design

BCR-A-002

Corby Energy Storage, LLC

**Corby BESS
Project No. 163851**

**For Permitting Purposes Only
Issued for 30%**

**Revision B
01/30/2026**



Basis of Design

prepared for

**Corby Energy Storage, LLC
Corby BESS
Vacaville, CA**

Project No. 163851

**Revision B
1/30/2026**

prepared by

**Burns & McDonnell Western Enterprises, Inc.
Brea, CA**

INDEX AND CERTIFICATION

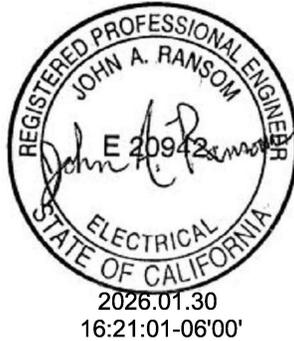
Corby Energy Storage, LLC Design Basis Project No. 163851

Report Index

<u>Chapter Number</u>	<u>Chapter Title</u>	<u>Number of Pages</u>
1.0	General Information	2
2.0	Major Equipment	2
3.0	Electrical	3
4.0	Instrumentation and Control	1

Certification – Electrical & I&C

I hereby certify, as a Professional Engineer in the state of California, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Corby Energy Storage, LLC or others without specific verification or adaptation by the Engineer.



Revision History

Rev	Date	By	Checked	Revision Description
A	12/17/2025	A. Thanvi	J. Thomas	Issued for 30%
B	01/30/2026	A. Thanvi	D. Franco	Clarified design storm criteria

INDEX AND CERTIFICATION

Corby Energy Storage, LLC Design Basis Project No. 163851

Report Index

<u>Chapter Number</u>	<u>Chapter Title</u>	<u>Number of Pages</u>
5.0	Civil	1

Certification – Civil

I hereby certify, as a Professional Engineer in the state of California, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Corby Energy Storage, LLC or others without specific verification or adaptation by the Engineer.



Kenneth Choong
2026.01.30 12:21:16-07'00'
SEAL APPLICABLE TO REV B ONLY

Revision History

Rev	Date	By	Checked	Revision Description
A	12/17/2025	D. Rosenblum	J.T. Dowell	Re-Issued for 30%
B	01/30/2026	D. Rosenblum	K. Choong	Clarified design storm criteria

INDEX AND CERTIFICATION

Corby Energy Storage, LLC Design Basis Project No. 163851

Report Index

<u>Chapter Number</u>	<u>Chapter Title</u>	<u>Number of Pages</u>
6.0	Geotechnical Information	1
7.0	Structural	1

Certification – Structural

I hereby certify, as a Professional Engineer in the state of California, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by the Corby Energy Storage, LLC or others without specific verification or adaptation by the Engineer.



2026.01.30 14:02:47-06'00'

Revision History

Rev	Date	By	Checked	Revision Description
A	12/17/2025	K. Farmer	P. Raadt	Issued for 30%
B	01/30/2026	K. Farmer	P. Raadt	Clarified design Storm criteria

TABLE OF CONTENTS

1.0	GENERAL INFORMATION	3
1.1	General	3
1.2	General Project Information.....	3
1.3	Site Conditions	3
1.4	Sparing Philosophy	3
1.5	Future Expansion/Augmentation, Equipment Space	4
1.6	Drawing Number Format	4
2.0	MAJOR EQUIPMENT	5
2.1	Battery Enclosures	5
2.2	Power Conversion System Enclosures.....	5
2.3	Auxiliary Power transformer.....	5
2.4	Auxiliary Power Distribution.....	5
2.5	Equipment Clearances.....	6
3.0	ELECTRICAL	7
3.1	Cable Requirements.....	7
3.1.1	General Requirements for all Cable	7
3.1.2	35kV Power Cable Requirements	7
3.1.3	2000V Power Cable Requirements	8
3.1.4	600V Power Cable Requirements.....	8
3.2	Acceptable Conduit Construction.....	9
3.3	Grounding Requirements	9
4.0	INSTRUMENTATION & CONTROL	10
4.1	Preferred Manufacturer	10
4.2	Communications Cables.....	10
4.3	Networking Requirements.....	10
5.0	CIVIL.....	11
5.1	Civil.....	11
5.1.1	Earthwork	11
5.1.2	Sitework Design Requirements	11
6.0	GEOTECHNICAL INFORMATION.....	12
6.1.1	Sources.....	12
7.0	STRUCTURAL	13
7.1.1	Design Standards and Codes	13
7.1.2	Structural and Miscellaneous Steel	13

1.0 GENERAL INFORMATION

1.1 General

Basis of Design (BOD) is defined as the documentation of codes, standards, principles, assumptions, rationale, criteria, and considerations that each engineering discipline will be using to develop the engineering drawings, specifications, and studies to meet the design requirements of the agreement.

