



INTERNAL AUDIT

**Capital Improvement Program –
Project Delivery
Follow-Up Audit**

Prepared by

**Michelle Tressler, CIA
City Auditor**

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Authorization

The City Auditor has conducted a Capital Improvement Program (CIP) – Project Delivery Follow-Up audit. This audit was conducted under the authority of Resolution #2013-51 and in accordance with the Annual Audit Plan approved by the League City, City Council.

Objective

This is a follow-up of the “Capital Improvement Program – Project Delivery” report issued on September 24, 2014.

The objective was to determine if previous audit recommendations were implemented.

The objective of the original audit was to determine if the process is as efficient and effective as it can be. The two sub-objectives are as follows:

- 1) Determine if general controls are sufficient and appropriate
- 2) Determine through sampling if there are any notable lapses in Project Delivery

Scope and Methodology

The City Auditor conducted this audit in accordance with Generally Accepted Government Auditing Standards except this audit function has not had an external peer review. Those standards require planning and performing the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for the findings and conclusions based on the audit objectives. The City Auditor believes that the evidence obtained provides a reasonable basis for the findings and conclusions based on the audit objectives.

In order to determine if previous recommendations were implemented, I:

- Inquired with Management
- Examined Documentation

To assess the reliability of the data elements needed to answer the engagement objective, I (1) Performed inquiries with management, (2) Reviewed related documentation. As a result of the testing, I determined that the data was sufficiently reliable for the purposes of this report.

Overall Conclusion

Fully Implemented	Partially Implemented	Not Implemented
0	3	0

Due to the loss of key personnel and new staff since the original audit was performed, few of the items from the original action plans were implemented. In order to address some of these personnel concerns and to gain some efficiencies, the City's Department of Public Works has recently undergone a reorganization.

The reorganization includes the following:

- The Engineering Department has been made part of the City's Department of Public Works.
- The "Director of Engineering" position has been eliminated.
- A "City Engineer" position has been added.
- The City's project/construction managers fall under the direction and control of the City Engineer.
- The City is in the process of hiring a City Engineer. Anticipate new hire starting in January 2017.
- City is in the process of hiring an additional project manager. Anticipate new hire starting in Spring of 2017.
- Project Coordinator position was combined with the Budget Manager redirecting some of the reporting responsibility.

In light of these occurrences, the purpose of this follow-up audit was altered to update the Management Responses and Action Plans to satisfy the current personnel and ensure that the improvements were achievable. An additional follow-up audit will be needed in FY2018 to determine that these updated recommendations were properly implemented.

Audit Follow-Up

The follow-up audit was not intended to be a detailed study of every relevant system, procedure, and transaction. Accordingly, the Follow-Up section presented in this report may not be all-inclusive of areas where improvement might be needed.

The following results for each finding are as follows:

Finding #1 – Project Delivery Manual – Sub-objective #1

Condition (The way it is)

The Project Delivery Manual does not address several important Project Management tasks. They are as follows:

- 1) Lessons Learned Section
- 2) No Past History Kept on Contractors
- 3) No Discussion on Risk Analysis
- 4) No Discussion on Project Manager Performance Measurements
- 5) No Discussion on Linking Cost and Schedule
- 6) No Discussion on Project Management Thresholds

Criteria (The way it should be)

Project Delivery Manual should be comprehensive enough to give proper guidance to the responsible parties.

Effect (So what?)

Continuous improvement in Project Delivery may be hampered which may increase the cost of the project and delay the project completion. This in turn may lead to public sensitivity risk. Projects may show increases in schedule and cost. Indirectly, additional planning and oversight may be required.

Cause (Difference between condition & criteria)

Compiling a Project Delivery Manual is a difficult task to get comprehensive enough the first time around.

