

Edmonton City Collection Repository: Functional Program

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1.0 INTRODUCTION

1.1 Project Background

The City of Edmonton maintains a collection of approximately 90,000 historic artifacts related to the founding and development of Edmonton. These artifacts date back to the first half of the twentieth century and range from household accessories to vehicles. The majority of the City's artifacts are stored at the Edmonton Artifact Centre, a portion of a re-purposed brewery known as the O'Keefe Building. A large portion of the City's collections can also be found at Fort Edmonton Park, where they are on display in historic homes and used to animate the living history village.

In 2008, the City created the *Art of Living Cultural Plan* to secure and support the future of arts and heritage in Edmonton, as well as to bolster the City's creative potential. Among the recommendations in the Cultural Plan was the need to prepare for the future needs and best public use of the City's historical collections. The Plan highlighted the need to revitalize or relocate the Artifact Centre at the O'Keefe Building, determine a new collections management approach for the artifacts at the O'Keefe Building, and support the development of a City Museum. The Plan also recommended the need to provide adequate resources for the future storage and program needs of the City Archives that is facing a lack of archival storage space at its current location.

In 2010, the City commissioned Lundholm Associates Architects in association with Catherine C. Cole Associates to complete a collection storage strategy report for the City collections at the Artifact Centre, Fort Edmonton Park, as well as the City Archives. The study included an overview assessment of the City's artifact collection, an assessment of additional relevant collections, and an analysis of the Artifact Centre's potential as a collection storage facility. The study also calculated the requirements of the City Archives, including archival storage and related collection functions at an off-site storage facility. Included in the study was a general review of the City's public art collection, to determine if there could be efficient sharing of resources in a City collection storage strategy. This information was then consolidated into a proposed collection strategy with both short and long term collection storage recommendations.

The *Developing and Preserving Edmonton's Historical Collections: Artifact Centre and Archives Strategy* study found that the Artifact Centre did not provide adequate housing for the City's collections and recommended that the City construct two collection storage facilities to replace the current Edmonton Artifact Centre: one primary professional collection storage facility to house the majority of artifacts in the City's collection, and a secondary facility to house less vulnerable artifacts currently relevant to Fort Edmonton Park.

The primary City Collection Repository would provide professional museum standard collection storage, as well as collection related functions such as shipping / receiving, collection processing areas, and administrative space. The City Collection Repository would also house an off-site storage facility for the City Archives and accommodate the conservation requirements of the Public Art program of the Edmonton Arts Council.

1.0 INTRODUCTION

The Fort Edmonton Park Collection Repository would house collection objects in use at the Park, as well as minimal collection workspaces. The facility is intended to meet requirements to house and preserve the collection, however, it is not intended to equal the sophistication of the City Collection Repository. Vulnerable objects related to FEP would remain at the City Collection Repository.

This Functional Program document carries forward the work of the previous study. As the next step in the City Collections Repositories projects, the City commissioned Lundholm Associates Architects to create a complete Functional Program for each collection facility. This Functional Program is intended to translate and articulate, in spatial and technical language, the needs and aspirations of the City of Edmonton for the new Edmonton City Collection Repository. A separate document defines the requirements for the Fort Edmonton Park facility. .

1.2 Scope of Functional Program

The *City Collection Repository Functional Program* attempts to provide a comprehensive understanding of the required collection storage building, including the facilities needed to house and preserve the City's collection, additional facilities for complementary organizations, and the resulting overall spatial requirements. A separate document defines the requirements for the Fort Edmonton Park facility. Each document addresses both subjective and objective design criteria and processes, from general principles to specific details. The objective of the Functional Program is to present, in one consolidated and concise source, all the original input to the design process from the project Steering Committee and representatives from the Edmonton Artifact Centre, City of Edmonton Archives, and Edmonton Arts Council's Public Art Department. The Functional Program presents the requirements for the new repository in a generic manner, applicable to any design and construction methodology, including phased construction. While the City Collection requirements are the dominant aspects of the project, the requirements for the City Archives facilities and the Edmonton Arts Council's Public Art Department are based on the same rigorous, consultative process. The principle is to provide as thorough a briefing on the project requirements as possible without limiting the potential design solutions.

The Functional Program presents the requirements for the building project and defines the institutional values, which should guide the design process. There are four primary uses for the document:

- 1) Definition of the design requirements
- 2) Guideline for user analysis of the development and design proposals
- 3) Justification to approving agencies and sponsors
- 4) Control of the project content throughout the duration of the project

The need to provide reliable and appropriate conditions for the City's artifact collections, archival collections, and public art collection is explained through the principles of preventive conservation. The preservation of the collections is the most critical factor governing the technical design of the repository building. The building must provide a suitable environment and the means to maintain it, to enable the City to ensure its collections are preserved for future uses.

1.0 INTRODUCTION

1.3 Structure of Functional Program

The Functional Program is organized into the following chapters:

Introduction

Here is a brief summary of all contextual aspects that have prompted the City of Edmonton to undertake this project, including a brief description of the City's collections and their current housing. This chapter will also outline the structure and methodology of the Functional Program document.

Project Objectives

This includes an overview of the requirements for a collection storage facility, as well as the rationale for the City Collection Repository. It also includes the rationale for the complementary collection facility at Fort Edmonton Park for reference, and summarizes the intended relationship between the two collection repositories.

General Requirements

The General Requirements chapter provides an outline of the functional model for the repository, functional diagrams of particular aspects of the facility, the overall functional and spatial requirements for the project, and a detailed space list.

Functional Group Requirements

The specific functional requirements for each of the six functional groups in the project are described. Each group includes an introduction, which outlines the functions included in the group, with a series of subgroup sections as outlined in the space list. In each subgroup section, a detailed description of the function and users is included, as well as information on the desired proximity and adjacency requirements. Finally, each subgroup contains qualitative criteria, which describes the general qualities and character that the spaces should have.

Preventative Conservation Criteria

Preventative conservation requirements outline the environmental factors that need to be considered to safely house the City's collection within the Repository. These requirements are intended to reduce further deterioration to artifacts and archival documents, as well as maintaining each artifact's or archival document's current state.

Technical Criteria

The technical requirements needed for a collection facility are described here, following the traditional architectural and engineering disciplines. This chapter consists of interpretation of the functional, museological, and archival requirements in terms of building fabric and systems that pertain specifically to collection storage facilities.

Unit Space Requirements

Detailed information and technical design criteria for each individual space identified in the space list are found here.

1.4 Methodology

The *Edmonton City Collection Repository Functional Program* has been prepared using the following methodology:

A review of the previous *Developing and Preserving Edmonton's Historical Collections: Artifact Centre and Archives Strategy 2010* was carried out to determine how the proposed changes to collection management, organization, and development will impact and guide the design of the collection. The previous study was used as a guide to ensure the Functional Program carries forward the previously established project principles. Finally, the implications of sharing the facility between the EAC, City Archives, and Edmonton Public Art, and the presence of the Fort Edmonton Park Repository were reviewed and further tested through user consultation with representatives of each interest.

The institutional objectives of all three organizations to share the facility was then translated into specific objectives for the Repository and the required functional spaces.

Further consultation with the relevant stakeholders was carried out to determine in greater detail the spatial and functional requirements of each organization within the facility.

These requirements were then consolidated in the Functional Program document and articulated in the space list, functional model, and technical criteria. This information was presented to the Steering Committee and relevant stakeholders for review.

Together with the Steering Committee and relevant stakeholders, the consultants highlighted areas with the potential for greater efficiency in the facility, such as shared spaces, and co-located complementary functions.

The information collected and the decisions made during the course of the study were once again consolidated into a final detailed space requirement for the City Collection Repository with specific design criteria for each required space.

The area calculations for the City collection storage have been based on general estimates from a knowledgeable curator who performed the overview collection assessment in the previous collection strategy study. These estimates are dependant on a collection redevelopment strategy in which the City will de-accession a portion of the current collection and acquire additional artifacts to support a future City Museum. The City Museum has yet to be planned, and no specific mandate has been articulated. Therefore, the projections for the City collection were based on educated assumptions based on knowledge of the potential stories and themes unique and important in Edmonton's history. The future acquisition of these artifacts constitutes the calculated growth of the collection and the final area figures reflect a collection of approximately 25,000 artifacts. If this collection redevelopment strategy were to change prior to a building project, or should the definition of the future City Museum require different types and numbers of artifacts, the storage requirements of the City collection would need to be revisited. Nevertheless, the facility defined in this document is quite adaptable to changes in collection development that might occur.

1.0 INTRODUCTION

If significant time elapses between this Functional Program document and implementation of the repository building project, the requirements and assumptions that guided the facility and its spatial requirements could require updating, and at the very least should be confirmed prior to beginning the design project.

2.0 PROJECT OBJECTIVES

2.1 Nature of a Collection Storage Repository for the City of Edmonton

Collection care and preservation is the core function of a collection storage repository. The fact that material culture survives as well as it does is a tribute to the museums, heritage organizations, and archives that have taken the long-term preservation of their collections seriously. Collection storage for long-term preservation presents many challenges and the City of Edmonton Artifact Collection presents some unique problems that place particular demands on the design of the collection facility.

A collection repository provides a proper storage space for the objects and documents in a collection. It is not a simple warehouse. Items stored in the facility include artifacts made up of a wide range of materials including: metals, wood, ceramics, glass, and synthetic materials. The City's collections include a full range of artifacts found in any historical collection, but also objects that are very large and frequently very heavy. These artifacts vary in shape and size and as such need a variety of storage configurations. The artifacts are typically held in storage until they are moved for purposes such as display, loan to another institution, research, or conservation. Artifacts must be easily accessible for inspection, display preparation, and research, with as little movement as possible. Although typically organized by curatorial categories, environmental requirements and the configuration of the artifacts are often a more suitable basis for the organization of objects.

