



# College of Engineering Master Plan

University of California, Berkeley

May 2020



# TABLE OF CONTENTS

|          |   |            |
|----------|---|------------|
| <b>1</b> | <b>Executive Summary</b> .....            | <b>1-1</b> |
| <b>2</b> | <b>Master Plan Vision</b> .....           | <b>2-1</b> |
|          | 2.1 College Context .....                 | 2 3        |
|          | 2.2 Planning Objectives .....             | 2 4        |
| <b>3</b> | <b>Planning Context</b> .....             | <b>3-1</b> |
|          | 3.1 Space Needs .....                     | 3 3        |
|          | 3.2 Department Context .....              | 3 14       |
|          | 3.3 College Survey .....                  | 3 16       |
|          | 3.4 Existing Buildings .....              | 3 17       |
|          | 3.5 Related Campus Plans .....            | 3 22       |
|          | 3.6 Site Planning Context .....           | 3 23       |
| <b>4</b> | <b>Master Plan Framework</b> .....        | <b>4-1</b> |
|          | 4.1 Land Use Strategies .....             | 4 3        |
|          | 4.2 Landscape Strategies .....            | 4 5        |
|          | 4.3 Mobility Strategies .....             | 4 7        |
| <b>5</b> | <b>Proposed Projects</b> .....            | <b>5-1</b> |
|          | 5.1 Proposed Projects .....               | 5 3        |
|          | 5.2 Building Projects .....               | 5 5        |
|          | 5.3 Landscape Projects .....              | 5 10       |
|          | 5.4 Near Term Improvements .....          | 5 18       |
| <b>6</b> | <b>Phasing &amp; Implementation</b> ..... | <b>6-1</b> |
|          | 6.1 Phasing Assumptions .....             | 6 3        |
|          | 6.2 Preferred Phasing Scenario .....      | 6 4        |
|          | 6.3 Implementation .....                  | 6 8        |

# 1 EXECUTIVE SUMMARY

The College of Mechanic Arts was founded as part of the original University of California (UC), and was merged with the College of Civil Engineering to form the College of Engineering in 1931. Today Berkeley Engineering consistently ranks among the top three engineering schools in the United States, and is recognized globally as a leader in engineering education and research. Our dynamic and vibrant programs continually advance the forefront of knowledge and practice in engineering, with transformative impact on society.

- We empower students to succeed as innovators and to be effective leaders for positive change;
- We expand the frontiers of knowledge and invent new technology through original research to tackle the world's biggest challenges;
- We benefit the public good through innovation and entrepreneurship, and through service to industry, non-profit organizations and government.



Demand for engineering education and innovation will continue to grow as society becomes increasingly dependent on engineered devices, processes and systems. The College of Engineering Master Plan (2020 Master Plan) serves as a guide for renewing and reinvigorating the engineering neighborhood (“precinct”) of UC Berkeley’s Campus Park to meet the needs of our growing and evolving educational and research programs. It envisions more welcoming and interactive spaces for learning and discovery, and facilitates collaboration in research across disciplines, to foster an inclusive culture that values and leverages diversity to fully unlock our individual and collective potential to benefit society.

The 2020 Master Plan builds on the 2002 Facilities Master Plan by synthesizing the College’s strategic growth projections and programmatic space needs into a flexible planning framework. This framework harmonizes building, land-use and landscape design principles to guide capital investment and implementation, while providing versatility to accommodate future programmatic needs.



## PLANNING OBJECTIVES

A series of physical planning objectives define the vision of the 2020 Master Plan. These planning objectives are organized into three categories, reflecting goals related to the College community, its space, and campus precinct.

### Enhance Community and Identity

Today's engineers work and learn in teams, and fostering community is a vital element of the 2020 Master Plan, particularly for students. Spaces to support student clubs, group projects and out-of-classroom learning are in high demand, as are active learning classroom environments and flexible event spaces to accommodate increased enrollment.

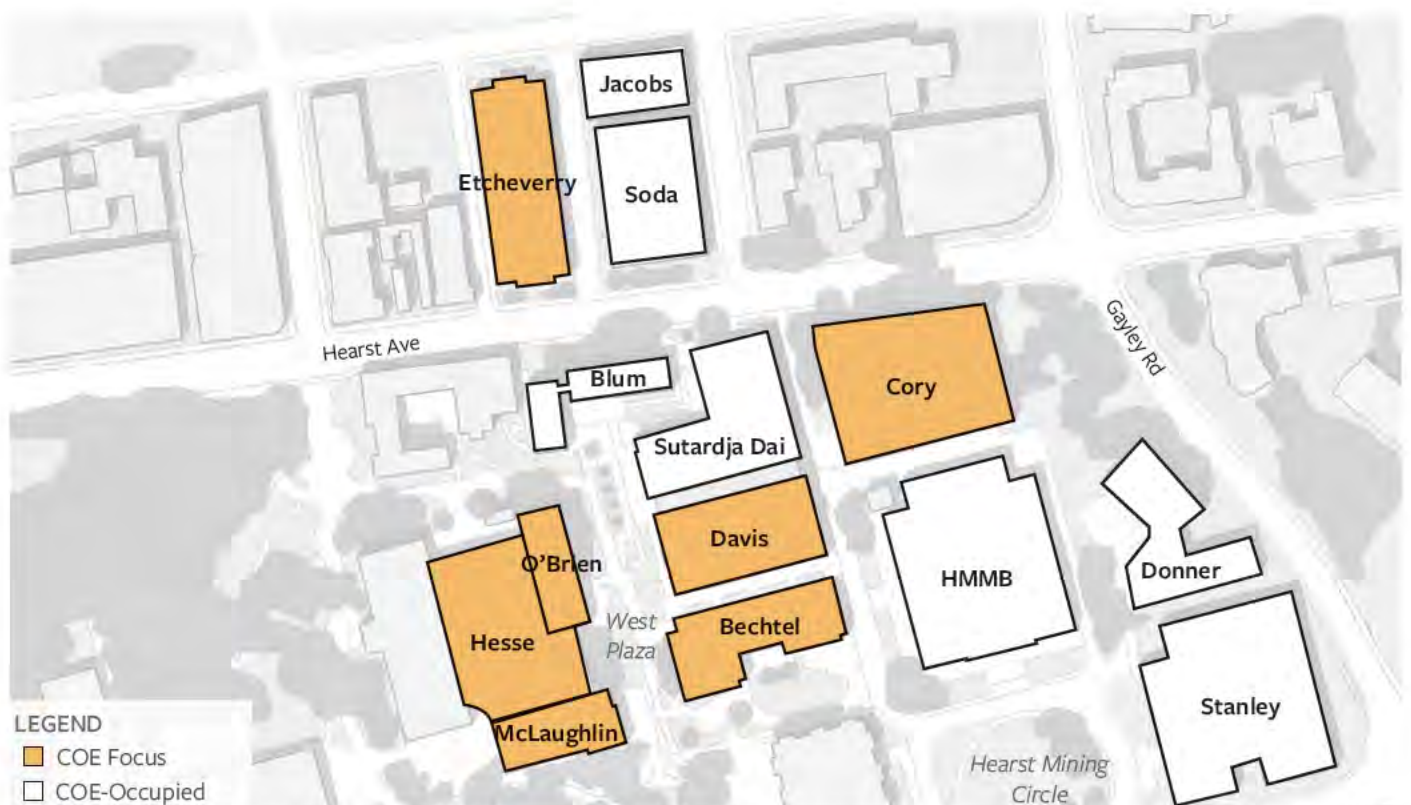
Faculty and staff are eager for collaborative research neighborhoods, as well as greater identity and cohesion within departments. Greater identity and cohesion is supported in the 2020 Master Plan through the consolidation of fragmented departments, which will facilitate easier interaction and collaboration.

### Support Program Needs and Modernize Facilities

The College needs space with the infrastructure and capability to support new types of research and accommodate faculty hires. Given the limited amount of land in the precinct, the 2020 Master Plan identifies unique needs for which space should be set aside as projects occur. The plan also recommends renovation and replacement of buildings based on careful consideration of each building's highest and best use and necessary structural upgrades.

### Activate Outdoor Spaces and Enhance Connectivity

UC Berkeley's campus is unrivaled in its beauty; the quality of its open space is a major asset. The activation of outdoor spaces, complemented by intuitive, accessible routes, is a key theme throughout the 2020 Master Plan. The College's precinct also frames a key view of the historic Campanile from the north.



*Buildings that are either fully occupied or partially occupied by the College of Engineering*

## BUILDINGS IN FOCUS

The 2020 Master Plan focuses on the 15 buildings currently occupied by the College in, or around, the Campus Park, comprising over one million assignable square feet (ASF). The College's seven departments are largely located within those buildings. The College also leases space at six sites around the City of Berkeley, primarily housing institutes and research groups.

The 2020 Master Plan focuses on renovation and replacement of seven "focus buildings," due to their suitability for long term use as learning and research facilities:

- Bechtel Engineering Center
- Cory Hall
- Davis Hall
- Etcheverry Hall
- Hesse Hall
- McLaughlin Hall
- O'Brien Hall



*College of Engineering precinct as viewed from the Campanile*

## SUMMARY OF NEEDS

### Program Needs

The 2020 Master Plan incorporates planning-level assumptions for potential growth of 25 principal investigators (PIs) and proportional enrollment and staff growth, in order to project future space needs. The following key space needs are addressed in the 2020 Master Plan:

| Space Type          | Existing ASF   | Future Need (ASF)          |
|---------------------|----------------|----------------------------|
| Research Space      | 391,000        | + 70,000 - 80,000          |
| Instructional Space | 118,000        | + 10,000 - 15,000          |
| Office Space        | 156,000        | 0                          |
| Community Space     | 114,000        | + 20,000                   |
| <b>TOTAL</b>        | <b>779,000</b> | <b>+ 100,000 - 115,000</b> |

Overall, the space needs comprise a 20% increase in research space, 13% increase in community space, and 18% increase in instructional space. The 2020 Master Plan plans to support these space needs through the renewal of over 600,000 assignable square feet (ASF) of space, including new construction projects and renovations. The 2020 Master Plan also recommends pursuing rightsizing opportunities as part of the College's space strategy, assuming that existing space can be made more efficient after it is relocated to new, consolidated space. Some additional program needs may be accommodated in the ongoing Division of Computing, Data Science, and Society project at the Tolman Site.

The proposed master plan projects would also address qualitative space needs by renewing or replacing existing space that has a significant deferred maintenance backlog. The 2020 Master Plan also anticipates the consolidation of leased space back within the College precinct.

The College has access to a limited amount of surge space for relocating program during capital projects, and the identified projects will need to accommodate surge space capacity in order to enable subsequent projects.

Additional programming will be conducted for individual projects as they are implemented, and can incorporate any changes that have occurred over time relative to the College's needs, as well as pedagogical changes and emerging trends.

### Campus Planning Context

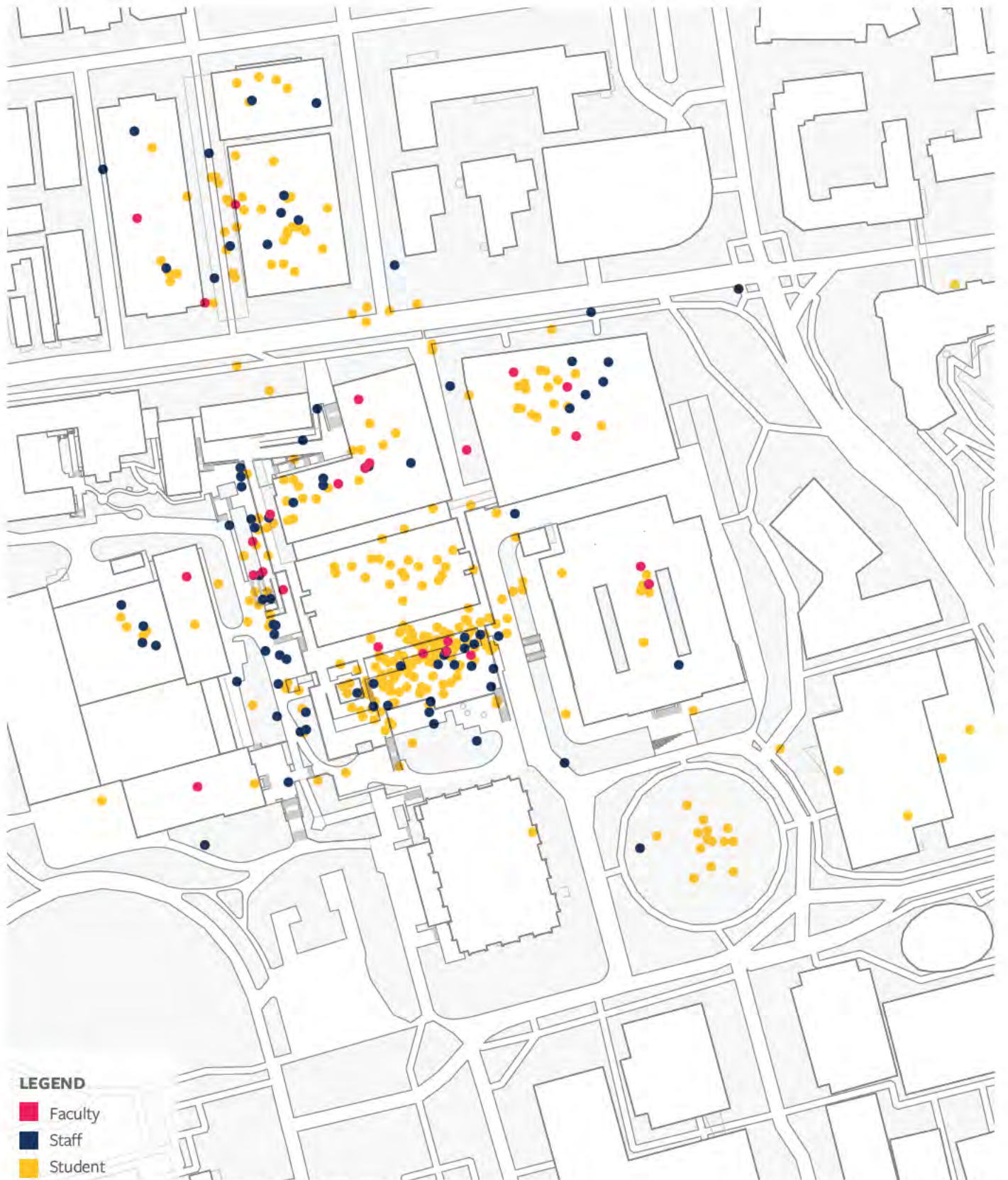
The College precinct is located in the northeast corner of the Campus Park, extending across Hearst Avenue. The precinct is densely developed, in comparison to other areas of the Campus Park, and all available development sites are currently built out. The superblock of Sutardja Dai, Davis, and Bechtel is particularly imposing. However, some sites are underdeveloped and could support a net gain in capacity, such as Hesse and O'Brien Halls, as well as Bechtel. Future projects will need to be planned carefully to maximize opportunities to gain net new capacity for surge space. Potential redevelopment sites were identified through synthesis of existing building analysis, space needs, and desired programmatic changes.

The precinct is also marked by significant grade change — approximately 50 feet of grade change occurs from the precinct's southwestern edge at Memorial Glade to its northeastern corner at the intersection of Hearst Avenue and Gayley Road. The steep terrain impacts the perception of cohesion between buildings throughout the precinct, as well as accessibility and circulation.

The precinct is adjacent to the Classical Core, a cluster of historic Beaux Arts buildings and landscapes designed by John Galen Howard, UC Berkeley's first campus architect. New buildings have the opportunity to further enhance the Classical Core.

The West Plaza is also a key view corridor to the Campanile, an iconic campus landmark. The College's proximity to green space, including Memorial Glade and Observatory Hill, combined with significant topographic change throughout the College, represent opportunities to provide outdoor spaces at a variety of different scales. The precinct's natural areas and tree canopy support the campus's biodiversity.





**LEGEND**

- Faculty
- Staff
- Student

Survey responses to "Where is the Heart of Engineering?"

## PROPOSED MASTER PLAN

The 2020 Master Plan envisions a comprehensive program of major building projects, major landscape projects, and near term improvements, identified in the illustrative plan to the right. Asterisks (\*) indicate key catalytic projects.

### Major Building Projects

These projects will support planning assumptions and enhance the student experience. The Hesse-O'Brien Replacement and Davis Addition and Renewal are key catalytic projects that create a new heart for the College's precinct, and support research growth, learning and community.

1. Hesse-O'Brien Replacement \*
2. Davis Addition and Renewal \*
3. Bechtel Addition and Renewal
4. Cory Replacement
5. Etcheverry Renewal
6. McLaughlin Renewal

### Major Landscape Projects

These projects will activate the College's outdoor space and amplify connectivity between the College and the campus. The West Plaza renovation is a key catalytic project that links indoor and outdoor spaces, fosters community, and improves accessibility.

7. Soule Corridor
8. West Plaza Renovation \*
9. Plaza Steps
10. Bechtel Courtyard
11. Bechtel Terrace and Green Roof
12. East Plaza
13. Central Glade Restoration
14. Saber Tooth Plaza

### Near Term Improvements

These projects comprise high-impact, highly visible projects that can be implemented in the near term.

15. North Plaza
16. Covered Outdoor Seating
17. West Plaza Landscape Furnishings
18. Bechtel Terrace Enhancements
19. Bechtel Library Commons
20. Hearst Mining Courtyards



Illustrative plan of proposed master plan



## KEY CATALYTIC PROJECTS

These catalytic projects are high-impact projects that have the potential to transform the College precinct, while addressing programmatic needs.

### Hesse-O'Brien Replacement

The 2020 Master Plan envisions the Hesse-O'Brien Replacement as an active hub of community, learning, and research: a new center of gravity for the College. Because the current site is underdeveloped, it represents the College's best opportunity to gain space for current and future program needs, as well as for surge space to enable other projects. This project should be the College's first priority. The proposed building would be anchored by an active ground floor focusing on community space,

addressing critical needs for study, teaching and collaboration, as well as student club space. Upper floors would house modern research space; lower levels below grade could house low-vibration, low EMI space.

### Davis Addition and Renewal

Davis Hall is in need of significant structural upgrades, and redevelopment of this site would provide the College with more efficient, fully modernized research space as well as instructional and student space. The proposed project would retain the facility and replace the upper floors, embracing transparency and capitalizing on views to the Central Glade. The high bay facility could become a focal point for fabrication, with visual connections out to the West Plaza, effectively putting the



College's research and innovation on display for the College, and for the campus at large.

**West Plaza**

The Berkeley landscape is an iconic and memorable element of the physical campus environment. The West Plaza is the College's primary open space, but functions today as a pass-through space. The plaza could be revitalized as a true central gathering space that brings people together, both from the College and from the campus at large. The plaza would be designed with zones at a variety of scales to allow it to function as a multi-purpose space that unifies the precinct from Blum to McLaughlin Halls, with seamless indoor-outdoor connections.

**Key Catalytic Project Highlights**

1. College of Engineering Commons
2. Connection to Saber Tooth Plaza
3. Classrooms
4. Hesse-O'Brien Outdoor Terrace
5. Hesse-O'Brien Research Labs
6. Low-Vibration, Low EMI Labs
7. High Bay Facility Activity Zone
8. High Bay Facility
9. Classrooms and Teaching Labs
10. Davis Research Labs
11. Davis Outdoor Terrace
12. West Plaza Outdoor Commons



**DAVIS ADDITION AND RENEWAL**











# 2 MASTER PLAN VISION



In 2002, the College of Engineering (College) completed a facilities master plan studying facilities on campus and at Richmond Field Station (RFS). The 2002 Master Plan proposed a series of projects intended to strategically expand selected research programs, support interdisciplinary programs, and improve student space in alignment with campus-wide master planning efforts.

Many of the proposed projects and renovations from the 2002 Master Plan have been completed, including the adaptive reuse of the Naval Architecture Building (Blum Hall), the replacement of Davis Hall North (Sutardja Dai Hall), the construction of Jacobs Hall, renovations to Bechtel, and West Terrace improvements.

The 2020 Master Plan builds on the 2002 vision, refreshing it to reflect current and anticipated future needs for the next ten to twenty years, as well as pedagogical shifts in engineering research and instruction. The 2020 Master Plan incorporates major projects not yet implemented from the 2002 Master Plan, including the replacement of Hesse and O'Brien Halls, renovations to Bechtel Engineering Center, and the replacement of Davis Hall South. The Hesse-O'Brien replacement, in particular, is the linchpin for a progressive modernization of the College's facilities. While facilities at RFS were considered for strategic uses, the 2020 Master Plan focuses on facilities within and adjacent to the Campus Park.



The 2020 Master Plan addresses the following key questions:

- How can the College’s assets be supplemented, reconfigured, or replaced to create a cohesive whole and a geographic center for the College, in order to foster community?
- How can the College’s facilities be renewed or replaced to comply with the UC Seismic Safety Policy?
- How can the urban design of the precinct be improved to enhance wayfinding and accessibility?
- What is the capacity of existing facilities to accommodate the College’s potential growth?
- What permutations can be reasonably considered to accommodate future programmatic needs, and what are the cost implications of those options?
- How can the campus experiences of students, staff, faculty and visitors convey the extraordinary creativity and social contributions that distinguish Berkeley Engineering?

Answers to these questions share the goal of creating a connected, coherent and vibrant village of entrepreneurial engineers collaborating at a memorable, world-class campus.

## 2.1 COLLEGE CONTEXT

Berkeley Engineers brought water to California’s vast agricultural industry and helped to build the previously unbuildable, including the Hoover Dam and the Golden Gate Bridge. Berkeley Engineers pioneered the microelectronics that seeded the Silicon Valley, and the information technology that created the Internet. Today, Berkeley Engineers remain at the nexus of innovation worldwide.

The College aims to educate and inspire leaders for the global economy who can marshal strong entrepreneurial and management skills to match technological expertise. The College is poised to take on the challenge of applying technological and scientific innovations to make a significant impact on health, sustainability, poverty, and other global challenges.

The 2020 Master Plan synthesizes a new capital plan with the College’s culture, as defined by its legacy, mission and vision. It imagines a series of campus and building transformations designed to enhance and expand the College in flexible, dynamic settings for world-class faculty, students and staff.



*Hearst Memorial Mining Building*

## 2.2 PLANNING OBJECTIVES

The 2020 Master Plan is structured around a series of planning objectives that address the College's needs at multiple scales. Campus context, College considerations, and building-specific issues are addressed through a series of transformative capital projects. The planning objectives also span fundamental cultural and strategic topics such as discovering new frontiers in research; fostering undergraduate culture; defining the College precinct and its connection to the broader university; and critical improvements to the core infrastructure of the College's buildings.

### OBJECTIVE 1 – Enhance Community and Identity

The 2020 Master Plan seeks to strengthen community and identity for students, faculty and staff, by creating collaborative hubs that nurture research and provide a range of learning environments in and out of the classroom. Fundamental improvements to community space and, more broadly, the student experience, will enhance the potential for interdisciplinary interaction. This objective is influenced by the following factors:

- **Student Experience:** College and campus-wide demand for student services, welcoming study areas, and space for office hours and group work has increased due to overall enrollment growth and changes in engineering education.
- **Shops and Student Clubs:** Shops, makerspaces and student club spaces are signature resources and experiences for engineering students. Centralizing these facilities in highly visible locations brands the engineering experience and increases the efficient use and overlap between students from different degree programs.
- **Increased Enrollments:** Enrollment has grown, especially in Bioengineering, Mechanical Engineering, and Electrical Engineering and Computer Science. Some departments have large classes with breakout sessions that require multi-use learning environments that operate in many modes.
- **Faculty and Staff Community:** College buildings lack informal space and sufficient meeting space to support faculty and staff collaboration. More spaces like the cafes in Etcheverry and Sutardja Dai are needed throughout the College. Work environments should be designed with more meeting areas and comprehensive technology, as well as



*The Davis high bay supports research, teaching, and student activities, and provides opportunities for interdisciplinary collaboration.*

supporting spaces such as lactation rooms, meditation spaces and kitchen areas to foster informal interaction.

- **Departmental Cohesion:** The 2020 Master Plan advocates for greater cohesion of departments and better definition of their homes, which have become fragmented over time across both campus and leased space. Departments contain great diversity in terms of research and degree programs. Fragmentation of their space challenges connections between faculty, administration and students. New buildings should restore and improve departmental cohesion while enabling cross-departmental collaborations. Functionally similar labs from multiple departments can be co-located, while faculty offices and departmental homes can be discrete clusters.

## **OBJECTIVE 2 – Support Program Needs and Modernize Buildings**

The 2020 Master Plan will support program needs by outlining potential growth and recommending initiatives that might well-anticipate the College’s development. Providing net new space for supporting research, while still planning for space that is balanced

and flexible, will be particularly important. All buildings seek a level of adaptability, but they must strike a balance between too much and too little flexibility — a building cannot be everything to everyone. Instead, the College’s buildings should be planned with a strategic level of flexibility that accommodates a reasonable range of functions, while allowing a baseline level of specialization or focus.

Ideally, future College buildings will include capacity for wet laboratory capabilities, as well instructional space (consistent with campus policies). However, individual buildings will likely have specific programmatic focuses based on the College’s needs at the time, for example a building with intensive laboratory environments, or a building focusing on teaching, learning, and the student experience. Future buildings may also move more towards mixed-used buildings that provide departmental critical mass, but support collaboration and interdisciplinary interaction.

The College operates or occupies facilities that cover a broad range of conditions and ages. The aforementioned space needs, in tandem with upgrades consistent with the University of California



*The West Plaza today*

Seismic Safety Policy, are major drivers for the replacement and renovation of College facilities. The following opportunities would support modernization of existing facilities, with strategic replacement as needed:

- **Adaptable Buildings:** Buildings should be designed with contiguous functional zones to enable repurposing within laboratory, office space and learning spaces. Given the limited amount of development capacity in the College's precinct, unique research and teaching needs require special consideration relative to overall building massing, from low-vibration space in basement levels, to large classrooms with long span structures.
- **Infrastructure renewal:** The College's facilities support a wide range of research and teaching activities that depend on high performance infrastructure. This plan integrates the requirements of the University of California Seismic Safety Policy, adopted in 2017. As renovations occur, infrastructure should be replaced with systems that meet the university's energy efficiency and sustainability goals, and that integrate with campus-wide initiatives to renew campus energy systems.

The biggest challenge to any development scenario within the College's precinct is the need for surge space. All sites are currently occupied; it is not possible to commence any renovation or replacement project without first identifying a location for the displaced programs. This existing condition emphasizes the need to start implementing the master plan by redeveloping sites that could support a significant net gain in capacity. Furthermore, any department or group would ideally be surged only once due to the cost of surging both people and labs, as well as the associated disruption caused by temporary relocation.

### **OBJECTIVE 3 – Activate Outdoor Spaces and Enhance Connectivity**

While the College precinct is an active place, research and learning activities are not always visible or apparent. The 2020 Master Plan imagines improvements to the campus landscape and to College facilities that would put its activity on display, and render buildings and landscape a cohesive, connected whole. The College's precinct is also located in an area that has significant grade change, which can make connectivity a challenging experience. The following opportunities would support enhanced connectivity and activation of indoor and outdoor spaces:

- **Building and Landscape Connectivity:** Projects should leverage the precinct's proximity to the Classical Core, as well as the West Plaza's axial relationship with the Campanile. Signature engineering buildings should be integrated with iconic, active, and vibrant open spaces. The replacement of buildings along the West Plaza and facing onto Memorial Glade offer opportunities to transform the civic potential of the College precinct.
- **Social Networks:** Daylight, views and indoor-outdoor connections are essential human-centered elements that should be used to build community and improve wayfinding. The precinct's open spaces and interior paths would benefit from clear signage, universal access and a diverse range of gathering places.

