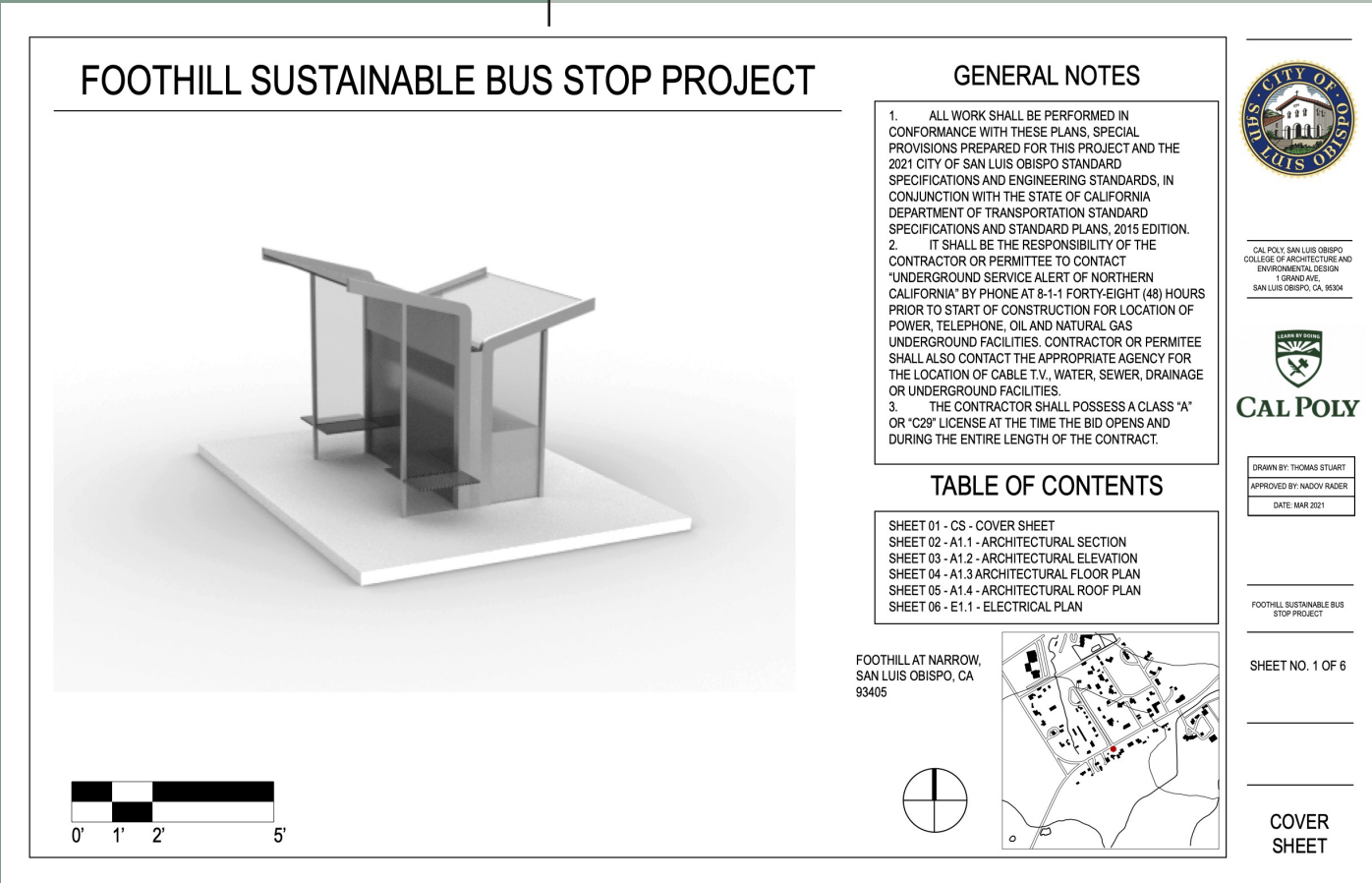


SUSTAINABLE BUS STOP

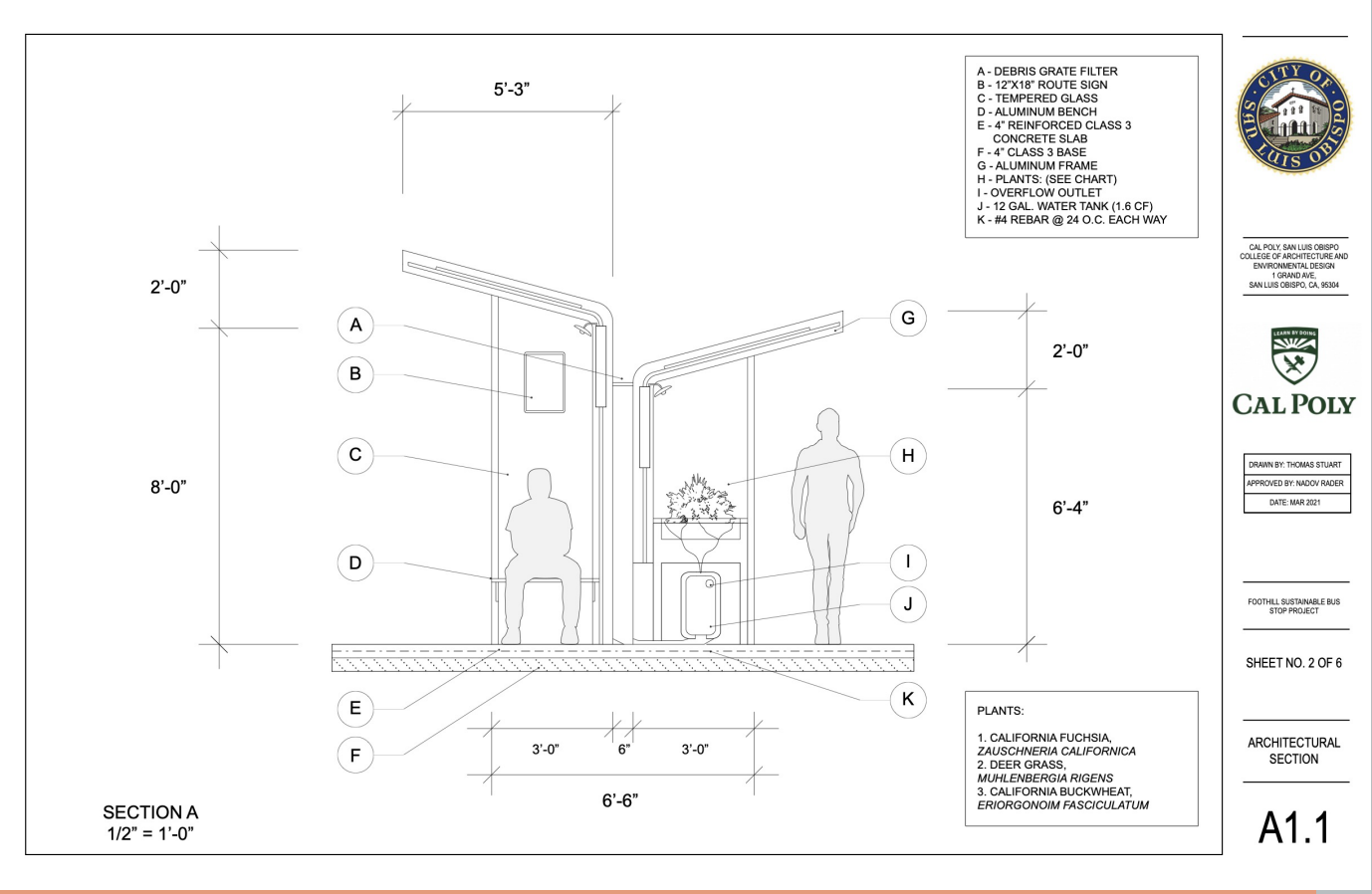
DESIGN AND PRE-CONSTRUCTION

AUTHOR
Nadov O Rader, CM
California Polytechnic State University
San Luis Obispo, CA

ABSTRACT
The objective of this project is to design and prepare to build a sustainable bus stop for the City of San Luis Obispo (SLO). Compiled are pre-construction plans and documents for delivery of a sustainable bus stop. All pre-construction services include: project budget/estimates, construction plans and specifications including architectural and electrical plans, timeline/schedule, and materials lists. With a strong focus on sustainability, the design incorporates the use of photovoltaic panels as a form of renewable energy to power features of the sheltered bus stop. This includes a light fixture and a pump to use collected rainwater to nourish native vegetation in a planter box.



