



B.E.S. COLUMBIA BUILDING:
Scope additions and ineffective design oversight
led to substantially higher project costs

October 2014

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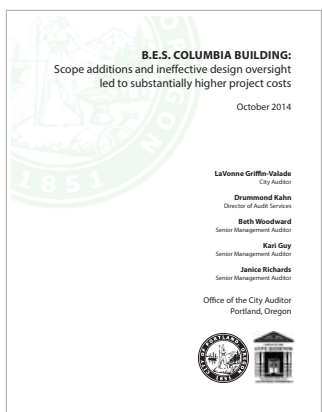
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October 22, 2014

TO: Mayor Charlie Hales
Commissioner Nick Fish
Commissioner Amanda Fritz
Commissioner Steve Novick
Commissioner Dan Saltzman
Dean Marriott, Director, Bureau of Environmental Services

SUBJECT: Audit Report – *BES Columbia Building: Scope additions and ineffective design oversight led to substantially higher project costs*, (Report #446B)

The attached report addresses management of the City's design and construction of an employee building at the Columbia Boulevard Wastewater Treatment Plant. Mayor Hales and Commissioner Fish formally requested that my office conduct an audit of this single capital project due to concern about appropriate levels of oversight.

Public and private sector organizations regularly misjudge the ultimate scope and cost of capital construction and technology projects. Scope expansion and escalating costs are serious concerns for both sectors. However, projects funded by taxpayers or ratepayers require a higher level of vigilance, transparency, and stewardship. In the case of the Columbia Building, as this project is now known, City managers were remiss on all three counts.

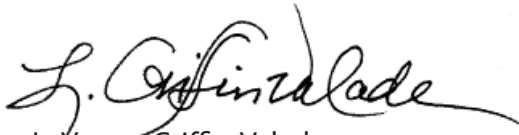
Our report describes why the Columbia Building project was necessary and why, at \$11.5 million, it cost more than three times the early budget estimates provided to City Council by the Bureau of Environmental Services (BES). Although the City's general and sustainability requirements for office building construction contributed to cost, we found that BES expanded scope, made discretionary design choices, and provided ineffective oversight of the design phase of this project.

The audit of the Columbia Building project was undertaken concurrent with our audit of the City procurement function, a review that was already underway. The audit team has considerable expertise on best practices regarding management of construction projects and extensive knowledge of the City's procurement practices. This allowed us the opportunity to take advantage of that expertise and knowledge, and provide decision makers with a timely report with far-ranging recommendations.

Our audit recommendations are too late to positively affect this specific capital project. However, if implemented by the City as a whole, those recommendations could prevent or

mitigate many of the conditions we found as problematic and leading to overall higher project costs.

We ask BES to provide us with a status report in one year, through the Commissioner-in-charge, detailing steps taken to address our recommendations in this report. We very much appreciate the cooperation and assistance we received from BES staff as we conducted this audit.



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Attachment

B.E.S. COLUMBIA BUILDING:

Scope additions and ineffective design oversight led to substantially higher project costs

Summary

A recently completed Bureau of Environmental Services (BES) project to design and build an office building and make other improvements at the City's wastewater treatment plant cost ratepayers \$11.5 million – more than three times the \$3.2 million budgeted in 2010. We conducted this audit to determine why costs for the office building project increased, and to recommend improvements aimed at preventing future capital project overruns of this magnitude.

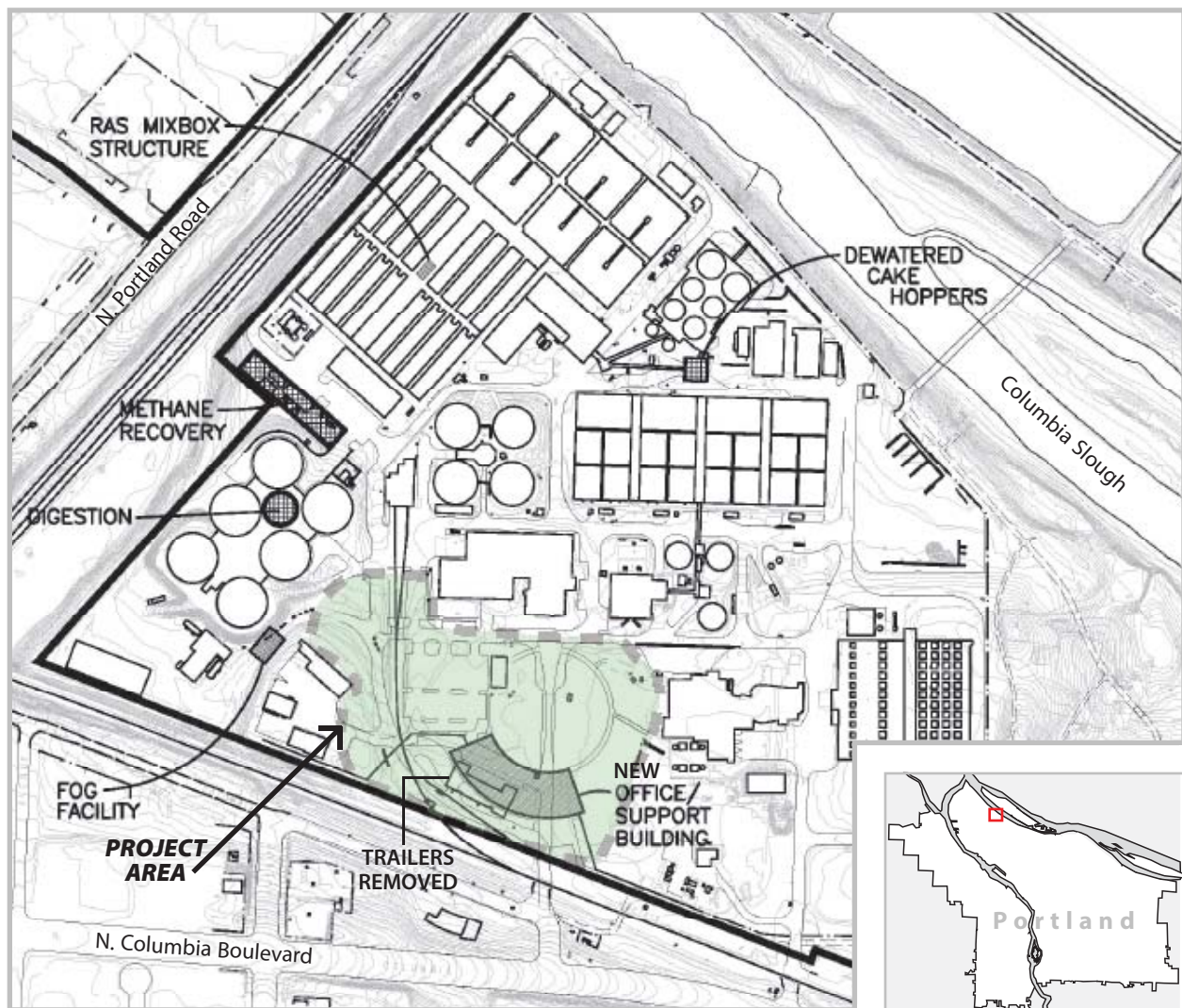
We found that two main factors caused the costs for this office building project to increase dramatically above initial estimates. First, design choices and additions to the scope made after City Council gave the go-ahead were more costly to design and construct than originally planned. Second, weaknesses in oversight during the design stage resulted in additional costs. In addition, a philosophy of striving to be a model of sustainability at the City and BES turned the project into an educational "showcase" of values. This resulted in a more elaborate, architecturally unique and complex project than originally conceived in the capital budgeting process and agreed to by Council.

We recommend specific ways for BES to improve design choices and design oversight and control. While these recommendations address issues we observed on this project, City Council should consider adapting them to capital project design management citywide.

