

# Department of Metropolitan Services West Point & Renton Wastewater Treatment Facilities Construction Management Audit

## Executive Summary

The Barba-Arkhn Audit Team

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## INTRODUCTION AND BACKGROUND

The Department of Metropolitan Services (Metro) in King County (County) has been in the process of constructing \$1.05 billion in wastewater treatment facilities to service the greater Seattle metropolitan area. With the merger of Metro and King County, the County is assuming responsibility for completing this wastewater facilities construction program. Two of the largest components of this ongoing program, expansion and upgrading of the West Point Treatment Plant and the Renton Treatment Plant, were selected by King County for review by an independent construction management audit team.

The West Point project has a total budget of \$573,513,000. West Point represents the largest single component of the overall \$1.05 billion program. The wastewater treatment portions of the West Point project have been constructed under the terms of a court-ordered consent decree,

which dictated deadlines for project completion. The portions of the project controlled by the consent decree are essentially complete, and Metro has reportedly met all conditions and deadlines set forth in that decree. Less than ten percent of the West Point project remains to be completed, consisting primarily of community enhancements, scheduled for completion in 1997.

The Renton project has a total budget of \$157,007,773, making it the second largest component of the overall program. The work at Renton, specifically known as Phase 1 of the Renton Phase III Treatment Plant Enlargement, is approximately fifty percent complete and is scheduled for completion in 1997.

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## OBJECTIVE AND SCOPE

The purpose of this audit was to examine the policies and procedures used by Metro to manage large capital improvement projects. Four principal efforts or phases of work were involved in conducting this audit, as follows:

1. Review current Metro procurement regulations and policies;
2. Audit all phases of construction management and administration on two large wastewater treatment facility projects, specifically the Renton and West Point Wastewater Treatment facilities;
3. Compare Metro's stated policies, as well as their actual construction management practices, to generally accepted construction industry practices and procedures; and
4. Determine whether Metro's practices were adequate to protect the owner's interests and recommend solutions for improving or correcting any deficiencies identified.

The immediate outcome of this audit is an assessment of the construction management of the Renton and West Point Wastewater Treatment Facilities. The broader purpose of the audit is to provide recommendations to King County as to how practices may be improved to ensure that large public works projects in King County are completed, to the greatest extent possible, on time, on budget, at the level of quality desired, and in accordance with all applicable laws, regulations, and industry standards.

The audit recommendations set forth herein consider the need for public agencies to be accountable to the public for their expenditures of public money. It is anticipated that the audit recommendations will be considered for application of ongoing and future capital improvement projects in King County.

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## SUMMARY STATEMENT OF FINDINGS

The general conclusions are that Metro project management has done a reasonable job of representing the owner's interests with respect to schedule and with respect to quality and inspection. However, the audit concluded that Metro project management has not done a reasonable job of representing the owner's interests with respect to costs and fiscal accountability. This conclusion is based on the fact that the audit identified about \$5.3 million in unwarranted payments and \$20 million in unexplained or unsupported costs for which payments were made.

The audit also concludes that improvements are needed to ensure proper segregation of procurement and construction administration duties on large, long-term capital projects. Improvements are also needed to ensure proper authorization of transactions and adequate documentation and record-keeping.

Finally, improvements are needed to increase the level of independent verification of performance.

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## MAJOR FINDINGS AND RECOMMENDATIONS

Finding 3-A. Metro did not provide for adequate segregation between procurement and construction administration duties.

Metro's Technical Services Department managed both procurement and construction administration at both West Point and Renton. Segregation of duties, a key element of fiscal control and accountability, requires that procurement and construction administration be performed by separate departments. Other elements of internal management control, that is, proper authorization of transactions; adequate documentation and records; and independent checks on performance, were not in place to compensate for the lack of segregation which existed in Metro's organizational structure.

By failing to provide adequate segregation of the procurement and construction administration processes, Metro placed public funds at risk by providing an environment open to errors and irregularities in both procurement and administration. Some of the specific conditions described under other findings in this audit report with regard to construction support services, work orders, and change orders would have been avoided entirely, or at least alleviated, had adequate segregation of duties existed between the procurement and construction administration functions.