# 3 PLANNING CONTEXT





This chapter presents planning and programmatic context about the campus, College and buildings that comprise a foundation for the recommendations in the Master Plan Framework. This context combines analytical and physical planning elements with a complementary range of stakeholder outreach, from a College space audit and campus tours, to listening sessions, an online survey, and campus tours. Documented space needs establish planning-level metrics and form the basis for building massing and departmental consolidation concepts, along with growth assumptions provided by the College. These figures are high-level planning estimates that will be revised as individual building projects are programmed and implemented.

This chapter is organized into the following sections:

- 3.1 Space Needs
- 3.2 Department Context
- 3.3 College Survey
- 3.4 Existing Buildings
- 3.5 Related Campus Plans
- 3.6 Site Planning Context

The appendix provides material that elaborates on the findings presented in this chapter.



### 3.1 SPACE NEEDS

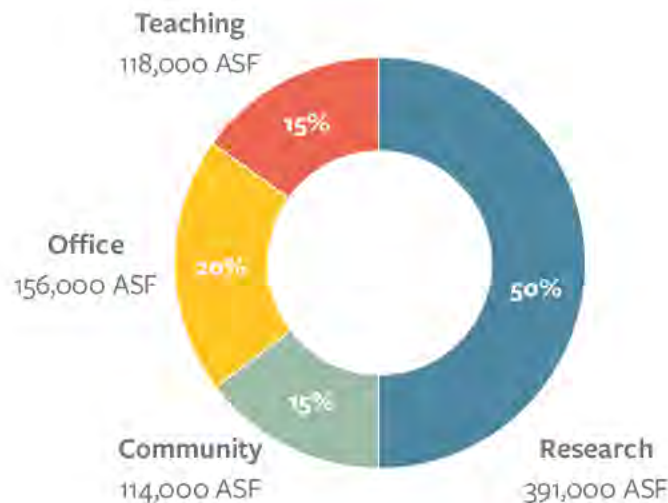
#### Existing Space Summary

The College currently occupies 15 buildings in and around the Campus Park, and an additional 77 buildings at Richmond Field Station. Those buildings house over one million assignable square feet (ASF) of College program. Based on the analyses conducted during this study, the 2020 Master Plan focuses on seven “focus buildings,” due to their suitability for long term use as learning and research facilities. These focus buildings represent approximately 443,00 ASF of the College’s total space portfolio. An additional 75,500 rentable square feet (RSF) of College program is housed in leased space in the City of Berkeley.

The figures below summarize basic information about the focus buildings; they are approximate and used for planning purposes:

|                        | Year Built | Gross SF | Assignable SF |
|------------------------|------------|----------|---------------|
| <b>Bechtel</b>         | 1980       | 49,490   | 35,000        |
| <b>Cory Hall</b>       | 1950       | 206,102  | 120,000       |
| <b>Davis Hall</b>      | 1968       | 140,000  | 88,000        |
| <b>Etcheverry Hall</b> | 1964       | 179,722  | 110,000       |
| <b>Hesse Hall</b>      | 1924       | 41,444   | 30,000        |
| <b>McLaughlin Hall</b> | 1931       | 49,388   | 32,000        |
| <b>O’Brien Hall</b>    | 1959       | 41,822   | 28,000        |

Source: UC Berkeley Space Inventory, 2019 (GSF); College of Engineering Space Audit, 2019 (ASF)



#### Summary of Space Needs

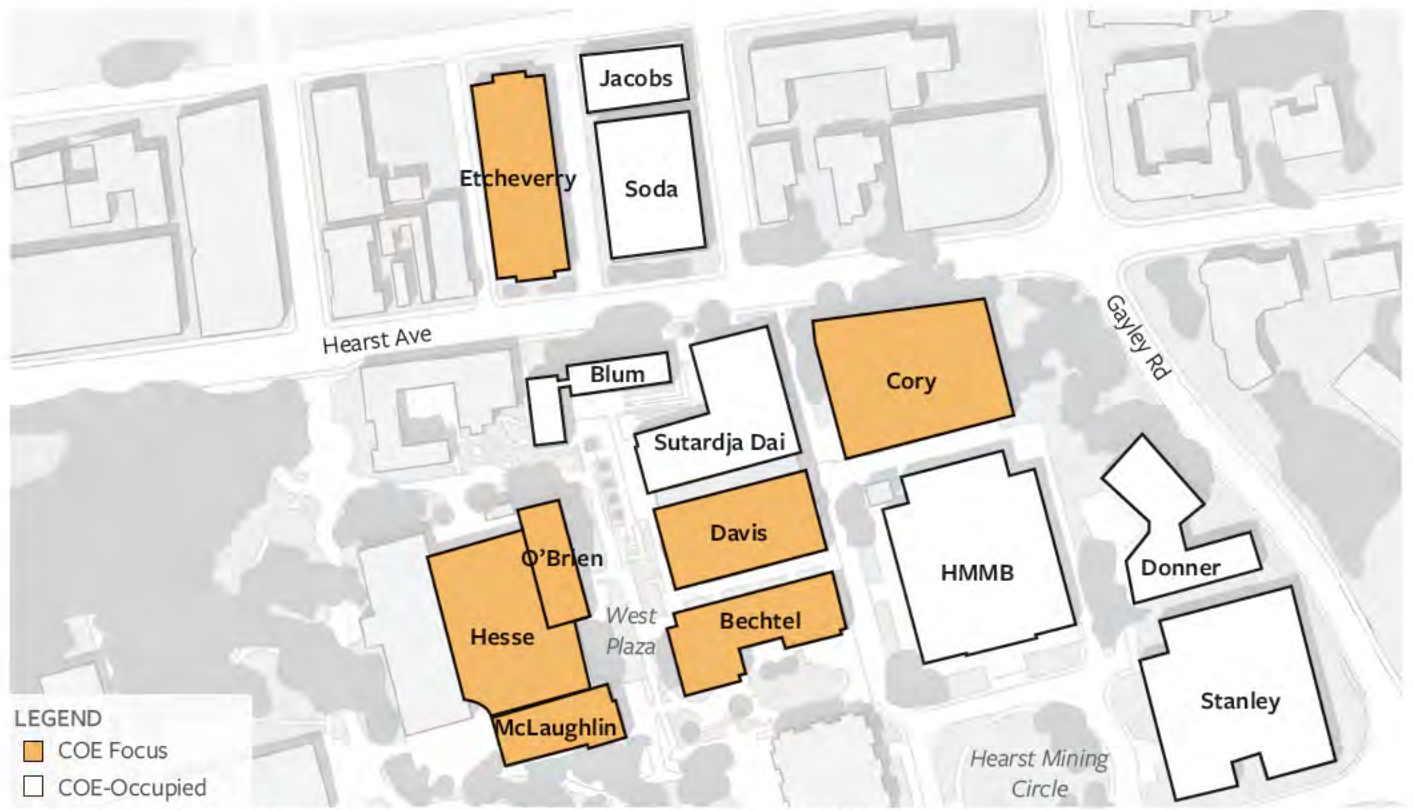
The space needs assessment provides a quantitative, planning-level program that guides the 2020 Master Plan. The following table summarizes the findings of the assessment, comprising a 20% increase in research space, 13% increase in community space, and 18% increase in instructional space. Overall, this represents an increase in the proportion of research space, relative to the total portfolio, and a decrease in the proportion of office space.

Additional programming will be conducted for individual projects as they are implemented, and can incorporate any changes that have occurred over time relative to the College’s needs, as well as pedagogical changes and emerging trends..

| Space Type          | Existing ASF   | Future Need (ASF)          |
|---------------------|----------------|----------------------------|
| Research Space      | 391,000        | + 70,000 - 80,000          |
| Instructional Space | 118,000        | + 10,000 - 15,000          |
| Office Space        | 156,000        | 0                          |
| Community Space     | 114,000        | + 20,000                   |
| <b>TOTAL</b>        | <b>779,000</b> | <b>+ 100,000 - 115,000</b> |

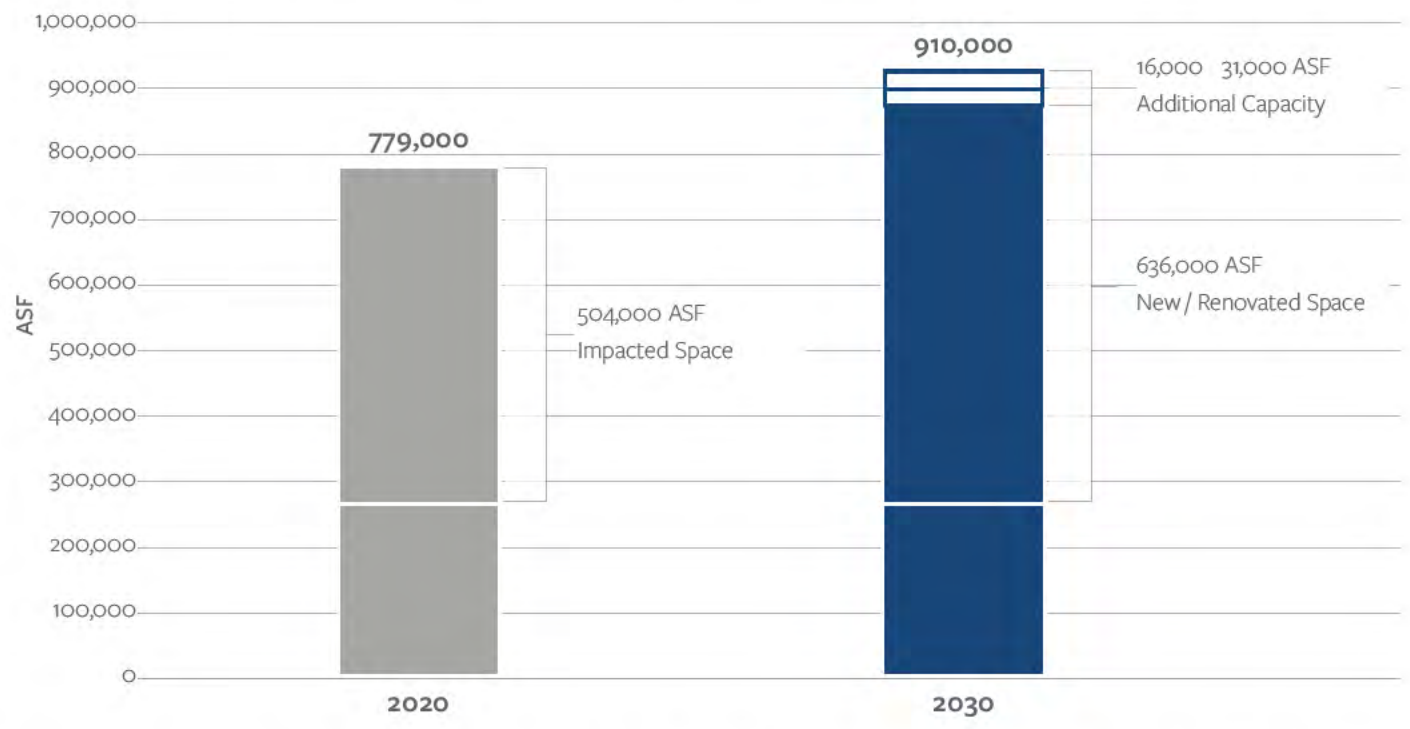
The quantitative space needs assessment does not account for qualitative space needs, e.g. configuration of space, deferred maintenance, structural considerations. The 2020 Master Plan incorporates these needs through a combination of renovation and replacement projects. As existing spaces are renovated, comprehensive qualitative improvements should be considered.

Space needs are summarized in the following pages for each major space type, including the assumptions and metrics used to build the quantitative needs, as well as specific programmatic needs. Additional qualitative considerations at the building scale are identified in Section 3.4, Existing Buildings.



**LEGEND**  
■ COE Focus  
 COE-Occupied

Buildings that are either fully occupied or partially occupied by the College of Engineering



Existing College space portfolio and growth projections; Note that "New/Renovated Space" includes potential space at the Tolman Site.

### 3.1.1 RESEARCH SPACE

Research space occupies half of the College’s space portfolio, and comprises computational and experimental research space, shop and support space. This portfolio supports 227 tenure-track faculty and \$185.5 million in annual research funding. Ninety percent of research occurs in six buildings: Cory, Davis, Etcheverry, Hearst Mining, Stanley and Sutardja Dai Halls. Forty-five percent of the College’s research portfolio in the precinct is located in focus buildings, highlighting research needs as a major driver of the 2020 Master Plan.

Research space includes faculty labs, as well as shops and core facilities including the Davis Hall high bay facility, Cory Hall machine shop, and Sutardja Dai Hall nanofabrication facility. A significant amount of space primarily dedicated to centers and institutes is leased off campus. Research space needs were analyzed based on a series of assumptions and space metrics:

#### Assumptions & Metrics

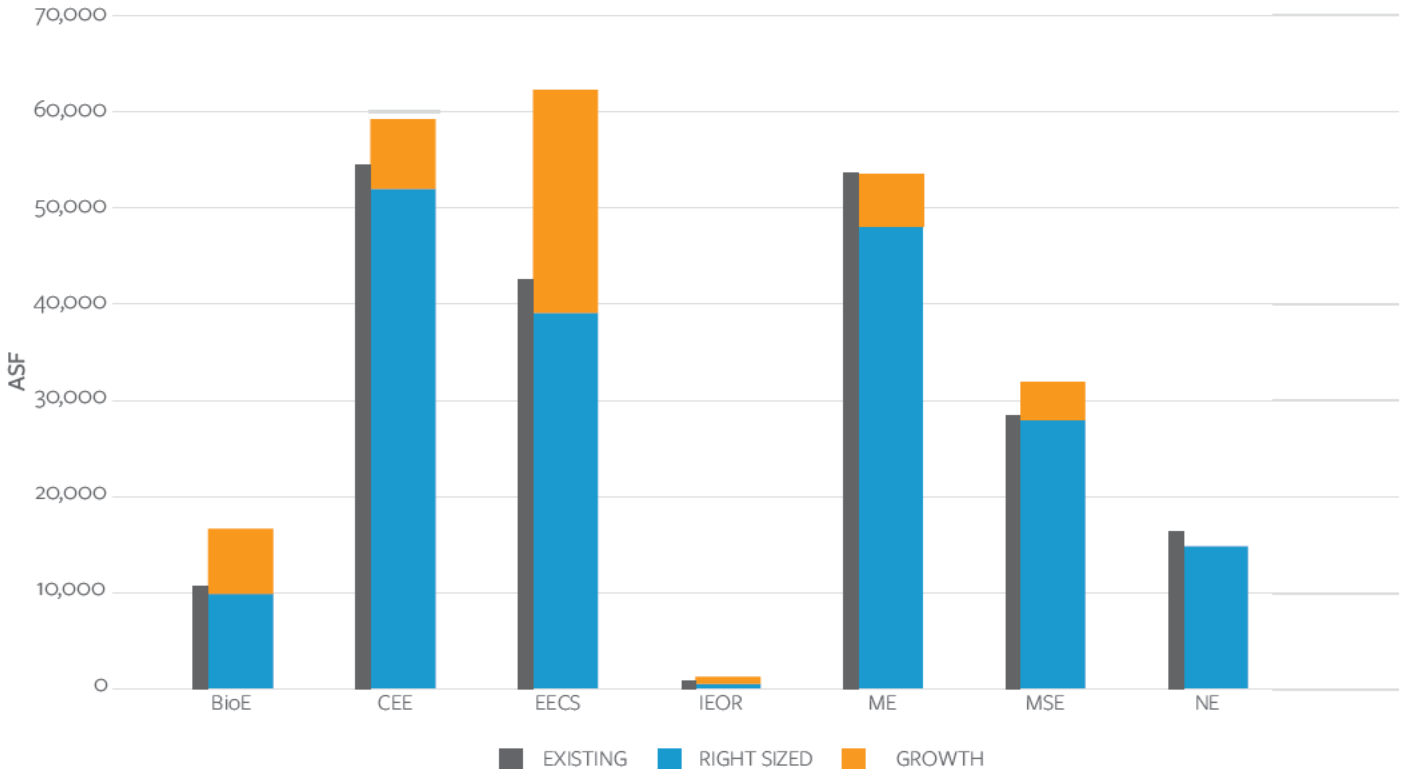
- 25 faculty full time equivalent (FTE) growth across all departments

- Interdisciplinary research space for equivalent of 8.5 research groups
- 10% improvement in space usage efficiency as a result of renovation or relocation

#### Programmatic Needs

- Faculty listening sessions surfaced a need for each department to have a critical mass of department-focused space, in order to build community within departments. Existing department space allocations have become fragmented over time.
- Co-location would support many potential synergies between the College and other campus departments, and serve the College’s mission and the university’s Signature Initiatives.
- Space for high-resolution transmission electron microscopy (TEM) and scanning electron microscopy (SEM) imaging systems is needed and cannot be accommodated in existing facilities, as the College does not have space that is shielded from EMF pulses and resulting ground vibrations from BART trains. This space needs to be purposely designed for low vibration tolerances.
- A nanofabrication facility with Class 10,000 cleanroom space, and the potential for a Class 1,000 cleanroom space

RESEARCH SPACE NEEDS BY DEPARTMENT



COE Research by Department

within, would complement the existing cleanroom facility in Sutardja Dai Hall. It would consolidate and replace the physical electronics research cleanroom spaces presently located in Cory Hall. This facility would require low vibration tolerances.

- Consolidation of machine shop spaces and replacement of aging machine equipment to enhance support for state-of-the-art research instrumentation and facilities, potentially in Davis.

### Research Space Needs Summary

The 2020 Master Plan identifies a total research space need of between 70,000 ASF and 80,000 ASF, in three major categories:

- New Hire Research Growth – 46,500 ASF
- Core Facilities Growth – 9,000 ASF
- Research Collaboration Space – 17,000 ASF

The 2020 Master Plan also envisions the physical and operational consolidation of the College’s machine shops as a core facility, in order to improve functional efficiency and space utilization. Existing machine shops support research, service to industry, and student clubs and projects. Qualitative improvements should be considered for existing research space as renovations occur.

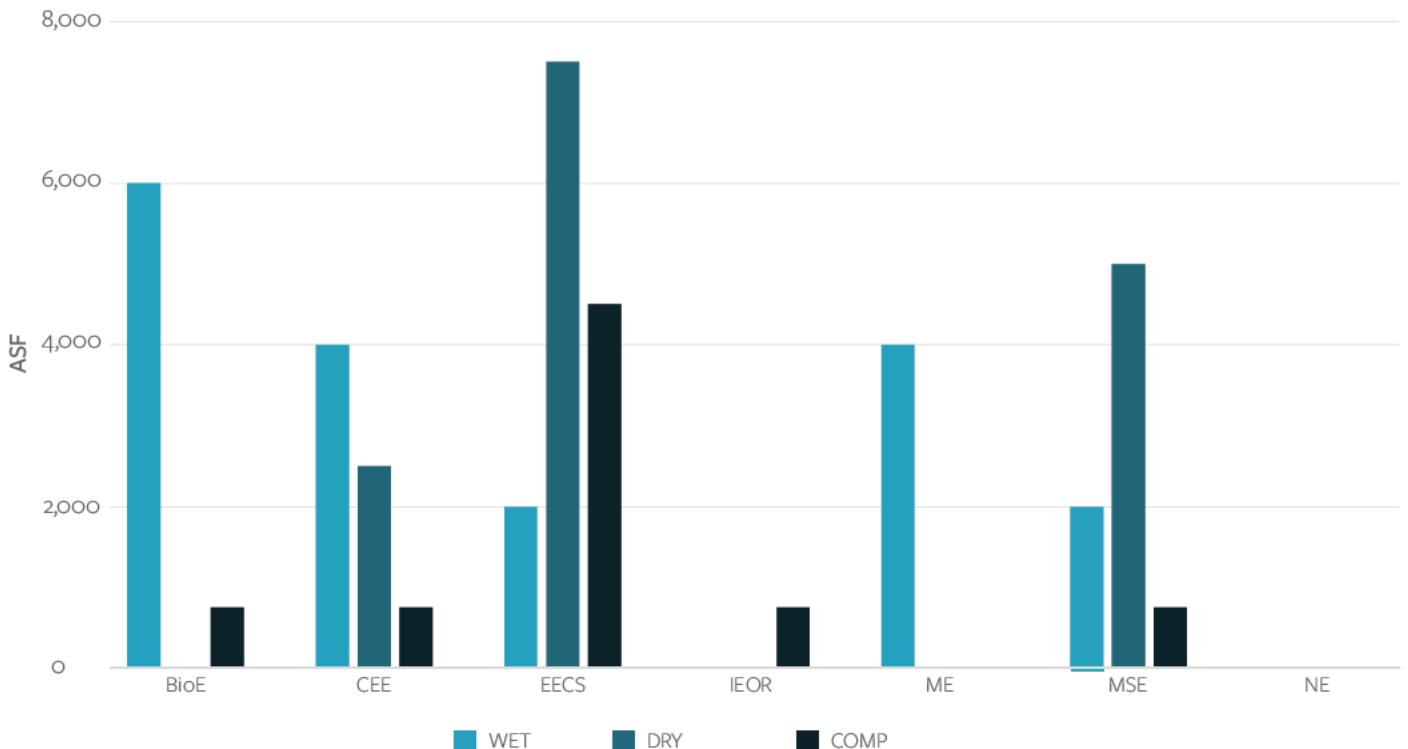
### COE Research Lab Space Metrics

| WET LAB                | Quantity | ASF Allowed | Total ASF    |
|------------------------|----------|-------------|--------------|
| Faculty                |          | 150         | 150          |
| Staff/Admin            |          | 1           | 1            |
| Students               | 10       | 60          | 600          |
| Lab Space              | 1        | 1000        | 1000         |
| Shared Equipment       | 1        | 400         | 400          |
| ASF per Researcher     |          |             | 200          |
| <b>Total Group ASF</b> |          |             | <b>2,450</b> |
| DRY LAB                | Quantity | ASF Allowed | Total ASF    |
| Faculty                |          | 5           | 5            |
| Staff/Admin            | 1        | 100         | 1            |
| Students               | 12       | 6           | 720          |
| Lab Space              |          | 1200        | 1200         |
| Shared Equipment       | 1        | 250         | 200          |
| ASF per Researcher     |          |             | 177          |
| <b>Total Group ASF</b> |          |             | <b>2,370</b> |
| COMPUTATIONAL LAB      | Quantity | ASF Allowed | Total ASF    |
| Faculty                | 1        | 150         | 150          |
| Staff/Admin            | 1        | 100         | 100          |
| Students               | 14       | 60          | 840          |
| Shared Equipment       | 1        | 150         | 150          |
| ASF per Researcher     |          |             | 71           |
| <b>Total Group ASF</b> |          |             | <b>1,240</b> |

#### Space Assumptions:

|                   |  |
|-------------------|--|
| Faculty           | One Faculty Office                               |
| Students          | Individual cubicle or work stations              |
| Staff/Admin       | ERSO staff cubicle & copy area                   |
| Shared Conference | Access to shared conference room in the building |
| Shared Equipment  | Access to shared equipment room in the building  |

### LAB SPACE GROWTH NEEDS BY DEPARTMENT AND LAB TYPE



Lab space needs. Lab space needs exclude associated office space.

### 3.1.2 OFFICE SPACE

Office space is a key supporting component of any space portfolio, although the need for private offices is decreasing as demand for collaboration space rises. The College has 156,000 ASF of office space, including faculty and staff offices as well as office support spaces, but excluding conference rooms. This represents 30% of the College’s total space portfolio. Office space need is calculated based on a series of assumptions and space metrics, primarily based on university space guidelines:

#### Assumptions & Metrics

- Office space is allocated to College of Engineering affiliates
- Regular faculty members are allocated one private office, regardless of tenure
- Emeritus faculty are allocated private or shared office spaces based on their level of research and teaching activity
- Staff office spaces are allocated based on job titles and programmatic needs for privacy (e.g. confidential conversations)
- Graduate student offices are accounted for in research space needs
- New construction will utilize the space metrics listed below, while existing office space will be right-sized incrementally through renovation, also using those space metrics, not to exceed the ranges noted in the table below

#### Programmatic Needs

The 2020 Master Plan anticipates no major office space needs, other than the space resulting from the growth assumption of 25 tenure track faculty. Office space for staff and faculty will need to be assessed and programmed as individual projects occur.

#### Office Space Needs Summary

If the College were able to right-size office space, it could reduce office space by approximately 30,000 ASF, to 125,000 ASF. Office sizes typically reflect a range of office sizes that have occurred over time; more recently built offices tend to be smaller than those that were built more than ten years ago. For example, the typical office size in Hearst Mining Memorial Building is 350 ASF, a legacy of the building’s design in 1907. In contrast, offices in Sutardja Dai Hall, built in 2009, generally average 135-140 ASF per office.

As older buildings are renovated, office spaces can generally be designed more efficiently, but such right-sizing occurs incrementally. When existing office space is compared using station counts and faculty and staff headcount, the College has a sufficient number of offices to accommodate the current population, but will need additional space to accommodate future growth assumptions. As renovations occur, qualitative improvements should be considered for existing space.

| OFFICE SPACE METRICS         |                    |  |
|------------------------------|--------------------|--|
| Office Type                  | Space Metric (ASF) | Notes  |
| Dean                         | 240                | Private office   |
| Department Chair             | 160                | Private office   |
| Faculty                      | 125 140            | Private office   |
| Emeritus Faculty (active)    | 100                | Private office   |
| Emeritus Faculty (inactive)  | 48                 | Shared office  |
| Staff                        | 80 110             | Blended average of campus guidelines, assuming 35% private offices, 65% workstations |
| Student Staff                | 36                 | Non research student staff   |
| Copy/Mail Room               | 120                | Allocation per department, per building  |
| Departmental Storage         | 8.5                | ASF per faculty/staff  |
| Lobby/Reception (Dean)       | 250                | In addition to office space allocation   |
| Lobby/Reception (Department) | 175                | In addition to office space allocation   |

### 3.1.3 INSTRUCTIONAL SPACE

The College has 118,000 ASF of instructional space, including the following types of learning environments:

- Classrooms (46,000 ASF)
- Teaching Labs (33,000 ASF)
- Computer Labs (27,000 ASF)
- Machine Shops (7,000 ASF)
- Maker Space (5,000 ASF)

This allocation represents 15% of the College's total space portfolio, a typical proportion for a university space portfolio.

Classrooms include departmentally-controlled classrooms as well as university-controlled General Assignment (GA) classrooms, and classrooms dedicated to specific centers and institutes (e.g. CITRIS, Fung Institute). The College has 19 departmental classrooms and nine teaching labs, and houses 17 GA classrooms within its buildings. This combined instructional portfolio accommodated 274 courses, 764 sections, and 83,086 weekly student contact hours in Fall 2018. The majority of the College's courses are taught in classrooms that are located in the College's buildings; of the balance, most are taught in proximity to the College. Nearly all classes taught in GA classrooms in the College's buildings are the College's courses.

