



KING COUNTY AUDITOR'S OFFICE

Transit IT: Improved Project Planning and Delivery Needed to Support Expanding Service



King County

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EXECUTIVE SUMMARY:

Metro Transit's information technology (IT) projects are essential for achieving its goals of improving and expanding service. Transit plans to spend around \$114 million on IT projects over the next five years. However, Transit generally completes IT projects three years later than planned, and it lacks practices that could help it deliver results. Greater focus on project management fundamentals could help Transit meet its ambitious goals to expand and improve service.

Transit IT: Improved Project Planning and Delivery Needed to Support Expanding Service

REPORT HIGHLIGHTS

What We Found

Transit's information technology (IT) projects are essential for improving and expanding services. Transit must make several improvements to ensure that IT projects are completed as promised. First, it lacks a sufficient process to use lessons learned to inform future projects and avoid repeating mistakes. Second, while generally completing projects three years later than estimated, it lacks a process to determine why projects are late and to use this information to inform future estimates. Third, it does not baseline project budgets, which is necessary to fully evaluate project performance and control costs. Finally, Transit has insufficient portfolio planning and management of its IT projects to ensure that funded projects address strategic priorities.

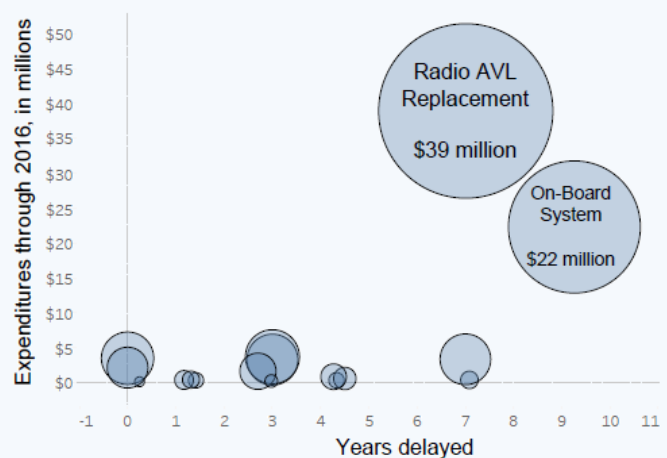
What We Recommend

We make 12 recommendations that support Transit's IT project and portfolio management. We recommend that Transit develop a lessons learned process to share information across projects and inform future planning. We also recommend that Transit improve its collection of schedule information and track project spending against a baseline budget to support current projects and enhance lessons learned data. Finally, we recommend that Transit build on the Strategic Technology Roadmap for Transit (STRT) work to better define and document its IT portfolio development process and the relationships and dependencies of projects within the portfolio.

Why This Audit Is Important

Metro Transit's IT project portfolio constitutes the largest portion of King County's overall IT investment budget for an individual department. Transit has spent over \$86 million on IT projects since 2001, and it is planning to spend an additional \$114 million by 2022. Transit's IT environment is complex, supporting operations of about 1,500 coaches with scheduling, fare collection, communications, and route coordination, along with regional contract services and partnerships like ORCA. Accordingly, Transit's IT projects are often interrelated and dependent on one another and external factors for success. This audit reviewed Transit's recent history of IT project development and implementation to identify weaknesses in project management and help support Transit's future IT work.

Transit IT Projects Generally Late



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Lessons Learned

SECTION SUMMARY

King County Metro Transit is not sufficiently using “lessons learned” to improve future projects. A formal “lessons learned” process is one of the most important project management practices. It reviews success and difficulties from earlier projects to inform current and new projects. Although Transit information technology (IT) project managers document some lessons learned as part of required project documentation, Transit does not have a process for reviewing and incorporating this knowledge into project management or future planning. As a result, Transit may be limiting its ability to anticipate and address potential project challenges before they happen.

Transit should use lessons learned to improve IT project performance

Transit is not using documented lessons learned from IT projects to improve project outcomes. The Project Review Board (PRB) is the county entity that oversees IT projects.¹ The PRB requires all IT project managers to submit a close out report at the end of each project. These reports include a lessons learned section explaining a project’s various successes and difficulties. Transit submits close out reports in accordance with PRB guidance, but Transit told us it does not use the reports to inform and influence current and future IT projects. Transit told us that while it does not have a formal process for collecting and using lessons learned, it has used information from past projects to change how some projects are managed. However, since project managers may forget lessons from the early project stages or may leave county employment before a project closes out, an ongoing lessons learned process throughout all project stages would provide more benefit to Transit. The underuse of the existing process is a missed opportunity to promote the recurrence of desirable outcomes and prevent the recurrence of undesirable ones.

Exhibit A illustrates the three essential steps in the lessons learned process. As noted above, Transit is following PRB guidance to fulfill the first step of the process. However, it has not taken ownership of the second and third steps of the process: to review and share the lessons learned information, and then to use that information to guide project management and planning.

¹ The PRB is chaired by the county’s chief information officer, who also heads the King County Department of Information Technology (KCIT). The PRB includes the budget director, assistant county executive, and director of the Department of Executive Services. The PRB reviews project status, plans, and progress and approves the release of funding so that projects can continue to completion. It advises on risks to project scope, schedule, and budget and provides assistance and support for successful project completions.

EXHIBIT A: Transit implements only one of the three key steps in a lessons learned process.



Source: King County Auditor's Office based on best practice literature.

In the absence of ongoing and accessible information about lessons learned, project managers run the risk of repeating mistakes made by their predecessors. Conversely, actively sharing and applying lessons learned increases the chances of achieving project success. The lessons learned should be documented and stored in a central location, such as a database, in order to be used by other project managers and Transit staff. According to best practices, organizations should collect, review, and use lessons learned throughout the project life cycle. Doing so on multi-year projects allows for greater use of this information on concurrent projects. It also reduces the risk of losing key information and perspectives.

Recommendation 1

Transit should standardize its lessons learned processes in alignment with best practices and create a lessons learned knowledge base that is accessible to relevant users, including project planners and management.

Recommendation 2

Transit should incorporate a formal review of lessons learned from relevant projects when initiating new information technology projects.

