

UC/CSU/CCC SUSTAINABILITY CONFERENCE 2008
CAL POLY SAN LUIS OBISPO
July 31 – August 3

ENERGY EFFICIENCY PARTNERSHIP PROGRAM
BEST PRACTICE AWARDS APPLICATION FORM
Due Friday March 7, 2008

I. CONTACT INFORMATION

Campus: [Cal Poly SLO](#)

Department: [Facilities Planning & Capital Projects](#)

Contact name/title: [Mary-Alice Avila, Project Manager](#)

Telephone: [\(805\) 756-7358](#)

Fax: [\(805\) 756-7566](#)

Email: mavila@calpoly.edu

***Conference presenter name:** [Mary-Alice Avila, Project Manager](#)

***Conference presenter telephone:** [\(805\) 756-7358](#)

*The Partnership will cover the conference registration and on-campus housing fees for ONE person per each project selected as a Best Practice Award winner. This person must be the main presenter in a conference session track and submit their name here.

II. PROJECT CATEGORY- see attached category descriptions

NEW CONSTRUCTION

- Best Overall Sustainable Design
- HVAC Design
- Lighting Design/Retrofit

SUSTAINABLE OPERATIONS

- HVAC Retrofit (labs included)
- Renewables/Innovative Energy Generation or Procurement
- Water Efficiency/Site Water Quality
- Innovative Waste Reduction
- Student Energy Efficiency
- Student Sustainability Program

III. PROJECT/ PRACTICE INFORMATION

A. GENERAL QUESTIONS

Project/practice name: Bonderson Projects Center

Project/practice location: California Polytechnic State University, SLO

Implementation cost: \$7,340,000

Estimated annual energy savings (as applicable):

Estimated annual energy cost savings (as applicable):

Description- Provide a detailed narrative describing the project or practice.

Made possible by a gift from Paul R. Bonderson, Jr., and his wife, Sandra, the 19,000 square-foot building is the first on the university campus to be funded entirely by a private, individual donor. The donor's vision was to create a facility to provide an interdisciplinary, cooperative work environment that facilitates the students of the College of Engineering as they conceive, design and create their Senior Projects. The facility also serves as a hub for student activity and provides open viewing of projects and the process of creating them, while inspiring underclass members seeking direction for their future project ideas.

The project is an example of a simple, elegant use of sustainable building materials brought together to create an open, day lite, health working environment within the campus core. Because of the functions in the building where students are brought together to research and work, it is an excellent example of a sustainable student work space.

Relevancy to the Best Practices program- Describe the features of the project/practice that qualify it as a best practice of potential interest to other campuses (eg. replicability).

Cal Poly strives to create spaces for students, faculty and staff that are elegant representations of current industry standards and practices, reflect the University's goal towards a sustainable campus. Additionally, the design and construction of this facility reflects the University's and donors' philosophy of integrated work practices to obtain the best results possible. The building's construction systems and layout are easily understood, and even without an understanding of the intricacies of building systems, students know this is a space they want to work in.

Design integration- If appropriate, describe the ways in which this project/practice incorporated multiple disciplines and/or stakeholders into the design process. Describe how collaboration produced sustainable solutions or improved the project's performance.

The University's Facilities Planning and Capital Projects staff worked with the architect, engineers, college, donor and Facility Services to incorporate as many sustainable features and conservation measures into the project as possible. Each group had a different interest and approach, and working together, a sustainable project emerged.

Load management- If appropriate, describe how the project/practice provides on-peak electricity demand reduction, or demand response capability. N/A

B. DEPENDENT QUESTIONS- This section contains questions that are relevant **ONLY** for certain awards. If the award you are submitting under is listed, please address the question that follows.

Best Overall Sustainable Design:

Please describe the design of the building envelope, focusing on its effect on the facility's overall energy-efficiency.