*The audit recommended* that large, long-term capital projects, such as West Point and Renton, should be organized to ensure adequate segregation of the procurement and construction administration functions.

*The audit further recommended* that to facilitate adequate segregation of procurement and construction administration functions, the use of independent construction management firms to manage large, long-term capital programs should be investigated.

Finding 4-A. Change documentation was not organized or maintained in sufficient compliance with Metro's procedures and industry standards to facilitate internal review and audit.

Change documentation for the completed contract at Renton and the change documentation at West Point was not consistently organized or maintained within the standards set forth by Metro or within standard industry practices for maintaining change files. In many cases, because of the state of the documentation, the pricing of changes and the resultant change orders could not be confirmed as being fair and reasonable. This impact is discussed in detail in subsequent findings. The audit team also believes that the existing change order-related documentation in most cases could not have enabled any other reviewers or interested parties, such as a Metro manager, to readily determine with specificity the basis for a negotiated price on a given change or how that price was determined by Metro staff to be fair and reasonable.

*The audit recommended* that change documentation should be organized and maintained in strict accordance with the requirements set forth in Metro's Manuals. To ensure compliance, for each individual change, that is, for each individual PWC, a file content checklist should be completed and approved by management, usually the project controls manager and the program manager, prior to execution of a change by procurement. Such a procedure is standard practice on large public works projects.

Finding 4-B. Metro did not administer and document changes in accordance with Metro's own procedures or in conformance with industry standards for large public works projects.

As a result of this lack of documentation,

- 1) the audit team was in many instances unable to confirm the pricing of changes as fair and reasonable,
- 2) opportunities for error and irregularities in the administration of changes were created, and
- 3) instances of error and irregularity would have been extremely difficult, if not impossible, to

detect through either management review or independent audit.

The effect of missing or incomplete change documentation is that in many instances the audit team was unable to confirm the negotiated or accepted costs as fair and reasonable. These unexplained costs total \$17,666,474.

*The audit recommended* that a summary of negotiations, as described in Metro's Construction Management Procedures Manuals, should be prepared for each change. Although it is recognized that negotiations per se are not always necessary, at a minimum, a record should be maintained that describes what steps were taken to review the contractor's proposal, the basis for compensation, and why the final price is considered fair and reasonable. The summary of negotiations should be reviewed for completeness and signed by both the project controls manager and the program manager prior to execution of a change by procurement.

*The audit also recommended* that an independent estimate or analysis of a contractor's time and materials proposal should be performed and documented for each and every change. For time and materials changes a complete and independent review, essentially an audit, of a contractor's and its subcontractor's calculations of costs is required, and this review must be documented.

*The audit further recommended* that formal training in contract administration and complying with procedures manuals should be implemented.

Finding 4-C. Metro did not comply with the terms and conditions of its contracts when negotiating changes.

Metro did not comply with the terms and conditions of its contracts when negotiating changes with its contractors. As a result, reimbursement to contractors through the change order process was in excess of that permitted by the general terms and conditions of the applicable contracts. Metro paid through change order a bonus of \$69,462 to its site preparation contractor at West Point. No provision existed in Metro's contract for the payment of bonuses to the contractor. Metro's payment of this \$69,462 to the contractor is therefore considered unwarranted.

Metro paid through change order \$298,142 to its liquids stream contractor at West Point for the purpose of substitution of an instrumentation and controls (I & C) subcontractor meeting the requirements of the technical specifications. An analysis by Metro had shown that the original low-bid subcontractor did not meet the technical requirements for performing work under this contract. Provision by the contractor of subcontractors meeting the technical requirement of a contract is a condition of Metro's acceptance of a contractor's bid. Metro's payment of this \$298,142 to the contractor is therefore considered unwarranted.

Metro paid contractors direct compensation for items designated as overhead costs in the applicable contracts and used inappropriate overhead mark-up rates resulting in \$1,747,605 in unwarranted overhead payments to contractors.

*The audit recommended* that bonus and incentive payments to contractors should only be made when explicitly allowed by contract. Change orders should only be paid for changes in the scope of work.