The College has three primary student-supporting machine shops: the Materials Science and Engineering Shop in Hearst Mining Memorial Building, and the Mechanical Engineering Student Machine Shops in Hesse and Etcheverry Halls. The Materials Science and Engineering Shop supports the adjacent teaching lab, providing samples and lab preparation for 300 to 700 students each year. The Mechanical Engineering Student Machine Shop is located in Hesse and Etcheverry Halls. Its primary mission is to provide a hands-on learning experience for undergraduate students; proximity to the associated teaching labs is important for the shop. Utilization data indicates that students badge in 7,000 times per year. The shop trains 300-400 students per year, and provides design reviews for student projects. The shop also supports student clubs.

Davis Hall provides additional shop space that includes a high bay facility. This two-story, ground floor facility supports large scale fabrication and material testing.



*Civil & Environmental Engineering classroom in Davis Hall*



*Mechanical Engineering teaching lab in Hesse Hall*



*Mechanical Engineering student machine shop in Etcheverry Hall*

The Jacobs Institute houses the College's primary makerspace. Through the Maker Pass system, any university affiliate can gain access to the makerspace (as well as to the CITRIS Invention Lab in Sutardja Dai). The facility serves approximately 1,400 students per semester, of which half are from the College. The facility's popularity has highlighted the demand for additional maker space and also for storage space for projects in progress.

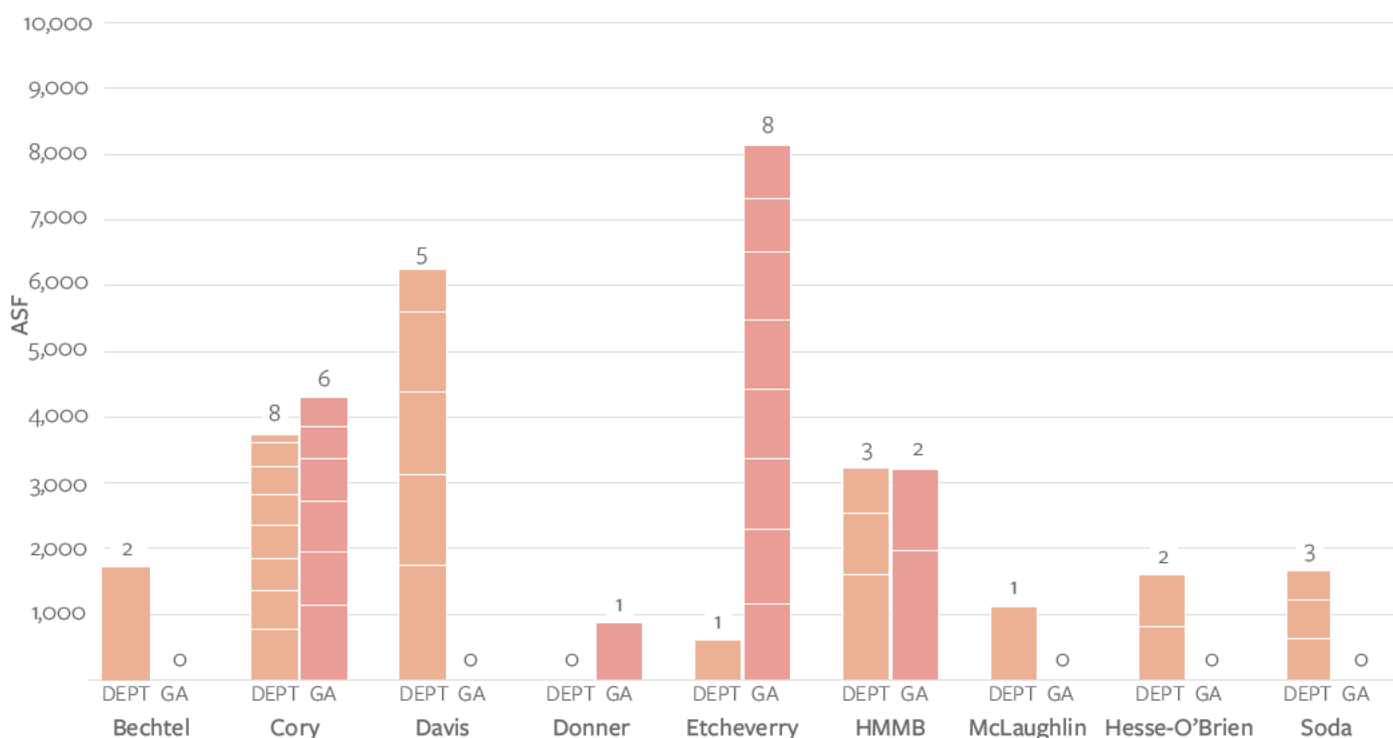
Instructional space need was calculated based on a series of assumptions and space metrics:

**Assumptions & Metrics**

- A right-sizing analysis was used to determine current demand for classrooms and for teaching labs, using actual section sizes and weekly student contact hours (WSCH) from the Fall 2018 class schedule to assess current demand for classrooms of different sizes. The right-sizing analysis made the following assumptions:
  - Current enrollment patterns are typical on average, and will continue
  - Typical hours of instruction are Monday through Friday, 8:00 a.m. – 5:00 p.m.

- Independent study, online, and fieldwork course components do not require instructional space
- Excludes rooms dedicated to and controlled by specific centers and institutes (e.g. CITRIS, Jacobs Institute, Fung Institute)
- Daytime weekly target utilization is 70% for classrooms and 50% for teaching labs
- GA and departmental classrooms should be right-sized separately, as they are currently scheduled separately
- Departmental classrooms are used for other functions and needs, when not in use for classes
- Departmental classrooms are not currently shared between departments, but future departmental classrooms would be centralized under the Dean
- Each new building should include classroom space
- Open labs were estimated using the following assumptions:
  - Computer Labs: 2 ASF per student
  - Maker Space: 2.25 ASF per student
  - Student Shops: 2 ASF per student

CLASSROOMS IN COE BUILDINGS (2019)



Classrooms are counted and quantified in ASF by building



### Programmatic Needs

- Each new building should include classroom space
- Fume hood capabilities are needed for the Materials Science and Engineering Shop, to support sample production for teaching labs
- Provision of graduate student maker space would help balance overall demand for maker space
- Student-supporting machine shops need to be in proximity to associated instructional spaces
- Office hours do not require dedicated space and can occur in a range of spaces (classrooms, lounges, cafes, etc), but adequate space is needed to accommodate them

### Instructional Space Needs Summary

The 2020 Master Plan identifies a need for approximately 12,000 ASF of additional instructional space. A range of 10,000-15,000 ASF is used for planning purposes, as the College's needs may change over time.

This total includes right-sizing existing GA and departmental classrooms as well as allowing for future growth, for a total need of 10,000 ASF of classroom space. New classrooms should be flexible and support active learning to the extent possible. The classroom right-sizing analysis indicated that there is significant demand for smaller classrooms (1-25 seats). Discussions with department chairs also identified a need for larger classrooms of 100-125 seats. The College could test the need for both classroom sizes as it implements projects by increasing the number of each

classroom size incrementally and assessing the utilization of new classrooms, then making adjustments to the future classroom program as needed.

Departmental classrooms are currently utilized for academically related activities outside of scheduled courses, including qualifying exams, dissertations, office hours, meetings, and student clubs. Some of this utilization is desirable, as it increases utilization of existing space. However, some of the current use is due to shortages in other space categories (e.g. meeting rooms, student clubs). As those shortages are resolved, departmental classroom utilization could increase.

For teaching labs, 2,000 ASF of net new space is needed, including two teaching labs with 50 stations each. However, as new buildings are implemented, teaching labs should be programmed based on the given department's specific instructional needs, which vary significantly. Qualitative conditions in existing teaching labs should also be considered, and the College could explore models for interdisciplinary, flexible teaching labs to replace existing spaces.

Total existing open lab space is sufficient, but could be rebalanced more towards maker space and student shops, in support of the College's mission and vision. In particular, a graduate student makerspace should be considered as proposed projects are implemented. Flexibility in open lab space, to the extent possible, would help the College adapt as needs change over time. As renovations occur, qualitative improvements to existing classroom spaces should be considered.



Machine shop in Cory Hall



Material testing in Hearst Mining Memorial Building

### 3.1.4 COMMUNITY SPACE

The College has 114,000 ASF of community space, including:

- Conference rooms (43,500 ASF)
- Assembly and exhibition space (9,000 ASF)
- Library and study space (24,500 ASF)
- Lounge space (25,500 ASF)
- Student club space (5,000 ASF), excluding space at RFS
- Dining space (6,500 ASF)

This allocation represents 22% of the College's total portfolio. Community space is a key component of the master plan vision, and is a space type for which the campus has significant demand.

#### Assumptions & Metrics

- Conference rooms: 3 hours per week per faculty or staff head member, converted to ASF using the following metrics:
  - One conference room per 20 hours of weekly use
  - 400 ASF per room (average metric reflecting a range of small, medium, and large rooms)
- Library and study space: 30 ASF per student, assuming 15% of undergraduate and 20% of graduate students using the space at any given time
- Library service and processing space: 10% of library and study space ASF
- Lounge space: 3 ASF per student
- Student club space, including:
  - Shared office space: 60 ASF per club
  - Shared work space: 400 ASF per 15 clubs
  - Large meeting space: 600 ASF for all clubs (flexible space that could be available for other student needs)
  - Storage: 50 ASF per club

#### Specific Programmatic Needs

- Each College building should have student space, ideally on the ground floor to maximize visibility and activate the public realm
- Lounge and study space can be located either in structured spaces or in informal “soft” spaces
  - Study space is assumed to be a College resource, while lounge space could be a departmental or College resource
  - Flexible furniture in study and lounge spaces as well as student club spaces, with adequate outlets and wifi



Yali's Cafe on the West Plaza



V&A Café in Etcheverry Hall



Community space in Sutardja Dai Hall

- Additional stack space in Kresge Engineering Library should be converted to group and individual study space
- Group study spaces in the Engineering Library could be put on a reservation system to improve ease of use
- Student club space should have good visibility so students are aware of it, and to allow clubs to display their work
  - Shared work space on campus for student clubs that primarily use facilities at RFS would allow them to more effectively balance their time between campus and RFS
- While no additional dining space is needed, qualitative improvements may be needed
- The Fung Institute identified a need for a 500-seat event space, which should be created as a College-wide amenity and configured either as an auditorium or as a flexible lobby or atrium space, with adjacent support space

### Community Space Needs Summary

The 2020 Master Plan identifies a need for 20,000 ASF of community space. Community space is a critical need, not only within the College but throughout the campus. Although the College has repurposed a significant amount of its existing space for group study rooms and open study areas over the years, this space is well-utilized and students would like more of it.

The College's student clubs typically do not have dedicated space unless they are working on a major project that requires it (e.g. Concrete Canoe, Steel Bridge). The 2020 Master Plan includes shared collaboration and support spaces for student clubs.

Conference rooms should be considered as proposed projects are implemented, in order to identify specific room sizes that are needed. Right-sizing the classroom inventory would likely reduce use of conference rooms for academic courses.

The identified community space needs also include a multi-purpose, flexible event space that would be a College resource. This space could accommodate the Fung Institute cohort, as well as departmental and College events and programming. Use by academic courses could also be considered.

As renovations occur, qualitative improvements may be made to existing facilities. For example, food service at Bechtel Terrace can be enhanced by improving the point of sale and food preparation area, as well as renewing and densifying the seating areas.



*Engineering Student Services at Bechtel Engineering Center*



*Student club space at Bechtel Engineering Center*



*Study space in Kresge Engineering Library in Bechtel*

### 3.1.5 FUNG INSTITUTE

The Fung Institute provided a recommended space program that would replace its existing space on campus as well as its off campus facilities in Shires Hall, and accommodate the program’s anticipated growth. The program would increase the Fung Institute’s total space portfolio by 10,000 ASF. It accommodates the unique needs of the program, including student collaboration space, and a mix of case study and flexible, collaborative teaching spaces. The program assumes that the a 500-seat event space would be a shared College resource available to the Fung Institute.

#### Specific Programmatic Needs

- Four 60-seat case study classrooms with tiered seating
- Five 30-seat flexible project teaching labs
- Four 45-seat flexible design/collaboration lecture classrooms
- Staff offices, meeting room, and support spaces
- Student office area, with an open plan and hoteling space
- Student lounge and meeting room

To accommodate its program needs in the near to medium term, the Fung Institute has leased additional space in Mudd Hall, adjacent to its current facility. This additional space comprises 12,176 rentable square feet.

### 3.1.6 OFF-SITE PROGRAM SPACE

The College also has a significant amount of leased space, located off campus. Leased space is measured in rentable square feet, including gross square footage at the office suite level, but not including overall building gross square footage outside the office suite. The following table summarizes the College’s leased space:

| Location and Users                                     | Rentable Sq Ft |
|--|----------------|
| <b>2108 Allston Way</b>                                |                |
| – Berkeley Wireless Research Center                    | 12,000         |
| <b>Berkeley Way West</b>                               |                |
| – Berkeley Artificial Intelligence Research Lab (BAIR) | 27,000         |
| <b>2150 Shattuck Avenue</b>                            |                |
| – Tsinghua Berkeley Shenzhen Institute                 |                |
| – Global Learning & Outreach from Berkeley Engineering | 11,000         |
| – Nuclear Science and Security Consortium              |                |
| <b>Shires Hall</b>                                     |                |
| – Fung Institute                                       | 10,500         |
| <b>Mudd Hall</b>                                       |                |
| – Fung Institute                                       | 12,000         |
| <b>Memorial Stadium</b>                                |                |
| – Sutardja Center for Entrepreneurship & Technology    | 3,000          |
| <b>TOTAL</b>   | <b>75,500</b>  |

In addition to leased space, the College also occupies more than 35,000 ASF of space outside its precinct, in Calvin Lab, Donner Lab, Innovative Genomics Institute Building, the Li Ka Shing Center, and Stanley Hall.

#### Consolidation and Growth

Some programs, such as BAIR and the Fung Institute, are located off campus due to space constraints on campus and should move back when possible. Other programs, such as the space located in Energy Biosciences Building, are located off campus due to specific research facility needs. While there may always be some need for leased space, especially to accommodate unforeseen needs, the 2020 Master Plan anticipates the consolidation of leased space back to campus in the long term.

### 3.2 DEPARTMENT CONTEXT

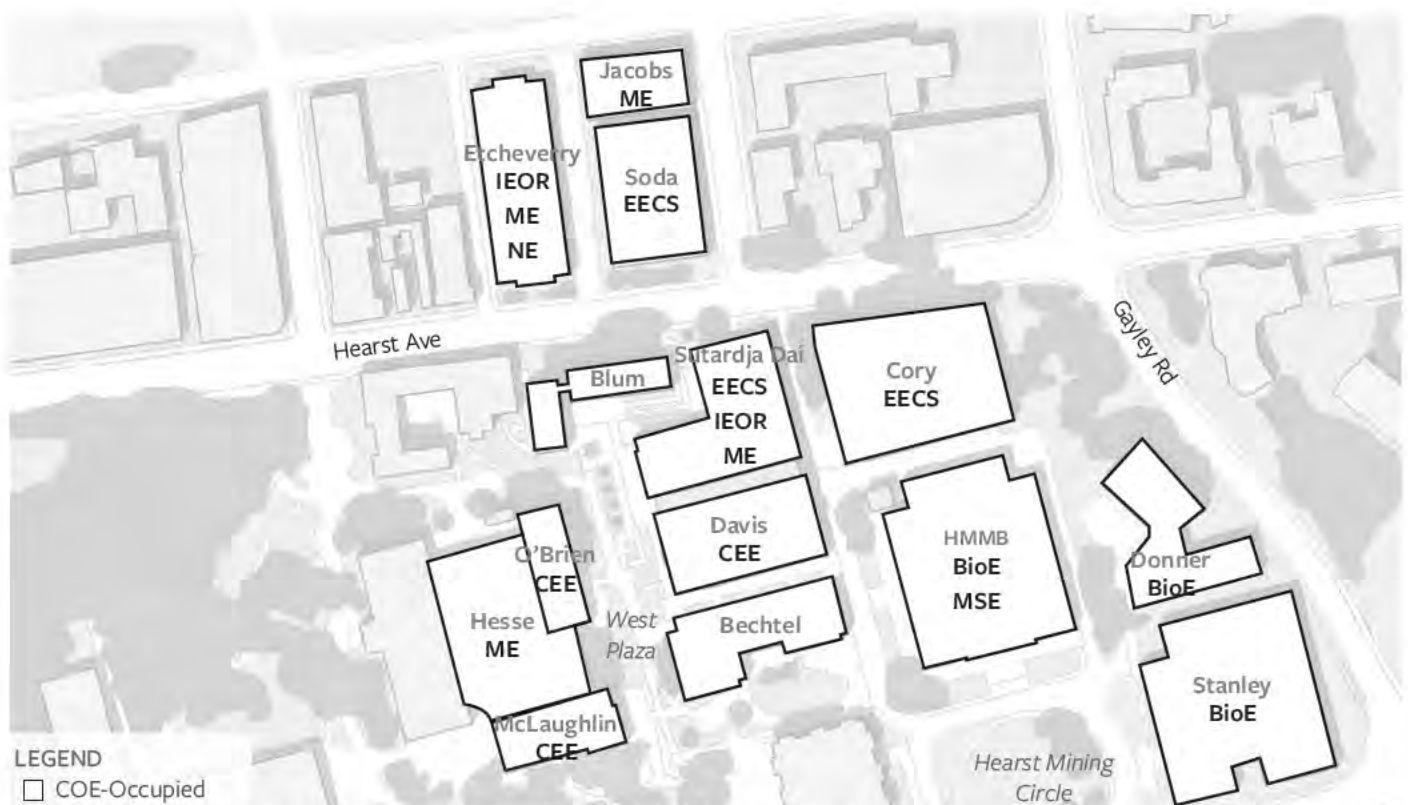
The College comprises seven academic departments:

- Bioengineering (BioE)
- Civil & Environmental Engineering (CEE)
- Electrical Engineering & Computer Science (EECS)
- Industrial Engineering & Operations Research (IEOR)
- Materials Science & Engineering (MSE)
- Mechanical Engineering (ME)
- Nuclear Engineering (NE)

Over time, departments have become fragmented as they have grown, due to the availability of space. In some cases, departmental fragmentation has decreased space efficiency. The diagram below shows the distribution of departments between buildings that the College occupies. A summary of each department is provided in this section.

| Department                                   | Current ASF | Faculty & Students  |
|--|-------------|---|
| Bioengineering                               | 28,500      | <ul style="list-style-type: none"> <li>• 20 faculty</li> <li>• 414 UG, 250 G</li> </ul>   |
| Civil & Environmental Engineering            | 113,100     | <ul style="list-style-type: none"> <li>• 36 faculty</li> <li>• 375 UG, 431 G</li> </ul>   |
| Electrical Engineering & Computer Science    | 168,500     | <ul style="list-style-type: none"> <li>• 94 faculty</li> <li>• 1,630 UG, 763 G</li> </ul> |
| Industrial Engineering & Operations Research | 8,800       | <ul style="list-style-type: none"> <li>• 15 faculty</li> <li>• 204 UG, 221 G</li> </ul>   |
| Materials Science & Engineering              | 55,500      | <ul style="list-style-type: none"> <li>• 14 faculty</li> <li>• 144 UG, 173 G</li> </ul>   |
| Mechanical Engineering                       | 96,400      | <ul style="list-style-type: none"> <li>• 41 faculty</li> <li>• 672 UG, 363 G</li> </ul>   |
| Nuclear Engineering                          | 25,100      | <ul style="list-style-type: none"> <li>• 9 faculty</li> <li>• 65 UG, 97 G</li> </ul>      |

*Number of faculty is full time equivalent. Data is from 2019.  
UG: Undergraduate G: Graduate*



LEGEND  
 COE-Occupied

COE department locations; Identified buildings are either fully occupied or partially occupied by the College of Engineering

### **Bioengineering (BioE)**

Bioengineering has faculty located across five buildings: Hearst Mining, Donner Lab, Stanley, Energy Biosciences, and Li Ka Shing. The department is growing quickly, and has a joint program with UCSF. Enrollment in the department has grown at an average annual rate of 4.3% over the past ten years.

The department lacks a dedicated, identifiable home due to its multiple locations, which impacts recruitment and retention. However, the quality of lab space is the department's top priority. Consolidation of faculty should be strategic and should be prioritized according to improvement of lab facilities.

### **Civil & Environmental Engineering (CEE)**

Civil & Environmental Engineering has faculty located in three buildings: Davis, McLaughlin, and O'Brien Halls. Enrollment in the department has grown at an average annual rate of 1.3% over the past ten years.

CEE faculty pursue research across a diverse spectrum of topics, requiring a similarly heterogeneous collection of research spaces. The high bay facility in Davis, which accommodates long and short term testing, is a unique space that would be expensive to replace, and is a critical resource for the structural program. The department's space utilization is currently inefficient due to its multiple locations and lack of intentionally configured space. Consolidation would support collaboration and potential resource sharing within the department, and could be organized based on infrastructure needs and functional attributes.

### **Electrical Engineering & Computer Science (EECS)**

Electrical Engineering & Computer Science has faculty in three buildings: Cory, Soda, and Sutardja Dai Halls. It also has leased space in Berkeley Way West for the BAIR lab. Enrollment in the department has grown at an average annual rate of 2.2% over the past ten years.

Faculty feel strongly about physical departmental unity and the desire to enhance collaborations with other departments. One of the department's primary labs, the Berkeley Artificial Intelligence Research Lab (BAIR), is moving to leased space at Berkeley Way West, due to lack of space on campus. The department routinely teaches very large classes that are scheduled by the Office of the Registrar and are difficult to accommodate on campus. The

department also needs more space to accommodate office hours. Some EECS faculty are likely to be relocated to a new building currently being programmed for the Division of Computing, Data Science, and Society on the site of the former Tolman Hall.

### **Industrial Engineering & Operations Research (IEOR)**

Industrial Engineering & Operations Research has faculty in two buildings: Etcheverry and Sutardja Dai Halls. Enrollment in the department has grown at an average annual rate of 3.8% over the past ten years. Graduate enrollment growth has generally exceeded undergraduate enrollment growth.

IEOR research space needs are generally flexible, as they tend to be computational. Office space for faculty and graduate students, particularly the doctoral students, is the department's priority space need.

### **Material Science & Engineering (MSE)**

Materials Science & Engineering has faculty in one building: Hearst Mining Memorial Building. Enrollment in the department has grown at an average annual rate of 2.5% over the past ten years.

Faculty with vibration-sensitive equipment are not currently able to locate this equipment in Hearst Mining, due to the building configuration. Overall, there is a lack of low-vibration research facilities available within the College. Some faculty have joint appointments and space at Lawrence Berkeley National Lab, but would occupy lab space on campus if it were available. The department sees research growth in 'soft' materials and needs a characterization lab, which could be a core facility shared with Bioengineering.

### **Mechanical Engineering (ME)**

Mechanical Engineering has faculty in two buildings: Etcheverry and Hesse Halls. The department also uses space in Jacobs Hall, although the space is not dedicated to the department. Enrollment in the department has grown at an average annual rate of 1.3% over the past ten years.

Research growth, notably in autonomous systems and robotics, is generating a need for modernized lab space. Most of the department's instructional labs are located in Hesse, and are in need of modernization. ME students also spend significant time in the student machine shop in Etcheverry.

### Nuclear Engineering (NE)

Nuclear Engineering has faculty in one building, Etcheverry Hall. Enrollment in the department has grown at an average annual rate of 5% over the past ten years.

Departmental priorities include office space for faculty, which is in short supply in Etcheverry, as well as graduate office and community space. The department has a significant amount of lab space, including a high bay nucleonics lab in the lower level of Etcheverry. This space would ideally be reconfigured to accommodate smaller, flexible lab spaces, while maintaining some of the high bay space.

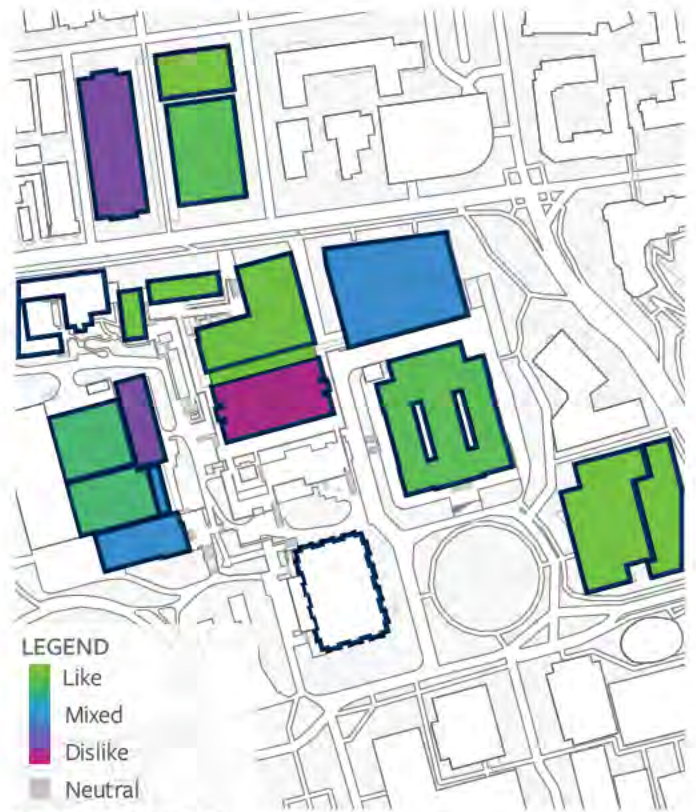
### Engineering Research Support Organization (ERSO)

ERSO staff provide administrative research support and are embedded within departments, an organizational model that works well. However, office space varies widely based on building conditions and should be more consistent. Conference and collaboration space is also needed. Some staff are located off campus at the university's 4th Street facility, and would ideally be relocated to campus.

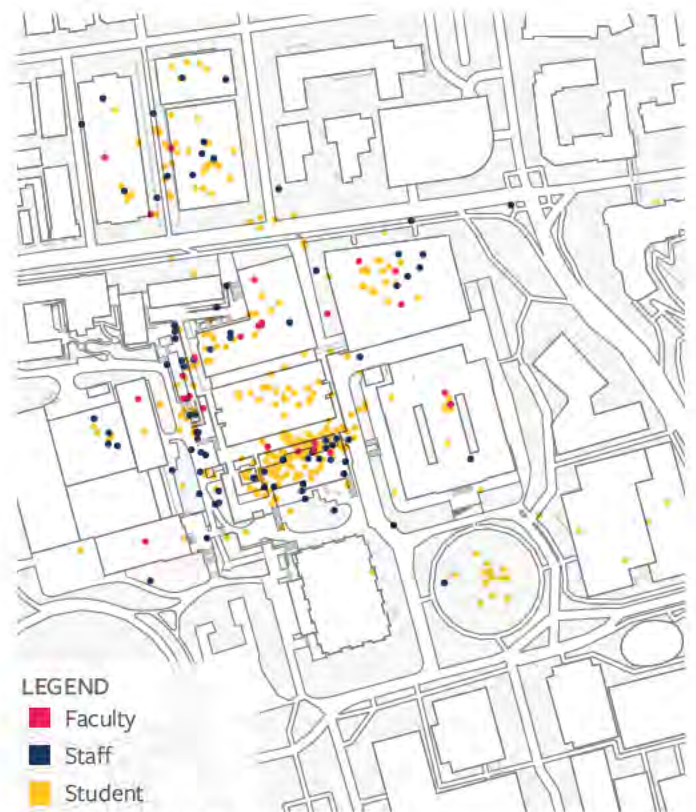
## 3.3 COLLEGE SURVEY

As part of the analyses conducted for the 2020 Master Plan, a map-based online survey was distributed to College faculty, staff, and students. The goal of the survey was to provide the College community with an opportunity to describe their respective experiences in College facilities. Ultimately, the survey findings informed the 2020 Master Plan's recommendations for creating collaborative, transparent space throughout the College to support research, learning, and community.

