SAFER
Program

Seismic Action Plan for
Facilities Enhancement and Renewal

UNIVERSITY OF CALIFORNIA, BERKELEY
OCTOBER 24, 1997

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PART I

EXECUTIVE SUMMARY

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In the 20 years since the UC Regents' Policy on Seismic Safety was adopted to guide the campus in assessing the safety of its structures and the campus inaugurated its seismic corrections program, several major earthquakes have occurred in urban areas. The Loma Prieta in the Bay Area, Northridge in Southern California, and Japan's Kobe earthquake have together provided a wealth of insight into seismicity and building behavior. With this new information, and in consideration of the age of campus buildings, the campus's proximity to the Hayward Fault, and the university's obligation to provide safe facilities for students, faculty, and staff, the Berkeley campus commissioned a new review of its buildings.

The completion of this review provides the campus with the most up-to-date, comprehensive analysis of structural seismic safety performance it has ever had. Correcting seismic deficiencies in campus facilities has long been an issue of the highest priority. Now, equipped with this new review, the campus can more effectively focus its efforts to meet its greatest responsibility: the protection of the life and safety of students, faculty, and staff. Further, the review provides a clearer understanding of what it will take to ensure the sustained operation of the campus as one of the region's largest job centers and one of the nation's most important educational and research institutions.

The 1997 survey was conducted jointly by three of California's most experienced structural engineering firms. They analyzed the probable performance of campus structures in the likely event of a major earthquake on the Hayward Fault. They concluded that given the age of the campus's buildings and new information on how buildings react in strong earthquakes, particularly given the campus's proximity to a major fault, the amount of campus space in need of corrective seismic work has increased significantly.

In the 1970s, when the first facilities assessment was undertaken, experts determined that a significant portion of the main campus's space required retrofitting to be safe in a major earthquake. Work on 18 of the structures thus identified — including the upgrading of the three high-rise residence hall complexes to a rating of Good — has been completed or is under way. Thus far, the campus's program has funded approximately $250 million of seismic improvements.

Phase 1 of the new assessment, conducted over the summer, has determined that 73 percent of the space on campus, including buildings with corrections under way, will perform adequately in a major earthquake, but approximately 27 percent of the main campus's total space rates Poor or Very Poor and needs corrective work. The second phase, assessing primarily off-campus structures, will be completed in mid-November.

Most building ratings were downgraded as a result of greater knowledge of building performance in earthquakes, particularly structures close to fault lines. The buildings today are not less safe than they were 20 years ago, but we now have superior evaluation techniques based on actual experiences of earthquakes in urban areas. Further, the age of the campus's physical plant cannot be overlooked. Most of the seismically deficient buildings were constructed before 1960 when less stringent building codes were in effect.

The preliminary estimated total cost to retrofit the on-campus facilities most in need of attention for life safety purposes is approximately $700 million, in 1997 dollars. Preliminary projections of available funds indicate that a 20- to 30-year time frame could be required to fund a seismic program of this magnitude. The total cost of the program would escalate to at least $1.2 billion over such a time frame, including assumed inflationary increases and new understandings of seismic safety developed along the way.

Though correcting these buildings will be a long-term, costly undertaking, the new information provides the campus with an exceptional framework from which to develop a strategic plan to deliver the most responsible, effective, and cost-efficient solution.

To start, Chancellor Robert M. Berdahl has committed $1 million to intensify campus planning and has announced a 10-point action plan that includes a high-level administrative restructuring to focus on the issue. The 10-point plan, called the SAFER (Seismic Action plan for Facilities Enhancement and Renewal) Program, provides a comprehensive approach to seismic safety on the UC Berkeley campus.

The 10-Point SAFER Program

1. Create a new position titled Vice Chancellor for Capital Projects whose duties will include overseeing all aspects of the SAFER Program.
2. Form an Executive Campus Planning Committee chaired by the Chancellor to be responsible for all physical planning decisions on the campus, including the coordination of seismic projects with academic program improvements.
3. Establish campus precinct planning committees to assess seismic needs in specific areas of campus along with campuswide functional assessment committees.
4. Determine the need for full or partial closure of facilities posing an unacceptable risk for continued use.
5. Create a master plan for facilities renewal.
6. Overhaul and streamline capital project management to increase efficiency and cost effectiveness.
7. Develop plans for obtaining temporary space, sites, and buildings to house functions that must be relocated as structures are renovated, or, in some cases, demolished and replaced.
8. Initiate a multiple-source financing plan to implement the plan for seismic corrections.
9. Ensure comprehensive emergency preparedness and provide training.
10. Develop a comprehensive campus and community communications plan.

The SAFER Program, with its implications for the security of the campus community and for the sustained operation of the institution in the event of a major earthquake, will remain a top priority for the campus for many years to come.

PART II

BACKGROUND

BACKGROUND

The Fault

The Hayward Fault, a part of the San Andreas Fault system, is the closest active fault to the campus, crossing through the eastern part of the campus. Earthquakes on the Hayward Fault in 1836 and 1868 produced strong ground motions and widespread damage in the Bay Area. The magnitudes of these events have been estimated at M7 and M6.5-7, respectively. Since the early 1800s major earthquakes also have been reported on the Calaveras Fault to the east of the Berkeley hills. In general, earthquakes with magnitudes greater than 6 occurred with epicenters within 20 miles of the UC Berkeley campus in 1836, 1838, 1865, 1868, 1898, 1906, 1911, and 1984. Therefore, the risk to human life and property from a major seismic event is expected to be especially severe.