*The audit also recommended* that compensation to contractors for overhead costs should be calculated and paid in accordance with the terms and conditions under which a contract is awarded. Construction contracts should specify the maximum allowable overhead mark-ups on changes and further specify that this overhead mark-up includes all overhead costs, including change and change order administration costs.

Finding 4-D. Metro made adjustments to contracts that cannot be confirmed as representing fair and reasonable costs for which Metro was responsible.

Metro made various adjustments to several contracts but did not follow generally accepted construction management practices in doing so. As a result, these adjustments could not be

confirmed by the audit team as representing reasonably incurred costs for which Metro is responsible. These adjustments all relate to the issue of attempting to quantify change order impact.

Metro paid \$800,000 to its West Point liquids stream contractor for change order impact. The audit team was unable to identify a rational technical or audited costs basis for the amount Metro paid. There was no evidence found to support that the negotiated amount of \$800,000 had any relevance to actual impact or costs incurred by the contractor. The amount, although negotiated, appears to be arbitrary, and the audit team questioned legal entitlement to a large portion of the amount paid.

Following this \$800,000 payment for change order impact, Metro employed the factor-formula approach to calculating additional change order impacts allegedly incurred on the West Point liquids stream contract. Metro paid an additional \$810,038 on the liquids stream contract in impact costs through the use of a negotiated factor-formula. The factor-formula is not a generally recognized or accepted construction industry approach to pricing change order impact. The factor-formula approach has also been employed at the Renton facility in an effort to price alleged change order and related impacts.

In addition to the change order impact payments described above, at West Point Metro also paid change order impact costs of \$250,000 and \$113,453 for the solids stream contract and the Administration Building contract, respectively. No basis for the \$250,000 paid by Metro for change order impact on the solids stream contract was identified. The \$113,453 paid for change order impact on the Administration Building contract appears to have been negotiated as part of a final change order package for this contract (Change Orders 5 and 6), wherein the total change order value was brought up exactly equal to the remaining contingency funding. No basis for the \$113,453 amount Metro paid was identified.

Thus, the dollar value impact of the pricing methods used by Metro is that \$2,050,249 in payments for change order impact could not be determined by the audit team to represent actually incurred costs for which Metro was responsible.

*The audit recommended* that the practice of using factor-formulas to price change order impact should be discontinued. Change order impact costs should be assessed and paid only on the basis of the industry-accepted approaches and/or through costs audits and technical analysis. To facilitate implementation of this recommendation, contractors on large, complex contracts should be required by their contracts to submit resource-loaded baseline (as-planned) schedules that can be fully supported by bid estimates.

Finding 5-A. Metro did not enforce or follow contract terms and conditions, or standard industry practices, for the negotiation and acceptance of West Point renovation work orders.

At West Point, Metro did not enforce or follow the renovation contract terms and conditions, or standard industry practices, for the negotiation and acceptance of renovation contract work orders. The audit team audited each renovation work order over \$1,000,000, which represents 22% of the value of all work orders.

The West Point renovation contract required that the contractor's cost proposals be based on estimated detailed direct costs. None of the audited work orders were supported with the complete and detailed direct cost proposals that were to have been submitted by the contractor. The work order files contained summary cost proposal information, but did not contain proposals showing the level of detail required by contract or by industry standards. These detailed proposals would have been necessary for Metro to fully understand the basis of the contractor's estimates and to enter into advantageous negotiations in areas of difference between the contractor's proposed prices and Metro's independent estimates.

The work order pricing and payments appear to have been based solely on the renovation contractor's summary price proposals. However, the renovation contractor's summary prices were materially higher than Metro's detailed estimates. The work order files did not contain justification for paying the contractor's summary price over Metro's estimated detailed price. As

a result, the audit team cannot support payment of \$773,196 over Metro's estimated costs as being fair and reasonable.

*The audit recommended* that a contractor's proposal should not be accepted as the basis for pricing a work order unless that proposal

- 1) conforms with the requirements of the contract, and
  - 2) contains sufficient detail for the basis of the proposal to be evaluated and understood.
- Before a work order is approved, a negotiation record should be prepared that fully reconciles the negotiated price with Metro's independent estimate.

Finding 5-B. The technical services director improperly delegated to the construction manager the authority to approve work order pricing.

