

State of Washington
Joint Legislative Audit & Review Committee (JLARC)



Evaluation of the Accuracy of Capital Project Cost Estimates

Report 09-8

September 23, 2009

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formats for persons with disabilities.*

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The statutory authority for JLARC, established in Chapter 44.28 RCW, requires the Legislative Auditor to ensure that JLARC studies are conducted in accordance with Generally Accepted Government Auditing Standards, as applicable to the scope of the audit. This study was conducted in accordance with those applicable standards. Those standards require auditors to plan and perform audits to obtain sufficient, appropriate evidence to provide a reasonable basis for findings and conclusions based on the audit objectives. The evidence obtained for this JLARC report provides a reasonable basis for the enclosed findings and conclusions, and any exceptions to the application of audit standards have been explicitly disclosed in the body of this report.

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Committee Approval

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- Central Washington University
- The Evergreen State College
- Western Washington University
- The State Board for Community and Technical Colleges and each of the individual colleges

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REPORT SUMMARY

Why a JLARC review of the accuracy of state agency capital project cost estimates?

Washington's capital budget provides funds to construct facilities that enable state agencies to perform the responsibilities assigned by law. The facilities range from prisons to office buildings to classrooms and represent long-term public investment. During fiscal years 2002 through 2009, the Legislature appropriated \$5.8 billion for state agency capital projects. Accurate project cost estimates are essential to the capital budget process. Reliable, consistent cost estimates for capital projects enable the Legislature and Executive Branch officials to make informed decisions when considering agency capital project requests. Accurate cost estimates are also critical to project managers responsible for constructing facilities within appropriations.

In the 2008 Supplemental Capital Budget (ESHB 2765), the Legislature directed the Joint Legislative Audit and Review Committee (JLARC) to "conduct an evaluation of the accuracy of capital project cost estimates prepared by state agencies for their budget requests." The Legislature further directed JLARC to focus on state agencies with large capital programs.

JLARC reviewed development of cost estimates for **all major projects** (over \$5 million) at ten agencies that account for over 80 percent of state capital projects constructed since 2002. For these ten state agencies, JLARC **measured the accuracy of capital project cost estimates by comparing estimates prepared at three major phases of project development to final project costs.** As part of this evaluation, JLARC also **reviewed the processes the agencies use to develop capital project cost estimates.**

A large majority of capital project cost estimates reviewed meet professional expectations for accuracy

Compared to final project costs, between 71 and 74 percent of the state agency capital project cost estimates reviewed by JLARC fell within the expected cost accuracy ranges identified by the Association for the Advancement of Cost Engineering International. This result was consistent for estimates at each phase of project development (concept, pre-design, and design), even though the expected range of accuracy narrows at each successive phase of development.

For those projects that fell outside the expected cost accuracy ranges, JLARC analyzed project characteristics to identify possible causes but found no systemic relationships between those characteristics and differences between estimates and final costs. Agencies cite various reasons for differences including changes in project scope and unfavorable market conditions.

The processes state agencies use to develop capital project cost estimates are consistent with professional practices

JLARC identified 11 critical steps in developing project cost estimates based on the work of the U.S. Government Accountability Office and professional societies involved in estimating project costs. The project development processes at all ten state agencies incorporate these 11 steps. State agencies accomplish these 11 steps through a combination of professional expertise, long-range planning, and technical guidance. Specific procedures vary among agencies, but the intent and purpose are the same; JLARC did not identify any significant gaps or omissions in agency procedures.

Improved reporting will enhance future evaluations of accuracy of cost estimates

Assembling the data necessary to compare project cost estimates to final costs proved to be a significant challenge in performing this evaluation. Part Three of this report describes those challenges and offers two solutions that would aid future evaluations. Responsibility for these two proposed solutions is directed to the Office of Financial Management as the agency that provides directions and other guidance to the state agencies on capital budgeting and as the agency responsible for the state's centralized accounting system. The following two recommendations would facilitate future evaluations of the accuracy of capital project cost estimates:

Recommendation 1

The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.

Recommendation 2

The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.

PART ONE – HOW ACCURATE ARE CAPITAL PROJECT COST ESTIMATES?

Estimating the cost of proposed capital projects provides critical information for decision-makers who must decide how to best use available funds to meet public needs. JLARC’s review of project cost estimates for 96 major projects (projects over \$5 million) constructed between 2002 and 2008 found that three-fourths of cost estimates are consistent with recognized expectations for accuracy.

JLARC reviewed the accuracy of capital project cost estimates for the following ten state agencies:

- State Board for Community and Technical Colleges
- Department of Corrections
- University of Washington
- Washington State University
- Department of General Administration
- Department of Social and Health Services
- Western Washington University
- Eastern Washington University
- Central Washington University
- The Evergreen State College

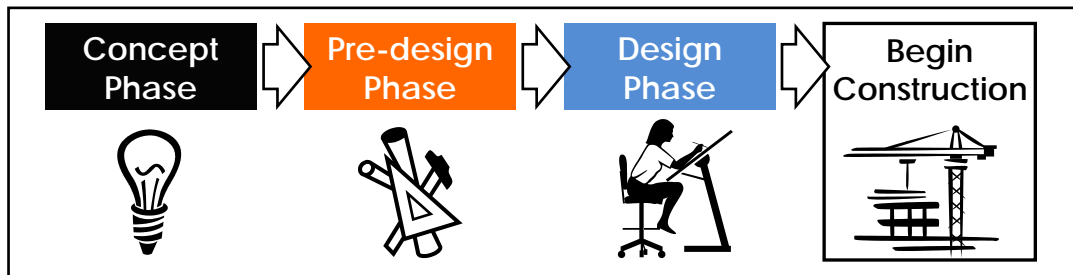
Analysis of Washington’s capital budget appropriations between 2001-03 and 2007-09 indicates that these ten agencies represent approximately 84 percent of capital appropriations for state agency construction.

This part of the report begins with an explanation of the criteria that JLARC used to evaluate the accuracy of capital project cost estimates. It then goes on to report the results of JLARC’s comparisons of capital project cost estimates with final project costs. Overall, almost three-fourths of the capital project costs reviewed meet professional expectations for accuracy. Further analysis did not identify any systemic reasons that explain why project costs varied outside of expected ranges. JLARC found differences in cost estimate accuracy among the selected agencies and between project delivery methods. However, averages for all categories were within expectations.

Setting Expectations: How Accurate Should Estimates Be?

The accuracy of a project cost estimate is defined primarily by the extent to which project details are known. Defining those details occurs during project design. Washington State agency capital projects typically progress through three major phases of development prior to construction, as shown in Exhibit 1: **concept, pre-design, and design.**

Exhibit 1 – Capital Projects Move through Three Phases Prior to Construction



Source: OFM Capital Budget Instructions and JLARC summary of meetings with capital project staff at ten selected agencies and institutions.

At the concept phase when few specifics are known, the accuracy of any cost estimate is likely to fall within a wide range. Cost estimates at this phase are typically based on very limited definition such as “a 50,000 square foot classroom building” or “100-bed medium security prison” and historical costs for similar facilities. As the project becomes more defined during subsequent phases, the expected accuracy increases. However, even when fully designed, the expected accuracy of any cost estimate may still fall within a range simply because information is not always perfect, and events such as weather delays, unexpected site conditions, or changing material prices can affect the actual cost of a project. As a result, expectations for cost estimate accuracy are typically expressed as a range at all phases of project development.

For this evaluation, JLARC used the cost estimate classification system developed by the Association for the Advancement of Cost Engineering International (AACEI) as criteria for evaluating the accuracy of cost estimates. (Appendix 3). The system establishes five classes based on the level of project definition and considers that estimating is a process whereby successive cost estimates are prepared until a final estimate closes the process. JLARC selected three of the Association’s five classes that mirror the three phases of development used in Washington’s capital budget process.

The ranges for expected accuracy of cost estimates for the phases described are:

- Concept phase: plus 30 to minus 15 percent,
- Pre-design phase: plus 20 to minus 10 percent, and
- Design phase: plus 10 to minus 5 percent.

The estimating process is sequential. Each phase builds upon information developed in the preceding phases thereby further defining the project. As project definition increases, so does the nature of the information available, moving from general projections based on previous experience and history to very specific calculations based on the unique characteristics of the individual project. The increasing project definition warrants a narrowing range of accuracy at each phase.

Between 71 and 74 Percent of Capital Project Cost Estimates Reviewed by JLARC Met Expectations for Accuracy

JLARC analysis of 96 major projects shows that from 71 to 74 percent of the cost estimates prepared by the selected agencies meet the expected accuracy criteria established by AACEI. As shown in Exhibits 2, 3, and 4 on the following pages, this result is consistent for all three project development phases reviewed.

The accuracy of these cost estimates should be viewed in the context of market conditions and inflation experienced during 2002-2008, the time period during which most of the projects were under development. The audited agencies provided information showing a tight market for essential construction commodities such as steel, petroleum products, and copper. Inflation, as measured by the non-residential construction price index, rose by approximately 50 percent cumulatively over this six-year period. Project managers also reported a high degree of competition for contractors and labor.

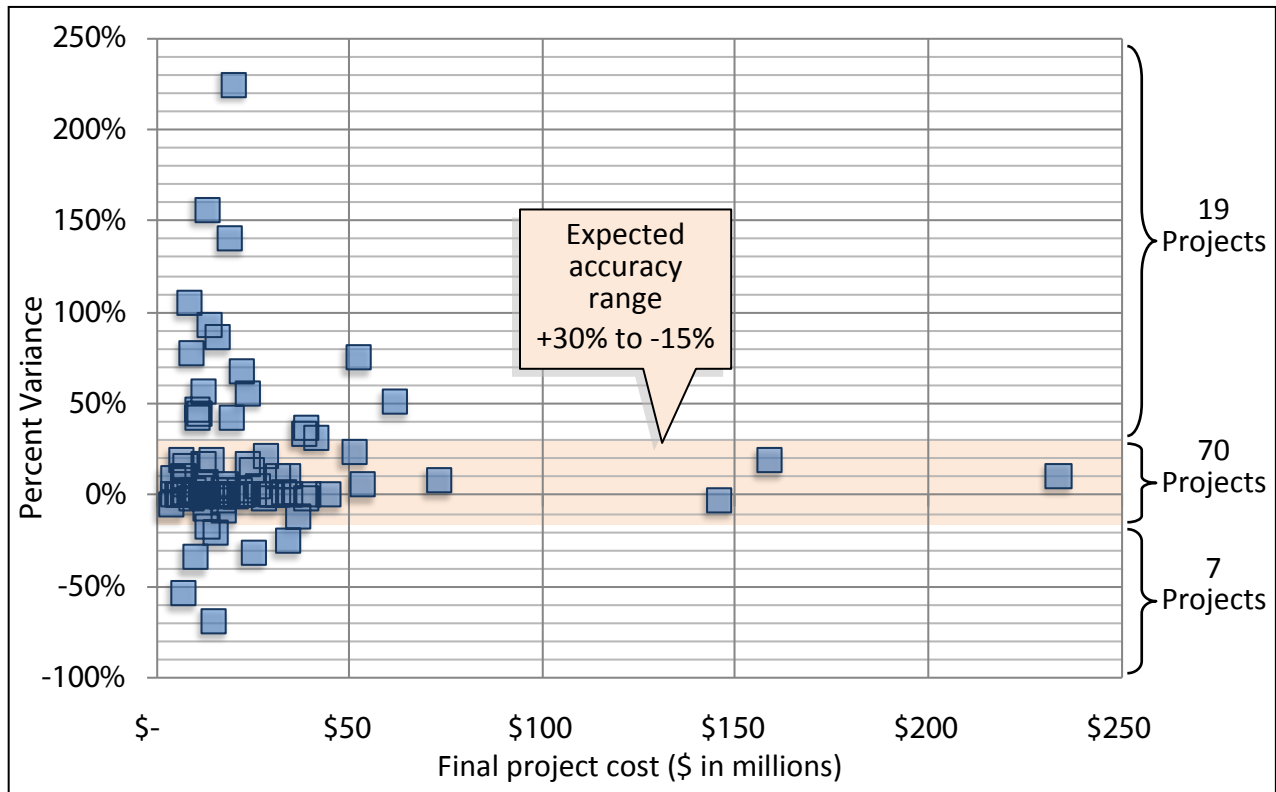
Concept Phase: Estimating Costs with Minimal Information

Exhibit 2 illustrates the accuracy of cost estimates prepared at the concept phase. The percent variance is the percent difference between the cost estimate at the concept phase, the point when agencies first ask for capital project funds, and the final cost. The tight grouping of projects within the plus 30/minus 15 percent range shows that, for the majority of projects, cost estimates are reasonably accurate at this early phase when few specifics are known. However, the scattering of projects above and below the expected range also indicates that these early cost estimates do not always predict the final project costs.

The exhibit also plots the accuracy for each project relative to its total cost. The accuracy of cost estimates for the largest projects are little different at this phase than the entire population. Of the eight projects that are over \$50 million, six (75 percent) fall within the expected accuracy range. Final costs for the other two projects are above the expected accuracy range.

Although the differences between cost estimate and actual costs may be dramatic for some projects, the impact of the differences is lessened by the fact that at the concept phase, agencies are requesting relatively small amounts of funds for pre-design work that will further define the project and provide a more informed cost estimate. OFM guidelines for funding requests at this phase range from \$200,000 to \$300,000 for a project estimated to cost \$50 million. Guidelines for a \$5 million project allow from \$50,000 to \$62,500 for pre-design.