Scheduling and Delays

SECTION SUMMARY

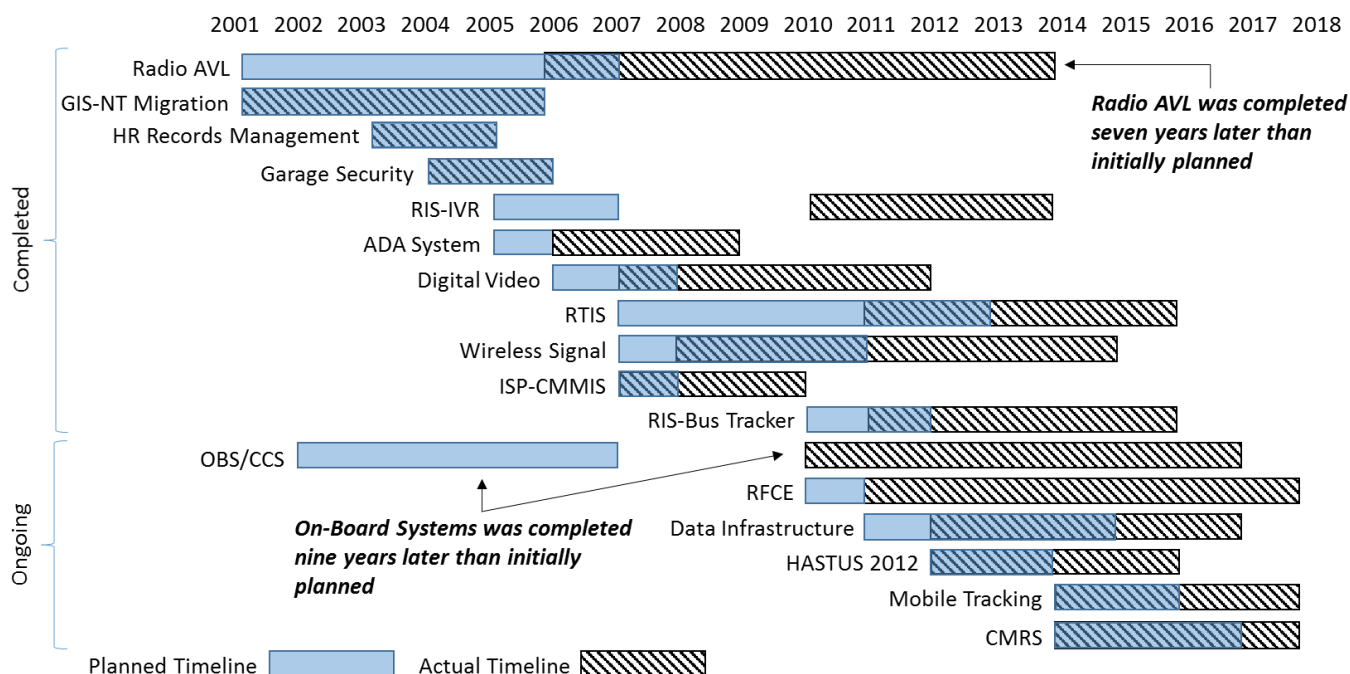
Transit IT projects are completed three years late on average, which can increase project cost. Projects often begin after their planned start date and take longer to complete than estimated. These delays result from a range of issues including poor estimation, vendor problems, and dependencies on other projects. Schedule delays can increase the cost of projects by using more resources. Delays can also increase risk to the county by relying on unsupported systems for more time.

Transit IT projects take significantly more time than planned

Past and present Transit IT projects have experienced significant schedule delays.

Seven of the 11 IT projects completed between 2002 and 2016 took significantly longer to complete than Transit originally estimated. We calculated the schedule delays in Exhibit B based on documentation from Transit and the PRB. The information was sometimes incomplete and contradictory, but it provides an overall view of project changes over time. The actual completion date for all projects was, on average, three years later than planned. Schedule delays are not limited to past projects: all six of the Transit IT projects that were nearing completion during our audit had significant schedule delays. On average, these six projects were completed four years late.

EXHIBIT B: Completed and ongoing projects commonly have delayed start and end dates.



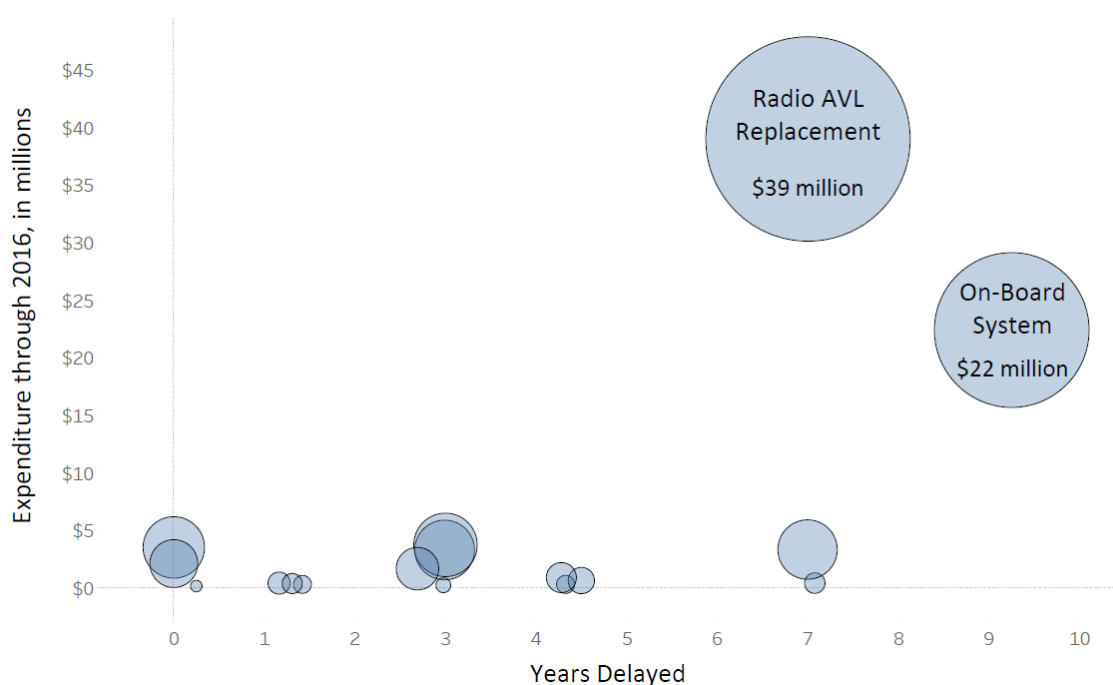
Source: King County Auditor's Office, based on Transit annual reports and project documentation.