Collection repositories may also provide space for activities concerning the processing, preservation, and caretaking of collections. Workrooms are placed outside the collection storage areas to reduce risks to the collections. The related functions include registration, conservation, inspection, quarantine, treatment for contamination, and shipping / receiving.

2.0 PROJECT OBJECTIVES

2.2 Objectives for the City Collections Repository

The current primary storage facility for the City of Edmonton's collection is the Edmonton Artifact Centre (EAC) – a portion of the O'Keefe Building. The previous collection storage strategy report included a building assessment of the O'Keefe Building to determine its ability to house the City's artifact collection. The report found the facility was inadequate for storing the collection and recommended provision of a new facility rather than investing in upgrading the current facility. The new facility would replace the existing function of the EAC on a yet to be determined site and include collection storage, collection processing functions, and administrative facilities. The following highlights some of the specific planning and design objectives for the new collection repository:

Objective 1: Care and Security of the Majority of Artifacts in the City Collection

The current City collection storage facility does not provide adequate conditions in either quantitative or qualitative terms. It is the primary objective of the City to provide a professional building that will enable the majority of the City's collection to be preserved in museum-standard storage spaces with environmental control, fire protection, and security.

The importance of providing reliable and appropriate environments for the artifact collection cannot be overstated. The preservation of the collections, as part of the heritage of future generations, is the single most critical objective of the collection repository project.

Consolidating the City's collections into specific storage areas, separate from other collection functions, will improve security standards and allow light, temperature, relative humidity, and air quality to be controlled. Access to the collection will be strictly controlled and facilitated by appropriately planned circulation routes.

The intention is for the majority of artifacts in the City's collection to be held in storage at the new City Collection Repository (CCR). Those artifacts deemed suitably robust and relevant to the operations at Fort Edmonton Park (FEP), and also oversize and difficult to transport items, will be stored at a purpose-built repository at the Park. Further discussion of the FEP Repository will follow this section.

Objective 2: Housing of the City Collection Processing Functions

In addition to providing adequate storage space for the City's artifact collection, the future City Collection Repository will also include efficient space for other collection-related functions such as assessment, registration, conservation, and documentation. Proper spaces for corresponding offices and work spaces for each function are part of the Functional Program. The location of each group of functions will depend on their relationship to the process of collections management, and proximity to publicly accessible areas. Shared spaces such as meeting rooms, washrooms, change rooms, and kitchens are also a part of the functional model.

***Objective 3: Accommodating Complementary Organizations –
City Archives and Edmonton Public Art***

Coinciding with the needs of the City Artifact Collection are the needs of the City Archives for additional off-site storage space and the needs of Edmonton Arts Council for Public Art conservation facilities. As each of these organizations have complementary functions to the City collection caretaking, the previous Collection Strategy Report proposed the sharing of a number of facilities within the new City Collection Repository. The City Artifact Collection will be the primary user of the building, with additional archival storage space and archival operations spaces for use by the City Archives. Edmonton Public Art will share conservation facilities with the City Artifact Collection and the facility will provide a temporary holding space for the Edmonton Public Art collection. All the organizations will share the collection truck bay, shipping and receiving room, a central lobby, and staff support spaces such as meeting rooms, lunch rooms, and washrooms.

Objective 4: Professional Standards

The new City Collection Repository intends to provide a facility that supports the responsibility and professionalism of the City collection management in all aspects. The City intends to equip the Repository with proper environmental controls, fire protection, security, collection management and collection handling facilities, create conditions to national standards for collection conservation, and ensure that spaces for collection circulation have the capacity and equipment to handle oversized objects. The facility will also provide adequate storage capacity for future collection development. Administrative and office facilities for a developed staffing complement to manage the collection will also be provided.

Objective 5: Building Quality

The building project should deliver a facility whose building envelope, systems, and architectural detailing are appropriate for the long-term function of a collection storage repository. The objective is to create a building for which proper building science, life-cycle cost effectiveness, ease of maintenance, sustainable design, flexibility for future updating, high-level construction workmanship, and all aspects of safety and health standards are carefully considered.

***Objective 6: Future Needs and Development of the City Collection
as well as the future Edmonton Museum***

In creating the Collection Repository, the City has considered the future redevelopment of the City Artifact Collection, the proposed future City Museum, and the advancement of collection management and related technology in the future. The building project will provide the necessary architectural flexibility and adaptability to accommodate changes to the collection, staffing, and technological requirements as best as possible. As well, the City intends to create a facility that in the future could support a museum dedicated to the City of Edmonton.

2.0 PROJECT OBJECTIVES

2.3 Objectives for the Fort Edmonton Park Repository

(for reference – full requirements for the FEP Repository are presented in a separate document)

As previously stated, the current primary storage facility for the City of Edmonton's collection is the Edmonton Artifact Centre (EAC) with additional collections housed at Fort Edmonton Park (FEP). Approximately 25% of the City's collection can be found on display or in use at FEP. The artifacts at the Park range from household items used to decorate historic homes, to functioning vehicles used by visitors and operated by costumed interpreters. The previous Collection Storage Strategy study conducted an assessment of the storage conditions at FEP to determine if the collection artifacts were in jeopardy. The study found that the Park does not provide adequate security or storage for the collection and recommended providing a new facility, located at the Park, to house those City collection materials that support FEP. The following highlights some of the specific planning and design objectives for the new FEP Repository:

Objective 1: Preservation and Security of the City Collection Artifacts in Use at the Park

The Fort Edmonton Park Repository will house collection objects relevant to the Park, as well as minimal collection workspaces. The facility is intended to meet requirements to house, secure, and preserve the collection, however, it is not intended to equal the sophistication of the City Collection Repository that will house the majority of the City's collection on a different site. It will also provide seasonal storage for some objects used in programs during the summer. Any FEP materials that require special conditions will be located at the main City Collection Repository. The FEP Repository is primarily a storage facility as all required collection-processing functions have been provided for at the new CCR or can be found in existing facilities at the Park.

Objective 2: Increase the Efficiency of the City's Collection Management Operations

A purpose-built collection repository at FEP will not only aid in the preservation and security of the City's artifacts, it will also increase the efficiency of the City's collection management operations. Many of the artifacts in use at the Park are large in scale, such as rolling stock – wheeled and track-based vehicles and agricultural equipment, and would be more efficiently stored in a collection repository at the Park rather than moved back and forth from the City Collection Repository. The City Repository will likely be a distance away from the Park and moving the many large artifacts between the two locations would be a significant drain on the City's resources. The FEP Repository will also be appropriately sized to accommodate large sized artifacts, with drive-in access for vehicles, a small workshop for preparation, and appropriate storage for heavy objects. This eliminates the need to provide this type of access at the City Repository. As the FEP Repository will be a support function, it will not require public access, significant administration facilities, or collection-related functions.

Objective 3: Provide a Facility that will Maintain the Historical Accuracy of FEP

Fort Edmonton Park functions as a living history museum that provides visitors with the opportunity to view and interact with original artifacts that represent the history of Edmonton from 1846 to 1929. In this context, the need for the new FEP Repository to blend in with the historic environment of the Park is an important design consideration. However, with some consideration, it is very possible for the building to have an outward appearance of a period piece of architecture or a neutral background piece, or be sited out of public view, but function as a proper collection repository to house artifacts.

2.4 Implementation Considerations and Site Criteria for the new Edmonton City Collection Repository

There are a range of implementation options possible for the new Edmonton City Collection Repository. Six of these possible options are outlined below and an evaluation chart is found on the following page. The Consultants' recommendation for the implementation of the CCR follows the chart. In addition, site criteria for a collection repository are listed in this section, with emphasis on site characteristics to avoid.

Description Implementation Options:

City Built, Owned, and Managed

In this option, the City commissions an architect / engineer design team to meet the full requirements defined by the City, then tenders construction to general contractors, and builds on City owned land. The building is operated by the City to meet the special museological requirements. Payment is progressive through construction.

City Owned or City Purchased Building with Renovation

In this option, the City purchases an existing building of a suitable size and renovates the building to meet the full requirements defined by the City. The building is operated by the City to meet the special museological requirements. Payment is progressive through construction.

Developer Design-Build-Turnkey

In this option, the preliminary design and requirements package is prepared by the City, based on requirements of the City. Developer proposals are called for completion of documents and construction. Building is turned over to City and thereafter operated by City to the special museological requirements. This strategy is usually taken in cases in which there is a City-owned site, but could involve developer land turned over to the City after completion. The City pays for the building at turn-over.

Developer Design-Build-Lease

In this option, the preliminary design and requirements are prepared by the City, based on the requirements of the Edmonton City Collection Repository. Developer proposals are called for to complete the design and construction. The City does not pay for construction but rather enters into a long-term lease. The developer/ owner manages the property according to terms defined in the original RFP.

Lease with Tenant Improvements

In this option, the City enters into a lease agreement for all or part of a pre-existing building. The agreement includes tenant improvements based on the museological requirements. The City may pay for improvements up front or have them incorporated into lease payments. The building is managed by the owner according to the terms of agreement.

Lease As Is

In this option, the City enters into a lease agreement for all or part of a pre-existing building deemed to already meet Edmonton City Collection Repository requirements, with little or no tenant improvement. The building is managed by the owner according to terms of agreement.