Per Metro's own policies, authority to commit public funds of over \$1,000,000 must be reviewed and approved by, at a minimum, the Technical Services Director. However, at West Point, the Technical Services Director delegated authority to the Construction Manager to approve work orders, which did not allow for adequate review and approval of work orders and violated the segregation of procurement and construction administration duties principles.

The delegation of authority weakened the internal control structure by giving the Construction Manager full control of the entire work order definition, pricing, negotiation, and approval process, with inadequate control from outside the project. This delegation facilitated Metro's lack of compliance with contract pricing terms and allowed this lack of compliance to remain undetected.

*The audit recommended* that work order scope definition and negotiation should be segregated from work order approval. Review and approval of work orders should occur under the supervision of a Procurement Manager, who should not report to the same manager as construction and program management.

Finding 5-C. Metro's renovation contract inappropriately allowed the same mark-up rate on vendor equipment purchases as on construction work.

The renovation contract employed work orders to purchase equipment. Equipment purchasing was a planned part of the contract, but no specific pricing terms for such purchases were defined in the contract. The lack of separate pricing terms allowed the contractor to be reimbursed using the 12% mark-up rate used for overhead on construction performed by the contractor, rather than the more appropriate mark-up rate of 6%. A 6% mark-up rate was applied to subcontractors on the renovation contract; the same rate was equally applicable to vendors. The risk and overhead associated with purchasing equipment is typically less than the risk and overhead associated with construction work. Accordingly, the same mark-up rate should not have been used to price both equipment purchasing and construction work.

The impact of the higher mark-up is significant. For example, work order 6.31 was for the purchase of two pieces of equipment totaling \$1,805,032. The mark-up at 12% totals \$216,603. The difference between the 12% and 6% is \$108,302, which warrants adding separate mark-up pricing terms to construction contracts employing work orders for equipment purchases.

*The audit recommended* that work order contracts should specify a mark-up rate for the purchase of major equipment that is lower than the mark-up rate applied to construction activities.

Finding 6-A. At West Point, Metro paid mark-up rates above industry standards for certain construction support services received from its Architectural and Engineering (A&E) contractor.

Mark-ups paid by Metro on direct labor for construction were between 133% to 215% of direct labor costs. Given the conditions existing at West Point, industry standard mark-ups for these construction support services should have been between 90% to 120% of direct labor costs. Due to Metro's reimbursing the A&E contractor and its associated firms' mark-up rates between 133% to 215% versus industry standard rates of between 90% to 120%, Metro effectively spent

\$3 to \$4.5 million more than it would have, had Metro negotiated for appropriate industry mark-up rates.

*The audit recommended* that standard policies and contract terms should be developed addressing the appropriate use of design firms for construction management support services on large capital projects. Construction management support services should be procured using a competitive selection process, not a single-source process.

*The audit also recommended* that audit services and industry guidelines should be utilized to negotiate fair and reasonable mark-up rates for construction support services when a contractor's staff reside in a project owner's offices and are providing long-term project support.

*The audit further recommended* that a cost-benefit study to analyze the use of construction management firms for managing large capital projects should be considered. Hiring a construction management firm in a competitive environment would validate, via competitive procurement, the mark-up rates paid for construction support services.

Finding 6-B. Adequate cost data did not exist to effectively manage the Architectural and Engineering (a&e) contractor at West Point.

All services were provided under the original terms and conditions of the original \$4.5 million cost-reimbursement design contract. Throughout the life of the project, through amendments, the contract value increased to \$99 million. However, the terms and conditions of the original \$4.5 million contract did not provide for adequate cost reporting or invoicing for a \$99 million contract.

The A&E contractor's scope was not clearly defined. The importance of monitoring billed versus budgeted comparisons at the task level by cost element is further amplified when one takes into consideration the fact that Metro did not define the scope of services the A&E contractor was to perform. The A&E contractor proposed its own scope of services and budget.

By not requiring adequate cost reporting or invoicing, Metro was not in the position to determine whether it received the services defined in the original budget within the negotiated labor hours; at the negotiated labor rates; and within the negotiated direct cost budget. In addition, if cost saving opportunities were available, Metro would not know if these opportunities for savings were passed on to Metro or utilized by the A&E for services not originally defined or budgeted.

