

# An Analytical Framework for Project Loan Monitoring

**Tulsi P. Regmi, PhD, PQS, MCIOB and Christopher J. Willis, PhD, P.Eng., MCSCE**

George Brown College  
Toronto, Canada

Research shows that project loan monitoring is one of the essential services provided by professional quantity surveyors in the Canadian construction industry. Although the 2016 RICS Guidance Note on Canadian practices of project loan monitoring attempts to professionalize project loan monitoring services in Canada, it only covers general practices of project loan monitoring and is void of any analytical and quantitative procedures. Findings from this investigation indicated that quantitative analysis was one of the core tasks in the provision of project loan monitoring services to lender clients. As such, this paper's focus was to develop a remedial supplement to fill this information gap. Utilizing the detailed responses obtained from professional quantity surveyors practicing in Canadian construction, this paper developed a streamlined analytical framework for project loan monitoring in a case study format to facilitate preparation of lender's loan advance calculations for developer's progress draw requests. The analytical approach formulated in this paper is expected to be used as a supplemental resource to train construction management students to become competent project loan monitoring practitioners for the construction industry.

**Key Words:** Risk Management, Project Loan Monitoring, Project Loan Administration, Loan Advances, Project Monitor

## Introduction

Construction projects are exposed to a variety of risks and uncertainties (RICS, 2016; Kubba, 2016; Baxter et al., 2009; Whitehead, 2008; Hamm, 2007). The construction industry is complex, and lenders do not necessarily have the resources or expertise within their institutions to monitor all technical issues and performance requirements and/or to develop an informed view of associated cost issues (RICS, 2016). Professional project monitoring is, therefore, required to minimize lenders' risk. As projects become more complex in design and construction, and developers increasingly rely upon leveraging to finance their projects, the demand for project loan monitoring services increases (RICS, 2016). RICS (2016) defines project loan monitoring as a professional practice in construction required to minimize the lender's risk exposure in the administration of its loan for construction projects. In the Canadian construction sector, project loan monitoring services mitigate financial risks, protecting the interests of lenders by providing them with reliable, independently verified project information, and an objective examination of the key risk parameters and status updates on the project throughout the development process (RICS, 2016; Baxter et al., 2009). Project loan monitoring is one of the most crucial cost management services rendered by project monitoring professionals in Canada (CIQS, 2018).

When projects are financed, lending institutions also become involved in monitoring of projects' cost and schedule performance. This necessitates the services of a professional project monitor (RICS, 2016; Cuthbert, 2013; Baxter et al., 2009). In the Canadian construction industry, project loan monitoring and reporting services are typically provided by an independent construction cost management consultant for clients that may include financial institutions, governments, real estate investors and other organizations (RICS, 2016; Cuthbert, 2013). Complementary to the traditional project management functions, project loan monitoring and reporting functions are independently provided to lenders to ensure that their financial interests are protected. Trained in construction management, project loan monitors have in-depth knowledge of how construction projects are delivered and managed. They know about issues that can arise during the design and construction phases, about issues relating to handover of the works as phases of the construction work are finalized, and about the pitfalls lenders and developers face during the course of a construction project.

Construction projects are primarily financed by short-term construction loans that provide funds to cover the cost of development (Collier et al., 2007). Construction is a risky business, and any lender extending credit to finance construction encounters a multitude of risks, including credit, operational, and compliance risks (OCC, 2017;

Hamm, et al., 2015; Hamm, 2007). Lenders employ independent construction loan administrators to provide an efficient and effective means of risk management and project financial oversight (CREFC, 2015). Construction loans are inherently risky, and a professional construction loan administrator can provide a wealth of experience to manage and mitigate risks related to construction loans (RICS, 2016; CREFC, 2015; Berger, 2012; Hamm, 2007). These loan administrators provide the lender with the expertise and resources to manage construction lending risks related to contractual, budget, design and scheduling matters (Scales, 2008; Hamm, 2007). The project monitor assumes the role of a construction loan administrator for a construction project (CIQS, 2018; RICS, 2017; Baxter et al., 2009). The loan administrator's experience related to financial risk management is a critical, value-added expertise (RICS, 2017; CREFC, 2015; Hamm et al., 2015).

Lender risk can be minimized by monitoring and controlling disbursement of loan funds (Fuhr and Schlemlein, 2010; Hamm, 2007). The goal of project monitoring is that the lender will always have sufficient funds remaining to complete construction (RICS, 2016; Cuthbert, 2013; Fuhr and Schlemlein, 2010). Monitoring is more than requiring inspection reports and tracking draws (CREFC, 2018; Scales, 2015). Hamm (2007) outlines four steps of construction lending risk management: identifying construction-related risks; using a loan commitment letter and loan administration procedures; closing out the construction loan with permanent financing; and implementing timely progress reporting requirements. The construction loan administrator, acting on behalf of the lender, is responsible for monitoring the project budget, for performing progress monitoring and inspections, for tracking borrower's equity and contingency reserves, for calculating and certifying loan disbursements, for reviewing project documentation and for providing detailed client reporting (Kubba, 2016; Berger, 2012). Examiner's Guide (2018) describes that a lender that makes a construction loan for a development project needs an effective system to monitor the financial condition of the borrower and the progress of the project. Construction financing requires adherence to an accurate budget and timetable because deviations from the construction budget and schedule can result in extra cost and adversely impact the feasibility of the project (Examiner's Guide, 2018; OCC, 2018). A properly executed construction loan administration program must include specific procedures for tracking and monitoring construction phases and for loan disbursements (Examiner's Guide, 2018).