Recommendation

Revise the Project Delivery Manual and implement the following sections:

- 1) Lessons Learned Section – Discussion during and after the project should note what went right with the project and what went wrong. This should be written to memorialize and mine the information for future reference. Documentation should include naming the issue, a brief description of problem or success, impact on the project and the process improvement recommendations. Consequences of not having a project review of lessons learned are the increased likelihood of repeating actions that might have caused:

- Project Failures
- Budget Overruns
- Scope Creep
- Reduced Quality from Expectations
- Missed Scheduled Deadline¹

This provides a means of continuous improvement for Project Delivery and facilitates Life Cycle Management for Capital Projects.

- 2) No Past History Kept on Contractors - This information can be helpful for future projects. This may be part of the Lessons Learned Section. A grading system for contractors could facilitate the process. Contractors are part of the city's third party risk and as such that risk must be managed and monitored. A helpful guide is the Federal Acquisition Regulation (FAR) Subpart 42.15 – Contractor Performance Information.
- 3) No Discussion on Risk Analysis – Risks can damage projects. Risks can increase costs by setting projects back. One of the levers the city must manage is risk in the contract.

Through inquiry it was found that discussion does take place regarding risk but no written documentation exists. The purpose of a risk analysis for capital construction projects is to determine the likelihood of mistakes and the magnitude of associated project costs and project delays.

The Project Delivery Manual mentions the use of Gantt Charts. While Gantt Charts are a useful and easy way to provide accountability to the scheduling function they do not provide information on the critical path of tasks for the project. The critical path can make or break the scheduling of a project. It should be part of the risk analysis. Risks should be mitigated before they happen.

- 4) No Discussion on Project Manager Performance Measures – Performance measures assist in the management of talent. The purpose of performance measurement is to help organizations understand how decision-making processes or practices have led to success or failure in the past and how that understanding can lead to future improvements. They are also a mechanism for accountability and a method to identify areas for improvements. Considerations can be given to the following Project Management Performance Measures:

- Schedule
 - Deviation from planned schedule (days)
 - Length of time to design

¹ From the article, "Importance of Lessons Learned in Project Management" by Dianne Davenport

- Number of milestone dates missed more than once
- Budget
 - Design cost as a percentage of budget
 - Construction as a percentage of overall cost
 - Construction engineering as a percentage of construction cost
 - Preliminary engineering as a percentage of overall project cost
 - Change order costs as a percentage of overall project cost
- Scope
 - Change in cost estimate at 30, 60, and 90 percent design
 - Percentage of established project objectives met at closeout (based on project manager review)
- Quality
 - Number of change orders caused by design errors
 - Results of citizen satisfaction survey²

You can't manage what you can't measure. It's like sailing a ship without a compass. The first step is to know what do your Project Manager's need to accomplish and how do the metrics support the business processes.

- 5) No Discussion on linking Budget and Schedule – There were no reporting requirements that were found for actual schedule versus budget schedule and relating it to actual cost vs. budget costs. See Exhibit C for explanation on how this can be accomplished.
- 6) No Discussion on Project Management Thresholds – Projects of different size ranges have different key characteristics. For example, a small project size may only expend a small amount of effort that being measured in work hours. This is opposed to a larger project which will take a large effort based on work hours. Likewise, the same holds true for the duration of the project and the ideal staffing. The role of the Project Manager can change from a small project (worker/coordinator) to (manager/leader) for large projects.

The bottom line is that resources must be dictated by the size of the project. If there is large project that you work as a medium project there is added risk. Or, having an aggressive due date for a large project creates added risk. Developing Project Thresholds require good mining of project history.

Different projects require different resources. Thresholds can be created for total cost of the project, total estimated time/effort in days (not calendar or continuous), or staffing requirements (current employees in place) vs. (cross-functional teams).

² From the City of Seattle report, "Capital Improvement Program Study of Seattle Transportation," September 6, 2001

The reporting requirements should also be taken into consideration depending on the size of the project. For example, a large project could use Earned Value Analysis while a smaller project could use a simple Gantt Chart.

Original Management Response

Generally agree ...

1. The development and use of the project manual is an evolution to incorporate what works, what is important from a historical perspective and what is useful in the active management of projects. The current version is a first generation completed in October of 2013.