Site Selection –

- Located in the northwest area of the campus core in a former parking lot, the Bonderson Projects Center anchors the south side of Engineering Plaza. Its neighbors include Engineering IV, the Advanced Technology Laboratories, the Kennedy Library and the Agricultural Sciences.
- Existing infrastructure was available on or adjacent to the site with the exception of chilled water. Chilled water is provided by high efficiency screw chillers and cooling towers, which serve Engineering III and IV as well. In the future, when the campus chilled water lines are extended to this area of campus, the satellite chiller plant will serve as a booster for the existing central plant.
- In order to preserve the only existing example of a large American Elm tree native to Eastern North American between Los Angeles and San Francisco for the Cal Poly Plant Conservatory and teaching curriculum, the tree was pruned, protected during construction and utilities routed around it.
- Drought tolerant landscaping, including native grasses, was introduced to the site, replacing the former asphalt pavement. Additionally, a coral specimen tree was added to further enhance the tree inventory of the Cal Poly Plant Conservatory on campus.
- Trees, added to the south side of the facility for shading, Energy Star compliance high-albedo TPO roofing, light colored exterior walls and shading devices reduce the heat island effect. South-facing glass and adjacent outdoor work areas are under a broad overhang, shading the building during the summer. Low winter sun penetrates the same area to warm the concrete slab.
- Light-colored roofing under the overhang south of the high bay work area serves as a light shelf to bounce south light into the two-story work space.
- The building footprint was reduced by adding a second story.
- The site is adjacent to city and regional bus stops, and near one of the campus' Escort Van stops further encouraging students to use alternative transportation.
- Care was taken to direct light within the building and site boundaries. Exterior lights are managed using a lighting control system with light sensors and time clocks.

Water Efficiency –

- Low-flow fixtures with automatic controls were used in the restrooms decreasing the amount of water needed and the amount of sewage conveyance.
- Drought tolerant landscaping was used to minimize landscape irrigation.

Energy & Atmosphere –

- The building is oriented on an east-west access with the north face glazing daylighting the rooms.
- Dual glazed, high-performance, low-E windows are used throughout. Additionally, glazing used on the south, east and west sides of the building are provided with deep

overhangs; and the west side has louvers, shading the glass in the afternoon, while still allowing day light into the building.

- Insulated walls and roof, and the thermal mass provided by the two-foot deep slab help to moderate the building temperature.
- Sensor controls, used on the interior of the building, turn off lights. In machining areas, sweep switches flash the light off and on at preprogrammed times, warning users to toggle the light switch to keep the lights on until the next sweep. If the switches are not toggled, then the lights turn off in five minutes. This provides safety for machine operators and addresses energy efficiency.
- Fluorescent lighting is used both inside and under the exterior overhangs. Other light fixtures use metal halide lamps.
- Further energy reduction is gained by using a variable-air-volume system with an economizer, which filters and uses outside air whenever possible. Electronic controls allow the system to be monitored from campus engineering services.

Materials & Resources –

- Excavated material was used on campus on another project. Additionally, construction waste was diverted from the landfill and recycled.
- The Campus has an aggressive recycling program, which was instituted in the Bonderson building.
- The structural system is made from recycled steel for the building's columns and beams, and in-filled with metal studs and corrugated decking. Aluminum, used in the building, is easily recycled when the building is deconstructed.
- The flooring consists of sealed concrete in shop and work areas, carpeting in the entry and computer lab, vinyl flooring in the corridors, and ceramic tile in the restrooms. The carpet squares used contain recycled content, were manufactured using sustainable practices, and can be recycled when removed.
- Interior materials are lightly colored, durable and cleanable.
- The concrete floor slab contains fly ash, a substitute for some of the virgin material and energy used in the creation of Portland cement.
- Acoustical absorbent material used on the walls is made from recycled agricultural waste and left with its natural finish.