Project loan monitoring services facilitate the flow of project-related information to lenders by providing accurate, timely analysis and clear concise reporting (Kubba, 2016; Scales, 2008). RICS (2016) and Cuthbert (2013) state that these services usually entail a two-step process that starts with an initial project review prior to commencement on site, and subsequent monitoring and reporting throughout the construction period. Project monitors typically prepare their preliminary budget analysis and lender's progress draw analysis using multiple spreadsheets (RICS, 2016), and disburse the loan on a cost-to-complete basis (Examiner's Guide, 2018; Cuthbert, 2013). Examiner's Guide (2018) emphasizes that controlling disbursements on a project is key to successful construction loan administration.

In 2016, the Royal Institution of Chartered Surveyors (RICS) and the Canadian Institute of Quantity Surveyors (CIQS) jointly published the first edition of a guidance note for Canadian project loan monitoring practitioners. Although this project loan monitoring guidance note represents an attempt to professionalize project loan monitoring services in Canada, it outlines only general practices and is void of any analytical or quantitative procedures which would form the core task in providing project loan monitoring services. The secondary research undertaken in this study has established that there is a dearth of information in the literature in relation to construction project loan monitoring analytics.

Therefore, the aim of this paper is to develop a streamlined analytical framework to facilitate preparation of a quantitative analysis of project loan monitoring and to present a step-by-step guide in a case study format to calculate lender's progress draws. The specific objectives of this study are to (1) determine the scope of project loan monitoring services provided by professional quantity surveying firms in Canada, (2) analyze industry practices of project loan monitoring; and (3) develop a generalized analytical framework for project loan monitoring analytics as practiced in the Canadian construction industry. It is expected that the information provided in this paper will be used as a supplemental resource to train construction management students to become competent project loan monitoring practitioners for the construction industry.

## **Research Methodology**

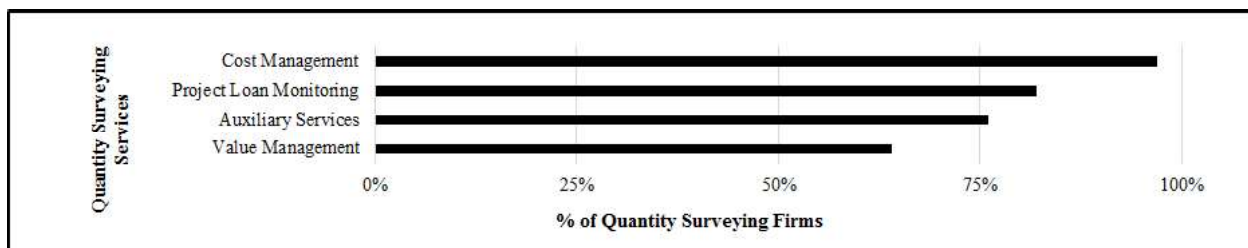
This investigation's data collection and analysis was done in three parts:

- 1) The first part of the investigation consisted of an in-depth evaluation of the extent of project loan monitoring services as provided by quantity surveying firms in Canada. This was done by mining the CIQS' public depository of all consulting firms and mapping their service offerings to the CIQS' four main service areas.
- 2) The second part of the investigation consisted of an in-depth questionnaire executed with project monitoring practitioners to rate the relative importance of core project loan monitoring tasks. A total of 38 valid responses were obtained. Analysis of Variance (ANOVA) was employed to test the core tasks' statistical significance.
- 3) The third part of this investigation was completed by developing an analytical framework for project loan monitoring as practiced in the Canadian construction industry. This was completed by means of extensive surveys and interviews with project loan monitoring practitioners in Canada. Five (5) practicing project monitors were interviewed to identify the core elements of project monitoring analytics and another 38 practitioners were surveyed to determine the core tasks required for an effective project loan monitoring program. Simulation runs were carried out to verify the validity of the analytical model.

## Results and Analysis

### *The Practice of Project Loan Monitoring*

The CIQS identifies four categories of quantity surveying services, namely cost management; project loan monitoring; value management; and auxiliary services (property condition assessment, reserve fund studies, etc.). Based on information provided on the CIQS website, there are 105 quantity surveying consulting firms registered with the CIQS providing a variety of services which are summarized in Figure 1. Figure 1 shows that project loan monitoring services are provided by 82% of all CIQS-registered consulting firms, indicating that project loan monitoring is an essential service area for quantity surveying firms. This also implies that Canadian construction management programs must train their students in this area of professional service.



