# In-River Projects: More Systematic Focus Needed on Risk and Lessons Learned

**Chelsea Lei**
**Laina Poon**
**Chantal Stevens**

June 9, 2015

**Executive Summary**

The Water and Land Resources Division has matured its management of flood and restoration projects since 2012. However, gaps in risk management and lessons learned can lead to insufficient attention to schedule and budget. The impact of these gaps includes significant schedule delays that, in turn, can result in prolonged exposure to risk and missed opportunities to conduct in-river projects.

# King County Auditor's Office

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# In-River Projects: More Systematic Focus Needed on Risk and Lessons Learned

## Report Highlights
### June 9, 2015

**Why this Audit Is Important**

The Water and Land Resources Division (WLRD) was appropriated $160 million for flood management and ecological restoration for the 2015-2016 biennium. This audit examined the extent to which WLRD meets project management standards for alternative analysis, risk management, and lessons learned in alignment with county strategic priorities related to fiscal management, safety, and environmental sustainability.

**What We Found**

We found that project management in WLRD has matured since they implemented a Project Management Manual in 2012. Yet weaknesses in risk management and lessons learned processes remain and may have contributed to schedule delays of a year or more.

Project risks were not well identified or monitored, especially related to budget and schedule. WLRD conducts risk assessments in early project stages. However, as risks emerge and change over the life of projects, WLRD has not consistently monitored those risks or their impact on budget or schedule.

In addition, WLRD has not systematically reported performance on baseline schedule and budget versus actual. This diminishes focus on project outcomes and reduces accountability to decision-makers.

Finally, WLRD has not established necessary processes to consistently capture the full benefit of lessons learned practices. This increases the risk of repeating mistakes and lessens the likelihood of capitalizing on successes from project to project.

**What We Recommend**

We make recommendations to support achievement of county strategic goals that focus on comprehensive risk assessment and management, enhanced attention to schedule and budget, and ensuring that lessons learned are collected and incorporated into new projects.

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## Appendices

# 1. Risk Management

**Summary**

**Project management in the Water and Land Resources Division (WLRD) has matured since the implementation of the 2012 Project Management Manual. However, weaknesses in risk and lessons learned processes may have contributed to undesirable outcomes such as schedule delays of a year or more.** WLRD has focused its risk management activities at the beginning phases of projects and on technical risks without identifying potential impacts to budget and schedule. Closer attention to risks to budget and schedule could improve project performance and accountability. WLRD's post project review process has matured and continues to improve. However, projects across the division do not consistently employ standard procedures to collect lessons learned and do not have a process in place to make those lessons learned available to inform future projects. As a result, WLRD may be missing opportunities to reduce costs and improve services based on experience.

**Project risks not well identified or monitored, especially risks to budget and schedule**

**Although risks emerge and change over the life of projects, WLRD has not consistently monitored those risks.** In most projects we reviewed, teams assessed technical risks at the beginning of the project, but did not demonstrate an increasingly detailed understanding of risk as the project progressed. WLRD's 2012 project management guidance specifies that risks—and mitigation strategies—should be reassessed throughout the project to ensure that an evolving understanding of risks is reflected in project control activities and baseline scopes, schedules, and budgets. The 2012 Project Management Manual was developed to standardize project management practices at WLRD and has instituted tighter controls with decision points and oversight at key milestones. Those procedures have resulted in clear improvement in risk management practices in general, but few projects appeared to be monitoring risk as an ongoing part of project oversight as the manual directs.

**Recommendation 1**

The Water and Land Resources Division (WLRD) should ensure that project teams monitor risks as they evolve throughout the project, as specified in the WLRD Project Management Manual.

**WLRD project managers often did not translate technical risks into impact on budget or schedule**. WLRD expends significant effort to identify technical risks associated with river behavior, public safety, and construction so that its projects achieve their objectives. However, WLRD should also quantify potential impacts on budget and schedule for contingency planning as well as to provide transparency to management and stakeholders.

