

# **TUHSD Board Presentation** Solar PV, BESS, and EVSE Project

December 2022



# Agenda

- 1. Site Layouts
- 2. Site-by-Site Financial Analysis
- 3. Redwood High School Scenarios Financial Analysis
- 4. Interconnection Applications Approach
- 5. Project Schedule
- 6. Next Steps
- 7. Appendices





# SOLAR PV LAYOUTS

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# **Tamalpais HS**



#### PV Target (Estimated)

	Nameplate (kWp)	Production (kWh)
PV Shown	255	411,000
	% Offset	30

Estimated Minimum # of EV Chargers Required by CalGreen: 4 (8 stalls)

Recommended # of EV Chargers Needed by 2035: 32 (64 stalls)

Notes

Tamalpais Union High School District Solar Preliminary Siting 11/30/2022



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## **Archie Williams HS**



SAGE

an NV5 company

#### PV Target (Estimated)

	Nameplate (kWp)	Production (kWh)
PV Shown	420	639,000
	% Offset	77

Estimated Minimum # of EV Chargers Required by CalGreen: 4 (8 stalls)

Recommended # of EV Chargers Needed by 2035: 32 (64 stalls)

Notes







## **Redwood HS**





#### PV Target (Estimated)

	Nameplate (kWp)	Production (kWh)
Existing PV	705	1,120,000
New PV Shown	785	1,267,000
	% Offset	107

Estimated Minimum # of EV Chargers Required by CalGreen: 13 (26 stalls)

Recommended # of EV Chargers Needed by 2035: 105 (210 stalls)

#### Notes

1. This scenario includes San Andreas HS as a NEM-A benefitting account.







### San Andreas HS

Scenario #3 - As A Separate Site From Redwood HS



#### PV Target (Estimated)

	Nameplate (kWp)	Production (kWh)
PV Shown	64	99,000
	% Offset	100

Estimated Minimum # of EV Chargers Required by CalGreen: 1 (2 stalls)

Recommended # of EV Chargers Needed by 2035: 9 (18 stalls)

Notes







# **SITE FINANCIALS** (EACH SITE + REDWOOD HS SCENARIOS)

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### Site-by-site Financial Analysis (With 100% Capex Bond Reimbursement)

Site	System Size (kWp DC)	PV EPC Installed Cost (\$/Watt)	Energy Consumption Offset <sup>3</sup> (Year 1)	Estimated Capital Cost <sup>1,2</sup> (\$)	Bond Reimbursement (100% CAPEX)	Annual Average Nominal Net Savings <sup>1,4</sup> (\$)	Lifetime NPV Savings <sup>1</sup> (\$, 2023)	IRR (%)
Tamalpais HS	260	\$5.11	30%	(\$1,300,000)	\$1,300,000	\$116,000	\$2,120,000	38%
Archie Williams HS	420	\$4.65	77%	(\$1,950,000)	\$1,950,000	\$157,000	\$2,850,000	36%
<u>Scenario #1:</u> Redwood HS + San Andreas HS (> 1 MW AC)	785 (+705 existing)	\$5.58	100%	(\$4,380,000)	\$4,380,000	\$354,000	\$6,440,000	36%
<u>Scenario #2:</u> Redwood HS + San Andreas HS (< 1 MW AC)	464 (+705 existing)	\$6.10	86%	(\$2,830,000)	\$2,830,000	\$251,000	\$4,590,000	38%
<u>Scenario #3:</u> Redwood HS (and San Andreas HS as a separate site, see below)	464 (+705 existing)	\$6.10	90%	(\$3,334,000)	\$3,334,000	\$289,000	\$5,230,000	37%
San Andreas HS	64	\$7.82						

<sup>1</sup> Individual costs and savings assume portfolio pricing and may not be achievable on each individual site basis

<sup>2</sup> Costs include an estimated 15% soft costs, including 10% contingency

<sup>3</sup> Offset percentages include existing solar PV (while the other table info includes just the new solar PV)

<sup>4</sup> These amounts are averages of the net energy savings per year (which includes PV-related O&M, insurance, inverter replacement, etc.). It is worth noting that savings generally increase over time, so these figures are not necessarily representative of the Year-1 savings.