Earlier Seismic Assessments of the Campus

An early study of state-owned buildings indicated that a significant number of the most hazardous buildings in California were on the Berkeley campus, and projects have been included in the campus's capital improvement program to address this. The current five-year state-funded capital program is devoted almost exclusively to seismic projects. Corrections totaling approximately $250 million have already been completed or are funded and in progress, including the three high-rise residence hall complexes. All of these corrections are designed to bring the buildings to a rating of Good.

Seismic projects completed or in progress include South, Wheeler, California, McCone, Barker, North Gate, and University halls, Moffitt Library, Doe Library, the Hearst Memorial Mining Building, 2607 Hearst, 2401 Bancroft, 6701 San Pablo, Harmon Gymnasium, and University House. In addition, much more work has been done to mitigate nonstructural hazards. The assignable square feet (ASF) of these buildings is nearly 1.5 million, or 21 percent of the main campus space.

The Current Seismic Evaluation

Since adoption of The Regents' Policy on Seismic Safety 20 years ago, several major seismic events have occurred in urban areas. The Loma Prieta, Northridge, and Kobe (Japan) earthquakes have provided a wealth of knowledge of seismicity and building behavior. With this new knowledge, and in consideration of the age of campus buildings, Berkeley's proximity to the Hayward Fault, and its obligation to provide safe facilities for students, faculty, and staff, the Berkeley campus commissioned a new review of its buildings in the summer of 1997.

The 1997 Preliminary Seismic Evaluation, Phase 1 Report,* conducted jointly by three structural engineering firms (Degenkolb Engineers; Rutherford & Chekene, Consulting Engineers;f and Forell/Elsesser Engineers), analyzed the probable performance of campus

*This document is available for review at the reference desk at the Information Center, 1st Floor, Doe Library.

structures under a major earthquake on the Hayward Fault. The three firms reviewed architectural and structural drawings of over 100 campus buildings, walked through each, and assigned a performance rating to each. The survey methodology included comprehensive peer review and utilized several earthquake/seismic rating models to ensure consistency.

The $250,000 survey has revealed that the amount of campus space in need of corrective seismic work represents approximately 27 percent of the main campus's total ASF.

The following report outlines the magnitude of the problem, the planning issues involved, and implementation strategies being considered by campus leaders. It also identifies strategic planning considerations that provide a framework for decision making.

PART III

FINDINGS AND IMPLICATIONS

FINDINGS AND IMPLICATIONS

Combining known seismic needs and the recommendations in the 1997 Preliminary Seismic Evaluation, Phase 1 Report, seven campus buildings have been rated Very Poor and 50 buildings have been rated Poor (a ratings explanation is given below). No buildings were downgraded to Very Poor as a result of the new report, but many formerly rated Good or Fair were downgraded to Poor.

In all, 315,000 assignable square feet (ASF) is rated Very Poor and 1,610,000 ASF is rated Poor, totaling nearly two million ASF, or 27 percent of campus space. Nearly three-quarters of all campus space is rated Good or Fair.

These figures and the analysis do not include facilities at Clark Kerr Campus, Richmond Field Station, Albany Village, and other off-campus facilities, which remain to be rated in Phase 2 of the evaluation project. Nor do they include more than 780,000 ASF in seismic projects currently funded for construction (Doe Library, 6701 San Pablo, 2607 Hearst, 2401 Bancroft, McCone Hall, Harmon Gym, and Hearst Mining).

The 57 buildings rated Very Poor and Poor have a current replacement value exceeding $1 billion. A preliminary estimate of the total cost for seismic retrofit of these 57 facilities is at least $700 million, in 1997 dollars. This estimate includes seismic retrofit and associated minimum code upgrades, essential deferred maintenance work that should be performed concurrently with the seismic retrofit construction, demolition/relocation costs, and surge costs (that is, costs to relocate people and programs during construction). These estimates do not include non-seismic interior renovations. Preliminary estimates of available funds indicate that a 20- to 30-year time frame could be required to fund seismic corrections in these buildings. The total cost of the program would escalate to at least $1 billion to $1.2 billion over such a time frame, including assumed inflationary increases.

The campus has long recognized its seismic safety problems and for some time has ranked correcting seismic deficiencies in campus facilities an issue of the highest priority, in order to protect the life and safety of students, faculty, and staff. The campus currently is in the midst of a major seismic upgrade program involving numerous campus buildings, and the realization of the magnitude of the problem identified in the 1997 Preliminary Seismic Evaluation comes at a time when the campus had anticipated completion of its seismic program by the middle of the next decade. The increased number of buildings means that a comprehensive program could take 20 or more years to complete.