Exhibit 2 – 73% of Concept Estimates Are Within Expected Accuracy Range (96 projects)



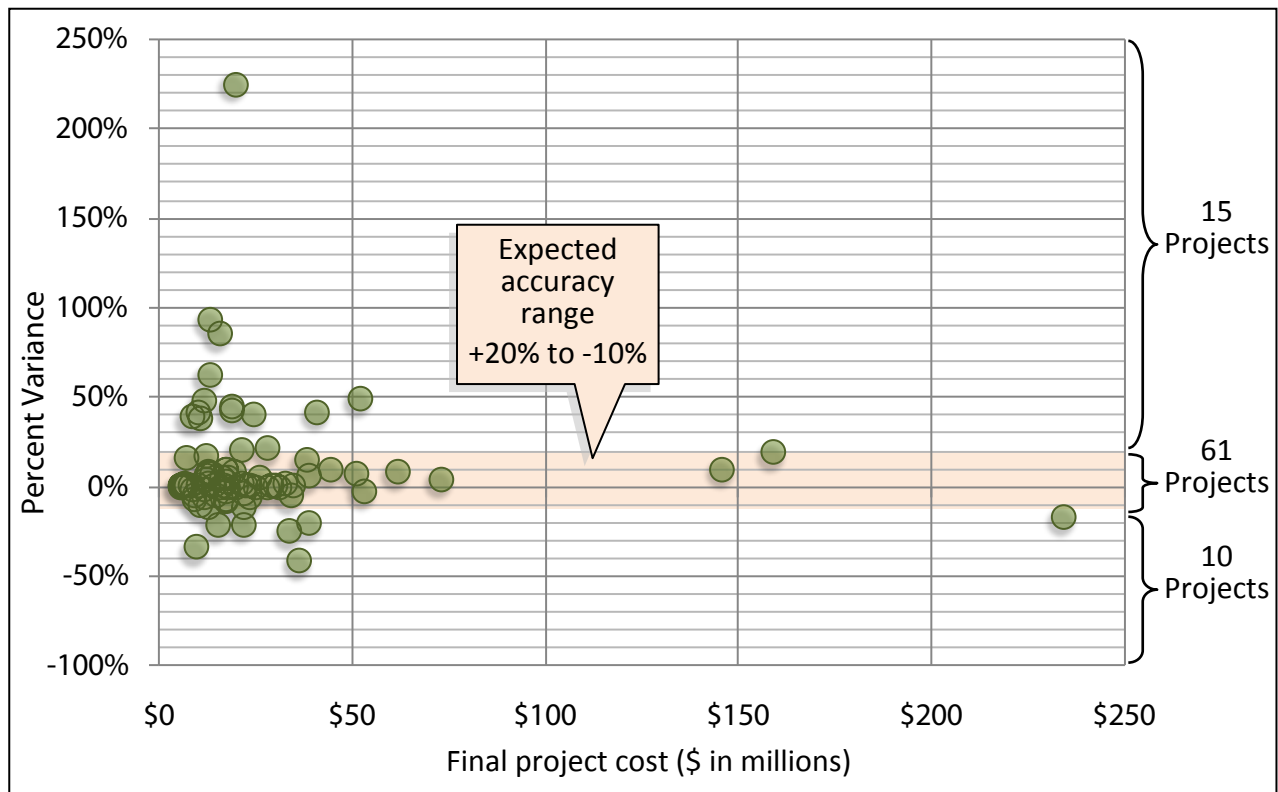
Source: JLARC analysis of survey data and Association for Advancement of Cost Estimating International Recommended Practice 17R-97.

Pre-Design Phase: Adding Information to the Cost Estimate

The same overall pattern of accuracy appears among cost estimates prepared during the pre-design phase even though the expected accuracy range has narrowed by one-third. As shown in Exhibit 3, 71 percent of pre-design cost estimates fall within the expected accuracy range of plus 20 to minus 10 percent. The pattern for projects over \$50 million is similar. Among these eight projects, cost estimates differ by more than the expected range for only three projects, one of which falls below the expected range. For the two projects where final costs exceed the expected range, the amount of the difference is considerably reduced from what was observed at the concept phase.

These results demonstrate the impact of increasing project definition. The pre-design phase adds greater detail to the project, thereby enabling cost estimators to more accurately anticipate project costs. Following pre-design, the next funding will be for design funds and is likely to be substantial. For example, the largest community and technical college project reviewed by JLARC requested \$7.4 million to begin designing the project, an amount equal to 20 percent of the estimated total cost.

Exhibit 3 – 71% of Pre-Design Estimates Are Within Expected Accuracy Range (86 projects*)



Source: JLARC analysis of survey data and Association for Advancement of Cost Estimating International Recommended Practice 17R-97.

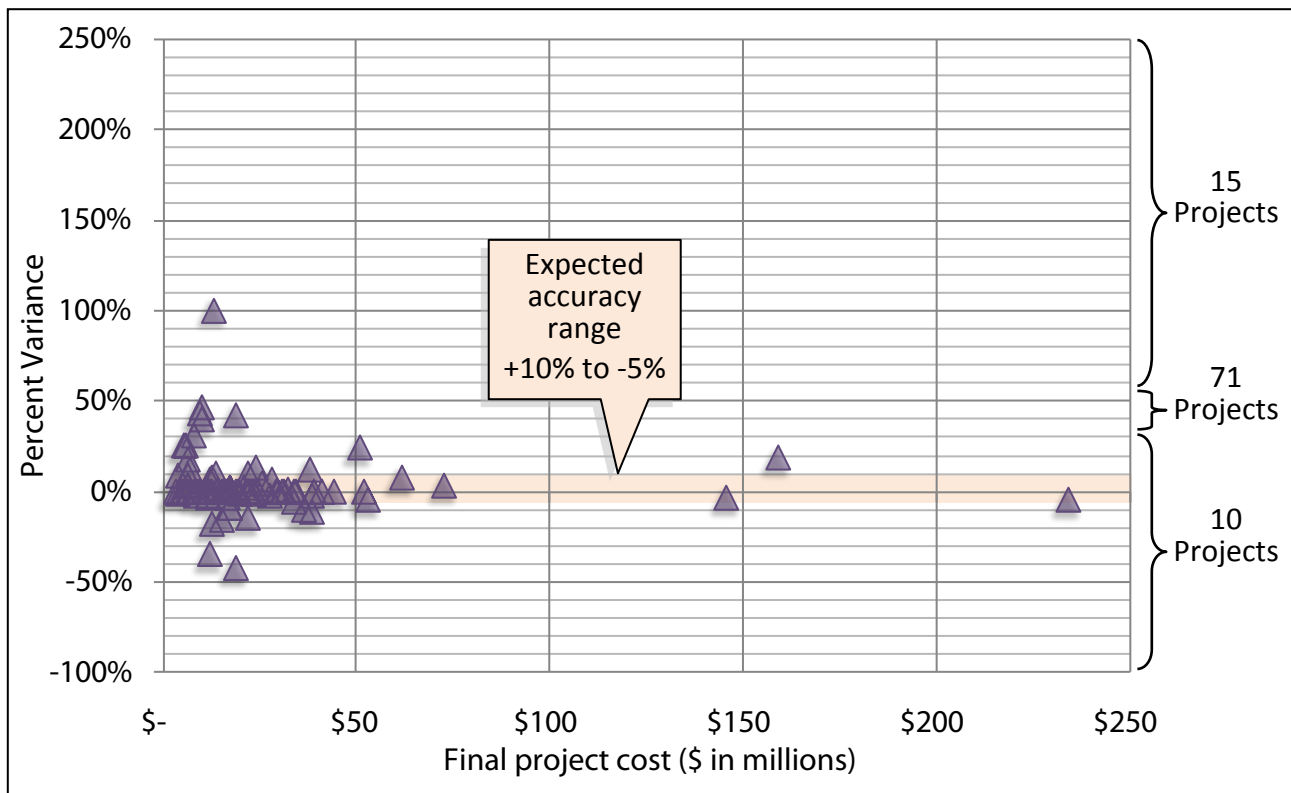
*Pre-design cost estimates not available for all projects; n=86.

Design Phase: Estimating Project Costs in Detail

Accuracy of project cost estimates increases slightly during the design phase; as shown in Exhibit 4 below, 74 percent of the cost estimates reviewed fall within the expected accuracy range. At this phase, the range has narrowed considerably and is only half of the pre-design range. The narrower range reflects the expectation of increased accuracy resulting from greater project definition during design.

However, as shown in Exhibit 4, cost estimates developed during the design phase are not always accurate. Nine of the 15 projects falling above the accuracy range exceed the range by more than twice the expected amount. Among the eight projects over \$50 million, final costs for two projects are outside of the accuracy expectation for design estimates.

Exhibit 4 – 74% of Design Estimates Are Within Expected Accuracy Range (96 projects)



Source: JLARC analysis of survey data and Association for Advancement of Cost Estimating International Recommended Practice 17R-97.

Additional Results Illustrate Accuracy Trends

In addition to these project level results, JLARC was also able to further summarize the cost data into various sub-categories based on the phase of development, the type of agency, and project delivery method. While the focus of JLARC’s evaluation is on costs, it was also possible to review changes in project square footage as a proxy for changes in project scope.

Overall, Cost Estimates Become More Accurate as Projects Develop

Although the previous exhibits show little change in the proportion of projects falling within the expected accuracy range from one phase to the next, Exhibit 5 shows that average cost estimate accuracy improved as projects progressed from concept to design. Final project costs averaged 15 percent more than the amounts estimated at the concept phase. At the end of the design phase however, the difference between cost estimates and final costs had declined; final costs exceeded design phase cost estimates by less than 4 percent. This change reflects the greater understanding of the project that occurs as the project design develops.

Exhibit 5 – Average Cost Estimate Accuracy Improves as Projects Progress from Concept to Design

Phase Estimate	Average Percent by which Final Cost Differs from Estimate	Number of Projects
Concept	+15.0%	96
Pre-design	+9.2%	86*
Design	+3.7%	96

Source: JLARC survey of capital projects.

*Pre-design cost estimates not available for all projects.

Cost Estimate Accuracy Varied Among Agencies

The JLARC analysis also identified differences in cost estimate accuracy among the types of organization, as shown in Exhibit 6 below. Each organizational type shows progress toward increasingly accurate estimates, and all averages are within the ranges of expected accuracy for each organizational type. Final costs for community and technical college projects tend to exceed cost estimates by higher percentages at all phases than for all other types of organization.

Exhibit 6 – Average Differences Between Cost Estimates and Final Costs Varied Among Agencies But No Averages Exceed Expected Accuracy

Agency Category	Number of Projects	Average Percent by which Final Costs Differ from:		
		Concept Phase Estimates	Pre-design Phase Estimates *	Design Phase Estimates
Community & Technical Colleges	51	+19.4%	+15.3%	+6.4%
Regional Universities	11	+11.1%	-5.2%	-0.9%
Research Universities	20	+9.0%	+2.9%	+2.2%
DOC/DSHS/GA	14	+10.5%	+2.2%	-0.5%

Source: JLARC survey of capital projects.

*Pre-design cost estimates not available for all projects; n=86.

General Contractor/Construction Manager Projects Had More Accurate Cost Estimates

The majority of state agency capital projects reviewed for this evaluation were delivered using the design-bid-build approach, in which a project is designed by consultants, put out to bid for construction, and constructed by the lowest responsible bidder. However, in recent years, agencies have begun to use alternative approaches, such as the general contractor/construction manager (GC/CM),¹ and design-build delivery methods in an attempt to improve coordination between designers and builders and to speed project delivery. Under GC/CM, the contractor provides construction expertise during the design phase and serves as general contractor during the construction phase. The design-build method contracts design and construction to a single entity, an approach that attempts to bring construction expertise into the design phase and to speed project delivery by allowing construction to begin before all design work is complete.

Twenty-seven alternative projects—23 GC/CM and four design-build—were among the projects JLARC reviewed. As shown in Exhibit 7, the average cost estimates for GC/CM projects are more accurate than the average for the traditional design-bid-build projects. Exhibit 7 also presents averages for the design-build projects, but the very small number of projects does not allow any conclusions about the accuracy of this project delivery method compared to other methods.

Exhibit 7 – Accuracy of Cost Estimates Varied Among Project Delivery Methods

Project Delivery Method	Number of Projects	Average Percent by which Final Costs Differ from:		
		Concept Phase Estimates	Pre-design Phase Estimates *	Design Phase Estimates
Design-Bid-Build	69	+17.5%	+11.0%	+4.9%
GC/CM	23	+8.2%	+4.7%	0.0%
Design-Build	4	+10.8%	+0.7%	+4.6%

Source: JLARC survey of capital projects.

*Pre-design cost estimates not available for all projects; n=86.

Projects Change Scope During Development

The primary focus of this JLARC evaluation was cost estimates. However, the review also measured the extent to which projects were built as proposed as indicated by the square footage of the completed facility.

JLARC’s survey of agency personnel found that they express a strong commitment to building projects within the budgets provided by state appropriations. One method for meeting this commitment was to alter the scope of the projects. In order to address unfavorable changes in material prices and other uncertainties, capital project managers often request bids for variations on the project that allow some flexibility in constructing the project within available funds. Other

¹ JLARC previously reported on Washington’s experience with GC/CM method of contracting in 2005; see *An Assessment of General Contractor/Construction Manager Contracting Procedures* (Report 05-09).

strategies included leaving out equipment or interior finishes. In some cases, managers reduced the size of the project.