### Redwood Scenarios Financial Analysis (100% Capex Bond Reimbursement)

Site	Expected Lifetime NPV Savings (\$)
Scenario #1: Redwood HS + San Andreas HS (> 1 MW AC)	\$6,440,000
<u>Scenario #2:</u> Redwood HS + San Andreas HS (< 1 MW AC)	\$4,590,000
Scenario #3: Redwood HS and San Andreas HS as separate sites	\$5,230,000

Estimated Minimum Interconnection Upgrade "Breakeven" Cost

\$1,210,000



# INTERCONNECTION APPLICATIONS APPROACH

## **Interconnection Applications Approach**

- 1. Tamalpais HS
- 2. Archie Williams HS
- 3. Redwood HS (over 1 MW AC)
- 4. San Andreas HS
- 5. Tamiscal HS\*

### Notes:

- Despite San Andreas currently being a NEM-A benefitting account, we can file IAs for both Redwood HS and San Andreas HS
- \*Tamiscal is only being considered for Interconnection Applications; it will not be a part of the current project



# PROJECT SCHEDULE

And Bridge And Andrews

### **Project Schedule (Current)**



# COMMUNITY ENGAGEMENT

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## **Community Outreach**

Community Outreach meetings will be scheduled in conjunction with the public comment period required by the CEQA filing.

Two meetings are anticipated; one in the afternoon (in person), and one in the evening (virtual).

Content covered will include:

- Photo simulation of the arrays
- Detailed construction timeline
- Anticipated impacts
- Benefits to the school district and community



# **NEXT STEPS**

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## **Next Steps**

- 1. District review of Site Details and Board direction\*
- Solicit competitive proposals through RFP under CA GC 4217 (targeting a 12/13 release date)
- 3. Evaluate proposals and rank vendors\*
- 4. Contract negotiations with top-ranked vendor\*
- 5. Design, construction, and commissioning

\* Go/no-go decision points





# Thank You

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## **Sample Board Questions**

- Will there be added costs due to soil conditions/bay mud?
  - Yes, and those added costs have already been included in our modeling.
- How will this project disrupt campus/students next fall?
  - This project is aiming to complete substantial construction (foundations and panels) before school starts, so that when students are on campus only sections of the parking lot(s) will be closed at any given time to complete the electrical, commissioning, and closeout of the canopies.
- Is glare a possible issue for nearby residents?
  - No. The panels are at a low enough angle that it is highly unlikely any sunlight reflects into nearby residences. Additionally, none of the proposed solar PV is angled toward any houses.
- What if the District does not pursue bond funding?
  - These projects will still have positive lifetime NPV savings even if the District is not reimbursed (see Appendix for financials assuming no reimbursement).
- What are the expected annual energy financial savings when these projects are completed?
  - Portfolio annual estimated net savings: \$627,000 (with Scenario #1)





# APPENDIX

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### **Alternate Redwood HS Layout**

Scenario #2 - Under 1 MW AC



#### PV Target (Estimated)

	Nameplate (kWp)	Production (kWh)
Existing PV	705	1,120,000
New PV Shown	465	744,000
	% Offset	86

Estimated Minimum # of EV Chargers Required by CalGreen: 13 (26 stalls)

Recommended # of EV Chargers Needed by 2035: 105 (210 stalls)

#### Notes

 This scenario includes San Andreas HS as a NEM-A benefitting account.