Many of the schedule issues relate to preliminary project design/development such as: development of a consensus from the stake holders regarding scope and routing, approval of scope and routing, and processing through other agencies. In addition, changes in priorities, changes in staff, funding and acquisition of property also influence project schedules.

2. We keep history of contractors within each project file...it is not quantified but information is available regarding communications on how issues are addressed, change order negotiations and approvals, and schedule of the project. With the assistance of the Assistant to the City Manager a contractor/vendor report card is being developed that will make the information more readily available.
3. Agree
4. Project managers are reviewed as needed and formally at least annually. Documentation in the project manual/file will be improved to explain deviations in schedule and costs. In addition we meet weekly as a group to discuss projects, project schedules, obstacles, critical path items, measured risk, etc. in an effort to strategize collectively to push projects forward and minimize delay and risk.
5. Agree this should be improved. Currently the quarterly report reflects the adopted budget and a current budget. This has not been integrated into the project manual.
6. We agree that projects share some typical qualities...there is a contract/agreement; there is a procurement process, payment process, etc. Then there are unique characteristics that impact the level of detail and sophistication required to reasonably tract and monitors the project. Minor projects with short duration do not need the same level of detail. Each project needs to be evaluated at implementation and the appropriate levels of the Project Manual need to be used as the project moves forward. We will

continue to monitor the applications of the process and refine the manual as necessary based on type, size and duration of a particular project.

Original Action Plan

Work on a second generation of the project manual and get additional buy in from the project managers. Evaluate resourcing to make sure there are sufficient resources to address the steps and documentation necessary while keeping key projects moving forward. We need to move from reactive project management to proactive project management to better control schedule and costs. One of the critical areas is to more efficiently address right-of-way acquisition. This may require outsourcing some of this activity and moving acquisition through to eminent domain. We also need to improve our community outreach on the more challenging projects to better develop community consensus as we move these projects toward construction.

Development of a contractor/vendor report card will be completed by the end of September and used going forward.

Documentation within the project manual/file will be improved to document schedule changes/refinements and cost changes.

Starting with the first quarter of FY2015 we will include comparison of initial funding and schedule to current funding and schedule.

The Engineering Director will be tasked with the evaluation and development of additional performance indices related to project management, project schedule and project budget during his first year with a recommendation due the first quarter of FY2016.

We will continue to monitor and customize the project manual as necessary based on type, size and duration of a particular project.

Original Implementation Date

The director of Engineering Earl Smith is schedule to start September 22, 2014. Evaluation and update of the project manual is a key initiative for his first 6 months. With an anticipated update around **April 1, 2015**.

Development of a contractor/vendor report card will be completed by the **end of September** and used going forward.

Documentation within the project manual/file will be improved to better document schedule changes/refinements and cost changes.

Starting with the **first quarter of FY2015** we will include comparison of initial funding and schedule to current funding and schedule.

The Engineering Director will be tasked with the evaluation and development of additional performance indices related to project management, project schedule, and project budget during his first year with a recommendation due the **first quarter of FY2016**.

Revised Management Response

1. Project priorities limit the time spent on updating the project delivery manual. There appear to be more project priorities than resources to address them. To date, manual does not include a Lessons Learned Section, which would memorialize what went right and what went wrong with a project for future reference. To date, such discussions have occurred on an informal basis, typically at staff meetings, where experience and vigilance is shared for the group's present and future benefit. The project delivery manual needs to be updated and time committed to summarize post project findings.
2. Report cards to grade vendors, consultants, and contractors on service delivery have been developed, but not consistently used. Staff is currently completing report cards for all projects that reached substantial completion since January 1, 2014. This should be completed by the end of January 2017.
3. Although project risk analysis discussions have occurred, they have been informal in nature and not documented formally. Schedules, when provided, have not clearly identified risk factors (TxDOT requirements, consensus development, changing priorities, land acquisition, environmental issues, funding deficiencies, key decision points, etc.) associated with a project's critical path.
4. Although staff is evaluated annually in accordance with the City's procedures, uniformity of performance measures specific to project managers is absent.
5. Part of the initial engineering analysis is to take order of magnitude budgets and refine them prior to the 30% design threshold so we can most effectively utilize the funds on hand for projects that are ready to move from design to construction. We need to take the time post-construction and compile a formalized summary of budget and schedule. The information exists in the various 5-year CIP's, monthly reports, and projects, but is not captured in summary form and compared from year to year. It is a function of committing human resources to provide the summary reports.

