



INTERNAL AUDIT REPORT

Construction Audit of Fire Station #7-4: Phase 2

December 2019

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CONSTRUCTION AUDIT OF FIRE STATION 7-4: PHASE 2

CONCLUSION AND SUMMARY

The construction phase of Fire Station 7-4 experienced numerous issues that have contributed to this project not being delivered on time. Improvements will be required to ensure risks related to the execution of the City's construction activities are efficiently and effectively mitigated.

The construction of Fire Station 7-4 was awarded to one of the largest construction companies in Ontario. However, in the fall of 2018 it was widely reported that the general contractor was facing financial difficulties. In April 2019, the Ontario Superior Court granted the general contractor its application for protection from its creditors, and the surety¹ provided funds to allow the general contractor to complete existing projects. This resulted in significant delays in the construction of Fire Station 7-4, as work on the project halted until subcontractor liens were cleared.

Throughout the construction phase, Infrastructure Delivery did an admirable job in ensuring that the project progressed by keeping the lines of communications open with the contractor, validating that liens were being cleared and working with the consultant, contractor and surety to develop recovery plans. Under these circumstances, the City had the option of replacing the general contractor. However, this would have been extremely risky since construction was already well underway and may have led to even more delays. By opting to work with all parties involved, the project was able to overcome these difficulties and be completed with the existing general contractor.

Additionally, the construction phase was completed with a relatively small number of change orders. Change orders are frequently encountered in any construction project. The American Society for Engineering² estimates that increases in the contract value from 5 to 10% are expected in most construction projects. The construction change orders represented only 2.6% of the construction cost of the Fire Station 7-4. The largest change was ensuring that the Fire Station was fitted with the recently developed security hardware standard. Accommodating this change during the construction phase of the Project prevented the need for a more costly retrofit at a future date.

Although contractor issues created tremendous operational challenges for the project, it has also highlighted improvement opportunities to help mitigate future project related risk by ensuring that:

- A liquidated damages provision is included in all major construction contracts.
- Construction schedules and recovery schedules are realistic, complete and timely.
- Contractors provide acceptable expertise and resources.
- A formal project file quality review program is implemented.

¹ The surety provides the financial guarantee that the contractor will fulfill their obligations outlined in a contract agreement.

² American Society for Engineering Education: AC 2007-3039: CHANGE ORDERS IMPACT ON PROJECT COST; Engy Serag, San Diego State University, Amr Oloufa, University of Central Florida.

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Liquidated damages are defined as a pre-estimate of the probable loss that would be suffered from the late completion of a contract. In order to be enforceable, liquidated damages are meant as a fair representation of losses in situations where actual damages are difficult to determine. Liquidated damages establish some predictability and can act as a type of insurance against the cost of a breach. Although the Stipulated Price Contract with the contractor had a provision for liquidated damages, it had been zeroed out. As such, the City had no recourse for liquidated damages against the general contractor. Ensuring that the City's major construction contracts include a liquidated damages provision will help mitigate the risk of not completing a project on time and improve predictability involving costs.

As the project fell further behind the baseline schedule, getting a realistic, complete and timely project schedule/recovery plan from either the general contractor or the surety representative proved to be a challenge. Reliable scheduling can eliminate many risks that may come up during a construction project. The main goal of scheduling is to improve the allocation of materials and resources within a project. In that way, any potential delays can be avoided and better communication between all the different parties could be ensured.

The general contractor is responsible for ensuring that the project is appropriately staffed in order to deliver the project on budget and within scope. The general contractor's project managers play a key role as they oversee all aspects of the building process, manage subcontractors and employees, gather permits, are involved in risk management and scheduling, and managing relationships with key stakeholders.

We noted that the general contractor replaced their project manager on this project without appropriate notification to the City. Management should ensure that contractors formally notify the City of all key staff changes and provide the City with the qualifications of the individuals that they assign to a project. Management should diligently assess the change and provide formal approval of all key staff changes.

