



City Auditor's Office

Corporate Structures List Audit

November 3, 2017

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The City Auditor's Office completes all projects in conformance with the *International Standards for the Professional Practice of Internal Auditing*.

Executive Summary

The Corporate Structures List (CSL) initiative is constructing a comprehensive repository of structures by Business Unit, along with basic attributes for each structure. This initiative is significant due to the large number of stakeholders impacted and its role in ensuring space is efficiently utilized at a corporate level. Furthermore, reliable structure information is critical to ensure proper maintenance, insurance and cost management of each structure.

The objective of the audit was to assess the effectiveness of the CSL as a tool to manage the facility portfolio at a corporate level. This was achieved by assessing time frames and criteria for moving the initiative to a sustainment phase¹, and the design of controls that ensure information quality. As the list was under development, and subject to ongoing additions and alternations, we did not test its accuracy.

Since beginning this initiative in March 2016, Facility Management (FM) has populated the listing with information on over 3,000 structures. For each structure the CSL identifies its location on a map, address, construction year and building steward responsible for maintenance. The listing is stored within The City's existing geographic information system (GIS), which has allowed the initiative to avoid the additional upfront costs, ongoing support costs and time associated with implementing a new system.

The CSL tool provides a foundation for managing The City's facility portfolio at a corporate level. However, the initiative does not have formal objectives to provide clarity of purpose and balance the different stakeholder needs identified in the next paragraph. As such we are currently unable to provide full assurance on CSL effectiveness, as a tool to manage the facility portfolio at a corporate level.

FM is successfully collaborating with stakeholders across the corporation, both for data collection and to understand their usage needs. In addition to supporting efficient facility management the CSL is planned to be used for emergency management, securing buildings, ensuring appropriate insurance coverage and responding to 311 requests. Finally, FM has identified and is in the process of implementing controls to address risks to the CSL's information quality.

The information quality controls in place provides sufficient checks at the CSL's current development phase. This reflects that during development, a small number of individuals within FM are comparing information received against multiple sources to validate its quality. As the initiative moves into sustainment, preventative controls are needed, and the detective information quality controls FM are currently implementing will need to be formalised.

We raised four recommendations to support CSL as the initiative moves into sustainment phase. These recommendations are:

1. Define objectives for the CSL to provide clarity of purpose and balance stakeholder needs.
2. Articulate and formalize definitions of structures to be included and attributes collected for each.

¹ Sustainment is the phase after the launch of the initiative that focusses on maintenance and iterative refinements.

3. Map relationships between the CSL and other systems holding information on structures to support data completeness, and
4. Enhance and complete implementation of data quality controls.

Facility Management has agreed to all recommendations and committed to implementing the recommendations by December 31, 2018. The City Auditor's Office will monitor the status of commitments as part of its ongoing recommendation follow-up process.

1.0 Background

The CSL was initiated in March 2016 by FM to create and maintain a comprehensive listing of structures by Business Unit, along with basic attributes (building name, address and number of staff). The information is stored as a layer within The City's corporate wide GIS, which plots each structure as a polygon on the map (see Figure 1).

This listing is currently under construction; as at June 2017 it captures information on 3,027 structures that The City owns, leases or has another relationship with. The scope of the structures list is broader than just buildings. For example it includes information on Fuel Pumps for the benefit of the Calgary Emergency Management Agency (CEMA). Attributes captured in the CSL include address, Business Unit responsible for the structure and number of staff in the building. The list also includes references that link to the asset in financial reporting records and another GIS layer prepared by Corporate Analytics and Innovation.

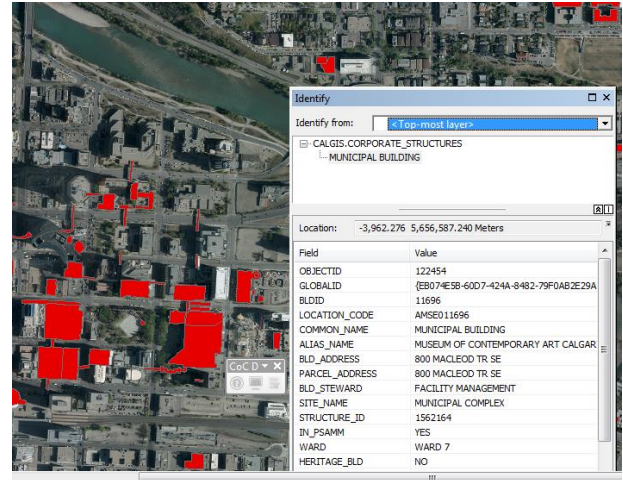


Figure 1: CSL layer within The City's GIS

The CSL is positioned by FM as containing key data that will benefit and support a multitude of stakeholders as illustrated in Figure 2². Long term FM envisions CSL as an enabler for:

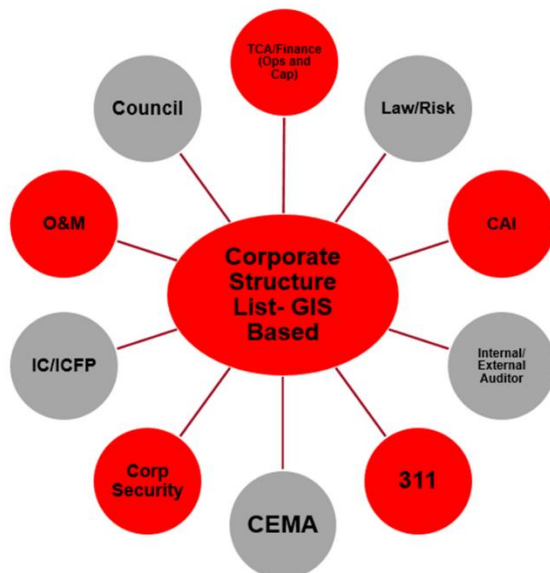


Figure 2: CSL Stakeholders

- Efficiency Savings - by managing the facility portfolio as a strategic resources across the corporation. (e.g. corporate-wide integrated facility planning to optimize space used and coordinate maintenance).
- Emergency Management - by providing information, on buildings The City has access to and is responsible for. Furthermore, The CSL is a feed into the Calgary Emergency Management Agency's Common Operating Platform.
- Risk Management - by providing the information to ensure buildings are properly insured, have appropriate security arrangements and responsibility is assigned for maintenance.
- Financial Reporting - by ensuring financial records are complete (e.g. structures are not missing) and all assets within the financial records exist (e.g. the structure has not been demolished or sold).

² Figure 2 created by Data and Technology Lead, FM

- Responding to Citizen Requests – 311 can use the information in the CSL to confirm if the structure is City owned and to direct the request to the responsible party.

An audit of corporate facilities management was included on the 2017/18 audit plan as a continuation of the Facility Utilization Audit (AC2014-0086), presented to Audit Committee in January 2014. A key recommendation from the Facility Utilization Audit was to define data on a centralized basis to efficiently and effectively manage The City's facility portfolio at a corporate level. The CSL is an important component in actioning this recommendation through the creation of a comprehensive listing of structures owned by The City.

2.0 Audit Objectives, Scope and Approach

2.1 Audit Objective

The objective of this audit was to assess the effectiveness of the CSL as a tool to manage the facility portfolio at a corporate level.

The objective was achieved by:

- Evaluating time frames and criteria for moving the initiative from development to a longer term sustainment phase.
- Evaluating the design of the following controls, which management has identified and are in the process of implementing to address data quality risks:
 - Quarterly, Facilities Management provide a report to the Business Units to verify completeness and accuracy of the information contained within the CSL.
 - Quarterly, fields within the CSL are verified against other layers within the GIS system (prepared by other groups) to ensure consistency of structure ID, address and year of construction.
 - Quarterly, the location of GIS polygons within the CSL are verified against other GIS layers (spatial verification) to ensure accuracy.
 - Quarterly, information within the CSL is verified against PeopleSoft Asset Management (PSAM) to identify transfers, disposals or addition of assets, and to ensure steward information is up to date.
 - Update access to the Corporate Structures List is restricted to users with a valid business need.
- Identifying additional controls necessary to address the data quality risks identified in the Appendix.

2.2 Audit Scope

The scope of the audit comprised the status of the CSL at June 30, 2017, design of associated controls and future plans for sustainment phase. Accuracy of data within the list was not tested because information was being modified and added during its development phase.

2.3 Audit Approach

Our audit approach was designed to ensure appropriate controls will be in place, when management transitions the CSL to sustainment phase. We conducted interviews with management, reviewed procedure documentation and assessed the design of controls.

3.0 Results

The CSL provides a foundation for managing The City's facility portfolio at a corporate level based upon the initiative's progress and information quality. The initiative's progress was assessed by evaluating time frames and criteria for moving the initiative from development to sustainment phase. Information quality was assessed by evaluating the design of controls, which management is in the process of implementing, to address data quality risks and identifying additional controls necessary to address these.