The current practice is, as projects are brought forward they include a high level project schedule and budget based on the initial information of the project. Recent examples are Kansas Avenue, Annual Asphalt Paving, Calder Road Phase 2, Dickinson Avenue, and St. Christopher. Last week we completed an analysis of change orders during construction for projects

completed from 2013 through September of 2016. The results showed construction change orders were less than 1% for \$152 million of construction costs.

6. The revised project manual needs to address project management thresholds. Most of the human resources committed to projects are from 3rd party outside services in the form of professional services agreements. Internally, one of our goals is to keep projects moving forward by providing owner information.

In addition, we have added two additional project manager positions and an inspector to help with work flow.

Revised Action Plan

Management generally agrees with the above assessment and will over the course of the next 12 months modify and amend the project delivery manual to address the areas needing improvement and formal reporting upon project completion. This time frame will allow for the amendment of the manual, work with the staff transitions/new project managers, and to disseminate the information throughout the department. In addition, we will need to assign resources to provide a post project summary/report to document lessons learned and compare projected cost and schedule to actual cost and schedule. This can simply be added to project scope for our consultants.

Revised Implementation Date

January 5, 2018 for revised project delivery manual. Contractor/Professional Services reports cards are being completed for substantially complete projects through November 2016. In addition, new professional services agreements currently include a schedule and preliminary budget.

Finding #2 – CIP Spreadsheet – Sub-Objective #2

Condition (The way it is)

The CIP spreadsheet is not always kept up-to-date. Issues found are as follows:

- Two projects were not found on the spreadsheet.
- One project is set up electronically but no documents have been placed in the file
- One project did not have all relevant information placed in it

Criteria (The way it should be)

According to the Project Delivery Manual, “The Director of Engineering will be responsible for the development and maintenance of a spreadsheet that includes all CIP projects on it.....The PM is responsible keeping the Director of Engineering up to date and provides the proper information to the CIP spreadsheet to keep it up to date. The CIP spreadsheet will be updated monthly.”

Effect (So what?)

Project Delivery can be hampered if the decision makers do not have up to date statuses on the projects.

Cause (Difference between condition & criteria)

It does not appear that all parts of the Project Delivery Manual have been fully implemented. Inquiry revealed that no training was provided on the Project Delivery Manual.

Recommendation

To fully optimize the use of the Project Delivery Manual, briefings on the subject matter would be beneficial.

Original Management Response

Agree. The project manual is a first generation document and the team is working to integrate this tool in there project management process. It is time for a full review of the document to create a second generation document.

Original Action Plan

The project management team will work with the new Director of Engineering to create a second generation of the project manual. They will continue to integrate all of the manual elements into their daily work to improve overall project delivery, reporting and management.

Original Implementation Date

Create a second generation project manual/file system to improve overall project delivery, reporting and management by **April of 2015**.

Revised Management Response

Agree. The project manual is a first generation document and it is time for a full review of the document to create a second generation document.

Revised Action Plan

1. At all of our recent pre-con meetings, staff has informed the contractors/consultants/vendors that updated project schedules are required with each invoice submittal. Report cards for engineers/professional service providers and contractors shall be completed upon substantial completion of the project. As we refine the project delivery manual to include these components we'll seek to formalize their implementation within the next 12 months.
2. The CIP monthly report is currently being kept up-to-date on a monthly basis and provided to Council. The report currently includes key milestone dates.

Revised Implementation Date

January 5, 2018 for revised project delivery manual.

