



# AUDIT AND ADVISORY SERVICES

## Major Construction Audit Project No. 12-585

June 8, 2012

Prepared by:

---

Tania Hall  
Auditor-in-Charge

Reviewed by:

---

Jaime Jue  
Associate Director

Approved by:

---

Wanda Lynn Riley  
Chief Audit Executive

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

AUDIT AND ADVISORY SERVICES  
Tel: (510) 642-8292

611 UNIVERSITY HALL #1170  
BERKELEY, CALIFORNIA 94720-1170

June 8, 2012

Edward J. Denton  
Vice Chancellor  
Facilities Services

Vice Chancellor Denton:

We have completed our audit of Major Construction as per our annual audit plan in accordance with the Institute of Internal Auditors, Inc. *Standards for the Professional Practice of Internal Auditing* and the University of California Internal Audit Charter.

Attached is our audit report including observations and management action plans, where relevant. Thank you to the Capital Projects staff for their cooperative efforts throughout the audit process.

Please destroy all copies of draft reports and related documents. Also, please do not hesitate to call on Audit and Advisory Services if we can be of further assistance in this or other matters.

Respectfully reported,

Wanda Lynn Riley  
Chief Audit Executive

cc: Associate Vice Chancellor Robert Gayle  
Assistant Campus Counsel Michael Cole  
Director Grace Crvarich  
Senior Vice President Sheryl Vacca  
Associate Chancellor Linda Morris Williams  
Assistant Vice Chancellor and Controller Delphine Regalia

**University of California, Berkeley  
Audit and Advisory Services  
Major Construction**

**Table of Contents**

OVERVIEW .....	2
Executive Summary .....	2
Source and Purpose of the Audit .....	3
Scope of the Audit .....	3
Background Information.....	3
Audit Methodology.....	4
Summary Conclusion.....	5
SUMMARY OF OBSERVATIONS & MANAGEMENT RESPONSE AND ACTION PLAN.....	8
Change Orders – Pricing.....	8

---

---

## OVERVIEW

---

---

### Executive Summary

The purpose of this audit was to assess the effectiveness of construction management policies and procedures as well as internal controls and processes related to the administration of construction activities, specifically bidding, change order and funding restrictions across the University system. All ten UC campuses and the Lawrence Berkeley National Laboratory participated in this audit. The Office of the President directed each campus to consider major construction projects (which for the purposes of this audit were defined as projects with a budget exceeding \$750,000) that were currently in the construction phase but for which retention payments had not been made. This report contains the observations related to conducting the systemwide audit program at the Berkeley campus.

External consultant Doug Creech of Doug Creech Audits, LLC assisted Audit and Advisory Services by conducting the primary analysis and testing in the audit areas of bidding procedures and change orders. His observations in these areas were reviewed by Audit and Advisory Services and are incorporated in this report. Analysis and testing in the area of funding requirements was conducted by Audit and Advisory Services Senior Auditor Tanaiia Hall.

Based upon the audit performed, we observed that there is general compliance on campus with requirements in the UC Facilities Manual (Facilities Manual) with respect to the bidding process, change orders, and funding restrictions.

We had observations related to pricing on change orders for which management responses were obtained. We noted one instance of a subcontractor using an hourly rate on a change order that included overhead and other costs not allowed under the University's General Conditions. We have obtained management responses to these observations and believe that they are responsive, but note that they do not require direct follow-up by us going forward.

In addition, we also noted one instance of pricing for purchased equipment that appear higher than independent cost publications and one instance of an equipment credit to the campus for a change order at a price lower than independent cost publications. Although the dollar amounts associated with these individual transactions are small (under \$20,000), we have discussed with Capital Projects management the importance of obtaining comfort with rates and prices submitted to the campus on change orders when they have unit costs listed.

## Source and Purpose of the Audit

The purpose of this audit was to assess the effectiveness of construction management policies and procedures as well as internal controls and processes related to the administration of construction activities, specifically bidding, change order and funding restrictions across the University system. All ten UC campuses and the Lawrence Berkeley National Laboratory participated in this audit. This report contains the observations related to conducting the systemwide audit program at the Berkeley campus.

## Scope of the Audit

The scope of systemwide audit included the bid and award process, change orders execution, and compliance with funding requirements. The Office of the President directed each campus to consider major construction projects (which for the purposes of this audit were defined as projects with a budget exceeding \$750,000) that were currently in the construction phase but for which retention payments had not been made.

External consultant Doug Creech of Doug Creech Audits, LLC (External Consultant) assisted Audit and Advisory Services by conducting the primary analysis and testing in the audit areas of bidding procedures and change orders. His observations in these areas were reviewed by Audit and Advisory Services and are incorporated in this report. Analysis and testing in the area of funding requirements was conducted by Audit and Advisory Services Senior Auditor Tanaiia Hall.