2.0 PROJECT OBJECTIVES

Implementation Chart

	Pros	Cons
City Built, Owned, & Managed	<ul style="list-style-type: none"> • best way to control quality of construction for specialized building type and environmental sustainability • building operation can be controlled to suit special requirements • possibly best long term investment • could build on future public museum site 	<ul style="list-style-type: none"> • possibly longest implementation schedule due to approvals, etc • largest capital investment • requires public land or site purchase
City Owned or Purchased & Renovated	<ul style="list-style-type: none"> • may reduce some capital costs • building operation can be controlled to suit special requirements and environmental sustainability • could become future public museum site (depends on site) 	<ul style="list-style-type: none"> • capital cost may approximate cost of new construction depending on existing building limitations • requires public land or site purchase • all sites not equal, requires significant case by case evaluation (prior to purchase)
Developer Build / Turn-key	<ul style="list-style-type: none"> • may reduce capital cost – at some loss of quality • may be faster than City- built • could involve developer site • building operation can be controlled to suit special requirements 	<ul style="list-style-type: none"> • loss of some degree of control – architects/ engineers responsible to developer – not City • needs third party scrutiny during design and construction
Developer Build / Lease	<ul style="list-style-type: none"> • could involve very little capital investment • may be faster than City- built 	<ul style="list-style-type: none"> • very difficult to control quality • usually a poor long term financial result for client • dependent on suitable developer interest • difficult to control quality of building operations • difficult to expand or change over time
Lease with Tenant Improvements	<ul style="list-style-type: none"> • moderate capital investment • City could control quality of upgrade if paying costs 	<ul style="list-style-type: none"> • available buildings unlikely to be suitable for specialized purpose • extensive improvement still unlikely to meet full standards • difficult to control quality of building operations • difficult to expand or change over time
Lease As Is	<ul style="list-style-type: none"> • least capital investment 	<ul style="list-style-type: none"> • limited availability of such buildings • difficult to control quality of building operations • highest lease rate • difficult to expand or change over time

Implementation Recommendation

The ideal implementation option for the new Edmonton City Collection Repository is a purpose built, City-owned building (first option listed). This would provide the City with the greatest ability to control the construction and operating standards of the building.

Required Site Criteria for the City Collection Repository

Parking space for approximately 20 vehicles (subject to zoning requirements for specific site) and secure parking for bicycles

Access for a full size tractor-trailer truck, considering turning radii

Sites to Avoid (see Chapter 5.0 for discussion of risk factors including contaminants and water)

Contaminated, 'brownfield' sites; sites of former industrial operations unless fully remediated

Sites nearby or downwind of an industrial facility

Land filled sites or sites with other unstable soil conditions

Sites within flood plains or otherwise poorly drained sites

Sites susceptible to contaminating spills or vibrations from highway, air, or rail transport

3.0 GENERAL REQUIREMENTS

3.1 Functional Model

This chapter of the Functional Program provides a functional model outlining the general requirements for the new City Collection Repository facility. The model is described in three sections: functional diagrams, a space requirements summary, and a detailed space list. Detailed functional descriptions of the required spaces can be found in Chapter 4.0 of this report.

Functional diagrams are provided to illustrate the ordering design principles, relative sizes, and adjacencies of the facility's spatial requirements. These diagrams present an ideal condition and the target relationships for the facility. They emphasize major spatial relationships, hierarchies of access, and dominant circulation routes. The overall functional diagram illustrates the required spaces for the complete facility. This overall diagram is followed by two detailed diagrams that represent two selected functional groups: the public portion of the facility that houses the reference room, and the shipping and receiving collection gateway.

3.0 GENERAL REQUIREMENTS

3.2 Functional Diagrams

This section identifies the ideal conceptual relationships between the various functions, circulation, and relationships with key points of access to the building and other external factors. This is presented in the overall functional diagram, and, at a more detailed level, in the local functional diagrams that follow.

In a project where a new building is being designed, it is theoretically possible that an actual building layout would literally follow the functional diagram. Even in such a case, the building layout will respond to such external factors as the site, construction economics, and to a wide range of other factors that influence building design. The diagram is a tool that communicates zoning, circulation, and proximity requirements rather than a conceptual floor plan.

There are several organizing principles that guide the grouping and placement of functions in the Edmonton City Collection Repository. The key principals are as follows:

The Collection Repository's main lobby also serves as the public zone of the facility. It will serve as the main point of access for both staff and visiting researchers.

The entrance to the reference room is found within the main lobby. The reference room is a secure area in which visiting researchers may have controlled access to the Archival Collections and portions of the City Artifact Collection. Due to the need for security, the reference room must be completely enclosed and adjacent to the archive processing room and the City collection general office with windows for staff supervision.

The collection truck bay will serve as a shipping / receiving room dedicated to artifacts and document movement. This room will be directly adjacent to quarantine, assessment, and temporary holding facilities. The truck bay, shipping / receiving room, quarantine, assessment, and temporary holding facilities are collectively known as the 'gateway' functions within the Repository. All non-collection shipping / receiving, such as garbage and recycling, will occur at a separate service entrance.

The movement of collection artifacts and documents drives the spatial organization of the collection storage and processing functions. An interior truck bay is used for all collection movement in and out of the building, and is sized to accommodate a 21 meter long truck and trailer. The highest on-going frequency of this movement will likely be the arrival and departure of the archival collection and collection related material. The objects requiring the largest access requirements will likely be the public art works moved in and out of the facility when they are in need of conservation. The City collection accounts for the greatest amount of storage and will likely require the most access to the conservation facilities. There will be intense usage of the collection gateway during the initial transfer of collections from the existing Edmonton Artifact Centre (EAC), which will take several months.

The collections are stored in a number of collection 'vaults' that have specialized environments and storage equipment that correspond to the material in storage. Each function – the City Collection, the City Archives, and the Public Art program, will have its own controlled access collection storage areas.

3.0 GENERAL REQUIREMENTS

Also in close proximity to the shipping / receiving area is the preparation workshop that will serve the City collection and be shared with the Public Art program. The workshop will not contain collections and will serve as a carpentry workshop for collection related fabrication.

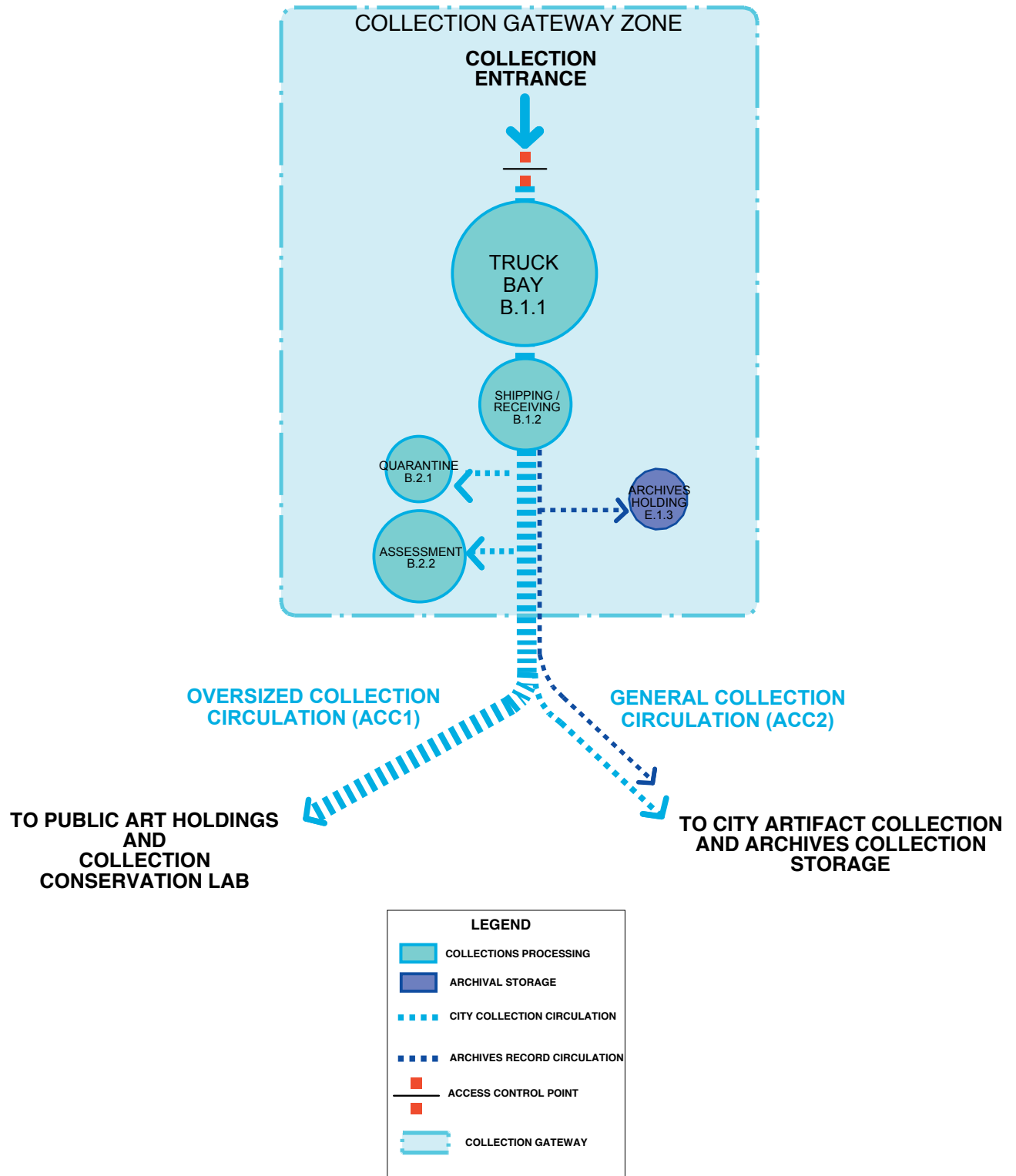
All administration offices should be as close as possible to other staff workspaces so that staff areas are consolidated and sharing of staff amenity spaces such as the lunchroom / meeting area is as efficient as possible. The staff amenity spaces should also be located in close proximity to the public area of the building so that visiting researchers can have access to these facilities without being taken through back-of-house functions.