3.1 Initiative Progress

We inquired with FM, other stakeholders, and inspected project documentation, to understand the progress made to date and the initiative's future direction.

FM has populated over 3,000 structures into CSL, since its initiation in March 2016. The CSL uses The City's existing GIS, which has allowed the initiative to avoid the additional upfront costs, ongoing support costs and time associated with implementing a new system.

Information collected within the CSL is relevant to the management of facilities at a corporate level, since it identifies the location on a map, address, construction year and building steward. Knowing where The City's structures are and who is responsible for maintaining them, is foundational to managing them on a corporate level. Over time FM plans to add information on facility condition and current replacement value. Providing this additional information will facilitate the prioritization of expenditure and making decisions regarding the renovation or disposal of various structures.

Management created a charter document which identified nine stakeholders, including property owning Business Units. The charter document does not establish timeframes. Our interviews with stakeholders found that FM was successfully collaborating with property owning Business Units to populate the CSL, and to address errors that were identified in other systems through this process.

To understand the future direction of the initiative, we evaluated if objectives, requirements and milestones had been formally defined. This evaluation was done by reviewing the project charter and discussions with FM personnel. The large number of stakeholders impacted by the CSL and its organizational-wide reach, means that there is value in formally defining them. This would provide clarity of purpose and balance different stakeholder needs. Objectives can then be translated into requirements that determine if a phase of the CSL was completed and milestones to track progress. As these items were not defined, in section 4.1, we recommended formally defining them.

3.2 Information Quality

To identify risks to information quality, we used information quality criteria identified in the COBIT 5 Information Model³. COBIT is a framework for the governance and management of enterprise information technology. We identified and agreed with FM the four risks, which if unmitigated, would present the greatest information quality risk to the CSL and mapped these to controls (see Appendix). These risks are that information within the CSL is:

1. Inaccurate or is not regarded by stakeholders as a credible source

³ COBIT is published by ISACA and more details can be found at <http://www.isaca.org/COBIT/pages/default.aspx>

2. Outdated
3. Incomplete
4. Misunderstood or interpreted in an inconsistent manner.

Management has began to implement detective controls, which address the first three risks. These controls are:

1. On a quarterly basis FM provide a report to the Business Units to verify completeness and accuracy of the information contained within the CSL. (risks 1, 2, 3)
2. Verification of information within the CSL against other GIS layers and PeopleSoft Asset Management to ensure the consistency of information. (risk 2)

In addition, management had implemented a preventative control restricting update access to the CSL (risk 1). We identified an opportunity to further restrict access, which was promptly implemented.

A formal control to address the fourth risk does not exist. However, FM is closely collaborating with business units to populate the CSL. This close collaboration helps to reduce some of the inherent risk at this stage in the CSL's development.

In addition, we recommended additional preventative controls in the area of data definition (section 4.2) and mapping between the CSL and other systems (section 4.3). Although three of the risks listed previously had controls under implementation that could identify errors after the fact, it would be more efficient and improve data quality to implement preventative controls. Data definition address the risk of stakeholders misunderstanding or interpreting data in an inconsistent manner (risk 4), completeness (risk 3) and accuracy (risk 1). Data mapping will contribute towards mitigating the risk associated with the completeness of the listing (risk 3).

We examined the design effectiveness of the detective controls under implementation by examining the review frequency, roles assigned to perform the review, criteria used in the review, follow up on items identified, evidence retained, and availability of procedures. Areas that needed to be formalised were evidencing the review, accountabilities for performing the review when parties outside FM were involved and procedure documentation. In section 4.4 we made recommendations to address these areas, which will ensure controls are performed completely and consistently as the CSL moves into its sustainment phase.

4.0 Observations and Recommendations

4.1 Initiative Objectives

Initiative objectives have not been defined for the CSL. We expected objectives would be defined prior to the start of the initiative. Clearly defined objectives provide clarity of purpose, and assist in prioritizing the needs of different stakeholders that utilize the CSL for a variety of information needs. Information collected within the CSL provides a foundation towards managing the facility portfolio at a corporate level. As a result, objectives need to include collecting and reporting on City of Calgary structure data, to support strategic objectives of efficient corporate space utilization.

These objectives can then be translated into requirements that determine if a phase of CSL was completed and milestones to track progress.