Project durations, which take into account both the start and end dates, have been significantly longer than planned. For example, the Radio AVL project was planned to last for six years, but actually lasted eight years. On average, the 11 completed projects took a year and a half longer than planned, while the ongoing projects have taken an average of two and a half years longer than planned.

Complex, large-budget projects are more likely to have long delays. Two projects from the portfolio—Radio AVL Replacement and On-Board Systems/Communication—had the largest project budgets by a significant margin. As seen in Exhibit C, these projects were delivered seven and nine years late respectively, compared with the average of three and a half years.

EXHIBIT C:

The two projects with the largest budgets experienced some of the longest project delays.



Source: King County Auditor's Office, based on Transit annual reports and project documentation.

This raises concerns that the two large and high-profile projects in the 2017-2018 budget may also face significant delays. Transit estimates the ORCA Replacement project² will cost \$57 million over seven years, and the 4.9 Network Replacement project³ will cost \$28 million over seven years.

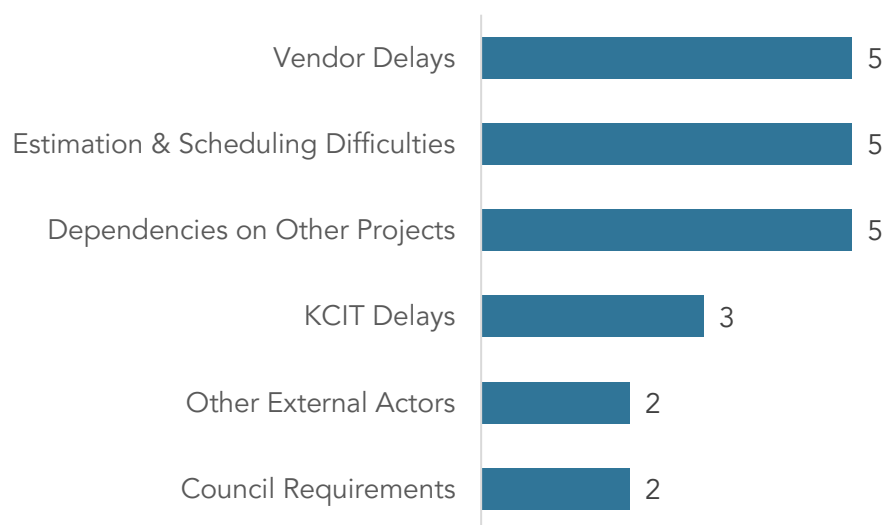
² The ORCA Replacement project will replace the existing smart card fare collection system.

³ The 4.9 Network Replacement project will replace the existing 4.9 GHz network, which provides data communications to support ORCA, on-board systems, signal priorities, and real-time information signs.

Both internal and external factors contributed to the project delays

Transit and other King County actors contributed to project delays. We interviewed project managers to determine the main causes of project delays. The managers cited poor scheduling, vendor difficulties, and dependencies on other projects as the most common causes for delays. They also mentioned delays caused by waiting for KCIT, other county departments, and the County Council. Poor scheduling and dependencies on other projects are both internal issues for Transit, while the other challenges involve communication and coordination with external groups. Exhibit D shows the number of projects that experienced these different causes.

EXHIBIT D: Vendor problems, poor estimation and scheduling, and dependencies on other projects were the most commonly cited causes of project delays.



Source: King County Auditor's Office

Transit does not systematically track or document the causes of project delays.

Transit does not consistently record delay causes in project documentation, so project managers relied on their memory to explain the causes shown in Exhibit D. Since they were discussing the projects retrospectively, the project managers could not always specify the timing of the problems and delays on their own projects. As a result, Transit cannot systematically identify when and why delays occur across all IT projects.

Recommendation 3

Transit should track and record the duration, project phase, and cause of delays for active and future projects in the lessons learned knowledge base.

Recommendation 4

Transit should use information in the lessons learned knowledge base to inform schedule estimates for future projects.

Schedule delays negatively affect benefits, risk, and cost

Schedule delays may either delay the anticipated benefits to the county or lengthen the time that the county relies on an at-risk system. Transit officials noted that some delayed projects still deliver benefits on time, since the delays occurred in the close-out period after implementation. Other project delays, however, have affected the timing of benefits and risk mitigation. For example, the Interactive Voice Response project replaced an outdated customer service system that was at risk of failure. The system's vendor had gone out of business and no longer provided maintenance support. Transit had no other contingency plans, so Transit relied on the old system for seven more years while the replacement Interactive Voice Response project faced delays. As a result, Transit was at risk for a system failure for seven years longer than intended. Another example is the ongoing Capital Management Reporting System (CMRS) project. Transit claimed that CMRS would increase the efficiency of Transit capital projects and prevent problems that have arisen in past projects. This financial and asset management tool is especially important now since Transit is significantly increasing its capital projects in the 2017-2018 biennium.⁴ Our office has already recommended that Transit complete the CMRS in early 2017 as committed, but Transit has delayed the end date to late 2018. This means that the earliest CMRS will be useful in budget development is for the 2019-2020 biennium, thus delaying the potential benefits of this project.

Incorrect scheduling increases project costs. IT project management research has found that incorrect estimates can lead to more overtime, increased schedule pressure, and staff turnover, which increase Transit's costs. Projects with schedule delays also use resources that could otherwise be devoted to other projects. These consequences can multiply quickly in Transit, because projects are often interdependent, so a delay in one project causes delays in others. As shown in Exhibit C, individual project managers reported that linkages delayed completion of a number of projects. These delays primarily related to the delays in Transit's two largest IT projects (Radio AVL Replacement and OBS/CCS). However, Transit staff could not estimate the actual costs of these delays.

⁴ Non-fleet capital expenditures will more than triple from the 2015-2016 biennium to the 2017-2018 biennium.