Survey results pertaining to building impressions and the Heart of Engineering were particularly formative on these recommendations. They indicated preferences for buildings that provided natural light and reliable infrastructure, as well as indicating the needs of creating a network of core facilities. Mixed feedback about the Heart of Engineering, which generally pointed to Bechtel and West Plaza, indicated the importance of creating a true heart for the College precinct. "It's where all the resources are and where my friends are," one stakeholder said about Bechtel. Other stakeholders challenged this perspective. "I've never thought of engineering as having a social heart. Something to work on," one said.



Building impressions



Heart of Engineering

### 3.4 EXISTING BUILDINGS

This section summarizes the existing conditions for nine College of Engineering buildings, omitting newer buildings such as Blum and Sutardja Dai Halls, whose deferred maintenance needs are less intensive. The group includes the following buildings:

- Bechtel Engineering Center
- Cory Hall
- Davis Hall
- Etcheverry Hall
- Hearst Memorial Mining Building (HMMB)
- Hesse Hall
- McLaughlin Hall
- O'Brien Hall
- Soda Hall

The building summaries combine analyses conducted during building walkthroughs with structural assessments, building systems assessments, and qualitative assessments. Ultimately, the assessments are summarized into individual radar charts for each building.

Each chart reflects a particular building's performance in 16 significant categories: superstructure, floor height, grid, partitions, historic, façade performance, daylight views, roof/basement, HVAC, plumbing, fire protection, electrical, energy, accessibility, overall dimensions, and assets.

The categories are divided into radar slices such that more significant categories display as wider slices. Larger slices for particular categories then indicate better performances than smaller slices for the same category. Consequently, the charts facilitate suitability comparisons between buildings across the aforementioned categories.

Detailed building profiles are included in the appendices of this report.



*Bechtel Engineering Center*



*Cory Hall*



*Davis Hall*





*Etcheverry Hall*



*McLaughlin Hall*



*Hearst Memorial Mining Building*



*O'Brien Hall*



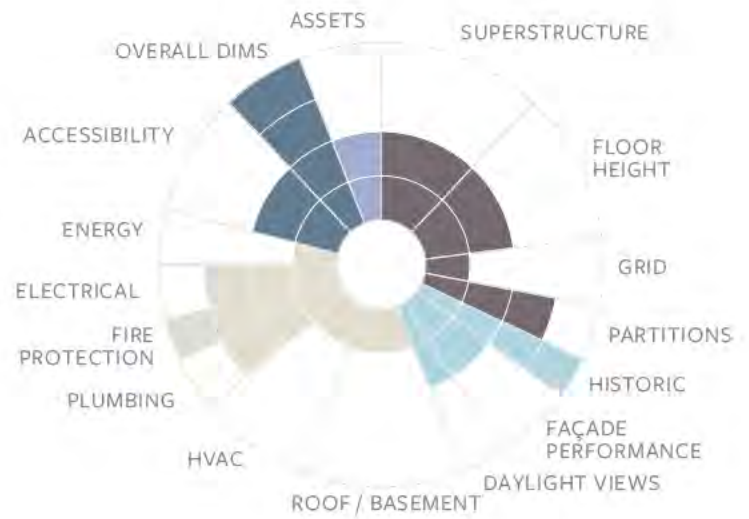
*Hesse Hall*



*Soda Hall*

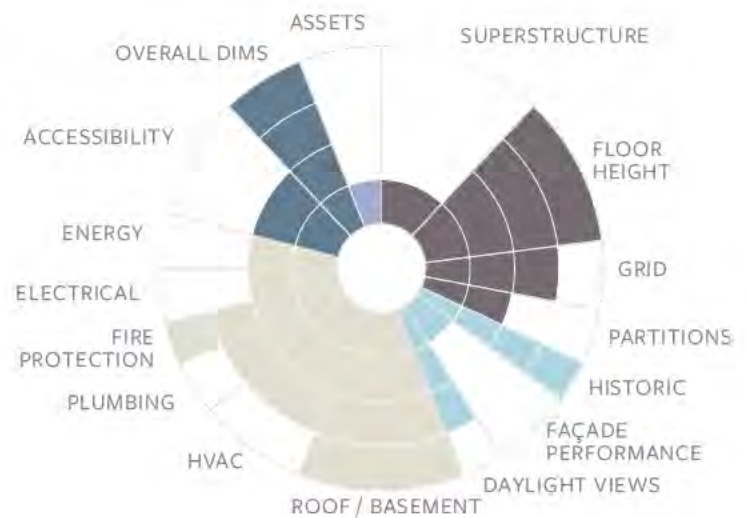
**Bechtel Engineering Center**

Built in 1980, Bechtel Engineering Center houses community spaces, including Sibley Auditorium, Kresge Engineering Library, and Engineering Student Services. Building systems are in relatively good condition, although the library and auditorium lack air conditioning; while typical for many campus buildings, both spaces can be difficult to use on hot days. The building’s rooftop terrace represents an opportunity for revitalization as an active open space. If Evans Hall is replaced or demolished, Bechtel would have more prominence on the Central Glade.



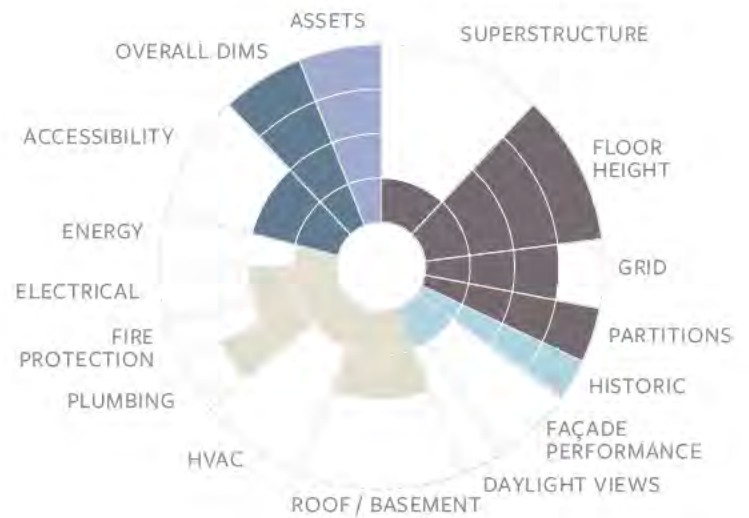
**Cory Hall**

Built in 1950 with a later addition, Cory Hall houses a significant proportion of the EECS department, along with several departmental and GA classrooms and teaching labs. Departmental research space ranges from wet labs to dry labs, and also includes a machine shop. The building has a number of deferred maintenance projects planned over the next ten years. Due to its structural configuration, Cory Hall is a candidate for replacement.



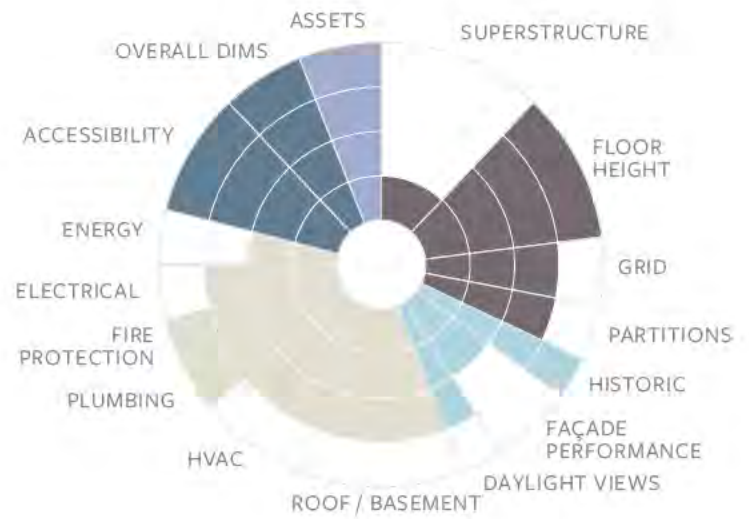
**Davis Hall**

Built in 1968, Davis Hall comprises a major proportion of CEE’s current space allocation. The building houses CEE’s high bay facility, a unique research and instructional space that requires tractor trailer access. The building underwent a partial seismic retrofit in the early 2000s, although the building still has a significant backlog of deferred maintenance. Its structural and interior configuration makes it a candidate for replacement, although the high bay may not need to be fully replaced. The building’s central location within the precinct offers an opportunity to create highly visible program spaces.



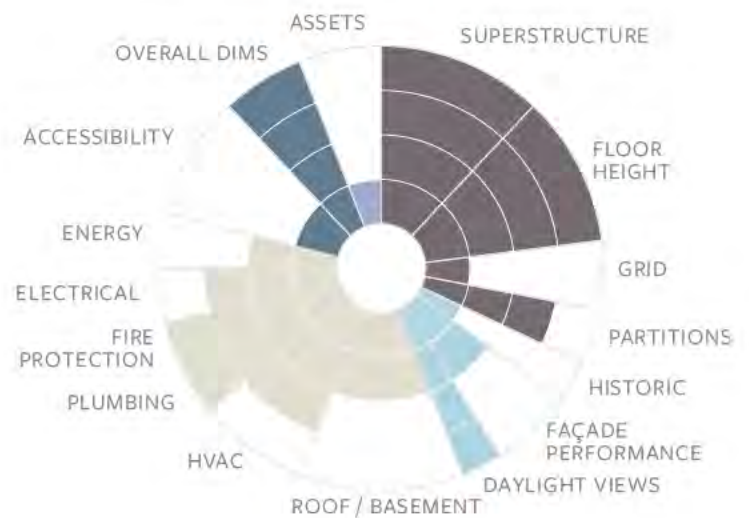
### Etcheverry Hall

Built in 1964, Etcheverry Hall is a large building that houses three departments (Mechanical Engineering, Nuclear Engineering, and IEOR) in addition to classrooms and a café. The building has a significant amount of deferred maintenance, although life safety upgrades have been made over time. Structural upgrades would provide an opportunity to reconfigure floors and improve space efficiency. The College could also consider moving the building's GA classrooms to the center of the precinct to allow the existing space to be repurposed as student space. Like the 2020 Master Plan, the 2012 Etcheverry Hall Master Plan elaborates on facility improvement opportunities.



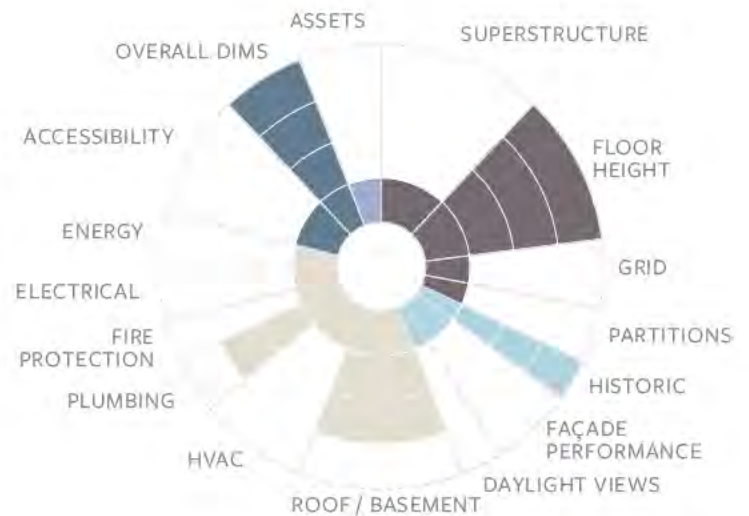
### Hearst Memorial Mining Building

Built in 1907, Hearst Mining was renovated in 2003. The building was designed by John Galen Howard and was an element of Howard's 1898 campus master plan; it is listed on the National Register. Although the building currently houses labs and offices for MSE and BioE, as well as classrooms, it is not well suited for wet lab research facilities. It could be repurposed for office and classroom use if there were space to relocate the existing lab facilities.



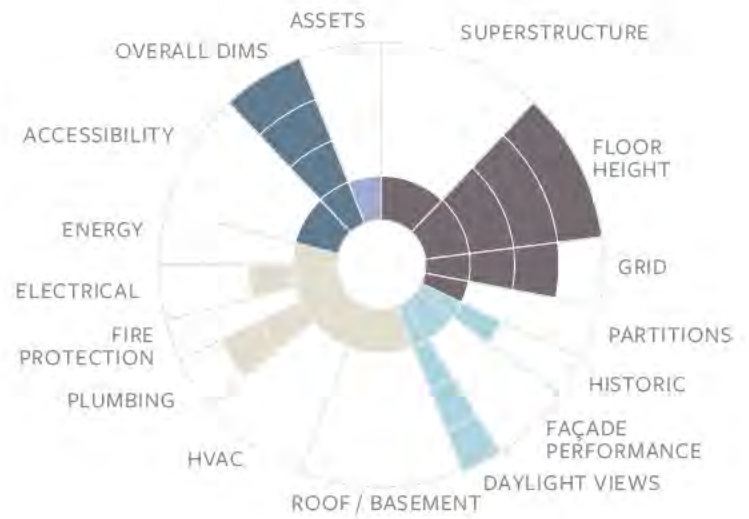
### Hesse Hall

Built in 1924, Hesse Hall houses research and instructional labs for Mechanical Engineering. The building has been planned for replacement since the 2002 Master Plan, and represents an opportunity to gain capacity due to the site being underdeveloped. The building has a significant amount of deferred maintenance, including structural upgrades. The existing building is built into the hillside; the new building could house low-vibration space without a significant amount of additional excavation.



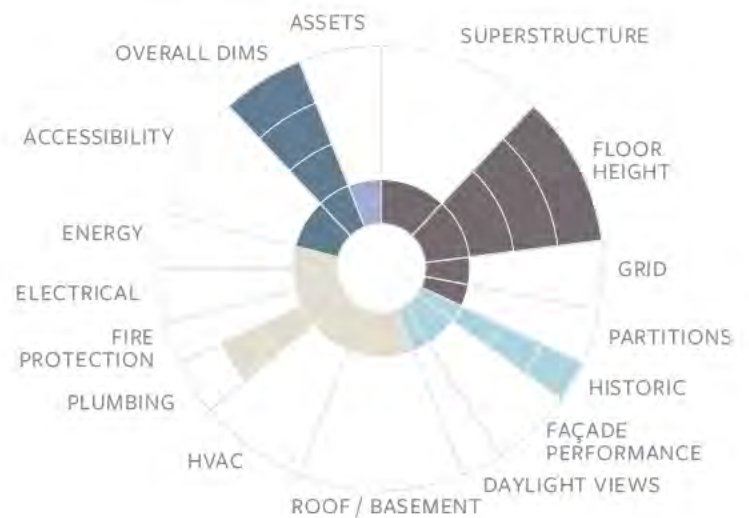
### McLaughlin Hall

Built in 1931, McLaughlin Hall houses the Dean’s office as well as faculty from CEE and the Institute of Transportation Studies. The building is essentially in its original condition, and is in need of complete renewal. Prominently located on the Central Glade and part of the Classical Core, the building could be repurposed with student-focused program.



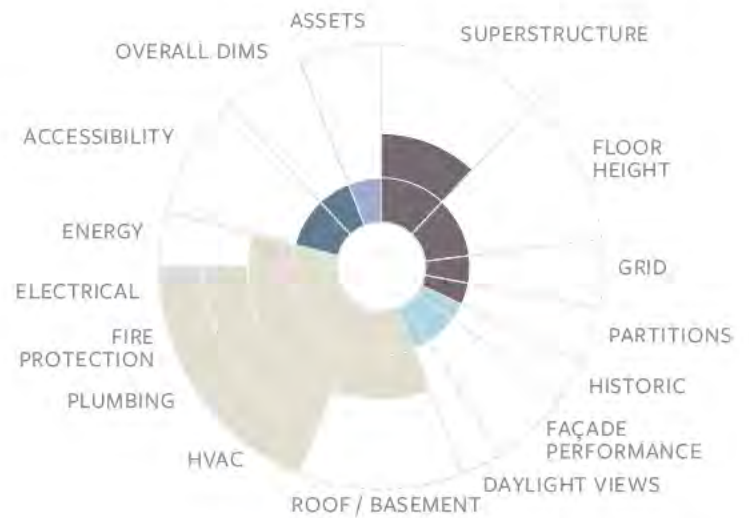
### O’Brien Hall

Built in 1959, O’Brien Hall houses CEE research labs and classrooms. The building has been planned for replacement since the 2002 Master Plan, in conjunction with Hesse Hall; it represents an opportunity to gain capacity due to the site being underdeveloped. The building has a significant deferred maintenance backlog that reduces the effectiveness of the research labs housed in the building; it is also in need of structural improvements. Redevelopment of this site would redefine the West Plaza as an active gathering space.



### Soda Hall

Built in 1994, Soda Hall houses a significant proportion of EECS as well as data centers that serve a number of buildings in the area. The building does not have any major programmatic or deferred maintenance needs, but some structural upgrades may be required.



### 3.5 RELATED CAMPUS PLANS

The physical development of the campus is guided by a number of component master plans, as well as the 2020 Long Range Development Plan. The 2020 Master Plan draws upon the campus-wide plans as described below.

#### **New Century Plan (2002)**

Adopted in 2002, the New Century Plan is the current campus master plan, and outlines strategic goals designed to guide future capital investments. The New Century Plan provides site development recommendations, including proposals for the redevelopment of the Hesse-O'Brien site, and design guidelines for the Classical Core. These recommendations were incorporated into both the 2002 Facilities Master Plan, and the 2020 Master Plan. A new campus master plan is currently underway, and will provide additional context to future College buildings as they are implemented from the 2020 Master Plan.

#### **Landscape Master Plan (2004)**

The Landscape Master Plan provides guidance for the development of the campus's landscape, focusing on the physical framework for the use of open space. The plan characterizes the College precinct's landscape as primarily urban, and identifies adjacent rustic, natural, picturesque, and neoclassical landscape types. The Landscape Master Plan recommends several initiatives of significance to the precinct, including: the restoration of Hearst Mining Circle, University Walk improvements, and planting, road, and sidewalk improvements along Hearst Avenue and Gayley Road.

#### **Landscape Heritage Plan (2004)**

The Landscape Heritage Plan importantly provides site planning and landscape design guidelines for the Classical Core. The College precinct is divided by the Classical Core's edge, and a major view corridor to the Campanile extends along the length of the West Plaza. The Landscape Heritage Plan directs future development to enhance and strengthen both formal and dynamic views of the Classical Core. It also provides guidelines for landscape materials for different campus landscape types.

#### **2020 Long Range Development Plan (2005)**

The 2020 Long Range Development Plan (2020 LRDP) is a regulatory document, required for each University of California

campus, that guides physical development of the campus. The 2020 LRDP also provides a foundation for entitlements and CEQA compliance. Based on the New Century Plan, the 2020 LRDP and the LRDP Environmental Impact Report (LRDP EIR) identify guidelines and mitigation measures that campus development must follow. Capital projects must be consistent with the 2020 LRDP and LRDP EIR. Major projects from the 2020 Master Plan are anticipated to be entitled from the forthcoming new LRDP and its EIR, which are currently underway.

#### **Physical Design Framework (2009)**

The Physical Design Framework provides design guidelines for the campus, based on the campus zones in which a given project is located. Capital projects at all University of California campuses are required to be consistent with the Physical Design Framework when seeking approval from the UC Regents.

The Physical Design Framework recommends that sites within the Campus Park be prioritized for academic programs, including more intensive use of existing land. It recommends a 65' height limit for within 75' of the build-to lines specified in the Framework; building heights may increase in line with the distance from the build-to lines. Proposed large buildings are also subject to additional considerations; in general, they should be designed to reduce perception of mass, in order to maintain a human scale.

Of the College buildings within the Campus Park, a few are located in or adjacent to the Classical Core and are subject to additional design guidelines. For example, new development in or adjacent to the Classical Core should complement the existing context; building orientation should prioritize the Classical Core's orthogonal structure. Similarly, open spaces should preserve significant views and landscapes, and create places of interaction.

#### **UC Berkeley Strategic Plan (2018)**

The campus's Strategic Plan sets out a course for the university with respect to the comprehensive Berkeley experience. In particular, it highlights the need to focus on the student experience, both academic and extracurricular; to support research that innovates in strategic interdisciplinary areas that address the world's challenges; and to embrace diversity holistically. These themes provide a framework and foundation for the campus's physical planning.

### 3.6 SITE PLANNING CONTEXT

The College’s site planning context identifies physical opportunities and constraints that impact potential development proposed in the 2020 Master Plan. This context informs development capacity, massing, urban design, landscape, infrastructure, and circulation considerations for the precinct.

The College precinct is located in the northeast corner of the Campus Park, extending across Hearst Avenue. The precinct is densely developed, in comparison to other areas of the Campus Park, and all available development sites are currently built out. The superblock of Sutardja Dai, Davis, and Bechtel is particularly imposing. However, some sites are potentially underdeveloped,

such as Hesse and O’Brien Halls, as well as Bechtel. Preservation of historic resources has been balanced with the need for additional space in the past, as evidenced by the Naval Architecture Building (Blum Hall) and the redevelopment of Davis Hall North.

#### List of Buildings

- |                      |                                     |
|----------------------|-------------------------------------|
| 1. Etcheverry Hall   | 9. Davis Hall                       |
| 2. Jacobs Hall       | 10. Bechtel Engineering Center      |
| 3. Soda Hall         | 11. Cory Hall                       |
| 4. Blum Hall         | 12. Hearst Mining Memorial Building |
| 5. Hesse Hall        | 13. Donner Laboratory               |
| 6. O’Brien Hall      | 14. Stanley Hall                    |
| 7. McLaughlin Hall   |                                     |
| 8. Sutardja Dai Hall |                                     |








Aerial view of campus

### Terrain and Topography

The College precinct is located at the foot of the Berkeley hills — approximately 50 feet of grade change occurs from the precinct’s southwestern edge at Memorial Glade to its northeastern corner at the intersection of Hearst Avenue and Gayley Road. The steep terrain impacts the perception of cohesion between buildings throughout the precinct, as well as accessibility and overall circulation. For example, the grade change through the precinct requires the accessible route to move through buildings. The most significant challenges to circulation are posed by the East Plaza adjacent to Cory Hall, and the transition from Memorial Glade up to McLaughlin. The stairs and ramps required to navigate the grade change also create visual clutter in the landscape and can impact wayfinding.

### LEGEND

-  <6.1 %
-  6.1-8 %
-  8.1-14 %
-  14.1-100 %
-  College-occupied buildings

*Note: Diagram assessment based on site reconnaissance, and Pathway Slopes (2006) diagram provided by the university.*






Terrain and topography

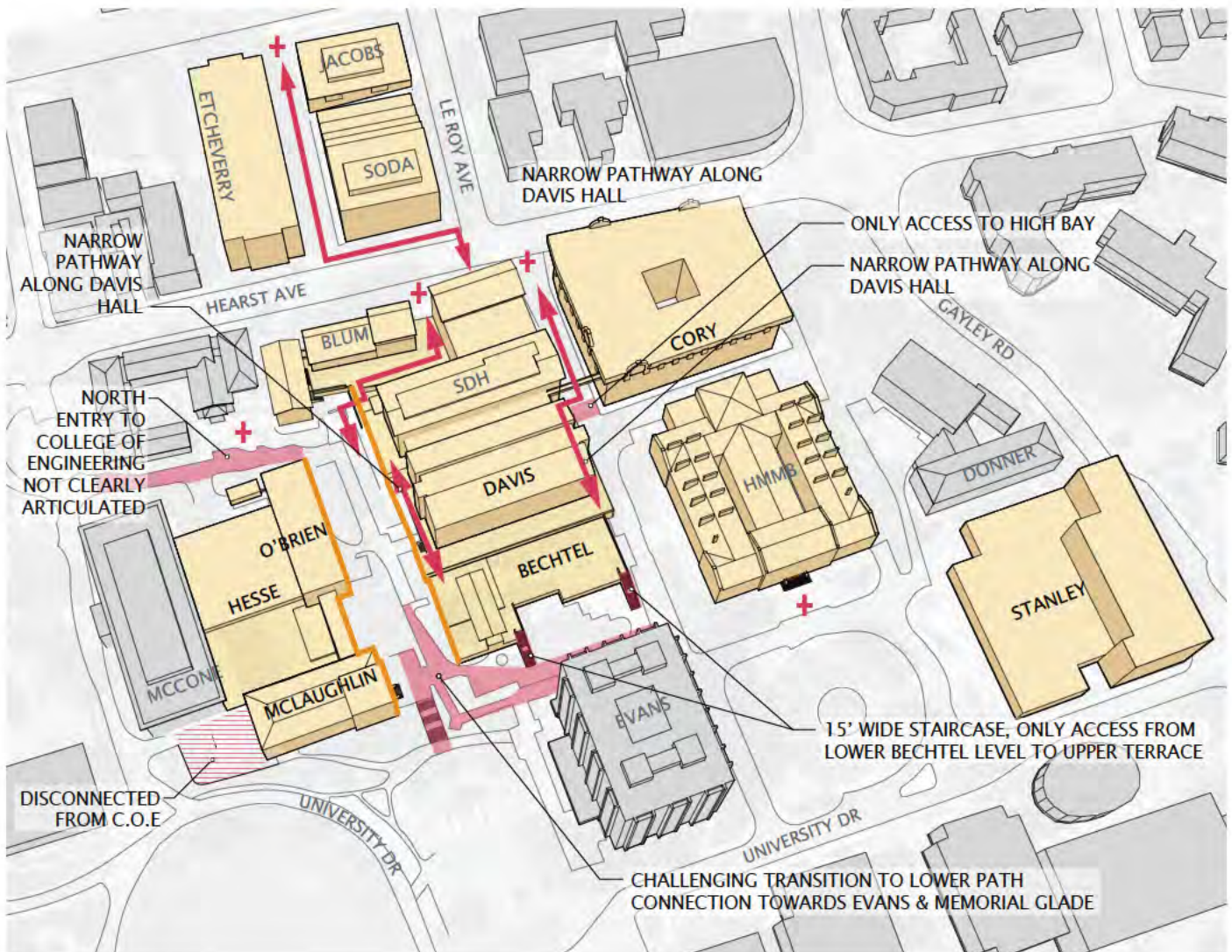
### Circulation and Connectivity

Accessing and traversing the College precinct can be challenging due to the steep terrain. The lack of connectivity between buildings can be challenging for visitors and new students to navigate, and building signage can be inconsistent or minimal, as is typical across campus. Concerns about pedestrian safety have resulted in the relatively recent installation of a crosswalk at Hearst and Le Roy Avenues. Two pedestrian routes lead to this crosswalk from the east and west edges of Sutardja Dai and Davis.