1.2 General Project Information

Design Criteria	Value(s)	Note(s)
Client	Corby Energy Storage, LLC	
Site Address	6865 Byrnes Rd, Vacaville, CA 95687	
Site Access via	Byrnes Rd	
POI Type	AC	
POI Voltage	230kV	
POI Location	Vaca-Dixon PG&E Substation	
Project Type	Li-Ion Battery Storage (LFP)	
Battery Installation	Containerized	
Project Rated Power	300MW	
Project Rated Capacity	1200MWh	
BESS System Voltage (Max)	1500VDC	

1.3 Site Conditions

Design Criteria	Value(s)	Note(s)
Ambient Design Air Temp (Max)	45.7 °C	*ASHRAE, Extreme DB, n=20 PCS nameplate rating of 4.2MVA @40°C used for design calculations.
Ambient Design Air Temp (Min)	-6.6 °C	*ASHRAE, Extreme DB, n=20
Site Elevation	77'	DK Engineering Survey
Known Utilities/Obstructions	PG&E owned transmission pipeline at southwest corner of site	
Site Contamination	None known	

*ASHRAE: [VACAVILLE NUT TREE, CA, USA \(WMO: 724828\)](#)

1.4 Sparing Philosophy

Design Criteria	Value(s)	Note(s)
-----------------	----------	---------

34.5kV Breakers	N/A	
Inverters and Step-Up Transformers	N/A	
480V Distribution Breakers	See Section 1.5	
120VAC Breakers	N/A	
120VAC UPS Feeders	N/A	
125VDC Breakers	N/A	
Aux Switchboard Bus Capacity	TBD	At Beginning of Life
Aux Transformer Capacity	TBD	
UPS Battery Margin	N/A	
UPS Inverter Margin	N/A	
Duct Spares	N/A	
Tray Fill Margin	N/A	
Fiber Optic Cabling	Over 50% spare strands	

1.5 Future Expansion/Augmentation, Equipment Space

Design Criteria	Value(s)	Note(s)
34.5kV Breakers	N/A	Spare capacity on existing breakers planned for augmentation.
Inverters and Step-Up Transformers	AC Augmentation planned to meet facility nameplate rating for 20-year design life.	Space allocated for 13 future PCS skids.
480V Distribution Breakers	None planned.	
120VAC Breakers	N/A	
120VAC UPS Feeders	N/A	
125VDC Breakers	N/A	
Battery Augmentation Skids	AC Augmentation planned to meet facility nameplate rating for 20-year design life.	Space allocated for 38 future battery containers

1.6 Drawing Number Format

Design Criteria	Value(s)	Note(s)
Site Code	BCR	
Discipline	A - General C - Civil E - Electrical S - Structural T - Controls	
Sequence	XXX	
Drawing Number Format	Site Code-Discipline-Sequence	Ex. BCR-A-000

2.0 MAJOR EQUIPMENT

2.1 Battery Enclosures

Design Criteria	Value(s)	Note(s)
Quantity	(303) Three Hundred and Three battery enclosures	Beginning of Life Sizing and quantity provided by Owner
Manufacturer, Model	LG DC Link 5.1	Owner Supplied
Rated Power (BOL)	5112 kWh	
Discharge Duration	4 Hours	
Voltage Range	1134-1499.4VDC	
Nominal Voltage	1344 VDC	
Auxiliary Power Requirements	22.8 kVA, 480VAC, 3PH, 4W	
UPS Power Requirements	N/A	

2.2 Power Conversion System Enclosures

Design Criteria	Value(s)	Note(s)
Quantity	(101) One Hundred One	Beginning of Life Sizing and quantity provided by Owner
Manufacturer, Model	Power Electronics FP4200M	Owner Supplied
MV Transformer Rating	4207 kVA @ 40 °C	
MV Transformer Voltage	34.5 kV-660 V	
MV Transformer Configuration	Delta-Wye	
MV Transformer Impedance	8.0%	Impedance at 4207 kVA

2.3 Auxiliary Power transformer

Design Criteria	Value(s)	Note(s)
Quantity	9	
Manufacturer	Hitachi/ABB	Owner Supplied
Auxiliary Transformer Rating	1500 kVA @ 40 °C	
Auxiliary Transformer Voltage	34.5 kV-480/277 V	
Auxiliary Transformer Configuration	Delta-Wye Grounded	HV-LV
Transformer Impedance	5.65 +/- 7.5%	