Establishing Baseline Budgets

SECTION SUMMARY

Transit lacks budget information to evaluate IT project performance and control costs. Transit spent at least \$86 million on 18 new IT projects since 2002. Transit tracks spending against appropriations, but it does not follow the best practice of setting project baseline budgets. Transit is also missing information that would help it create more accurate budget requests. Without baseline budget information, Transit is unable to find and correct project issues, increasing the risk of cost overruns and the wasteful use of taxpayer money. This concern increases given Transit's anticipated growth in IT project spending; Transit anticipates spending roughly \$114 million on current and future IT projects from 2017 through 2022.⁵

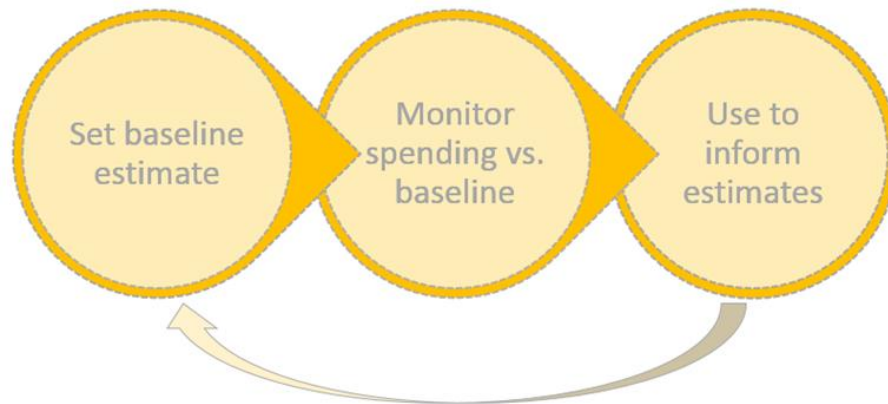
Baseline budget information is necessary to assess performance and improve estimates

Transit does not set baseline budgets for its IT projects. Baseline budgets are a best practice essential for assessing performance, controlling costs, and improving estimates. Without baseline budget information, Transit is missing a key tool for assessing performance, identifying financial issues, and controlling costs. It is also missing information that would improve future budget estimates and help Council and other entities provide effective oversight. Transit has a performance reporting structure in place that could incorporate baseline estimates, and oversight by the PRB and Council could benefit from access to this information. Transit told us that having a baseline budget would be useful but has not determined when the baselining should occur. According to an expert at KCIT, the optimal time to set an IT project baseline is after the project has completed its request for proposals.⁶ The three key steps for using baselines to improve estimates are illustrated in Exhibit E below.

⁵ Approximately \$83.5 million of the \$114 million (nearly $\frac{3}{4}$) is on two projects: ORCA Replacement (\$56.1 million) and the 4.9 Network replacement (\$27.4million).

⁶ At this stage, the project manager should have clarity about the scope of the project, and how much contracting services will cost. They should also have a clearer idea about the schedule of the project, which will also drive cost.

EXHIBIT E: Baselines can improve estimates and reduce risks of inaccurate budgeting.

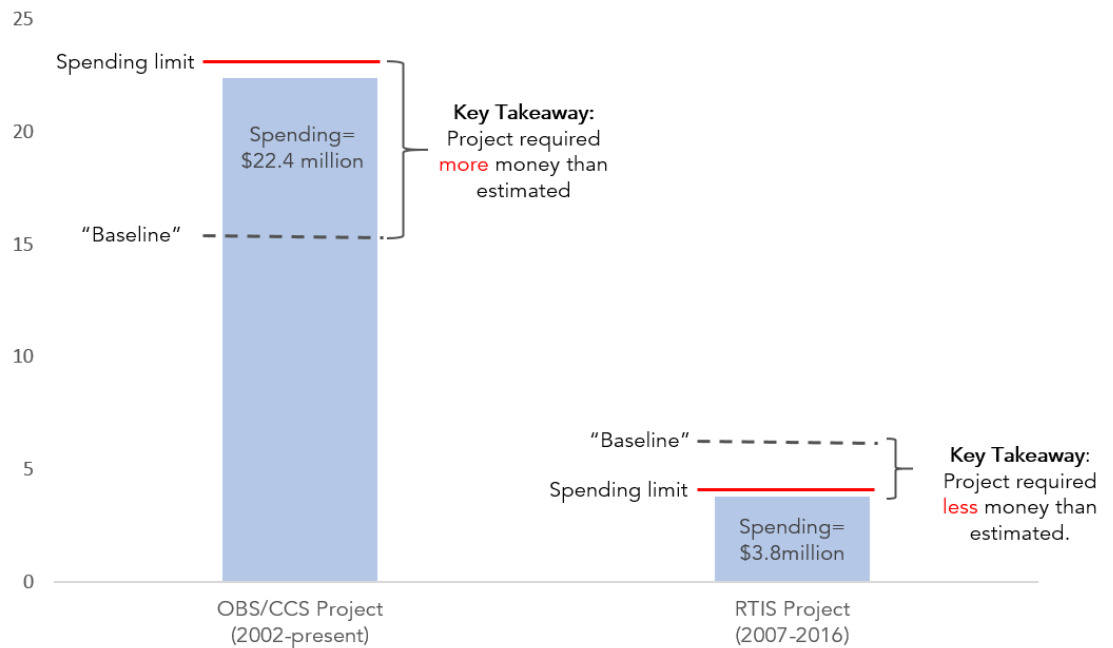


Source: King County Auditor's Office

As an example, Exhibit F below illustrates the type of information Transit could gain from having a baseline budget. Exhibit F shows the budget and actual spending from two recent IT projects, and utilizes the first known estimate as an approximate baseline.⁷ In the On-Board Systems/Communications Center System project (OBS/CCS), spending is much higher than an earlier estimate. In the other, Real Time Information Signs (RTIS), spending was significantly below the estimate. When management or others can see the variance between the actuals and a baseline, it informs questions about what is going right and what is going wrong on the project. Differences can highlight performance issues, improve estimating practices, and ultimately contribute to better project outcomes.

⁷ Since appropriations change over the life of a project, variance between final expenditures and these original estimates is not unusual. For these two examples, we used the earliest projected estimate as the baseline.

EXHIBIT F: Actual IT project spending can be above or below early estimates.



Note: "Baseline" is the first known estimate for each project. Spending limit is the amount in the most recent appropriated budget.

Source: King County Auditor's Office analysis of Transit financial data.

Setting a baseline can be challenging; a recent survey of IT professionals found that 40 percent of IT projects were over budget, and that bad estimates were partially to blame.⁸ Yet, once a baseline budgeting process is in place, it informs future estimates and leads to better outcomes. Improving IT project estimates is an iterative process, with lessons documented in a knowledge base that other teams can use to build their estimates.

Because Transit does not set baseline budgets, it does not have the information that could help it monitor projects and improve estimates. Transit may be over estimating project needs, tying up resources that could be used elsewhere, or under estimating them and promising more than can be delivered. Maintaining and using information about spending and estimating will help make sure that Transit is making accurate budget requests to Council and making reasonable projections about what it can carry out.