Vehicular circulation in this area of campus is limited to service and loading, primarily along Soule Road and the access road between Davis and Cory.

### LEGEND

-  Existing pedestrian connection
-  Building frontage lacks sufficient ground floor openings and connections to plaza
-  Wayfinding opportunity
-  Challenging conditions
-  Disconnection
-  College-occupied buildings



Pedestrian network



**Landscape and Open Space**

Landscape, including the Classical Core and the Central Glade, is an iconic heritage element of the campus. The College precinct enjoys incredible views to the Central Glade and the Campanile. The Landscape Master Plan recommends using dynamic views to frame open spaces, as well as to guide pedestrians through the campus. Consistent with campus plans, the view corridor through the West Plaza to the Campanile should be preserved. The landscape edge south of McLaughlin Hall, fronting out onto the Central Glade, should contribute to the Glade in keeping with the 1898 John Galen Howard plan for the campus.

**LEGEND**

- Open space: hardscape
- Open space: plaza / courtyard
- Open space: terrace
- Open space: softscape
- Tree
- Key pedestrian movement
- College-occupied buildings



Open space

The precinct also includes multiple open spaces intended for interaction and activity — primarily hardscape plaza spaces rather than grassy lawns. The West Plaza, located between McLaughlin and O'Brien to the west, and Sutardja Dai, Davis, and Bechtel to the east, is a key open space with enormous potential to become the precinct's center of activity, and a memorable and iconic place within the campus. Currently, the West Plaza functions more as a pass-through space for pedestrians than a locus of activity, although it does have adjacent food service. The plaza is also fragmented, and does not feel unified. Coordination of utilities running beneath the West Plaza is a key consideration for future improvements. Bechtel Terrace, on the building's upper level, is a plaza space with furnishings that are original to the building. This open space allows for a respite from the hustle and bustle of the

campus, with views of the Campanile and trees set into planters in the roof. Replacement of the furniture and recalibration of the cafe at the terrace would improve the terrace's use and functionality.

The East Plaza, connecting the precinct across Hearst Avenue between Cory and Sutardja Dai, is a small, shaded plaza accessible from the south by a narrow walkway along the eastern façade of Davis. The narrow walkway limits pedestrian volumes that can pass through the East Plaza, which impacts use of the open space. The northern portion of the precinct houses a plaza between Etcheverry, Soda, and Jacobs Halls that functions as a pass-through space. The plaza is defined overhead by a trellis structure; adjacent buildings connect to the plaza only at building entrances.

#### SPECIMEN TREES

- A Canary Island Palm  
*Phoenix canariensis*
- B Deodar Cedar  
*Cedrus deodara*
- C White Alder  
*Alnus rhombifolia*
- D Canary Island Pine  
*Pinus canariensis*
- E Coast Live Oak  
*Quercus agrifolia*
- F Japanese Maple  
*Acer palmatum*

#### OTHER PRECINCT TREES

- 1. Redwood  
*Sequoia sempervirens*
- 2. Marina Madrone  
*Arbutus 'Marina'*
- 3. Washington Hawthorn  
*Crataegus phaenopyrum*
- 4. Cork Oak  
*Quercus suber*
- 5. Coast Live Oak  
*Quercus agrifolia*
- 6. Sour Gum  
*Nyssa sylvatica*
- 7. Oleander  
*Nerium oleander*
- 8. Fern Pine  
*Afrocarpus gracilior*

- 9. Mexican Fan Palm  
*Washingtonia robusta*
- 10. Japanese Maple  
*Acer palmatum*
- 11. European White Birch  
*Betula pendula*
- 12. Texas Redbud  
*Cercis canadensis*
- 13. Eddie's White Wonder Dogwood  
*Cornus nuttallii x florida*
- 14. Katsura Tree  
*Cercidiphyllum japonicum*
- 15. Red Oak  
*Quercus rubra*
- 16. Strawberry Tree  
*Arbutus unedo*
- 17. Japanese Pagoda Tree  
*Sophora japonica*
- 18. European Hornbeam  
*Carpinus betulus*
- 19. Canary Island Pine  
*Pinus canariensis*
- 20. Little Gem Magnolia  
*Magnolia grandiflora 'Little Gem'*
- 21. Chinese Elm  
*Ulmus parvifolia*
- 22. Sweet Gum  
*Liquidambar styraciflua*
- 23. Silver Dollar Gum  
*Eucalyptus polyanthemos*
- 24. Carob Tree  
*Ceratonia siliqua*
- 25. Lemon Tree  
*Citrus limon*
- 26. Italian Alder  
*Alnus cordata*
- 27. Victorian Box  
*Pittosporum undulatum*
- 28. Catalina Ironwood  
*Lyonothamnus floribundus*  
subsp. *aspleniifolius*
- 29. California Black Oak  
*Quercus kelloggii*
- 30. Hollywood Juniper  
*Juniperus chinensis 'Torulosa'*
- 31. Trident Maple  
*Acer buergerianum*
- 32. Toyon  
*Heteromeles arbutifolia*
- 33. Griselinia  
*Griselinia littoralis*
- 34. Maidenhair Tree  
*Ginkgo biloba*
- 35. California Buckeye  
*Aesculus californica*
- 36. Sydney Golden Wattle  
*Acacia longifolia*
- 37. Holly Oak  
*Quercus ilex*

### Tree Canopy and Vegetation

Although it does not pass through the College precinct, Strawberry Creek defines not only the campus structure, but also the campus-wide ethos of preserving the natural environment that is embedded in the physical realm. The tree canopy, as an element of the campus landscape, is a defining characteristic of the campus's identity. The campus's natural environment serves as a complement to its buildings, and is also a resource to faculty, staff, and students as a living laboratory.

The campus is home to over 200 native and non-native tree species, with some trees that are original to the founding of the campus. Despite its dense, urban setting, the precinct reflects the campus' overall biodiversity, with over 30 species represented,

with some mature trees reaching 80 feet in height. Of these trees, 24 are specimen trees, characterized as particularly significant to the campus, including the Island Palm and Canary Island Palm, Deodar Cedar, White Alder, Coast Live Oak and Japanese Maple. Most trees are in good or fair condition, with the exception of a few in poor health. The latter are generally located around Davis and Bechtel: Chinese Elm and Little Gem Magnolia trees at Davis Hall; and American Sweet Gum, Italian Alder and lemon trees at Bechtel Engineering Center.



Existing tree inventory

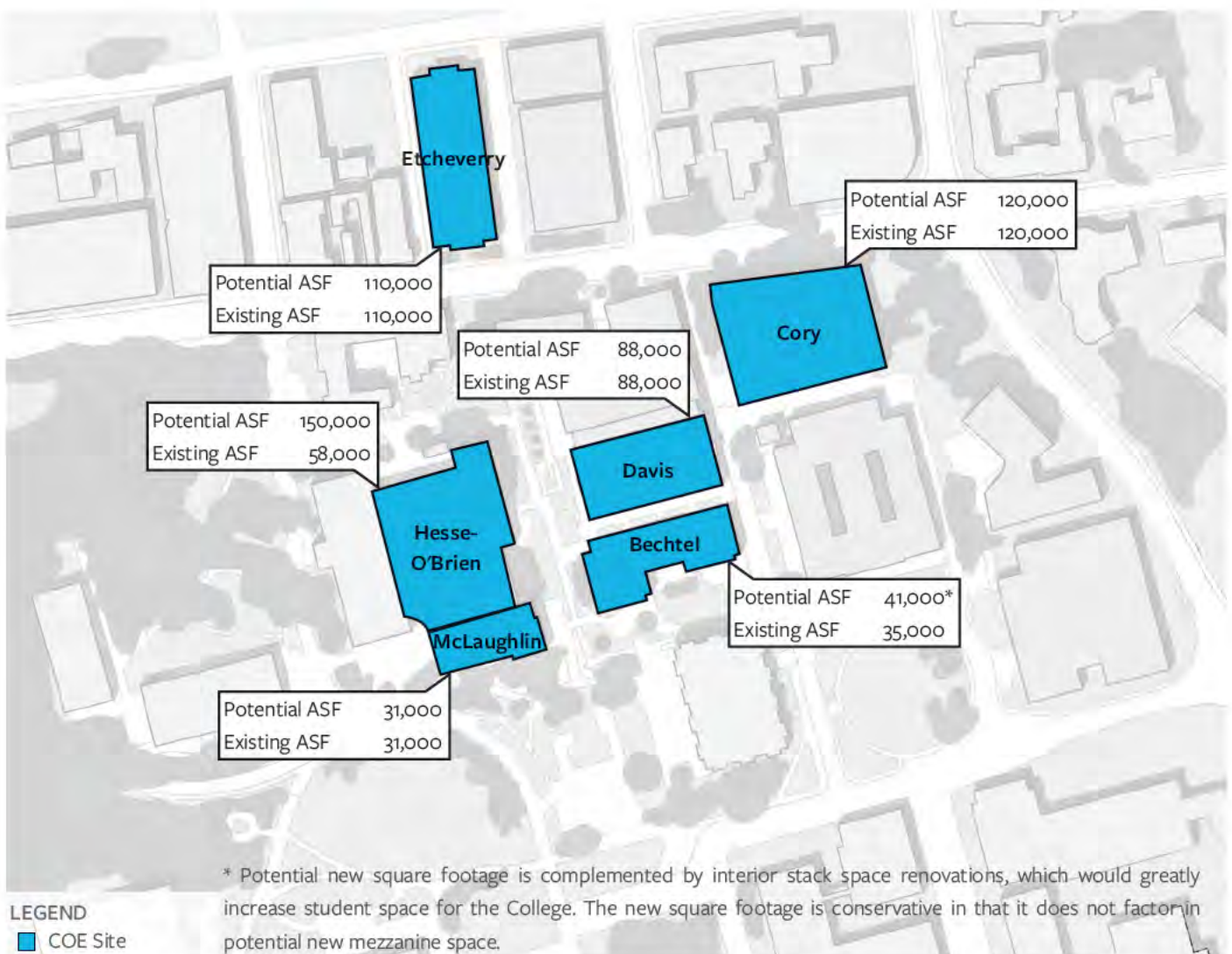
**Site Capacity**

Potential redevelopment sites were identified through synthesis of existing building analysis, space needs, and desired programmatic changes. Redevelopment sites are generally those whose buildings have mechanical or structural improvement needs that would be so disruptive that replacement was a better and more cost-effective option than renovation. These sites include: Hesse and O'Brien Halls, Davis Hall, Bechtel Hall, and Cory Hall. Etcheverry and McLaughlin Halls were considered as candidates for renovation.

Site capacity ranges have been determined for each redevelopment site, based on physical site constraints identified

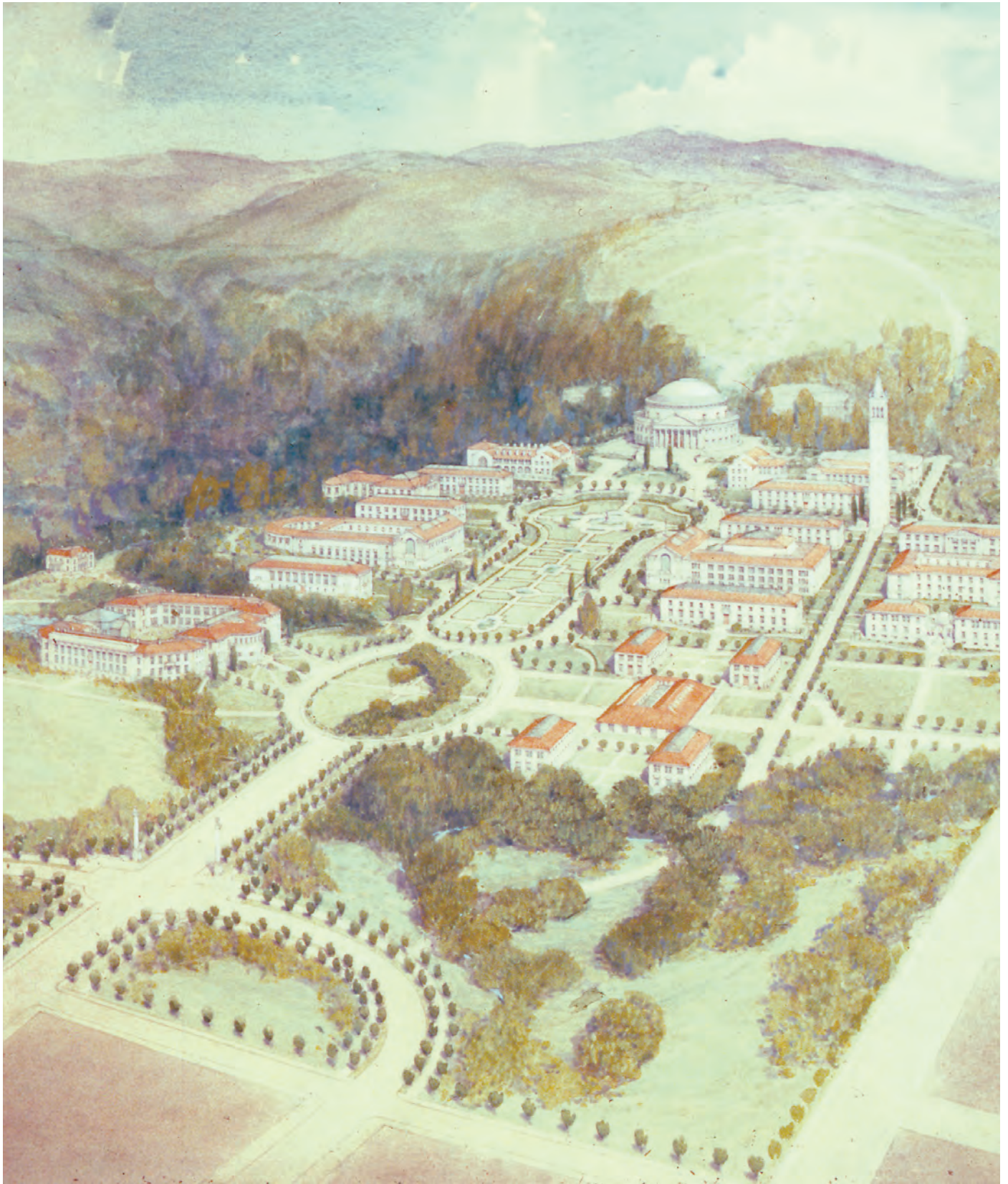
through the site planning context, and guidelines from applicable campus plans and frameworks. Site capacity is independent of program; it identifies the overall ability of the precinct to physically accommodate the College's needs over time.

The Hesse-O'Brien site has the greatest potential for a net gain in capacity, as it is currently underdeveloped compared to campus guidelines and modern building types. The Davis and Cory sites are already developed to their maximum capacity, but replacement of the existing buildings would include improved space efficiency through modernization and consolidation. The Bechtel site could potentially accommodate a larger building, but expansion of the adjacent superblock must maintain human-scaled building masses.



LEGEND  
■ COE Site

Potential building project sites in the COE precinct



*Bird's eye view looking east over John Galen Howard's master plan for the campus, 1898*

# 4 MASTER PLAN FRAMEWORK



The Master Plan Framework is a set of physical strategies that guide the development of the College precinct. It provides the specificity to guide individual projects, while allowing for flexibility should the College’s needs change in the future. The framework also references the campus’s relevant master plans and frameworks. It has three primary components:

- Land Use Strategies
- Landscape Strategies
- Connectivity Strategies

The 2020 Master Plan re-envisioned the “connective tissue” between buildings within College precinct, and how individual buildings contribute to the precinct and campus as a whole. It seeks to improve connectivity and the potential for interaction through utilization of existing land, circulation, wayfinding, interdepartmental interfaces, and loading and service routes. By proposing projects that bring each site to its highest and best use and then ensuring that each project has a strong physical connection to its neighbors, the 2020 Master Plan proposes a precinct that will function increasingly as a comprehensive network of facilities that support each other operationally, programmatically, and experientially.



## 4.1 LAND USE STRATEGIES

Land use strategies synthesize the College's space needs and strategic goals, while re-envisioning the physical structure of precinct. The following land use strategies guide the master plan framework:

- Build community through strategic development
- Preserve and enhance views and axes

### Build Community through Strategic Development

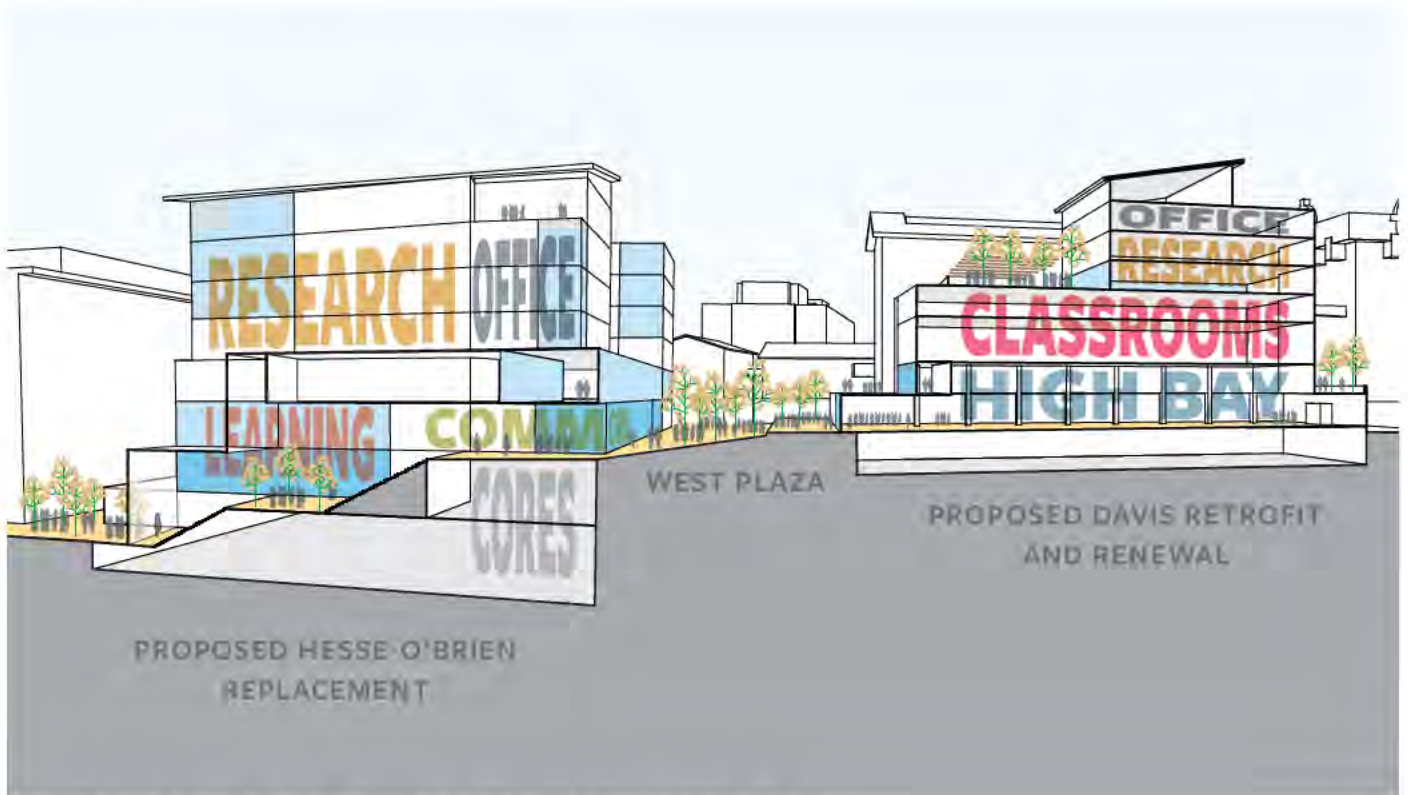
Land is a limited resource campus-wide; thus an efficient and clear land use strategy is vital to maximize built area while preserving the campus's character and heritage landscape. Because land and developable sites are in short supply, surge space is also a significant consideration for the phasing and implementation of the master plan. Development sites that have the potential for increased capacity should be prioritized for development, in order to gain surge space and enable future projects to be implemented.

At the same time, land use should also promote physical development that embodies the values and culture of the people

who inhabit the resulting buildings and open spaces. Buildings and land use should reflect this emphasis on human interaction, with buildings that are multi-purpose and feel open and accessible, with as much active, community-focused ground floor program as possible.

The replacements of larger buildings like Cory and Davis Halls offer opportunities to reshape the precinct as a more human-scaled place, while the replacement of Hesse and O'Brien Halls will create a new center of gravity for the College. Buildings should be intentionally multi-purpose, integrating learning with research, departments and College, but allowing each department a critical mass of dedicated space to build departmental identity.

Once the 2020 Master Plan is fully implemented, the College precinct will be fully built out; further expansion will necessarily occur elsewhere on campus. As other campus or precinct plans are created for adjacent areas, future expansion of the College precinct should be considered.






Section looking northward through new ground floors on a renewed West Plaza

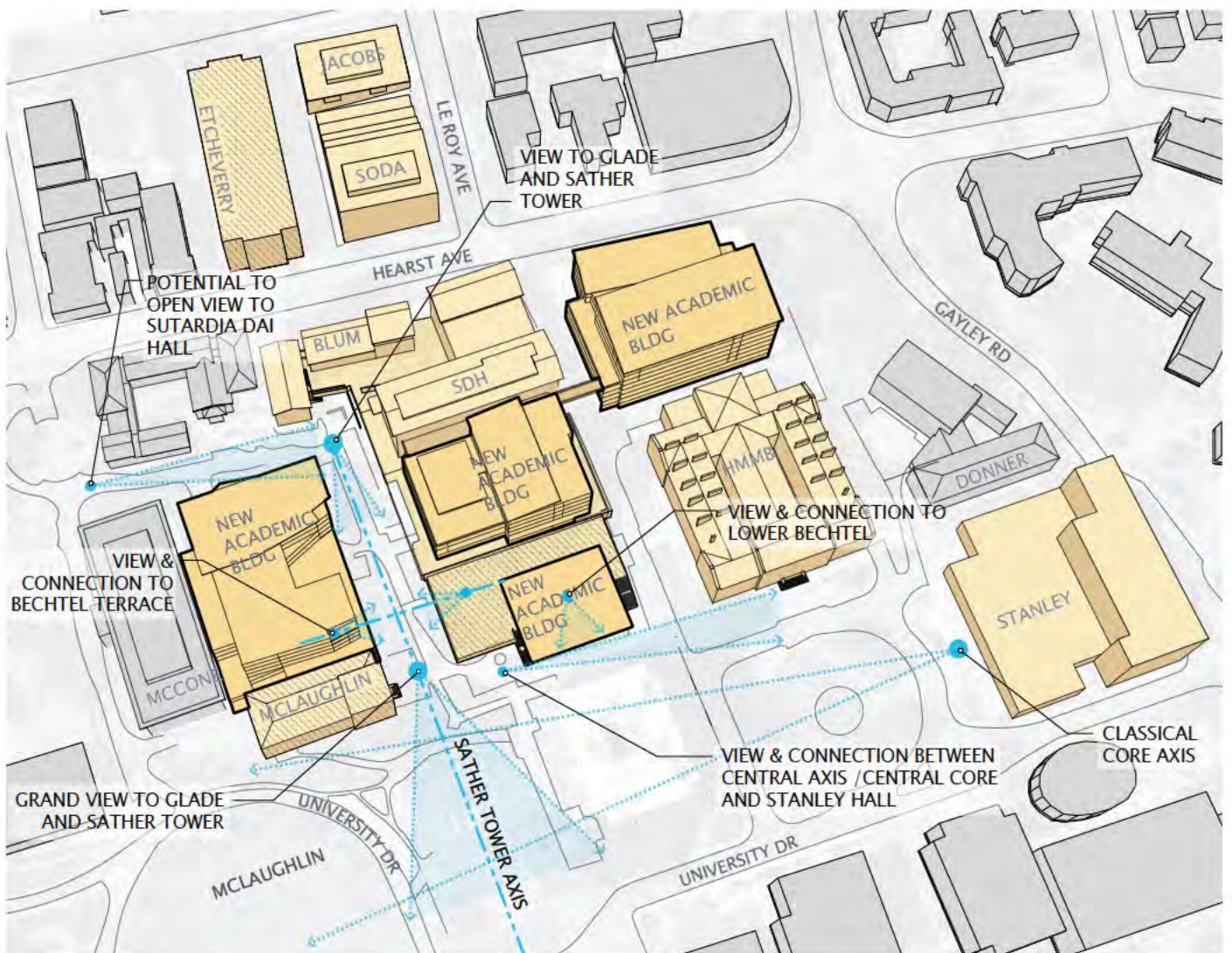


**Preserve and Enhance Views and Axes**

Two iconic and historic axes exist within the precinct: the north-south axis anchored by the Campanile, and the east-west axis of the Central Glade. Both axes should be reinforced by building and landscape interventions. In keeping with these axes, buildings adjacent or within the Classical Core should respond to its character and scale, while allowing modern interpretation. The West Plaza, as a revitalized central open space, can transform the College precinct into a cohesive whole, as well as forge stronger connections to the rest of the Campus Park.