The following diagrams include an overall functional diagram that illustrates the organizing principles for the entire Repository, and two detailed diagrams for the collection gateway / collection storage and the public and administrative functions respectively.

3.0 GENERAL REQUIREMENTS

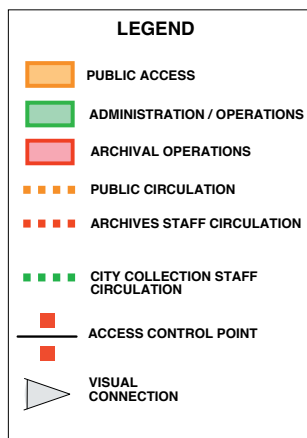
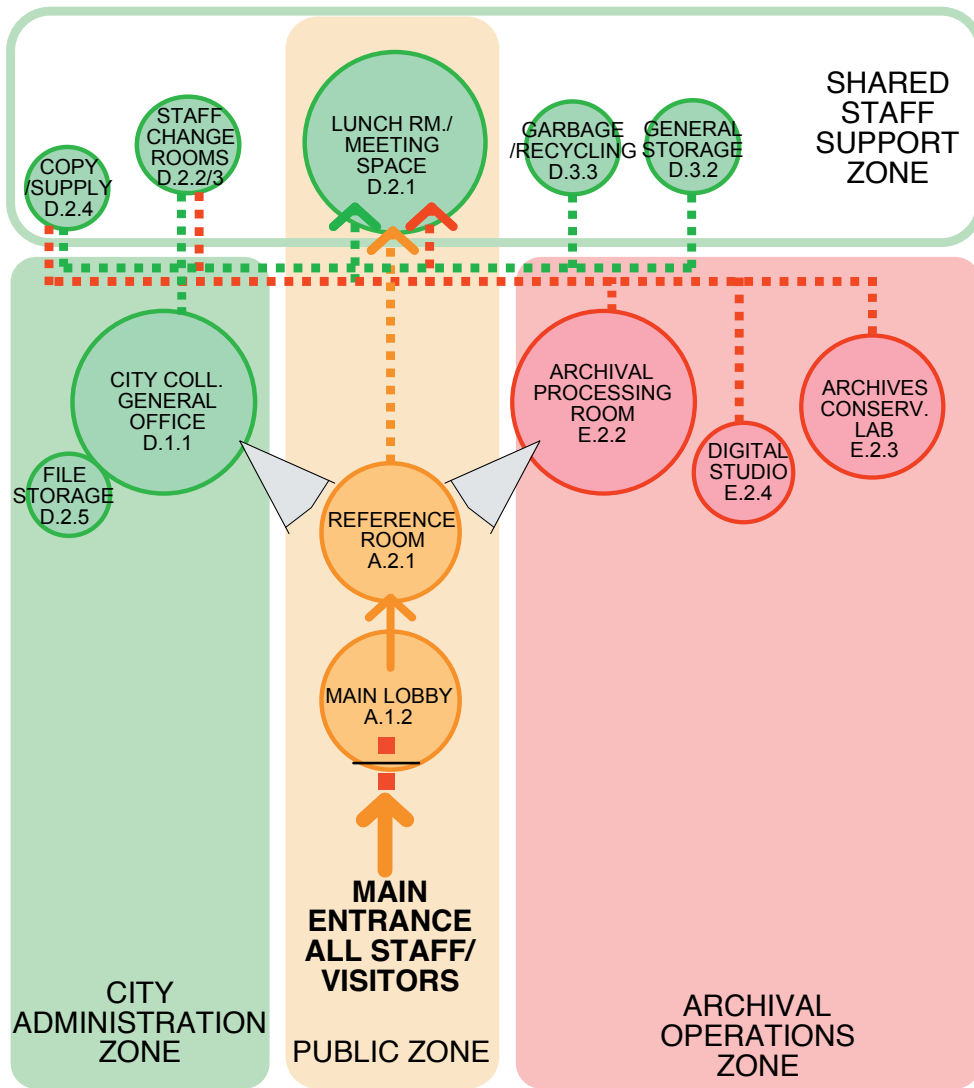
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City Collection Repository Collection Gateway and Storage Functional Diagram



3.0 GENERAL REQUIREMENTS

City Collection Repository Public and Administrative Functional Diagram



3.0 GENERAL REQUIREMENTS

3.3 Space Requirements Summary

SPACE GROUP		PROPOSED SPATIAL REQUIREMENTS	
		sm	sf
	Sub-Group		
SUMMARY:			
CITY COLLECTIONS + OFF-SITE ARCHIVE:			
A	Public Access	120.8	1,300
B	Collections Processing	739.1	7956
C	City Collections Storage	2,212.2	23,812
D	Administration/ Operations	283.4	3,050
TOTAL CITY COLLECTIONS REQUIREMENTS		3,355.4	36,118
E	Archival Operations	213.7	2,300
F	Archive Records Storage	1,580.0	17,007
TOTAL OFF-SITE ARCHIVE REQUIREMENTS		1,793.7	19,307
TOTAL CITY COLLECTIONS + OFF SITE ARCHIVE (net area)		5149.1	55,425

NET AREA

All area figures express net functional area: true net space devoted to each function measured to inside face of defining partitions or boundaries. Internal circulation within exhibition spaces and aisles / maneuvering space in collection storage spaces are counted as part of the functional area. Otherwise no circulation, building structure, or building service space is counted as functional area.

GROSS AREA PROJECTION

Gross area is the total size of the building measured to the outside of the exterior walls and is used in estimating building cost. Gross area is only determined accurately through building design. For collection storage facilities, the gross area usually falls in the range between 1.3 and 1.7 x the net area. This project has a high requirement for space for mechanical and electrical systems, which will tend to increase the gross area. On the other hand, the largest areas in the project are collection storage spaces with a simple circulation system proposed. This simplicity will tend to make the gross to net ratio lower. With all factors considered, with careful discipline over the design, the gross to net ratio can probably be kept to 1.35:1.0. **The projected gross area based on the current program of net space is 6,450 sm / 69,427 sf.**

3.0 GENERAL REQUIREMENTS

3.4 Detailed Space Requirements List by Functional Group

				PROPOSED SPATIAL REQUIREMENTS		NOTES
SPACE GROUP						
Sub-Group				sm	sf	
SUMMARY:						
CITY COLLECTIONS REQUIREMENTS						
A PUBLIC ACCESS						
A .1 Arrival						
A	.1	.1	Vestibule	4.6	50	shared with Archives
A	.1	.2	Main Lobby	46.5	500	shared with Archives
A	.1	.3	Coats / Lockers	9.3	100	shared with Archives
A	.1	.4	OH&S / First Aid Room	13.9	150	shared with Archives
A	.1	.5	Washrooms	as required	as required	shared with Archives
<i>Subtotal Sub-Group A.1</i>				74.3	800	
A .2 Study / Reference Areas						
A	.2	.1	Reference Room	46.5	500	shared with Archives
<i>Subtotal Sub-Group A.2</i>				46.5	500	
TOTAL GROUP A: PUBLIC ACCESS				120.8	1300	
B COLLECTIONS PROCESSING						
B .1 Shipping / Receiving						
B	.1	.1	Truck Bay	134.7	1,450	lift to meet truck beds, no dock
B	.1	.2	Shipping / Receiving Room	55.7	600	shared
			Holding Room	In B.2.1	In B.2.1	
<i>Subtotal Sub-Group B.1</i>				190.5	2,050	
B .2 Collections Processing						
B	.2	.1	Quarantine / Fumigation	27.9	300	
B	.2	.2	Assessment / Acquisitions Process	55.7	600	
B	.2	.3	Conservation Lab	157.9	1700	shared with Public Art
B	.2	.4	Spray / Paint Booth	74.9	806	contains 500sf shared spray booth
B	.2	.5	Spray / Paint Ante Room	46.5	500	shared with Public Art
B	.2	.6	Preparation Workshop	46.5	500	shared with Public Art
<i>Subtotal Sub-Group B.2</i>				409.3	4,406	
B .3 Edmonton Public Art						
			Lab Office	In B.2.3	In B.2.3	
			Public Art Conservation Lab	In B.2.3	In B.2.3	
			Public Art Conservation Spray Booth	In B.2.4	In B.2.4	
B	.3	.1	Public Art Temporary Holding Room	139.4	1500	with storage space for maquettes
			Public Art Collection Workshop	In B.2.6	In B.2.6	
<i>Subtotal Sub-Group B.3</i>				139.4	1500	
TOTAL GROUP B: COLLECTIONS PROCESSING				739.1	7,956	