The financial difficulties faced by the contractor were amplified by the poor performance of some of its key subcontractors. Although the City requests a list of subcontractors, they are not qualified by the City. This resulted in additional delays once work was able to resume. Some of these subcontractors had been used in the construction of Fire Station 7-3 and had been difficult to work with on that project as well. As noted in the first phase of this audit, we recommended that management implement a vendor performance evaluation process to pro-actively evaluate and improve the performance of all suppliers, vendors and contractors that are sourced by the City. We would expand this recommendation to also consider vendor performance evaluation and pre-qualification of key subcontractors for major construction projects. Vendor performance evaluation and pre-qualification at the subcontractor level would help ensure that there is a reasonable prospect that all vendors selected for the project will have the demonstrated expertise, capitalization and resources to perform the final contract in a satisfactory manner.

Project management is the basis on which every construction project is founded. Ideally the City's Infrastructure Delivery project manager should lead the project for the duration, from the creation of the charter and up until closing phase is complete. However, there are times when the original project manager has to leave the project and a new person is assigned to manage and control the resources. While there may be differing needs or circumstances that must be met for each

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project, minimum documentation requirements are necessary and should be developed in order to establish an adequate method of record keeping. Further, a file quality review should form part of a continuous improvement program that helps ensure that project managers are complying to documentation requirements and projects are being managed in a uniform manner.

Internal Audit will follow up on the status of outstanding management action plans related to this audit and will report the status to the appropriate Committee.

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BACKGROUND

Capital projects are generally funded, planned and executed as individual, discrete projects. Four objectives which are common to every construction project are: scope, cost, schedule and quality. The primary focus of project management is to plan and execute a project in such a manner as to maximize the ability to meet those four primary project objectives.

The project team's and specifically the project manager's focus now shifts from planning the project efforts to participating in, observing, and analysing the work being done. Infrastructure Development's project managers are responsible for keeping the project moving according to plan. The goal is to manage the project so that it finishes on schedule and within budget, while still meeting building codes, plans, and specs.

Some of the reasons why construction projects do not meet their objectives is that they are often saddled with poor communication protocols and inadequate controls around scope change management. Project management plans, even for relatively small construction projects, should exhibit a level of detail greater than might be deemed appropriate for other types of projects of equivalent cost and duration.

In the construction phase of a project, the project plan is put into motion and the work of the project is performed on site. Progress is continuously monitored, and appropriate adjustments are made and recorded as variances from the original plan. The following chart outlines the project timelines for the construction of Fire Station 7-4:

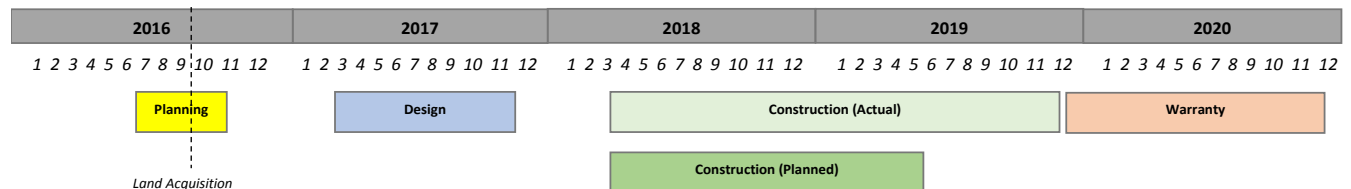


Figure 1 Designer Render and Actual Sept 2019

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OBJECTIVES AND SCOPE

The objective of the audit was to evaluate the effectiveness of construction management policies and procedures related to the fiscal, operational, and administrative controls over construction activities, including project scope, cost, schedule and quality.

Based on consultations with management, the construction of Fire Station #7-4 was selected for the audit. The single-story, LEED certified fire station is in Kleinburg and will include apparatus bays, ancillary offices and provide living quarters for the fire crew on shift. Construction of the fire station started in the spring of 2018, with a substantial performance date outlined in the contract of May 24, 2019.

Auditing a construction project from beginning to end can provide added assurance, identify problems as they arise, and help improve outcomes. Since the scope of the audit will encompass the complete lifecycle of the project, audit reports will be issued after the completion of the following project phases:

- Planning and Design, Bid and Procurement Phases (Phase 1). The Phase 1 report was presented at FA&A on June 6, 2018 and approved by Council on June 19, 2018.
- Construction Phase (Phase 2).
- Close Out Phase (Phase 3).

Phase 2 included a review of:

- Planning and Scheduling Management Process.
- Cost Management Process.
- Change Management Process.
- Liability and Insurance Provisions.

