



1111 Franklin Street
Oakland, CA 94607-5200
Phone: (510) 987-9074
Fax: (510) 987-9086
<http://www.ucop.edu>

December 13, 2013

**CHAIRMAN OF THE BOARD OF REGENTS
CHAIR OF THE COMMITTEE ON GROUNDS AND BUILDINGS
PRESIDENT OF THE UNIVERSITY**

**ACTION BY CONCURRENCE – AMENDMENT OF THE BUDGET FOR CAPITAL
IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL
UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS**

EXECUTIVE SUMMARY

The Residential Unit 3 Improvements project implemented structural improvements to four high-rise residential towers housing 1,240 students, to improve the seismic performance rating from Seismic Rating Level V¹ to Seismic Rating Level III. The work had to be completed within the constrained schedule of the 2013 summer break to immediately address the seismic risk and allow the students to reoccupy the towers in time for the 2013 fall semester.

On behalf of the Berkeley campus, the President requests a budget augmentation of \$4,600,000 (+46.4 percent) for the project, to be funded from Housing Reserves. The original budget of \$9,905,000 was approved by the Chancellor in May 2013 and funded entirely with housing reserves. The augmentation will revise the budget to \$14,505,000.

The project was completed on October 1, 2013 and payment to the contractor is due in December 2013.

Concurrence of the Chairman of the Board and the Chair of the Committee on Grounds and Buildings is required pursuant to Standing Order 100.4(q)(1) because the augmentation exceeds 25 percent and the total cost of the project exceeds \$10 million.

¹ Seismic rating system as defined in the California Code of Regulations, Part 2, California Building Code.

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

RECOMMENDATION

The President recommends, pursuant to the authority granted under Standing Order 100.4(q)(1), that the 2013-14 Budget for Capital Improvements and the Capital Improvement program be amended as follows:

- From: Berkeley: Residential Unit 3 Improvements – Preliminary Plans, Working Drawings, and Construction – \$9,905,000, to be funded from Housing Reserves.
- To: Berkeley: Residential Unit 3 Improvements – Preliminary Plans, Working Drawings, and Construction – \$14,505,000, to be funded from Housing Reserves.

BACKGROUND

Residential Unit 3 is comprised of four high-rise residential towers constructed in the early 1960s, located two blocks south of the central Berkeley campus. The four-tower complex houses approximately 1,240 students during the academic year, and is used for summer programs and conference housing during the summer. Unit 3 also includes a two-level Central Building, which provides dining, kitchen, and administrative support facilities.

Unit 3 was last seismically upgraded in the 1980's to respond to structural analyses reflecting methodology then current in the engineering profession and, based on those improvements, was assigned a seismic performance rating of "Good" under the University Policy on Seismic Safety current at that time.

In 2012, the campus undertook a study for the redevelopment of the Unit 3 facilities, including an assessment by consulting structural engineers who determined that the seismic performance rating of all the original towers in Units 1, 2 and 3 was Seismic Rating Level V (Poor) as defined by the University Policy on Seismic Safety. The finding was corroborated by two independent peer review structural engineers and by the Berkeley campus Seismic Review Committee. Under the direction of the campus Capital Projects office, consulting structural engineers prepared designs intended to achieve a seismic performance rating of Seismic Rating Level III (California Building Code "Good").

A discrete capital project was established for each of the three Unit sites. While one general contractor would be responsible for the work at all three sites, the scope of the work and the constrained schedule required different subcontractors at each site in order for the schedule to be met, and the separate projects enabled a clear tracking of costs and payments.

In May 2013, the Chancellor approved budgets for the three projects – one each for Units 1, 2 and 3 – the objective being to achieve the improved seismic performance rating (Seismic Rating Level III) in time for fall semester 2013 student occupancy. The approved budgets were \$9.5 million each for Units 1 and 2, and \$9,905,000 for Unit 3. The variance of the Unit 3 budget

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

reflects the unique structural characteristics of the Unit 3 towers. The three projects were determined to be exempt from the California Environmental Quality Act.