Indoor Environmental Quality –

- Beginning with the entrances to the building, walk-off mats are provided to remove dirt from shoes before entering the building.
- The wood shop is provided with special venting and a wood dust collection system. A welding exhaust system draws fumes from the manufacturing room.
- Occupants have the ability to work in their project rooms, project integration work room, shops, or outdoors in a covered area or an open yard. Roll-up and sectional doors, plus doors to the exterior in the two shops, allow students to open the rooms up to covered outdoor work spaces.
- Paints and coatings, and carpeting are low-or no-emitting materials with regards to VOC.
- Most of the rooms in the building have natural daylighting and views both within and outside the building. Skylights provide daylighting to interior corridors. Overhead coiling doors in the project work rooms have integral Plexiglas view lights to allow

daylighting of the work areas. Section doors with glass view lights in the project integration work room provide daylighting.

- In both the project work rooms and the project integration work room, students may work indoors, outside under a covered work space, or in the yard.

Innovation & Design –

- Spaces in the building were designed to be open and flexible so that they are adaptable, make moving equipment in and out easy, and allow for frequent change of use as the student project needs change.
- Outdoor work areas are shielded by the building itself from north winds and receive sun from the south. Additionally, these areas are oriented toward student traffic to encourage students to stop and discuss senior projects with students working in the facility.
- The simple palette of materials and exposed structure equates to less energy input to construct the building.

Water Efficiency/Site Water Quality:

Please provide an estimate of the annual amount of water saved or treated. N/A

Best Overall Sustainable Design; HVAC Design; HVAC Retrofit; Lighting Design/ Retrofit; and Water Efficiency/ Site Water Quality, if applicable:

Please describe how the project/practice has been received by building occupants.

Describe what has been met with satisfaction or dissatisfaction, and why.

The Bonderson Projects Center has become a show piece for the College of Engineering. Students have given positive responses to the spaces, amenities – roll-up doors, daylighting, in-door and out-door work spaces, and storage facilities. Because the equipment for the shop areas is still being acquired, the building is not up to full capacity yet. It has taken a little bit of time to bring the university community up to speed on the systems and features in the building. Additional signage would help to inform the ever-changing student users of the facility's amenities.