3.0 GENERAL REQUIREMENTS

				PROPOSED SPATIAL REQUIREMENTS		NOTES
SPACE GROUP						
	Sub-Group			sm	sf	
SUMMARY:						
CITY COLLECTIONS REQUIREMENTS						
C	CITY COLLECTIONS STORAGE					
C	.1	City Collections Storage				
C	.1	.1	General Collections Storage	1,440.8	15,509	ENV2/Includes Textiles and Paintings
C	.1	.2	Metals Storage	715.6	7,703	ENV3
			Cool Storage	In F.1.3	In F.1.3	ENV 5/ Includes Older Plastics
<i>Subtotal Sub-Group C.1</i>				2,156.4	23,212	
C	.2	Collections Workspace				
C	.2	.1	Collections Workroom A	27.9	300	
C	.2	.2	Collections Workroom B	27.9	300	
<i>Subtotal Sub-Group C.2</i>				55.8	600	
TOTAL GROUP C: CITY COLLECTIONS STORAGE				2,212.2	23,812	
D ADMINISTRATION / OPERATIONS						
D	.1	City Collections Office Facilities				
D	.1	.1	General Office	92.9	1,000	
<i>Subtotal Sub-Group D.1</i>				92.9	1,000	
D	.2	Office Support Facilities				
D	.2	.1	Kitchen/ Lunchroom/ Lockers/ Meeting	55.7	600	shared with Archives and Public Art
D	.2	.2	Staff Male Change Room	13.9	150	shared with Archives and Public Art
D	.2	.3	Staff Female Change Room	13.9	150	shared with Archives and Public Art
D	.2	.4	Copy / Supply Room	4.6	50	shared with Archives
D	.2	.5	File Storage Room	18.6	200	
D	.2	.6	Server Room	4.6	50	shared with Archives / Public Art
D	.2	.7	Emergency Response Supply Room	18.6	200	
<i>Subtotal Sub-Group D.2</i>				130.1	1,400	
D	.3	Security / Building Operations				
D	.3	.1	Housekeeping	23.2	250	shared with Archives
D	.3	.2	General Storage	23.2	250	shared with Archives
D	.3	.3	Garbage / Recycling Room	13.9	150	shared with Archives
<i>Subtotal Sub-Group D.3</i>				60.4	650	
TOTAL GROUP D: ADMINISTRATION / OPERATION				283.4	3,050	
TOTAL CITY COLLECTIONS REQUIREMENTS (net area)				3,355.4	36,118	

3.0 GENERAL REQUIREMENTS

			PROPOSED SPATIAL REQUIREMENTS		NOTES
SPACE GROUP					
	Sub-Group		sm	sf	
SUMMARY:					
ADDITIONAL FACILITIES FOR OFF-SITE ARCHIVE STORAGE					
E	ARCHIVE OPERATIONS				
E	.1	Archive Records Shipping/ Receiving			
		Truck Bay	in B.1.1	in B.1.1	
		Shipping / Receiving Room	in B.1.2	in B.1.2	
E	.1	.1 Dedicated Archives Holding Area	27.9	300	
<i>Subtotal Sub-Group E.1</i>			27.9	300	
E	.2	Archive Records Processing			
		New Acquisitions / Contamination Assessment	in E.1.1	in E.1.1	
E	.2	.1 Archives Processing Room	92.9	1,000	
E	.2	.2 Archives Conservation Lab	55.7	600	
E	.2	.3 Film / Audio Digitization Studio	27.9	300	
E	.2	.4 Supplies Storage Room	9.3	100	
<i>Subtotal Sub-Group E.2</i>			185.8	2,000	
Total Group E: Archival Operations			213.7	2,300	
F	ARCHIVE RECORDS STORAGE				
F	.1	Storage Vaults			
F	.1	.1 General Archives Storage - Mobile	464.8	5,003	4000 lm. general mobile shelving
F	.1	.2 Oversized Archives Storage - Mobile	1092.0	11754	4000 lm. oversized mobile shelving
F	.1	.3 Transitional Chamber	13.9	150	Provides access to F.1.4
F	.1	.4 Cold Storage	9.3	100	Access through F.1.3
<i>Subtotal Sub-Group F.1</i>			1,580.0	17,007	
Total Group F: Archive Record Storage			1,580.0	17,007	
ADDITIONAL FACILITIES FOR OFF-SITE ARCHIVE STORAGE			1,794.0	19,307	
TOTAL CITY COLLECTIONS + OFF-SITE ARCHIVE STORAGE (net area)			5,149.1	54,425	

4.0 FUNCTIONAL GROUP REQUIREMENTS

In order to clarify the functional operations to be accommodated in the new City Collection Repository, a list of required spaces for all activities was compiled. Spaces were then grouped into the following six functional categories.

- Group A: Public Access
- Group B: Collection Processing
- Group C: City Collections Storage
- Group D: Administration / Operations
- Group E: Archival Operations
- Group F: Archival Records Storage

This chapter presents the specific functional requirements for the six space groups in the new City Collection Repository. Each group and sub-group is described with a brief explanation of the overall function and character of the space group, as well as the requirements of the individual spaces. A summary of area requirements and functional diagrams that illustrate the overall facility planning can be found in Chapter 3.0. Unit space sheets for each space are found in Chapter 7.0.

4.1 Group A: Public Access

Edmonton's new City Collection Repository is primarily a non-public facility. It will offer certain public functions to enable visiting researchers to access the City Archival and Artifact collections. These public access spaces include the arrival and orientation of all users to the building in a modest main lobby, user amenities such as a storage area for coats, lockers for the use of visitors, a first aid room located close to public washrooms, and a public reference room. As the public face of the facility, all publicly accessible areas should be comfortable, welcoming, and accessible to all users of the building.

Subgroup A.1: Arrival

The arrival group is comprised of the main access point to the CCR for all users and staff, orientation within the facility, and visitor amenities. It includes the vestibule, main lobby, coatroom, first aid room, and visitor washrooms.

Main Lobby

The main lobby should provide an area where users can gather, orient themselves, and find access to amenities such as washrooms, coatroom / lockers, and the reference room. It should be welcoming, with clear signage to locate amenities and other functions in the building. It will not normally be staffed and should have a prominent communication point where visitors can telephone staff to be escorted to their destination.

Coatroom / Lockers

Coatroom and locker facilities should be provided to serve visiting researchers. The coatroom and locker facilities should be placed in close proximity to the research room and should be clearly accessible from the main lobby in order to serve visiting researchers.

4.0 FUNCTIONAL GROUP REQUIREMENTS

Occupational Health and Safety / First Aid Room

The occupational health and safety / first aid room will provide a secure space for those injured or ill while waiting for medical attention. It will house general first aid supplies and equipment. The assessment of first aid needs, together with the risk assessment of activities, will determine the level of first aid equipment required.

The first aid room should be located close to the washroom facilities and be easily accessible at all times. The size and layout of the room must be able to accommodate a cot. The room must also be clearly identified as a first aid facility and equipped with a telephone. The room will be outfitted with a sink and storage furniture for first aid supplies.

Washrooms

A set of public washrooms should be placed in the main lobby and easily identifiable from the main entrance. Accessibility must conform to City regulations and the Alberta Building Code.

Subgroup A.2: Study / Reference Areas

The study / reference area functional subgroup consists solely of the reference room, which will function as a secure research room for collection artifacts and archival documents. This will allow the CCR to offer visiting researchers a dedicated and secure workspace in which to study the Archives and City Artifact collections.

To enable CCR staff to monitor researchers in the reference room it should be located adjacent to the archival processing room with windows to facilitate supervision. The reference room should also be located in proximity to the City collection staff general office, to allow for similar supervision while artifact collections are in use.

The reference room will house three computer workstations for users to conduct research online and access City databases. Three large layout tables with individual desk lamps, power, and IT connections will also be provided.

The design of the reference room should have security of the collections in mind, while maintaining appropriate access from the public area of the facility. The reference room should be well lit, comfortable, and well suited for conducting research for long periods of time.

4.2 Group B: Collections Processing

The collection processing functional group includes the 'gateway' for the City artifact collection, City Archives record collection, and Public Art collection into the Repository. The functional group includes the majority of the facilities responsible for the physical care and handling of the City artifact collections and Public Art program collections to be housed in the Repository. (A separate functional group details the processing facilities for the Archives collections.) This functional group will also house the necessary office and laboratory spaces to perform collection assessment, registration, and conservation work. Activities in this category include documentation, evaluation, treatment, and shipping / receiving. This area will be entirely off-limits to visiting researchers and members of the public.

To ensure the safe movement of large collection objects, it is crucial for the circulation spaces in this group to meet the access criteria defined in Chapter 7.0 Unit Space Requirements.

The collections will first enter an internal truck bay sized to accommodate a long trailer truck. The bay will have no internal dock, and instead will use a hydraulic lift platform to meet various levels of trailer truck beds. The platform will remain flush with the floor of the bay when not in use. The truck bay will lead directly to an enclosed shipping / receiving room. The intention is for this truck bay and the adjacent shipping / receiving room to be shared among all the organizations in the Collection Repository. The shipping / receiving room will lead to a secure path for collection circulation. The collection circulation path will connect the various collection-processing facilities as well as the collection storage vaults. Included in the suite of collection processing functions are:

- A quarantine / freezer room that also functions as a temporary holding area for the City artifact collections.

- An assessment / acquisitions processing room for the exclusive use of the City artifacts collections staff.

- A shared conservation lab with two workstations for City Collection and Edmonton Public Art conservators. The conservation lab will house specific conservation equipment, layout tables, and storage shelves for artifacts in treatment, reference material storage, chemical storage, and other items as specified by the conservators.