Background Permanent office building replaced old trailers

The City needed a new office building at its Columbia Boulevard Wastewater Treatment Plant to replace several trailers it had used as engineering offices for over 15 years. The trailers had deteriorated to the point that staff could no longer work in them due to mold and other concerns. Figure 1 shows the location of the trailers, now removed; shows the new office building, called the Columbia Building, which replaced the trailers close to the Treatment Plant entrance; and shows the extent of site improvements included in the project.

Figure 1 Project area at Columbia Blvd. Wastewater Treatment Plant



Source: CBWTP Master Plan, April 2011

Engineering and construction services staff who work in the Columbia building are professionals engaged in design and construction of critical infrastructure at the Treatment Plant and other City locations. They play a significant part in fulfilling BES responsibility for protecting public health and water quality.

Office building was unusual for BES

The project to design and construct a new office building was unusual for BES, which typically designs and builds infrastructure, such as pipelines and pump stations. For this audit, we focused our review on the Columbia Building project, and our findings may not apply to other BES projects. Also, several BES projects may be underway at a given time at the Treatment Plant.

BES identified its need for the new office building in 2007. After employees had to be moved out of one trailer due to mold problems, BES began the project in 2009. Its Citizens Advisory Committee requested that the new building offer meeting space available for public use. BES considered other needs during the early planning process in 2009, such as providing a visitor reception area, improving security and emergency preparedness, and offering a long service life for the office building to reduce its long-term cost.

Figure 2 shows the numerous City and BES objectives for the new building. The list included requirements for all new City buildings and procurement, as well as the Treatment Plant goals and project goals.

Figure 2 Project objectives

| | |
|--------------------------------------|---|
| City requirements | <ul style="list-style-type: none"> • Construct new buildings to be sustainable, at LEED™ Gold level • Construct eco-roof, minimum 70% of roof area • Finance projects to meet the Green Building Policy • Increase opportunities for State-certified small businesses as well as for minority-owned and women-owned businesses (weight proposals) • Involve community to improve decisions and project |
| Treatment Plant service goals | <ul style="list-style-type: none"> • Protect public health • Practice environmental stewardship – e.g. protect water quality, educate • Be a good neighbor • Provide value to ratepayers • Achieve outstanding operational performance |
| Project functional goals | <ul style="list-style-type: none"> • Provide productive workplace for staff - replace temporary trailers where engineering staff and construction staff were working and maintain collaborative relationship between the groups. • Improve treatment plant security and public safety • Incorporate video conferencing capability to reduce travel time for meetings • Provide public gateway to Treatment Plant • Create community formal and informal meeting spaces, indoor and outdoor |
| Project financial goals | <ul style="list-style-type: none"> • Adhere to budget and schedule • Reduce employee health and safety liabilities • Build in long life and flexibility for future needs |
| Project design goals | <ul style="list-style-type: none"> • State of the art sustainable building and site - meet or exceed LEED™ Gold level of sustainability - model of sustainability and functionality • 100 year building cycle for low maintenance and energy use • Flexible, adaptive workspace • Design excellence - modest but elegant form • Quality workplace with productive, healthy and comfortable working environment • Demonstrate BES design excellence standards • Incorporate public education about water • Meeting space for up to 100 seats • Reconfigure parking lot, landscaping, security fencing and site restoration • New front entry for Treatment Plant |

Source: Audit Services Division and documents provided by the Bureau of Environmental Services

The initial office building project estimate for budgeting purposes was \$3,224,000. The final project cost for the building and scope additions during design was \$11.5 million, not including interest and overhead. Figure 3 provides a breakdown of how BES spent the \$11.5 million. The final project cost includes City labor and expenses along with the cost of contracts used to accomplish outside design and construction work.

Figure 3 Project expenditures

| | Task/Item | Amount | Subtotal (rounded) | |
|---|--|--|-------------------------------|-----------|
| Design Phases (2010-2014) | Design contract original amount | \$521,926 | | |
| | Master Plan update (Amend. 1) and fee | \$114,402 | | |
| | Add Amendments 2, 3, and 4 | \$700,323 | | |
| | Additional landscape design contract | \$49,840 | | |
| | Surveying and mapping by City | \$37,975 | | |
| | Geotechnical study by City | \$27,309 | | |
| | Art by Regional Arts Council | \$125,000 | | |
| | <i>BES Project Management</i> | \$258,883 | \$1,863,000 | |
| | <i>BES review & oversight</i> | \$27,365 | | |
| Construction (2012-2014) | Building permits (estimate) | \$100,000 | | |
| | Construction contract | \$7,732,807 | | |
| | Material Testing Lab (City) | \$59,592 | | |
| | BES Inspection and safety | \$184,304 | | |
| | | <i>BES Construction Management & Engineering</i> | | \$580,922 |
| | <i>BES Project Management</i> | \$119,895 | \$8,777,500 | |
| Startup/Closeout and miscellaneous | BES engineering (startup/closeout) | \$79,290 | | |
| | Furnishings | \$408,602 | | |
| | Move staff to temporary locations (estimate) | \$157,852 | | |
| | Public involvement | \$13,773 | | |
| | | <i>BES Project Management (startup/closeout)</i> | | \$45,142 |
| | | <i>Legal assistance by City</i> | | \$50,090 |
| | Other, not included above | \$107,842 | | \$862,600 |
| | Total as of August 8, 2014* | \$11,503,134 | | |

* Not including interest and overhead

Source: Audit Services Division and documents provided by the Bureau of Environmental Services

Audit Results

We found that costs for the office building increased dramatically above initial estimates for several reasons. Essentially, what could have been a relatively straightforward and simple building became more complex and elaborate, as design choices and scope additions expanded the project area as well as the building's complexity. During the design process, gaps in project oversight also contributed to the increase in project cost.

Design choices and project scope changes increased project cost

Today, the completed office building and its surrounding site work are very different from early drawings of a rectangular office building with a rectangular eco-roof. BES decided to fulfill its service goals by developing the office building as a model of environmental stewardship that would help educate the public about such stewardship. BES also approved unusual design features, and expanded site work to meet other Treatment Plant needs.