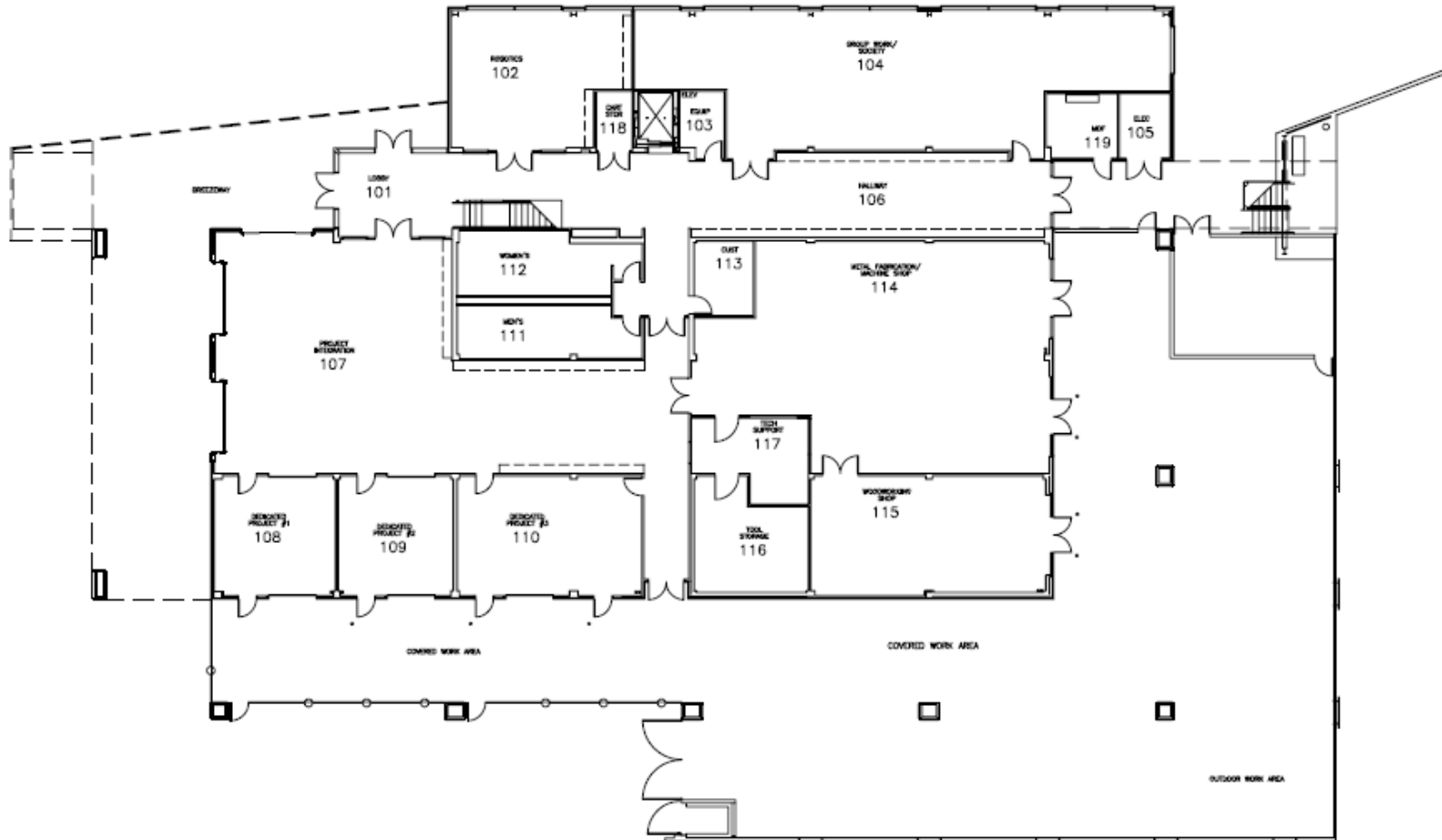
IV. ADDITIONAL INFORMATION

Please provide any additional information necessary to assist the selection team in understanding and evaluating the project. Supplemental information in the form of photos, drawings, etc. may be submitted. PLEASE NOTE: If you are submitting in the Best Overall Sustainable Design category, the following must be submitted:

1. Completed submittal form, 2. Floor Plans, 3. Elevations and Sections illustrating sustainable features, 4. Perspectives (or photographs if the project is constructed). This information will enable the selection committee to adequately evaluate the building design.