To measure scope attainment, JLARC compared the final square footage of the projects surveyed to the scope estimates developed at the concept feasibility phase. Concept phase scope estimates for 73 percent of projects reviewed were within the plus 30 to minus 15 percent range applicable to cost estimates at that phase,² 26 percent were within 1 percent. The average project was 16 percent larger than initially estimated with notable outliers in each direction. The data available for this evaluation did not allow JLARC to determine what impact the scope changes could have on program operation and maintenance costs.

No Systemic Relationships Between Project Characteristics and Estimate Accuracy

JLARC analyzed the project data to determine if any characteristics are related to the accuracy of a project’s cost estimate. The analysis looked at the dollar value of the projects, the number of change orders, the project duration, project scope, and the speed and intensity of project delivery. None of these variables were correlated with the differences between cost estimates and final project costs.

JLARC asked agencies why projects might exceed expected accuracy ranges. As Exhibit 8 illustrates, the reasons range from scope change, to changing markets, to inflation. During meetings with capital project staff at the agencies, they also pointed out the difficulties involved in estimating project costs anywhere from two to four years prior to beginning construction. As noted previously, the time period reviewed was characterized by tight markets for materials and labor and by substantial inflation. Agency staff, particularly within the community and technical college system, also reported that opportunities to combine projects or take advantage of partnerships with local businesses also resulted in final projects that differed from their original estimates. Appendix 4 presents three specific examples provided by agencies for the differences between cost estimates and final costs.

Exhibit 8 – Reasons Cited by Agencies for Final Costs Exceeding Estimates

Reason	Number of Projects
Change in project scope	17
Market conditions	16
Change in program	14
Change in funding	11
Inflation	14

Source: JLARC survey of capital projects. N=96.

² Project cost and square footage are directly and highly related; JLARC used the accuracy range for initial cost estimates to measure accuracy of final project scope compared to initial estimates.

PART TWO – ARE AGENCIES’ COST-ESTIMATING PROCEDURES CONSISTENT WITH PROFESSIONAL PRACTICES?

This part of the report evaluates the procedures state agencies use in developing cost estimates for capital projects and compares those procedures to established professional practices. Overall, JLARC found that state agencies are following project development processes that are consistent with professional practices.

To provide context for that discussion, this part of the report begins with a brief description of the capital budgeting process and provides additional detail about the activities that occur during each of the three project development phases that produce the cost estimates discussed in Part One.

Capital Budgeting is a Multi-Year, Multi-Stage Process

Washington’s capital budget provides funds to construct facilities that will serve the state into the future. The capital budget provides funds to construct facilities such as state office buildings, prisons, K-12 classrooms, university and community college classrooms, local parks, museums, and medical facilities. Unlike the operating budget which establishes spending levels for each biennium, the capital budget provides funding for projects that may be constructed over several biennia.

Budgeting for capital projects begins long before any funds are actually requested. RCW 44.88.030(5) establishes a ten-year capital planning process. Prior to the beginning of each biennium, the Governor prepares a capital plan which identifies projects proposed for funding in the upcoming biennium and four succeeding biennia. Although the Legislature appropriates funds only for projects in the upcoming biennium, the plan provides a long-range look at future needs. The amount of funds proposed in each year of the ten-year plan must be balanced against the projected available revenue.

The Office of Financial Management (OFM) coordinates the preparation of the Governor’s biennial capital request, which begins with each agency identifying its capital construction needs. OFM develops instructions and standards to guide agencies in preparing requests; reviews and evaluates their requests; and assembles the Governor’s capital budget plan. The Governor submits this proposal to the Legislature. After review and modification, the Legislature passes a final biennial capital budget.

Agencies identify proposed capital projects through a variety of sources, such as master plans, established program requirements, and projected service levels. Other sources include facility condition assessments, health and safety requirements, and local building codes. Project cost estimates included in the latter years of the capital plan (such as years 8, 9, and 10) are based on very limited information; only after funds are appropriated do cost estimates become more specific.

What Steps *Should* State Agencies Take to Develop Cost Estimates for Capital Projects?

JLARC identified 11 critical steps in developing project cost estimates from a variety of sources. These include the US Government Accountability Office (GAO), the Association for the Advancement of Cost Engineering International, the National Association of State Budget Officers, and the Society of Cost Estimating and Analysis. Exhibit 9 describes these steps in detail.

Exhibit 9 – Steps of Cost Estimating

Step	Description
1. Define the estimate’s purpose	Cost estimates have two purposes: to help managers evaluate and select alternatives, and to support the budget process by providing estimates of the funding required for a project.
2. Develop estimating plan	Determine the estimating team, outline the estimating approach, and develop the estimate timeline and schedule.
3. Define project characteristics	Identify the project purpose, characteristics, technology implications, system characteristics, acquisition schedule and strategy, support needs and risk items.
4. Determine estimating approach	Develop a work breakdown structure that defines the work necessary to accomplish the project. For each work element, an estimating method should be identified.
5. Identify ground rules and assumptions	Clearly define what is included and excluded from the estimate. Identify specific assumptions such as base year, schedule information by project phase, acquisition strategy, schedule/budget constraints, contractor information, and inflation and technology assumptions.
6. Obtain data	Create a data collection plan, identify data sources, analyze and store data.
7. Develop point (base) estimate	Based on ground rules and assumptions, and using data, develop the cost estimate and the level of confidence using identified risk factors.
8. Conduct sensitivity analysis	Test the sensitivity of cost elements to changes in data input and key assumptions.
9. Conduct risk and uncertainty analysis	Determine the level of cost, schedule, and technical risk associated with each data element.
10. Document the estimate	Explain the cost estimating process used, and document how the cost estimate was prepared so that the quality can be determined and the estimate could be recreated.
11. Update estimate to reflect actual costs and changes	Update the estimate to reflect any changes in assumptions or as the project passes milestones.

Source: Best Practices based on work performed by US Government Accountability Office, Association for the Advancement of Cost Engineering, Bureau of Labor Statistics, Federal Highway Administration, National Association of State Budget Officers, US Office of Management and Budget, and Society of Cost Estimating and Analysis.

Cost estimating requires both science and judgment. In general, the goal is to find a “reasonable” answer. However, the cost estimator typically faces many challenges: insufficient data, incomplete project definition, uncertainty of available resources, and unidentified risks. These challenges may lead to bad estimates, which can be characterized as containing poorly defined assumptions, no supporting documentation, no comparisons to similar programs, inadequate data collection, inappropriate estimating methodologies, irrelevant or out-of-date data, no basis or rationale for the estimate, and no defined process for generating the estimate.

The Processes State Agencies Use to Develop Capital Project Cost Estimates Are Consistent with Professional Practices

The Office of Financial Management and the state agencies reviewed for this evaluation follow generally recognized practices in developing capital project cost estimates. OFM establishes instructions that require agencies to submit specific information in a defined format. Each agency further defines the estimating process in ways that develop projects in a logical, consistent manner. In addition, the estimating process is managed by individuals with relevant professional skills and expertise. The process provides opportunities for project managers to explore and consider alternatives before requesting the Governor and Legislature to commit substantial funds for design and construction.

The typical project development process includes three phases of project development prior to construction: **concept**, **pre-design** and **design**. State agencies must prepare a cost estimate for capital projects at each of these three phases. Exhibit 10 provides an overview of the typical activities that occur at each phase, the actors involved, and policy and professional guidance that directs their efforts during project development.

Interviews with capital project managers and review of procedures at each of the ten agencies show that the agencies incorporate these 11 steps in developing project cost estimates. Although specific procedures and activities may vary among the agencies, the processes at each of the ten agencies JLARC reviewed are consistent with the intent and purpose of the established business practices identified in Exhibit 9. The 2005 JLARC performance audit of Capital Budget Processes (Report 05-7) came to a similar conclusion based on a series of in-depth project case studies. This review found nothing that challenges that conclusion.

Exhibit 10 – Moving From Idea to Concrete – How Projects Develop

	Appropriation \$	Appropriation \$	Appropriation \$	
	Concept Phase	Pre-design Phase	Design Phase	Under Construction
Activities	<ul style="list-style-type: none"> Identify need for building Develop preliminary scope for facility <ul style="list-style-type: none"> Gross square feet Purpose Possible locations Prepare project estimate Submit request for pre-design study funds 	<ul style="list-style-type: none"> Analyze requirements: <ul style="list-style-type: none"> Project – Program Site – Budget Master plan coordination Operation & maintenance Develop more detailed description of facility needs Prepare project estimates Submit request for design funds 	<ul style="list-style-type: none"> Prepare schematic drawings Develop detailed design Conduct value engineering and constructability review Prepare construction documents Prepare bid documents Submit request for construction funds 	<ul style="list-style-type: none"> Assess and prepare site Prepare construction schedule Construct Pay contractors Document final acceptance
Actors	<ul style="list-style-type: none"> Owner/user Internal capital project staff 	<ul style="list-style-type: none"> Owner/user Architect/engineer Internal stakeholders Internal capital project staff Project steering committee 	<ul style="list-style-type: none"> Owner/user <ul style="list-style-type: none"> Students, faculty, staff, administration Architect/engineer Sub-consultants Project steering committee External stakeholders 	End of Project Development Project Complete
Guidance	<ul style="list-style-type: none"> OFM Capital Project Instructions OFM Predesign Manual Historical data Master plan Program/accreditation standards (where applicable) 	<ul style="list-style-type: none"> OFM Predesign Manual Instructions for architects & engineers Project design guidelines Conditions of agreement 	<ul style="list-style-type: none"> Instructions for architects & engineers Project design guidelines Conditions of agreement 	<ul style="list-style-type: none"> Instructions for architects & engineers General conditions for constructing state facilities Supplemental conditions

Source: JLARC summary of interviews with capital project staff at ten selected agencies and institutions.

Note: Process described applies to design-bid-build and general contractor/construction manager projects. Design-bid projects usually request design and construction funds at the end of pre-design stage.

Compliance with best practices is accomplished through a combination of professional expertise, long-range planning, and technical guidance. Each of the ten state agencies has capital project managers and staff—architects or engineers—with recognized professional expertise. By law, the Department of General Administration provides technical expertise for state agencies such as the State Board for Community and Technical Colleges, the Department of Corrections, and the Department of Social and Health Services. The latter two agencies' professional staff are a combination of departmental staff and embedded General Administration staff who function as a unified team. Universities are authorized to develop and manage projects on their own. Staff size varies from two to three individuals at the regional universities to much larger staff at the two research universities. In addition to permanent architectural and engineering staff, additional expertise is provided by private consultants contracted to prepare pre-design studies and project designs.

Each of the agencies JLARC reviewed indicated that they use technical guidelines and procedures for cost estimating. The guidelines are either those developed by the General Administration Architectural and Engineering Services staff or comparable guidelines and procedures developed by the agency. Examples of technical guidance include:

- Instructions for architects and engineers,
- Project design guidelines,
- Campus standards and guidelines (developed by individual universities), and
- Accreditation standards for educational institutions or correctional facilities.

PART THREE – FUTURE EVALUATION OF COST ESTIMATE ACCURACY

This final part of the report describes some of the challenges JLARC encountered in locating and assembling the data used for this evaluation. The report concludes with two recommendations, the implementation of which would enhance future evaluations of the accuracy of capital project cost estimates.

Data Limitations Hinder Legislative Efforts to Assess Capital Budget Performance

Assembling the data necessary to compare project cost estimates to final costs is a significant challenge. Information on cost estimates and expenditures is available from a variety of sources but not available in any standardized summary form. Obtaining information for this evaluation required requesting information from a variety of sources. Because of the time and difficulty involved in collecting this information, legislators and staff face challenges in assessing agency capital development performance and focusing attention on agencies or projects where costs exceed acceptable ranges.

Capital Project Information is Fragmented

Since agency capital budget requests are based on project cost estimates, JLARC initially attempted to obtain these estimates from OFM. However, OFM records were not a sufficiently complete source for all the information needed for this review.

JLARC was also not able to find project close-out reports that summarize all details of completed projects. OFM requires agencies to submit semi-annual status reports for all major projects that include much of the information needed about project expenditures, scope, and cost. However, the reports are not consistent in their detail nor do they summarize **completed** projects. The final scope is not always included nor are changes to the scope described. In addition, financial data in the semi-annual status reports is often budget and appropriation information rather than actual expenditures. If project costs are presented, the amounts do not correspond to the same amounts reported by the state accounting system. As a result, status reports do not always document final project expenditures, thereby limiting the opportunity to compare final cost to earlier cost estimates.

As a result of these limitations, JLARC requested information from each of the ten agencies via survey. The survey methodology and form are provided in Appendix 5. In testing the financial data reported by the agencies, JLARC found that the state accounting system, the Agency Financial Reporting System (AFRS), does not always report the total, final cost of a project. Although JLARC found no evidence that AFRS information is incomplete or erroneous, the financial information about **individual capital projects** is fragmented and not easily compiled. For example:

- **Multiple projects may be combined into a single project.** Seattle Central Community College reported \$17.7 million in state funds for a science and mathematics building completed in 2006. College staff reported that funds for this project were provided from

three separate state appropriations and project expenditures are reported under three separate project numbers. Obtaining a complete record of project expenditures requires collecting information from the three sources.

- **Additional funds may be provided by programmatic appropriations:** Yakima Valley Community College reported \$22 million in state funds for the Deccio Higher Education Center. AFRS reports \$20.5 million. The college informed JLARC that the additional funds were provided by a special appropriation entitled “Infrastructure” used to bring technology into the building. The expenditures from the additional appropriation that contributed to building the Deccio Higher Education Center are not included in the AFRS total for the project.
- **Funds may be appropriated under another project number:** Washington State University reported state funds of \$17.5 million for the WSU Vancouver Center Multimedia/Electronic Communication Classroom Building. The AFRS amount for this project is \$15.8 million. The difference, according to university officials, was attributed to funds provided by an earlier appropriation for the Vancouver Center, \$1.5 million of which was allocated to this project.