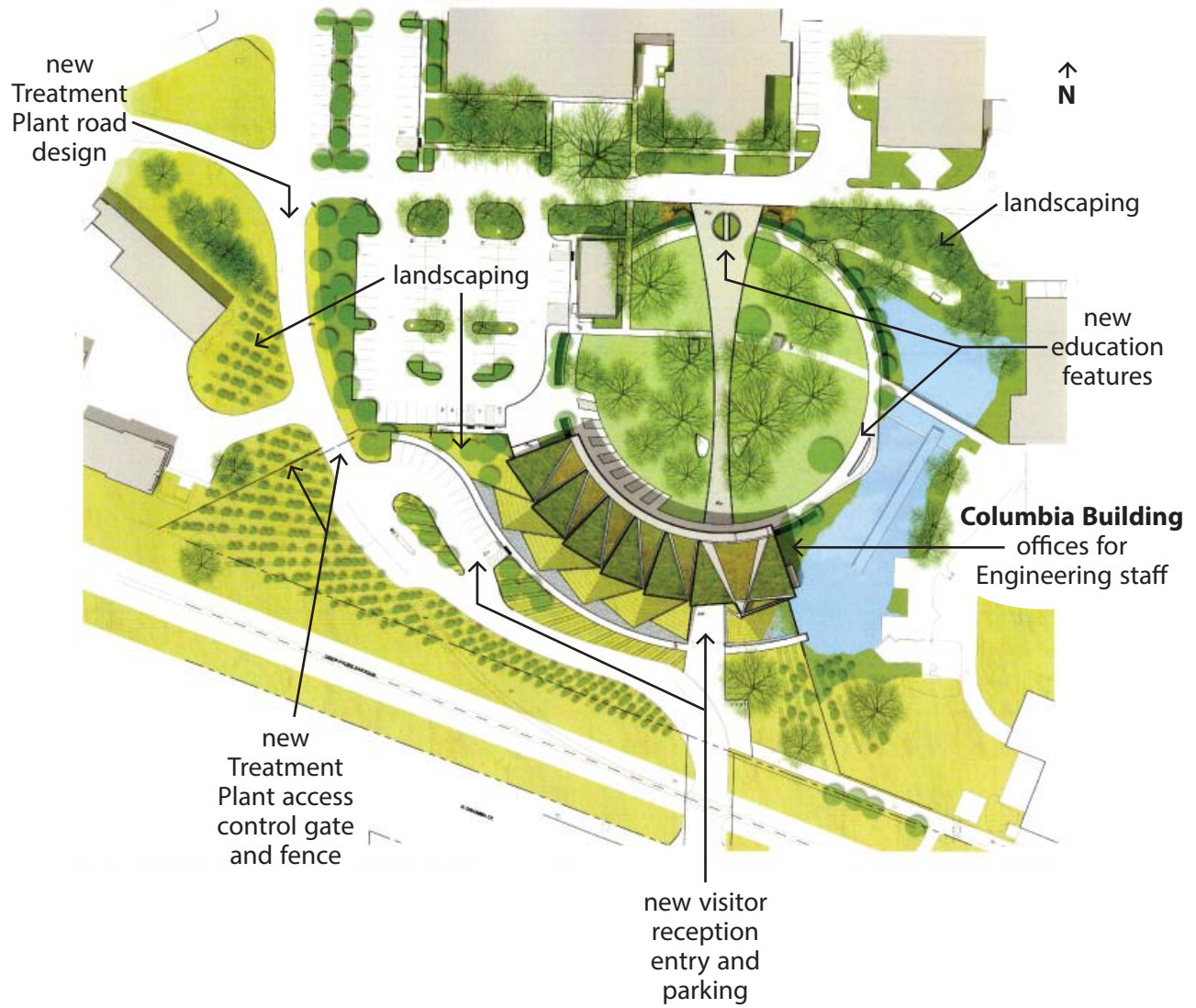
Figure 4 illustrates several of the project elements that substantially increased project cost beyond the first budgeted amount. We compared early cost estimates with the actual construction bid amount. We found that the building and site features BES added cost about \$3.3 million more to construct than the \$3.4 million the design contractor estimated at pre-design for a building that would meet BES and City requirements, including LEED.

BES implementation of City-wide requirements affected project cost

Some project costs were related to City-wide requirements for green buildings, community involvement, and emerging small businesses.

Since 2005, the City has required green building standards for new office buildings. To meet the City's sustainability requirements, the Columbia Building must achieve LEED™ Gold level certification and also incorporate an eco-roof over at least 70% of the roof area. Although the BES website described the Columbia Building as "a LEED Gold Certified structure, [that] demonstrates sustainable practices through its design" in September 2014, the LEED™ review process was not yet underway at that time.

Figure 4 Project features

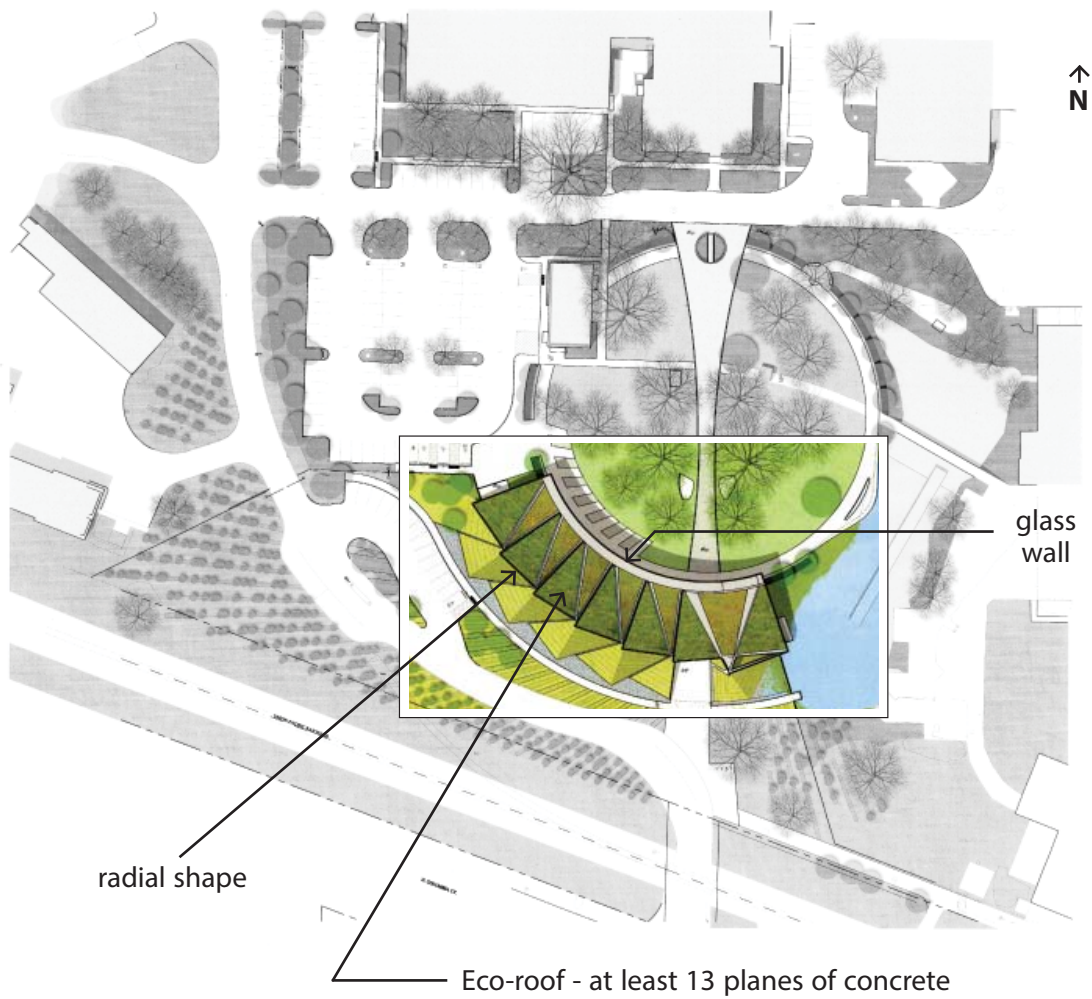


Source: Audit Services Division using base map provided by Bureau of Environmental Services

The City began requiring bureaus to involve the local community in project development in 1996, when the Treatment Plant already had a citizen committee in place. BES complied with the committee's request to incorporate a public meeting room in the building design. BES included a meeting room that can accommodate up to 100 people, located away from the office space and other meeting rooms in the building.

A 2003 City decision to foster minority-owned, women-owned, and emerging small businesses (ESBs) also applied to this project. The City requires bureaus to award points for ESB certification when evaluating proposals to perform professional design work. The design contractor for the office building was certified as an ESB, but, according to a firm Principal, was new to public projects.

Figure 5 Building design



Source: Audit Services Division using base map provided by Bureau of Environmental Services

Some building design features were not needed to meet initial requirements

The BES goals to “showcase the sustainability of City and BES values” and achieve “design excellence” were aligned with City leaders’ routine use of the term “world class” as a positive attribute. The design contractor, an architectural firm, proposed the unusual and costly design features shown in Figure 5.

Architects designed a radial-shaped building with tapered structural beams across the ceiling and a complex glass wall, shown in Figure 6.

Figure 6 Glass wall on North side of new building



Audit Services Division photo

Figure 7 Steep concrete eco-roof, new visitor entrance



Audit Services Division photo

Parts of the roof lie at a steep slope of 18 degrees, shown in Figure 7 above the public entrance to the building.

Figure 8 shows some of the many different planes, at least 13, that make up the roof. Triangular windows fill the irregular space between some walls and roof. The BES Bureau Leadership Team approved these features.