**LEGEND**

-  Existing axis
-  Enhanced / future views
-  Existing College-occupied buildings
-  Proposed building
-  Buildings slated for renovation



Views and axes

## 4.2 LANDSCAPE STRATEGIES

Landscape strategies focus on the balance between the built environment and open spaces, as well as extending connectivity between buildings. The following landscape strategies guide the master plan framework:

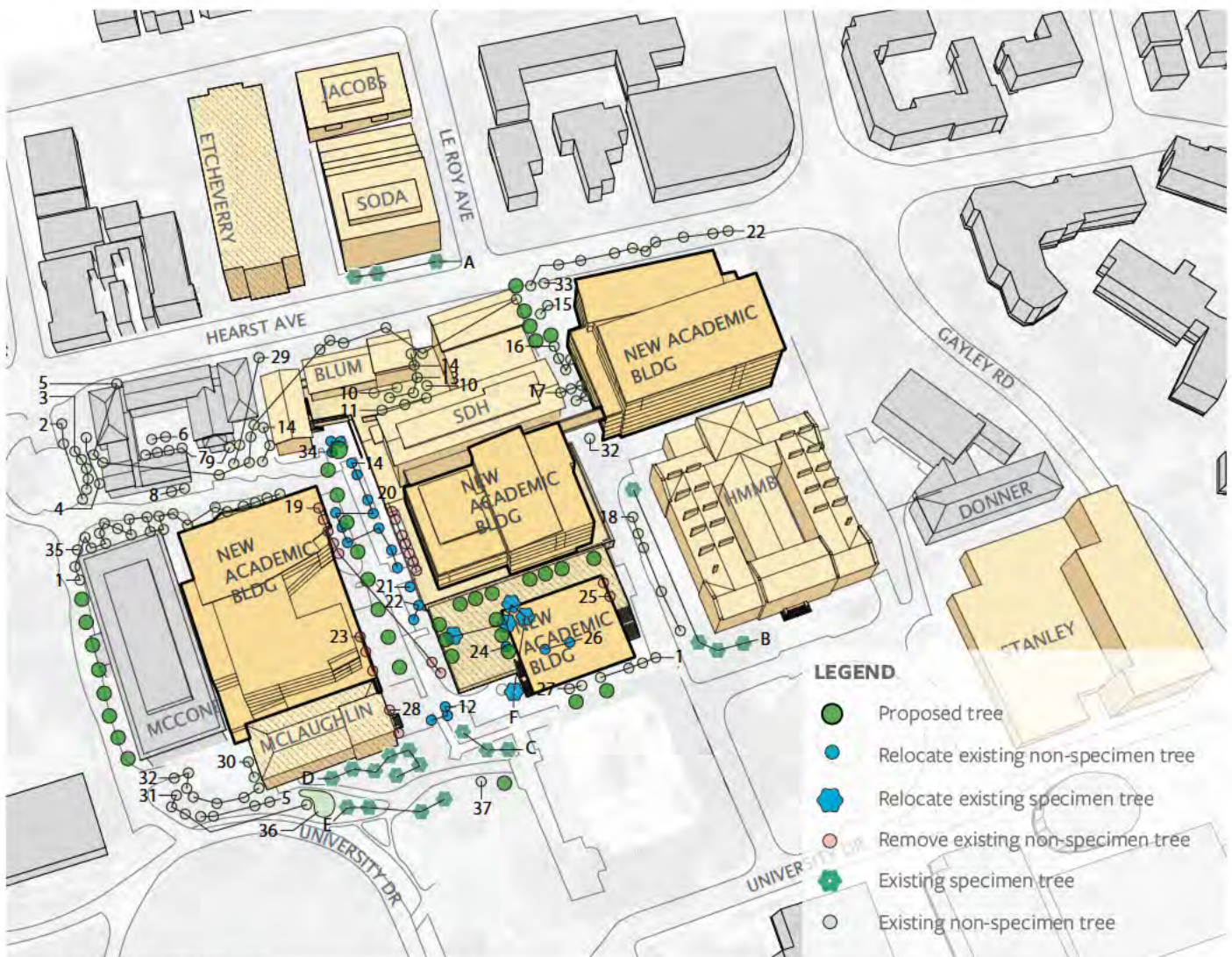
- Preserve open space
- Utilize landscape to unify the precinct
- Create seamless indoor-outdoor connections

### Preserve Open Space

Open space may be perceived as a luxury due to the need to redevelop the precinct in order to address space needs. Contrary to this idea, the 2020 Master Plan preserves and increases open

spaces throughout the precinct, recognizing the importance of outdoor community spaces and open spaces that offer opportunities for gathering and contemplation. In addition to enhancing existing open spaces, the 2020 Master Plan envisions rooftop terraces to balance the proportion of built space to open space. Integrating open spaces at multiple elevations accommodates the precinct's steep terrain, and makes open spaces accessible to the College and campus community.

As open spaces are strengthened and expanded, a planting palette incorporating native, fire-resistant, and drought-resistant materials should be employed. Projects should also pay close attention to specimen trees, as well as replacement of trees that have been impacted by drought and other climate events.



Trees and Landscape Heritage

Heritage landscapes, including the transitional landscape between McLaughlin Hall and the Central Glade, should be complemented and enhanced by landscape and building projects.

### **Utilize Landscape to Unify the Precinct**

Landscape is an integral part of Berkeley's history and legacy, and understanding its role in unifying the College and the campus will crucially inform future development. Landscape can act as connective tissue between buildings, making them feel like a cohesive whole, while also creating places for interaction.

The precinct's open spaces should take advantage of the Bay Area's temperate climate and provide environments where faculty, staff, and students can interact, collaborate, and socialize. Open

spaces should also include opportunities for shade, from both the tree canopy and built shade structures, to allow open spaces to be used on both hot and rainy days. Where possible, wifi and power should be incorporated to provide technological connectivity.

### **Create Seamless Indoor-Outdoor Connections**

Open spaces are most active and successful when the adjacent buildings relate to them programmatically, and direct visibility links interiors and open space. Thoughtfully designed open spaces can create a seamless connection between indoor and outdoor spaces, ensuring a cohesive realm of community space across the precinct that fosters interaction and informal learning. To the extent possible, ground floor uses should comprise community spaces and high-activity spaces such as classrooms.



*Proposed master plan view looking southward over a renewed West Plaza toward the Campanile*

### 4.3 MOBILITY STRATEGIES

Mobility strategies address how people get around the precinct, providing guidance on how the precinct can become a fully connected network with a strong sense of place. The following mobility strategies guide the master plan framework:

- Build connectivity through integrated systems
- Enhance and rationalize accessible routes
- Improve bicycle accommodations

#### **Build Connectivity Through Integrated Systems**

Connectivity isn't just about buildings, or about landscape, or about circulation: mobility strategies work hand in hand with building and landscape to increase opportunities for interaction.

Buildings and landscape shape view corridors and loci of activity that can be integrated and supported by circulation networks. Choices about building program influence where people gather and collaborate, and connections to open spaces extends connectivity into the outdoor environment. Buildings should maximize ground level visibility to create a sense of community and to aid wayfinding through the use of landmarks.

Projects should enhance the potential for building community and strengthening connectivity across the precinct. Both north-south and east-west connections can be improved for pedestrians and bikes, both physically and programmatically. Projects should aspire to make pedestrian circulation as seamless and continuous as possible; building and landscape projects can contribute to the



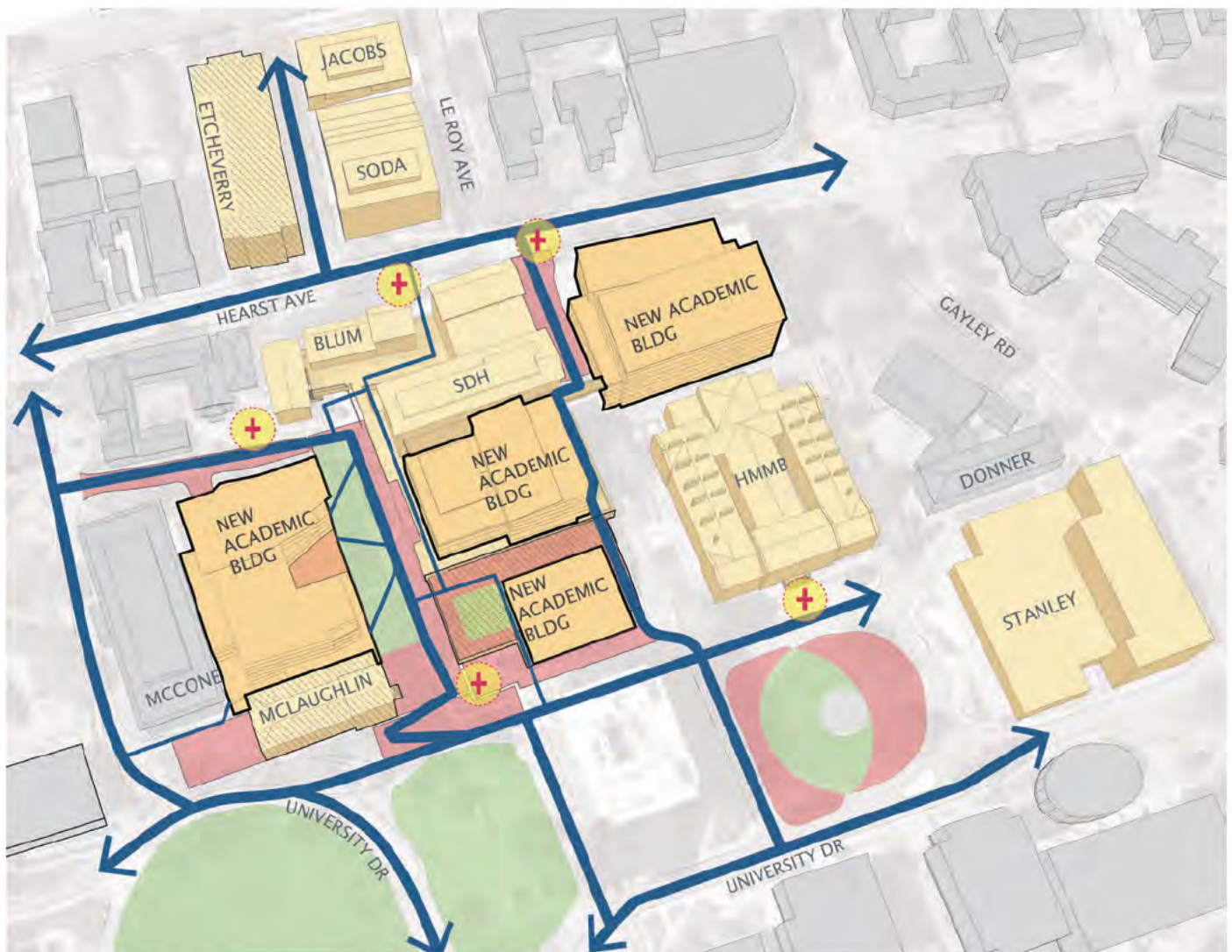
*Approaching the precinct along Memorial Glade*

pedestrian realm, in addition to dedicated mobility enhancements. Consideration of how projects can improve mobility at the campus scale, beyond the precinct itself, should also be an area of focus.

Gathering places can be made easier to find and inhabit by creating defined, inviting outdoor spaces that are clearly connected by the circulation network. The precinct's steep terrain can become an asset through the enhancement of views framed by open space, circulation, and buildings. Creating dynamic views and landmarks throughout the precinct can also make wayfinding more intuitive without needing to add signage. However, signage could still be considered at key locations at the edges of the precinct, consistent with the current campus standards.

**LEGEND**

- Open space: hardscape
- Open space: softscape
- + Potential COE gateway signage
- Key pedestrian movement
- Secondary pedestrian movement
- Existing College-occupied buildings
- Proposed building
- Buildings slated for renovation



Enhanced connectivity through cohesive building, landscape, and circulation strategies

**Enhance and Rationalize Accessible Routes**

Accessible routes through the precinct are a key consideration for its mobility network, given the steep terrain; existing accessible routes are not always intuitive. Building and landscape projects should strive to enhance accessibility throughout the precinct, through the provision of more direct or more readily visible routes. Routes that do not require special access permissions to buildings after hours are preferred. If accessible routes must pass through buildings, they should be co-located with community spaces to the extent possible.

**LEGEND**

-  Proposed bikeway improvements
-  Existing primary bicycle route
-  Existing secondary bicycle route
-  Abrupt or steep grade changes
-  Existing campus bike racks
-  Existing College-occupied buildings
-  Proposed building
-  Buildings slated for renovation



Accessible routes network

### **Improve Bicycle Accommodations**

A significant proportion of the College community bikes to the precinct, as evidenced by interior spaces that have been retrofitted as secure bicycle storage. The campus does not have any dedicated bike paths; however, mobility and landscape projects should accommodate and enhance bicycle circulation through the precinct, while balancing the needs of bicycles with those of pedestrians and the disabled. Projects should seek to accommodate multiple modes of mobility, while minimizing the potential for conflicts between modes.

Roads and pathways don't stop at the boundary of the precinct: mobility extends beyond the precinct to the campus as a whole. Projects should help create routes that link the precinct to the

campus-wide bicycle network, in order to better connect the College with the campus, and with the City of Berkeley. Improved bicycle circulation can impact travel both to and within campus. Bicycle routes should be clearly delineated by their location, as well as materials and signage, and should be coordinated with campus-wide initiatives for bicycles.

Consistent with campus design standards, new buildings and major renovations to existing buildings should include indoor, secure bicycle storage facilities as well as shower and locker room facilities. The campus design standards are a minimum and can be combined with other supporting facilities to meet a given project's programmatic needs.



*Biking on West Plaza*

# 5 PROPOSED PROJECTS



HESSE-O'BRIEN REPLACEMENT



This section describes the 2020 Master Plan’s proposed projects. The 2020 Master Plan recommends a series of projects to achieve the College’s vision and planning objectives. While projects support growth and modernization for academic programs, they also place a renewed focus on transforming the College precinct into a vibrant, cohesive whole that reflects the College community. Projects are based on the master plan framework, and often utilize multiple strategies to create high-impact initiatives. Project descriptions document the master plan’s intentions and provide a starting point for individual projects as they are implemented. Campus and College conditions – physical, financial, organizational – will change over time, and the master plan retains the flexibility to accommodate those changes.

**Key Catalytic Project Highlights**

1. College of Engineering Commons
2. Connection to Saber Tooth Plaza
3. Classrooms
4. Hesse-O’Brien Outdoor Terrace
5. Hesse-O’Brien Research Labs
6. Low-Vibration, Low EMI Labs
7. High Bay Facility Activity Zone
8. High Bay Facility
9. Classrooms and Teaching Labs
10. Davis Research Labs
11. Davis Outdoor Terrace
12. West Plaza Outdoor Commons



DAVIS ADDITION AND RENEWAL

## 5.1 PROPOSED PROJECTS

The 2020 Master Plan recommends a number of proposed projects, based on its stated land use, landscape, and mobility strategies. The proposed projects have been developed as catalytic projects that can each make a major impact as they are implemented. Projects are presented in three categories, as listed below:

### Major Building Projects

1. Hesse-O'Brien Replacement
2. Davis Addition and Renewal
3. Bechtel Addition and Renewal
4. Cory Replacement
5. Etcheverry Renewal
6. McLaughlin Renewal

### Major Landscape Projects

7. Soule Corridor
8. West Plaza
9. Plaza Steps
10. Bechtel Courtyard
11. Bechtel Terrace and Green Roof
12. East Plaza
13. Central Glade Restoration
14. Saber Tooth Plaza

### Near Term Improvements

15. North Plaza
16. Covered Outdoor Seating
17. West Plaza Landscape Furnishings
18. Bechtel Terrace Enhancements
19. Bechtel Library Commons
20. Hearst Mining Courtyards

The following sections elaborate on these recommendations and suggest additional opportunities that might be pursued by the College as part of its strategic development.



*Illustrative plan of proposed conditions*



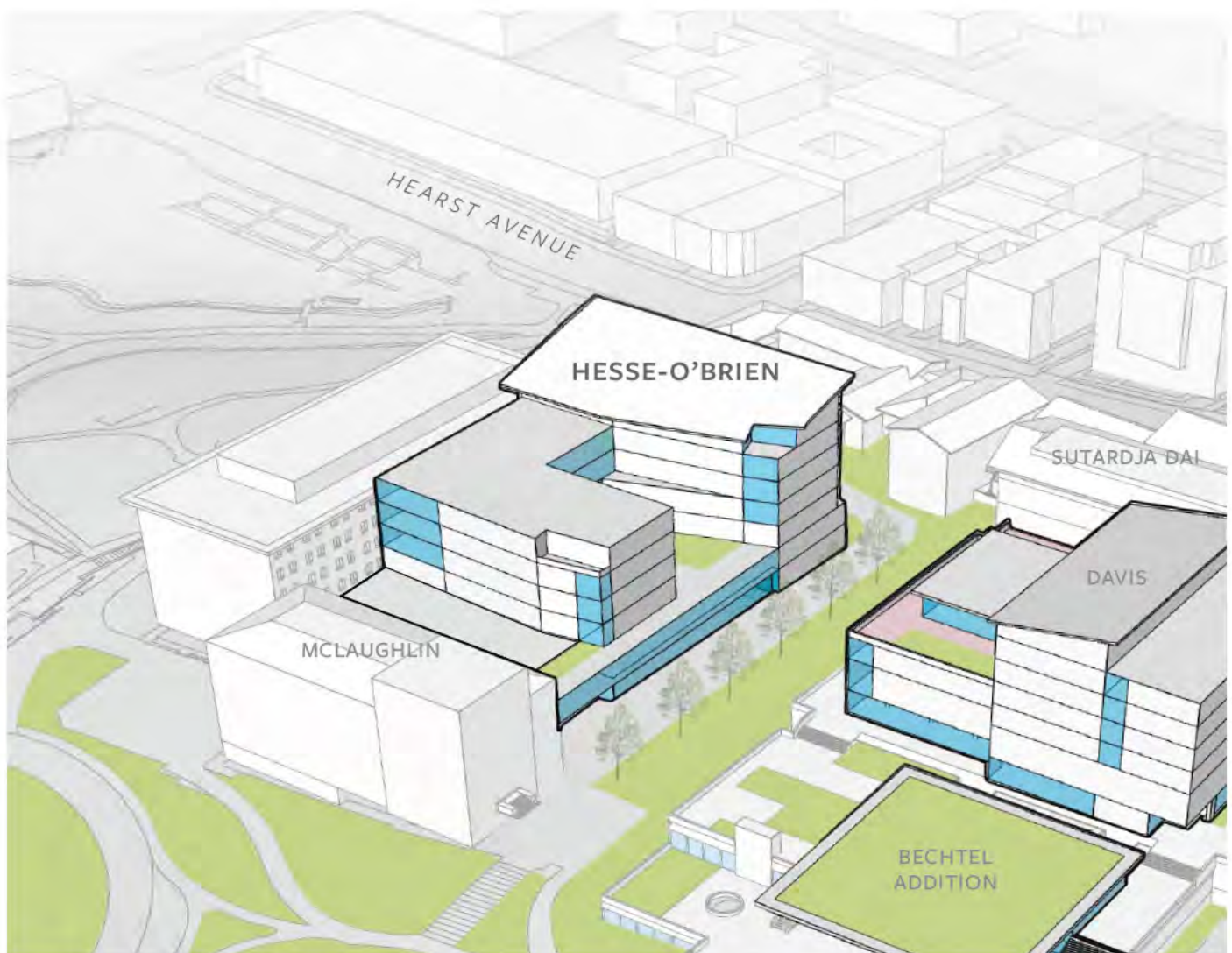
## 5.2 BUILDING PROJECTS

The 2020 Master Plan recommends six major building projects to support the college's pursuit of its strategic goals.

### 5.2.1 HESSE-O'BRIEN REPLACEMENT

The 2020 Master Plan builds on the New Century Plan and 2002 Facilities Master Plan concept for this site, envisioning the Hesse-O'Brien replacement as an active hub of community, learning, and research: a new center of gravity for the College. Because the current site is underdeveloped, it represents the College's best opportunity to gain space for current and future program needs, as well as for surge space to enable other projects. This project should be the College's first priority.

The Hesse-O'Brien replacement would be anchored by an active ground floor focusing on student-centric and community space, addressing critical needs for study, teaching, and collaboration. It could also include dedicated student club space. The ground floor should be prominently connected to the West Plaza to maximize interaction. The building could have a rooftop terrace at an upper level – a multi-purpose social and event space. The proposed building would also be a modern research facility that increases student access and proximity to the research world. Upper floors would house research space capable of supporting chemical as well as electronics and dry laboratories; lower levels below grade could be used for low-vibration, low EMI space. Consistent with strategic goals, the building could include interdisciplinary lab space for affiliated faculty from outside the college.



*Hesse-O'Brien Replacement from southeast*

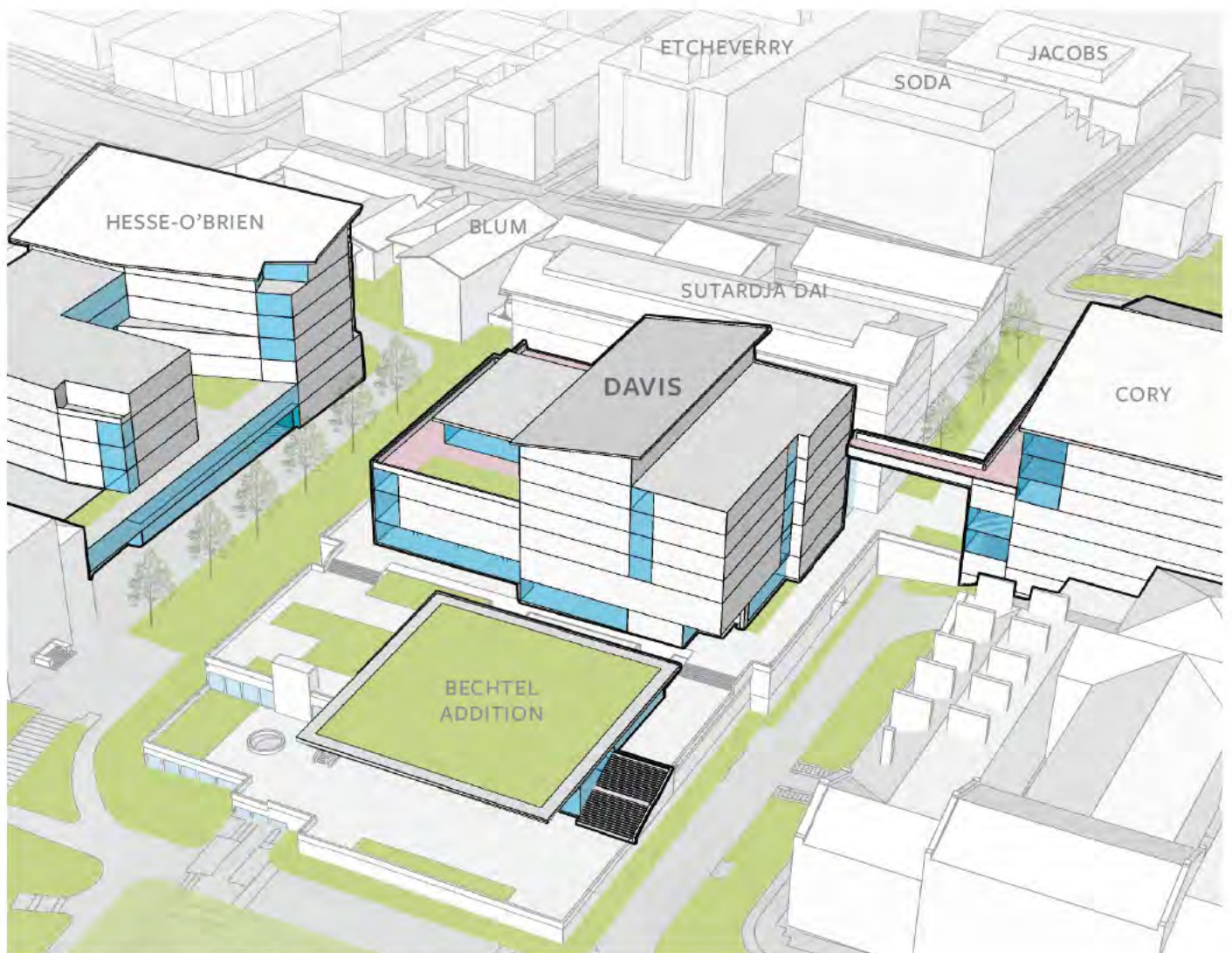
### 5.2.2 DAVIS HALL ADDITION AND RENEWAL

Davis Hall is in need of significant structural upgrades, and redevelopment of this site would provide the College with more efficient, fully modernized research space as well as instructional and student space. The proposed project would retain the high-bay facility and replace the upper floors, making use of this opportunity to reorient and re-scale the building to frame views to the Campanile and respond to the precinct's physical context.

The proposed addition would have an efficient steel frame structure that could support several floors, with a glassy façade that embraces transparency and capitalizes on views to the Central Glade. An improved public interface connecting the

West Plaza would help activate both the plaza and the building, complementing the Hesse-O'Brien replacement. The location of a significant proportion of instructional space at the heart of the precinct would reinforce programmatic linkages to instructional and student space in the Hesse-O'Brien and Cory replacements. The building would also have a terrace and green roof overlooking the Campanile, further unifying the precinct and the Campus Park.

The high bay facility could become a focal point for fabrication with a consolidated suite of shop facilities, with visual connections out to the West Plaza, effectively putting the College's research and innovation on display for the College, and for the campus at large. Improving visibility between buildings and the public realm would also improve wayfinding and lighting in the evening hours.



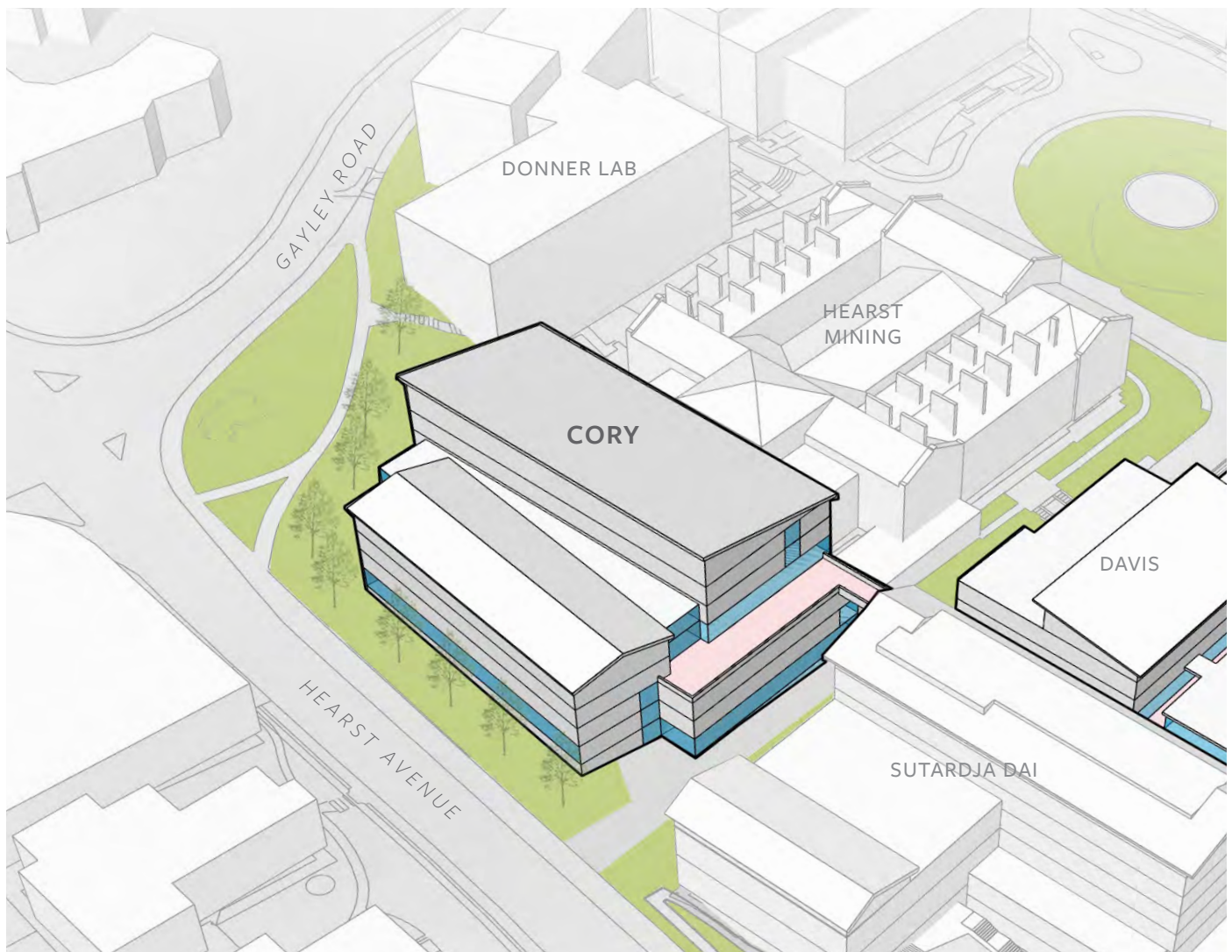
*Davis Addition (Upper Levels) from southeast*

### 5.2.3 CORY REPLACEMENT

Cory Hall is a major research and teaching facility in the College, in particular for EECS, its primary occupant. The proposed project would replace the existing, aging building and address significant structural upgrades that are needed. Like the Hesse-O'Brien replacement, the building would be a major teaching and research facility for the College, with a mix of student, instructional, collaboration, and research space that would maximize the potential for interaction. The building could also house interdisciplinary lab space for collaborative research with faculty from the university's other colleges, schools, and departments, in support of the College's mission and of the university's Strategic Initiatives.