Inconsistent project numbering also contributes to difficulty in compiling project data. Although the number assigned to a project typically carries forward through the project’s life, JLARC encountered instances where numbers changed. For example, funds for project number 20002001, the Special Commitment Center, was initially appropriated to the Department of Corrections and later transferred to the Department of Social and Health Services. DSHS reported that project on the JLARC survey using a different number from the original. The DSHS number does not appear in AFRS. The original number is the only valid AFRS account for this project. In addition, the Department of General Administration Architectural and Engineering Services uses a different numbering system for capital projects. This system does not link to AFRS project numbers. Tracking expenditures between the two systems is virtually impossible for anyone without direct knowledge of the projects.

Compiling total project costs from separate sources is time-consuming and introduces the risk of error or omission. Thus, policy-makers cannot readily determine the accuracy of project estimates.

State Accounting System Does Not Report Local Non-Appropriated Funds by Project

In addition, AFRS does not report local non-appropriated funds for **individual capital projects**. Thirty-four of the projects reviewed for this evaluation, primarily educational institution projects, reported use of local funds. Some local funds, including a portion of tuition, some fees, miscellaneous revenues and interest income, are appropriated by the Legislature to institutional building accounts for specific projects. However, other local funds are administered by the individual institutions without appropriation. These non-appropriated funds are typically associated with a specific purpose such as student activities, bookstore operations, parking facilities, housing or food service. Non-appropriated local funds, however, were a significant source (26 percent) of funds for university capital projects during the period reviewed, as shown in Exhibit 11. The University of Washington relied on local funds for almost three-fifths of its capital spending between 2001 and 2008.

Exhibit 11 – Non-appropriated Local Funds Account for a Quarter of Higher Education Capital Project Expenditures, July 2001 through December 2008

	Appropriated Funds		Non-appropriated Funds	
	Amount	% of Agency Funds	Amount	% of Agency Funds
UW	\$653,244,148	41%	\$942,022,221	59%
CTCS	\$1,675,599,581	90%	\$179,700,664	10%
WSU	\$536,615,544	86%	\$86,379,766	14%
EWU	\$140,355,803	81%	\$32,865,298	19%
CWU	\$158,470,739	92%	\$14,066,658	8%
WWU	\$192,569,315	99%	\$1,683,325	1%
TESC	\$133,151,093	100%	\$0	0%
Totals	\$3,490,006,221	74%	\$1,256,717,931	26%

Source: JLARC analysis of AFRS data provided by LEAP and OFM, FY 2002 through December 2009.

Although non-appropriated local funds are a significant source of capital project revenue, they are reported in AFRS only as summary information for each organization rather than by project. As a result, AFRS cannot provide complete information for projects that utilize non-appropriated local funds. Obtaining that information requires inquiries to each agency.

Recommendations

The lack of complete, accessible information on capital project cost estimates and expenditures limits policy-makers' ability to monitor agency performance in developing capital projects. To address this problem, improved direction for project accounting is needed to ensure that state accounting records report all funds used for each capital project. In addition, a standardized project close out report for each project will facilitate comparison of cost and scope estimates with final project results.

Recommendation 1

The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.

Legislation Required:	None
Fiscal Impact:	JLARC assumes that this can be completed within existing resources.
Implementation Date:	Beginning Fiscal Year 2010

Recommendation 2

The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.

Legislation Required:	None
Fiscal Impact:	JLARC assumes that this can be completed within existing resources.
Implementation Date:	Beginning Fiscal Year 2010

APPENDIX 1 – SCOPE AND OBJECTIVES

EVALUATION OF THE ACCURACY OF CAPITAL PROJECT COST ESTIMATES

SCOPE AND OBJECTIVES

MARCH 9, 2009



STATE OF WASHINGTON
JOINT LEGISLATIVE AUDIT
AND REVIEW COMMITTEE

STUDY TEAM

Mark Fleming

PROJECT SUPERVISOR

Keenan Konopaski

LEGISLATIVE AUDITOR

Ruta Fanning

Joint Legislative Audit &
Review Committee
1300 Quince St SE
Olympia, WA 98504
(360) 786-5171
(360) 786-5180 Fax

Website:

www.jlarc.leg.wa.gov

e-mail: neff.barbara@leg.wa.gov

Why a JLARC Study of the Accuracy of Capital Project Estimates?

The 2008 Supplemental Capital Budget (ESHB 2765) requires the Joint Legislative Audit and Review Committee (JLARC) to review the accuracy of capital budget cost estimates. The mandate directs JLARC to evaluate the procedures used by agencies in formulating budget requests, examine how the Office of Financial Management (OFM) and legislative committees review requests, and compare final costs to project estimates.

Background

Between fiscal years 2002 and 2007 state capital expenditures totaled \$9.3 billion for more than 1,400 capital projects (excluding the transportation budget). Approximately 56 percent of this amount was grants and loans to build K-12 schools and other local infrastructure. The remaining 44 percent funded construction of state facilities such as college classrooms and laboratories, state office buildings, prisons, and mental health facilities.

Capital budgeting is a longstanding legislative interest. Five JLARC studies have addressed various aspects of capital budgeting and management since 2002. The most recent, the 2005 *Performance Audit of Capital Budget Processes* (Report 05-7), found that while agency capital project planning and management were generally successful, OFM oversight was limited, especially during the early stages of project planning and development that have a profound influence on project cost and value. Since then, the Legislature and OFM have taken action to strengthen oversight during the critical early stages of project development.

Capital Budgeting is a Multi-Year Process

Washington's capital budget process involves many state agencies and typically plays out over several years. OFM coordinates the preparation of the Governor's biennial capital request, which begins with each agency identifying its capital construction needs. OFM develops instructions and standards to guide agencies in preparing requests, reviews and evaluates their requests, and assembles the Governor's capital budget plan. The Washington State Legislature reviews and approves or modifies the Governor's proposed capital budget.

During this process, capital projects progress through pre-design, design and construction stages. Large projects may require two or more biennia to complete all phases. The Department of General Administration provides project management services for most state agencies. However, the four-year baccalaureate institutions, Fish and Wildlife, Natural Resources and the State Parks and Recreation Commission are authorized to manage their own capital projects. OFM provides financial control over all projects through a system of periodic allotments.

Study Scope

JLARC will evaluate the accuracy of capital project estimates by reviewing capital programs at several agencies that account for over 90 percent of the state’s non-transportation capital construction expenditures. The agencies include the state’s six baccalaureate institutions, the Community and Technical College system, Corrections, General Administration, and Social and Health Services.

Study Objectives

The JLARC review will evaluate the accuracy of capital budgeting by answering the following questions:

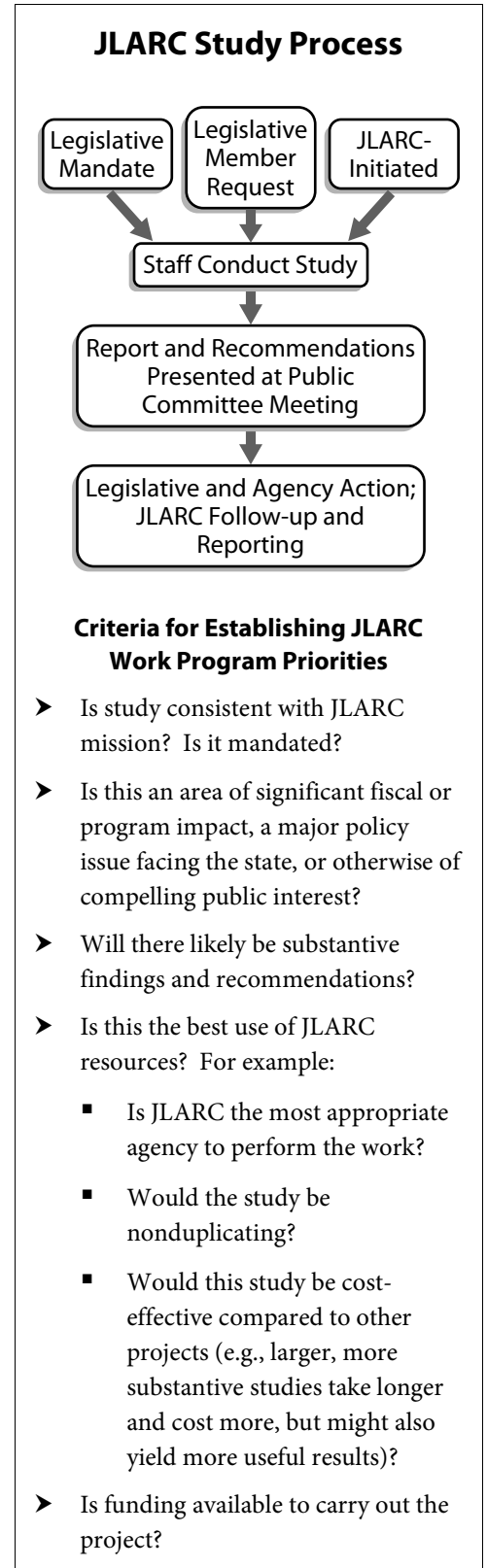
- 1) What methods do agencies use to prepare estimates?
- 2) What is the role of OFM and General Administration for evaluating cost estimates? What processes do they use in this role?
- 3) What processes are used by legislative fiscal committees to evaluate project cost estimates?
- 4) How do processes used to develop and evaluate project estimates in Washington State compare to cost estimating best practices?
- 5) How accurate are these cost estimates compared to final actual costs for the agencies in the scope of this study?

Timeframe for the Study

Staff will present its preliminary and final reports at the July and August 2009 JLARC meetings.

JLARC Staff Contact for the Study

Mark Fleming (360) 786-5181 fleming.mark@leg.wa.gov



APPENDIX 2 – AGENCY RESPONSES

- Office of Financial Management
- General Administration
- Department of Social and Health Services
- Department of Corrections
- State Board for Community and Technical Colleges
- Central Washington University
- Eastern Washington University
- The Evergreen State College
- University of Washington
- Washington State University
- Western Washington University




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AUG 11 2009
JLARC

STATE OF WASHINGTON
OFFICE OF FINANCIAL MANAGEMENT

Insurance Building, PO Box 43113 • Olympia, Washington 98504-3113 • (360) 902-0555

August 7, 2009

TO: Ruta Fanning, Legislative Auditor
Joint Legislative Audit and Review Committee

FROM: Victor A. Moore 
Director

SUBJECT: PRELIMINARY REPORT ON EVALUATION OF THE ACCURACY OF CAPITAL PROJECT COST ESTIMATES

Thank you for the opportunity to review JLARC’s preliminary report on the Evaluation of the Accuracy of Capital Project Cost Estimates. Here is our response to the recommendations in the report.

Recommendation	Agency Position	Comments
<p>1. The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project costs.</p>	<p>Do not concur</p>	<p>While OFM agrees that it is very valuable to have complete project costs, changing financial reporting requirements can be difficult and expensive to implement. Accounting systems that interface with the Agency Financial Reporting System (AFRS), including systems operated by higher education, would be impacted. It may be less expensive and quicker to collect local funds expended on projects through Recommendation #2.</p>
<p>2. The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare projects with cost and scope estimates submitted in request for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures; 2) transfers to and from other projects, where applicable; 3) final square footage; 4) changes to scope; and 5) major milestone achievement dates.</p>	<p>Concur</p>	<p>OFM requires major project status reports from agencies every six months. They can be adapted to include the information recommended by JLARC. These reports then can be transmitted to the Legislature.</p>

We look forward to your final report. If you have questions, please call Tom Saelid at (360) 902-0562.

cc: Pat Sanborn, Statewide Accounting, OFM
Tom Saelid, Senior Budget Assistant, OFM





State of Washington
Department of General Administration
 210 11th Avenue, SW • PO Box 41000 • Olympia, WA 98504-1000
 (360) 902.7300 • FAX (360) 586.5898

August 19, 2009

Ruta Fanning, Legislative Auditor
 Joint Legislative Audit and Review Committee
 506 16th Avenue SE
 P.O. Box 40910
 Olympia, WA 98501-2323

Dear Auditor Fanning:

We are pleased to provide this formal response to the preliminary report on the *Evaluation of the Accuracy of Capital Project Estimates*.

RECOMMENDATION	AGENCY POSITION	COMMENTS
Recommendation 1: The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.	Concur	None
Recommendation 2: The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.	Concur	None

We thank you for this opportunity to provide General Administration’s position on each of the study’s recommendations and would be happy to discuss them further if you wish.

Sincerely,

Linda Villegas Bremer
 Director



STATE OF WASHINGTON

DEPARTMENT OF SOCIAL AND HEALTH SERVICES

P.O. Box 45010, Olympia, Washington 98504-5010

August 21, 2009

RECEIVED

AUG 26 2009

JLARC

Ruta Fanning
 Joint Legislative Audit and Review Committee
 Post Office Box 40910
 Olympia, Washington 98504

Re: Evaluation of the Accuracy of Capital Projects Estimates

Dear Ms. Fanning:

As requested, this is the Department of Social and Health Services formal response to the JLARC preliminary report. Bob Hubenthal, Capital Programs Office Chief, has notified Mark Fleming that he will be available at the committee meeting to answer questions.