Recommendation 5

Transit should establish and record baseline budgets in documents accessible to the Performance Review Board and the County Council.

⁸ Nelson, R. Ryan and Michael G. Morris, "IT Project Estimation: Contemporary Practices and Management Guidelines," *MIS Quarterly Executive*, March 2014.

Recommendation 6

Transit should include the variance between baseline budgets and actual spending in its internal performance reports.

Recommendation 7

Transit should document reasons for variance between project expenditures and baseline budget estimates in the lessons learned knowledge base.

Recommendation 8

Transit should use information about variances to evaluate and improve the methods it uses to estimate information technology project budgets.



Portfolio Planning and Management

SECTION SUMMARY

Transit's current IT planning is inadequate to ensure that its IT projects support its future transit system goals. Transit is embarking on an ambitious plan to significantly expand service in the regional transit system, including 20 new RapidRide lines, greater frequency of service, and faster travel. These goals will require significant IT investments. For example, Transit plans to provide more mobile applications for its customers to provide real-time information about service. Simultaneously, Transit must maintain and improve the existing technologies that support current operations and anticipate future IT needs. Together, these demands create a complex IT environment with a growing number of interrelated IT projects. As noted in the previous section, Transit anticipates significantly increased IT spending through 2022—roughly \$27 million more over the next 5 years than over the previous 15 years.

Transit recently published a Strategic Technology Roadmap for Transit (STRT), but must do more to ensure its IT planning processes lead to IT projects that best support operational goals. Transit needs a formal process for identifying IT projects that is informed by its operational goals. It also needs to use standard criteria to assess potential IT projects, examining the extent to which proposed projects align with Transit's current IT systems and support Transit's operational goals. In addition, it needs to provide greater information about the interrelationships among IT projects. Without a more rigorous project development process, Transit runs the risk of wasting time and effort on IT projects that do not contribute to the future transit system and missing opportunities to use technology to further its goals.

The STRT does not directly link operational and technology goals

Transit's strategic roadmap helps show how current IT projects support technology goals, but not how those goals support operations. In the 2015-2016 budget, the Council required Transit to develop the STRT in response to the large number and size of IT projects Transit proposed. The STRT establishes five technology goals, along with objectives and strategies to meet those technology goals. It also categorizes Transit's current IT projects relative to those goals. For example, the STRT identifies the CMRS project as supporting the technology goals of "Ensuring Business Continuity" and "Delivering Initiatives that Promote a Quality Workplace." The STRT, however, does not show how current projects support the underlying objectives and strategies for the technology goals, nor how those goals relate to Transit's larger operational goals.

The Metro Connects Long-Range Plan includes a number of IT-related ideas. For example, it imagines an integrated fare payment system and improved customer engagement regarding travel options. To become a reality, these ideas will require a number of IT investments that Transit has yet to identify. Moreover, Transit will require a process that defines its operational needs, and then selects and prioritizes IT projects to

meet them. The STRT, however, does not specifically identify what IT investments are needed nor does it provide a process for Transit to identify technology gaps. As a result, it is difficult to see how Transit's current IT projects, and the technology goals themselves, support Transit's present and future operational needs.

Transit's strategic roadmap is missing key information about how current IT projects are related. The STRT includes a timeline of currently planned IT projects over the 2016-2021 period, along with the functional relationships among projects in major areas (fare collection, data analytics, and communication). However, the STRT does not link these IT project relationships with their estimated timelines. As a result, stakeholders cannot tell how, for example, one project's delay would affect another project, or how such a delay would impact the portfolio of IT projects as a whole. Although Transit has objected to integrated project schedules in the past because of their complexity, critical dependencies should be identified, documented, and reported within Transit and with stakeholders. More detail on the relationships among projects: information and resource needs, respective to anticipated schedules, would help inform stakeholders and Transit about project priorities and risks.

Recommendation 9

Transit should develop an ongoing process for identifying, assessing, and reporting interrelationships and dependencies across project schedules.

Transit is not fully considering how IT projects relate to one another in meeting operational goals. Transit currently selects IT projects after several layers of review, but it does not use documented selection criteria at any layer of review. Having documented outcomes resulting from application of selection criteria, is a best practice. According to experts, organizations should use defined processes to select projects and use documented criteria to rank investments relative to its larger goals. When considering new projects, the organization should assess the extent to which the project:

- fits within the organization's enterprise architecture (e.g., its business processes, systems, data, and technology)
- relates to other new or future IT projects
- contributes to operational needs
- contributes to strategic goals.

Best practices also say that the project selection processes should be transparent so stakeholders can see the alignment of the IT portfolio with the organization's goals. Conversely, low maturity organizations lack assurance that its IT portfolio is consistent with its larger operational needs and priorities. Because Transit is not formally using any criteria to select its projects, it runs the risk of investing in projects that contribute little to the organization, and ignoring projects that could further operational needs or strategic goals.

Recommendation 10

Transit should develop and document its process and criteria for selecting, advancing, and prioritizing information technology projects based on its strategic needs. The process should include Transit's ranking or prioritization of projects within the Transit information technology project portfolio.

Recommendation 11

Transit should define and document its enterprise architecture target state, and a process for evaluating and selecting projects to implement it.

Updating the
STRT will
inform
ongoing IT
investments

While a good start, the STRT is only a snapshot of the current IT planning environment and needs to be continuously updated. Given the complexity of its IT environment, Transit's technology needs are constantly changing. To be relevant, the STRT must be revisited and updated on an ongoing basis. Doing so will give Transit the opportunity to see if its current IT projects make sense relative to operational goals and to adjust investments accordingly. Transit indicates that it may update the STRT for each biennial business plan, beginning in 2017. Formalizing this requirement would offer a vehicle for strategic planning, consistent with best practice.

Recommendation 12

Transit should use the Strategic Technology Roadmap for Transit updates in 2017 and future biennia to document its framework for information technology project portfolio development and any changes to it.