Figure 8 Complex roof with at least 13 planes



Audit Services Division photo

Some building features are less visible from the exterior. The office building is designed to withstand a severe earthquake and function as a BES emergency operations center. This feature alone added about \$500,000 to the cost. Some interior design features, such as tiles that compose an aerial photograph of the city on an entry wall, provide public education opportunities. The covering on other interior walls is bamboo louvers that partially hide the heating and ventilation ducts. BES told us that materials used in construction were sustainable and durable.

BES added other Treatment Plant needs to the office building project

BES used the office building project to address additional Treatment Plant needs it identified before and while the design contract was underway. It provided only limited information to Council about the extent of the Treatment Plant needs added to the project. While the new work may have been important and necessary, adding it to the office building design contract made the building seem more expensive and the other work less transparent. Much of the added work increased construction cost as well as design cost.

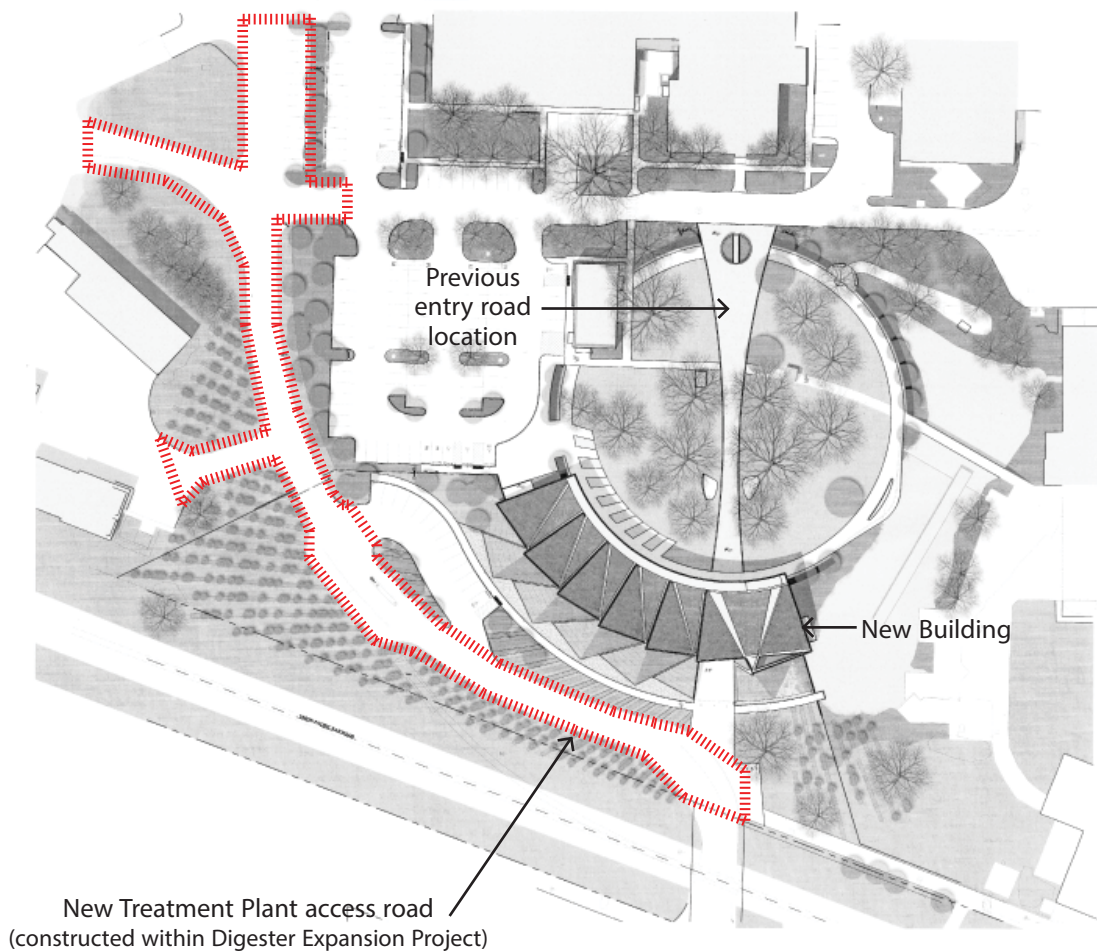
BES could have accomplished some of the added work by creating new contracts within the project or by starting a new project, instead of adding work to the office building design contract. Those methods would have been more transparent. BES management agreed, but said that adding new contracts could also be more costly due to delays and the cost of separate procurement processes.

After it evaluated proposals and selected the design contractor, BES added the task of space planning and furniture design to the contract scope. It also added site planning to the scope, including integration of the new artwork commissioned through the Regional Arts and Culture Council. A week after the design contract was signed, BES amended it to add planning work to the contract, to update the Treatment Plant's required Master Plan. The update was needed for a variety of other projects, as well as for the office building. The update could have been part of the initial project scope when BES requested proposals.

The expanded site work shown in Figure 4 increased construction costs by about \$1.5 million. Site work included a new fence and secure gate with remote operation, repaving the modified parking lot, landscaping the project area, and designing educational features incorporated into the landscape to support student tours BES hosts at the Treatment Plant. For example, a timeline of local history about water was etched into the new circular concrete walkway and an upright segment of large diameter sewer pipe was placed on a pathway with a bench inside.

When BES approved the building and site design to be constructed in the Treatment Plant entry road location, it added the design of a new access road to the project. Figure 9 shows both the new access road and the former entry road that became a walking path between office buildings. However, BES added construction of the road to a different Treatment Plant project already under construction, again increasing the design contractor's fee to prepare separate plans for the road.

Figure 9 New entry road construction by other project, designed in office building project



Source: Audit Services Division using documents provided by Bureau of Environmental Services

Gaps in design oversight and control allowed costs to increase further

Difficulty managing the design process resulted in more costly design in addition to more costly construction. BES construction oversight helped limit construction cost increases to 15% of the bid amount. However, design oversight was not as successful, and some controls were not applied effectively.

Priority among competing goals was unclear

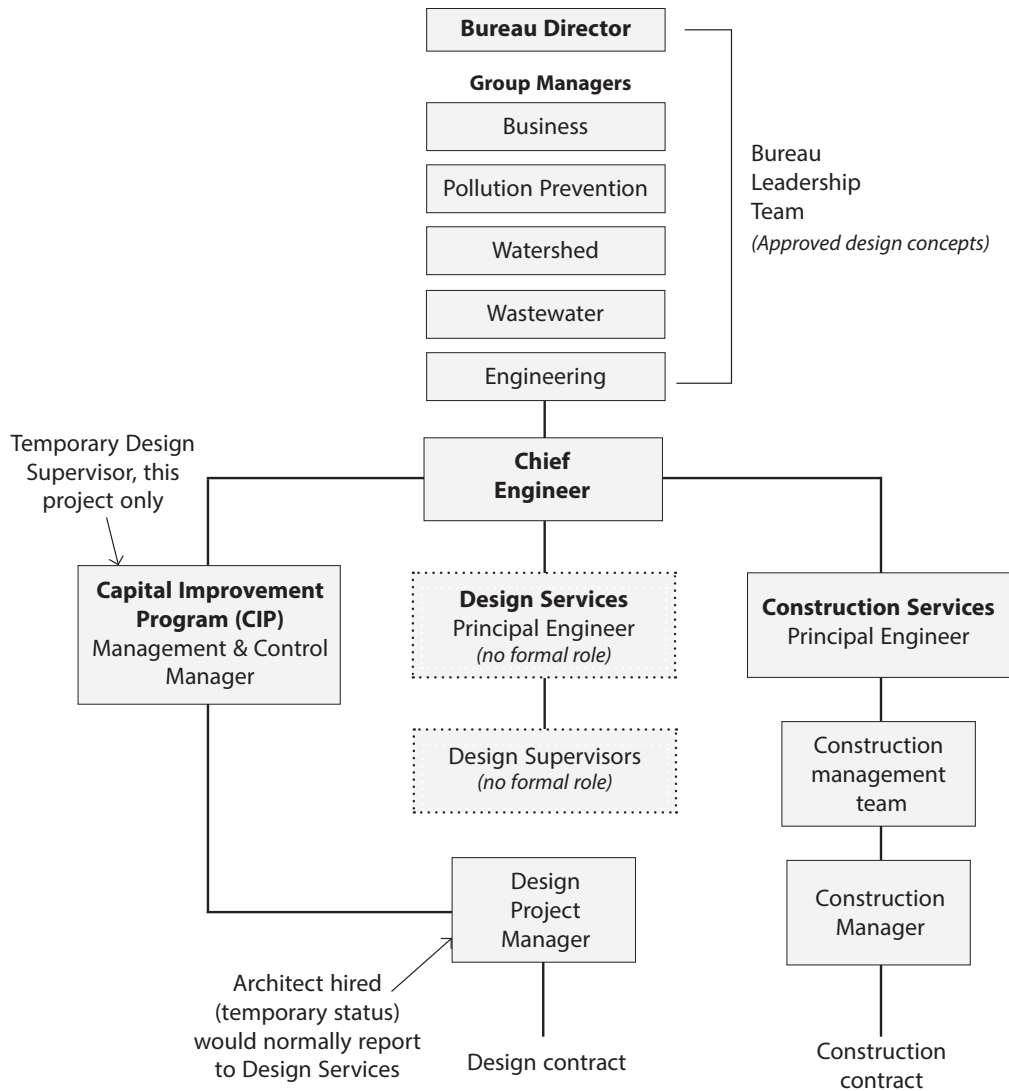
Although BES had many goals for this project (Figure 2), it did not clarify the priorities among competing goals to guide decisions. For example, the project work plan listed adhering to the budget as a goal, but incorporating a public meeting room appeared to be an equal or higher priority as a project goal. Ranking the goals before the design process began might have reduced spending on some elements of the project, such as adding features to meet the goal of educating visitors about water. When faced with competing goals (such as controlling costs versus creating a large public meeting room), BES did not prioritize the goals.