# 2. Performance Tracking

Although little data is available on project outcomes, we noted that four of the six projects that reported budget and schedule variances at project completion exceeded schedule estimates, often by one to two years.[1] A recent consultant report prepared for the King County Flood Control Zone District confirmed that WLRD's flood control projects often face serious delays against planned schedules and warned that the situation may become more acute in coming years as the pace of project implementation increases.[2]

**Recommendation 2**

The Water and Land Resources Division should quantify potential risks in terms of impact to schedule and budget as part of risk assessment and ongoing risk management.

**WLRD has not reliably tracked or reported project performance**

**Closer attention to and regular reporting on variance against budget and schedule estimates could improve project performance and accountability to decision-makers.** According to WLRD managers, prior to the 2012 Project Management Manual, they did not consistently establish baseline budget and schedule estimates or report project performance against the baselines. Projects initiated after 2012 have reported budget and schedule variance at project closeout, as directed by the manual. However, few projects have reached completion under the new process. Further, WLRD does not have a formal process for tracking budget and schedule variance prior to project completion.

For capital projects with budgets over $1 million, the county requires project managers to report variance from baseline estimates on a quarterly basis. The Office of Performance, Strategy and Budget tracks these projects using an online dashboard. Only three WLRD projects have reported performance data as of the fourth quarter 2014.

**Recommendation 3**

The Water and Land Resources Division should improve project performance and accountability by baselining all projects over $1 million, and tracking and reporting project budget and schedule variances on periodic internal communications and in the Performance, Strategy and Budget database.

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[1] The projects for which data were available generally adhered to budget baseline estimates. Although project costs typically increase as schedules are exceeded, due to the nature of WLRD's projects, budget overruns do not always accompany schedule delays because staff can be reassigned to work on other projects during delays.
[2] Review of Current Service Provider Model – Draft 9/17/2014 – Strategica

# 3. Lessons Learned

**A more robust lessons learned process could promote continuous improvement**

**No formal process exists to incorporate lessons learned into new projects.** The division does not have a formal process to make lessons learned available for future projects or new employees. According to WLRD managers, the most significant learning occurs at the specific project team and project manager level. They also note that sharing important information occurs with peers, across teams, units, and the division. Without an institutionalized lessons learned knowledge base and a consistently applied process to incorporate lessons learned into future projects, project managers risk stumbling over obstacles that past projects have already navigated, reducing the chances of achieving project success. Many agencies, both within and external to King County, use databases to ensure that lessons learned on one project are applied to subsequent efforts.[3]

**Recommendation 4**

The Water and Land Resources Division should standardize lessons learned processes and establish a lessons learned knowledge base that is accessible to relevant users.

**Recommendation 5**

When initiating new projects, the Water and Land Resources Division should incorporate review of lessons learned.

**While the King County Capital Project Management Workgroup advises that collecting lessons learned should be an iterative process, the WLRD Project Management Manual requires documentation of this step only at closeout.** Given that WLRD projects can spread over many years with possible changes in staffing, an iterative process that also collects lessons learned at the end of the preliminary and final design phases would provide more precise information related to the different phases and would minimize the risk of mistakes being repeating in future projects. The 2012 Project Management Manual mentions reviewing lessons learned at various stages in the project, but only requires documentation at the end of the project. A tracking log used throughout the life of the project would more effectively capture lessons learned.

**Recommendation 6**

The Water and Land Resources Division should align its 2012 Project Management Manual with county project management standards, directing teams to record lessons learned periodically throughout the project life.

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[3] A good example of a lessons learned database can be found in the [Washington Department of Transportation's Lessons Learned System](Washington Department of Transportation's Lessons Learned System)

**King County**

**Dow Constantine**
King County Executive
401 Fifth Avenue, Suite 800
Seattle, WA 98104-1818
**206-263-9600** Fax 206-296-0194
TTY Relay: 711
www.kingcounty.gov

KING COUNTY AUDITOR

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May 5, 2015

Kymber Waltmunson
King County Auditor
Room 1033
C O U R T H O U S E

Dear Ms. Waltmunson:

Thank you for the opportunity to review and comment on the proposed final report on the Water and Land Resources (WLR) Division's Riparian Project Management Audit. We are committed to ensuring that the Division meets project management standards for alternatives analysis, risk management and lessons learned in alignment with County strategic priorities related to fiscal management, safety, and environmental sustainability.