RECOMMENDATION	AGENCY POSITION	COMMENTS
<p><u>Recommendation 1</u> The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.</p>	<p>Concur</p>	<p>Not applicable.</p>
<p><u>Recommendation 2</u> The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.</p>	<p>Concur</p>	<p>Not applicable.</p>

Sincerely,

Susan N. Dreyfus
 Secretary



STATE OF WASHINGTON
DEPARTMENT OF CORRECTIONS
P. O. Box 41100 • Olympia, Washington 98504-1100 • Tel (360) 725-8500

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AUG 21 2009
JLARC

August 17, 2009

Ruta Fanning
Legislative Auditor
Joint Legislative Audit & Review Committee
Post Office Box 40910
Olympia, Washington 98504

Dear Ms. Fanning:

Thank you for the opportunity to review the Evaluation of the Accuracy of Capital Project Estimates – Preliminary Report. The Department of Corrections was one of the agencies evaluated in this document. We concur with the recommendations presented in this report.

If you have any questions, please contact Dave Jansen, Director of Capital Programs at (360) 725-8354.

Sincerely,

A handwritten signature in black ink, appearing to read "E. Vail", enclosed in a large, loopy oval.

Eldon Vail
Secretary

EV:dj

cc: David Jansen, Director of Capital Programs

"Working Together for SAFE Communities"



RECEIVED
JUL 29 2009
JLARC

July 27, 2009

Ref.: 09-31-16

MEMORANDUM

TO: Mark Fleming, JLARC
FROM: Tom Henderson, Director Capital Programs, SBCTC
SUBJECT: Technical Review – Capital Project Cost Estimate

Thank you for the opportunity to review the July 22, 2009, preliminary report of the JLARC evaluation of the accuracies of capital project cost estimates. While it is refreshing to note that 71-74 percent of the state agency capital cost estimates fall within an expected cost range of estimates, and that on average the totals are less than half the expected range, it is equally important to recognize the underlying reasonableness of the cost estimate. A large difference on a very tight estimate may be less of a problem than no increase on an excessively high cost estimate. In addition, the added cost or in many cases loss of scope to manage the budget using the GCCM process may not be worth the accuracy in estimating. Each biennium, the State Board provides cost estimating standards to colleges in fairly narrow ranges of expected cost by building. This information is based on current bids and escalation standards and provides a basis for evaluating the reasonableness of cost estimates.

Separate budget requests for construction funds will often be higher than design estimates due to inflationary factors and inclusion of permit requirements. Higher Education projects are unique and the state benefits from other sources of capital investment. In addition to a primary major project appropriation, many community and technical colleges use multiple funding sources to deliver a project. Colleges use local funds including Certificates of Participation, minor works appropriations, rebates from utility companies, college foundation grants to enhance technology and instructional equipment, escalation pool funds provided by the legislature and associated matching local funds, as well as other local and student funds to complete a project. Several two-year college projects during this time frame included funding from four-year institutions to add offices, classrooms, and distance education labs for collocated upper division learning centers (2+2). Several SBCTC projects were amended during a subsequent supplemental which is not reflected in the design estimate figures in the data tables. If the additional funding is not adequately reflected in the base, percentage differences in final cost will naturally be higher. The major project status report is the best vehicle for reporting and tying together the budget, schedule, and actual experience on a capital project.

Coordination of project cost is not easy due to the state accounting structure that controls by appropriation codes and not project codes. In addition, the legislature has complicated cost collection and reporting by combining projects within consolidated appropriations (Reference Ch 26, Laws of 2003, sec 800, Facility Preservation Backlog Reduction – aggregated minor works accounts with

Appendix 2 – Agency Responses

portions of six major capital projects). The legislature has in the past also combined predesigns within a single appropriation and has included major matching fund projects within minor works appropriations. Without firsthand knowledge of the sources of revenue supporting the project, it is difficult to reconstruct the cost structure, especially with a process that often takes six years to deliver and reviews that take place years after project completion.

With respect to the recommendations in the report:

RECOMMENDATION	AGENCY POSITION	COMMENTS
<p><u>Recommendation 1</u> The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.</p>	Partially concur	<p>A transfer requires that the fund source is consistent between appropriations. We have several fund sources that are available within our agency and it is not possible to ensure that multiple sources of funding would allow for a transfer to a single project.</p> <p>Even in our system, it is difficult to track local fund expenditures beyond the biennium without evaluating year end reports and pulling data from other sources.</p> <p>Local funds are not appropriated and allotted and we would prefer to maintain that status.</p>
<p><u>Recommendation 2</u> The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.</p>	Partially concur	<p>OFM already has the major project status report. This is a better option than trying to get the AFRS system to account for all expenditures by project or to begin a process of tracking a more detailed breakdown of local fund data in AFRS. Most of the items listed in the recommendation are already addressed in that report.</p> <p>The major project status report was created because the state recognized the limitations of AFRS as a reporting tool. Additional instructions and changes in how project costs are displayed may be all that is necessary to support obtaining information called out in this recommendation</p>

There are other options in higher education to augment project cost. It does not negate the need to manage project cost within the appropriation. Any additional costs will be managed within project contingencies or covered by local funds, and the state appropriation will never be exceeded.



CENTRAL WASHINGTON UNIVERSITY

August 18, 2009

Ruta Fanning, Legislative Auditor
Joint Legislative Audit and Review Committee
1300 Quince St SE
PO Box 40910
Olympia WA 98504

RECEIVED
AUG 21 2009
JLARC

Re: Formal Response to JLARC Preliminary Report Dated July 22, 2009 – *Evaluation of the Accuracy of Capital Project Cost Estimates*

Dear Ruta:

Central Washington University appreciates the opportunity to respond to the recommendations in this preliminary report and to support the committee's efforts to give capital project cost estimating the position of importance it deserves.

<u>Recommendation No.</u>	<u>Agency Position</u>
Recommendation # 1	Partially Concur

Comments

The real issue with this recommendation is not necessarily accountability of the funds since all funding sources are taken into account when a major project is capitalized within the agency's financial statements. The real issue is that there should be a 'timely', close-out phase where all relevant data is reported including financial, applicable comments, etc. after final completion. (Concept, pre-design, design, and final completion phases.)

<u>Recommendation No.</u>	<u>Agency Position</u>
Recommendation # 2	Partially Concur

Comments

Again, the issue is timeliness. Some of the data was hard to accumulate to answer the survey since it was not necessarily compiled in one report or location. A recommendation is to not have the template be a highly structured final document, but, rather a living document that allows the data to be compiled for each respective phase during the length of the project.

Thank you and if you have any questions, please feel free to contact us.

A handwritten signature in blue ink that reads "Bill Vertrees".

Bill Vertrees
Interim Vice President



Construction & Planning Services
Eastern Washington University
101 Rozell, Cheney, WA 99004-2464
(509) 359-4333 FAX (509) 359-4224

24 Aug 09

To: Joint Legislative Audit & Review Committee
P.O. Box 40910
Olympia, WA 98504

Re: Evaluation of Capital Project Estimates; Preliminary Report

Eastern Washington University has reviewed the Preliminary Report, dated 22 Jul 09, and provides the following comments on the recommendations in the report.

<u>RECOMMENDATION</u>	<u>AGENCY POSITION</u>	<u>COMMENTS</u>
#1 – OFM Accounting Directions	Concur	None
#2 – OFM Close-out Template	Concur	None

To save time and costs associated with travel from Cheney, WA, we do not plan to have a representative in attendance at the 23 Sep 09 meeting of the JLARC. However, please don't hesitate to forward any questions or requests for additional information.

Respectfully,

Kim C. Traver, Director
Construction & Planning Services

Cc: AVP, Facilities & Planning
File



RECEIVED
JUL 27 2009
JLARC

July 24, 2009

Ruta Fanning
Legislative Auditor
Joint Legislative Audit and Review Committee
1300 Quince St SE
P.O. Box 40910
Olympia, WA 40910

Dear Ruta,

Thank you for the opportunity to comment on the recommendations from the recent JLARC report, "Evaluation of the Accuracy of Capital Project Estimates." The Evergreen State College was pleased to see that the majority if not all of our projections fall within the expected cost accuracy ranges identified by the Association for the Advancement of Cost Engineering International.

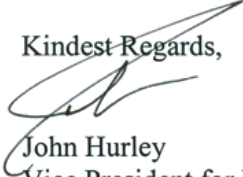
I also want to thank you for our phone call regarding the brief e-mail that Evergreen sent to you and the committee as a prelude to our formal response. Please let me assure you that Evergreen 1) works very hard to ensure our cost estimating accuracy on capital projects is good and 2) believes strongly that all expenditures, change orders, and other aspects of administering a capital project should be transparent and easily accessible.

In keeping with a transparent public process, we submit numerous reports to the Office of Financial Management on the progress of our projects. In keeping with our current level and frequency of reporting with our existing data we are supportive of working with OFM to centralize data collection. As I mentioned, our concern lies with the potential for the creation of a whole new layer of data accounting which we would not be able to support in this statewide climate of budget reductions. Evergreen is reducing staff in the capital area as our capital allocations shrink along with the rest of the state government.

In summary, we are proud of the work we do in the capital projects arena. We, like you, don't believe you should have to hunt out information from multiple sources. This information should be readily available in a central location and we believe this can be accomplished using the existing reporting process. Again, thank you for the opportunity to comment.

Please feel free to contact me with any questions you may have. I can be reached at (360) 867-6500 or hurleyj@evergren.edu.

Kindest Regards,



John Hurley
Vice President for Finance and Administration

cc: Thomas L. Purce, President
Paul Smith, Director of Facilities Services
Steve Trotter, Executive Director of Operational Budget and Planning
Julie Suchanek, Director of Government Relations

The Evergreen State College
Comments to Recommendations on JLARC Report – Evaluation of the
Accuracy of Capital Project Estimates

Recommendation	Agency Position	Comments
<p>1. The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.</p>	<p>Partially Concur</p>	<p>The Evergreen State College has an established track record of successful capital project estimation that meets or exceeds private industry benchmarks. We believe that expenditures on capital projects should be transparent and readily accessible to the public in a centralized location. This transparency assists with telling our story of good stewardship with public funds. We currently report capital project data to the Office of Financial Management on a frequent basis. Evergreen is willing to work with OFM to make existing data and existing reporting requirements more useful and meaningful. But given the significant budget reductions we have made for this year, and the possibility that more may become necessary, we would be concerned about creating a whole new layer of reporting. We could not sustain this with a reduced number of staff.</p>
<p>2. The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare related projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.</p>	<p>Partially Concur</p>	<p>We would support a final closeout report to the extent that our current data and reporting could be made more readily available and transparent. As with recommendation one above, we would be concerned about adding a whole new and different reporting system in light of our diminishing staff resources in capital.</p>



CAPITAL PROJECTS OFFICE

UNIVERSITY of WASHINGTON

Finance & Facilities

August 11, 2009

RECEIVED
AUG 19 2009
JLARC

Ruta Fanning, Legislative Auditor
1300 Quince St. ES
P.O Box 40910
Olympia, WA 98504-0910

RE: JLARC Preliminary Report on the Evaluation of the Accuracy of Capital Project Cost Estimates

Thank you for the opportunity to review and comment on JLARC Draft Report, "Evaluation of the Accuracy of Capital Project Cost Estimates." First, let me compliment you on the quality of the report and also extend our appreciation that you captured the difficulties associated with the process of capital requests in the State of Washington. Following are our comments on the Preliminary Report:

RECOMMENDATION	AGENCY POSITION	COMMENTS
Recommendation #1	We partially concur that there should be a standard.	Reporting of the Capital Projects is a time consuming and cumbersome task. We currently report to OFM but our reporting is different than the other 4 year Universities. It would seem that information is important and that the ability to report across all type of project and institutions would be important. We would suggest that a data base or the submittal of project information may be more beneficial to meet future needs.
Recommendation #2	Disagree.	The use of the information for comparative purposes could be very misleading. Projects are almost always unique and therefore very difficult to make general analysis. We would be concerned that the limited data would be used in ways that could not explain differences with the information available
Not a Recommendation: The section title on page 10 reads, "No Systemic Reasons Why Projects Do Not Meet Accuracy Expectations,"	Disagree.	The text of this section you note that "time" is a factor in being able to estimate accurately. Time is a systemic reason for a majority of the reasons cited. The longer the duration of time, the more difficult it is to predict market conditions, funding, inflation and even program needs /requirements which would be a large factor associated with changes in scope. By reducing the time between estimating and construction, many factors will be more predictable and thus lead to more accurate estimates

Sincerely,

Richard Chapman
Associate Vice President for Capital Projects
University of Washington



August 11, 2009

Joint Legislative Audit & Review Committee
 PO Box 40910
 Olympia, WA 98504

RE: JLARC report Evaluation of the Accuracy of Capital Project Estimates
 Attn: Ruta Fanning

Washington State University appreciates the opportunity to respond to the draft report referenced above and to have our comments included in the final report.

Overall, we found the draft report to be an accurate reporting of the information supplied to the JLARC team and we especially appreciate their comments indicating the bulk of our cost estimates meet professional expectations and that the processes we use to develop our capital project estimate are consistent with professional practices. WSU has two basic comments:

RECOMMENDATION	AGENCY POSITION	COMMENTS
Recommendation 2	Do not concur with additional reporting	If OFM is going to use JLARC's recommendation to add to current reports, they MUST understand the significant burden that represents to the agencies. If, however, representatives from the 4-year schools could partner with OFM to create a living data base where project data is input during the course of the project, and if using that database could result in LESS reports (both regular and ad hoc) to OFM, CPARB, and others (including JLARC), it would benefit all of us.
Accuracy of project cost estimates (although not a recommendation, WSU has a comment)	Recommend change in terminology	Part One under "Setting Expectations: How Accurate Should Estimates Be?" The second sentence states "Defining [those] details occurs during project design." WSU suggests using different terminology (other than 'cost estimate') for the budgeting that occurs during concept and pre-design phases. The 'cost estimate' term should be used beginning in the design phase. Too many project details are unknown during concept and pre-design. A term such as 'Preliminary budget' should replace 'cost estimate' during those early phases so agencies are not held to unrealistic accuracy expectations during those phases.