- A shared spray paint booth in an enclosed room for use by the City collection staff and the Edmonton Public Art staff. The paint spray booth will be accessed via an ante room that is adjacent to the conservation laboratory. The ante room will allow artifacts to move directly from the conservation laboratory to the paint spray booth, or enter the ante room from the main collection corridor and then enter the paint spray booth.

- A shared collection workshop that will house carpentry equipment, workspace, and storage for materials. This workshop is to be shared by City collection and the Edmonton Public Art, and should be located in close proximity to the shipping and receiving room to allow for large materials to be easily carried in and out.

- A dedicated Public Art temporary holding room for short-term storage of public art works awaiting conservation treatment. The holding room will also contain a small area for storage of public art maquettes. This holding room should be located in close proximity to the conservation lab to facilitate easier movement of objects.

4.0 FUNCTIONAL GROUP REQUIREMENTS

Subgroup B.1: Shipping / Receiving

The shipping / receiving areas will process all incoming and outgoing shipments of collection artifacts, archival documents, public art works, office supplies, and conservation equipment and supplies. The shipping / receiving areas should be utilitarian, but of light coloured, high quality finishes, with special attention to the facilitation of housekeeping to minimize contamination risks.

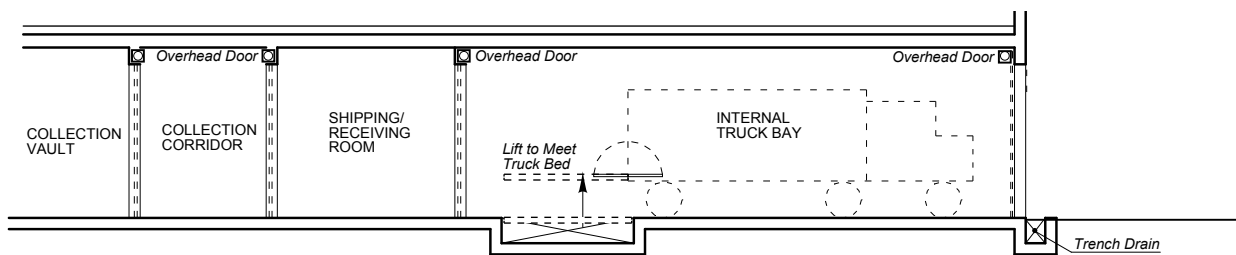
Truck Bay

An enclosed interior truck bay will provide access for trucks to deliver and pick up collection artifacts, archival documents, and collection related materials. All incoming and outgoing artifacts, documents, collection materials, and collection related goods will enter and exit the building via the truck bay.

The interior truck bay should have the capacity to receive the longest tractor-trailer allowable in the province of Alberta. It should be an enclosed and temperature controlled space operable in all seasons. Bay doors should be designed to accommodate the full width of the tractor-trailer. The typical procedure is for the truck to enter the bay, the exterior door closed, the interior space allowed to recover to room temperature, and only then should the truck trailer door be opened.

A hydraulic platform should be installed to handle the height difference between the truck bay floor and the variable truck bed heights. The size of the lifting device should be 3.048m (10'-0") W x 4.879m (16'-0") D. The lift in its lowered position must be flush with the floor with a load capacity of 4,545 kg (10,000 lbs). The impact of wheeled vehicles passing over the lift will have to be allowed for.

Once off-loaded from the truck, collection materials will move straight through the truck bay to the shipping / receiving room. The doorway between the truck bay and the shipping / receiving room should be sized to accommodate the largest collection objects.



SECTION AT CCR REPOSITORY COLLECTION ENTRANCE:
AN INTERNAL TRUCK BAY, IN WHICH TRUCKS BACK INTO THROUGH AN OVERHEAD DOOR

Shipping / Receiving Room

All collections entering or leaving the Repository will require a clean, safe, secure, and environmentally controlled room for shipping and receiving. Because of the potential risk of contamination to the collection from the receiving and shipping of general services such as food and waste, collection shipping / receiving must be segregated from service shipping / receiving. Incoming collection shipments will be directed accordingly, by type, institution, and requirements, from the shipping / receiving room. Once received, the collection materials will move from the shipping / receiving room to the appropriate temporary holding area or quarantine / fumigation room before entering any other collection services areas.

4.0 FUNCTIONAL GROUP REQUIREMENTS

The doorway between the truck bay and the shipping / receiving room, as well as the door between the shipping / receiving room and the collection circulation corridor, should be sized to accommodate the largest collections objects to be stored at the CCR.

Subgroup B.2: Collections Processing

The collection processing subgroup includes all aspects of the physical care and handling of objects in the City Artifact and Public Art collections. The Archives collections are processed in a separate group of spaces. The functions within the collection processing spaces include temporary storage / quarantine, assessment, processing, and conservation of the collections. As artifacts spend time in these areas, spaces in collection processing will require environmental control, fire protection, and light control. These areas will also require a high degree of security. These are typically utilitarian spaces that must be easy to clean and are designed to facilitate the movement of collection objects.

 Holding Room (Quarantine / Fumigation) (City Collections)

This space will provide temporary, secure, environmentally controlled storage for City collection artifacts awaiting shipment out of the Repository, or movement into the collection processing suite of spaces. Primarily a temporary storage space, it will also function as an isolation room for unpacking, examining, and sorting of incoming artifacts to determine if they require treatment before accessioning is possible. Activities may include inspection of uncontaminated artifacts as well as packing and unpacking. A walk-in freezer and a CO₂ 'bubble' may be used in the space.

Assessment / Acquisitions Processing

Assessment and acquisitions processing encompasses the processing and documentation of artifacts. It involves organization, maintenance, and supervision of all incoming artifacts, incoming and outgoing loans, and associated records and files pertaining to the collections, whether electronic or hard copy.

This work area will need clean layout tables for artifacts and storage space for supplies. Ideally the assessment / acquisitions processing room will be in close proximity to the quarantine / freezer room and the conservation lab.

Conservation Lab

The primary function of the conservation lab will be to enable the preservation and long-term care of the artifact and Public Art collections through analysis and application of conservation treatments. Conservation work may involve various types of treatments. Proper ventilation will be necessary as chemicals are often used in treatments. Access to the conservation lab must allow for the movement of the largest objects in the City artifact and Public Art collection. The lab will be used primarily by conservators, contract conservators, and interns – and will need to be clean, bright, and functional. Health and safety of staff should dominate the design of this area.

Paint Spray Booth Ante Room

This space will connect the conservation laboratory and the main collection corridor to the paint spray booth room. It will be used to move artifacts and objects in and out of the spray booth room, as well as to provide an area to dry works once they leave the booth. The Public Art department will share this facility with the City collection .

4.0 FUNCTIONAL GROUP REQUIREMENTS

Paint Spray Booth Room

This room will house the paint spray booth. The booth will be used for applying coatings to collection display elements such as cases, stands, etc. The Public Art program will also use this facility for conservation treatments. The room that houses the paint spray booth must be sized to allow for the necessary clearances around all sides of the booth for servicing and maintenance. The spray booth compressor will require sound and vibration isolation.

Preparation Workshop

The preparation workshop is involved in all collection-related fabrication. It will house the usual tools and equipment associated with rough and finished woodworking. Shop equipment will require a power supply to suit special equipment. It will also require a saw dust removal system and ambient air filtration. Proper ventilation and other safety requirements must be met, to ensure compliance with codes and regulations for a high level of workplace health and safety.

Subgroup B.3: Edmonton Public Art

Public Art Temporary Holding Room

This space will provide temporary and secure storage for Public Art objects awaiting shipment out of the repository or waiting to be moved into the conservation laboratory. This space will also provide storage for Public Art maquettes and will require some utility shelving.

4.3 Group C: City Collections Storage

The goal of a collection storage repository is to safely house and protect each artifact from any harm. The City collection storage functional group includes those spaces where the City will store its artifact collection. The storage of the archival collection is included in a separate functional group. It is ideal to have all collection storage vaults consolidated in one area of the building for efficiency and security. If it is necessary to have the collection spaces on more than one level, they should be vertically aligned with a freight elevator serving each area. The size and load capacity of the freight elevator must be determined by the largest and the heaviest objects that would be stored on the upper level. All vaults and collection workrooms must be clean, secure, and meet all collection access requirements. Doors for vaults and workrooms must be sized according to the access requirements listed.

This Functional Program proposes to organize the storage of all City collection artifacts according to similar size and environmental requirements. A collection organized according to these parameters has the benefit of optimizing storage equipment, space, and aisle widths. Those collections that require specialized flooring and / or similar preservation environments will be co-located, and those collections that required oversized circulation space for movement will also be housed together. The portion of the collection that can be more efficiently stored on rack or utility shelving will be housed together and the aisle widths will be sized accordingly.

Collection storage spaces must be easy to clean and maintain without the risk of contaminating artifacts. Mechanical equipment that poses the risk of water leakage or requires maintenance access must be kept away from collection storage.

These spaces will be accessed primarily by staff, including conservators, curators, and interns. Access to these spaces will be strictly monitored for security reasons.

Subgroup C.1: City Collections Storage Vaults

The purpose of the collection storage vaults is to provide a secure and stable environment to preserve the artifacts. Artifacts are best preserved with as little interference or movement as possible, stored in secure, fire safe, environmentally stable rooms with dedicated space for each artifact. Storage vaults must have lighting on local switching so that only the part of the storage area being accessed is illuminated.

Each collection housing space must be specifically proportioned to accommodate the specialized storage systems housed within. Doors for vaults must be sized to allow for safe and easy access for the largest objects. These are utilitarian spaces that must be easy to clean without harming artifacts.