*Figure 1: Summary of cost consulting services in Canada.*

The core task of the project monitor entails two distinct reviews - preliminary review and progress review – as described in Figure 2. In order to identify the primary tasks carried out by professional project loan monitors, an industry survey was executed. The aggregated results of this survey from 38 respondents are presented below. The industry practitioners identified and rated 15 core tasks for preliminary review and another 12 tasks for progress review.

As it can be seen from Figure 2, the top three core tasks identified by project loan monitoring practitioners as being essential to their everyday practice and rated at relative importance greater than 95% included development of project budgets (96%), loan advance margin (also known as lender's draw) calculations (96%) and verification of borrower's equity contribution (95%). These specific core tasks, which are essential parts of project loan monitoring analytics, were found to be statistically more significant ( $p < 0.1$ ) than other tasks carried out by a project loan monitor. This finding proves that construction management students aspiring to pursue a career in project monitoring must be trained in practical skills of project loan monitoring analytics.

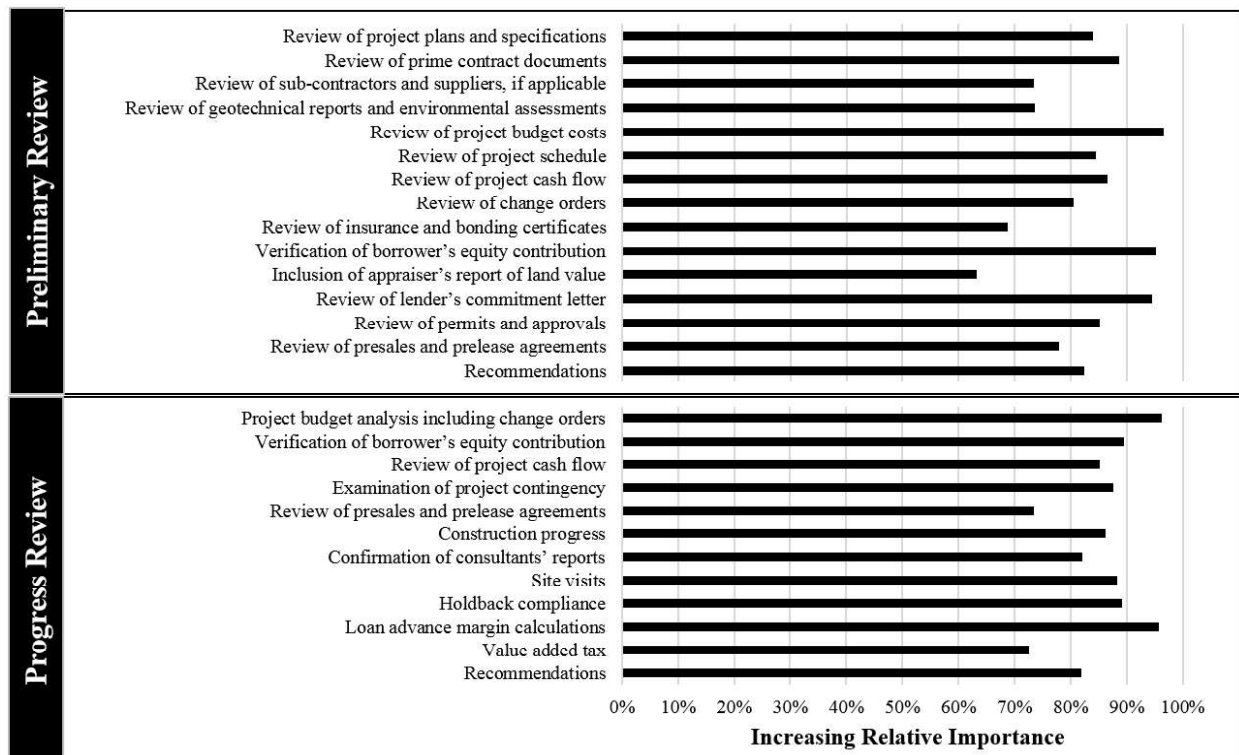


Figure 2: Scope of preliminary and progress reviews of project loan Monitoring.

### *Development of Analytical Framework for Project Loan Monitoring*

Results indicated that while the analytical approach employed by each practitioner interviewed for this research varied from one another, it was possible to develop a generalized analytical procedure by incorporating the fundamental principles of project loan monitoring analytics. To do this, the authors interviewed five professional project monitors and asked them to identify the core elements of project loan monitoring analytics. Based on this information, the authors formulated a framework for a generalized project monitoring model. The framework included an analytical procedure for developing project budget, construction cost summary, capital cost summary, cash flow analysis, advance margin calculations and the cost analysis. Based on the information obtained from the interviewees, it is proposed that the analytical procedure presented in Figure 3 be followed to establish the lender's progress draw advances using both the primary and secondary loan advance margin methods.