## Background Information

### *Relevant Policies – The University of California Facilities Manual*

The Facilities Manual provides access to important policies, procedures, and guidelines for facilities management and operation. The Office of the President, Facilities Management and Construction, is responsible for Facilities Manual preparation, publication, and administration. Each campus is encouraged to develop its own procedures manual that may expand on and complement Facilities Manual content. The Berkeley campus uses the Office of the President version of the Facilities Manual.

Within the Facilities Manual, the proper name "Facility" is given to any University campus, laboratory, unit of the Division of Agriculture and Natural Resources, or location of any other administrative unit. The common term facility refers to a building, structure, site or ground improvement, or other item built or installed to serve the University's mission of providing teaching, research, and public service.

Volume 5, Part I of the Facilities Manual contains bidding and construction administration policies, procedures, and guidelines and Part II, Chapter 3 (Contract Modifications) discusses the means of accomplishing changes in the work required during construction. In particular, it contains policies and procedures for administering the contractor selection/bidding process and the construction contract modifications/change order process found in the Facilities Manual, Volume 5. Required bidding documents are specified and instructions for soliciting bids, receiving and opening bids, reviewing and evaluating bids, and awarding the contract, among other things, are

detailed. These were accessed and reviewed while preparing to perform the audit. Volume 5 also provides instructions for the proper authorization and modification of construction contracts via the use of change orders. Additionally, Section 7 of the General Conditions, which is a part of all construction contracts, details what "costs of extra work" are allowed and what costs are not allowed. These too were accessed and reviewed.

### *Capital Projects Management at UC Berkeley*

At the Berkeley campus, the Capital Projects (CP) group manages the planning, design, construction, retrofitting, and restoration of campus buildings and their surroundings. More than 140 skilled professionals work in CP as architects, landscape architects, planners, engineers, inspectors, construction specialists, contract administrators, accountants, and administrative personnel to serve the campus community.

As of June 30, 2011, there were 21 active projects with budgets exceeding \$750,000 on which funds were expended in FY2011 and had not been completed. The total allocated budget at that time was \$1.27 billion.

### **Audit Methodology**

The UC systemwide construction audit program was the basis for scoping the audit of campus bidding and change order processes. Data on all active construction projects during FY2011 and FY2012 were obtained and analyzed. One judgmentally selected currently active major project, the Helios Energy Research Facility West with an estimated construction cost of \$85 million, was selected for detail testing.

Bid documents that were obtained and reviewed included, but are not limited to:

- Advertisement for Contractor Prequalification
- Construction Manager/Contractor Request for Proposals Bidding Documents with Addenda
- Advertisements for Prequalification
- Prequalification Questionnaire
- Prequalification Questionnaire/Bid Package by the Construction Manager, Rudolph and Sletten
- Advertisement for Bids
- Instructions to Bidders
- Supplementary Instructions to Bidders
- Bid Forms
- Mandatory Prequalification Conference Attendance Sheet
- Bid Summaries

These documents were used to evaluate campus compliance with the Facilities Manual bid administration requirements.

At the time of this audit 29 change orders had been approved. Copies of all of these change orders were obtained and reviewed. Four change orders (CO) were selected for detail testing. These included:

- CO #9 – Revised framing at stair 3, added HSS tubes in the roof screen, added footings at the main entry per revised drawings in the amount of \$172,277,
- CO #14 – A net deductive CO in the amount of -\$101,281 resulting from changes to combine the visual and performance exterior skin mock-ups,
- CO #22 – Thirty-two separate changes totaling \$627,318, and
- CO #23 – Changes from the fifth floor alternate base bids in an amount of \$466,986.

Change orders #22 and #23 were very large so judgmentally selective sampling was used to identify specific cost proposals within each for detail testing.

### Summary Conclusion

Based upon the audit performed, we observed that there is general compliance on campus with requirements in the Facilities Manual with respect to the bidding process, change orders, and funding restrictions.

We had observations related to pricing change orders for which management responses were obtained. We noted one instance of a subcontractor using an hourly rate on a change order that included overhead and other costs not allowed under the University's General Conditions.

In addition, we also noted one instance of pricing for purchased equipment that appears higher than independent cost publications and one instance of an equipment credit to the campus for a change order at a price lower than independent cost publications. Although the dollar amounts associated with these individual transactions are small (under \$20,000), we have discussed with Capital Projects management the importance of obtaining comfort with rates and prices submitted to the campus on change orders when they have unit costs listed.