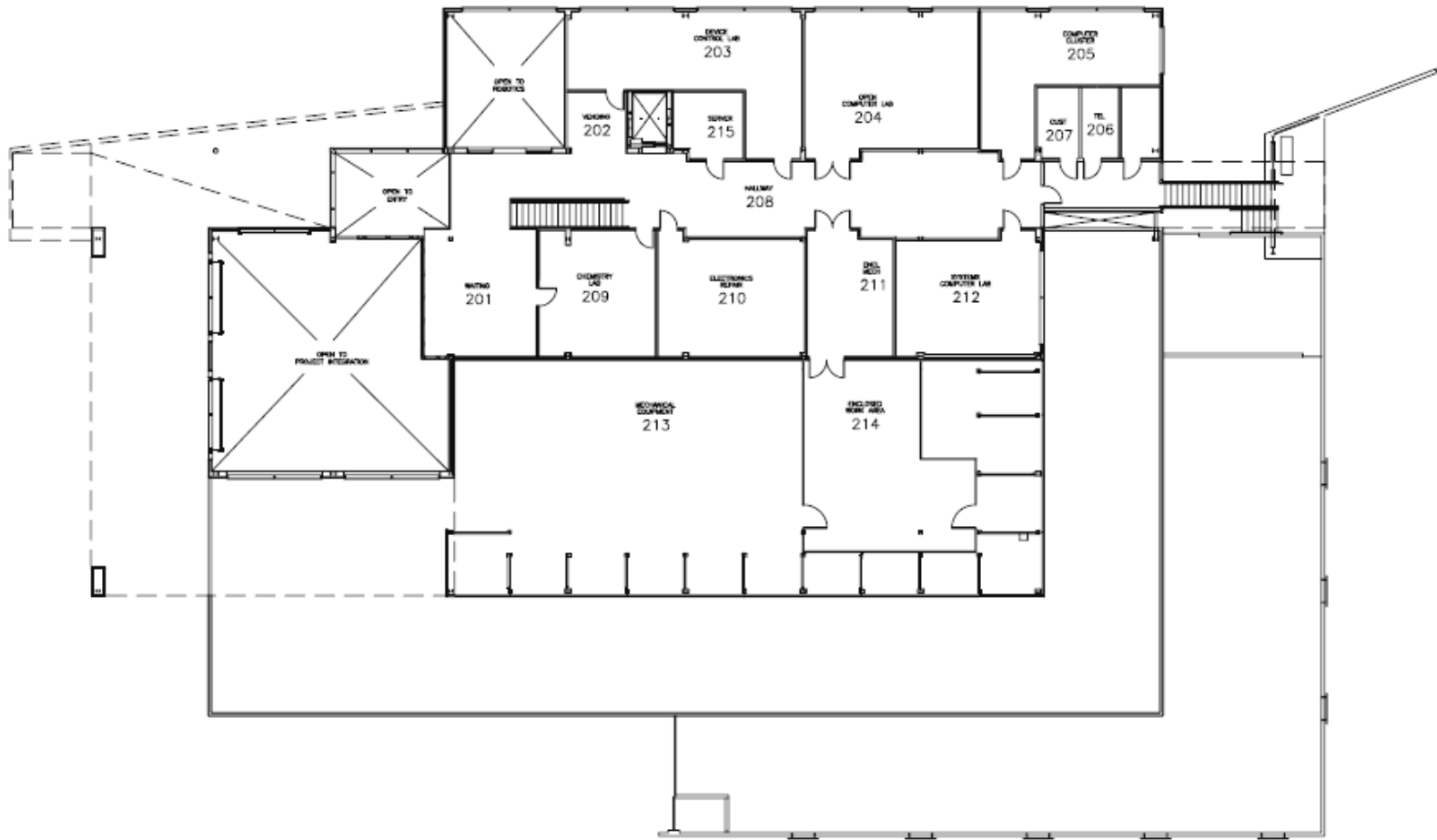


Cal Poly SLO - Bonderson Projects Center - Perspective