Appendix 1

Budget Estimates and Expenditures for Transit IT Projects

TABLE 1: Summary of Completed, Current and Planned Projects, 2001-2022

	Number of Projects	Early Estimate	Current or Final Estimate	Total Expenditures (through 2016)
Completed Projects	13	\$36,556,944	\$66,251,515	\$50,623,565
Current Projects	12	82,278,473	138,940,913	35,623,064
Planned Projects	6	7,314,929	11,142,561	0
TOTAL	31	\$126,150,346	\$216,334,989	\$82,246,629

Note: All dollars in nominal dollars, not adjusted for inflation. Early estimates are based on multi-year projections made early in the project cycle, but in some cases record of an estimate was not available. For completed projects, the "Current or Final Estimate" is the final appropriated budget amount. For current and planned projects, the "Current or Final Estimate" includes the most recent appropriation and multi-year projections by the agency.

Source: King County Auditor's Office analysis of budget requests, project reports, and financial data.

TABLE 2: Completed IT Projects

Project Name	Project Years	Early Estimate	Final Estimate	Total Expenditures
Radio AVL Replacement (RAVL)	2001-2014	\$18,200,000	\$46,621,769	\$39,007,351
Information Systems Preservation & GIS to NT Migration ^a	2001-2006	3,306,729	5,663,760	3,524,974
Dwell Time Reduction	2010-2012	5,503,842	5,503,842	0 ^d
Real Time Information Signs (RTIS)	2007-2016	5,993,302	3,953,738	3,758,442
Base Parking Garage Security/Access Control	2003-2006	2,242,551	2,242,551	2,137,998
Digital Video Replacement	2006-2012	938,578	938,578	843,596
Rider Information Systems – Bus Tracker (RIS-Bus Tracker) ^b	2010-2016	*	*	157,798
Information Systems Preservation - CMMIS	2007-2010	*	495,000	457,216
Rider Information Systems – IVR (RIS-IVR) ^b	2005-2014	*	*	393,111
Wireless Transit Signal Priority	2007-2015	*	305,835	*
ADA System Enhancements	2005-2009	55,000	209,500	206,503
P&F Timekeeping ^b	2015-2017	191,942	191,942	12,284
Human Resources Records Management	2003-2005	125,000	125,000	124,292
TOTAL ^c		\$36,556,944	\$66,251,515	\$50,623,565

Note: All dollars in nominal dollars, not adjusted for inflation. Early estimates are based on multi-year projections made early in the project cycle, but in some cases record of an estimate was not available. The final estimate is the last appropriated budget amount.

^a Master project with multiple subprojects that could not be disaggregated.

^b Original appropriation was made as part of a master project.

^c Totals shown may be lower than what actual estimates or expenditures because some amounts are unknown.

^d This was a grant funded project that Transit determined to be unfeasible.

*County records are incomplete, so the number is unknown.

Source: King County Auditor's Office analysis of budget requests, project reports, and financial data.

TABLE 3: Current IT Projects

Project Name	Project Years	Early Estimate	Current Estimate	Total Expenditures
ORCA Replacement	2015-2022	\$29,864,000	\$57,127,918	\$944,742
Replacement of 4.9 Network and Mobile Access Routers	2014-2021	16,222,208	28,099,616	687,307
On-Board Systems/Communications Center System (OBS/CCS)	2002-2017	15,408,052	22,797,150	22,365,072
Regional Fare Coordination Enhancements (RFCE) ^a	2010-2018	3,554,303	4,701,561	3,296,224
Transit Data Infrastructure Replacement	2011-2017	4,927,996	4,439,140	3,322,375
Transit Signal Priority System Replacement Conceptual Design or Specification	2015-2019	578,313	6,197,118	313,550
Vehicle Telematics for Transit Coaches	2017-2018	3,428,817	3,428,817	0
Capital Management and Reporting System (CMRS)	2014-2018	600,000	3,120,460	376,882
HASTUS 2012 Upgrade	2012-2017	1,973,793	1,973,793	1,686,725
Customer Information Systems	2012-2019	5,153,657	5,149,252	2,220,898
Rider Information System – TABS Replacement ^a	2014-2016	345,090	1,435,088	109,934
Mobile Ticketing Pilot Project ^a	2014-2018	222,264	471,000	299,355
TOTAL		\$82,278,473	\$138,940,913	\$35,623,064

Note: All dollars in nominal dollars, not adjusted for inflation. Early estimates are based on multi-year projections made early in the project cycle. The "Current or Final Estimate" includes the most recent appropriation and multi-year projections by the agency.

^a Original appropriation was made as part of a master project.

Source: King County Auditor's Office analysis of budget requests, project reports, and financial data.

TABLE 4: Planned IT Projects

Project Name	Project Years	Early Estimate	Current Estimate	Total Expenditures
Safety & Security Systems	2017-2019	\$2,406,468	\$2,406,468	\$0
Transit Business Intelligence Resource Data (TBIRD)	2017-2019	2,390,132	6,000,976	0
Real-Time Improvements Project	2016-2019	1,157,274	1,309,722	0
On-Board Camera Management System	2017-2018	640,778	640,778	0
HASTUS Planning Module ^a	2016-2018	419,218	443,302	0
Vehicle Maintenance Dispatch Replacement ^b	2014-2018 ^c	341,315	341,315	0
TOTAL		\$7,314,929	\$11,142,561	\$0

Note: All dollars in nominal dollars, not adjusted for inflation. Early estimates are based on multi-year projections made early in the project cycle. The "Current or Final Estimate" includes the most recent appropriation and multi-year projections by the agency.

^a Amounts for preliminary planning and design only.

^b Original appropriation was made as part of a master project.

^c Project is currently on hold.

Source: King County Auditor's Office analysis of budget requests, project reports, and financial data.

Executive Response



King County

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KING COUNTY AUDITOR

MAY 04 2017

RECEIVED

May 4, 2017

Kymer 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 "Transit IT: Improved Project Planning and Delivery Needed to Support Expanding Service."

We concur with all the audit recommendations and appreciate the Auditor's cooperative work with Metro Transit Division and King County Information Technology (KCIT) department employees during the development of this report. Generally, the recommendations will help us improve not only some of the key processes associated with technology project budgeting and reporting, but also to support our efforts to move to portfolio management for our technology assets.

The audit recommendations come at a time when the Office of Performance, Strategy and Budget, KCIT and Council staff are in the middle of a process improvement effort for technology project budget development. Metro Transit staff along with staff from other County agencies are fully participating in this effort. Concepts, such as developing baseline budgets, are being reviewed as part of this effort. We anticipate that this effort will result in a stronger, more transparent process for budgeting and reporting technology projects.

Attached is our response to the audit recommendations. Our timelines for implementation are intended to align with the 2019-2020 budget development cycle as well as the timeline for Metro Transit's implementation of its Capital Management and Reporting System over the next few quarters.