- TITLE SHEET OF PLANS
- Concept drawing rendering
 - Mini map locating the site of the project
 - Architectural section with callouts for materials
 - Front elevation
 - Floor plan
 - Electrical section
 - Plan documents meet all local building codes per the requirements of the City of SLO



- ARCHITECTURAL SECTION VIEW
- Renewable energy is the source of power
 - Roofs feature photovoltaic panels
 - Sustainable features include two light fixtures and a pump in the irrigation system
 - The planter box will have the following: California Fuchsia (Zauschneria californica), Deer Grass (Muhlenbergia rigens), and California Buckwheat (Eriogonum fasciculatum)
 - These plants are not only native to the area but require very limited maintenance as they are extremely drought tolerant.

START DATE	TASK	EXPENSES					ESTIMATED COST
		LABOR HRS	RATE	UNITS	\$ PER UNIT	FIXED COST	
SITE PREP							
	Boundary Survey and Stakeout	1.00	\$ 30.52			\$ 200.00	\$ 230.52
	Demolition	4.00		180.00	\$ 5.00		\$ 900.00
	Excavation	4.00		3.33	\$ 50.00		\$ 166.67
FOUNDATION							
	Rebar (cut, tie, and place)	2.00	\$ 90.00	12.00	\$ 40.00		\$ 660.00
	Concrete (mix, pour, and finish)	6.00	\$ 45.00	400.00	\$ 2.78		\$ 1,382.00
	Hardward mounted in concrete	0.50				\$ 100.00	\$ 100.00
	Base Rock	1.00	\$ 45.00	2.22	\$ 38.00		\$ 129.36
STRUCTURE							
	Install framework	4.00	\$ 50.00			\$ 1,000.00	\$ 1,200.00
	Install glass	1.00	\$ 50.00	200.00	\$ 5.00		\$ 1,050.00
	Install benches	1.50	\$ 50.00			\$ 1,050.00	\$ 1,125.00
	Install trash can	0.50	\$ 50.00			\$ 350.00	\$ 375.00
	Install planter box	0.50	\$ 25.00			\$ 700.00	\$ 712.50
	Install pump	0.50	\$ 25.00			\$ 30.00	\$ 42.50
ELECTRICAL							
	Install wiring/conduit	1.00	\$ 50.00	30.00	\$ 6.00		\$ 230.00
	Install panels	1.00	\$ 50.00				\$ 50.00
	Install light fixture	0.50	\$ 50.00			\$ 120.00	\$ 145.00
	Install charge controller	0.50	\$ 50.00			\$ 700.00	\$ 725.00
	Install battery	0.50	\$ 50.00			\$ 1,275.00	\$ 1,300.00
	Install irrigation timer	0.50	\$ 50.00			\$ 62.00	\$ 87.00
	Connections	1.00	\$ 50.00				\$ 50.00
	Test electrical	1.00	\$ 50.00				\$ 50.00
CLOSEOUT							
	Clean up	0.75	\$ 50.00				\$ 37.50
	Install bus schedule	0.25	\$ 50.00				\$ 12.50
TOTALS		33.50					\$ 10,760.55

- BUDGET
- The project cost was to be under \$10,000
 - Budget accounts for all labor and materials for the construction phase of the project
 - The estimate assumes the solar panels would be donated for this project

1	2	3	4
Environmental	Resources	Management	Construction
1.1 Extreme Heat	2.1 Cash Flow	3.1 Schedule Delays	4.1 Safety Hazards
1.2 Local Ecosystem	2.2 Lack of Funding	3.2 Communication	4.2 Re-work
1.3 Soil Type	2.3 Resource availability	3.3 RFI's	4.3 Unknown Site Conditions
1.4 Natural Disaster	2.4 Labor / Personnel	3.4 Change Orders	4.4 Public

- THE RISK BREAKDOWN STRUCTURE (RBS)
- Risk Breakdown Structure (RBS)
 - o Environmental
 - o Resources
 - o Management
 - o Construction
 - The Risk Register
 - The Severity Table

CONTACT
Nadov Rader
(415) 866-8050
nrader@calpoly.edu