The City artifact collection varies in material, size, and type, so it is important to organize the collection in a manner that best responds to the collection's needs for preventive conservation. For the new City Collection Repository the collection storage vaults have been organized into the following three areas:

4.0 FUNCTIONAL GROUP REQUIREMENTS

General Collections Storage

This space will house the majority of the City's artifact collection including medium sized wood, glass, and ceramic objects. These artifacts can be stored primarily on utility shelving. This storage area will also include textiles and costumes that require flat or rolled storage, and art works (framed or on paper) that will be housed in either slot storage, flat files, or hanging painting rack storage. The general collection will also include a small area allotted to storage of relevant City collections, including the Edmonton Transit Collection and the Telephone Historic Collection. Should any of these collections require additional controlled access, this can be achieved within the general collection storage area by partitioning the collection areas with wire mesh screens and / or locked cabinets.

Metals Storage

This storage area will house metal artifacts that are frequently heavy and large in size. They typically require specialized moving equipment to be moved from one area to another. These artifacts require heavy duty rack shelving for storage.

Cool Storage

The City artifact collection has a small amount of older plastics that would benefit from a Cool environment. All artifacts that require a Cool environment will be stored in the Archives Transitional Chamber room.

Subgroup C.2: Collection Workrooms

In addition to collection storage, two collection storage workrooms have been provided for the improved security and safety of the artifact collections. Research within collection storage spaces is not encouraged, and the collection workspaces should provide a secure area for researchers and staff to work with individual artifacts. Collection workrooms must be climate controlled, with appropriate relative humidity and temperature for the types of objects being examined. Workrooms should be adjacent to collection storage spaces to reduce handling and movement of objects.

Collection Workrooms

The intention is to provide two workrooms strategically located adjacent to collection storage spaces. These are utilitarian spaces that must be easy to clean, and designed to aid the ease and safety of movement of collection objects. Doors and circulation spaces must allow for easy movement of large objects. The workroom will provide computer terminal access and a layout table for artifacts. Collection workrooms and storage vaults will be highly secured with limited access.

4.4 Group D: Administration / Operations

The administration and operations group of functions includes office space for the City collections staff and staff support facilities to be shared between all organizations, such as the staff lunchroom / meeting room, the copy and supply room, and staff change room facilities.

This functional group also includes building operations support spaces for security and housekeeping functions at the Repository. Certain operations support spaces require specific adjacencies and these are indicated on the functional diagrams, while other listings are allowances that should be distributed appropriately through the building.

Other than the lunchroom / meeting room, all spaces in this section are generally off-limits to visitors without security clearance.

Subgroup D.1: City Collection Office Facilities

General Office

The administration area will accommodate a general open office area for approximately eight (8) staff. This open office should be pleasant and comfortable, and natural light is preferred. Workstations should reflect the latest ergonomic and supportive practice for open office design. Informal discussion spaces are encouraged.

This office will also require adequate spaces for filing, office supplies storage, and office equipment. A designated filing storage for registration files and a designated computer server room will adjoin the general office.

Subgroup D.2: Staff Support Facilities

Staff support facilities will be centrally located within the administrative suite of spaces to facilitate sharing between the three groups housed in the CCR. These shared facilities will include a staff lunchroom / meeting room, male and female change rooms, supply and storage rooms, and an emergency response room.

Staff Kitchen / Lunchroom / Lockers / Meeting Space

The staff kitchen / lunchroom / meeting room will be a single space that will accommodate a number of functions. These functions include: a generic meeting space for staff to have lunch or hold internal meetings; an adjacent kitchenette with a refrigerator, microwave oven, sink, counter, and cupboard space; and small staff lockers for the secure storage of personal items. This space should be bright and comfortable, flexible in design to accommodate the variety of functions, and accessible from staff workspaces.

Staff Male / Female Change Rooms

Changing rooms, including showers and lockers, are required for staff. Washrooms must also be made available in the changing areas.

Copy / Supply Room

The copy / supply room is intended to be a utilitarian space to house copy equipment and storage for office supplies.

4.0 FUNCTIONAL GROUP REQUIREMENTS

File Storage Room

A dedicated file storage room, accessible from the City Collections general office that houses files directly related to the collections.

Server Room

This room will house the server and other IT related equipment for the Repository. It must be secure, well ventilated, and insulated for sound transfer from equipment.

Emergency Response Supply Room

A dedicated storage room for supplies to be used in the event of a collection emergency such as flooding, fire, etc. The room will house carts to move the supplies into collection storage spaces, and storage for supplies and equipment. It is included in the staff support functional spaces but should be located in close proximity to the collection storage area.

Subgroup D.3: Security / Operations

The security and building operations group includes all functions necessary for the building to operate on a daily basis.

Security

All building entrances will require security surveillance. High level of security surveillance is required at the main entrance, the collection truck bay and shipping / receiving area, and any service entrances. Surveillance cameras and fire and intrusion detection systems will be monitored in the general office area and from an off-site City of Edmonton security office.

The actual need for a security system and posts should be studied in depth as the project develops.

Building Operations

Building maintenance, building services, general storage, waste management, and non-collection shipping / receiving are included in this section.

There should be a separate exterior truck loading area for non-collection shipping/ receiving. It is unwise to mix general shipping / receiving and waste management with art spaces due to the risk of infestation. Any waste and recycling disposal areas must be located near the non-collection shipping / receiving area and well away from collection areas.

Good housekeeping operations and proper training of maintenance staff in preventive conservation principles will be key in minimizing the risk of infestation to artworks and collections.

Housekeeping

The housekeeping room will provide storage for housekeeping supplies and equipment and a utility sink for housekeeping staff. It will be located near the waste and recycling disposal area.

General Storage

The general storage room will be a utilitarian space for non-collection related storage.

Garbage / Recycling Room

The garbage and recycling room is for collection and temporary storage non-collection materials, such as food and waste, before it is picked up by the City's waste collection services. It will be located near a separate exterior truck loading area, far away from all collection related functions.

4.5 Group E: Archive Operations

The archival operations functional group will include all workspaces required for assessment, documentation, and basic conservation of the archival collection. Archives staff workspaces are located within the archival processing room, the archives conservation lab, and the digitization studio.

Subgroup E.1: Archival Records Shipping / Receiving

The Archives will use the same internal truck bay and shipping / receiving room as the City collections and Public Art and will be easily accessible to a dedicated Archives holding area.

Dedicated Archives Holding Area

A secure and safe temporary holding room for archival materials and records. This room should be climate controlled and allow for inspection and acclimatization of archival documents. The dedicated Archives holding room should be located in close proximity to the shipping / receiving room for temporary storage archival material for shredding, and other materials that will be shipped between the Repository and the main Archives facility at the Prince of Wales Armouries Heritage Centre.

Subgroup E.2: Archival Records Processing

The workspaces in this group of functions are intended for the use of the City archivists to maintain and manage the archives in storage at the facility. These work areas will include a space for processing acquisitions, a dedicated archives conservation lab, and a film / audio digitization studio for reproductions. These workspaces should be accessible to the public reference room but restricted from public access.

Archival Processing Room

The archival processing room at the new Repository will provide the Archives with a workspace to organize incoming City record donations and to process archival materials from the main Archives facility. It will require raised layout tables and computer workstations. Open shelving for temporary storage of materials will also be required.

Archives Conservation Lab

Space will be used by Archives staff to clean, stabilize, repair, and document material in the collection. The lab will require: a chemical resistant raised counter with a sink; storage cupboards; an eye wash; a wall mounted, lockable, and chemical resistant cabinet for conservation lab chemical storage; a large cabinet for additional conservation supplies; designated raised work surfaces with a fume hood and elephant trunk extractors; and a grey wall for photography.

Film / Audio Digitization Studio

Archives staff will use this space to digitize and preserve A/V materials including audio and film works in the collection. The area will require tables for digitization equipment and a projection screen for viewing material. Natural light should be excluded from this space.

Supplies Storage Room

Utilitarian space for the storage of supplies and equipment related to archival operations.

4.0 FUNCTIONAL GROUP REQUIREMENTS

4.6 Group F: Archive Records Storage

The Archives collection storage will comprise four collection areas, divided by the preservation environment and storage equipment required for storing documents. In addition, for easy retrieval of documents by Archives staff, the archival collection storage should be located in close proximity to the reference room.

General Storage / Mobile Shelving

The general archives collection storage area will be used to store the majority of archival collections that have secure or restricted access and are therefore infrequently accessed by the public. These collections would include some of the Legal, Police, Fire and Payroll Department records, materials held for Fort Edmonton Park, and the Mayors' gifts. The collections are stored on shelving that is 0.76m (2'-6") deep and 2.13m (7'-0") high. Each shelf is must be accessible from both sides. See Archive storage studies in the appendices of this document for further detail.

Oversized Storage / Mobile Shelving

The oversized storage area will house rolled documents, such as maps and architectural plans that are currently in storage at the Archives main facility and the Corporate Records Centre. 10% of the collection requires shelving 1.52m (5'-0") and the remain collection requires shelving 1.06m (3'-6") deep. The intension is to provide mobile shelving 'back-to-back'. In addition, a specialized storage system for each shelf will prevent rolled documents from resting directly one on top of the other. See Archive storage studies in the appendices of this document for further detail.

Transition Chamber

The Transitional Chamber provides a Cool environment between the Cold Storage Vault and the General Collection storage environment. The space would be used to store City Artifact collections requiring a Cool environment for preservation, as well as Archival materials transitioning in / out of the Cold storage vault. Access to the Archival Cold Storage vault would be exclusively through the Archive Cool Transitional Chamber.