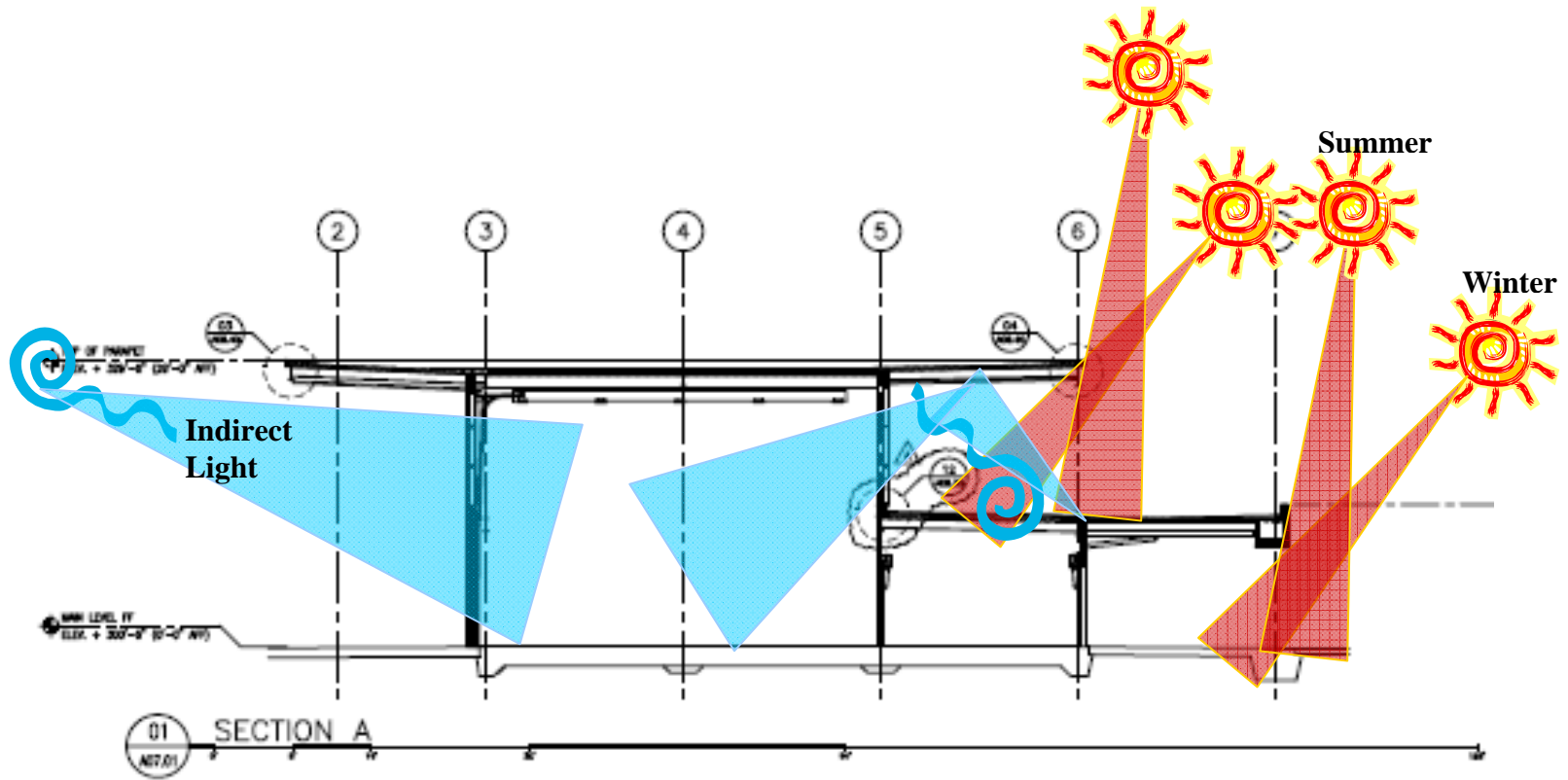
Cal Poly SLO - Bonderson Projects Center - 1st Floor Plan