After we communicated our findings to BES management, they told us that they did prioritize goals, and that all of the goals listed were high priority. Managers said they met project objectives while adhering to the overall BES budget by reducing funds for other projects.

Design Services was not involved in project supervision

In an exception to its usual assignment of project responsibility to the Design Services Division, BES assigned overall supervision of the project to its capital improvement program (CIP) control manager as an added temporary responsibility. The CIP control manager ensures that budgets and spending on capital projects conform to plans and approves budget increases. This assignment appeared to pose a conflict between the role of overseeing project budgets and the role of supervising design of one of those projects. In other words, the same manager was responsible to both oversee spending and carry out the project work. BES management told us that the reduced level of oversight in the arrangement was one reason why the Bureau Leadership Team participated in decision-making on the project.

Figure 10 Treatment Plant office building project responsibility



Source: Audit Services Division and documents provided by Bureau of Environmental Services

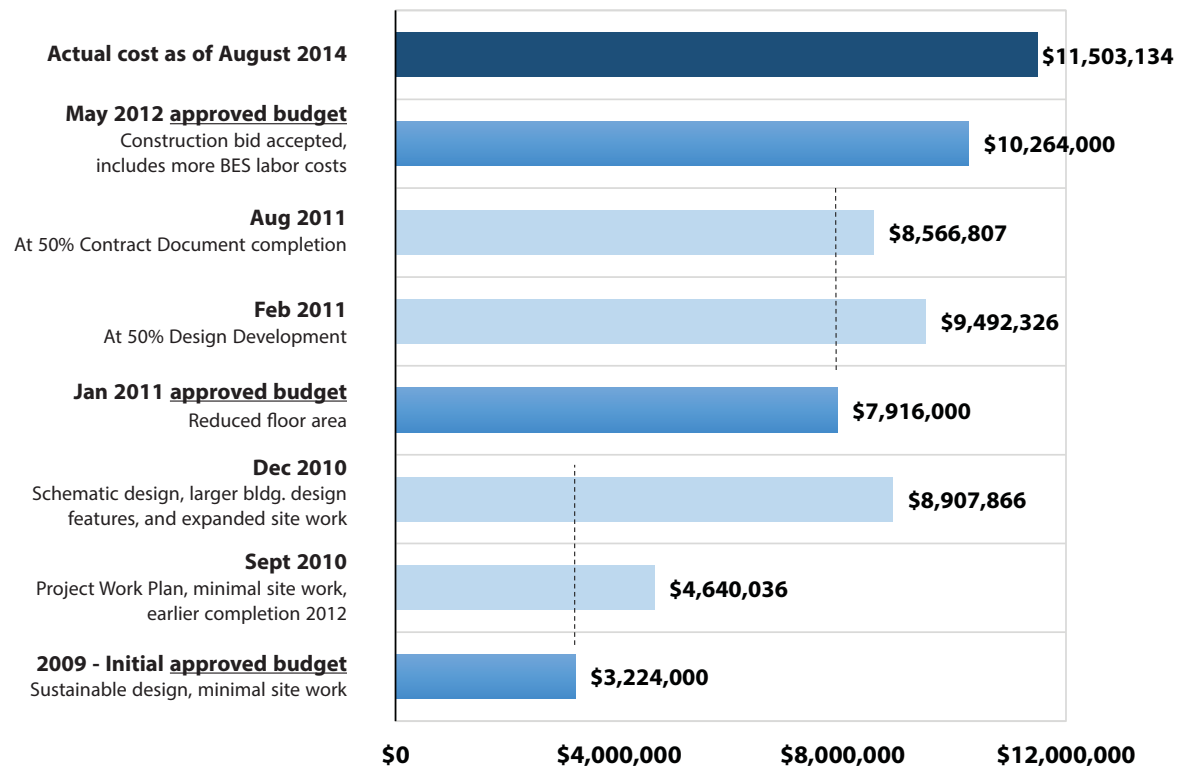
Figure 10 illustrates assigned project responsibility. For day-to-day design project management, BES hired a temporary architect who reported to the CIP control manager. The Design Services Division, which usually supervises and manages design of new BES structures, was not formally involved on this project, as shown. Design Supervisors' typical duties include providing technical and quality control review.

Managers bypassed intended controls

City capital project controls include controlling budgets, evaluating proposals, defining contract scope of work and payment conditions, monitoring design progress, and reviewing project design products for completeness, timeliness, and suitability for bidding. BES design managers on this project did not effectively implement these controls.

The initial BES budget did not include funds for site work beyond the planned office building site. However, Figure 11 shows that overall, BES increased the project budget as its estimates showed a greater total project cost for the expanding scope and design decisions it made. After approving the design of a complex roof and glass wall, BES did reduce floor area in order to lower estimated construction costs. It also eliminated less visible features such as air flushing, which did not significantly lower estimated costs.