#### **Method 1 - Primary Loan Advance Margin**

$$\text{Advance } N = \text{Total Cost to Date} - \text{Holdback Retained} + \text{Holdback Released} - \text{Borrower's Equity} - \text{Previous Advances}$$

#### **Method 2 – Secondary Loan Advance Margin**

$$\text{Advance } N = \text{Construction Loan} - \text{Total Cost to Complete} - \text{Holdback Retained} + \text{Holdback Released} - \text{Previous Advances}$$

Figure 3: Proposed analytical procedure for calculation of lender's draws.

It should be noted that at each draw, the lender will always hold back enough funds to complete the project. This is called the cost-to-complete method of progress draws. Based on the discussion with practitioners, it was discovered that while contractors expect to be paid for the work they have completed, that is, on a cost of completed work basis, lenders pay out on a cost to complete basis, that is, there must at all times be sufficient funds left to be drawn down in the loan to complete the project. Therefore, it is proposed that loan advance margins be calculated using both methods to prevent over-advancing in the event where the cost-to-complete method produces a higher advance amount than the cost-to-date method. The lender always advances the lower of the two results from the primary and secondary advance margin methods.

### *Analytical Procedure for Project Loan Monitoring: The Case Study*

The proposed framework for project loan monitoring analytics utilizes multiple spreadsheets: Project Economics; Construction Cost Summary; Capital Cost Summary; Cash Flow Analysis; Loan Advance Calculations; and Cost Analysis. These constituent elements of project monitoring analytics are further analyzed in a case study format, and simulation of the analytical model is investigated for validation.

In this study, a generalized analytical framework was developed and presented in a case study format. The case study examined a 75,000 sf office building project constructed in Toronto, Canada. The project duration was 12 months. The borrower owned the site valued at \$2,500,000. The total development budget for the project was \$22,721,873. The project was financed through a construction loan calculated at 65% of the estimated market value of the project upon completion. A draw request was made in Month 1. The following section systematically develops an analytical project loan monitoring framework for Draw 1 for this case study.

#### *Project Economics*

In Project Economics, the project monitor summarizes the basis economic parameters of the project, including the gross floor area of the project for each use (parking garage, retail, commercial, residential, etc.), estimated market value and cost of development, estimated profit, Loan-to-Value (LTV) ratio, the borrower's equity, and the amount of construction loan facility. In this case, the project, upon completion, was projected to have an estimated market value of \$27,950,250 which results in a profit margin of 27% when compared to the total cost of development of \$22,051,758. As indicated in Table 1, the loan-to-value ratio for this development is 65% which translates to a construction loan of \$18,167,663. The borrower is responsible for the total equity of \$3,884,096.

Table 1  
*Project economics*

Project Economics			
	Amount	GFA	\$/sf
Land Cost	\$2,500,000	75,000 sf	\$33.33
Hard Costs	\$15,727,850	75,000 sf	\$209.70
Soft Costs	\$3,823,908	75,000 sf	\$50.99
<b>Total Project Costs</b>	<b>\$22,051,758</b>	<b>75,000 sf</b>	<b>\$294.02</b>
<b>Estimated Market Value</b>	<b>\$27,950,250</b>	<b>75,000 sf</b>	<b>\$372.67</b>
Gross Profit Margin	\$5,898,492	75,000 sf	\$78.65
Profit Margin	27%		
Funding Requirements		Sources of Funds	
Estimated Market Value	\$27,950,250	Construction Loan	\$18,167,663
Loan-to-Value Ratio	65%	Borrower's Equity	\$3,884,096
		<b>Total Sources of Funds</b>	<b>\$22,051,758</b>

#### *Construction Cost Summary*

A Construction Cost Summary details and summarizes all hard costs of construction, typically based on MasterFormat's trade divisions. The Construction Cost Summary also establishes the cost to date and cost to complete for construction hard costs as of the draw period in question.

Table 2  
*Construction cost summary*

Construction Cost Summary											
Description	Original Budget	Changes	Current Budget	Gross Cost to Date	% Completed	Previous Payment	Amount Due this Draw	Estimated Cost to Complete	% To Complete	Holdback Retained	Holdback Released
A	B	C	D=B+C	E	F=E/D	G	H=E-G	I=D-E	J=I/D	K=10%xE	L
<b>Construction Hard Costs</b>											
Division 01 - General Requirement	\$1,050,250	\$25,550	\$1,075,800	\$317,800	29.5%	\$0	\$317,800	\$758,000	70.5%	\$31,780	\$0
Division 02 - Site Construction	\$1,850,450	\$125,950	\$1,976,400	\$692,017	35.0%	\$0	\$692,017	\$1,284,383	65.0%	\$69,202	\$0
Division 03 - Concrete	\$5,525,250		\$5,525,250	\$0	0.0%	\$0	\$0	\$5,525,250	100.0%	\$0	\$0
Division 16 - Electrical	\$902,250		\$902,250	\$0	0.0%	\$0	\$0	\$902,250	100.0%	\$0	\$0
<b>Total - Construction Hard Costs</b>	<b>\$15,727,850</b>	<b>\$151,500</b>	<b>\$15,879,350</b>	<b>\$1,009,817</b>		<b>\$0</b>	<b>\$1,009,817</b>	<b>\$14,869,533</b>		<b>\$100,982</b>	<b>\$0</b>