Finding #3 – Actual Time vs. Budget Time and Variance Analysis – Sub-Objective #2

Condition (The way it is)

Schedule is an important element of Project Delivery. Yet the sample indicated that only a couple projected Gantt Charts were present. No Gantt Chart was found comparing actual time to budget time. Consequently, no variance explanation for time delays was noted.

Criteria (The way it should be)

In the Project Delivery Manual it lists a requirement for Gantt Charts to be part of the Project Book. Gantt Charts are used to compare actual time vs. budget time

Effect (So what?)

Having a history of actual vs. budget times can be used for continuous improvement and for evaluation of the Project Manager. The lack of any variance explanations prevents a root cause analysis of project delivery failures.

Cause (Difference between condition & criteria)

Inquiry revealed that some in the department may not know how to construct a Gantt chart. No training was presented for the application of the Gantt chart.

Recommendation

Brief the department on the importance of scheduling (actual vs. budget) and determine if the Gantt chart is the best way to present such information.

Variance explanations could be part of the lessons learned.

Original Management Response

Agree. The development of an accurate schedule and budget is a priority regarding the delivery of Capital projects. Many of the schedule issues relate to project routing, development of a consensus from the stake holders regarding scope and routing, approval, processing through other agencies, changes in priorities, changes in staff, funding and acquisition of property. In most cases the use of a Gantt chart is an effective way to track the progress of the projects. In major projects with a critical delivery schedule the development of more comprehensive Gantt chart or critical path schedule is necessary to better monitor progress. Currently, many projects do not meet identified milestones for a variety of reasons listed above and we need to improve our ability to document those. In addition we meet weekly as a group to discuss projects, project schedules, obstacles, critical path items, measured risk, etc. in an effort to strategize collectively to push projects forward and minimize delay and risk.

Many times we are going from critical issue to critical issue based on the size and number of projects and do not completely document things that impact schedule and costs. It is clear we must improve.

Original Action Plan

1. Engineering will improve tracking of initial project milestones, costs and schedule and compare that with actual dates and final expenditures. This comparison will be included in the quarterly report.
2. With the hiring of the new Director of Engineering we will have him evaluate development of additional indices previously identified.
3. The CIP program is very ambitious and we need to get the Engineering Director to make sure we are properly resourced and that resources are properly assigned to meet the expectations of the Council, community, and management. Over the past few years we have had a CIP in excess of \$100 million and delivered approximately \$50 million of projects. This should be completed by April of 2015 to be included as a part of the budget development for fiscal year 2016.

Original Implementation Date

1. Starting with the **first quarter of FY2015** we will include comparison of initial funding and schedule to current funding and schedule.
2. The Engineering Director will be tasked with the evaluation and development of additional performance indices related to project schedule and budget during his first year with a recommendation due the **first quarter of FY2016**.
3. We will continue evaluating resources and make recommendations as a part of the budget development for fiscal year 2016.

Revised Management Response

Agree. The development of an accurate schedule and budget is a priority regarding the delivery of Capital projects.

We have added some additional resources. 1 new project manager in FY 2016, a new project manager in FY 2017, and reclassification of a traffic technician to construction inspector in FY 2017. Filling the positions has been difficult. It took 5 months in 2016 to fill the first position and we are still recruiting for the second position. Our director of engineering left in September of 2016 and we have hired the new City Engineer who's anticipated to start in January 2017.

In our newest professional services agreements, we include a project schedule and a preliminary cost estimate. We need to make time for the post-project comparison of costs and schedule.

Project score sheets will be completed for projects substantially complete between January 2014 and November 2016 by the end of January 2017.

Revised Action Plan

Over the course of the next 12 months, as a more formal objective methodology is developed in the Project Delivery Manual to compare planned vs. actual budgets and schedules, staff will effectuate that methodology and analyze the results

accordingly. As this process evolves the measures will be more insightful and useful leading to bigger and better lessons learned. It is and will remain an iterative process.

Revised Implementation Date

January 5, 2018