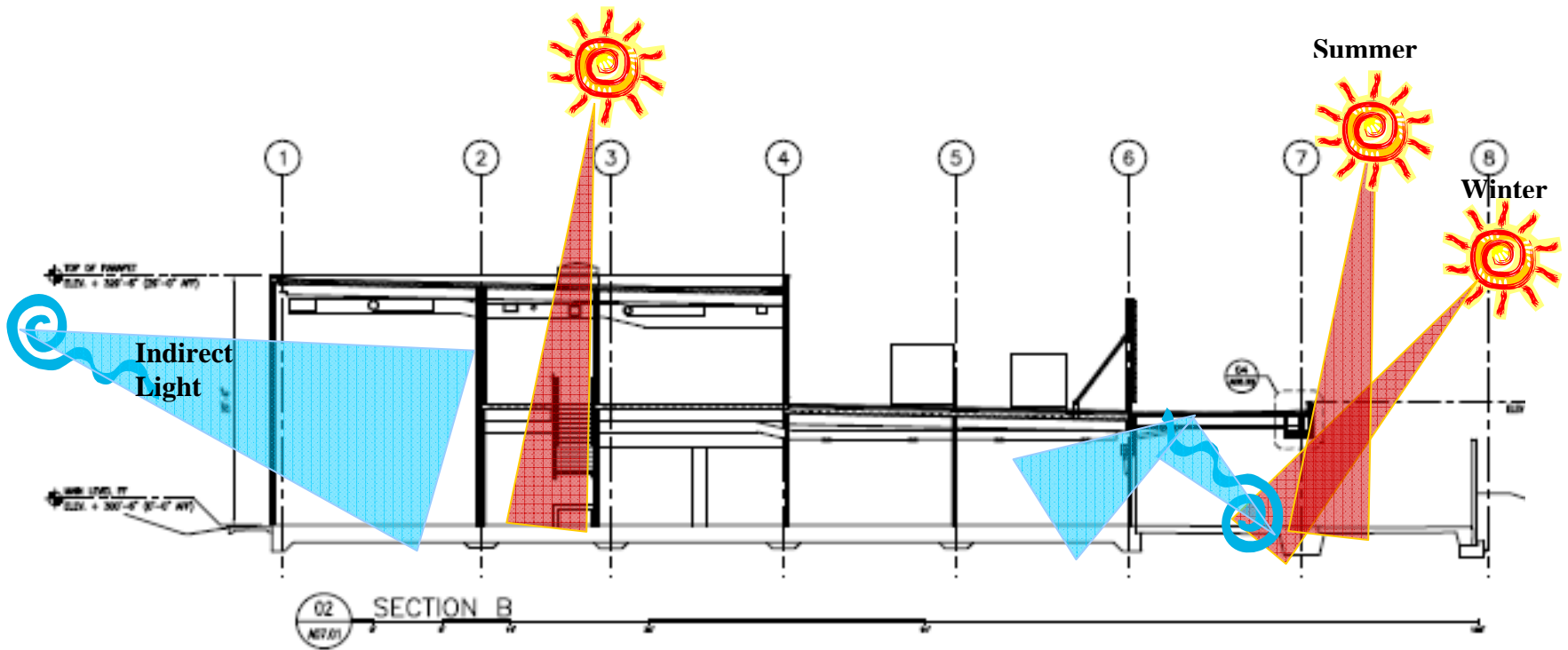


Cal Poly SLO - Bonderson Projects Center - 2nd Floor Plan

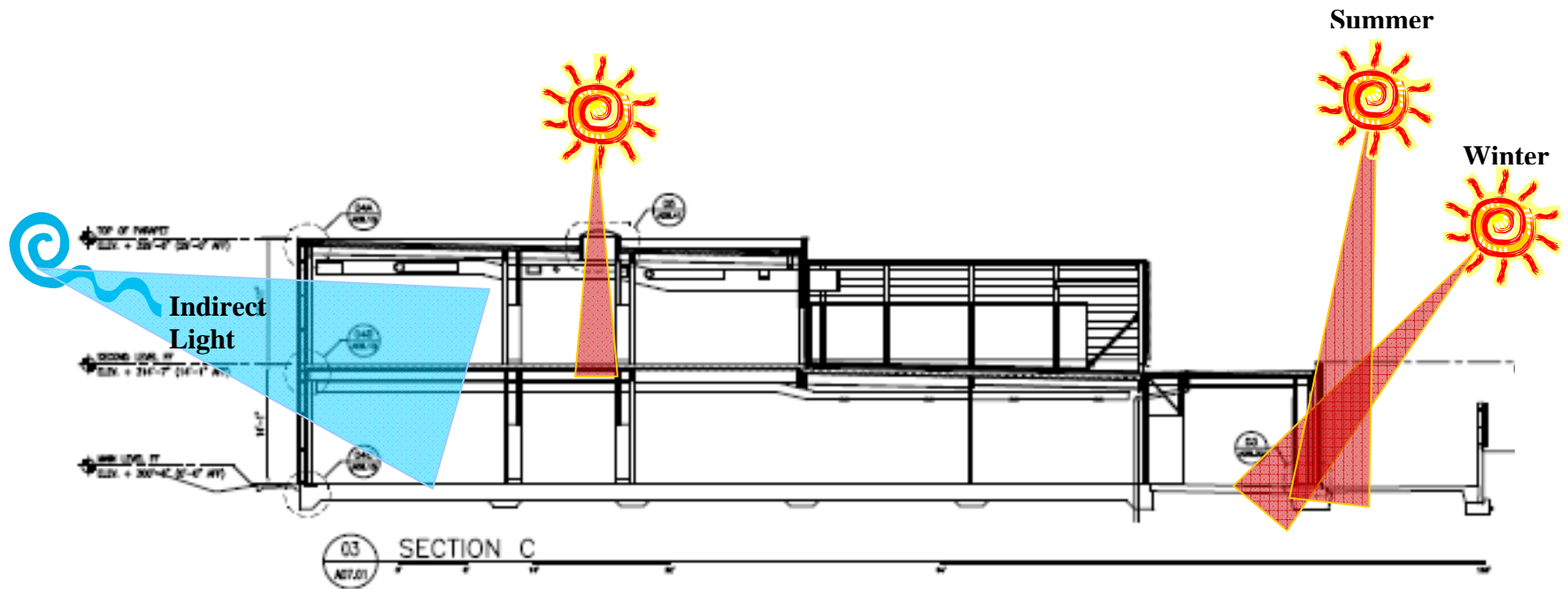




Cal Poly SLO - Bonderson Projects Center – Section @ Deep Overhang



Cal Poly SLO - Bonderson Projects Center - Section



Cal Poly SLO - Bonderson Projects Center - Section



Cal Poly SLO - Bonderson Projects Center – View from East

Located in the northwest area of the campus core, Bonderson anchors the south side of the Engineering Plaza, which replaced the former parking lot with green, open space.



Cal Poly SLO - Bonderson Projects Center – View from South

The only existing example of a large American Elm tree (native to Eastern North American) between Los Angeles and San Francisco is preserved for the Cal Poly Plant Conservatory and teaching curriculum. As part of the construction, the tree was pruned, protected and utilities routed around it.



Cal Poly SLO - Bonderson Projects Center – View from Southeast

The large preserved American Elm tree near the east building entrance is given more space in a new planting bed of trees, drought tolerant landscaping and native grasses. What was once just a parking lot is replaced with a student activity facility surrounded by trees and native vegetation.



Cal Poly SLO - Bonderson Projects Center - View from North

The building is oriented on an east-west access with the north face glazing daylighting the rooms and providing views to the Engineering Plaza. Dual, high-performance, low-E glazing is used throughout the facility. Skylights provide daylighting to the upper interior corridor and interior stairwell; while the Energy Star compliance high-albedo TPO roofing and light colored exterior walls reduce the heat island effect.