Specific observations in the following test areas are summarized below:

- Bidding Process – Concentration of Work Awarded
- Bidding Process – Prequalification
- Bidding Process – Bid Handling and Award
- Change Orders – Review and Approval Process
- Change Orders – Competitive Bidding and Authorization
- Change Orders – Pricing

Detailed observations and associated management responses for the last items are included in the following section (Summary of Observations & Management Response and Action Plan).

#### *Bidding Process - Concentration of Work Awarded*

We identified all active construction projects during FY2011 and FY2012 to determine if certain contractors were receiving a disproportionate share of awarded construction work. Based upon an analysis of the awarding of major construction contracts active in FY2011 and FY2012, work appears to have been distributed among contractors and subcontractors with no single one obtaining a disproportionate share of work.

### *Bidding Process - Prequalification*

We obtained and assessed bid data to determine if the campus Capital Projects group followed UC Facilities Manual requirements for prequalifying contractors. Based upon an analysis of the required prequalification advertising, questionnaires, conferences, interviews and evaluations, it appears that the prequalification process appears to have been administered in a manner consistent with the Facilities Manual.

### *Bidding Process – Bid Handling*

We examined whether the advertising, receiving, opening, and evaluating of bids as well as the awarding of the contract complied with Facilities Manual requirements. Based upon an analysis of the bid handling, evaluation, and award process, it appears that the bid handling and award process appears to have been administered in a manner consistent with the Facilities Manual.

### *Change Orders – Review and Approval Process*

We evaluated the process for review and approval of Capital Projects change orders. The campus Approval Authority Table differentiates change order threshold levels for all change orders up to and including those greater than \$5,000,000. Four change orders for the Helios Energy Project were examined and the change orders inspected had the required signatures based upon the nature and size of the change order, including those over \$100,000 with no formal public bid process approved through a Direct Award Justification Form (see below).

### *Change Orders – Competitive Bidding and Authorization*

In evaluating the Helios Energy Project, we identified all change orders, amounts and descriptions and reviewed those change orders exceeding \$100,000 to determine if they were competitively bid, or if not, verify that they were properly authorized. A total of 29 change orders had been approved at the time of the audit. Four change orders were selected for a detailed review. During these reviews, two project change orders in amounts greater than \$100,000 were identified. They were not competitively bid but they were properly routed for authorization and supported by a Direct Award Justification Form listing the reasons why they were to be awarded without competitive bidding.

### *Change Orders – Pricing*

With respect to the pricing associated with the four Helios Energy Project change orders sampled, we identified the following:

- Some change order cost proposals did not provide adequate detail as to labor hours, labor rates, material descriptions, quantities and/or unit costs to enable adequate evaluations. The at-risk amounts were relatively small.
- UC's General Conditions Section 4.2.3.1 requires that the Construction Manager/Contractor submit Change Order Requests to the University within seven days of discovering circumstances that will give rise to a Change Order Request. A time-line review of documents supporting the four sampled change orders revealed that none of



these change orders were submitted within seven days of first learning of a change circumstance that ultimately was included in the final Change Order Request.

- One concrete subcontractor billed carpenter hours at a rate specified in the concrete subcontractor's contract that included overhead, estimating, small tools, trailer and storage rentals, site fencing and other general conditions type costs. This audit determined that UC's General Conditions Section 7.3.3 to the executed contract (referencing changes in the work) states that these specific (and other) costs are not allowed on change orders. The potential at risk amount could be greater than \$3,000.
- A mechanical contractor billed charges from a subcontractor for six variable volume air valve terminals at unit costs of higher than independent cost publications. There was no indication of any competitive pricing in the file. The potential at risk amount could be greater than \$1,000 per unit or more than \$6,000.
- One laboratory equipment contractor provided a credit of \$16,995 for the scope deletion of three six-foot fume hoods with cabinets which was lower than costs listed in independent construction cost publications. The potential net credit short-fall risk amount is \$17,169.

---

---

## SUMMARY OF OBSERVATIONS & MANAGEMENT RESPONSE AND ACTION PLAN

---

---

### Change Orders – Pricing

We noted one instance of a subcontractor using an hourly rate on a change order that included overhead and other costs not allowed under the University's General Conditions to the executed contract. The inclusion of these additional costs were not noted and disallowed by the project management team prior to payment being made for the change order. Based upon feedback from the External Consultant, contractors/subcontractors often include such costs in change order unit costs and it is the responsibility of the owner to confirm that such costs are not included. In the absence of the project team obtaining positive confirmation that such costs are not included in unit rates or being generally aware of typical unit rates for the local market, there is a risk that contractors/subcontractors will bill the campus for such unallowable costs. A more detailed description of the observation follows below.