Recommendation 1

The Director of Facility Management define:

1. Strategic objectives for the CSL, which include amongst other objectives collecting and reporting on data to allow space to utilized efficiently at a corporate level.
2. Requirements to be completed for each phase of the CSL initiative and milestones to track each phase.

Management Response

Agree.

Action Plan	Responsibility
FM will consult with stakeholders and define written objectives for the Corporate Structures List. One objective will include collecting and reporting on City of Calgary structure data, to support strategic objectives of efficient corporate space utilization. FM will work to define the work into various phases for appropriate roll-out and tracking, using milestones.	<u>Lead</u> : Data and Technology Lead, FM <u>Support</u> : Building Inventory Technician, FM <u>Commitment Date</u> : June 30, 2018

4.2 Data Definitions

The CSL does not have documented definitions of the structures that should be included in the CSL, or attributes collected for each structure. Defining these will contribute to ensuring the CSL is complete, accurate, and that information within the list is interpreted consistently by different users.

The CSL is utilized by multiple stakeholders including Finance, Risk Management, 311, Calgary Emergency Management Agency (CEMA) and Corporate Security. The scope of CSL is

broader than buildings and include “significant” structures. Interviews conducted across a sample of three Business Units highlighted that each Business Unit has a different interpretation of significant structures. Defining significant structures will help clarify multiple stakeholder requirements (e.g. fuel pumps are included for the benefit of CEMA, but could be of less relevance to other Business Units).

The CSL captures attributes for each structure, titles of these include LOCATION_CODE, STRUCTURE_ID, BLD_ADDRESS and PARCEL_ADDRESS. Attributes to be captured later include BOMA_INTERIOR_GROSS, FCI and CRV. No written definitions exist of the meaning, usage and format of each of these attributes.

The absence of formal definitions could result in inaccurate data capture, or misinterpretation when different stakeholders report on the information, all of which could jeopardize the reliance and use of the CSL.

Recommendation 2

The Director of Facility Management consult with stakeholders to determine the scope of structures which should be captured in the CSL, and attributes captured for each. Based upon this consultation create and maintain publicly available definitions, which can be used to determine if a structure will be included in the CSL.

Management Response

Agree.

Action Plan	Responsibility
FM will work with BUs to determine exactly what should be captured within the CSL and then provide that definition in each Quarterly Report and within a CSL area of the FM intranet site.	<u>Lead</u> : Data and Technology Lead, FM <u>Support</u> : Building Inventory Technician, FM <u>Commitment Date</u> : September 30, 2018

Recommendation 3

The Manager of Operational Coordination, create and maintain a document available to all internal users that outlines definitions for all attributes included in the CSL. This should define the meaning, origin (i.e. if from a corporate system) and usage of each attribute.

Management Response

Agree.

Action Plan	Responsibility
FM will define each attribute (including meaning, origin and usage) within a document within a CSL area of the FM intranet site. We will also revisit quarterly to see if updates are required.	<u>Lead</u> : Data and Technology Lead, FM <u>Support</u> : Building Inventory Technician, FM <u>Commitment Date</u> : September 30, 2018

4.3 Data Mapping

Data in the CSL is also captured in Business Unit asset management systems and PeopleSoft Asset Management (PSAM). However, relationships between these systems are not formally defined. Formally defining these relationships will provide the opportunity to more easily identify discrepancies between systems and address the risk of any system missing a structure.

The most common Business Unit asset management system is Infor EAM. Infor EAM has an asset hierarchy that breaks assets down from a macro level, into more granular items (e.g. individual HVAC units). It has not been defined if a level in this hierarchy should correspond to the CSL.

PeopleSoft Asset Management, the system for reporting on Tangible Capital Assets, has broad asset classes and more specific profiles. For example, the engineered structures asset class, includes profiles that range from water treatment plants to fences. The CSL includes assets that fall both within the engineered structures and building PSAM asset classes. However, not every profile within the engineered structures class will be included in the CSL. The mapping between PSAM profiles and the CSL has not been defined.

Recommendation 4

The Director of Facility Management:

1. Assess the applicability and define the relationship between the CSL and other systems holding structure data.
2. As applicable, engage with other system owners to identify opportunities to support increased alignment. For example, use of common identifiers and processes to escalate discrepancies.

Management Response

Agree.