As it can be seen in Table 2, the original cost budget for the project was \$15,727,850. However, with the total changes to date of \$151,500, the adjusted hard cost budget for the project was revised to \$15,879,350. For the reporting period of Draw 1, the site assessment indicated the completion rate of 29.5% and 35.0%, respectively, for General Conditions and Site Construction, resulting in the gross hard cost to date of \$1,009,817, with the total hard cost to complete of \$14,869,533. A holdback of 10% was retained from the hard costs incurred to date. The Construction Cost Summary spreadsheet includes detailed items of cost elements for each cost category. However, Table 2, in this paper, shows only the rolled up MasterFormat division sums for construction hard costs.

*Capital Cost Summary*

A Capital Cost Summary spreadsheet provides the total project costs and the amount to be funded. The total project costs include the construction hard cost totals, the land cost total, the soft cost totals, the contingencies and interest costs. The Capital Cost Summary also establishes the cost to date and cost to complete for soft costs as of the draw period in question. As it can be seen from Table 3, the soft costs totaled \$2,359,050, along with \$435,513 for loan interest and \$1,029,345 for project contingencies. When all components of project development costs were tallied up, the total for the project was calculated at \$22,051,758. The cost-to-complete for this draw period was estimated at \$17,318,875.

Table 3  
*Capital cost summary*

Capital Cost Summary										
Description	Original Budget	Changes	Current Budget	Gross Cost to Date	% Completed	Previous Payment	Amount Due this Draw	Est. Cost to Complete	% To Complete	
A	B	C	D=B+C	E	F=E/D	G	H=E-G	I=D-E	J=I-D	
<b>Land Costs</b>										
Land cost	\$2,500,000	\$0	\$2,500,000	\$2,500,000	100.00%	\$0	\$2,500,000	\$0	0.00%	
<b>Total - Land Costs</b>	<b>\$2,500,000</b>	<b>\$0</b>	<b>\$2,500,000</b>	<b>\$2,500,000</b>		<b>\$0</b>	<b>\$2,500,000</b>	<b>\$0</b>		
<b>Construction Hard Costs</b>										
Construction hard costs	\$15,727,850	\$151,500	\$15,879,350	\$1,009,817	6.36%	\$0	\$1,009,817	\$14,869,533	93.64%	
<b>Total - Construction Hard Costs</b>	<b>\$15,727,850</b>	<b>\$151,500</b>	<b>\$15,879,350</b>	<b>\$1,009,817</b>		<b>\$0</b>	<b>\$1,009,817</b>	<b>\$14,869,533</b>		
<b>Development Soft Costs</b>										
Design fees	\$525,950	\$0	\$525,950	\$450,950	85.74%	\$0	\$450,950	\$75,000	14.26%	
Development levies	\$750,450	\$25,395	\$775,845	\$750,595	96.75%	\$0	\$750,595	\$25,250	3.25%	
Misc. soft costs	\$75,500	\$0	\$75,500	\$6,292	8.33%	\$0	\$6,292	\$69,208	91.67%	
<b>Total - Development Soft Costs</b>	<b>\$2,359,050</b>	<b>\$25,395</b>	<b>\$2,384,445</b>	<b>\$1,399,962</b>	<b>58.71%</b>	<b>\$0</b>	<b>\$1,399,962</b>	<b>\$984,483</b>	<b>41.29%</b>	
<b>Total - Land, Hard Costs, Soft Costs</b>	<b>\$20,586,900</b>	<b>\$176,895</b>	<b>\$20,763,795</b>	<b>\$4,909,778</b>	<b>23.65%</b>	<b>\$0</b>	<b>\$4,909,778</b>	<b>\$15,854,017</b>	<b>76.35%</b>	
Interest Charges	6.50%	\$435,513	\$435,513	\$0	0.00%	\$0	\$0	\$435,513	100.00%	
Contingencies	5.00%	\$1,029,345	(\$176,895)	\$852,450	(\$176,895)	-20.75%	\$0	(\$176,895)	\$1,029,345	120.75%
<b>Total - Project Costs</b>	<b>\$22,051,758</b>	<b>\$0</b>	<b>\$22,051,758</b>	<b>\$4,732,883</b>	<b>21.46%</b>	<b>\$0</b>	<b>\$4,732,883</b>	<b>\$17,318,875</b>	<b>78.54%</b>	
<b>Funding Requirements</b>										
Less, Holdback Retained	(\$1,572,785)	(\$15,150)	(\$1,587,935)	(\$100,952)	0.00%	\$0	(\$100,952)	(\$1,486,983)	0.00%	
Add, Holdback Released	\$0	\$0	\$0	\$0	0.00%	\$0	\$0	\$0	0.00%	
Less, Borrower's Equity	(\$3,884,096)	\$0	(\$3,884,096)	(\$3,884,096)	100.00%	\$0	(\$3,884,096)	\$0	0.00%	
<b>Funding Requirement</b>	<b>\$16,594,878</b>	<b>(\$15,150)</b>	<b>\$16,579,728</b>	<b>\$747,806</b>		<b>\$0</b>	<b>\$747,806</b>	<b>\$15,831,921</b>		

*Cash Flow Analysis*

A Cash Flow Analysis spreadsheet provides the spread of anticipated cost expenditures for each month of the construction period as shown in Table 4.