I want to first acknowledge my appreciation for your team's professionalism and collaborative approach in helping identify improvements for the Division's capital delivery process. We value the performance audit process as an integral component of continuous improvement and we believe that your thorough review and recommendations provide a good framework for improvements we can make in the areas of risk management, reporting and lessons learned.

We are proud of the achievements and significant improvements WLR Division has made in capital project management, particularly since the adoption of the WLR Division Project Management Manual in April 2012 coupled with its update at the end of last year. We appreciate your acknowledgement that WLR Division's capital project management has matured during the past three years, but we recognize there is more work to be done.

We concur with the findings contained in the report and will use these recommendations as guidance to further improve comprehensive risk assessment and management, enhanced attention to schedule and budget, and ensuring that lessons learned information is collected and incorporated into new projects. Please find the attached table with our response to each of the six recommendations and the timeline for their implementation.

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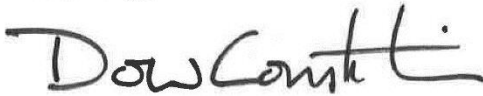*and complies with the Americans with Disabilitites Act*

Kymber Waltmunson
May 5, 2015
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Thank you for collaborating on this important work. If you have any questions regarding our audit response, please contact Mark Isaacson, Division Director of the Water and Land Resources Division in the Department of Natural Resources and Parks, at 206-477-4601.

Sincerely,

Dow Constantine
King County Executive

Enclosure

cc:    Fred Jarrett, Deputy County Executive, King County Executive Office (KCEO)
       Rhonda Berry, Chief of Operations, KCEO
       Dwight Dively, Director, Office of Performance, Strategy and Budget
       Christie True, Director, Department of Natural Resources and Parks (DNRP)
       Mark Isaacson, Division Director, Water and Land Resources Division, DNRP
       Ken Guy, Division Director, Finance and Business Operations Division, Department
          of Executive Services

| Recommendation | Agency Position | Schedule for Implementation | Comments |
|---|---|---|---|
| 1. The Water and Land Resources Division (WLRD) should ensure that project teams monitor risks as they evolve throughout the project, as specified in the WLRD Project Management Manual. | Concur | • WLRD capital project supervisors will review risk assessments with project managers at interim milestones of the project to ensure that risks are properly assessed and monitored, and that risk reduction strategies are employed on a timely basis.<br>• Target date for implementation is 3rd quarter 2015. | |
| 2. The Water and Land Resources Division should quantify potential risks in terms of impact to schedule and budget as part of risk assessment and ongoing risk management. | Concur | • WLRD will develop a methodology to quantify impacts to schedule and budget which could potentially result from risks identified during risk assessments.<br>• Target date for development of methodology is 4th quarter 2015.<br>• Target date for implementation is 1st quarter 2016. | |
| 3. The Water and Land Resources Division should improve project performance and accountability by baselining all projects over $1 million, and tracking and reporting project budget and schedule variances on periodic internal communications and in the Performance, Strategy and Budget database. | Concur | • WLRD will develop an internal communication protocol to report and review budget and schedule variances with Division management on a quarterly basis.<br>• Target date for development of methodology is 3rd quarter 2015.<br>• Target date for implementation is 4th quarter 2015. | WLRD currently baselines projects over $1 million and tracks and reports budget and schedule variances in the Performance, Strategy and Budget database. |
| 4. The Water and Land Resources Division should standardize lessons learned processes and establish a lessons learned knowledge base that is accessible to relevant users. | Concur | • WLRD will develop a more structured and standardized lesson learned process for CIP projects, and develop a database on which to store and organize information for use by other project teams.<br>• Target date for development of methodology and database is 4th quarter 2015.<br>• Target date for implementation is 1st quarter 2016. | |
| 5. When initiating new projects, the Water and Land Resources Division should incorporate review of lessons learned. | Concur | • WLRD will implement a requirement for new projects to review the database of lessons learned during project initiation.<br>• Target date for implementation coincides with implementation of Recommendation 4, which is 1st quarter 2016. | |
| 6. The Water and Land Resources Division should align its 2012 Project Management Manual with County project management standards, directing teams to record lessons learned periodically throughout the project life. | Concur | • WLRD will identify interim milestones when lessons learned will be conducted, in addition to the lessons learned performed at construction and closeout, as currently described in WLRD's Project Management Manual.<br>• Target date for development is 4th quarter 2015.<br>• Target date for implementation is 1st quarter 2016. | WLRD agrees that conducting interim lessons learned will be helpful for projects extending over multiple years. Our manual currently recommends this practice, in accordance with County project management standards and guidelines. |

# Statement of Compliance, Scope, Objective & Methodology

## Statement of Compliance with Government Auditing Standards

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.