The External Consultant reviewed change orders to evaluate that they were priced in accordance with the Facilities Manual and/or the construction documents, specifically Section 7 of the General Conditions.

A total of four change orders (CO) were selected for detail review. These included:

1. CO #9 for \$172,277 with 106 pages of supporting backup,
2. CO #14 for -\$101,281 (negative balance CO) with 29 pages of supporting backup,
3. CO #22 for \$627,318 with 1041 pages of supporting backup, and
4. CO #23 for \$466,986 with 214 pages of supporting backup.

All change orders were properly routed for approval and recalculations were performed to ensure there were no math and/or calculation errors.

Supporting documents were examined to determine if labor, materials, equipment, rentals, and other costs were billed as allowed.

The review identified the following observations:

#### *General Observation Across Change Orders Reviewed*

A general observation was that some change order cost proposals did not provide adequate detail as to labor hours, labor rates, material descriptions, quantities and/or unit costs to enable adequate evaluations. The at-risk amounts were relatively small.

UC's General Conditions Section 4.2.3.1 of the contract requires that the Construction Manager/Contractor submit Change Order Requests to the University within seven days of discovering circumstances that will give rise to a Change Order Request. A time-line review of documents supporting COs #9, #14, #22 and #23 revealed that none of these change orders were

submitted within seven days of first learning of a change circumstance that ultimately was included in the final CO Request.

#### *Change Order #9*

On CO #9, the concrete subcontractor billed 121 carpenter hours at a rate of \$88.00/hour and 22 laborer hours at \$64.30/hour. These were significantly higher than the California prevailing wages at \$60.83/hour and \$43.67/hour respectively. Additionally, it was noted that the steel contractor had billed its field work at \$88.18/hour. It is expected that iron worker/steel erector rates are somewhat higher than carpenter rates. The project team explained that the \$88.00/hour unit rate had been agreed to and included in the concrete subcontractor's contract and that it included overhead, estimating, small tools, trailer and storage rentals, site fencing and other general conditions type costs. This audit determined that UC's General Conditions Section 7.3.3 (referencing changes in the work) of the contract states that these specific (and other) costs are not allowed on change orders. The potential at risk amount could be greater than \$3,000.

#### *Change Order #22*

The mechanical contractor billed charges from a subcontractor for six variable volume air valve terminals at unit costs of \$2,602 to \$3,461 each. Variable volume air terminal units were independently priced from \$404 to \$1,644 each via *2010 Current Construction Costs* published by Saylor Publications, Inc. There was no indication of any competitive pricings in the file. The potential at risk amount could be greater than \$1,000 per unit or more than \$6,000.

#### *Change Order #23*

On CO #23, the laboratory equipment contractor provided a credit of \$16,995 for the scope deletion of three six-foot fume hoods with cabinets. Comparison of costs to *2010 Current Construction Costs* indicated three six-foot fume hoods with cabinets (labor and materials) cost a total of \$34,164. The potential net credit short-fall risk amount is \$17,169.

### **Management Response and Action Plan**

#### *Change Order #9*

Capital Projects asserts that it does not allow its contractors or their subcontractors to deviate from contract terms. Specifically, strict adherence to General Conditions Section 7.3.3 which states that the "cost of extra work shall not include...site fencing, utilities, taxes, and overhead and profit." However, the bid form used by the general contractor does have conflicting language by specifying that these four items be included in the subcontractor rates, but then goes on to attempt to clarify the matter with the sentence, "See Article 7 of the General Conditions... for an explanation of the OH&P limits on change orders."

Management concurs with the finding for CO#9 that the concrete subcontractor rates were directed to include some overhead items that were not allowed under General Conditions 7.3.3, and by way of explanation, Contract Administration (CA) did not notice that there were conflicting statements in the general contractors bid form. CA in the future will work with the general contractors to ensure that they do not issue conflicting statements about costs of extra work.

*Change Order #22*

Capital Projects asserts that the pricing included seven new valves rather than six. The building controls are designed for one particular type of air valve, thus it was not an option to look at competitive pricing from another manufacturer for this change. Pricing for air valves varies significantly based on the manufacturer and technical specifications. The pricing provided by vendor represented a 50% discount to their published product rates and appeared appropriate for this type of facility in the San Francisco Bay Area.

*Change Order #23*

Capital Projects asserts that the pricing provided by vendor is not directly comparable to published estimating journals for several reasons. Often the pricing in publications do not reflect bulk discounts or direct supplier/contractor agreed pricing. The campus benefits from these pricing arrangements and the credit provided in this change is reflective of that benefit to the campus. In addition, benches were provided in lieu of the deleted hoods, in several locations, potentially decreasing the amount of the credit.