Table 4  
*Cash flow analysis*

Cash Flow Analysis																				
Description	Original Budget	Changes	Current Budget	Month												Total	Budget	Variance		
				1	2	3	4	5	6	7	8	9	10	11	12					
<b>Land Costs</b>																				
Land cost	\$2,500,000	\$0	\$2,500,000	\$2,500,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,500,000	\$2,500,000	\$0	
<b>Total - Land Costs</b>	<b>\$2,500,000</b>	<b>\$0</b>	<b>\$2,500,000</b>	<b>\$2,500,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,500,000</b>	<b>\$2,500,000</b>	<b>\$0</b>	
<b>Construction Hard Costs</b>																				
Division 01 - General Requirements	\$1,050,250	\$25,550	\$1,075,800	\$317,800	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$75,250	\$5,500	\$1,075,800	\$1,075,800	\$0	
Division 02 - Site Construction	\$1,350,450	\$125,550	\$1,476,000	\$692,017	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$566,067	\$1,476,000	\$1,476,000	\$0	
Division 03 - Concrete	\$525,250	\$0	\$525,250				\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$1,249,950	\$525,250	\$525,250	\$0	
Division 16 - Electrical	\$902,250	\$0	\$902,250				\$50,450	\$50,450	\$133,558	\$133,558	\$133,558	\$133,558	\$133,558	\$133,558	\$133,558	\$133,558	\$902,250	\$902,250	\$0	
<b>Total - Construction Hard Costs</b>	<b>\$15,727,850</b>	<b>\$151,500</b>	<b>\$15,879,350</b>	<b>\$1,009,817</b>	<b>\$641,317</b>	<b>\$641,317</b>	<b>\$1,299,150</b>	<b>\$1,400,900</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$1,641,858</b>	<b>\$14,869,533</b>	<b>\$14,869,533</b>	<b>\$0</b>	
<b>Development Soft Costs</b>																				
Design fees	\$525,950	\$0	\$525,950	\$450,950	\$25,000	\$25,000											\$25,000	\$525,950	\$525,950	\$0
Development levies	\$750,450	\$25,395	\$775,845	\$750,595													\$25,250	\$775,845	\$775,845	\$0
Misc. soft costs	\$75,500	\$0	\$75,500	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$6,292	\$75,500	\$75,500	\$0	
<b>Total - Development Soft Costs</b>	<b>\$2,359,050</b>	<b>\$25,395</b>	<b>\$2,384,445</b>	<b>\$1,399,962</b>	<b>\$107,317</b>	<b>\$107,317</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$171,817</b>	<b>\$1,399,962</b>	<b>\$1,399,962</b>	<b>\$0</b>	
<b>Total - Land, Hard and Soft Costs</b>	<b>\$20,586,900</b>	<b>\$176,895</b>	<b>\$20,763,795</b>	<b>\$4,909,778</b>	<b>\$748,633</b>	<b>\$748,633</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$1,612,267</b>	<b>\$15,854,017</b>	<b>\$15,854,017</b>	<b>\$0</b>	
Interest Charges	6.50%	\$435,513	\$435,513	\$0	\$4,051	\$8,266	\$12,544	\$21,109	\$28,977	\$38,063	\$47,197	\$52,850	\$55,176	\$55,176	\$55,176	\$55,176	\$435,513	\$435,513	\$0	
Contingencies	5.00%	\$1,029,345	(\$176,895)	\$852,450	(\$176,895)	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$93,577	\$1,029,345	\$1,029,345	\$0	
<b>Total - Project Costs</b>	<b>\$22,051,758</b>	<b>\$0</b>	<b>\$22,051,758</b>	<b>\$4,732,883</b>	<b>\$846,661</b>	<b>\$846,661</b>	<b>\$1,736,388</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$1,892,702</b>	<b>\$17,318,875</b>	<b>\$17,318,875</b>	<b>\$0</b>	
<b>Funding Requirements</b>																				
Less, Holdback Retained	(\$1,572,785)	(\$15,150)	(\$1,587,935)	(\$100,952)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$84,152)	(\$1,486,983)	(\$1,486,983)	\$0	
Add, Holdback Released	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Less, Borrower's Equity	(\$3,884,096)	\$0	(\$3,884,096)	(\$3,884,096)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
<b>Funding Requirement</b>	<b>\$16,594,878</b>	<b>(\$15,150)</b>	<b>\$16,579,728</b>	<b>\$747,806</b>	<b>\$781,920</b>	<b>\$781,920</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$1,588,165</b>	<b>\$15,831,921</b>	<b>\$15,831,921</b>	<b>\$0</b>	
Cumulative Funding Requirement	\$16,594,878	(\$15,150)	\$16,579,728	\$747,806	\$1,529,735	\$1,529,735	\$3,896,975	\$5,349,535	\$7,026,928	\$8,715,356	\$10,413,523	\$12,121,688	\$13,840,843	\$15,571,998	\$17,318,875	\$19,089,040	\$16,579,728	\$16,579,728	\$0	