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DETAILED REPORT

1. *Ensure a Liquidated Damages Provision is included in all Major Construction Contracts*

Liquidated damages are a common element in Canadian construction contracts and serve as a useful risk allocation mechanism. Liquidated damages are defined as a pre-estimate of the probable loss that would be suffered from the late completion of a contract. In order to be enforceable, liquidated damages are meant as a fair representation of losses in situations where actual damages are difficult to determine. Organizations such as York Region have developed their liquidated damages provision in their contractual agreements to address this uncertainty and to increase the probability of enforceability of the provision.

There is a liquidated damages provision embedded in the City's standard construction contract template under the "KEY DETAILS" section. In reviewing the City's contract with the general contractor for Fire Station 7-4, we noted that there was a zero-dollar value agreed upon for liquidated damages.

Construction of Fire Station 7-4 commenced in the spring of 2018, with a substantial performance date outlined in the contract of May 24, 2019. Substantial performance was not achieved until November 28, 2019.

In the fall of 2018, it was widely reported that a dozen public-sector construction projects across Ontario, awarded to the same general contractor, were either months behind schedule or in limbo as the general contractor struggled to pay its subcontractors and complete projects. In April of 2019, the general contractor was granted court protection from its creditors as it faced more than 200 lawsuits and creditor claims³, while its surety provided funds to allow it to complete existing projects. This resulted in a work stoppage at the Fire Station 7-4 construction site until the surety provider could help clear the subcontractor liens and gain control of the project.

The delay faced by the project also resulted in construction taking place over the winter months, something that the City had initially considered but ultimately hoped to avoid. When first considering the construction of this facility, the architect on this project had advised against construction over the winter months because:

- There was increased risk of inclement weather, which may result in weather related delays. A general rule of thumb is that in winter one day a week will be lost due to weather conditions.
- Additional costs will be incurred due to required protective measures. For example, masonry work undertaken in temperatures below 4.4 degrees Celsius must provide conditions such as protected work areas and heated materials.
- Quality control of the work may suffer if cold weather measures are not properly implemented or are ineffective.

³ <https://www.theglobeandmail.com/business/industry-news/article-contractor-woes-stall-ontario-public-projects/>

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- Progress of the work will typically suffer from lack of productivity. A general rule of thumb is that productivity during winter months may be reduced by 30-40% in comparison to work undertaken under warmer conditions.

The absence of a liquidated damages provision in this contract has limited the leverage that the City may have had with the contractor and the City's ability to serve the community as initially intended. Deciding on damages at the outset gives both parties the opportunity to settle on an amount that they think is fair instead of potentially leaving this decision to the courts, if the City chose to take legal action.

Recommendations

We recommend that management, in consultation with the City Solicitor:

- Revisit the language of the existing liquidated damages provision to ensure that it is up to date and reflects the City's interests.
- Ensure that an appropriate value for liquidated damages is negotiated for all future major construction projects.

Management Action Plan

Management agrees with the audit recommendation.

The use of liquidated damages provisions within contracts is a practice that was regularly used on other types of projects within Infrastructure Delivery (such as roads, bridges, sewers and watermains). However, this practice is not widely used throughout the organization. Projects for new building construction and major renovations did not previously include liquidated damages provisions.

Following the procurement for the construction of Fire Station 7-4, all subsequent projects for new building construction and major renovations have included provisions for liquidated damages. The value of the liquidated damages is calculated to ensure that it represents the expected costs to the Corporation to continue oversight of the project beyond the completion date.

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2. *Ensure the Construction Schedule and Recovery Schedule are Realistic, Complete and Timely*

A construction project's schedule outlines each step that should be completed by a specific date before the next step can be taken. Not only does the schedule outline how quickly the work will get done, it also outlines how the work will get done. Further, the schedule helps in maximizing quality control measures by properly sequencing the work and enhancing coordination efforts between the City and construction operations.

Clause 3.5.1 in our contractor agreement states that:

“...the Contractor shall within 10 Working Days following the notice of award of the Contract, prepare and submit to the Owner and the Consultant for their review and acceptance, a construction schedule that indicates the timing of the activities of the Work and provides sufficient detail of the critical events and their inter-relationship to demonstrate that the Work will be performed in conformity with the Contract Time and in accordance with the Contract Documents....”