## Scope of Work on Internal Controls

We assessed internal controls relevant to the audit objectives. This included review of selected policies, plans, processes, and reports. We did not rely on computer-generated data for this report.

## Scope

This audit focuses on capital projects with riparian and/or in-water components conducted from 2010 forward.

## Objectives

To what extent does the Water and Land Resource Division (WLRD) meet project management standards for alternatives analysis, risk management, and lessons learned?

## Methodology

The Auditor's Office developed a list of criteria and a scoring matrix based on project management best practices from the 2012 and 2014 WLRD Project Management Manual and the Project Management Body of Knowledge (PMBOK Guide). We selected 12 projects, six each from the Ecological Restoration and Engineering Services and the Flood and River Management Section of WLRD for review, with a first set based on recommendations from WLRD and additional projects chosen from a short list of projects that include:

- in-water or shoreline element (no wetlands, no projects not connected to river systems, no saltwater projects)
- cost higher than $50,000
- began after 2008
- completed at least one of the audit objective's elements (alternative analysis, risk management, lessons learned)
- had a range of management practices for each element from high to low
- managed by various project managers.

We requested alternative analysis, risk management, and lessons learned files for the 12 projects and scored the documents provided against the criteria in the scoring matrix. We analyzed the results in the scoring matrix. Additional or clarifying information was collected through interviews and email exchanges with WLRD managers.

# List of Recommendations & Implementation Schedule

**Recommendation 1:** The Water and Land Resources Division (WLRD) should ensure that project teams monitor risks as they evolve throughout the project, as specified in the WLRD Project Management Manual.

> **Implementation Date:** 3$^{rd}$ Quarter 2015
> **Estimate of Impact:** Monitoring risks allows project managers to proactively address issues, which may reduce impacts on budget and schedule and improve project performance

**Recommendation 2:** The Water and Land Resources Division should quantify potential risks in terms of impact to schedule and budget as part of risk assessment and ongoing risk management.

> **Implementation Date:** 1$^{st}$ Quarter 2016
> **Estimate of Impact:** Clearly communicating risks to schedule and budget increases transparency and informs decision-making.

**Recommendation 3:** The Water and Land Resources Division should improve project performance and accountability by baselining all projects over $1 million, and tracking and reporting project budget and schedule variances on periodic internal communications and in the Performance, Strategy and Budget database.

> **Implementation Date:** 4$^{th}$ Quarter 2015
> **Estimate of Impact:** Setting project baseline estimates and tracking and reporting performance provides accountability and opportunities to manage for improved results.

**Recommendation 4:** The Water and Land Resources Division should standardize lessons learned processes and establish a lessons learned knowledge base that is accessible to relevant users.

> **Implementation Date:** 1$^{st}$ Quarter 2016
> **Estimate of Impact:** A lessons learned knowledge base will preserve expertise over staff transitions and reduce the risk of costly mistakes being repeated.

**Recommendation 5:** When initiating new projects, the Water and Land Resources Division should incorporate review of lessons learned.

>**Implementation Date:** 1ˢᵗ Quarter 2016
>**Estimate of Impact:** Project performance may improve as a result of avoiding mistakes made on prior projects.

**Recommendation 6:** The Water and Land Resources Division should align its 2012 Project Management Manual with county project management standards, directing teams to record lessons learned periodically throughout the project life.

>**Implementation Date:** 1ˢᵗ Quarter 2016
>**Estimate of Impact:** Recording lessons learned at intervals throughout the project helps capture details of early project experiences that could be overlooked by the time the project concludes.