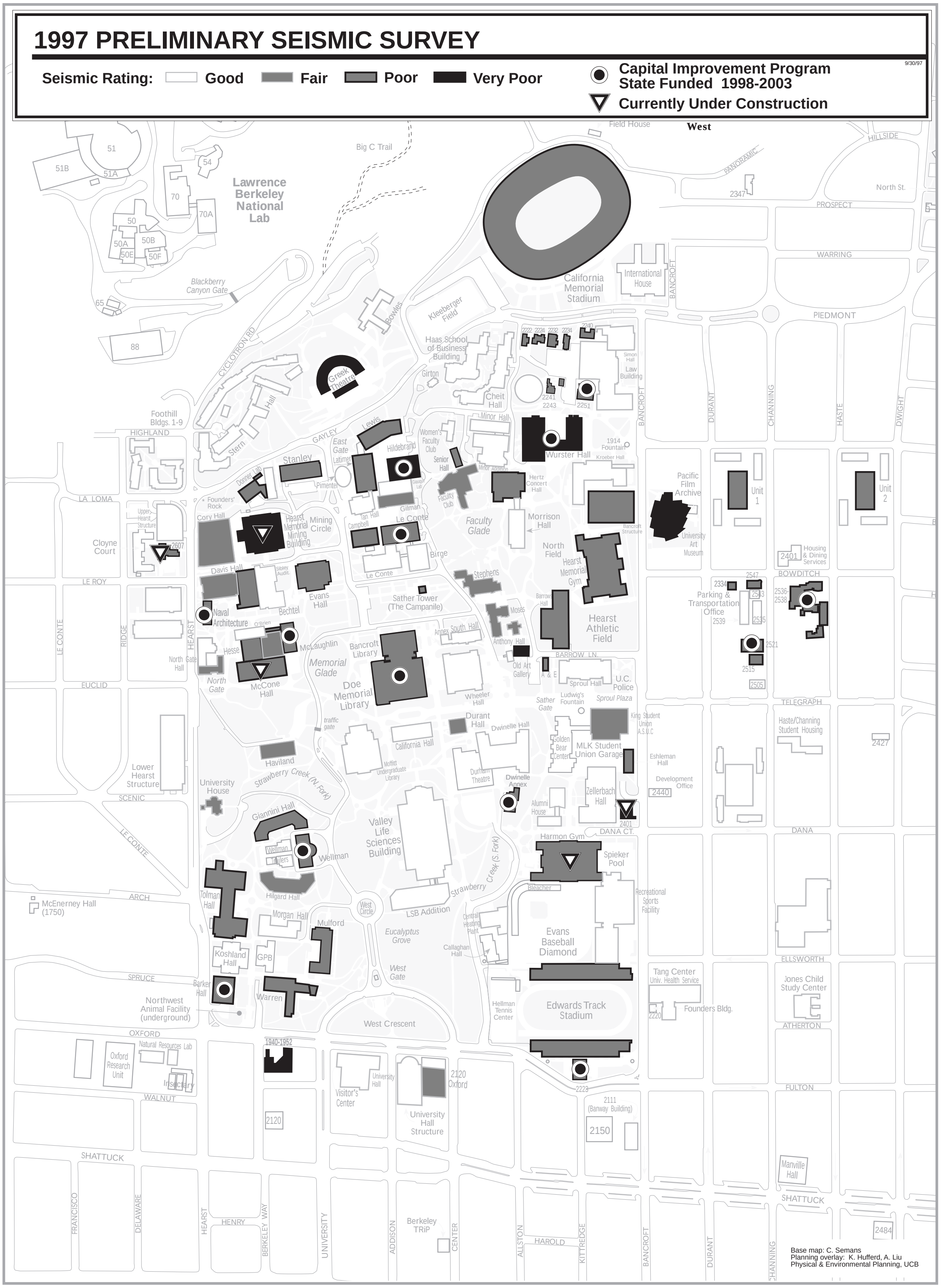
Until this program is complete, the campus will invest in efforts to address personnel safety, meet critical service needs, and ensure institutional survival should a major earthquake occur. Such efforts will include special communications systems, emergency preparedness training, and education, in addition to targeted capital investment.

The Rating System

Established campus standards for seismic rehabilitation projects, for new construction, and for hospital construction use performance ratings of GOOD, FAIR, POOR, and VERY POOR. These continue to serve as the backbone of the program.

- A GOOD seismic performance rating would apply to buildings and other structures whose performance during a major seismic disturbance is anticipated to result in structural and nonstructural damage and/or falling hazards that would not *significantly* jeopardize life. Buildings and other structures with a GOOD rating would represent an acceptable level of earthquake safety, such that funds need not be spent to improve their seismic resistance to gain greater life safety.
- A FAIR seismic performance rating would apply to buildings and other structures whose performance during a major seismic disturbance is anticipated to result in structural and nonstructural damage and/or falling hazards that would represent *low* life hazards. Buildings and other structures with a FAIR seismic rating would be given a low priority for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD.
- A POOR seismic performance rating would apply to buildings and other structures expected to sustain significant structural and nonstructural damage and/or result in falling hazards in a major seismic disturbance, representing *appreciable* life hazards. Such buildings or structures either would be given a *high priority* for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD, or would be considered for other abatement programs, such as reduction of occupancy.
- A VERY POOR seismic performance rating would apply to buildings and other structures whose performance during a major seismic disturbance is anticipated to result in extensive structural and nonstructural damage, potential structural collapse, and/or falling hazards that would represent *high* life hazards. Such buildings or structures either would be given the *highest priority* for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD, or would be considered for other abatement programs, such as reduction of occupancy.

The table on page 12 lists the buildings included in the 1997 Preliminary Seismic Evaluation, Phase 1 Report, with their new seismic rating plus other buildings whose seismic rating had previously been determined to be Poor or Very Poor. Some campus buildings are not listed, either because they are off campus and will be included in an upcoming evaluation — the Phase 2 Report — or because they are currently funded for seismic retrofit. The latter buildings were known from earlier assessments to require seismic corrections, and were targeted by the campus as priority construction projects to be funded by the state or other sources.


1997 PRELIMINARY SEISMIC SURVEY
9/30/97
Seismic Rating: Good Fair Poor Very Poor
Capital Improvement Program State Funded 1998-2003
Currently Under Construction
Lawrence Berkeley National Lab
California Memorial Stadium
International House
Greek Theatre
Haas School of Business Building
Wurster Hall
Hearst Memorial Mining Building
Stanley
Hildebrand
Le Conte
Birge
Evans Hall
Sather Tower (The Campanile)
Doe Memorial Library
Bancroft Library
McCone Hall
Haviland
Giannini Hall
Wellman
Valley Life Sciences Building
Tolman Hall
Koshland Hall
Mulford
Warren
West Crescent
Hearst Athletic Field
Sproul Hall
MLK Student Union Garage
Zellerbach Hall
Harmon Gym
Spieker Pool
Evans Baseball Diamond
Edwards Track Stadium
Pacific Film Archive
University Art Museum
Parking & Transportation Office
Unit 1
Unit 2
University Hall Structure
Berkeley TRiP
Base map: C. Semans
Planning overlay: K. Hufferd, A. Liu
Physical & Environmental Planning, UCB