Section 3.5.2 goes on to state that:

“if, at any time, the Owner or the Consultant advise the Contractor that it appears that the actual progress of the Work is behind schedule or is likely to become behind schedule, or if the Contractor has given notice of such to the Owner or the Consultant pursuant to subparagraph 3.5.1.3, the Contractor shall take appropriate steps to cause the actual progress of the Work to conform to the schedule or minimize the resulting delay and shall produce and present to the Owner and the Consultant a recovery plan demonstrating how the Contractor will achieve the recovery of the schedule.”

As the project fell further behind the baseline schedule, getting a realistic, complete and timely project schedule/recovery plan from either the contractor or the surety representative proved to be a challenge. In some cases, schedules were provided with project tasks that were missing, had significant continuity issues and schedule conflicts. Internal Audit attended site meetings where new construction schedules were being delivered to the Infrastructure Delivery staff with dates of task completion that had already passed. In fact, dates and deadlines came and went seemingly without explanation.

The payment package already includes a copy of the Construction Schedule, but it may not reflect the current status of the project or recovery plan. As part of the documentation that substantiates the payment requested, the City should ask for the latest and most up-to-date project schedule. The provision of a mutually accepted construction schedule or recovery plan should be a prerequisite to receiving payment. This should not be an overwhelming effort on the part of the contractor, since they should be using a current, realistic and complete construction/recovery schedule to manage the project activity.

Reliable scheduling can eliminate many risks that may come up during a construction project. The main goal of scheduling is to improve the allocation of materials and resources within a

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project. In that way, any potential delays can be avoided and better communication between all the different parties could be ensured.

Recommendations

We recommend that management work with the office of the City Solicitor to review the existing wording of our contractor agreement to strengthen the link between the Certificate for Payment and an updated construction schedule/recovery plan. This will help ensure compliance to the provisions outlined in the contract.

Management Action Plan

Management agrees with the audit recommendation.

Discussion regarding schedules are a high priority, standing item at every project progress meeting during construction.

As indicated in the audit report, there is existing language within the contract regarding the submission of the Construction Schedule. Recent legislative changes in the Construction Act provide opportunity for a greater linkage between updates to the Construction Schedule and payment to the General Contractor. Changes will be required to Corporation's Supplemental General Conditions document to define these requirements that are currently being undertaken jointly with the office of the City Solicitor and Procurement Services.

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3. Contractors Must Provide Acceptable Expertise and Resources

The contractor is responsible for ensuring that the project is appropriately staffed in order to deliver the project on budget and within scope. The general contractor's project managers oversee all aspects of the building process, help manage subcontractors and employees, gather permits and managing relationships with key stakeholders.

Clause 3.5.1.2 in our contractor agreement states that the contractor will:

"...provide the expertise and resources, such resources including manpower and equipment, as are necessary to maintain progress under the accepted baseline construction schedule or any successor or revised schedule accepted by the Owner..."

The above clause is further clarified by the following statements:

3.14.2.1 "the personnel it assigns to the Project are appropriately experienced"

3.14.2.2 "it has a sufficient staff of qualified and competent personnel to replace any of its appointed representatives, subject to the Owner's approval, in the event of death, incapacity, removal or resignation."

In the fall of 2018, when the general contractor found itself in financial difficulty and struggled to pay its subcontractors and complete projects, the general contractor's project manager assigned to the Fire Station 7-4 project left the contractor's employment. He was replaced with a far less experienced project manager. The City was only informed of this change at the next site meeting. Management in Infrastructure Delivery did contact the general contractor after the site meeting to remind him of his obligation to inform the City of proposed changes to key personnel for the City's review and approval prior to making any personnel changes. However, it was apparent that the financial difficulties faced by the contractor limited the options available to the general contractor for this project.

The impact of having a less experienced project manager was felt throughout the construction phase of the project but was especially evident towards the end of the construction phase. The new project manager had difficulty in managing the subcontractors, confirming completion dates, updating construction schedules and he did not seem to have a good grasp of the project occupancy documentation requirements.

The financial difficulties faced by the general contractor were amplified by the poor performance of some of its key subcontractors. Although the City requests a list of subcontractors, they are not qualified by the City. This resulted in additional delays once work was able to resume.