Figure 11 BES estimates of total project cost



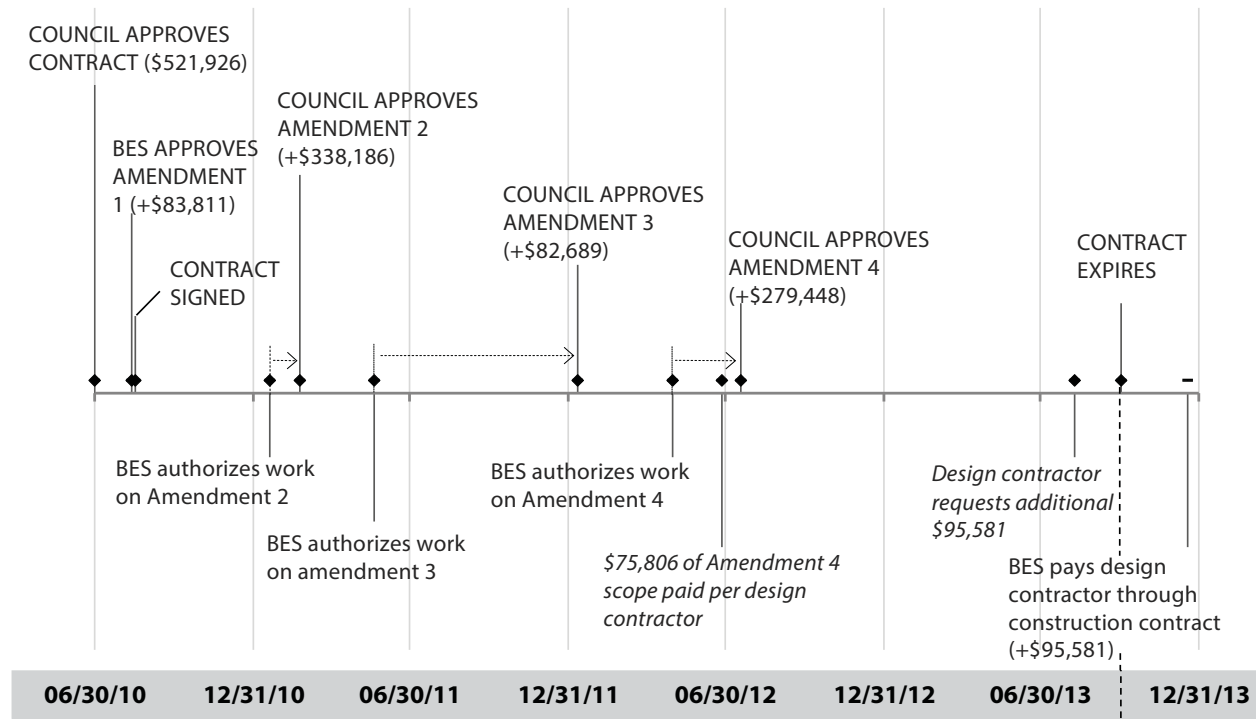
Source: Audit Services Division and documents provided by Bureau of Environmental Services

BES received 17 proposals to design the Columbia Building. BES evaluated the proposals, interviewed the four highest-scoring design teams, and selected a small ESB-certified firm new to the public procurement process, according to a Principal of the firm. The office building project the firm highlighted in its proposal to demonstrate experience was never completed. The proposal identified the subcontractor that would perform project management for the design team. The firm's inexperience may have been a factor in items missed during the design stage and in the design changes required after the contractor inquired about many design features.

The design contract did not clearly identify deliverables. In addition, when BES added work to the contract, the added fees were tied to subcontractors rather than to specific deliverables or to contract tasks. These two factors made monitoring more challenging since added work performed was not connected to documented, specific, visible results.

BES added work to the initial design contract instead of preparing new contracts for the new work. For example, BES selected a consultant to update the Treatment Plant's Master Plan weeks before it added that work to the office building design contract as Amendment No. 1. That firm did not have to compete for the work.

Figure 12 Design contract history

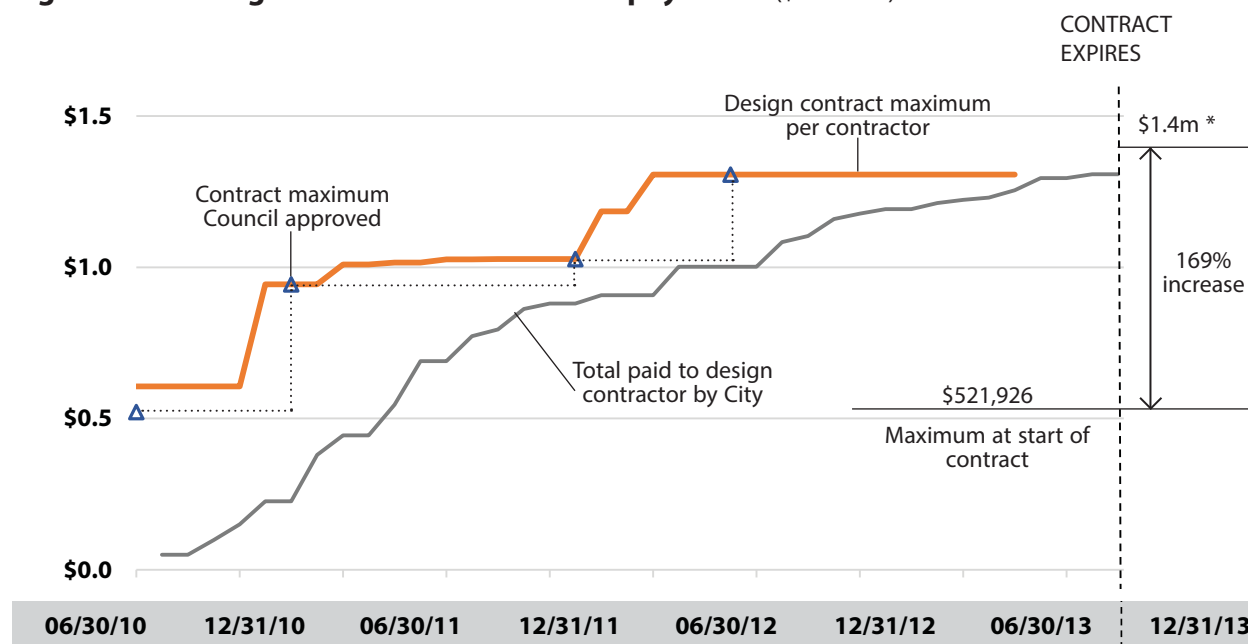


Source: Audit Services Division

Figure 12 shows the history of amendments to the design contract and BES' authorization to proceed with three amendments before Council had approved the added work. In its bills to the City, the design contractor frequently showed a maximum contract amount higher than the amount Council had authorized. These are charted in Figure 13 which also shows the overall 169% increase in fees that BES paid the design contractor.

BES managers had expected that Council would approve at least one more amendment, even while BES went ahead and paid for expanded design using dollars intended for later construction review and inspection. However, the Commissioner-in-Charge would not support any further increases to the design contract. Unable to amend the contract again, BES ultimately paid the design contractor an additional \$95,581 through construction change orders.

Figure 13 Design contract maximum and payments (\$ millions)



* \$1.4 million including payment through construction change orders

Source: Audit Services Division

BES management told us that the amount paid through change orders was owed by the construction contractor to the design contractor, and was paid as part of final negotiations to settle claims. Three months after requesting \$95,581 compensation from BES, the design contractor invoiced that exact amount to the construction contractor, which was then disbursed among 10 remaining change orders, and paid by the City.

BES also contracted directly and noncompetitively with one of the design subcontractors for \$49,840. These actions allowed BES to pay more for design work without having to go back to Council for an amendment to raise the contract maximum. Figure 13 shows the total \$1.4 million paid to the design team. Excluding the Master Plan update, this was about 18 percent of the final construction cost.