Again, WSU appreciates the opportunity to have our observations included in the final report. Please don't hesitate to let us know if there are any questions we can address.

Sincerely,

Gerald R. Schlatter, AIA, Associate Vice President
 Capital Planning and Development
 Washington State University
 PO Box 643611, Pullman, WA 99164-3611

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August 17, 2009

Ruta Fanning
 Legislative Auditor
 Joint Legislative Audit & Review Committee
 PO Box 40910
 Olympia, WA 98504

Dear Ms. Fanning:

Please accept this letter as the official response from Western Washington University to the preliminary report concerning Evaluation of the Accuracy of Capital Project Estimates.

RECOMMENDATION	AGENCY POSITION	COMMENTS
<p>#1 The Office of Financial Management should issue accounting directions that require state agencies to report capital project expenditures under the project number where they are actually used. These directions should address formally transferring funds among projects where appropriate and reporting all local funds used on each project so that the Agency Financial Reporting System provides a complete summary of all final project expenditures.</p>	<p>Concur</p>	
<p>#2 The Office of Financial Management should develop a template for a final project close out report that records all information needed to compare completed projects with cost and scope estimates submitted in requests for capital budget appropriations. The final report should include: 1) total cost and fund sources for all expenditures, 2) transfers to and from other projects, where applicable, 3) final square footage, 4) changes to project scope, and 5) major milestone achievement dates.</p>	<p>Concur</p>	

Thank you for your guidance in this process.

Sincerely,

Rick L. Benner, AIA
 Executive Director / University Architect
 Capital Planning and Development

APPENDIX 2A – JLARC RESPONSE TO AGENCY COMMENTS

Formal responses from many of the agencies commenting on this JLARC report raise the issue of cost and difficulty in implementing the recommendations. Their partial or non-concurrence is based on two concerns. For Recommendation 1, OFM responds that requiring agencies to report non-appropriated funds' support of projects in the state accounting system will be difficult and expensive. For Recommendation 2, many of the higher educational institutions state that reporting final costs will create a new layer of administrative reporting.

Recommendation 1

JLARC acknowledges that there may be accounting changes needed to report non-appropriated local fund expenditures for each capital project in AFRS (the Agency Financial Reporting System). OFM notes in its response that identifying the non-appropriated local funds used on individual projects may be more easily achieved using the final close out report proposed in Recommendation 2. While the OFM suggestion will achieve the intent of the recommendation, we also urge OFM to continue to explore methods to more simply adjust accounting records for non-appropriated funds, such as the use of a single annual or biennial reconciliation adjustment. Accounting for these expenditures in the official general ledger system will improve the reliability of the information.

Recommendation 2

We disagree that a final close out report will place an undue administrative burden on agencies. Agencies currently report much of this information in semi-annual progress reports to OFM and when they value their newly-completed capital assets as required by state accounting procedures. Summarizing this information in a final report that includes final total costs is unlikely to create an onerous burden and will provide readily accessible information for Legislative and Executive oversight.

APPENDIX 3 – COST ESTIMATE CLASSIFICATION SYSTEM

Criteria for evaluating the accuracy of project cost estimates are based on the Cost Estimate Classification System developed by the Association for the Advancement of Cost Engineering International (AACEI). Expected accuracy ranges are presented for five classes of estimates based on project definition. There is some overlap in the definition of the classes; however, each class represents an increased level of project definition as seen in the Exhibit 12 below.

Exhibit 12 – Generic Cost Estimate Classification Matrix

	<i>Primary Characteristic</i>	<i>Secondary Characteristic</i>			
Estimate Class	Level of Project Definition Expressed as % of complete definition	End Usage Typical purpose of estimate	Methodology Typical estimating method	Expected Accuracy Range Typical +/- range relative to best index of 1 [a]	Preparation Effort Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Screening or Feasibility	Stochastic or Judgment	4 to 20	1
Class 4	1% to 15%	Concept Study or Feasibility	Primarily Stochastic	3 to 12	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Mixed, but Primarily Stochastic	2 to 6	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Primarily Deterministic	1 to 3	5 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Deterministic	1	10 to 100

Source: ACE International Recommended Practice No. 17R-97 (1997).

Notes: [a] If the range index value of "1" represents +10/-5%, then an index value of 10 represents +100/-50%.

[b] If the cost index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%.

Because this is a generic classification system applicable to a variety of industries, each estimate class offers several ranges of expected accuracy. The applicable ranges depend on the state of technology and the quality of reference cost estimating data. The state of technology refers primarily to the programmatic or technical uniqueness and complexity of the project. There is generally a higher confidence for projects that repeat past practices. Expected accuracy also depends on the quality of reference cost data and history.

For this evaluation the project development stages were defined as follows:

- The **Concept** estimate is equivalent to a Class 4 Estimate. At this stage very little specific information about the project is developed. The Class 5 designation is not warranted for this phase because that designation is more appropriate for estimates in the latter four biennia of the ten-year capital plan. At the concept/feasibility stage, project estimators will have had some opportunity to improve their understanding of the project from previous years. However, alternatives have not been evaluated nor have key variables such as site conditions, type of construction or space allocation and layouts been addressed.
- The **Pre-design** estimate is a Class 3 Estimate. At the end of the pre-design, project estimators will have some specific information about the project. Usually, the preferred site will be known as will the overall size of the project, how the facility will function and the relationship among its spaces. The pre-design stage also defines the maximum allowable construction cost that will guide the detailed design. As such the pre-design stage provides a basis for design. The pre-design stage provides a decision point for committing major funds to the project and is, therefore, a key budget control point.
- The **Design** estimate is a Class 2 Estimate. At this point the project is largely designed with specific information about dimensions, systems, equipment and materials identified along with the estimated cost of the labor and project management needed to construct the facility.

As noted previously, AACEI provides several expected accuracy ranges for each class. JLARC used the most conservative range for the above estimate classes. The selection is based on the fact that the large majority of state construction projects involve well-established technology and that historical and industry cost information is widely available. Although some individual projects may require new technology, most projects repeat technological approaches used in earlier projects. Therefore, the narrower accuracy ranges are appropriate when evaluating the accuracy of a portfolio of projects rather than individual projects.

Risk also plays a role in establishing expectations for estimate accuracy. All construction projects involve some level of risk. However, since most of the projects reviewed represent construction with which the selected state agencies have experience, it is not likely that the risks involved will require a wider rather than narrower range of accuracy.

APPENDIX 4 – EXAMPLES OF FINAL COSTS DIFFERING FROM COST ESTIMATES

As noted on page 10 of this report, agencies cited a variety of reasons why final project costs exceed estimates. The following examples are from the survey.

Change in project scope and funding – Columbia Basin Community College, T Building:

The original project description was to renovate and build an addition to the T Building on the CBC Pasco campus in order to improve program delivery for math and sciences and increase capacity of the nursing program. With the relocation of the nursing program element to the Richland campus, CBC requested and received authority from SBCTC and OFM to use certificate of participation borrowing to increase the size and complexity of the project. The project now includes appropriate space for the mathematics and science programs as well as improved space for Information Technology and Computer Sciences.

Change in project scope and funding – Washington State University, Education Addition to Cleveland Hall

This project was initially funded for pre-design in 1997-99, with design scheduled for the following biennium. Changes in accreditation requirements, state regulations and increases in the number of programs to be served necessitated an increase in the size of the facility to house programmatic needs. The revised project was submitted for construction funding in 1999-01, but was not funded until 2003-05. The appropriated funding was for the larger size and increased cost.

Change in program funding – University of Washington, Emergency Power Generation Phase 2

The project was re-scoped to accommodate reduced state appropriations for Phase 2. The remaining work was held over for a future phase.

APPENDIX 5 – PROJECT SURVEY METHODOLOGY

JLARC staff obtained data for all major projects (over \$5 million) receiving appropriations during the 2001-03 through 2007-09 Biennia as reported by the Legislative Evaluation and Accountability Program (LEAP) Committee. LEAP records identified 137 appropriations during that time period. Eliminating project numbers where an agency received more than one appropriation produced a list of 130 unique projects at the ten selected agencies.

A web-based survey was the primary means for collecting data. The survey form is presented as Exhibit 13 on the following pages. JLARC staff developed a survey instrument and pre-tested it with six agencies. The revised survey was sent to nine of the ten selected agencies and 31 individual community colleges on January 25, 2009. A total of 125 responses representing 125 unique projects were returned by March 24. Four additional respondents reported that they were unable to locate information needed to complete the survey. The overall response rate was 99.2 percent. Since the survey requested complete data only for projects that were substantially complete by December 31, 2008, 96 projects were available for analysis in this evaluation.

JLARC staff followed up with respondents to verify the needed corrections. In addition, follow-up requests were made to the agencies to obtain data on pre-design estimates and design estimates for alternate delivery projects. The follow-up requests identified some additional errors that were corrected after consultation with the responding agencies. All possible efforts were made to ensure that data used for this analysis was as correct. A log of all corrections was maintained.

Because the data was self-reported by the responding agencies, JLARC staff tested the reliability of the state funds reported for each project by comparing that amount to the expenditures reported on the Agency Financial Reporting System (AFRS). While most (58 percent) amounts reported were within 5 percent of the AFRS amounts, many were not. JLARC staff requested agencies whose reported state fund expenditures differed from AFRS by more than 5 percent to reconcile those differences.

Of the 23 responses received, 15 were able to reconcile the reported amount with the AFRS amount; these differences were primarily due to the fact that the project was still expending funds and expected the final total to be the amount reported on the survey or that additional funds besides those specifically appropriated to the project were also used. Six responses identified errors in the original amounts reported. Two responses identified errors in the AFRS summary compiled by JLARC.

The results of this comparison identified limitations on the usefulness of financial information reported by the state accounting system that are addressed in Part Three of this report.

Exhibit 13 – Survey Form

Survey: Accuracy of Capital Project Estimates

Background:

The Joint Legislative Audit and Review Committee (JLARC) has been directed by the Washington State Legislature to evaluate the accuracy of capital project estimates. In order to carry out this assignment, JLARC requests your assistance in obtaining information about your organization's projects that will enable the committee to compare total costs for completed projects with the initial estimates submitted to the Legislature in capital budget requests.

Purpose:

The purpose of this survey is to compile systematic information about capital construction projects initiated by state agencies and institutions. JLARC is seeking data about total project costs, including pre-design, design, construction and project management for projects identified on the list accompanying this survey. We would appreciate your response by 2/18/2009.

Length of Survey:

You will be asked to answer approximately 35 questions about project status, scope and costs at several stages during development, construction and upon completion. This survey is designed to accommodate design-build and general contractor/construction manager procedures as well as the traditional design-bid-build procedures and will direct you to the appropriate questions depending on your answers.

Contact:

Please contact Mark Fleming at (360) 786-5181 (fleming.mark@leg.wa.gov) if you have questions or require additional clarification about any of the requested information. If you would like to receive a copy of your answers or have technical difficulties with the survey, please contact Natasha French at (360) 786-5286 (french.natasha@leg.wa.gov).

Thanks for your assistance in completing this survey.

Your Information

Your name: _____

Job Title: _____

Organization Name: _____

E-mail Address: _____

Phone Number: _____

Project Name: _____

Project Description: _____

Office of Financial Management (OFM) Project Number: _____

Has the project reached Substantial Completion?: Yes / No

If you answered “No” to the above question, you are **finished with the survey** and **do not need to go any further**. Thank you for your time.

If you answered “Yes” to the above question, please **proceed** to the [next question](#).

What was the date of Substantial Completion? _____

Have expenditures for this project been reported under another OFM project number?

Yes / No

If yes, please identify those project numbers in the comment section below:

Initial Estimates

Date initial request submitted to OFM: _____

Gross square footage – new construction: _____

Net square footage – new construction: _____

Gross square footage – renovation: _____

Net square footage – renovation: _____

Estimated State Funds Requested: _____

Estimates Local/Other Funds (if any allocated): _____

Projected Completion Date: _____

Which contracting procedure was used to deliver this project?

Design-Bid-Build

Design-Build

General Contractor/Construction Manager

If you answered “Design-Bid-Build”, please proceed to [“Design Firm Selection”](#).

If you answered “Design-Build”, please skip to [“Design-Build Firm Selection”](#).

If you answered “General Contractor/Construction Manager”, please skip to [“General Contractor/Construction Manager Selection”](#).

Design Firm Selection

Date of Request for Design Firm Proposals _____

Closing Date for Proposals _____

Number of Submittals _____

Design Contract Award Date _____

Design Contract Amount _____

Post Design (Pre-bid) Estimates

Gross square footage – new construction: _____

Net square footage – new construction: _____

Gross square footage – renovation: _____

Net square footage – renovation: _____

Estimates total project costs (from all state and other/local fund sources: _____

Construction Contractor Selection

Date advertised: _____

Bid closing date: _____

Number of bids: _____

Amount of accepted bid: _____

Contract award date: _____

Notice to proceed date: _____

Please skip to [“Project Totals”](#).