Campus Buildings Rated as of September 1997

Alumni House	good
Anna Head complex	poor
Anthony Hall	fair
Architects & Engineers Building	poor
Art Gallery (old)	very poor
2425 Atherton	good
2425 Atherton (outdoor walkway)	fair
Barker Hall	poor
Barrows Hall	poor
Bechtel Engineering Center	good
Birge Hall	good
2334 Bowditch	poor
Bowles Hall	good
California Hall	good
California Memorial Stadium	poor
Calvin Laboratory	good
Campbell Hall	poor
Campus Garage	very poor
2000 Carleton	fair
2515 Channing	poor
2521 Channing	poor
2539 Channing	good
2547 Channing (Shorb House)	poor
2241 College	poor
2243 College	poor
2251 College	poor
Cory Hall	fair
Davis Hall (new)	poor
Davis Hall (old)	fair
Doe Library Annex	poor
Donner Laboratory (old)	good
Donner Laboratory (new)	poor
Durant Hall	fair
Dwinelle Annex	poor
Dwinelle Hall	good
Edwards Track Stadium	poor
Eshleman Hall	poor
Etcheverry Hall	good
Evans Hall	poor
Faculty Club (The)	fair
Faculty Club (Women's)	good
Foothill Residential Housing Complex	good
2223 Fulton	poor
Giannini Hall	poor
Giauque Lab	good
Gill Tract, Hybridoma	good
Gill Tract, Insectary	good
Gilman Hall	fair
Girton Hall	good
Greek Theatre	very poor
Haas Clubhouse	poor
Haas School of Business complex	good
Haste/Channing Student Housing	good
Haviland Hall	fair
Hearst Gymnasium	poor
Heating Plant	good
Hertz Hall	poor
Hertz-Morrison canopy	good
Hesse Hall	poor
Hildebrand Hall	very poor
Hilgard Hall	fair
King Student Union	fair
Kroeber Hall	good
Latimer Hall	poor
Law complex	good
Lawrence Hall of Science	good

LeConte Hall (new)	good
LeConte Hall (old)	poor
Lewis Hall	poor
McLaughlin Hall	poor
Minor Hall	good
Minor Hall Addition	good
Moffitt Library	good
Morgan Hall	good
Morrison Hall	good
Moses Hall	fair
Mulford Hall	poor
Natural Resources Laboratory	good
Naval Architecture Building	poor
North Gate Hall (east wing)	good
North Gate Hall (library)	fair
North Gate Hall (west wing)	fair
Northwest Animal Facility	good
O'Brien Hall	good
O'Brien Hall (link portion)	poor
2120 Oxford (office tower)	good
2120 Oxford (printing area)	fair
Parking Structure A	good
Parking Structure B	poor
Parking Structure C	good
Parking Structure H	good
Parking Structure U	good
2222 Piedmont	poor
2224 Piedmont	poor
2232 Piedmont	poor
2234 Piedmont	poor
2240 Piedmont	poor
Pimentel Hall	good
Recreational Sports Facility	good
Residence Hall, Unit I (towers)	good
Residence Hall, Unit I Dining Commons	poor
Residence Hall, Unit II (towers)	good
Residence Hall, Unit II Dining Commons	poor
Residence Hall, Unit III (towers)	good
Residence Hall, Unit III Dining Commons	good
Sather Tower (observation level)	poor
Senior Hall	poor
Silver Laboratory	poor
Simon Hall	good
Smyth House	poor
Smyth-Fernwald Housing Buildings C, D and dining	poor
Smyth-Fernwald lounge	very poor
Soda Hall	good
South Hall	good
Sproul Hall	good
Stanley Hall	poor
Stephens Hall	fair
Stern Hall	good
Strawberry Canyon Center	poor
Substation #1	good
Tan Hall	good
Tang Center	good
Tolman Hall	poor
UC Berkeley Art Museum	very poor
University Hall	good
University House	fair
Valley Life Sciences Building	good
Warren Hall	poor
Wellman Hall	poor
Wheeler Hall	good
Wurster Hall	very poor
Zellerbach Hall	good

Estimated Building Repair or Replacement Costs*

Anna Head complex	11,000,000
Architects and Engineers Building	1,000,000
Art Gallery (old)	4,000,000
Barker Hall	14,000,000
Barrows Hall	13,000,000
2334 Bowditch	1,000,000
California Memorial Stadium	14,000,000
Campbell Hall	18,000,000
Campus Garage	4,000,000
2515 Channing	2,000,000
2521 Channing	7,000,000
2547 Channing	2,000,000
2241 College	1,000,000
2243 College	——
2251 College	2,000,000
Davis Hall (new)	16,000,000
Doe Library Annex	10,000,000
Donner Laboratory (new)	9,000,000
Dwinelle Annex	2,000,000
Edwards Track Stadium	10,000,000
Eshleman Hall	13,000,000
Evans Hall	24,000,000
2223 Fulton	14,000,000
Giannini Hall	21,000,000
Greek Theatre	5,000,000
Haas Clubhouse	3,000,000
Hearst Gymnasium	16,000,000
Hertz Hall	8,000,000
Hesse Hall	14,000,000
Hildebrand Hall	19,000,000
Latimer Hall	25,000,000
LeConte Hall (old)	14,000,000
Lewis Hall	22,000,000
McLaughlin Hall	13,000,000
Mulford Hall	23,000,000
Naval Architecture Building	4,000,00
O'Brien Hall (link portion)	1,000,000
Parking Structure B	2,000,000
2222 Piedmont	1,000,000
2224 Piedmont	2,000,000
2232 Piedmont	2,000,000
2234 Piedmont	1,000,000
2240 Piedmont	2,000,000
Residence Halls Unit 1 Dining Commons	6,000,000
Residence Halls Unit II Dining Commons	6,000,000
Sather Tower (observation level)	4,000,000
Senior Hall	1,000,000
Silver Laboratory	15,000,000
Smyth House	1,000,000
Smyth-Fernwald buildings	7,000,000
Stanley Hall	24,000,000
Strawberry Canyon Center	1,000,000
Tolman Hall	20,000,000
UC Berkeley Art Museum	28,000,000
Warren Hall	10,000,000
Wellman Hall	14,000,000
Wurster Hall	17,000,000
Total Seismic Retrofit or Replacement	544,000,000
Surge	95,000,000
Essential Deferred Maintenance	21,000,000
Demolition or Relocation	17,000,000
Subtotal	677,000,000
Plus financing during construction @3%	20,000,000
Total Seismic Program Costs, 1997	$**697,000,000**