Cal Poly SLO - Bonderson Projects Center - View from North
Glazing on the west side of the building provides daylighting to the west entrance and the Project Integration work room. A deep overhang and louvers shade the glass in the afternoon, while still allowing daylight into the building. The deep overhang also provides protection for an outdoor display area.



Cal Poly SLO - Bonderson Projects Center – View from West
The glazing at the west entrance and the Project Integration work room is shaded from the afternoon sun by deep overhangs and louvers.



Cal Poly SLO - Bonderson Projects Center – View of Concrete Forms

The thermal mass provided by the two-foot deep concrete floor slab helps to moderate the building's interior temperature. Additionally, the fly ash containing concrete substitutes for some of the virgin material and energy used in the creation of Portland cement, an ingredient in concrete.



Cal Poly SLO - Bonderson Projects Center – View of Structural Steel
The structural system is made from recycled steel and includes rebar used in the concrete slabs, columns, beams and corrugated metal decking.



Cal Poly SLO - Bonderson Projects Center – View of Interior Wall
In-fill for the exterior and interior walls is created by the use of metal studs manufactured from recycled steel.



Cal Poly SLO - Bonderson Projects Center – View of Southwest

The large expanse of glass in the Project Integration work room, provided by both windows and sectional doors, is protected by deep south and west overhangs. Light roofing and overhang colors bounce indirect light into the room, while the screens on the west keep afternoon sun from penetrating.