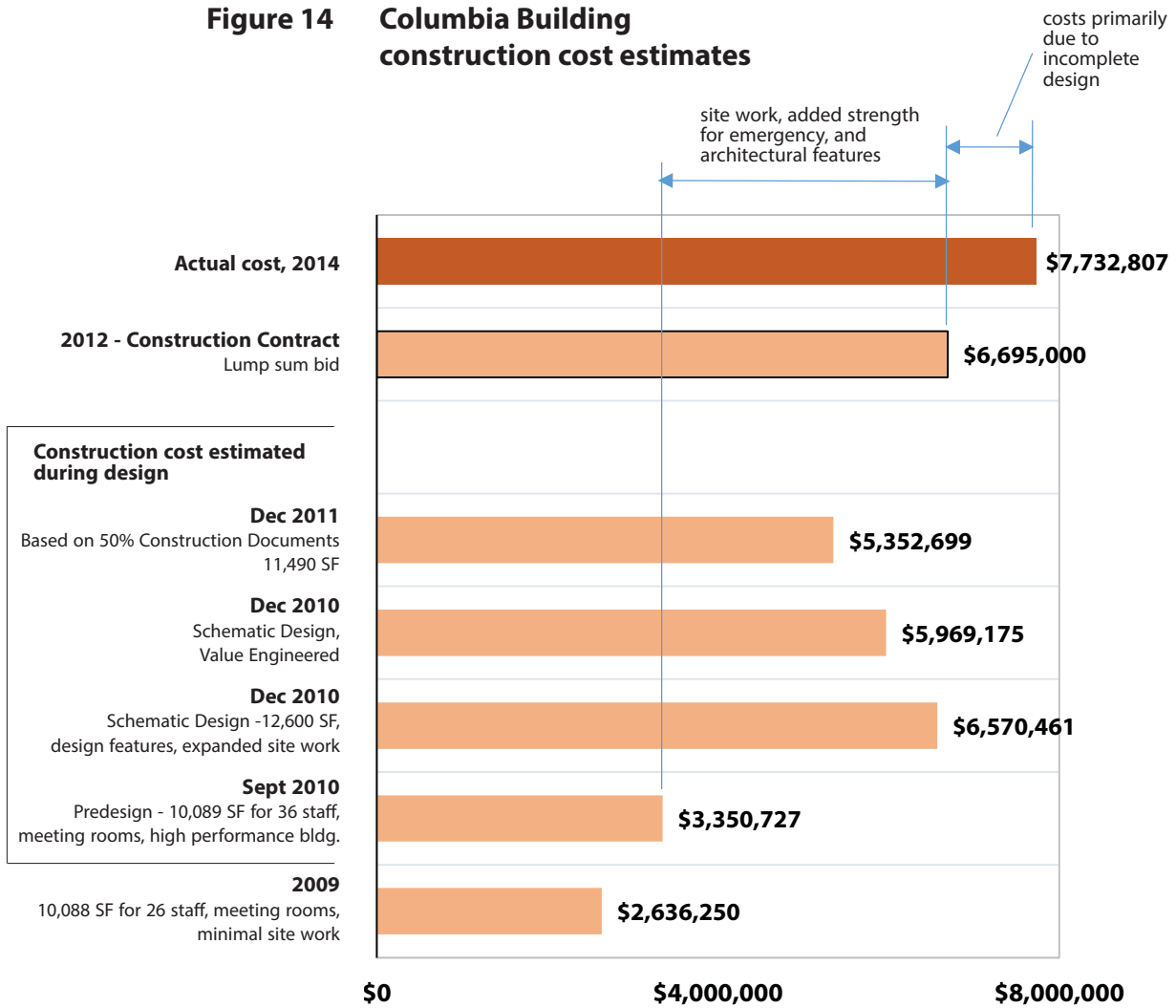
BES design managers bypassed opportunities to manage the design contract in some other ways such as monitoring performance to require compliance. In each example listed below, BES did not identify the violation, enforce the applicable contract condition or modify the contract condition in writing.

- The contractor hired the BES design project manager during the contract, violating a contract condition. The contractor was prohibited from hiring any City employee who participated in awarding the contract. For eight months BES allowed the employee to continue as design project manager while working for the design contractor at the same time. We verified with the City Attorney's Office that this conduct raised legal concerns and merited further inquiry to determine whether ethical or contractual violations had occurred.

BES management said there was no contract violation because they waived the contract condition informally based on the employee agreeing to not work on this project while working for the architect. In addition, BES told us that after going to work for the architect, the bureau removed the employee's signature authority as project manager.

- The contractor provided fewer document reviews and professional estimates than its contract required. A single set of drawings was used for both the final design review and the partial contract document review, although the contract called for approval of final design before beginning contract documents.
- The contractor did not provide specifications to reviewers for the final review of contract documents until after most review comments were turned in. The design was reported to be only 85% complete at the time of bid, with missing and conflicting details.
- Instead of providing the required cost estimate at 95 percent completion of contract documents, the contractor adapted the estimate done at 50 percent-complete contract documents, using quantities not verified by the contractor's estimator.

Figure 14 Columbia Building construction cost estimates



Note: Estimates exclude furniture and technology contract costs, design, management, and other BES project costs. Dec 2010 estimates included road construction work performed by another contractor.

Source: Audit Services Division and documents provided by Bureau of Environmental Services

BES deemed the modified 50 percent construction estimate of \$5,400,000 "optimal," in its communication to Council, although the estimate did not appear to meet the City definition of an optimal estimate, shown in the Appendix. The construction contract bid amount was \$6,695,000 and final construction cost was \$7,732,807 (including the payments to the design contractor).

Figure 14 shows construction cost estimates prepared during design, compared to the actual bid amount and the final cost including changes during the work.

Although BES and the design contractor attempted to reduce construction cost during the design phase, they may have overlooked the costs that would result during construction from inadequate and conflicting design information in the bid documents.

Most of the 85 change orders were related to design problems. Among examples of unplanned construction costs that resulted from design choices and ineffective oversight were:

- The warranty on the steep roof required adding soil barriers to prevent wet soil from sliding off. A less-steep roof design may not have needed these additions. Adding the barriers during construction cost the City \$30,000. Other design changes to the eco-roof cost \$80,000.
- Additional fall protection for workers also had to be installed on the roof. Although a comment at the 60% review identified the need, adding fall protection during construction cost the City over \$75,000.
- Specified windowpane size in the glass wall was not available locally as intended by the architect to meet LEED requirements. A design with smaller panes of glass would have been easier to manufacture and install.
- Footing drains required by State building code had been omitted from contract documents. Adding the drains during construction cost about \$86,000.
- Four categories of energy monitoring needed to meet LEED™ requirements were omitted from contract documents. Adding them during construction cost over \$66,000.
- The window shades specified by the designer would not work on the sloped windows under the steep roof. After window frames were redesigned to accommodate a different type of shades, adding cost to the project, the shades on angled windows were deleted. The changes resulted in a net credit, but no shades on those windows.
- The specified system for printing the aerial photograph on glazed tiles had not been tested during design. It cost \$40,000 to modify materials during construction.

As design scope increased, construction bidding was delayed from 2011 to 2012. When issues had to be resolved during construction, project completion was delayed further.

Changes and resolutions during construction were well-managed by BES Construction Services managers, who were able to limit the amount of change orders to about 15 percent over bid. However, managing the resolution of design issues required more BES construction management time than was budgeted, also contributing to higher project cost (Figures 3 and 11).

Communication to City Council did not reveal extent of project changes

By State law, City Council has authority over City contracts. Council oversight of these project contracts was hindered by limited information that BES provided to Council. Nine formal communication opportunities included budget requests, descriptions of the design and construction contracts and proposed contract amendments. Generally, they did not convey the extent of increasing project scope or contract costs compared to the original contract. BES could have been more transparent about the basis for project costs it reported to Council.

Managers and Council depend on budgets and cost information to oversee projects. When BES added new work to the office building contracts, like the extensive landscaping and new security features, without disclosing the scale of changes, it impacted the ability of those charged with oversight to fulfill their roles. For example, Amendment 2 authorized “additional work for design of site development improvements.” It did not disclose that with the sole exception of site design, the authorized “Design Development documentation [of] site design, building design, detailed system engineering, code review, project specifications, cost estimating,” was already part of the contract.

Audit Recommendations

Our review of this BES office building project identified areas where more effective oversight during the project could have reduced cost and improved accountability. We recommend well-established professional project management practices that BES should use to avoid the problems we observed on this project. These recommendations could also be considered for additional City projects in the future.

Effective project oversight by bureau managers and by Council depends on clarity and transparency in contracts to facilitate monitoring of products and costs. In addition, contract amendments should be specific about what they add or subtract from the original contract. These characteristics help achieve both efficiency and effectiveness. Costs are difficult to estimate at the start of a project, and amendments enable needed flexibility. The number of amendments is less important than the clear and transparent basis for management decisions.

To improve the timing and substance of design choices the bureau should:

- 1. In early project planning, determine and clarify City priorities among competing goals.**

For example, value to ratepayers must be weighed against cost for a “showcase” building.