The existing structure maximizes the available site capacity, without significant consideration for adjacent buildings and open space. The proposed project would balance the needed capacity with its massing, providing a more contextual response to Sutardja Dai Hall and Hearst Mining, as well as to the Goldman School of Public Policy facilities across Hearst Avenue. Responsive massing could still result in a building with no overall loss of capacity from the existing building. The proposed building would still connect above grade to Sutardja Dai.

The building is also located adjacent to Founder's Rock, which commemorates the location where the campus was dedicated in 1860 when it was the College of California.



Cory Replacement from northwest

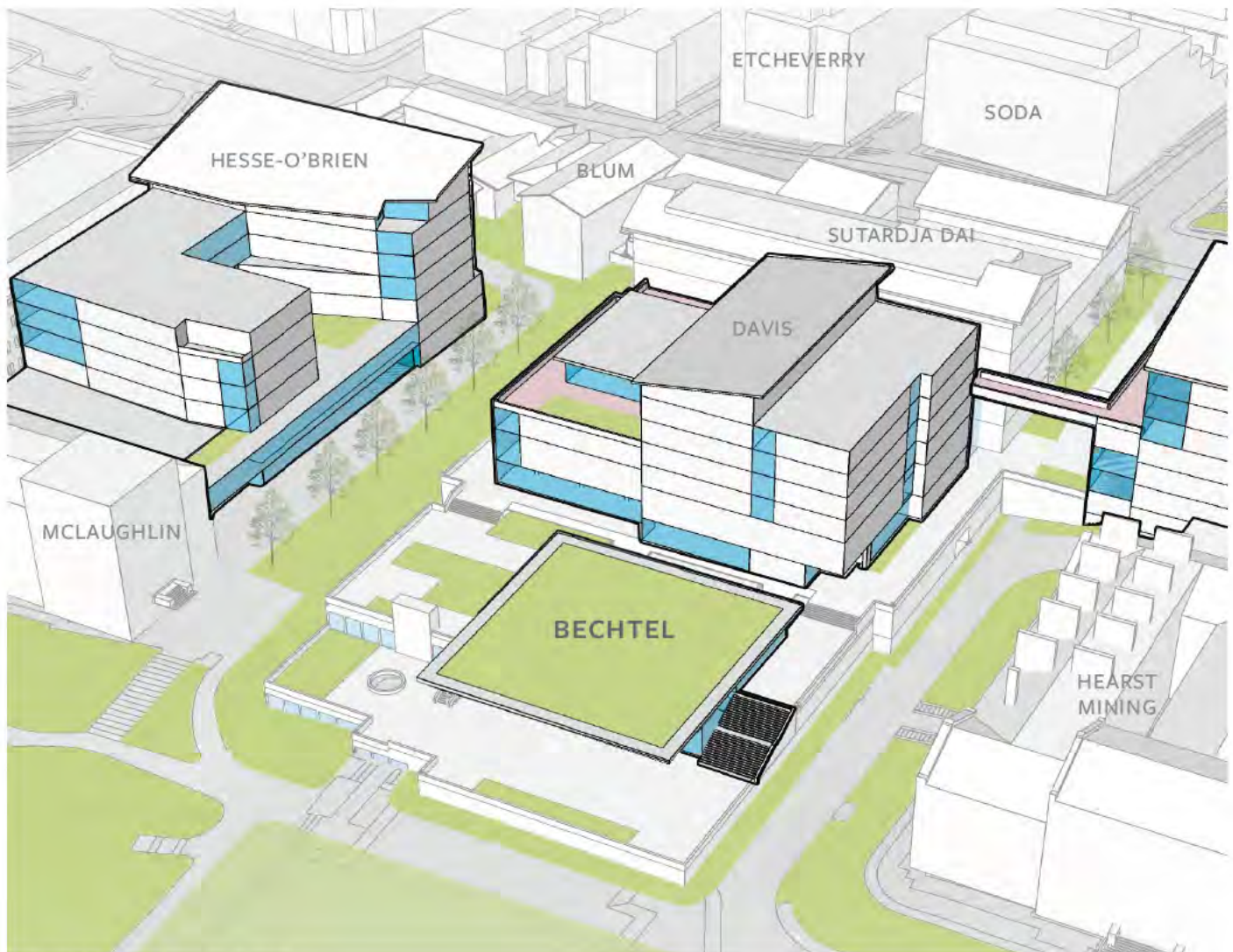
### 5.2.4 BECHTEL ADDITION AND RENEWAL

Bechtel Engineering Center houses critical community functions; together with McLaughlin Hall, it functions as the College's southern gateway within the Campus Park. The building itself is complex, navigating significant grade change with main entrances on each level. The rooftop Trefethen Terrace provides a respite with views to the Campanile, but can be difficult to find.

The 2020 Master Plan proposes a rooftop addition to the building. This pavilion structure would redefine the gateway to the precinct and reconnect the building's separate levels, while increasing the overall capacity of the building and renewing the Trefethen Terrace. The addition could better activate the terrace

by improving access and locating active program space adjacent to the terrace. The café could also be rejuvenated with improved food service, seating, and planting. Improvements to the courtyard in front of the building could be integrated into this project or implemented separately. Interior renovations to library, study and student services space would support the student experience. All of these improvements anticipate the future demolition of Evans Hall, after which the College will have increased prominence and visibility along the campus's premier open space.

The proposed project would address needed structural work within the existing building, as well as deferred maintenance including replacement or renewal of building systems.



*Bechtel Addition from southeast*

### 5.2.5 ETCHEVERRY RENEWAL

Etcheverry Hall is a large, research-intensive building. The 2020 Master Plan proposes to renew this building to address significant structural upgrades, as well as deferred maintenance and program needs. Comprehensive renewal would also facilitate reorganization of existing program to improve efficiency. Depending on instructional space programming in the Hesse-O'Brien, Davis, and Cory projects, the General Assignment classrooms in Etcheverry could be relocated to one of those projects. This would allow that space, which faces out onto the adjacent plaza, to be repurposed as highly visible, active collaboration or departmental space.

The renewal would also address qualitative needs such as increased transparency in the building's interior, which would bring more life to interior corridors and display research and activity in real time. Existing terraces, which are currently underutilized, could be enclosed as common spaces, highly visible from outside the building, and shaded on the interior to accommodate the southern exposure. The building could be renewed one floor at a time to avoid the need to surge the entire building.

### 5.2.6 MCLAUGHLIN RENEWAL

McLaughlin Hall, designed as a classroom building, is one of the College's oldest facilities. It has significant deferred maintenance needs, as many of its systems date to its original 1931 construction.

The proposed renewal would accommodate current and future teaching pedagogies, and address comprehensive building systems and structural renewal. Programmatic upgrades would also include student collaboration space to help activate the building 24/7 as a beacon to the campus. The building is also envisioned as a potential home for one of the College's centers or institutes.

The area along McLaughlin's southern edge is a transitional landscape to the Central Glade. This landscape should be designed to respond to both the building and the Central Glade, creating a collaborative threshold between the college and the campus.

### 5.2.7 OTHER PROJECTS

Soda Hall, adjacent to Etcheverry Hall on Hearst Avenue, primarily supports EECS and data centers for several nearby buildings. Although the building was built relatively recently, some renewal is needed to address structural upgrades. Soda could also provide surge space capacity, depending on project sequencing.



*Etcheverry Hall terrace*



*Soda Hall office space*



*McLaughlin Hall classroom*



### 5.3 LANDSCAPE PROJECTS

The Berkeley landscape is an iconic and memorable element of the physical campus environment. Landscapes help define and frame buildings, and offer the opportunity to create collaborative environments both in and between buildings. The precinct is already highly developed, highlighting the importance of balancing buildings and open space.

This unique asset has tremendous potential for improvement throughout the precinct, with a corresponding impact on the College’s physical environment. Landscape projects are typically less costly than building projects, and can immediately enhance the precinct and create community.

Consistent with the integrated building, landscape, and mobility strategies outlined in the master plan framework, proposed landscape projects focus on creating a cohesive College precinct with active spaces for collaboration as well as for contemplation and relaxation. Seamless connections between indoor and outdoor spaces would unify the fabric of the public realm throughout the precinct, accelerating learning and discovery.

The proposed landscape projects would also enhance the precinct’s biodiversity, with the opportunity to add vegetation that could improve the campus’s resilience as climate change occurs. Building and landscape improvements would also improve accessibility throughout the precinct.



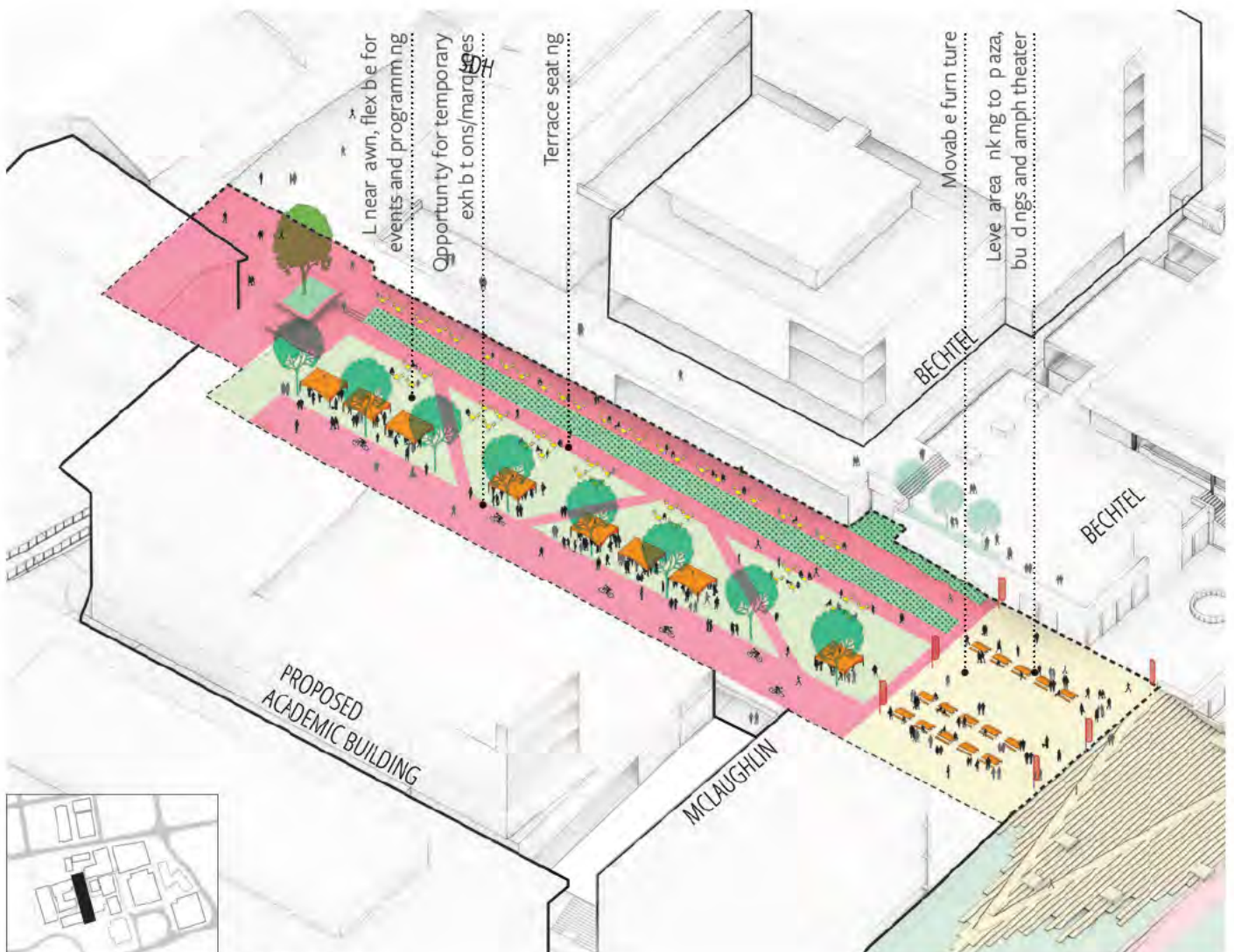
Proposed landscape projects by type

### 5.3.1 WEST PLAZA

The West Plaza is the College's primary open space; it also supports high-volume, multi-directional pedestrian and bicycle traffic. Today, it is a fragmented space that does not function as a gathering space. The 2020 Master Plan envisions the West Plaza as the precinct's central gathering space: an active outdoor collaboration hub that brings people together, both from the College and from the campus at large. The revitalized plaza would be a fully unified landscape from edge to edge, but would also have programmatic zones at a variety of scales to allow it to function as a multi-purpose space for socializing and smaller gatherings as well as larger department or College gatherings.

The existing hardscape, ranging from asphalt to concrete to pavers, would be transformed into a cohesive language of vegetated softscape and pavers. Vegetation would reinforce the campus's landscape character as an urban forest, while maintaining the proportion of open space needed for larger gatherings.

The re-envisioned plaza would unify the College's buildings from Blum Hall to McLaughlin Hall, with the potential for seamless indoor-outdoor connections. In doing so, it would unify multiple existing grades by raising the overall elevation of the existing plaza, eliminating the need for most of the existing stairs. The removal of existing stairs would also improve the plaza's overall accessibility.



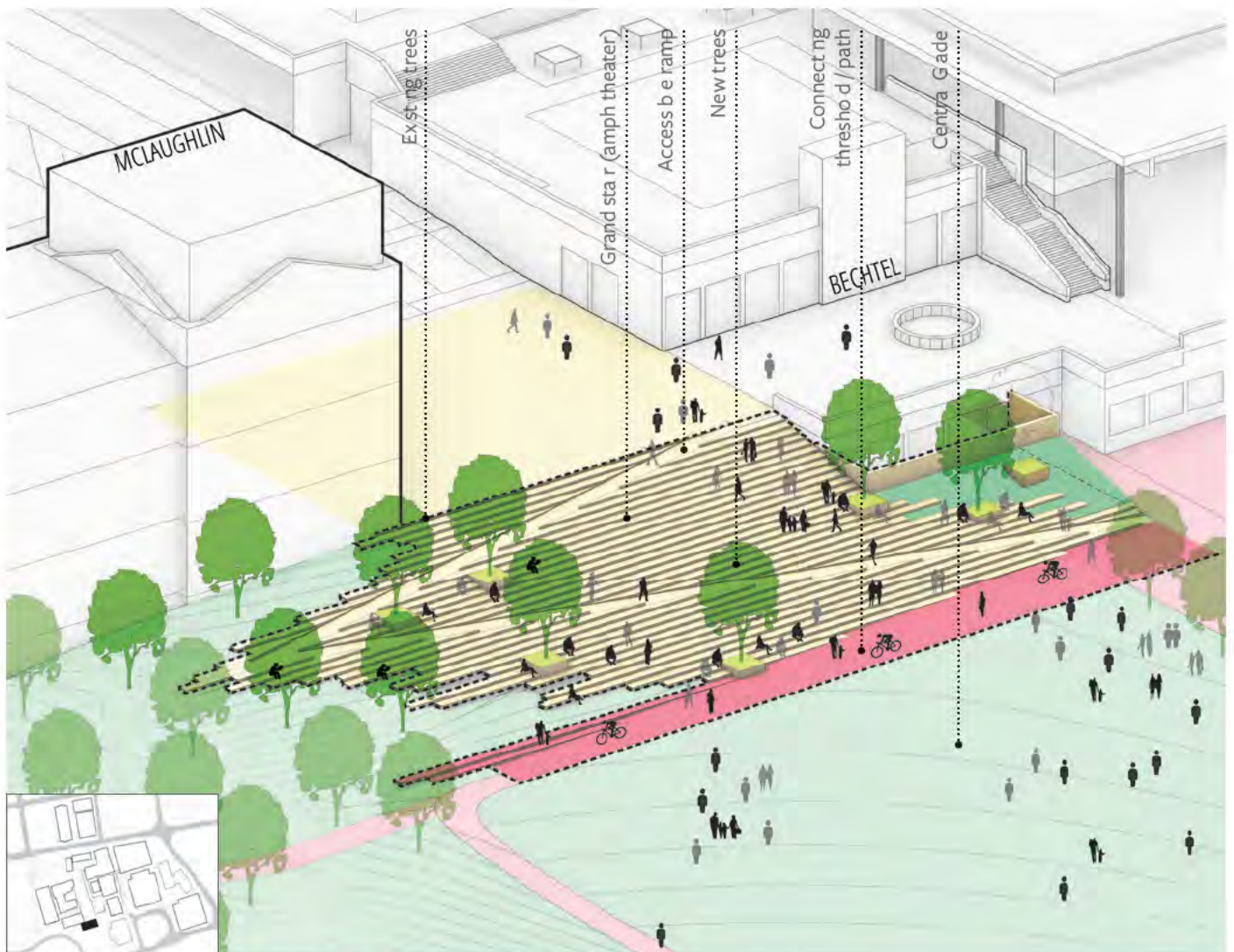
View looking northeast to the West Plaza

### 5.3.2 PLAZA STEPS

The proposed plaza steps would simplify the connection from the West Plaza to the Central Glade, enhancing and reinforcing impressive views of the Campanile. The existing stairs and accessible switchback ramp would be replaced by a graceful and expansive grand stair, with an accessible ramp running through it. At the seam between the stairs and the Central Glade, a connecting threshold path would navigate the grades, which change in multiple directions. The stairs could be occupied as a gathering space for small groups or as an amphitheater for a large event, and would provide an opportunity for people-watching, studying, and casual gatherings. The ramp would be graded such that it would not require railings.

The plaza steps would be integrated into the existing landscape. New vegetation would add shade and carry the language of the landscape into the hardscaped zones. The steps and ramp could also slow down bicycle traffic and speeds in an area with high pedestrian volumes.

This project could occur as a standalone project, or it could be phased with future demolition of Evans Hall and the subsequent renewal of the Glade in that vicinity. As this project occupies a threshold between the precinct and the rest of the Campus Park, implementation should be coordinated with other campus initiatives and potential projects.

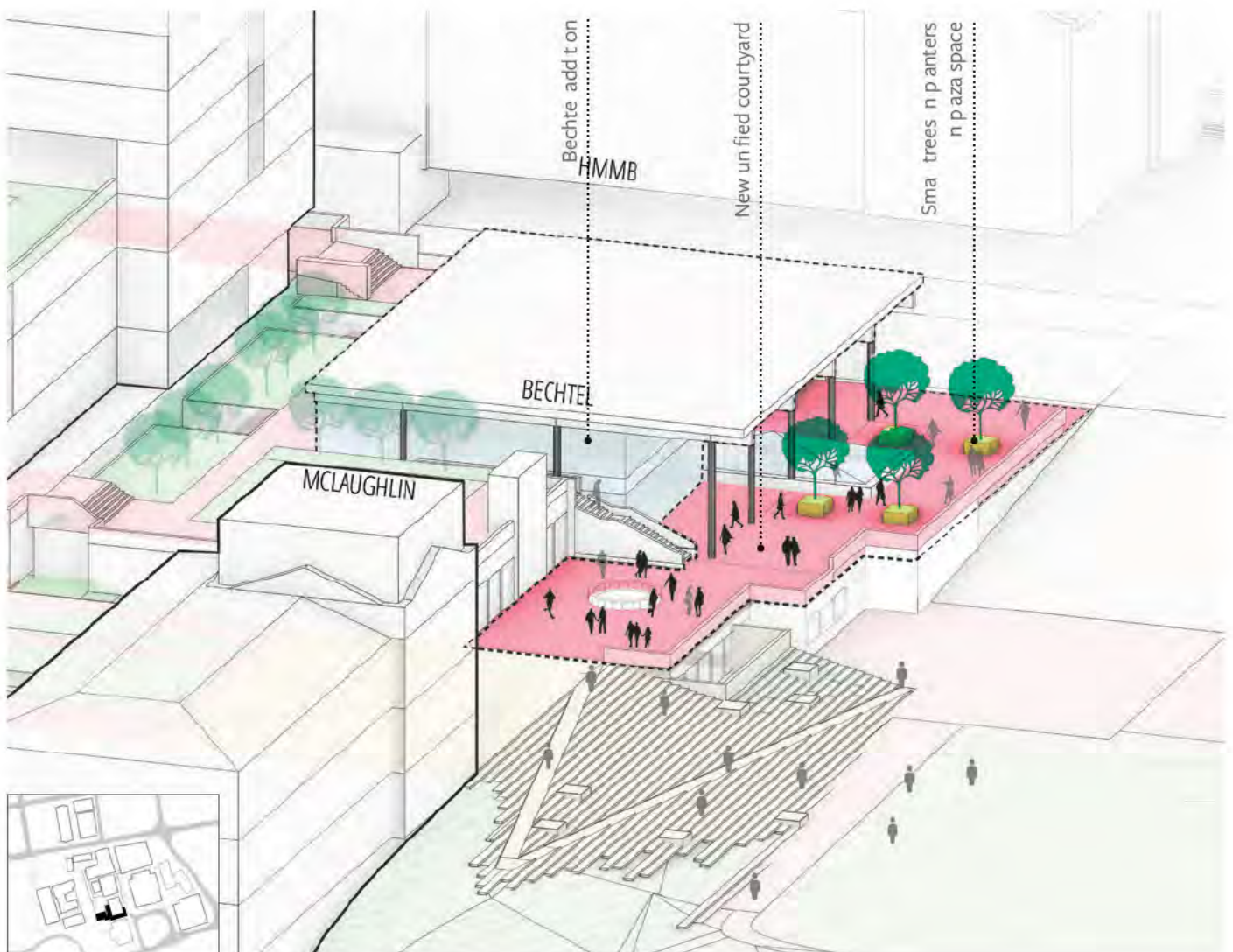


View looking north over the Central Glade, amphitheater, and West Plaza

### 5.3.3 BECHTEL COURTYARD

Bechtel Courtyard is envisioned as a transitional landscape that connects buildings and pedestrian thoroughfares, while offering additional opportunities for gathering. The proposed courtyard, located at the second level of the building, would expand the existing seating area that was recently added outside Engineering Student Services (ESS), and would be integrated with the Bechtel addition. It would also replace the existing grassy berm located in front of the building, simplifying pedestrian access to ESS. Revitalization of this open space would also serve Sibley Auditorium, whose main entrance is located at the courtyard – it would provide a more spacious entrance plaza to the auditorium, as well as improve wayfinding.

This proposed project also anticipates the future demolition of Evans Hall, which would transform the courtyard into a south-facing space with unobstructed views to the Central Glade and the Campanile. Toward that end, trees could be added in planters throughout the courtyard, in order to provide shade and vegetation, without obscuring views. Smaller trees would be appropriate for the courtyard, as the first level of the building would extend underneath the planters. The skylight to the first level below, adjacent to Sibley Auditorium, would be retained.



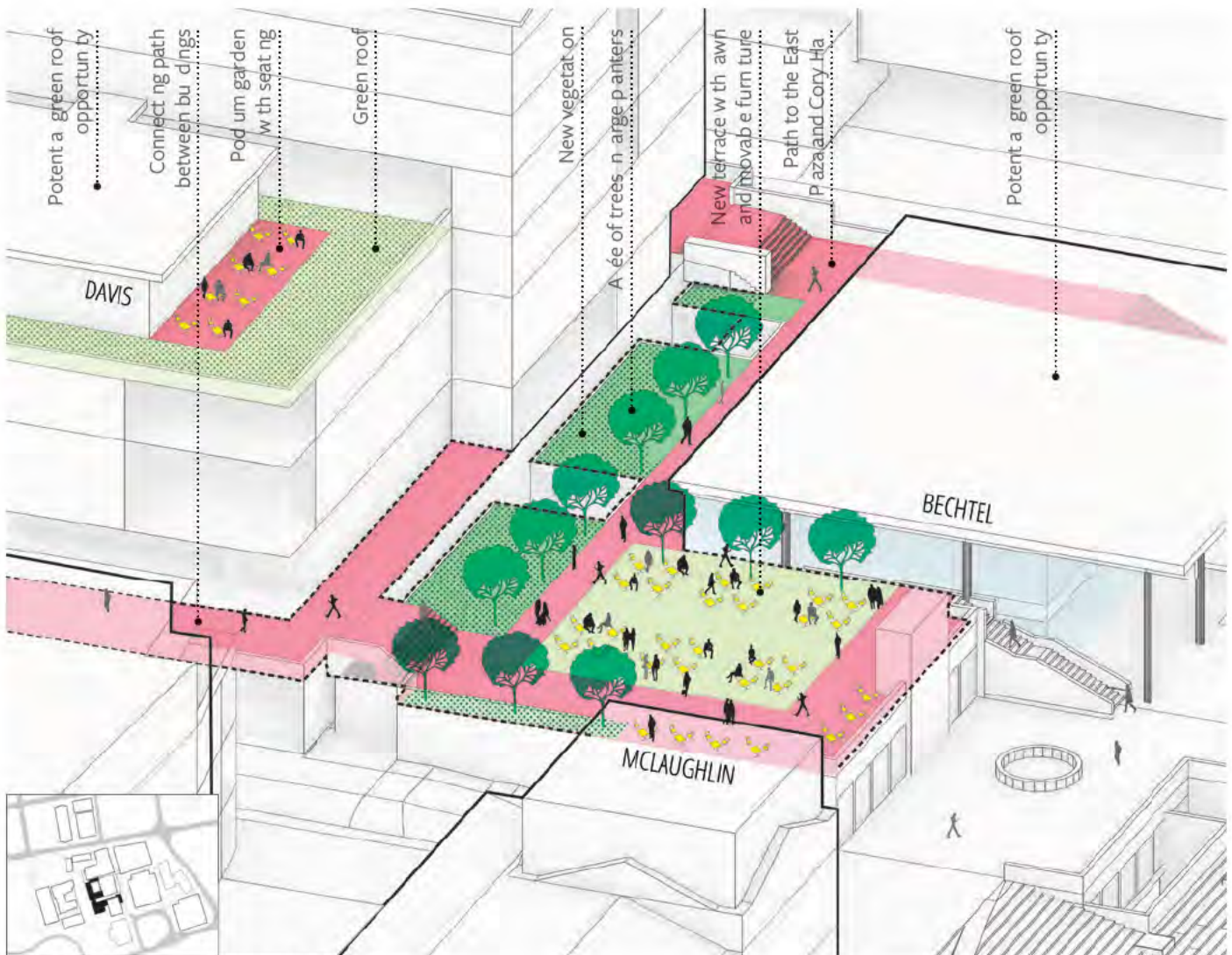
View looking east over the proposed Bechtel courtyard

### 5.3.4 BECHTEL TERRACE AND GREEN ROOF

The proposed addition to Bechtel would create an opportunity to re-envision the existing Trefethen Terrace. Although the terrace has a significant amount of seating and is vegetated via planter boxes, it can be difficult to find, even with the café located on its western side as a destination. The proposed project would revitalize the existing terrace, replacing existing furniture and activating the terrace through program in the adjacent addition. The existing landscape planters at the boundary between Davis and Bechtel would be replaced with new, larger planters that could accommodate an allée of trees. The new terrace would help maximize open space in the precinct's dense urban environment and transform it into an active social space.

