

## Design Build Solar Photovoltaic (PV) System Berkeley Unified School District (BUSD)

### Scope of work:

#### 1. Project Summary:

Provide complete solar photovoltaic (PV) system to offset 85% of the electrical energy used at each of the seven campuses/BUSD properties listed. 85% offset shall be provided at each service meter. Provide design, engineering, receive necessary approvals including but not limited to AHJ and where applicable Pacific Gas and Electric (PG&E), and construct the PV systems complete. Provide any additional design, engineering, and construction of items necessary to receive DSA and PG&E Approval. At the conclusion of the project the campus/facilities shall be restored to their condition prior to the start of the project with the exception of the addition of the PV system. The function and operation of the campus/facility shall be the same after the project as it was prior to the project.

For Energy Usage and required PV System Size refer to Table 1.

Energy Usage and PV System Size - Table 1

Site	Site Energy Usage kWh (3)	Required Offset (%)	Approximate PV System Size (KW)	Service Size (Amps)	Max Demand (KW) (3)	3 PH Voltage at Site (V)	Max Demand (Amps)
Ruth Acty	193,286	85%	121.79	1,200.00	81	208	224.83
Willard MS - Bldgs A&C	278,586	85%	175.54	1,200.00	91	208	252.59
Willard MS - Bldgs B&D	233,614	85%	147.2	1,000.00	76	240	182.83
Willard MS - Gym	148,890	85%	93.82	400.00	29	240	69.76
MLK MS - Main Classroom Bldg Service	601,126	85%	378.77	2,500.00	198	208	549.59
MLK MS - Science Bldg Service (1) (2)	251,152	85%	158.25	800.00	111	240	267.02
Thousand Oaks	238,003	85%	149.96	1,600.00	79	208	219.28
District Office	391,868	85%	246.91	2,500.00	138	208	383.05
Transportation Yard	98,809	85%	62.26	600.00	75	208	208.18
Transportation Yard - EV	88,452	85%	55.73	600.00	128	208	355.29
Adult School	253,175	85%	159.52	1,600.00	95	208	263.69

#### Notes:

1. Energy usage for Science Bldg Service is an estimate based on energy usage data for MLK MS site in the 2011 BUSD Solar Master Plan.
2. Max Demand for Science Bldg Service was assumed to be 1/3 of the Ampacity rating of the 800 service rating.
3. Site Energy usage and Max Demand is based on 2018 through 2022 Utility Bills provided by the School District.
4. It is the GC's responsibility to verify all information provided here.

2. Project Locations:

School Name	Address	Authority Having Jurisdiction (AHJ)
Ruth Acty Elementary School	1400 Ada Street, Berkeley, CA 94702	DSA
Willard Middle School	2425 Stuart Street, Berkeley, CA 94705	DSA
Martin Luther King Jr Middle School	1781 Rose Street, Berkeley, CA 94703	DSA
Transportation Bus Yard	1314 Seventh Street, Berkeley, CA 94710	Berkeley Planning and Building Department
Thousand Oaks Elementary School	840 Colusa Avenue, Berkeley, CA 94707	DSA
District Office/Oxford Elementary/West Campus	2020 Bonnar Street, Berkeley, CA 94702	DSA
Adult School	1701 San Pablo Ave, Berkeley, CA 94702	DSA

3. Project Criteria

A. PV System

PV system to be located on building roofs only; except at the District Office Campus and Transportation Bus Yard where PV is permitted over the respective parking lots. All campuses shall have the same type of complete system including the same type of PV panel and major equipment. Information on coverage and pricing for extended warranty or maintenance of panels shall be provided to the District.

B. Equipment

Design-Build team shall work with the district to ensure that the following items are placed in a location acceptable to the district:

- a. Inverters
- b. DC Optimizers
- c. PV Sub Panels
- d. PV Monitoring Cabinet with equipment and data switch
- e. AC Utility Disconnect Switch
- f. PV Distribution Panel
- g. Conduit

District has final say on the location of the above items.

C. Conduit

All exposed conduit shall be field painted to match the color of the adjacent wall, soffit, pitched roof, or other exposed surface. Conduits across low-slope rooftops that are not visible from the ground are not required to be painted.

D. Exterior and Interior Finishes

Any and all finishes disturbed as a result of the project shall be replaced in kind to the satisfaction of the district. Exterior finishes disturbed shall be made water tight as they were before the project.

E. Roofs

At the conclusion of the project it is the responsibility of the Design-Build team to restore roofs to existing condition prior to the start of the project. Roofs shall be watertight at the conclusion of the PV project. Any and all construction at the roof top which penetrates the rooftop surface shall be designed, engineered, and constructed to be patched and sealed to maintain roof warranties and to the satisfaction of the District. See exception below. Design-Build team shall field verify condition and type of each roof that will receive solar panels. Warrantors shall be notified by the Design-Build team before proceeding.

There are a variety of existing roofing types at each campus and may include:

1. Standing Seam metal
2. Ceramic tile
3. Built-up
4. Modified Bitumen
5. TPO
6. SBS Modified Membrane
7. 2 ply plus cap sheet

At the Adult School, a new roof shall be provided that meets the district standards. Proposed roofing type shall be approved by the district.

F. Structure

It is the responsibility of the Design-Build team to design, engineer, and construct the supporting structure that holds the PV system and attaches it to the building. It is also the responsibility of the Design-Build team to evaluate the ability of the structural system of the existing buildings as well as the existing building itself to support the PV system and to design, engineer, receive AHJ approvals, and construct any modifications to the structural system and the building to support the PV system and its supporting structure.

To assist the Design-Build team, a preliminary structural memo has been provided that:

- Identifies Approximate Roof Area
- Identifies Roof structural system
- Provides Preliminary evaluation of the gravity and lateral loads that can be accommodated
- Provides Preliminary layout spacing for supports

It is the responsibility of the Design-Build team to verify this information.

4. BUSD Standards  
Work shall comply with Berkeley Unified School District Standards. Refer to Exhibit 1.
5. Field Work  
Design-Build team shall field verify all field conditions.
6. Project Documents:
  - a. Exhibit 1.0 – Project Summary Description
  - b. Exhibit 2.X Structural Memos
    - i. Exhibit 2.1 - BUSD Group 1 Phase 1 Structural Memo
      1. Includes Ruth Acty ES, MLK Jr MS and Willard MS
    - ii. Exhibit 2.2 - BUSD Group 2 Phase 1 Structural Memo
      1. Includes Adult School, Thousand Oaks ES, Oxford ES/District Office, Transportation Bus Yard
  - c. Exhibit 3.0 - 7 Sites Site plans.pdf
    - i. Includes a site plan of each site, location of MSB.
    - ii. Structural drawings showing maximum additional panel load that can be supported by the roof without a seismic upgrade.
  - d. Tremco Roof Assessments
    - i. Exhibit 4.1 - BUSD – MLK Jr MS.pdf
    - ii. Exhibit 4.2 - BUSD – Oxford ES.pdf
    - iii. Exhibit 4.3 - BUSD – Ruth Acty ES.pdf
    - iv. Exhibit 4.4 - BUSD – Thousand Oaks ES.pdf
    - v. Exhibit 4.5 - BUSD – Willard MS.pdf
  - e. Exhibit 5.0 - BUSD Standards.pdf
  - f. Exhibit 6.0 - BUSD PG\_E Reports.xlsx