All costs are distributed in accordance with the projected times of expenditure. For each reporting period, the project monitor must update the cash flow projection to show the actual work completed to date and to accommodate the changes. The result of a project loan monitoring cash flow analysis is the projected funding requirement for each draw period. This will provide an overall picture of the funding requirements for each period which will allow both the lender and the borrower an ability to manage funds. In this case study, the cash flow analysis projected a funding requirement for Draw 1 at \$747,806, Draw 2 at \$1,529,735, and so on. Funds are typically drawn from the contingency allowance line item to offset any changes to the project budget during construction. As it can be observed in Table 4, the cost of changes to date in the amount of \$176,895 was drawn down from the contingency line item. The remaining contingency as of Draw 1 was \$852,450, down from \$1,029,345. The project monitor should critically assess the progress of the project to decide if the balance of contingency is adequate to complete the project.

### *Loan Advance Margin (Lender's Draw) Calculations*

A Loan Advance Margin Calculations spreadsheet shows detailed computation of loan advances for the reporting period. The project monitor calculates loan progress draws through advance margin calculations, making sure that the cost of change orders is drawn from the contingency line item. As seen in Table 5, both the primary and secondary loan advance margin methods produce an advance amount for Draw 1 of \$747,806. It is this amount that the project monitor will certify for Draw 1 in response to the borrower's payment application for this draw period.

Table 5  
*Loan Advance Margin Calculations*

Loan Advance Margin Calculations					
Source and Use of Funds		Method 1 - Primary Loan Advance Margin		Method 2 - Secondary Loan Advance Margin	
Construction Loan	\$18,167,663	Gross Cost to Date	\$4,732,883	Construction Loan	\$18,167,663
Borrower's Equity	\$3,884,096	Less, Holdback Retained	(\$100,982)	Less, Cost to Complete	(\$17,318,875)
		Add, Holdback Released	\$0	Less, Holdback Retained	(\$100,982)
		Less, Borrower's Equity	(\$3,884,096)	Add, Holdback Released	\$0
<b>Total Sources of Funds</b>	<b>\$22,051,758</b>	<b>Loan Ceiling</b>	<b>\$747,806</b>	<b>Loan Ceiling</b>	<b>\$747,806</b>
<b>Total Project Costs</b>	<b>\$22,051,758</b>	Less, Previous Advances	\$0	Less, Previous Advances	\$0
<b>Surplus/Shortfall</b>	<b>\$0</b>	<b>Current Advance</b>	<b>\$747,806</b>	<b>Current Advance</b>	<b>\$747,806</b>

### *Cost Analysis*

A Cost Analysis spreadsheet lists budgeted cost breakdown by construction hard costs, soft costs, cost of land, and contingencies, expressed in actual amounts and per unit of measurement. This analysis facilitates calculation of key performance parameters for comparison to similar projects, and it is also useful for preparing budgets for future developments. As shown in Table 6, the land cost for the project was \$33.33 per square foot of the gross floor area of the building. The hard costs and soft costs were \$211.72 and \$31.79 per sf, respectively. The total cost of development for the project is \$293.60 per sf.

Table 6  
*Cost analysis*

Cost Analysis						
Description	Original Budget	Original Budget per sf	Changes	Current Budget	Cost per sf	Variance
A	B	C=B/GFA	D	E=B+D	F=E/GFA	G=B-E
<b>Land Costs</b>						
Land Cost	\$2,500,000	\$33.33	\$0	\$2,500,000	\$33.33	\$0
<b>Total - Land Costs</b>	<b>\$2,500,000</b>	<b>\$33.33</b>	<b>\$0</b>	<b>\$2,500,000</b>	<b>\$33.33</b>	<b>\$0</b>
<b>Construction Hard Costs</b>						
Construction Hard Costs	\$15,727,850	\$209.70	\$151,500	\$15,879,350	\$211.72	(\$151,500)
<b>Total - Construction Hard Costs</b>	<b>\$15,727,850</b>	<b>\$209.70</b>	<b>\$151,500</b>	<b>\$15,879,350</b>	<b>\$211.72</b>	<b>(\$151,500)</b>
<b>Development Soft Costs</b>						
Development Soft Costs	\$2,359,050	\$31.45	\$25,395	\$2,384,445	\$31.79	(\$25,395)
<b>Total - Development Soft Costs</b>	<b>\$2,359,050</b>	<b>\$31.45</b>	<b>\$25,395</b>	<b>\$2,384,445</b>	<b>\$31.79</b>	<b>(\$25,395)</b>
<b>Total - Land, Hard Costs, Soft Costs</b>	<b>\$20,586,900</b>	<b>\$274.49</b>	<b>\$176,895</b>	<b>\$20,763,795</b>	<b>\$277</b>	<b>(\$176,895)</b>
Interest Charges	\$435,513	\$5.81	\$0	\$435,513	\$5.81	\$0
Contingencies	\$1,029,345	\$13.72	(\$176,895)	\$852,450	\$11.37	\$176,895
<b>Total - Project Costs</b>	<b>\$22,051,758</b>	<b>\$294.02</b>	<b>\$0</b>	<b>\$22,051,758</b>	<b>\$294.02</b>	<b>\$0</b>