2.4 Auxiliary Power Distribution

Design Criteria	Value(s)	Note(s)
Quantity	9	
Manufacturer	Lakeshore Electric	Owner Supplied
Switchboard Main	3P, 2000AF/2000AT	
Switchboard Feeder	(64) 3P, 125AF/40AT, 4-Wire	

2.5 Equipment Clearances

Design Criteria	Value(s)	Note(s)
Battery Enclosures	Front – 14' Rear – 3' E-Panel Side – 10' Non- E-Panel Side – 3' Top – N/A Bottom – N/A	Rear clearance is for 2 containers back-to-back with reversed orientation.
PCS Skid Enclosures	Front – 10' Rear – 10' Left Side – 10' Right Side – 10' Top – N/A Bottom – N/A	

3.0 ELECTRICAL

3.1 Cable Requirements

3.1.1 General Requirements for all Cable

Design Criteria	Value(s)	Note(s)
Flame Tests	IEEE 1202/CSA FT-4 UL1685	
Other Compliance Standards/Listings	ICEA S-93-639 / NEMA WC 74 AEIC CS8 SUN RES UL44	
Other Requirements	Surface printing shall show manufacturer's name, insulation type, jacket	

3.1.2 35kV Power Cable Requirements

Design Criteria	Value(s)	Note(s)
Temperature Ratings	105 °C Continuous 140 °C Emergency 250°C Short Circuit	
NEC/BMCD Cable Type	MV105/TPWR-S-1.0	
Installation	Underground/Aboveground	
Conductor Material and Construction	Single Conductor Class B compact or compressed stranded, 1350 or 8000 series aluminum OR Copper – Stranded (ASTM B496 and B8)	
Conductor Shielding	Extruded layer of semiconducting thermoset	
Insulation/Jacket	TRXLPE/LLDPE	
Insulation Shield	Extruded layer of semiconducting thermoset	
Metallic Shield	Helically applied, annealed, solid bare copper wires, 1/3 rated neutral	

3.1.3 2000V Power Cable Requirements

Design Criteria	Value(s)	Note(s)
NEC/BMCD Cable Type	PV/PV-1.0	
Installation	Underground/Aboveground	
Conductor Material and Construction	Single Conductor Copper – Stranded/Annealed (ASTM B496 and B8) Or Class B or C stranded, 8000 series Aluminum	
Insulation/Jacket	XLPE or EPR	
Strand Shield	N/A	
Conductor Shielding	N/A	
Insulation Shield	N/A	
Metallic Shield	N/A	

3.1.4 600V Power Cable Requirements

Design Criteria	Value(s)	Note(s)
NEC/BMCD Cable Type	XHHW-2, RHH, RHW-2, TC-ER/SPWR-S-1.0	
Installation	Underground/Aboveground	
Conductor Material and Construction	4-Conductor with Ground Copper – Stranded/Annealed (ASTM B8)	
Insulation/Jacket	XLPE/CPE	
Strand Shield	N/A	
Conductor Shielding	N/A	
Insulation Shield	N/A	
Metallic Shield	N/A	

Design Criteria	Value(s)	Note(s)
NEC/BMCD Cable Type	XHHW-2, RHH, RHW-2, USE-2/SGND-1.0	
Installation	Underground/Aboveground	
Conductor Material and Construction	Multi-Conductor Copper – Solid (ASTM B8)	
Insulation/Jacket	XLPE	
Strand Shield	N/A	
Conductor Shielding	N/A	
Insulation Shield	N/A	
Metallic Shield	N/A	

3.2 Acceptable Conduit Construction

Design Criteria	Value(s)	Note(s)
PVC	Buried, Ducts, Embedded Concrete, Buried Road Crossings	Schedule 40
Fiberglass	Risers	
RGS	Exposed, Risers	
Aluminum	Exposed	
EMT	Finished Areas	

3.3 Grounding Requirements

Design Criteria	Value(s)	Note(s)
Design Requirement	Modeled, step/touch per IEEE 80 requirements	
Conductors	Sized per CEC, Copper, minimum 4/0 AWG	
Rods	Copper-clad steel, minimum 10 ft. length, minimum 5/8" diameter	
Grid Burial Depth	Minimum 18", determined by model	
Risers	Size per NEC. Minimum 4/0 AWG	
Rod Connections	Exothermic	
Conductor Connections	Exothermic	
Equipment Connections	Bolted	
Cable Tray Grounds	N/A	