*These figures are very preliminary and require further detailed analysis and verification.

PART IV

PLAN OF ACTION
The 10-Point SAFER Program

PLAN OF ACTION — The 10-Point SAFER Program

While planning and funding a comprehensive seismic safety program is a major challenge, it also presents an extraordinary opportunity for the campus to re-examine its priorities, processes, and programs for capital development and facility reinvestment. The campus will be able to take a more comprehensive approach to construction rather than the building-by-building approach common in the past.

For example, the size and distribution of classrooms could be changed to improve service to the campus. Also, in planning for any major new development the campus should consider whether the facility should be constructed to a higher than typical level of seismic resistance, enabling the facility to provide emergency services to the campus and local community in the event of a major earthquake.

In addition, the campus has the opportunity to design all new building projects to performance criteria consistent with institutional sustainability; that is, for continued operation soon after an earthquake.

Though this will be a long-term, costly undertaking, the new assessment provides the campus an exceptional framework from which to develop a strategic plan to deliver the most responsible, effective, and cost-efficient solution.

To address the problem aggressively, Chancellor Robert M. Berdahl has committed $1 million to intensify campus planning and has announced a 10-point action plan that includes a high-level administrative restructuring to focus on the issue. The 10-point plan, called the SAFER (Seismic Action plan for Facilities Enhancement and Renewal) Program, provides a comprehensive approach to seismic safety on the UC Berkeley campus.

The key elements of the 10-point plan are:

1. **A new Chancellor's cabinet-level position to be titled Vice Chancellor for Capital Projects will be created.**

   A primary component of the new Vice Chancellor's charge will be to oversee all aspects of the SAFER Program. The search for this position will be initiated immediately with the appointment of a senior search committee chaired by a member of the Chancellor's Cabinet. The committee will include participation from the College of Environmental Design, the College of Engineering or other appropriate academic units, a comparable administrator at another campus of the University of California or the Office of the President, and a member of the UC Berkeley Foundation, in addition to senior staff from existing units within Business and Administrative Services. It is anticipated that this search will be completed within six months.

   In the meantime, the Chancellor will appoint an Interim Vice Chancellor for Capital Programs.

2. An Executive Campus Planning Committee to be chaired by the Chancellor will be responsible for all physical planning decisions on the campus.

The committee will approve the siting of new facilities, the initiation, scope, and priority of major projects, the campus physical plan and plans for campus precincts, financing strategies for capital projects, and final design for campus buildings. In addition, the committee will take responsibility for reviewing future needs to meet commitments to the academic program.

The committee will meet monthly and will be chaired by the Chancellor. Its membership will consist of the Chancellor's Cabinet, the Chair and Vice Chair of the Academic Senate, the Chair of the Design and Review Committee, and an undergraduate and a graduate student.

3. Specific committees will be established to focus on precinct planning and campuswide operational planning.

- Precinct Planning committees will assess the seismic needs of campus precincts with particular attention to current seismic upgrading plans, non-seismic facility needs, and options for temporary facilities. They will provide priorities where appropriate. Functional areas to be addressed include instruction, research, and infrastructure exterior to buildings.

  The main precincts (see appendix 1) are:

  Agricultural and Life Sciences
  Engineering and Earth Sciences
  Mathematics and Physical Sciences
  Art, Music and Professions
  Humanities and Social Sciences
  Library and Administration
  Student Services and Recreation
  Off-Campus Sites

- A Classroom Seismic Assessment and Recovery Committee has been established. This committee is charged with assessment of current general assignment and departmental classroom resources, in light of the seismic report, and the setting of priorities to retrofit classroom facilities. Further, it will be responsible for the development of a plan for recovery of campus classroom resources following a major seismic event.

- A Research Seismic Assessment and Recovery Committee will be established. It will have similar responsibilities to the classroom committee in the campus's research arena.

- A Utility Infrastructure Seismic Assessment and Recovery Committee will be formed to address the seismic safety of critical infrastructure services such as water, power, sewer, gas, and communications. It will analyze the campus's exterior utility infrastructure in light of potential damage from a major earthquake and recommend actions and strategies to permit continued service or rapid recovery.

4. **Determine the need for full or partial closure of any facilities deemed an unacceptable risk.**

   The campus has longstanding policies regarding the establishment of priorities for seismic correction projects. The key factor is minimizing exposure to risk or personal injury for users of campus facilities, should a significant earthquake occur. Priority is based primarily on the highest Equivalent Continuous Occupancy, or ECO, of each facility and its seismic rating, with Very Poor being a higher priority than Poor. Basic seismic corrections are planned to improve the rating of a structure to Good, which means the facility may or may not be functional after a major earthquake but the risk of serious personal injury or loss of life will be minimal.