*King County is an Equal Opportunity/Affirmative Action Employer
and complies with the Americans with Disabilities Act*

Kymber Waltmunson
May 4, 2017
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Thank you again for collaborating on this work. If you have any questions regarding our audit response, please contact Victor Obeso, Deputy General Manager, Metro Transit, at 206-477-5778.

Sincerely,


Dow Constantine
King County Executive

Enclosure

cc: Fred Jarrett, Senior Deputy Executive, King County Executive Office (KCEO)
Rhonda Berry, Deputy Executive for Operations, KCEO
Harold S. Taniguchi, Director, Department of Transportation (DOT)
Rob Gannon, General Manager, King County Metro, DOT
Victor Obeso, Deputy General Manager, King County Metro, DOT

Recommendation 1

Transit should standardize its lessons learned processes in alignment with best practices and create a lessons learned knowledge base that is accessible to relevant users, including project planners and management.

Agency Response

Concurrence	Concur
Implementation date	4Q 2017
Responsible agency	Transit
Comment	Transit will implement a knowledge base to capture lessons learned on technology projects. The database will be available for use by project managers and other staff by the end of fourth quarter 2017.

Recommendation 2

Transit should incorporate a formal review of lessons learned from relevant projects when initiating new information technology projects.

Agency Response

Concurrence	Concur
Implementation date	4Q 2017
Responsible agency	Transit
Comment	It is anticipated that HASTUS update project will be the first one to close and use the new lessons learned process. Lessons learned from the HASTUS project will be the first to be populated in the knowledge base and that will present the first opportunity for the Transit Technology Oversight Committee to review the process. Review by the Transit Technology Oversight Committee will include approval of new lessons learned business process steps as new projects are reviewed. In the long run the envisioned project prioritization process used to evaluate and select new projects will incorporate a review of lessons learned.

Recommendation 3

Transit should track and record the duration, project phase, and cause of delays for active and future projects in the lessons learned knowledge base.

Agency Response

Concurrence	Concur
Implementation date	3Q 2018
Responsible agency	Transit
Comment	The template for capturing lessons learned will be developed and used as projects are completed. The template will include consistent information on schedule delays. The template will support a business process that will identify significant project impacts (such as delays) which will trigger an analysis as to root cause. Maturation of this process requires use and it is not anticipated that Transit will have sufficient closed project activity until the later part of 2018 to review and refine the process.

Recommendation 4

Transit should use information in the lessons learned knowledge base to inform schedule estimates for future projects.

Agency Response

Concurrence	Concur
Implementation date	3Q 2018
Responsible agency	Transit
Comment	Lessons learned from projects will be applied to current, active and future projects as it is obtained and populated in the lessons learned database. Inclusion in the prioritization process will help to ensure that this occurs.

Recommendation 5

Transit should establish and record baseline budgets in documents accessible to the Performance Review Board and the County Council

Agency Response

Concurrence	Concur
Implementation date	1Q 2019
Responsible agency	Transit
Comment	Transit is participating in the IT project budget development process currently being conducted by KCIT and PSB. A standard baselining process is part of those discussions. While Transit has original project estimates available, they are not collected in a central place. Inclusion of a baselining step in the budget development process would help to ensure that Transit is collecting and reporting consistently with other agencies. The timeline for implementation reflects the fact that business process changes will be implemented as part of the 2019/2020 biennial budgeting process.

Recommendation 6

Transit should include the variance between baseline budgets and actual spending in its internal performance reports.

Agency Response

Concurrence	Concur
Implementation date	1Q 2019
Responsible agency	Transit
Comment	The Capital Management Reporting System (CMRS) along with the revised budget development processes will allow Transit to report actuals against the baseline budget. By early 2019, the CMRS system functionality will be in place and the development of the 2019/2020 budget will have provided the opportunity to implement a baseline budgeting process.

Recommendation 7

Transit should document reasons for variance between project expenditures and baseline budget estimates in the lessons learned knowledge base.

Agency Response

Concurrence	Concur
Implementation date	3Q2018
Responsible agency	Transit
Comment	The lessons learned template and database will include this information. The timeline reflects that full implementation will occur as projects are closed.

Recommendation 8

Transit should use information about variances to evaluate and improve the methods it uses to estimate information technology project budgets.

Agency Response

Concurrence	Concur
Implementation date	3Q 2018
Responsible agency	Transit
Comment	The information is available from closed projects will be used in the budget development process for new projects for the 2019/2020 budget cycle. Available information will grow as projects are completed and the knowledge base is updated.

Recommendation 9

Transit should develop an ongoing process for identifying, assessing, and reporting interrelationships and dependencies across project schedules.

Agency Response

Concurrence	Concur
Implementation date	1Q2019
Responsible agency	Transit
Comment	Implementation of this recommendation is dependent upon full implementation of the Capital Management Reporting system which will be available by the end of 2018. Incremental steps will be achieved as Transit implements the program areas as outlined in the initial Strategic Technology Roadmap for Transit and through the use of the Abacus system to capture application lifecycle information.

Recommendation 10

Transit should develop and document its process and criteria for selecting, advancing, and prioritizing information technology projects based on its strategic needs. The process should include Transit's ranking or prioritization of projects within the Transit information technology project portfolio.

Agency Response

Concurrence	Concur
Implementation date	3Q 2018
Responsible agency	Transit
Comment	A prioritization template is being developed for use in identifying and ranking projects. This tool will be used to rank projects for the 2019/2020 biennial budget process.

Recommendation 11

Transit should define and document its enterprise architecture target state, and a process for evaluating and selecting projects to implement it.

Agency Response

Concurrence	Concur
Implementation date	4Q2017
Responsible agency	Transit
Comment	By the end of 2017, Transit will define the 'to be' state for its enterprise architecture tool - Abacus. Abacus will include information for application lifecycle planning. The use of this tool needs to be differentiated from KCIT's role in establishing and maintaining Enterprise Architecture standards for King County.

Recommendation 12

Transit should use the Strategic Technology Roadmap for Transit updates in 2017 and future biennia to document its framework for information technology project portfolio development and any changes to it.

Agency Response

Concurrence	Concur
Implementation date	3Q 2018
Responsible agency	Transit
Comment	Following development of the prioritization tool, the implementation of the program areas identified in the current STRT, and the establishment of a prioritized investment list Transit will update the STRT.