Design-Build Firm Selection

Date of request for qualifications: _____

Closing date for qualifications: _____

Number of qualification submittals: _____

Date of request for proposals: _____

Number of firms invited to submit proposals: _____

Closing date for proposals: _____

Number of firms submitting proposals: _____

Amount of accepted proposal: _____

Contract award date: _____

Notice to proceed date: _____

Please skip to [“Project Totals”](#).

General Contractor/Construction Manager Selection

Date of request for construction manager qualifications: _____

Closing date for qualifications: _____

Number of qualification submittals: _____

Number of firms invited to submit proposals: _____

Closing date for proposals: _____

Number of firms submitting proposals: _____

Contract award date: _____

Notice to proceed date: _____

Construction contract award date: _____

Amount of construction contract: _____

Please proceed to **[“Project Totals”](#)**.

Project Totals

Gross square footage: _____

Net square footage: _____

Number of change orders: _____

Total value of change orders: _____

Total actual costs – state funds appropriated to this project number: _____

Total actual costs – state funds transferred from other sources: _____

Total actual costs – local/other funds: _____

What percentage of costs remain unexpended (if none, answer 0): _____

Did, or are actual project costs expected to, differ from the initial estimates reported earlier by more than 10 percent?: Yes / No

If you answered “Yes”, please **proceed** to the **[next question](#)**.

If you answered “No”, please **skip ahead** to the **[following question](#)**.

Please explain why project costs did/are expected to differ from the initial estimates (select all that apply):

- Added scope
- Architect/engineer performance
- Contractor/subcontractor performance
- Funding changes
- Internal review delays
- Permitting
- Program changes
- Unrealistic budget
- Section delays/protests
- Market conditions
- Escalation
- Other (please specify):
- _____

Please **proceed** to the [next question](#).

Is the final project substantially similar to the initial project scope? Yes / No

If you answered “Yes”, please **skip ahead** to [“Expectations Met?”](#).

If you answered “No”, please **proceed** to the [next question](#).

Please describe how the project differs from the initial proposal:

Please **proceed** to [“Expectations Met?”](#).

Does this facility meet your organization’s expectations? Yes / No

If no, in what ways does the facility not meet expectations? _____

If you have any additional comments or information to provide, please enter them below:

APPENDIX 6 – DATA TABLES

The following exhibits compare project estimates to final reported costs for all major projects completed by the selected agencies during the 2001-03 through 2007-09 Biennia.

Exhibit 14 – Concept/Feasibility Estimates Compared to Final Reported Costs
Expected Accuracy Range: +30/-15%

Organization Name	OFM Project #	Concept Estimate-All Funds	Project Total-All Funds	Percent Final Cost Differs from Estimate
Columbia Basin College	20041307	\$6,058,500	\$19,664,286	224.6%
Washington State University	19982032	\$4,959,000	\$12,700,000	156.1%
Dept. of General Administration	20021005	\$7,895,000	\$18,936,369	139.9%
Walla Walla Community College	20022686	\$4,083,000	\$8,368,230	105.0%
Lake Washington Technical College	20021240	\$6,915,000	\$13,371,636	93.4%
Clark College	20061302	\$8,374,000	\$15,561,000	85.8%
Bellingham Technical College	19982672	\$5,031,000	\$8,936,600	77.6%
Everett Community College	20042692	\$29,727,000	\$51,937,700	74.7%
Eastern Washington University	20002009	\$13,129,000	\$21,978,482	67.4%
Big Bend Community College	20021232	\$7,497,000	\$11,700,257	56.1%
Peninsula College	20041208	\$15,167,800	\$23,640,000	55.9%
Western Washington University	20022026	\$40,900,000	\$61,673,467	50.8%
University of Washington	20051004	\$7,150,000	\$10,476,663	46.5%
University of Washington	20062007	\$7,500,000	\$10,799,645	44.0%
Walla Walla Community College	20041211	\$7,261,400	\$10,316,000	42.1%
Bellevue Community College	20041308	\$13,418,700	\$19,030,473	41.8%
University of Washington	20061001	\$28,146,716	\$38,450,000	36.6%
Bellevue Community College	20042690a	\$28,405,700	\$38,032,204	33.9%
Washington State University	20021501	\$31,160,000	\$41,000,000	31.6%
The Evergreen State College	20022004	\$41,225,001	\$50,878,200	23.4%
Everett Community College	20041205	\$23,297,000	\$28,164,632	20.9%
Olympic College	20002002b	\$5,162,500	\$6,125,600	18.7%
Washington State University	19982008	\$11,713,000	\$13,887,101	18.6%
Department of Corrections	20042005	\$133,940,000	\$158,784,574	18.5%
University of Washington	20061008	\$20,281,943	\$23,628,666	16.5%
Green River Community College	20042682	\$10,302,200	\$11,999,500	16.5%
Columbia Basin College	20021333	\$6,241,600	\$7,237,102	15.9%
Edmonds Community College	20022685	\$21,481,354	\$24,418,456	13.7%
Department of Corrections	19982011	\$211,830,825	\$233,812,680	10.4%

Appendix 6 – Data Tables

Organization Name	OFM Project #	Concept Estimate-All Funds	Project Total-All Funds	Percent Final Cost Differs from Estimate
Highline Community College	20002678	\$30,836,000	\$33,945,205	10.1%
North Seattle Community College	20041309	\$6,176,600	\$6,786,000	9.9%
Central Washington University	20061004	\$28,700,000	\$31,500,000	9.8%
Dept. of General Administration	20021008	\$3,485,000	\$3,787,593	8.7%
Department of Corrections	20021006	\$6,170,000	\$6,671,529	8.1%
Department of Social and Health Services	20002001c	\$67,670,167	\$72,908,211	7.7%
Whatcom Community College	20002677	\$11,625,100	\$12,458,206	7.2%
Department of Corrections	20061018	\$6,195,000	\$6,587,892	6.3%
Washington State University	20022907	\$16,500,000	\$17,500,000	6.1%
University of Washington	20041005	\$50,352,025	\$53,012,984	5.3%
Lower Columbia College	20041214	\$24,661,775	\$25,776,654	4.5%
Washington State University	20002080	\$12,000,000	\$12,400,000	3.3%
Tacoma Community College	20022683	\$16,730,000	\$17,230,000	3.0%
South Seattle Community college	20051854	\$9,064,480	\$9,301,447	2.6%
Grays Harbor College	20041204	\$20,735,049	\$21,223,076	2.4%
Bates Technical College	20022684	\$17,153,800	\$17,519,464	2.1%
Centralia College	20042850	\$32,113,000	\$32,638,424	1.6%
Clover Park Technical College	20061310	\$6,499,000	\$6,568,083	1.1%
Renton Technical College	19982674	\$11,580,208	\$11,635,999	0.5%
Department of Corrections	20062950b	\$3,950,559	\$3,955,853	0.1%
Green River Community College	20012688	\$29,903,753	\$29,917,279	0.0%
Washington State University	20002007	\$39,000,000	\$39,000,000	0.0%
Central Washington University	20022101	\$12,500,000	\$12,500,000	0.0%
South Puget Sound Community College	20042695	\$29,121,000	\$29,121,000	0.0%
Washington State University	20042941	\$34,600,000	\$34,600,000	0.0%
Peninsula College	20061305	\$14,000,000	\$14,000,000	0.0%
Lake Washington Technical College	19982673	\$17,715,747	\$17,715,747	0.0%
Central Washington University	20002001a	\$16,425,000	\$16,425,000	0.0%
Central Washington University	20002001b	\$12,000,000	\$12,000,000	0.0%
South Puget Sound Community College	20002679	\$17,350,000	\$17,350,000	0.0%
Yakima Valley Community College	20002954	\$22,000,000	\$22,000,000	0.0%
Seattle Central Community College	20021215	\$19,182,800	\$19,182,800	0.0%
South Seattle Community college	20021217	\$5,556,249	\$5,556,249	0.0%
South Puget Sound Community College	20021238	\$7,132,000	\$7,132,000	0.0%
Bellevue Community College	20021320	\$5,566,100	\$5,566,100	0.0%
Olympic College	20041202	\$22,098,000	\$22,098,000	0.0%
Yakima Valley Community College	20041207	\$31,145,152	\$31,145,152	0.0%
Community Colleges of Spokane	20041212	\$15,664,600	\$15,664,600	0.0%
The Evergreen State College	20042006a	\$21,500,000	\$21,500,000	0.0%
The Evergreen State College	20042006b	\$22,500,000	\$22,500,000	0.0%
Bellevue Community College	20042690b	\$5,274,000	\$5,274,000	0.0%

Appendix 6 – Data Tables

Organization Name	OFM Project #	Concept Estimate-All Funds	Project Total-All Funds	Percent Final Cost Differs from Estimate
Columbia Basin College	20052851	\$12,963,000	\$12,963,000	0.0%
Seattle Central Community College	20061304	\$8,096,000	\$8,096,000	0.0%
Department of Corrections	20081005	\$6,666,000	\$6,666,000	0.0%
Clover Park Technical College	19962662	\$18,045,400	\$18,045,400	0.0%
Skagit Valley College	19982675	\$9,910,300	\$9,910,300	0.0%
Community Colleges of Spokane	20021331	\$5,582,800	\$5,582,000	0.0%
University of Washington	20022027	\$44,349,000	\$44,327,650	0.0%
University of Washington	20021009	\$11,700,000	\$11,609,168	-0.8%
Community Colleges of Spokane	20051853	\$20,312,385	\$20,082,001	-1.1%
Bellingham Technical College	20041213	\$17,054,500	\$16,838,000	-1.3%
University of Washington	20061006	\$28,324,000	\$27,815,814	-1.8%
Edmonds Community College	20041311	\$8,827,030	\$8,656,687	-1.9%
Department of Corrections	20002008	\$39,438,032	\$38,606,011	-2.1%
University of Washington	20022028	\$150,000,000	\$145,790,125	-2.8%
Department of Corrections	20042004	\$17,809,202	\$17,202,202	-3.4%
Department of Corrections	20062950a	\$3,460,467	\$3,264,081	-5.7%
Dept. of General Administration	19961002	\$13,500,000	\$12,494,444	-7.4%
South Seattle Community College	20042681	\$18,861,000	\$17,236,600	-8.6%
Western Washington University	19982053	\$41,422,700	\$36,393,400	-12.1%
Eastern Washington University	20001003	\$15,431,012	\$12,751,253	-17.4%
Clark College	20002680	\$19,129,777	\$15,232,920	-20.4%
Washington State University	20002906	\$45,250,000	\$33,850,000	-25.2%
Washington State University	20042940	\$35,999,000	\$24,750,000	-31.2%
Department of Social and Health Services	20002002a	\$14,583,000	\$9,566,168	-34.4%
University of Washington	20041024	\$14,461,164	\$6,678,747	-53.8%
Washington State University	20002905	\$46,611,000	\$14,626,000	-68.6%
Average				15.0%

Exhibit 15 – Pre-design Estimates Compared to Final Reported Costs

Expected Accuracy Range: +20/-10%

Organization Name	OFM Project #	Pre-Design Estimate	Project Total-All Funds	Percent Final Cost Differs from Estimate
Columbia Basin College	20041307	\$6,058,500	\$19,664,286	224.6%
Lake Washington Technical College	20021240	\$6,945,300	\$13,371,636	92.5%
Clark College	20061302	\$8,413,290	\$15,561,000	85.0%
Columbia Basin College	20052851	\$8,010,150	\$12,963,000	61.8%
Everett Community College	20042692	\$34,897,240	\$51,937,700	48.8%
Big Bend Community College	20021232	\$7,947,000	\$11,700,257	47.2%
Dept. of General Administration	20021005	\$13,095,000	\$18,936,369	44.6%
Bellevue Community College	20041308	\$13,418,000	\$19,030,473	41.8%

Appendix 6 – Data Tables

Organization Name	OFM Project #	Pre-Design Estimate	Project Total- All Funds	Percent Final Cost Differs from Estimate
Washington State University	20021501	\$29,000,000	\$41,000,000	41.4%
Walla Walla Community College	20041211	\$7,298,955	\$10,316,000	41.3%
Edmonds Community College	20022685	\$17,488,526	\$24,418,456	39.6%
Walla Walla Community College	20022686	\$6,048,311	\$8,368,230	38.4%
University of Washington	20051004	\$7,577,770	\$10,476,663	38.3%
Everett Community College	20041205	\$23,297,000	\$28,164,632	20.9%
Grays Harbor College	20041204	\$17,635,000	\$21,223,076	20.3%
Department of Corrections	20042005	\$133,940,000	\$158,784,574	18.5%
Green River Community College	20042682	\$10,302,200	\$11,999,500	16.5%
Columbia Basin College	20021333	\$6,241,600	\$7,237,102	15.9%
Bellevue Community College	20042690a	\$33,255,060	\$38,032,204	14.4%
University of Washington	20022028	\$132,950,000	\$145,790,125	9.7%
Washington State University	20022907	\$15,960,000	\$17,500,000	9.6%
Tacoma Community College	20022683	\$15,730,000	\$17,230,000	9.5%
University of Washington	20022027	\$40,519,400	\$44,327,650	9.4%
Seattle Central Community College	20021215	\$17,682,800	\$19,182,800	8.5%
Washington State University	19982032	\$11,750,000	\$12,700,000	8.1%
Western Washington University	20022026	\$57,171,000	\$61,673,467	7.9%
The Evergreen State College	20022004	\$47,346,108	\$50,878,200	7.5%
Whatcom Community College	20002677	\$11,625,100	\$12,458,206	7.2%
Washington State University	19982008	\$13,000,000	\$13,887,101	6.8%
Department of Corrections	20002008	\$36,467,000	\$38,606,011	5.9%
Central Washington University	20002001b	\$11,347,434	\$12,000,000	5.8%
Lake Washington Technical College	19982673	\$16,842,800	\$17,715,747	5.2%
Central Washington University	20002001a	\$15,670,266	\$16,425,000	4.8%
Lower Columbia College	20041214	\$24,661,775	\$25,776,654	4.5%
Department of Social and Health Services	20002001c	\$70,167,000	\$72,908,211	3.9%
Washington State University	20002080	\$12,000,000	\$12,400,000	3.3%
Bates Technical College	20022684	\$17,059,454	\$17,519,464	2.7%
The Evergreen State College	20042006a	\$21,111,000	\$21,500,000	1.8%
Centralia College	20042850	\$32,119,490	\$32,638,424	1.6%
Dept. of General Administration	19961002	\$12,303,235	\$12,494,444	1.6%
Clover Park Technical College	20061310	\$6,499,000	\$6,568,083	1.1%
Olympic College	20002002b	\$6,115,600	\$6,125,600	0.2%
Bellingham Technical College	20041213	\$16,830,000	\$16,838,000	0.0%
Green River Community College	20012688	\$29,903,600	\$29,917,279	0.0%
South Puget Sound Community College	20021238	\$7,130,000	\$7,132,000	0.0%
Peninsula College	20061305	\$13,998,000	\$14,000,000	0.0%
North Seattle Community College	20041309	\$6,785,700	\$6,786,000	0.0%
Peninsula College	20041208	\$23,640,000	\$23,640,000	0.0%
South Puget Sound Community College	20042695	\$29,121,000	\$29,121,000	0.0%