4.0 INSTRUMENTATION & CONTROL

4.1 Preferred Manufacturer

Design Criteria	Value(s)	Note(s)
Managed Ethernet Switch	Cisco	
Unmanaged Ethernet Switch	RLH	
Fiber Patch Panel	Corning	
PLC	Modicon	
EMS	Orion	
Other controllers	None	

4.2 Communications Cables

Design Criteria	Value(s)	Note(s)
FIB1	Corning 006ESF-T4101D20	Fiber Optic – Loose Tube Indoor/Outdoor Nonconductive Riser Cable
FIB2	Corning 072EUF-T4101D20	Fiber Optic – Loose Tube Indoor/Outdoor Nonconductive Riser Cable
DAT60		Category 6 - Outside Plant-Rated Communications Cable

4.3 Networking Requirements

Design Criteria	Value(s)	Note(s)
Network Redundancy	Redundant corporate fiber cables	
Route Redundancy	Separate Ducts	
Quantity of Networks	2 - corporate, control	
Cybersecurity	Inverter and BMS in separate fiber bundles and cassettes	
Termination and Splicing	Home-run bulk cables are directly spliced to field cables	

5.0 CIVIL

5.1 Civil

5.1.1 Earthwork

Design Criteria	Value(s)	Note(s)
Cut/Fill Balance. Limit import material.	22,650/28,188 Cu. Yd. (Cut/Fill)	Substation basin may be expanded to generate additional material.
Drainage Features designed for the increase in runoff from the 100yr-24hr storm.	Two (2) Retention Ponds	Ponds will be oversized to generate fill material for the pad.

5.1.2 Sitework Design Requirements

Description	Site Specific Depth (in)	Paved Width (ft)	Bottom Width (ft)	Minimum Drainage Slope %	Minimum Density %	Design Codes and Standards
Design Storm 100yr- 24hr	6.67"					NOAA Atlas 14/Solano County Road Improvement Standards Used for ditch design
Soil Compaction @ Optimum Moisture Density					90 for general grading 95 for under roads and structures	Geotech Report/ASTM D1557
Crushed Rock Roads	6" AB over geotextile fabric over 12" properly prepared subgrade					Site Specific
Plant Road Width & Surfacing	6" AB over geotextile fabric over 12" properly prepared subgrade	30'				Site Specific
Crushed Rock Surfacing	6" over compacted subgrade					Site Specific
Grass Topsoil Surfacing	4"					Site Specific
Overland Flow Storm Runoff				0.5%		Site Specific
Open Channel Ditches			8'	0.5%		Site Specific

6.0 GEOTECHNICAL INFORMATION

6.1.1 Sources

- Draft Geotechnical Report, Corby BESS Project, Prepared by RRC. RRC Project No. GE23006031, January 19, 2024.

7.0 STRUCTURAL

7.1.1 Design Standards and Codes

- California Building Code, 2022
- ACI 318-19, Building Code Requirements for Structural Concrete, 2019
- American Welding Society Structural Welding Code – Steel (AWS D1.1)
- ANSI/AISC 341, Seismic Provisions for Structural Steel Buildings, 2016
- ANSI/AISC 360, Specification for Structural Steel Buildings, 2016
- ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, 2016
- AISC Steel Construction Manual, 15th Edition

Design Criteria	Value(s)	Note(s)
Design Life	30 Years	

7.1.2 Structural and Miscellaneous Steel

Design Criteria	Value(s)	Note(s)
Wide flange (WF) shapes and tees cut from WF	ASTM A992, Grade 50 or ASTM A572, Grade 50	
Channels, angles, structural plate and bars	ASTM A36 or ASTM A572 Grade 50	
Pipe for structural uses	ASTM A53, Type E or S, Grade B or ASTM A106, Grade B	
Square and rectangular HSS	ASTM A500, Grade C (Fy = 50 ksi)	
Round HSS	ASTM A500 Grade C (Fy = 46 ksi)	
Anchor bolts (cast-in-place)	ASTM F1554, Grade 36, UNO (hot-dipped galvanized)	
Anchor bolts (post-installed)	Epoxy or adhesive type w/ galvanized materials, UNO	Design in accordance with manufacturer's printed instructions
Connection bolts	5/8" diameter ASTM F3125 Grade A325, UNO	
Grating	Main and cross bars – ASTM A1011 Depth – 1 1/4", UNO Serrated Finish - Galvanized	



CREATE AMAZING.

Burns & McDonnell Western Enterprises, Inc.
145 S STATE COLLEGE BLVD.
SUITE 600 BREAS, CA 92821
www.burnsmcd.com