   All decisions regarding changes in functions of facilities provoked by seismic conditions in a building will be made by the Executive Campus Planning Committee. Options may including closure of an entire building, non-use of certain facilities within a building, or relocation to minimize occupancy of heavily used facilities.

   Additional seismic evaluation will be necessary to address this issue fully. In particular, the second phase of the seismic re-evaluation, to be completed in mid-November, will ascertain the current status of those buildings previously rated as Poor. Phase 2 will also encompass the campus's outlying facilities, including the Richmond Field Station, Clark Kerr Campus, and Botanical Garden.

   For safety considerations, immediate attention with regard to reducing occupancy will be given to all buildings rated as Very Poor. In addition, for all buildings rated Poor or Very Poor, consideration will be given to phasing strategies or intermediate retrofit possibilities that could provide a significant improvement in safety until a more permanent solution can be implemented.

5. **Develop, coordinate, and establish an integrated planning process with a goal of producing a master plan for facilities renewal.**

   To ensure that all campus capital resources are invested effectively, it will be necessary to coordinate closely with other planned improvement projects. This will avoid unwise investment in facilities slated for major construction or possible demolition, and will enable the targeting and timing of investment to maximize leverage of available funds. Significant efficiencies and cost savings can be realized if funding from different sources can be blended early in the programming stages of major projects.

   Key components of this plan will be the new Executive Campus Planning Committee and Precinct Planning committees. An immediate requirement in this planning process is a detailed building systems assessment with particular attention to buildings rated as Poor or Very Poor.

   Most of the seismically deficient buildings were constructed before 1960 and thus contain a disproportionate share of the campus's deferred maintenance backlog, which exceeds $150 million. They also contain building systems that are at or beyond the range of their economic life cycle and in critical need of replacement or renewal. Mechanical, electrical, and plumbing system deficiencies are found throughout older

campus facilities. Building systems renewal must be an integral planning consideration in the seismic program if the campus is to maintain its mission and meet its stewardship responsibilities.

6. **The campus will overhaul capital project management to improve cost containment, consider new capital program delivery strategies, shorten schedules, and streamline campus policies.**

   The campus is currently evaluating its management of capital projects. In light of the expected increase in the capital program due to additional seismic projects, the Chancellor has decided to elevate the position of the Planning, Design and Construction (PD&C) department so that it will report directly to the new Vice Chancellor for Capital Projects.

   Additional immediate evaluation will result in recommendations for changes in both the resource base and organization of PD&C and other departments involved with the capital program so that the campus can handle the much expanded capital program effectively and assist in the development of our seismic retrofit master plan.

7. **The campus will develop plans for a variety of temporary relocation or "surge" space, sites, and buildings (see appendix 2).**

   Strategies to create or provide adequate surge space for the seismic program vary depending on the quantity, type, duration, and schedule of need. If carried out over 20 years, the seismic program would require surge space in the range of 100,000 to 150,000 assignable square feet (ASF), depending on the sequence and timing of projects. Of this, approximately 30,000 ASF is estimated to be research lab space. Approximately 65,000 ASF of nonlab space will become available by the year 2000 as projects presently funded for construction are completed, but many of these sites are scattered and some of the space is of limited use. There is a potential need for 50,000 ASF or more of additional office-type surge space. These figures are averages, and research lab needs could vary considerably from year to year.

   There are a number of variables in selecting appropriate sites for temporary relocation of facilities. For example, core instruction and research functions are recommended as highest priority for central campus surge and replacement space.

8. **The campus will develop and initiate a multiple-source financing plan to implement the master plan.**

   There are three general sources of funding for the seismic retrofit program: the state, the federal government, and the University.

   The campus is currently receiving an average of $20 million per year from the state for capital projects; for planning purposes this has been projected to continue indefinitely for the seismic program.

   In the past, the federal government has provided funding through the Federal Emergency Management Agency (FEMA) to some institutions in the past for seismic-related projects, although this support has been predominantly for after-the-fact repairs rather than for the type of mitigation effort anticipated in our seismic retrofit

program. Conversations with federal government officials are still in the preliminary phase.