Appendix 6 – Data Tables

Organization Name	OFM Project #	Pre-Design Estimate	Project Total- All Funds	Percent Final Cost Differs from Estimate
Washington State University	20042941	\$34,600,000	\$34,600,000	0.0%
Bellevue Community College	20021320	\$5,566,100	\$5,566,100	0.0%
The Evergreen State College	20042006b	\$22,500,000	\$22,500,000	0.0%
Bellevue Community College	20042690b	\$5,274,000	\$5,274,000	0.0%
Seattle Central Community College	20061304	\$8,096,000	\$8,096,000	0.0%
Department of Corrections	20081005	\$6,666,000	\$6,666,000	0.0%
Skagit Valley College	19982675	\$9,910,300	\$9,910,300	0.0%
Community Colleges of Spokane	20021331	\$5,602,000	\$5,582,000	-0.4%
Community Colleges of Spokane	20041212	\$15,721,600	\$15,664,600	-0.4%
Yakima Valley Community College	20041207	\$31,280,152	\$31,145,152	-0.4%
Washington State University	20042940	\$24,965,000	\$24,750,000	-0.9%
Clover Park Technical College	19962662	\$18,245,400	\$18,045,400	-1.1%
Community Colleges of Spokane	20051853	\$20,312,385	\$20,082,001	-1.1%
University of Washington	20061006	\$28,143,765	\$27,815,814	-1.2%
Edmonds Community College	20041311	\$8,827,030	\$8,656,687	-1.9%
University of Washington	20021009	\$11,900,000	\$11,609,168	-2.4%
University of Washington	20041005	\$54,405,000	\$53,012,984	-2.6%
Department of Corrections	20042004	\$17,809,202	\$17,202,202	-3.4%
Olympic College	20041202	\$22,953,000	\$22,098,000	-3.7%
Bellingham Technical College	19982672	\$9,375,400	\$8,936,600	-4.7%
Washington State University	20002905	\$15,373,000	\$14,626,000	-4.9%
Highline Community College	20002678	\$35,836,000	\$33,945,205	-5.3%
Renton Technical College	19982674	\$12,440,500	\$11,635,999	-6.5%
University of Washington	20061008	\$25,275,000	\$23,628,666	-6.5%
South Seattle Community college	20051854	\$9,994,283	\$9,301,447	-6.9%
South Puget Sound Community College	20002679	\$18,842,000	\$17,350,000	-7.9%
South Seattle Community College	20042681	\$18,861,000	\$17,236,600	-8.6%
University of Washington	20062007	\$12,070,000	\$10,799,645	-10.5%
Yakima Valley Community College	20002954	\$24,893,000	\$22,000,000	-11.6%
Eastern Washington University	20001003	\$14,488,500	\$12,751,253	-12.0%
Department of Corrections	19982011	\$282,141,000	\$233,812,680	-17.1%
Washington State University	20002007	\$49,000,000	\$39,000,000	-20.4%
Eastern Washington University	20002009	\$27,900,000	\$21,978,482	-21.2%
Clark College	20002680	\$19,476,900	\$15,232,920	-21.8%
Washington State University	20002906	\$45,250,000	\$33,850,000	-25.2%
Department of Social and Health Services	20002002a	\$14,583,000	\$9,566,168	-34.4%
Western Washington University	19982053	\$62,457,500	\$36,393,400	-41.7%
Average				9.2%

Note: Pre-design estimates were not available for 12 projects.

Appendix 6 – Data Tables

Exhibit 16 – Design Estimates Compared to Final Reported Costs
Expected Accuracy Range: +10/-5%

Organization Name	OFM Project #	All Design Estimate	Project Total- All Funds	Percent Final Cost Differs from Estimate
Lake Washington Technical College	20021240	\$6,685,818	\$13,371,636	100.0%
University of Washington	20051004	\$7,147,000	\$10,476,663	46.6%
Department of Social and Health Services	20002002a	\$6,674,101	\$9,566,168	43.3%
Bellevue Community College	20041308	\$13,418,700	\$19,030,473	41.8%
Walla Walla Community College	20041211	\$7,397,647	\$10,316,000	39.4%
Walla Walla Community College	20022686	\$6,394,295	\$8,368,230	30.9%
Olympic College	20002002b	\$4,863,523	\$6,125,600	25.9%
South Seattle Community college	20021217	\$4,433,349	\$5,556,249	25.3%
The Evergreen State College	20022004	\$41,000,000	\$50,878,200	24.1%
Department of Corrections	20042005	\$133,940,000	\$158,784,574	18.5%
University of Washington	20041024	\$5,675,849	\$6,678,747	17.7%
Edmonds Community College	20022685	\$21,481,345	\$24,418,456	13.7%
Bellevue Community College	20042690a	\$33,798,317	\$38,032,204	12.5%
Columbia Basin College	20021333	\$6,434,100	\$7,237,102	12.5%
Olympic College	20041202	\$20,064,435	\$22,098,000	10.1%
Washington State University	19982008	\$12,665,000	\$13,887,101	9.6%
Clover Park Technical College	20061310	\$6,000,000	\$6,568,083	9.5%
Dept. of General Administration	20021008	\$3,485,000	\$3,787,593	8.7%
Western Washington University	20022026	\$57,171,000	\$61,673,467	7.9%
Columbia Basin College	20052851	\$12,020,799	\$12,963,000	7.8%
Whatcom Community College	20002677	\$11,625,100	\$12,458,206	7.2%
Everett Community College	20041205	\$26,297,300	\$28,164,632	7.1%
Lower Columbia College	20041214	\$24,661,775	\$25,776,654	4.5%
Department of Social and Health Services	20002001c	\$70,167,000	\$72,908,211	3.9%
Department of Corrections	20021006	\$6,424,236	\$6,671,529	3.8%
North Seattle Community College	20041309	\$6,544,000	\$6,786,000	3.7%
Tacoma Community College	20022683	\$16,730,000	\$17,230,000	3.0%
Bates Technical College	20022684	\$17,059,454	\$17,519,464	2.7%
Grays Harbor College	20041204	\$20,735,049	\$21,223,076	2.4%
Centralia College	20042850	\$32,113,000	\$32,638,424	1.6%
Washington State University	20002905	\$14,431,000	\$14,626,000	1.4%
South Seattle Community college	20051854	\$9,243,119	\$9,301,447	0.6%
Bellingham Technical College	20041213	\$16,739,418	\$16,838,000	0.6%
Department of Corrections	20061018	\$6,552,949	\$6,587,892	0.5%
Clover Park Technical College	19962662	\$18,000,000	\$18,045,400	0.3%
Bellevue Community College	20021320	\$5,556,100	\$5,566,100	0.2%
Clark College	20061302	\$15,541,000	\$15,561,000	0.1%
Bellingham Technical College	19982672	\$8,930,418	\$8,936,600	0.1%
Everett Community College	20042692	\$51,937,000	\$51,937,700	0.0%

Appendix 6 – Data Tables

Organization Name	OFM Project #	All Design Estimate	Project Total- All Funds	Percent Final Cost Differs from Estimate
Washington State University	20002007	\$39,000,000	\$39,000,000	0.0%
Washington State University	20002906	\$33,850,000	\$33,850,000	0.0%
Washington State University	20021501	\$41,000,000	\$41,000,000	0.0%
Central Washington University	20022101	\$12,500,000	\$12,500,000	0.0%
Peninsula College	20041208	\$23,640,000	\$23,640,000	0.0%
South Puget Sound Community College	20042695	\$29,121,000	\$29,121,000	0.0%
Washington State University	20042940	\$24,750,000	\$24,750,000	0.0%
Washington State University	20042941	\$34,600,000	\$34,600,000	0.0%
Peninsula College	20061305	\$14,000,000	\$14,000,000	0.0%
Washington State University	19982032	\$12,700,000	\$12,700,000	0.0%
Lake Washington Technical College	19982673	\$17,715,747	\$17,715,747	0.0%
Central Washington University	20002001a	\$16,425,000	\$16,425,000	0.0%
Central Washington University	20002001b	\$12,000,000	\$12,000,000	0.0%
Washington State University	20002080	\$12,400,000	\$12,400,000	0.0%
South Puget Sound Community College	20002679	\$17,350,000	\$17,350,000	0.0%
Yakima Valley Community College	20002954	\$22,000,000	\$22,000,000	0.0%
Seattle Central Community College	20021215	\$19,182,800	\$19,182,800	0.0%
Big Bend Community College	20021232	\$11,700,257	\$11,700,257	0.0%
South Puget Sound Community College	20021238	\$7,132,000	\$7,132,000	0.0%
Yakima Valley Community College	20041207	\$31,145,152	\$31,145,152	0.0%
Community Colleges of Spokane	20041212	\$15,664,600	\$15,664,600	0.0%
Columbia Basin College	20041307	\$19,664,286	\$19,664,286	0.0%
The Evergreen State College	20042006a	\$21,500,000	\$21,500,000	0.0%
The Evergreen State College	20042006b	\$22,500,000	\$22,500,000	0.0%
Bellevue Community College	20042690b	\$5,274,000	\$5,274,000	0.0%
Central Washington University	20061004	\$31,500,000	\$31,500,000	0.0%
Seattle Central Community College	20061304	\$8,096,000	\$8,096,000	0.0%
Department of Corrections	20062950a	\$3,264,081	\$3,264,081	0.0%
Department of Corrections	20081005	\$6,666,000	\$6,666,000	0.0%
Skagit Valley College	19982675	\$9,910,300	\$9,910,300	0.0%
University of Washington	20062007	\$10,799,646	\$10,799,645	0.0%
Green River Community College	20042682	\$12,000,000	\$11,999,500	0.0%
Community Colleges of Spokane	20021331	\$5,582,800	\$5,582,000	0.0%
University of Washington	20022027	\$44,349,000	\$44,327,650	0.0%
Green River Community College	20012688	\$30,000,000	\$29,917,279	-0.3%
University of Washington	20061008	\$23,720,551	\$23,628,666	-0.4%
Department of Corrections	20062950b	\$3,982,530	\$3,955,853	-0.7%
Community Colleges of Spokane	20051853	\$20,252,001	\$20,082,001	-0.8%
University of Washington	20061006	\$28,287,115	\$27,815,814	-1.7%
Edmonds Community College	20041311	\$8,827,030	\$8,656,687	-1.9%
Department of Corrections	20002008	\$39,438,032	\$38,606,011	-2.1%

Appendix 6 – Data Tables

Organization Name	OFM Project #	All Design Estimate	Project Total- All Funds	Percent Final Cost Differs from Estimate
University of Washington	20021009	\$11,900,000	\$11,609,168	-2.4%
Renton Technical College	19982674	\$11,959,400	\$11,635,999	-2.7%
University of Washington	20022028	\$150,000,000	\$145,790,125	-2.8%
Department of Corrections	20042004	\$17,809,202	\$17,202,202	-3.4%
University of Washington	20041005	\$55,290,000	\$53,012,984	-4.1%
Department of Corrections	19982011	\$244,511,616	\$233,812,680	-4.4%
Highline Community College	20002678	\$35,836,004	\$33,945,205	-5.3%
Washington State University	20022907	\$19,050,000	\$17,500,000	-8.1%
South Seattle Community College	20042681	\$18,861,000	\$17,236,600	-8.6%
Western Washington University	19982053	\$40,473,400	\$36,393,400	-10.1%
University of Washington	20061001	\$43,205,836	\$38,450,000	-11.0%
Eastern Washington University	20002009	\$25,527,066	\$21,978,482	-13.9%
Clark College	20002680	\$17,948,420	\$15,232,920	-15.1%
Eastern Washington University	20001003	\$15,431,012	\$12,751,253	-17.4%
Dept. of General Administration	19961002	\$19,000,000	\$12,494,444	-34.2%
Dept. of General Administration	20021005	\$32,292,000	\$18,936,369	-41.4%
Average				3.7%