Statement of Compliance, Scope, Objectives & 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 scope, schedule, and budget information for past King County Metro Transit information technologies (IT) projects, relative to the IT program's performance, as well as interviews with individual Transit IT project managers, Transit IT program managers, and King County IT (KCIT) staff. We also reviewed the processes and procedures for planning the Transit IT program relative to Metro Transit's goals and objectives. In performing our work, we identified areas of concern regarding the effectiveness of the financial and performance reporting information for Transit IT projects.

Scope and Objectives

This audit examined the performance of King County Metro Transit's management of IT projects over the past 15 years. Specifically, we reviewed the past performance of Transit's IT projects relative to scope, schedule, and budget, and what management processes affect the success of future IT projects. We examined how Transit evaluated and selected the current portfolio of IT projects as part of its strategic planning process, and how the development of its strategic technology roadmap compares with best practices. We also reviewed how Transit documents its experiences on IT projects and informs planning for future projects based on those experiences, so that it is ensuring the success of its IT investment portfolio.

Methodology

To meet the objectives above, we interviewed individual project managers from a range of Transit IT projects over the past 15 years. We also interviewed IT management leadership from Metro Transit and KCIT, as well as knowledgeable stakeholders. We reviewed project documentation for Transit IT projects from multiple King County project data sources, including INNOTAS and the SharePoint site of the KCIT Project Review Board. We also reviewed IT project management guidance and best practices regarding budget and schedule documentation, along with King County strategic plans and reports impacting Transit IT management: the Strategic Technology Roadmap for Transit, the KCIT Strategic Technology Plan, the King County Metro Strategic Plan, the Metro Long Range Transit Plan ("Metro Connects"), and the King County Metro "Current" Enterprise Architecture Assessment Report. In addition, we reviewed strategic IT governance and management guidance and organizational frameworks, including COBIT 5.



List of Recommendations & Implementation Schedule

Recommendation 1

Transit should standardize its lessons learned processes in alignment with best practices and create a lessons learned knowledge base that is accessible to relevant users, including project planners and management.

IMPLEMENTATION DATE: 4Q 2017

ESTIMATE OF IMPACT: Creation of a lessons learned knowledge base and implementation of improved lessons learned data gathering will allow Transit to identify specific areas for improving IT project management, in both current and future Transit IT projects. As a result, elements of success can be repeated and risks can be mitigated or avoided.

Recommendation 2

Transit should incorporate a formal review of lessons learned from relevant projects when initiating new information technology projects.

IMPLEMENTATION DATE: 4Q 2017

ESTIMATE OF IMPACT: Formal review of lessons learned will help anticipate potential challenges and opportunities when new projects begin, lowering project risk and increasing the chance that projects will be successful.

Recommendation 3

Transit should track and record the duration, project phase, and cause of delays for active and future projects in the lessons learned knowledge base.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Tracking and maintaining a record of schedule delays and causes will help Transit identify risks to completing projects on time and develop strategies to address them. As a result, schedule estimates will be more accurate and projects should be completed closer to their estimated schedules.

Recommendation 4

Transit should use information in the lessons learned knowledge base to inform schedule estimates for future projects.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Incorporating previous lessons learned into the schedule estimation process will improve the accuracy of schedule estimates, lowering project risk.

Recommendation 5

Transit should establish and record baseline budgets in documents accessible to the Performance Review Board and the County Council.

IMPLEMENTATION DATE: 1Q 2019

ESTIMATE OF IMPACT: Establishing baseline budgets will help inform managers and stakeholders regarding the budget status and management of ongoing projects, facilitating oversight, and improving estimates of needed resources.

Recommendation 6

Transit should include the variance between baseline budgets and actual spending in its internal performance reports.

IMPLEMENTATION DATE: 1Q 2019

ESTIMATE OF IMPACT: Including a comparison between anticipated and actual project spending will provide Transit management and other stakeholders a clear and objective measure to determine how well projects are performing, as well as how accurate the project estimates were relative to their baselines. With this information, Transit will be able to identify budget risks and address them in a timely manner.

Recommendation 7

Transit should document reasons for variance between project expenditures and baseline budget estimates in the lessons learned knowledge base.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Tracking and documenting the reasons for variances between project spending and baseline estimates in the lessons learned database will help inform Transit management and stakeholders of risks in current projects and improve the accuracy of future cost estimates, in turn facilitating realization of intended project benefits at lowest cost.

Recommendation 8

Transit should use information about variances to evaluate and improve the methods it uses to estimate information technology project budgets.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Formal review of cost variances from the lessons learned database will help improve the accuracy of future cost estimates, in turn facilitating realization of intended project benefits without incurring additional or unnecessary costs.

Recommendation 9

Transit should develop an ongoing process for identifying, assessing, and reporting interrelationships and dependencies across project schedules.

IMPLEMENTATION DATE: 1Q 2019

ESTIMATE OF IMPACT: Project interrelationships are a key risk area for Transit IT projects, as a delay on one project can potentially delay multiple other projects. Identifying and reporting the dependencies among projects will help inform Transit IT managers and stakeholders of critical areas of risk within projects and across the IT project portfolio, and anticipate risk management needs.

Recommendation 10

Transit should develop and document its process and criteria for selecting, advancing, and prioritizing information technology projects based on its strategic needs. The process should include Transit's ranking or prioritization of projects within the Transit information technology project portfolio.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Development of criteria and prioritization of projects will help make sure that Transit is investing IT dollars to best meet operational and policy goals.

Recommendation 11

Transit should define and document its enterprise architecture target state, and a process for evaluating and selecting projects to implement it.

IMPLEMENTATION DATE: 4Q 2017

ESTIMATE OF IMPACT: Defining the 'to be' enterprise architecture, and reviewing projects against it, will ensure that Transit IT projects, and the project portfolio, contribute to improved systems alignment and operational resilience.

Recommendation 12

Transit should use the Strategic Technology Roadmap for Transit updates in 2017 and future biennia to document its framework for information technology project portfolio development and any changes to it.

IMPLEMENTATION DATE: 3Q 2018

ESTIMATE OF IMPACT: Including updated elements in the project and portfolio development process will provide managers and stakeholders transparency regarding how IT investments best advance Transit's operational and strategic goals, making it more likely that selected IT projects fully contribute to those goals.



KING COUNTY AUDITOR'S OFFICE

Advancing performance and accountability

KYMBER WALTMUNSON, KING COUNTY AUDITOR

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