### *Validation of the Project Loan Monitoring Analytical Model*

The project loan monitoring model developed in this study was tested under various cost-to-complete simulations. The simulation results indicate that the analytical model is capable of producing discriminating outcomes based upon different input scenarios. This means that this analytical procedure is capable of preventing inadvertent over advancement of funds by the project monitor during loan administration.

## Conclusions, Recommendation and Future Research

The following are the conclusions drawn from this study:

1. Results indicate that project loan monitoring is one of the essential services provided by professional quantity surveyors in the Canadian construction industry.
2. Findings indicate that the quantitative analysis of project loan monitoring is one of the core tasks in the provision of project loan monitoring services to lender clients. Development of project budgets, advance margin calculations and verification of borrower's equity contribution have been found to be the most important project loan monitoring tasks.
3. A generalized analytical framework has been developed to permit a quantitative analysis of project loan monitoring and presented in a case study format. Results from model simulation appear to produce the outcomes required to prevent over-disbursement of borrowed funds.

It is expected that the analytical framework developed in this study will serve as a supplemental resource for training construction management students as well quantity surveying professionals in project loan monitoring practices. Given the prevalence of project loan monitoring services used in Canadian construction, it is recommended that project monitoring be included as a curricular discipline in construction management programs. There is also a need for further investigation to determine what percentage of graduates from construction management programs end up pursuing a career in project monitoring and to determine how best to support their learning.

## References

- Baxter, D., Hamilton, S.W., and Ulinder, D.D. (2009). *Real Estate Finance in a Canadian Context*. Vancouver: UBC Real Estate Division.
- Berger, S. (2012, January). A New Model for Commercial Construction Loan Administration. *Mortgage Banking*, Vol. 72(4).
- CIQS. (2018, September). *Project Loan Monitoring*. Canadian Institute of Quantity Surveying. [WWW Document]. URL <http://www.ciqs.org/english/available-services>
- Collier, N.S., Collier, C.A., and Halperin, D.A. (2017). *Construction Funding: The Process of Real Estate Development, Appraisal, and Finance*. John Wiley & Sons
- CREFC. (2018, September). *Risk Management and Loan Administration for the Next Generation of Commercial Construction Lenders*. [WWW Document]. URL <https://crefc.wordpress.com/2015/10/16/risk-management-and-loan-administration-for-the-next-generation-of-commercial-construction-lenders/>
- Cuthbert, J. (2013). *Smart Economics in the Development of Real Estate*. Toronto: The Canadian Institute of Quantity Surveyors.
- Examiner's Guide. (2018, September). *Construction and Development (C&D) Loans*. National Credit Unit Administration (NCUA). [WWW Document]. URL [https://publishedguides.ncua.gov/examiner/Pages/default.htm#ExaminersGuide/MBL/CandD\\_Loans.htm](https://publishedguides.ncua.gov/examiner/Pages/default.htm#ExaminersGuide/MBL/CandD_Loans.htm)
- Fuhr, R. and Schlemlein, K. (2010, November). Reduce Risk with Rigorous Construction Loan Inspection and Disbursement. *The RMA Journal*, pp. 64-67.
- Hamm, R. (2007, April). Construction Loan Administration: Managing Risk in Commercial Projects. *The RMA Journal*, pp. 102-105.
- Hamm, R., Tryon, B., and Strischek, D. (2015, April). Construction Lending Risk Management: Build It Right So They Will Come. *The RMA Journal*, pp. 20-23.
- Kubba, S. (2016). *Green Construction Project Management and Cost Oversight*. Oxford: Butterworth-Heinemann.
- OCC. (2018, September). *Commercial Real Estate Lending*. [WWW Document]. URL <http://www.occ.gov/publications/publications-by-type/comptrollers-handbook/cre.pdf>
- RICS. (2016). *Project Monitoring for Real Estate Lending, Canada*. Toronto: RICS.
- Scales, B. (2008, September). Close and Continuous Monitoring of Construction Projects Can Prevent Headaches for Lenders. *The RMA Journal*, pp. 74-79.
- Whitehead, J. (2008). *Real Estate Development*. Vancouver: UBC Real Estate Division and Kwantlen University College.