In addition, the A&E contractor made extensive manual invoice adjustments on a monthly basis in order to bill for vendor services provided but not yet recognized by the A&E contractor's invoicing system. This situation appears to have contributed to the need for Metro to pay the A&E a monthly fee to prepare adjusted invoices (a task which was performed by a subconsultant) which involved making manual invoice adjustments to include the aforementioned unrecognized costs in the monthly billing. Later these same costs were presumably manually subtracted following their entry into the formal accounting system. However, this subtraction was never verified by Metro. By allowing the A&E contractor to make extensive manual invoice adjustments, Metro made its task of accurately monitoring total actual costs on a month-to-month basis extremely difficult. Also, it made the invoices prone to arithmetical error.

*The audit recommended* that for large dollar cost-reimbursement contracts, contract provisions should be developed that require cost data to be prepared, monitored, evaluated and presented as "budgeted versus actual costs expended" for individual tasks in an element of cost format. Budgeted and actual cost data, when submitted in this format, enable an owner to evaluate and verify the types and quantities of services received as compared to those budgeted.

*The audit also recommended* that contractors should be required to use formal cost accounting systems for invoicing on large cost-reimbursement contracts. Contractor's should be required to invoice in accordance with their formal system without manual modifications.

Finding 6-C. Metro did not always provide a competitive bidding environment for the required construction support services.

Public policy and industry standards typically dictate that whenever possible goods and services be acquired in a competitive bidding environment. Metro utilized its A&E contractor's contract at West Point to obtain goods and services on a single-source basis and did not comply with Metro's procurement policies. Metro's A&E contractor subcontracted, on a single-source basis, with sixteen firms not named in the original contract for services worth \$4.5 million. Metro management appears to have by-passed Metro's procurement system in favor of providing single-source contracts to these firms. By the use of the A&E contract to procure preferred vendors, the goal of fair and open competition in public contracting was compromised, and a higher price may have been paid for the goods or services received. p> Metro permitted Kramer, Chin & Mayo (KCM) to provide design and construction support services through Metro's A&E contractor and also to provide associated construction services through the general contractor, Magnolia, for the West Point renovation contract. KCM employees worked with Metro's five member renovation contract selection committee throughout the planning, design, and construction phase of the overall West Point project. KCM also provided construction services to Metro through the renovation construction contractor. It could be argued that KCM's involvement with Metro through Metro's A&E contractor may have given KCM an unfair competitive advantage in obtaining insights to the selection committee's technical and management preferences when pricing work for services to be provided to the renovation construction contractor. Although KCM properly disclosed a potential conflict of interest to Metro per State statute, Metro did not facilitate the other required steps to avoid the conflict of interest.

*The audit recommended* that policies should be developed to facilitate adherence to State regulations concerning conflicts of interest when responding to inquiries by potential contractors. In addition, obvious conflicts of interests should be fully considered before awarding contracts.

*The audit also recommended* that policies should be developed to prohibit the use of negotiated contracts to procure unrelated goods and services that would normally be acquired through a competitive selection process.

Finding 7-A. Metro's policies and procedures for releasing retention did not provide adequate transaction authorization for releasing the liquids stream contract retention (for an insurance bond) prior to contract completion.

Metro released to the liquids stream contractor \$4,652,293 in retention for a \$4,000,000 retention bond prior to completion of the liquids stream contract. Construction management staff approved the release. Neither the Executive Director nor the Technical Services Director approved releasing the retention. Thus, the authorization level which released this retention was too low to ensure adequate protection of Metro's and the owner's interests.

Standard industry practice for the release of retention, as it should have been applied by Metro, would have included review and approval of such release by the Technical Services Director and by a procurement manager. The release put Metro at risk in terms of not being able to as easily recover payments from the contractor if improper payments are later discovered or if problems arise prior to completion of the work. The decision to accept that level of risk should not be made at any level other than executive management.

*The audit recommended* that detailed internal control procedures should be established for authorization relating to the release of retention on the basis of accepting insurance bonds. The procedure needs to ensure executive management approval of all early releases of retention. Retention should also only be released upon review and concurrence of a procurement manager separate from construction management.

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