# **Site-by-site Financial Analysis**

### (Without Bond Reimbursement)

Site	System Size (kWp DC)	Energy Consumption Offset <sup>3</sup> (Year 1)	Estimated Capital Cost <sup>1,2</sup> (\$)	Lifetime Nominal Savings <sup>1</sup> (\$)	Lifetime NPV Savings <sup>1</sup> (\$, 2023)	IRR (%)
Tamalpais HS	260	30%	(\$1,300,000)	\$1,400,000	\$835,000	7.2%
Archie Williams HS	420	77%	(\$1,950,000)	\$1,690,000	\$940,000	6.1%
<u>Scenario #1:</u> Redwood HS + San Andreas HS (> 1 MW)	785 (+705 existing)	100%	(\$4,380,000)	\$3,830,000	\$2,140,000	6.1%
<u>Scenario #2:</u> Redwood HS + San Andreas HS (< 1 MW)	464 (+705 existing)	86%	(\$2,830,000)	\$3,040,000	\$1,820,000	7.2%
<u>Scenario #3:</u> Redwood HS (and San Andreas HS as a separate site, see below)	464 (+705 existing)	90%	(\$3,334,000)	\$3,400,000	\$2,000,000 <sup>4</sup>	6.9%
San Andreas HS	64					

<sup>1</sup> Individual costs and savings assume portfolio pricing and may not be achievable on each individual site basis

<sup>2</sup> Costs include an estimated 15% soft costs, including 10% contingency

<sup>3</sup> Offset percentages include existing solar PV (while the other table info includes just the new solar PV)

<sup>4</sup> A significant reason for why the third scenario is performing similarly to the other scenarios is because, in our modeling, 100% of the current production (under NEM1.0) is going to Redwood HS as opposed to a portion of it going to San Andreas. This analysis leads us to believe that there is a need for asset management services for the whole system (i.e., it seems the best decision historically would have been to keep all the solar at Redwood HS instead of having NEM-A benefitting accounts)



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### Redwood Scenarios Financial Analysis (Without Bond Reimbursement)

Site	Expected Lifetime NPV Savings (\$)
<u>Scenario #1:</u> Redwood HS + San Andreas HS (> 1 MW)	\$2,140,000
<u>Scenario #2:</u> Redwood HS + San Andreas HS (< 1 MW)	\$1,820,000
Scenario #3: Redwood HS and San Andreas HS as separate sites	\$2,000,000

Estimated Minimum Interconnection Upgrade "Breakeven" Cost

\$140,000

#### Notes:

- The comparative NPV chart is exclusively considering the value of solar
- The > 1 MW Scenario assumed zero interconnection costs
- When we incorporated BESS for tariff optimization, batteries did not add value to the sites
  - However, in order to keep the door open for garnering higher interest, and potentially better pricing, from bidders, Sage recommends that the District includes BESS as an Add-Alt in the RFP (with the condition that it does not have to accept the BESS sizing if the pricing is not what is deemed "best" for the District)



### CUMULATIVE CASH FLOWS (WITH AND WITHOUT BOND REIMBURSEMENT)

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## **Tamalpais HS**

### • Without bond reimbursement:

### • With bond reimbursement:





## **Archie Williams HS**

### • Without bond reimbursement:

### • With bond reimbursement





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### **Redwood HS** Scenario #1 - Over 1 MW AC

### • Without bond reimbursement:

### • With bond reimbursement:





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### **Redwood HS** Scenario #2 - Under 1 MW AC

### • Without bond reimbursement:

### • With bond reimbursement:





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\$8,466,000

\$5,871,000

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## **Redwood HS + San Andreas HS**

### Scenario #3 – As Separate Sites

• Without bond reimbursement:

• With bond reimbursement:





# **EV ASSUMPTIONS**

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# Marin County EV/EVSE Assumptions

- Total Marin County Vehicles: 212,000
- Total Vehicle Growth per Year: 2.00%
- Current Marin County EV Population: 14,500
- EV Adoption Rates Predicted to Fluctuate Annually
- Site-by-site future EV demand calculated based on student/staff/faculty demographics for each site and as a percent of total EV population
- Percent of EV Charging Done Publicly: 20%
- Only Modeled Dual-Port EV Chargers
- 1:1 ratio of EVs to EV Charging Ports











# Site-by-site EV/EVSE Results

Site	Total Stall Count	Estimated EV Stalls by 2035	Estimated Dual-Port EV Chargers Needed by 2035
Tamalpais HS	150	63	32
Archie Williams HS	150	63	32
Redwood HS	500	210	105
San Andreas HS	40	17	9