A construction project manager has to obtain a variety of skills and competencies in order to navigate through the project and to establish a functional connection with the numerous teams. Construction projects have a continuous need for alterations and in that sense project management is key to the stability of the whole procedure. Ineffective construction project

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management increases the risk of a project not being completed: on time, within budget, and free of financial or legal complications.

Recommendations

We recommend that management:

- Ensure that contractors formally notify the City of all key staff changes, provide the City with the qualifications of the individuals that they assign to a project and ensure that the City assess the change and provide formal approval before the individuals are assigned to the project.
- Investigate the feasibility of conducting vendor performance evaluations and pre-qualification of key subcontractors for major construction projects.

Management Action Plan

Management agrees with the audit recommendation.

As indicated in the audit report, there is existing language within the contract regarding the General Contractor's responsibility to notify the City of any changes in personnel. Staff overseeing the construction of Fire Station 7-4 did assess and provided approval of any recommended changes in personnel by the General Contractor, however, given the financial difficulties that they faced, this resulted in a higher frequency of changes than is typically encountered. Discussion of potential personnel changes will be a standing item at regular project meetings held during construction.

A pilot program was completed in 2019 to assess the Vendor Performance Evaluation procedure to pro-actively evaluate and improve the performance of all suppliers, vendors and contractors that are sourced by the City.

The Vendor Performance Evaluations procedure (PP-14) and the Vendor Performance Evaluation reports for Consultants and Construction Contractors have been developed to support the Vendor Performance Evaluation program. These are being rolled out on a corporate wide basis early 2020. Procurement Services will work with key stakeholders at the City to assess the feasibility of expanding the program to sub-contractors. This will be done by Q2 2020.

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4. Implement a Formal Project Quality Review Program

Project management is the basis on which every construction project is founded. Ideally the City's Infrastructure Delivery project manager should lead the project for the duration, from the creation of the charter and up until closing phase is complete. However, there are times when this is not feasible, and a new person is assigned to manage the project. In this transition, schedules can potentially slip because of the learning curve the new project manager has to go through to catch up, especially when the project is well into the execution phase.

The construction of Fire Station 7-4 has had 3 different Infrastructure Delivery project managers assigned to it. Not all project managers work in the same way, and although all project documents should be on the departments shared drive, they were not always placed there. This was problematic as key documents like the Project Schedule were difficult for the new project manager to locate.

While there may be differing needs or circumstances that must be met for each project, compliance to the minimum documentation requirements are necessary in order to establish an adequate method of record keeping. These minimum requirements also help to establish a basic level of uniformity among all project managers. This can help to facilitate the review of records by others and promotes greater efficiency when staff is transferred or reassigned between different projects. When a clear method of record keeping is identified prior to the beginning of work, then original field notes and records can be easily prepared and maintained as the work progresses. This also helps to reduce the effort required to produce the final contract records upon completion of the project. In a claim situation, these records will assist in producing an effective claim submission and may be vital to its success.

We also noted that there is no formal project file quality review done at the end of the project, as part of a formal project quality assurance program⁴. A file quality review should form part of a continuous improvement program that helps ensure that project managers are complying to documentation requirements and projects are being managed in a uniform manner. When undertaken at the end of a project, it can provide valuable lessons for project teams working on future projects.

Recommendations

We recommend that management:

- Ensure compliance to the minimum project file documentation requirements.
- Implement a formal project file quality review program.

⁴ Quality assurance may be applied to any internal management activity that assesses the current quality of performance against accepted benchmarks/standards with the aim of improving performance. Quality assurance is based on the strong correlation found between good quality project processes in design and implementation and successful project outcomes.

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Management Action Plan

Management agrees with the audit recommendation.

As previously indicated in the Construction Audit of Fire Station 7-4: Phase 1 report, the Infrastructure Delivery department developed its own framework and procedures manual to ensure consistency in project file documentation requirements for all projects undertaken. This is captured within the Project Management Procedures Manual that was also subsequently updated as part of the Phase 1 recommendations.

Efforts to ensure compliance to the minimum project file documentation requirements and implement a formal project file quality review program are activities that must be routinely and consistently undertaken across the departments responsible for project delivery. These procedures will be developed and implemented within Infrastructure Development Portfolio.