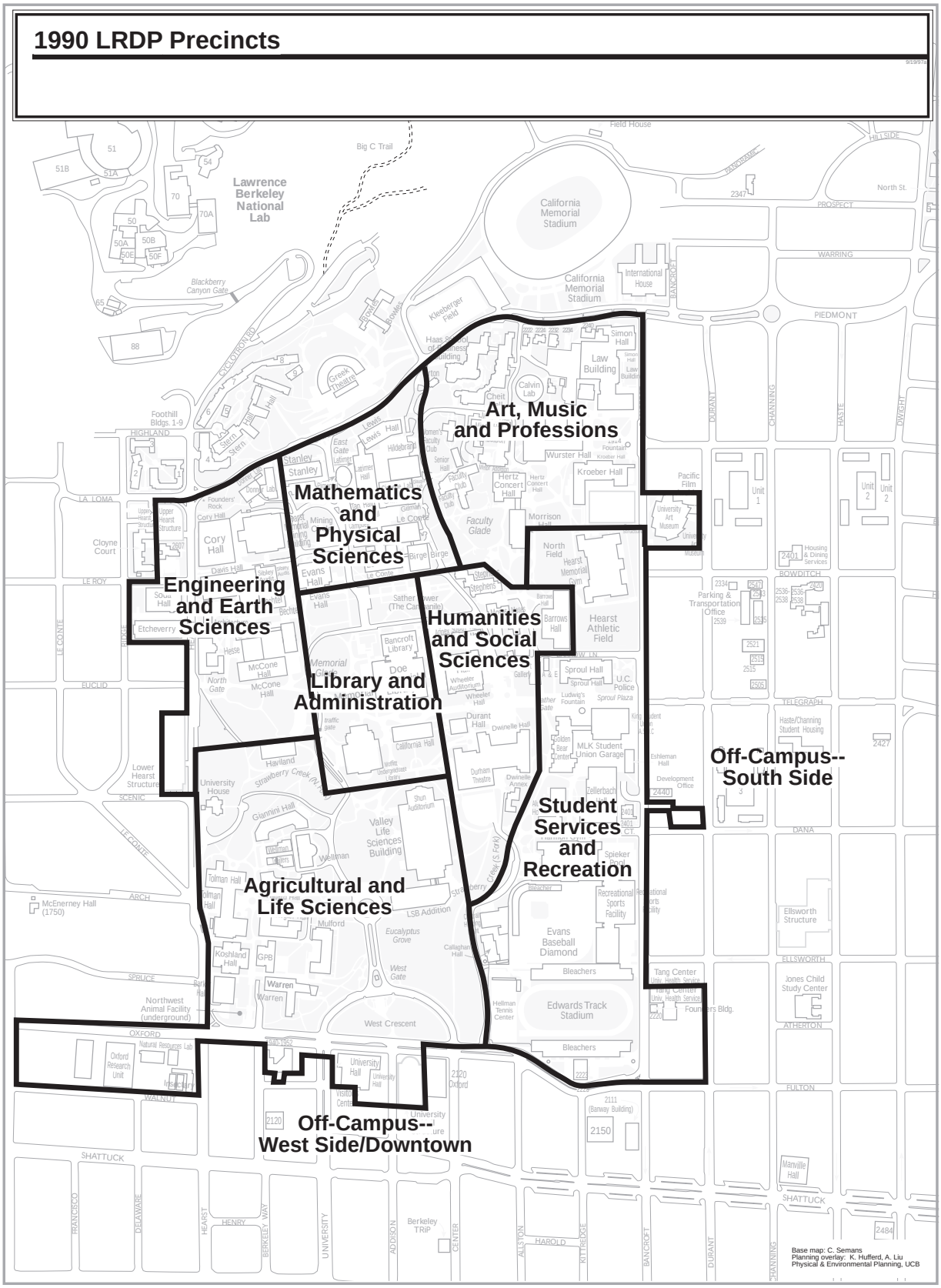
Berkeley campus funding will come from several venues. Campus housing and parking projects are expected to be funded from Housing and Dining Services and Parking reserves. Student fees and campus gifts will be sources of funds for some projects. In addition, the Chancellor expects to make a significant contribution of central campus reserves to meet the needs of the seismic program. Funding may also be sought through The Regents.

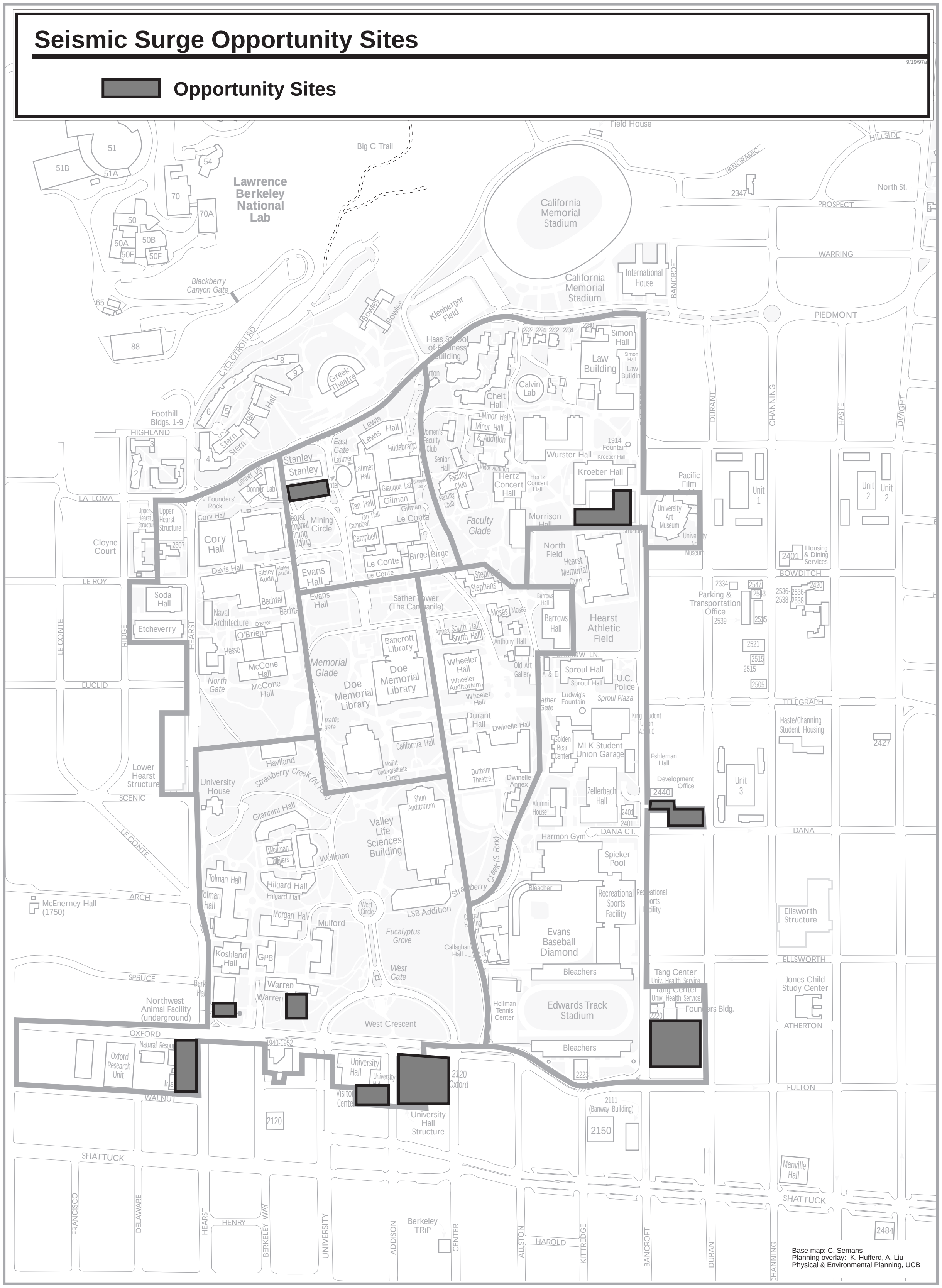
9. **The campus is undertaking a comprehensive emergency preparedness review. This will include mitigating nonstructural hazards, assuring that emergency facilities and critical services are available, and providing emergency response training.**