Action Plan	Responsibility
<p>FM has taken steps to align with 311, CEMA's Common Operating Platform and Building Central. Going forward we will:</p> <ol style="list-style-type: none"> 1. Determine and document the extent of the relationship between CSL and other systems holding corporate structure data. This will include Infor and PSAM. 2. We will review opportunities to support increased alignment based upon discussions with system owners. 	<p><u>Lead</u>: Data and Technology Lead, FM</p> <p><u>Support</u>: Building Inventory Technician, FM</p> <p><u>Commitment Date</u>: December 31, 2018</p>

4.4 Formalization of Controls

FM has identified and begun implementing controls to ensure the completeness and accuracy, currency and completeness of the CSL. Controls should have individuals accountable for their performance, documented processes and evidence retained to demonstrate the control was performed in its entirety. Our review identified design improvements, which will ensure controls are performed consistently and completely, regardless of any staff turnover.

Quarterly verifications - Quarterly an extract from the CSL is sent to multiple contacts within each facility owning Business Unit to identify missing or inaccurate information. However, there is not a designated individual within each Business Unit responsible for performing this review and signing off (e.g. an e-mail confirmation) to confirm completion of their review. Timeframes are not established for performing the review and written procedures do not exist. Finally, in the absence of defined data definitions (section 4.3) it is difficult for the reviewer to effectively perform this task. This is because reviewers cannot be confident of which structures should be included in the CSL and the correct value for each attribute.

Comparisons between the CSL and other source systems - Documentation retained for the comparisons between CSL and other data sources indicates some exceptions were resolved based upon activity taken to correct them. However, this documentation retained does not verify that all exceptions were properly identified and resolved. For this it would be necessary to retain documentation of the sources compared, exceptions that were identified through the comparison, and the follow-up that was undertaken.

Recommendation 5

The Manager of Operational Coordination, Facility Management:

- Establish accountable contacts within each Business Unit for reviewing that Business Unit's part of the CSL.
- As part of the quarterly verification package sent to Business Units, include information on structures that are included in the CSL and definitions of the attributes collected for each.
- Establish time frames for completing the review and written procedures for performing the review.
- Implement a process for these contacts to confirm their review has taken place and retain these confirmations.

Management Response

Agree.

Action Plan	Responsibility
FM will establish and implement the items from the above recommendation for quarterly business unit verifications starting in Q3 2018. These processes will be documented in the Appendix of the quarterly reports and procedure documents as appropriate.	<u>Lead</u> : Data and Technology Lead, FM <u>Support</u> : Building Inventory Technician, FM <u>Commitment Date</u> : September 30, 2018

Recommendation 6

The Manager of Operational Coordination, Facility Management retain documentation of the sources compared, exceptions that were identified through the comparison, and the follow up that was undertaken.

Management Response

Agree.

Action Plan	Responsibility
For reviews starting in 2018, FM will retain documentation of the most recent review. This will evidence sources compared, exceptions identified through the comparison, and the follow up that was undertaken.	<u>Lead</u> : Data and Technology Lead, FM <u>Support</u> : Building Inventory Technician, FM <u>Commitment Date</u> : March 31, 2018

Appendix: Data Quality Risks and Controls

Risk #	Risk	Controls *
1	Information held within the Corporate Structures List is inaccurate or is not regarded by stakeholders as a credible source.	On a quarterly basis Facilities Management provide a report to the Business Units to verify completeness and accuracy of the information contained within the Corporate Structures List.
		Fields within the Corporate Structures List are verified against other layers within the GIS system (prepared by other groups) to ensure consistency of structure ID, address and year of construction.
		Location of GIS polygons within the Corporate Structures List are verified against other GIS layers (spatial verification) to ensure accuracy.
		On a quarterly basis, information within the Corporate Structures List is verified against PSAM to identify transfers, disposals or addition of assets, and to ensure steward information is up to date.
		Update access to the Corporate Structures List is restricted to users with a valid business need
2	Information held within the Corporate Structures List is outdated.	On a quarterly basis, information within the Corporate Structures List is verified against PSAM to identify transfers, disposals or addition of assets, and to ensure steward information is up to date.
		On a quarterly basis Facilities Management provide a report to the Business Units to verify completeness and accuracy of the information contained within the Corporate Structures List.
3	Corporate Structures List is incomplete.	On a quarterly basis Facilities Management provide a report to the Business Units to verify completeness and accuracy of the information contained within the Corporate Structures List.
4	Data in the corporate structures list is misunderstood or interpreted in an inconsistent manner.	Control not identified.

* Controls were identified through interviews with management and review of documentation during the planning phase of the audit.