Construction commenced at all three sites in May 2013. Work was completed at Units 1 and 2 prior to fall semester 2013 student move-in, achieving the intended Seismic Rating Level III performance rating, and within the approved project budgets. Work at Unit 3 was complicated by undocumented and therefore unanticipated anomalies in the original construction, and was completed as of October 1, 2013 with the engineer of record attesting the improvements supported Seismic Rating Level III.

The factors contributing to the expansion of the schedule and budget for the Unit 3 project are described in detail in Attachment 2.

Statement of Issues

The 1,240 bed spaces in Unit 3 represent roughly 18 percent of residence hall bed spaces at UC Berkeley. It was thus imperative the work be completed in time to allow students to move in for the fall semester. The aggressive schedule objective for completing the work meant design was still being finalized as the contractor got underway. There were changes in detail and scope as structural analysis and peer review continued. Further design revisions were required as extensive variations in as-built conditions were encountered in the field.

Actual conditions in the original Unit 3 concrete columns varied extensively and unpredictably from those indicated in record drawings, and as a result the contractor was required to scan structural elements for re-bar to avoid damage to critical elements. Conditions were so variable as to render it impossible to predict the cost or time necessary to complete the column strengthening, but it was evident occupancy in fall 2013 could not be achieved without a change in strategy.

To maintain the schedule, the campus directed the engineers to re-design certain details, which in turn required additional steel fabrication as well as removal and replacement of exterior-mounted mechanical systems to provide access for structural work at each structural column. The productivity impacts due to concealed re-bar conditions and the repair of concealed electrical conduits, together with the reworking of steel fabrications and extended work duration, increased the project cost by \$3.7 million, plus \$500,000 for removal and replacement of exterior insulated pipes and pipe covers. Various other measures required to identify and then accommodate concealed and undocumented structural conditions, utility relocations, and constrained access increased the cost by another \$1.4 million.

In order to maintain construction progress, it was necessary to direct the contractor to proceed based on preliminary pricing information. Initial information indicated the project contingencies would be adequate to cover the cost of implementing the revised design details; however, because the contractor's preliminary pricing significantly underestimated the scope of the changes, the full cost implications were not evident until after the work was performed. The additional costs summarized herein have accrued and have been substantiated. Approval of the

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

augmentation is required to make payments to which the contractor is due. A full description of the contributing factors to the cost increase is presented in Attachment 2. The total increase in the cost of construction, surveys, and inspections was partially offset by the absorbance of the \$1 million project contingency in the original project budget, for a proposed net increase of \$4.6 million.

Central Building

The scope of the approved project for Unit 3 included an allowance of \$200,000 for structural improvements to the Central Building. Because the residential towers were given higher priority, structural analysis and design of the Central Building was deferred until construction occurred on the towers, and the scope of required Central Building improvements was not yet defined at the time of project approval. When the analysis was complete in August 2013, it was clear the Central Building itself also warranted a seismic rating of Seismic Rating Level V, and that the scope and complexity of corrections to achieve a Seismic Rating Level III rating would exceed the modest allowance that had been included in the approved Unit 3 project.

The campus intends to accomplish necessary seismic improvements to the Central Building as a separate project under the authority of the Chancellor, with anticipated completion by the end of the 2013-14 academic year. The original allowance has been removed from the project budget for this augmentation.

California Environmental Quality Act Compliance

The project was determined to be exempt from the California Environmental Quality Act.

Approved:

 12/19/13

Janet Napolitano Date
President of the University

Concurrence:

Bruce D. Varner Date
Chairman of the Board of Regents

Charlene Zettel Date
Vice Chair of the Committee on Grounds and Buildings

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

augmentation is required to make payments to which the contractor is due. A full description of the contributing factors to the cost increase is presented in Attachment 2. The total increase in the cost of construction, surveys, and inspections was partially offset by the absorbance of the \$1 million project contingency in the original project budget, for a proposed net increase of \$4.6 million.