   Under the direction of the Emergency Preparedness Manager, a process is being established to determine the facilities necessary to provide critical services and respond efficiently and effectively to a major seismic event. Critical service facilities and infrastructure systems include emergency communications, such as the emergency broadcast channel, cellular phone network, and police dispatch unit; health and emergency aid; emergency supplies and equipment holding areas; food services and refuge areas; and emergency shelter zones and staging areas for external logistics support. Campuswide disaster drills and training programs are scheduled.

10. **The campus will develop a comprehensive communications plan to ensure that all members of the campus community are adequately informed.**

    The SAFER Program, with its implications for the security of the campus community and for the sustained operation of the institution in the event of a major earthquake, will remain an overriding priority of the campus for many years to come.


1990 LRDP Precincts
Art, Music and Professions
Mathematics and Physical Sciences
Engineering and Earth Sciences
Humanities and Social Sciences
Library and Administration
Off-Campus-- South Side
Student Services and Recreation
Agricultural and Life Sciences
Off-Campus-- West Side/Downtown
Lawrence Berkeley National Lab
California Memorial Stadium
Base map: C. Semans
Planning overlay: K. Hufferd, A. Liu
Physical & Environmental Planning, UCB


Seismic Surge Opportunity Sites
9/19/97a
Opportunity Sites
Lawrence Berkeley National Lab
Big C Trail
California Memorial Stadium
Field House
HILLSIDE
PANORAMIC
North St.
PROSPECT
WARRING
PIEDMONT
International House
Kleeberger Field
Bowles
Greek Theatre
CYCLOTRON RD
Blackberry Canyon Gate
Foothill Bldgs. 1-9
HIGHLAND
LA LOMA
Cloyne Court
LE ROY
Soda Hall
Etcheverry
Stern
Stanley
Latimer Hall
Lewis Hall
Hildebrand
Haas School of Business Building
Simon Hall
Law Building
Calvin Lab
Cheit Hall
Minor Hall
Wurster Hall
Kroeber Hall
1914 Fountain
Hertz Concert Hall
Faculty Glade
Faculty Club
Morrison Hall
Pacific Film
University Art Museum
Cory Hall
Davis Hall
Mining Circle
Evans Hall
Gilman
Le Conte
Birge
Campbell
Naval Architecture
O'Brien
Bechtel
Hesse
McCone Hall
North Gate
Sather Tower (The Campanile)
Bancroft Library
Doe Memorial Library
Memorial Glade
Stephens
Moses
South Hall
Wheeler Hall
North Field
Hearst Memorial Gym
Barrows Hall
Hearst Athletic Field
Sproul Hall
U.C. Police
Sproul Plaza
MLK Student Union Garage
Zellerbach Hall
Eshleman Hall
Development Office
Parking & Transportation Office
Housing & Dining Services
BOWDITCH
TELEGRAPH
Haste/Channing Student Housing
Unit 1
Unit 2
Unit 3
EUCLID
LE CONTE
RIDGE
HEARST
Lower Hearst Structure
SCENIC
University House
Haviland
Strawberry Creek (N. Fork)
Durant Hall
Dwinelle Hall
California Hall
Moffitt Undergraduate Library
Durham Theatre
Dwinelle Annex
Alumni House
Giannini Hall
Wellman
Valley Life Sciences Building
Shun Auditorium
LSB Addition
Creek (S. Fork)
Harmon Gym
Spieker Pool
Recreational Sports Facility
Evans Baseball Diamond
DANA
DANA CT.
Ellsworth Structure
ELLSWORTH
Tolman Hall
Hilgard Hall
Morgan Hall
Mulford
West Circle
Eucalyptus Grove
Koshland Hall
GPB
ARCH
McEnerney Hall (1750)
SPRUCE
Northwest Animal Facility (underground)
Warren
West Gate
West Crescent
Callaghan Hall
Hellman Tennis Center
Edwards Track Stadium
Bleachers
Tang Center Univ. Health Service
Founders Bldg.
Jones Child Study Center
ATHERTON
FULTON
OXFORD
Oxford Research Unit
Natural Resources
WALNUT
University Hall
Visitor Center
2120 Oxford
University Hall Structure
2111 (Banway Building)
2150
2120
SHATTUCK
Manville Hall
HENRY
Berkeley TRiP
HAROLD
FRANCISCO
DELAWARE
BERKELEY WAY
UNIVERSITY
ADDISON
CENTER
ALLSTON
KITTREDGE
BANCROFT
DURANT
CHANNING
HASTE
DWIGHT
2484
Base map: C. Semans
Planning overlay: K. Hufferd, A. Liu
Physical & Environmental Planning, UCB