Landscaping the precinct's rooftop terraces would provide shade and creates a variety of intimate social spaces. Proposed vegetation would enhance urban ecology through plant diversity and moderation of ambient temperature, thus contributing to the campus's sustainability and resilience goals. Due to its elevation, the proposed terrace would have expansive views of the Glade and the Campanile, thus celebrating the campus's heritage.

Proposed building projects should also consider adding green roofs as appropriate, and as feasible. Green roofs can greatly increase habitats for birds and pollinating insects; they offer insulating properties and opportunities for rainwater capture. Design of green roofs should also include consideration of operational ease of maintenance.



View looking east over Davis and Bechtel Terraces

### 5-3-5 EAST PLAZA

The East Plaza is a critical connector between Hearst Avenue and the College precinct. It helps negotiate significant grade changes and the large volume of pedestrian traffic between the College's buildings on either side of Hearst Avenue, leading to a signalized street crossing added in recent years. The existing plaza does have some vegetation and shade trees, but is primarily hardscape and generally functions primarily as a pedestrian thoroughfare.

The proposed project would improve the pedestrian experience traversing the plaza, enhancing the wayfinding experience through pathway and landscape adjustments. It would add an integrated system of vegetated planters and pathways, with the goal of converting the large expanse of uninterrupted hardscape into a series of smaller, human scaled spaces.

Additional tables and seating could be added to facilitate collaboration and contemplation, transforming the vegetated zones into intimate outdoor rooms. The project would also be complemented by the Davis addition, which would resolve the existing narrow pedestrian pathway by replacing it with one that can accommodate desired pedestrian volumes. The future Cory redevelopment should consider its massing relative to this plaza, striving to minimize the impact of the shadows the building casts.



Illustrative plan view of the East Plaza

### 5.3.6 SOULE CORRIDOR

Soule Road is a major shared use corridor that connects the College to the campus's North Gate entrance; it supports pedestrians, bicycles, service vehicles, and emergency vehicles. In addition to regular service vehicle activity, frequent deliveries are made to Hesse and McCone Halls.

The master plan proposes to transform Soule Road into a pedestrian-priority shared use path. It would re-grade the existing pathway to maintain all connections to existing pathways, including the improved West Plaza, Hesse-O'Brien and McCone Hall service entrances, and accessible routes to North Gate Hall. New lighting and vegetation in the softscaped areas would

improve wayfinding. Changes in paving materials, as well as signage consistent with the campus signage standards, can also provide clear signals to pedestrians, bicycles, and vehicles on where to go. The improved corridor would also be designed with accessible routes in mind, in order to create a path of travel that is as direct as possible.

Improvements to the Soule Road corridor should be coordinated with the West Plaza and Hesse-O'Brien replacement projects, as the corridor would connect to both projects, potentially at different grades than they do today. Proposed improvements would maintain the minimum emergency vehicle requirements relative to turning radii and pathway width.



View looking east over North Gate and the Soule Road shared service route

### 5.3.7 CENTRAL GLADE RESTORATION

Restoration of the adjacent section of the Central Glade could be paired with the Plaza Steps project. The Glade is the campus's primary and historic open space, and its areas of open lawn are ideal for passive recreation. This section of the Central Glade, between McLaughlin, Bechtel, and Evans Halls, has the potential to provide much-needed recreation space. The restoration would unify the existing fragmented landscape, in keeping with the character of the adjacent Memorial Glade and Hearst Mining Circle. The view corridor to the Campanile from the West Plaza should be preserved. The project should also be consistent with significant characteristics of the Classical Core, which is listed on the National Register.

The restoration of the Central Glade should be coordinated with campus initiatives, such as the future demolition of Evans Hall. Evans Hall could be replaced by an open space that enlarges this area of the Glade, or it could also be redeveloped with lower buildings that frame the existing views along all axes.

### 5.3.8 SABER TOOTH PLAZA

The 2020 Master Plan re-envisioned the Saber Tooth Plaza, located between McCone and McLaughlin Halls. Today, the plaza functions as a pass-through space by occupants of McCone and McLaughlin; passage to Hesse Hall is possible, but is not signed or frequently used. The proposed project would revitalize the plaza as a gathering plaza and contemplative open space, shaded by existing trees along University Drive. It could also act as a connector between University Drive and the West Plaza, along with a new, open passageway between the Hesse-O'Brien Replacement and McLaughlin Hall. Active program at the ground level of the Hesse-O'Brien Replacement and McCone Hall would bring life to the plaza and connecting landscape. Implementation of this project would include collaboration with McCone Hall occupants.



*Illustrative plan view of Central Glade, Saber Tooth Plaza, and Memorial Glade*



## 5.4 NEAR TERM IMPROVEMENTS

In addition to the identified building and landscape projects, a number of near term projects could begin to activate the precinct's transformation. The proposed projects are highly visible, high-impact projects that anticipate future capital projects, and are focused on providing community spaces, both indoors and outdoors.

- **North Plaza.** The North Plaza, located between Etcheverry, Soda, and Jacobs Halls, has several potential near-term improvements. Additional seating could be integrated into the hardscape to provide places to gather; no such seating exists today other than at the V&A Café, although the plaza is wide enough to accommodate it throughout. Seating could be accompanied by adding shading material to enclose the open trellis overhead, potentially leveraging solar power opportunities to provide power in the seating areas below.
- **Covered Outdoor Seating.** The Bay Area climate is generally temperate; students, faculty and staff would spend time in outdoor spaces on sunny or rainy days, if sheltered outdoor spaces were available. Shade and rain shelters, from umbrellas to more expansive structures, would provide opportunities for students, faculty, and staff to congregate within the precinct while being protected from the elements.
- **West Plaza Landscape Furnishings.** In the near term before the Hesse-O'Brien and Davis projects are completed, new furniture and landscape amenities could be added to foster

collaboration and pilot potential longer-term landscape improvements. Upgrades should be anticipated to be in place until the Hesse-O'Brien and Davis projects are completed, or according to the College's discretion.

- **Bechtel Terrace Enhancements.** These near-term improvements would refresh the existing Trefethen Terrace until the Bechtel addition project is implemented. Improvements would focus on creating more functional and modern gathering spaces, and on providing amenities to better support outdoor collaboration. Improvements should include replacement of existing furniture.
- **Bechtel Library Commons.** While the library has been upgraded in recent years with the conversion of some of the book stacks to study spaces, there is more demand for the latter. This proposed project would convert additional stack space into student common space, including open study areas, and meeting rooms that can be scheduled.
- **Hearst Mining Courtyards.** The original design of this National Register building did not account for open collaboration space, although the renovation includes some of these spaces within office suites. The proposed project would enclose the existing light wells in the building, in order to provide new, covered common spaces for studying and informal meetings. Implementation of this project should include consideration of muffling noise from building systems that are routed through the light wells.

# 6 PHASING & IMPLEMENTATION



This section documents the phasing scenario recommended for the 2020 Master Plan. Phasing and implementation are the keys to achieving the goals and projects outlined in the master plan. The phasing scenario identifies a way forward in implementing the plan, highlighting enabling projects and surge space needs, as well as individual space moves that will facilitate larger projects. In the College's constrained physical environment, with little existing surge space, the phasing scenario is of particular importance and must focus on pragmatic, realistic steps.

The phasing scenario described in this section was identified as the preferred scenario among the many alternatives that were studied throughout the planning process. There are multiple phasing scenarios that can work from a physical planning and surge space perspective. However, the preferred scenario reflects additional considerations, such as funding sources and departmental preferences. As conditions change in the future, the phasing sequence can be adjusted, drawing on flexibility built into the preferred scenario, as well as previously studied scenarios.



## 6.1 PHASING ASSUMPTIONS

Many factors and assumptions drive project prioritization, making the project phasing a challenging and less predictable element of a master plan. The following major factors informed the development of phasing scenarios:

- Site utilization and building area
- Building condition and quality
- Departmental cohesion
- Programmatic space needs
- Surge space
- Location
- Multi-purpose building programs
- Overall project impact

When all existing development sites are currently occupied, surge space is a critical factor for any phasing scenario, as it is typically a limited but necessary resource to begin a sequence of construction projects. The College, similar to the campus at large,

currently has little surge space to spare. Accordingly, the relatively low-density development of the Hesse-O'Brien site makes it an obvious candidate for replacement and the first step for any of the College's potential phasing scenarios.

Phasing options are also driven by the need for structural upgrades and the subsequent need to accommodate displaced departments and other users. Davis and Cory Halls are both large buildings in need of significant structural and building upgrades, making them the next priorities in the phasing sequence. Their replacement is both necessary and complex, but will displace large amounts of program and people. While departments and units would ideally move only once, as moves can be costly, the complexity of redeveloping a fully occupied precinct may require additional moves before departments reach their desired location. For this reason, the assignment of departments to buildings must remain flexible, while maintaining the goal of creating dedicated department homes.



*Proposed end users at the completion of the 2020 Master Plan*

## 6.2 PREFERRED PHASING SCENARIO

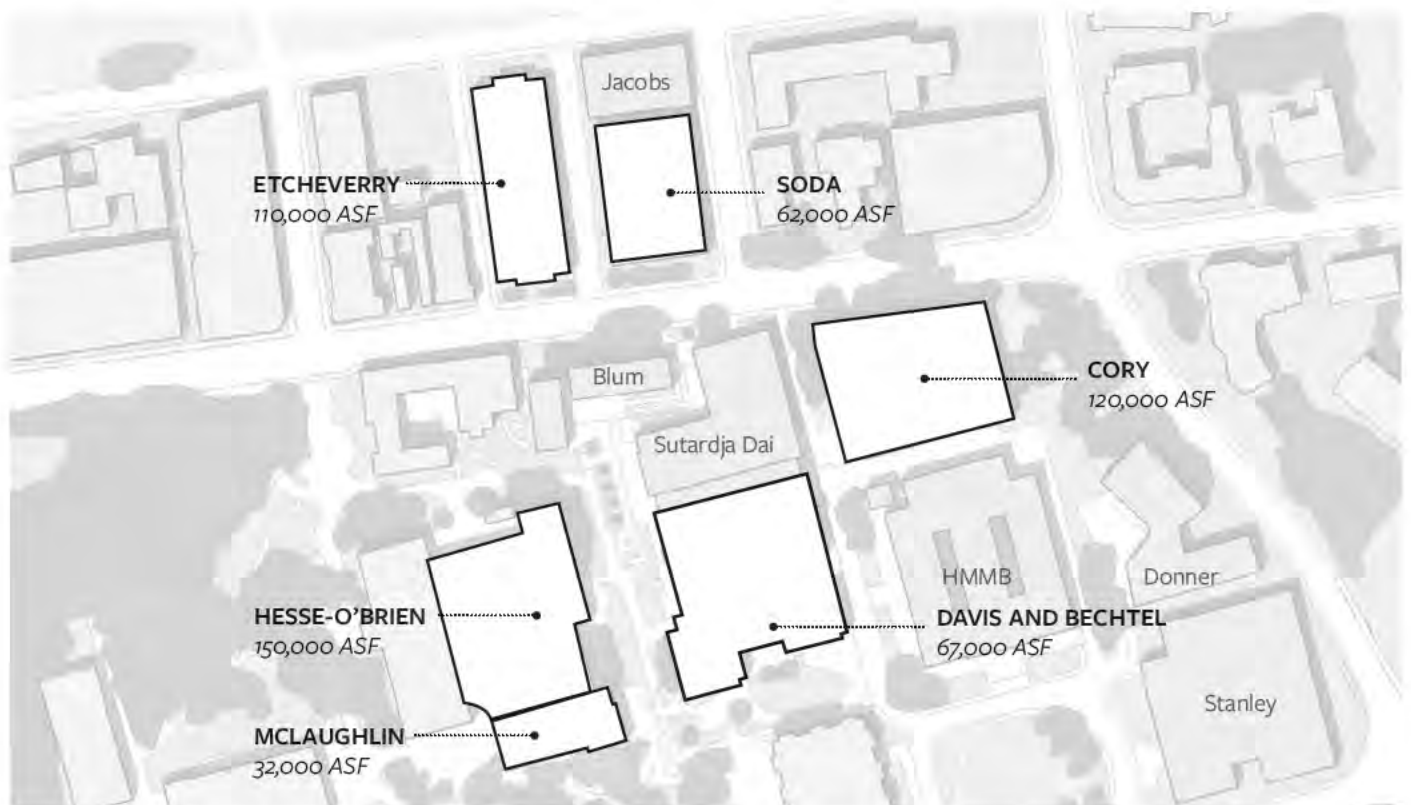
The preferred phasing scenario is initiated by the demolition and replacement of Hesse and O'Brien Halls, which creates a bank of surge space that enables subsequent projects throughout the sequence. Although some steps in the sequence may require multiple moves, the scenario minimizes the number of moves to the extent possible. The scenario provides the majority of the College's departments with consolidated locations, with the exception of additional locations for strategic considerations, such as interdisciplinary research. Additionally, the scenario aims to avoid moving program into qualitatively lesser space.

The scenario also incorporates the assumed move of some Computer Science faculty to the Data Hub project that is currently in its programming phase. Over the long term, the scenario also accommodates the consolidation of leased space back to campus. Near term projects are not included in the phasing scenario, as they can be implemented independently.

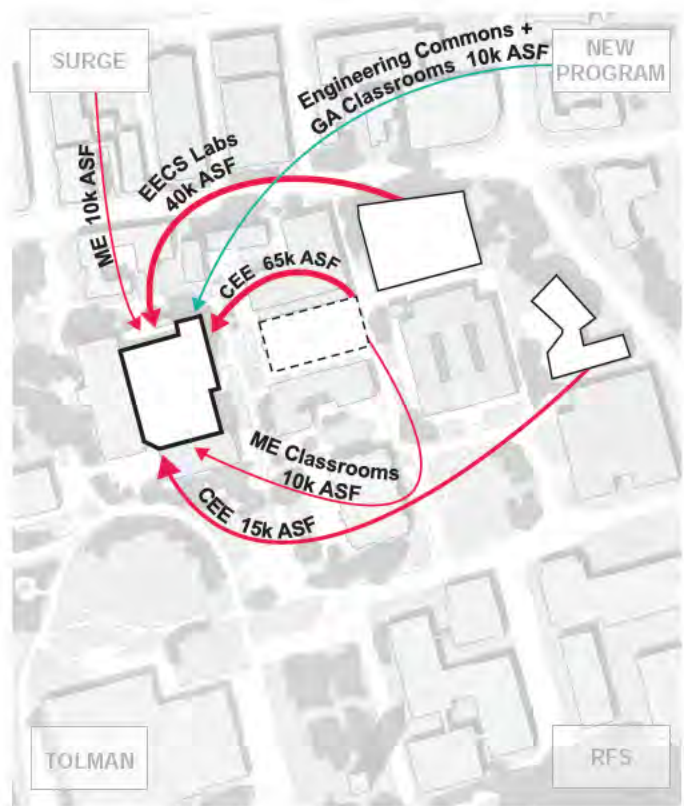
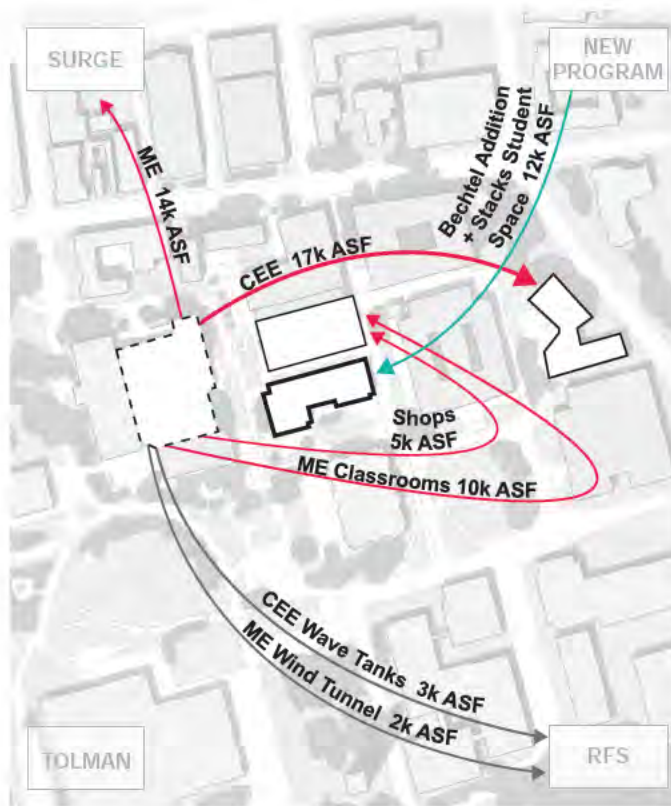
The preferred phasing scenario would include the sequence of major building projects that conclude this section.

Recommendations for major landscape projects are included on the following pages. Note that the phasing order could change based on conditions at the time of implementation.

- **Engineering Hub**
  - **Hesse-O'Brien Replacement:** CEE, EECS, ME, Engineering Commons, instructional space
  - **Bechtel Addition and Renewal:** Student space, collaboration space including for innovation and entrepreneurship
- **Davis Renewal**
  - **Davis Addition and Renewal:** EECS, instructional space, collaboration space
- **Multi-Disciplinary Initiatives**
  - **Cory Replacement:** BioE, IEOE, NE, instructional space, collaboration space
  - **Etcheverry Renewal:** ME, Aerospace Engineering, conversion of GA classrooms to collaboration space
  - **McLaughlin Renewal:** Fung Institute
  - **Soda Renewal:** Long-term surge and expansion space



Proposed projects



### Hesse-O'Brien Surge

Phase 1 focuses on surging the existing occupants of Hesse and O'Brien Halls, to enable the replacement of the existing buildings. This phase includes the following steps:

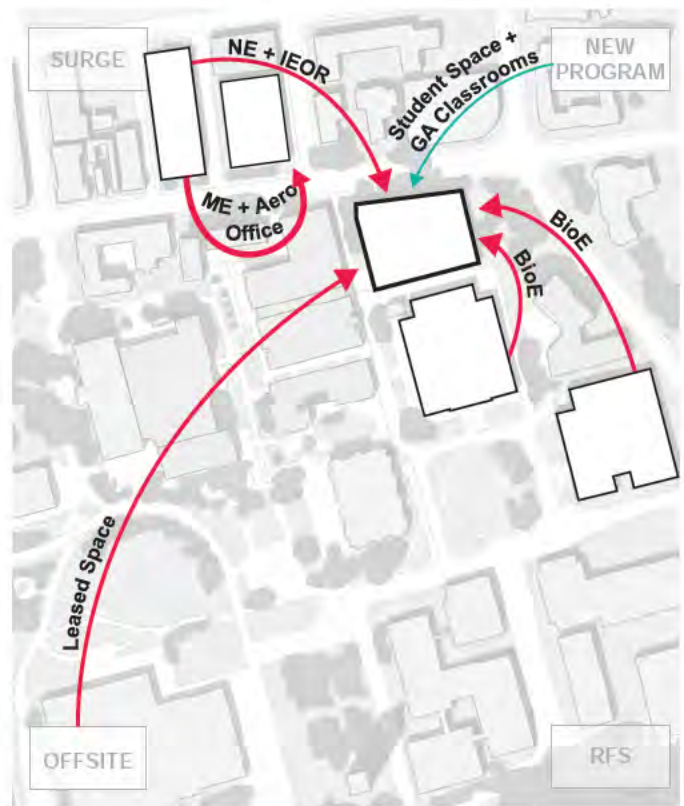
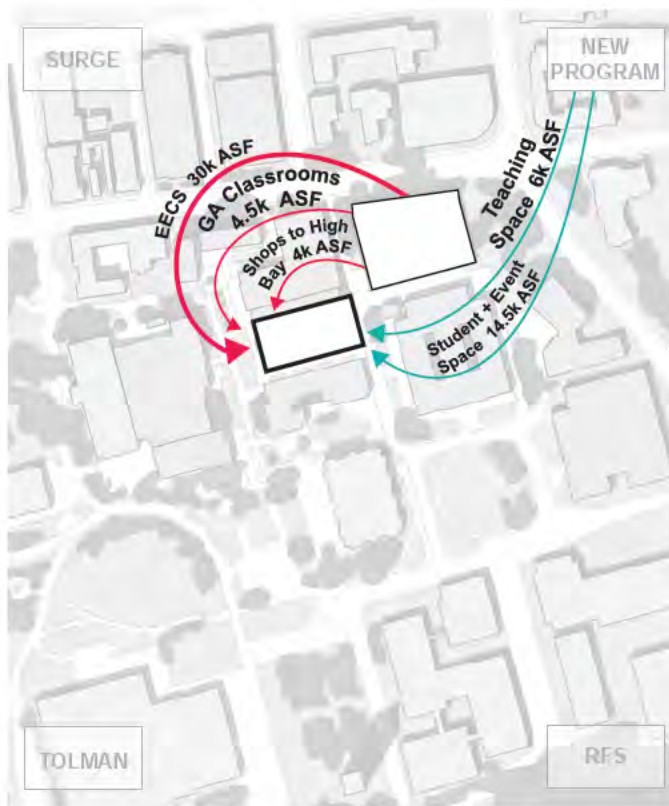
- CEE temporarily compresses into Donner swing space
- ME classrooms temporarily occupy Davis
- CEE, ME move assets to Richmond Field Station and elsewhere
- Renovations to Soda Hall would be completed based on the construction of the Data Hub. The renovations would create additional surge space capacity.
- Bechtel Addition
  - Build pavilion and renovate terrace
  - Bechtel courtyard improvements
  - Bechtel Library Commons (this project could occur earlier as a near-term project depending on available resources)

*Note: Surge planning is subject to change, based on availability of surge space outside of the College precinct.*

### Engineering Hub

Phase 2 starts with the construction of the Hesse-O'Brien replacement, followed by demolition of the upper levels of Davis Hall, whose occupants move into the Hesse-O'Brien replacement. This phase includes the following steps:

- Hesse-O'Brien Replacement
  - CEE, ME faculty and research/instructional labs (return from Hesse-O'Brien surge, plus Davis occupants)
  - GA and College classrooms
  - EECS faculty and research labs from Cory Hall
- West Plaza renovation
- Soule Corridor improvements
- Saber Tooth Plaza
- Bechtel surge to enable addition and renovation
- CS faculty and research space move to Data Hub (approximately 100,000 ASF)
  - EECS faculty surge from Cory to Soda as needed



### Davis Renewal

Phase 3 starts with the construction of the Davis addition project, including renewal of the high-bay facility and lower level. This phase includes the following steps:

- Davis Addition and Renewal
  - EECS faculty and research labs from Cory
  - Classrooms, teaching labs, and student clubs hub
- East Plaza renovation

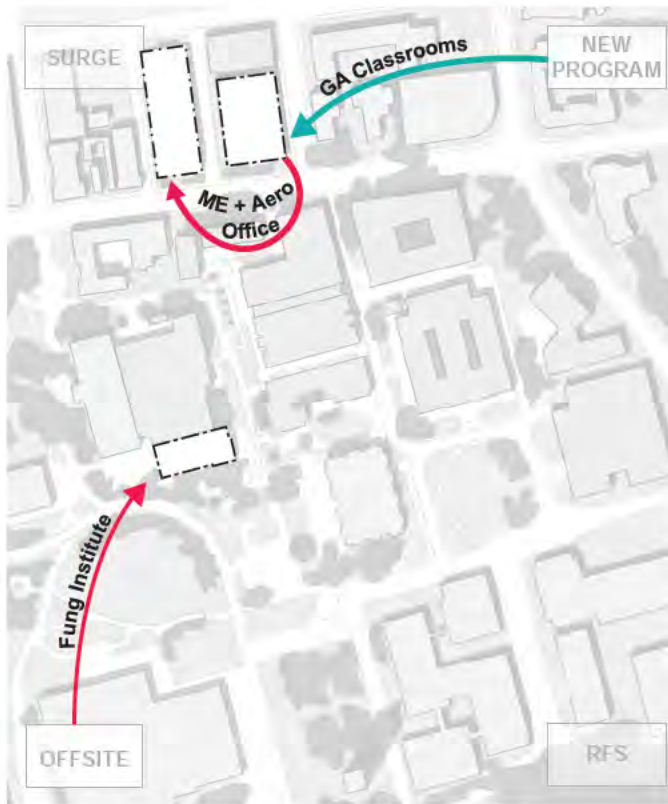
### Cory Replacement

Phase 4 assumes that the current occupants of Cory Hall have relocated to the Engineering Hub and Data Hub. Any remaining surge moves to enable the replacement of Cory Hall could be accommodated in Soda Hall.

- Cory Replacement
  - NE, IEO move from Etcheverry
  - BioE moves from Hearst Mining
  - Leased space consolidated back to campus

### Assumptions (applicable to all phases):

- Occupants and space programs are preliminary planning assumptions and need to be developed as projects occur.
- This sequence is subject to change relative to funding or changes in space needs.
- Scenario aims to avoid moving program into qualitatively lesser space.



### Major Building Renewals

The following major building renovations can occur after Phase 2 as funding becomes available, and as surge can be accommodated in Soda Hall:

- Etcheverry Renewal
  - ME, Aerospace faculty and research labs, phased floor-by-floor laboratory renovations
  - Conversion of GA classrooms to collaboration space
- McLaughlin Renewal
  - Dean’s office moves to Hearst Mining
  - Fung Institute relocates from off campus
- Soda Renewal
  - Surge and expansion space for the College



## 6.3 IMPLEMENTATION

As one of the country's top public institutions of higher education, UC Berkeley expands the boundaries of knowledge, challenges convention and expands opportunity to create the leaders of tomorrow.

The 2020 Master Plan serves as a road map for transforming the engineering neighborhood of the Campus Park to embody a vibrant and inclusive culture that values diversity and collaboration, and maximizes the impact of the College of Engineering's educational and research programs. The master plan proposes a series of projects and strategic initiatives to rejuvenate the physical infrastructure to meet current seismic performance

standards, and to provide modern facilities for learning, discovery and innovation. It aims to create a coherent and identifiable home for the College, with outward-facing and engaging buildings, to serve as a welcoming destination for engineering students, faculty, staff and the campus community at large.

Focusing on optimized use of existing resources, buildings and land, the master plan calls for both new building construction and transformational renovation of existing facilities. Successful implementation will require engagement and collaboration across a broad group of stakeholders, and will provide inspiring spaces and places for cultivating talent and producing transformative technology toward a brighter future for all.



*The re-envisioned precinct, looking north towards the West Plaza, Davis Hall, and Bechtel Engineering Center*



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San Francisco, CA 94105  
415-957-9445  
[www.arup.com](http://www.arup.com)

### Simpson Gumpertz & Heger

Structural / Seismic Engineer  
100 Pine Street, Suite 1600  
San Francisco, CA 94111  
415-495-3700  
[www.sgh.com](http://www.sgh.com)

### SWA Group

Landscape Architect / Wayfinding / Signage  
811 W. 7th Street, 8<sup>th</sup> Floor  
Los Angeles, CA 90017  
213-236-9090  
[www.swagroup.com](http://www.swagroup.com)

### Cumming

Cost Consultant  
475 Sansome Street, Suite 520  
San Francisco, CA 94111  
415-748-3080  
[www.ccorpusa.com](http://www.ccorpusa.com)



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