Central Building

The scope of the approved project for Unit 3 included an allowance of \$200,000 for structural improvements to the Central Building. Because the residential towers were given higher priority, structural analysis and design of the Central Building was deferred until construction occurred on the towers, and the scope of required Central Building improvements was not yet defined at the time of project approval. When the analysis was complete in August 2013, it was clear the Central Building itself also warranted a seismic rating of Seismic Rating Level V, and that the scope and complexity of corrections to achieve a Seismic Rating Level III rating would exceed the modest allowance that had been included in the approved Unit 3 project.

The campus intends to accomplish necessary seismic improvements to the Central Building as a separate project under the authority of the Chancellor, with anticipated completion by the end of the 2013-14 academic year. The original allowance has been removed from the project budget for this augmentation.

California Environmental Quality Act Compliance

The project was determined to be exempt from the California Environmental Quality Act.

Approved:

Janet Napolitano Date
President of the University

Concurrence:

 12-19-2013

Bruce D. Varner Date
Chairman of the Board of Regents

Charlene Zettel Date
Vice Chair of the Committee on Grounds and Buildings

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

augmentation is required to make payments to which the contractor is due. A full description of the contributing factors to the cost increase is presented in Attachment 2. The total increase in the cost of construction, surveys, and inspections was partially offset by the absorbance of the \$1 million project contingency in the original project budget, for a proposed net increase of \$4.6 million.

Central Building

The scope of the approved project for Unit 3 included an allowance of \$200,000 for structural improvements to the Central Building. Because the residential towers were given higher priority, structural analysis and design of the Central Building was deferred until construction occurred on the towers, and the scope of required Central Building improvements was not yet defined at the time of project approval. When the analysis was complete in August 2013, it was clear the Central Building itself also warranted a seismic rating of Seismic Rating Level V, and that the scope and complexity of corrections to achieve a Seismic Rating Level III rating would exceed the modest allowance that had been included in the approved Unit 3 project.

The campus intends to accomplish necessary seismic improvements to the Central Building as a separate project under the authority of the Chancellor, with anticipated completion by the end of the 2013-14 academic year. The original allowance has been removed from the project budget for this augmentation.

California Environmental Quality Act Compliance

The project was determined to be exempt from the California Environmental Quality Act.

Approved:

Janet Napolitano Date
President of the University

Concurrence:

Bruce D. Varner Date
Chairman of the Board of Regents

Charlene Zettel 12-20-13

Charlene Zettel Date
Vice Chair of the Committee on Grounds and Buildings

AMENDMENT OF THE BUDGET FOR CAPITAL IMPROVEMENTS AND THE CAPITAL IMPROVEMENT PROGRAM, RESIDENTIAL UNIT 3 IMPROVEMENTS, BERKELEY CAMPUS

ATTACHMENTS

Attachment 1 - Project Budget

Attachment 2 - Construction Issues Driving Cost and Schedule Expansion Specific to Residential Unit 3 Seismic Safety Improvements

ATTACHMENT 1

PROJECT BUDGET

Berkeley: Residential Unit 3 Improvements
Project 912610

Category	Approved Budget May 2013	Augmentation Request	Proposed Budget Oct 2013	% of Total
Site Clearance	\$0	\$0	\$0	0.0%
Building	7,874,000	5,275,000	13,149,000	90.7%
Exterior Utilities	0	0	0	0.0%
Site Development	100,000	0	100,000	0.7%
A&E Fees	400,000	0	400,000	2.8%
Campus Administration	277,000	0	277,000	1.9%
Surveys, Plans, Tests	75,000	325,000	400,000	2.8%
Special Items	179,000	0	179,000	1.2%
Contingency	1,000,000	-1,000,000	0	
Subtotal	\$9,905,000	\$4,600,000	\$14,505,000	100%
Group 2 & 3 Equipment	0	0	0	
Total	\$9,905,000	\$4,600,000	\$14,505,000	