- 2. Consider related adjacent needs, such as new entry roads, prior to building design. Include related needs in the initial project budget and requests for design proposals, rather than adding work later to the same contract.**

When such needs are difficult to specify prior to design, include and identify estimated contract amounts to disclose the potential needs identified.

To improve design oversight and control the bureau should:

- 3. Clearly define contract deliverables in a format that facilitates monitoring performance.**

Clear contract deliverables can facilitate amending the contract to add or remove deliverables and respective fees, as City needs are better understood.

4. Verify claimed professional experience and capability of design contractors prior to contract award.

The basis for awards determined by professional qualifications should be checked as part of evaluation and in fairness to other proposers.

5. When a contract is in place and new needs are identified, prepare new contracts when practical to meet the needs.

Avoid adding work to a contract without competition.

6. Clearly define the scope associated with each budget estimate, design contract fee, and construction estimate.

Specifying estimating requirements or standard(s) for bureau employees and contractors to use can make estimates more comparable and useful for decision-making.

7. Create and follow a clear policy on avoiding any appearance of conflict of interest and perceived or actual role conflicts.

Especially when a standard process is modified for a specific project, check for any appearance of role conflicts and document accountability within the modified process.

8. Complete design work prior to soliciting bids for construction.

Incomplete or conflicting contract documents can lead to justified claims. Changes during construction cost more than changes during design.

9. Increase transparency to Council of the relative contract amount of each increase requested, both in amendment documentation (percent increase over original) and in specific changes to contract requirements. Wait for Council approval before authorizing additional work under a contract.

Objective, scope and methodology

We reviewed BES management of one capital improvement project located at the Treatment Plant – the design and construction of a new office building. The scope of the audit was focused on the BES project scope for its Project No. E09023, with an emphasis on why project costs increased substantially during the project. We conducted this audit to determine why costs for the office building increased, and to recommend improvements to management to prevent future capital projects from costing much more than expected.

To accomplish our objective, we visited the Treatment Plant with BES managers to view the office building exterior and interior features. We selected and reviewed project documentation provided by BES and in archived records and related BES policy and procedure guidance documents. For example, our review included contracts, design contract deliverables, and construction contract change orders.

We analyzed project chronology, cost estimates and correlated scope, related project contracts, design contract invoices and progress reports, construction change orders, project correspondence and meeting notes, selected employment records, and information BES provided to Council.

We interviewed BES Engineering Services Group managers, the BES Contracts Manager, the Commissioner-in-Charge during the design process, and representatives of the design contractor and the construction contractor. We also met with the City Attorney's Office.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX – COST ESTIMATE CONFIDENCE RATING

Cost estimate confidence rating

| | |
|------------------------|---|
| <u>COMPLETE</u> | <ul style="list-style-type: none">o Final payment made.o Post project assessment completed comparing project estimate, amount of contract award and total amount of change orders issued during project.o Total project costs reported. |
| <u>OPTIMAL</u> | <ul style="list-style-type: none">o Project scope and specifications clearly understood and well defined.o Clear understanding of materials, size and quantities needed to execute job.o Schedule and special site conditions understood.o Project estimate unlikely to change (generally at 90% or greater design and engineering phase).o Total Project contingencies (including project management, design, engineering, plus construction) range between 10%-15%. |
| <u>HIGH</u> | <ul style="list-style-type: none">o Project scope and specifications nearly complete but still subject to change (70%-90% design and engineering phase)o Materials, size and quantities needed to execute job have been defined but subject to minor changes.o Schedule understood.o Total Project contingencies (including project management, design, engineering, plus construction) may range between 20%-30%. |
| <u>MODERATE</u> | <ul style="list-style-type: none">o Project scope defined but lacks details.o Project specifications incomplete (60%-70% design and engineering phase).o Total Project contingencies (including project management, design, engineering, plus construction) may range between 30%-40%. |
| <u>LOW</u> | <ul style="list-style-type: none">o Project scope is a conceptual "vision" with limited detail.o Project cost is an educated guesstimate. Limited technical information available and/or limited analysis performed.o Specifications still in infancy stage. (Less than 50% design and engineering phase).o Total Project contingencies (including project management, design, engineering, plus construction) may range up to or exceed 50%. |

Source: Binding City Policy ADM-1.13 – Assigning Confidence Ratings to Project Cost Estimates

RESPONSES TO THE AUDIT



Commissioner Nick Fish
City of Portland

DATE: October 13, 2014

TO: LaVonne Griffin-Valade, City Auditor

FROM: Commissioner Nick Fish *NF*

SUBJECT: BES Columbia Building Audit Response

Thank you for the opportunity to respond to the audit of the BES Columbia Building project.

As Commissioner in Charge of BES, I accept, in their entirety, the analysis and recommendations presented in the audit.

I want to acknowledge that you and your team began this audit out of sequence in response to a request from Mayor Hales and me. This, no doubt, placed burdens on your team. I especially want to recognize the work of Drummond Kahn, Director of Audit Services, and Beth Woodward, Senior Management Auditor.

When concerns about the cost of the project were raised earlier this year, I concluded that an outside, independent construction audit was necessary. This audit raises serious and troubling issues.

Good stewardship of ratepayer dollars is critical to maintaining public confidence in our utilities. I have already taken steps to increase transparency in all phases of the bureau's construction projects. For example, the City contracted with the Citizen's Utility Board to conduct independent analysis of our utilities, and I have directed both of my utilities to bring any contract over \$500,000 to Council as a Regular Agenda item, allowing for a full Council discussion.

The Columbia Building project was conceived with the good intention of providing employees with a sustainably designed, safe and supportive work environment. While the City is a leader in sustainable building practices, we also have an obligation to provide common-sense value to our ratepayers.

I understand that this audit is now an adjunct to the more far-reaching work your team is doing on the City's procurement process. I look forward to reviewing the recommendations of that audit, and working with my Council colleagues to implement them as well.



CITY OF PORTLAND
ENVIRONMENTAL SERVICES



1120 SW Fifth Avenue, Room 1000, Portland, Oregon 97204 ■ Nick Fish, Commissioner ■ Dean Marriott, Director

October 13, 2014

To: Auditor LaVonne Griffin-Valade

From: Director Dean Marriott *DM*

Re: BES Columbia Building Audit

Thank you for the opportunity to comment on the audit, "BES Columbia Building".

The nine audit recommendations contained in the report are appropriate and helpful. We agree that they should be considered for City projects in the future. The well-established professional project management practices described in the audit are now being utilized by the Bureau.

We do think it is important for the reader to understand that what increased the cost of the projects at the treatment plant was the addition of site improvements not in the original project scope. These include a visitor reception area, improved treatment plant security and traffic circulation, providing an earthquake resilient emergency operations center, public meeting space and constructing a building that meets LEED gold standards. Adding earthquake resilience to the building increased the budget by \$500,000 alone. These added features are important improvements to the Columbia Boulevard Treatment Plant Campus. These are long-lasting investment to this critical public facility.

The Summary should be clearer that while the initial budget in 2009 was \$3.2 million, the project changed to include the improvements described above, and the budget was adjusted to \$8.9 million by December of 2010. Starting with this adjusted budget would provide the reader with a better comparison to the final \$11.5 million cost.

The Bureau has changed how it seeks approval for contract amendments. Items are now placed on the Regular Agenda and are explicitly presented to the City Council to insure transparency.

**Audit Services Division
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BES Columbia Building: Scope additions and ineffective design oversight led to substantially higher project costs

Report #446B, October 2014

Audit Team: Beth Woodward, Kari Guy, Janice Richards,
Ken Gavette

This report is intended to promote the best possible management of public resources. This and other audit reports produced by the Audit Services Division are available for viewing on the web at: www.portlandoregon.gov/auditor/auditservices. Printed copies can be obtained by contacting the Audit Services Division.

LaVonne Griffin-Valade, City Auditor
Drummond Kahn, Director of Audit Services

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Vacant Positions: Few positions vacant long-term, but enhanced oversight can reduce risk (#444, May 2014)

East Portland: History of City services examined (#435, April 2014)