Project Statistics

	May 2013	Oct 2013
GSF	175,016	175,016
Building Cost/GSF*	\$44	\$75
Project Cost/GSF*	\$55	\$83

*Calculation excludes Central Building allowance

ATTACHMENT 2

Construction Issues Driving Cost and Schedule Expansion Specific to Residential Unit 3 Seismic Safety Improvements

Seismic corrections for the four Unit 3 residential towers, as at Units 1 and 2, included enhancements of structural elements, both interior and exterior to the towers. Factors contributing to the proposed increase in the project budget for Unit 3 are described below.

The majority of the increase is due to one major element of the Unit 3 scope that varied considerably from the similar elements at Units 1 and 2. At each high-rise building, the remediation design for the exterior columns entailed the addition of vertical steel “jackets” to the columns. The jackets were to be attached with brackets bolted onto the existing columns at each floor level of each column – some 290 bracket locations. In Units 1 and 2, this detail affected some columns at each building and was required at only the lower stories of each eight-story building. At Unit 3, every external column required steel cladding for its full eight-story height. This variation was due to unanticipated seismic performance variations arising from differences in original structural details. The greater scope of steel column jacketing at Unit 3 exacerbated the impact associated with construction complications that drove the additional costs.

Actual conditions in the original Unit 3 concrete columns varied extensively and unpredictably from those indicated in record drawings. Variation in re-bar placement rendered the detailing of the corrective steel column jackets extremely inefficient to implement in the field because the contractor was required to scan for re-bar to avoid damage to critical elements. Given the imperative to complete the improvements in time for fall semester, the uncertainty this created in the schedule was unacceptable.

In response to these challenges and in collaboration with the contractor and structural engineers, the campus directed the engineers to re-design certain details in the interest of constructability. The revised details necessitated fabrication of modified steel brackets, as well as the removal and replacement of exterior-mounted mechanical systems to provide access for structural work at each structural column.

Even though further interference was encountered in the form of undocumented electrical conduits, the revised detailing enabled the work to proceed with predictable productivity. The contractor was able to schedule for completion of the structural corrections on or before October 1, 2103, approximately six weeks later than the original target. This revised schedule objective was achieved.

The productivity impacts due to concealed re-bar conditions and the repair of concealed electrical conduits in some locations, together with the re-working of steel fabrications and extended work duration added a total of \$3.7 million in costs. The removal and replacement of exterior insulated piping and pipe covers incurred a cost of \$500,000.

Other factors contributing to the increased cost include the following:

Interior structural work consisted of adding steel frames to reinforce critical concrete shear walls. The need to relocate above-ceiling piping and electrical conduits, restoration of finishes and architectural alterations to accommodate fire exit requirements added \$833,000 in costs over the four Unit 3 towers.

Exterior fire exit stairs were reinforced to provide greater collapse resistance. Relocation of utilities and detail modifications to accommodate concealed conditions added \$100,000.

Exterior columns at the ground floor of each tower were strengthened with additional reinforced concrete and fiber-wrapping. Accommodation of concealed conditions and constrained access conditions added \$100,000.

The total increase of \$5,275,000 in construction cost, as reflected in Attachment 1, was partially offset by the absorbance of the \$1 million project contingency included in the originally approved project budget. Thus, the net increase in construction costs was \$4,275,000.

The additional construction scope described above required unanticipated extensive scanning at each of hundreds of connection points, to ensure that attachment of added structural elements did not conflict with existing concrete reinforcing. The highly variable concealed existing conditions also demanded additional unanticipated special inspection services, resulting in an additional cost of \$325,000, reflected in Attachment 1, yielding the total net increase in project cost of $\$5,275,000 + \$325,000 - \$1 \text{ million} = \4.6 million .