Cold Storage

Freezer or Cold storage is required to prevent the degradation of film negatives and other particularly temperature sensitive visual material.

NOTE REGARDING MECHANICAL AND ELECTRICAL ROOMS AT THE CCR

Appropriate mechanical and electrical spaces are essential to meet the special demands of environmental control for the various types of facilities in the Collection Repository, which include collection handling and collection storage spaces. Mechanical and electrical spaces should be configured for ease of access by maintenance personnel to encourage good preventive maintenance practice. Requirements will be determined during design.

Access to M/E spaces and equipment must never be through collection spaces.

Equipment and piping involving liquids must not be placed above collection spaces.

Rooftop equipment is not acceptable because it inhibits preventive maintenance and presents leakage risk to collections below. Exceptions can be made for non-collection areas.

Ideally, chillers, boilers, and other equipment that may poses higher risks of water leakage should be located in the basement to minimize the risk of water damage to collections.

Further technical requirements for the mechanical and electrical systems can be found in Chapter 6.0.

5.0 PREVENTIVE CONSERVATION CRITERIA

Introduction

Storage standards for museum collections evolved in the latter half of the twentieth century to a point where there is general agreement on most points of practice. These criteria develop from the science of preventive conservation, which reflects the importance of the storage conditions in the longevity of the objects. In turn, this focus derives from a fundamental aspect of museum mandates concerning the preservation of collections for future generations. Authoritative organizations such as the Canadian Conservation Institute, the Smithsonian Conservation Laboratories, and the Getty Conservation Institute develop and publish guidelines and principles that help museums apply best practice to take care of their collections. In recent years, the Canadian Conservation Institute has played a key role in updating the Museums and Archives section (Chapter 21) of the *ASHRAE Applications Handbook* (2003), which is widely used by the engineering professions in North America.

The collection caretaking functions to be housed in museum and archive facilities place special demands on their design, construction, and operation. In many instances, the design criteria exceed present building codes and general institutional building standards. In the case of environmental control systems, redundancies and backup systems are called for that clearly exceed the usual building practices. The following sections, organized by categories of risk to the collections, explain these requirements and the reasons they are important.

The primary causes of deterioration and loss of collections are:

Light:	intensity, duration, ultraviolet content
Relative Humidity:	variation, extremes
Temperature:	variation, extremes
Insect / Animal Pests:	moths, dermestids, wood-boring insects, rodents
Contaminants:	various pollutant sources including dust
Water Damage:	rain and ground water entry, plumbing leaks
Physical Damage:	structural failure, inadequate support, improper handling, inappropriate storage conditions, overcrowding, blocked or narrow aisles, shelving that is too high, inadequate corridors
Damage due to Fire:	fire, smoke, and by water from sprinklers and firefighting measures
Theft and Vandalism:	intentionally caused loss or damage
Vibration:	damage to collections due to earthquake and other sources of vibration

5.0 PREVENTIVE CONSERVATION CRITERIA

Light

When designing lighting systems for collections storage, one basic fact must be considered in all decisions: light damages many classes of artifacts and works of art. For many objects, any and all light is damaging and the damage is irreversible and strictly cumulative – directly related to the intensity of the light and the length of exposure. Storage methods attempt to minimize this danger.

Excessive or improper exposure to light causes damage through the acceleration of chemical processes, colour change, and fading. Many pigments lose colour saturation or change hue and chroma. The degree of sensitivity varies widely from one material to another. For more stable objects, even small increments of change must be taken seriously in long-term exposures.

In collection storage areas, the preferred approach is to provide good overall light levels (approximately 500 lux) for inspection, retrieval, and housekeeping, but switched in local zones that allow only the area being worked in to be lit at any one time. Operational practice will ensure that collection storage areas are dark most of the time. Provision of collection work spaces close to the collection storage helps minimize the time that lights are on in the storage. Objects are brought out to the workspace for any lengthy process, permitting the general storage to remain dark.

Relative Humidity

Relative humidity control presents challenges in Canadian museum and collections buildings, yet the issue is fundamental: uncontrolled fluctuations and inappropriate levels account for very significant collection losses. Inappropriate levels or fluctuations cause damage to collection objects and works of art through mechanical stress, differential response, microbiological decay, and chemical degradation. These damages occur within the first season of acquisition, as well as the result of repeated stresses over many years. Relative humidity damages are the most costly to repair and the most visible.

One of the important considerations with humidity controlled environments is the building envelope. Flaws in the building envelope can permit humidity to condense on cold surfaces within the envelope, causing potentially serious problems. The heating, ventilating, and air conditioning systems must provide precision environmental controls to the building to the standards defined for RH, temperature, and air purity. Systems must provide efficiency and economy in both capital and operating costs. Maintenance procedures must be clearly outlined in a preventive maintenance plan to encourage compliance and minimize system failures. Equipment must be arranged for easy access and replacement.

The system must be designed to include redundant pieces of critical or difficult-to-repair or replace equipment, to permit the maintenance of critical environments in the event of equipment failure. The system must be designed to maintain the specified environments under emergency conditions, such as electrical power supply interruption. The systems must also be designed in a manner that avoids disruption to environmental conditions for equipment maintenance shutdowns. The electrical system must provide sufficient backup capacity to operate those systems to a degree required to maintain the environment within the specified limits during an interruption in electrical supply.

5.0 PREVENTIVE CONSERVATION CRITERIA

Setpoint Selection

Recent research by the Smithsonian Institution Conservation Analytical Laboratory has indicated that the degree of flatlining prescribed in the last thirty years may be excessively rigid for many collections. This research does not suggest that uncontrolled environments do not cause damage, but rather that the middle range in which minimal damage will occur may be slightly wider than previously believed. Similarly, there may be a slightly wider tolerance for short-term fluctuation limits. This information has been much debated by conservators who must balance the findings of research scientists with observed behaviour of collection objects, in the context of their specific institutions.

The possibility that lower winter humidity setpoints might be acceptable is of interest in its potential to alleviate problems in existing gallery and museum buildings, and to simplify the design of new situations.

Temperature

Temperature directly affects rates of chemical and biological decay. The latter is virtually eliminated below 5°C. Chemical change is similarly diminished at lower temperatures. Colour photographic materials, paper records, furs, and plastics are examples of collection materials that are frequently given cool or cold storage environments.

Generally, compliance with the measures listed under RH will provide a system that can easily keep the space within an acceptable temperature range.

Insects and Animal Pests

Vertebrate animal pests can cause damage to collections through eating, shredding for nesting material, or staining with wastes. Common pests include mice, rats, squirrels, porcupines, raccoons, bats, and birds. Insect and animal pests are a major concern. Outbreaks of pests can quickly do irreparable damage to artifacts that can even result in total loss. As well, the cost of intervention to control an outbreak will be time for staff to clean, move, and freeze artifacts. The preferred prevention method is exclusion by having a well constructed, tightly sealed building fabric.

Insect pests are numerous and include many species of beetles, wasps, ants, bees, dermestids, moths, flies, and roaches. Exclusion is also important – for example, in denying access for nest building to wasps and bees. But many of the other perpetrators enter the building within the collection itself, on staff clothing, or with food deliveries. The design considerations are therefore to create conditions that encourage good housekeeping and ease of inspection. Food and garbage facilities should be strictly segregated from collection areas. Compartmentalization and zoning of mechanical systems can reduce the extent of infestation and be useful if extermination efforts become necessary. The availability of a freezer used for treatment of incoming collections and an integrated pest management program will also help to eliminate pests.

5.0 PREVENTIVE CONSERVATION CRITERIA

Contaminants

It is generally recognized that air pollutants, gaseous and particulate, threaten the conservation of collection objects and works of art. The Canadian Conservation Institute has published an excellent review of this subject: *Airborne Pollutants in Museums, Galleries, and Archives: Risk Assessment, Control Strategies, and Preservation Management*, by Jean Tétreault, Canada 2003. Offending agents which must be considered include: sulphur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), carbon dioxide (CO₂), hydrogen chloride (HCl), acetic acid, formaldehyde (HCHO), fine particulate (TSP – Total Suspended Particulate), and metallic fumes.

Filtration is the primary approach to avoid airborne contaminants from reaching the collections. Filtration must be specifically designed with respect to the ambient environment. Space should be allowed within the air handling units for later upgrading of the filtration components, should the ambient conditions change. Air intakes should be located appropriately high and at an authorized distance to avoid drawing in pollutants from local sources such as the shipping/receiving or parking areas. Electrostatic filtration must not be used unless the resultant ozone is removed.

The large and changing variety of materials used in construction present one of the most difficult to control threats to museum and archive collections through contact and off-gassing. This is a fairly recent area of study for conservation scientists and the constant emergence of new materials requires knowledgeable, up-to-date information to make clear recommendations. Publications by the Canada Mortgage and Housing Corporation on healthy material alternatives, the above referenced publication by the Canadian Conservation Institute, and WHMIS Material Safety Data Sheets now required by labour and health regulating agencies, are helpful in identifying the major groups of corrosive and acidic off-gassing materials. The following chart gives a general indication of preferred and prohibited materials.

5.0 PREVENTIVE CONSERVATION CRITERIA

Off-gassing of Construction Materials - Preferences

<i>Material</i>	<i>Best</i>	<i>Worst</i>
Wood and Wood Products (no wood is perfect – substitute metal with powder coating, galvanized or stainless steel, acrylic sheet, glass)	aged, seasoned, dry wood, beech, birch, mahogany	young, unseasoned wood, knots, red cedar, oak, douglas fir, sweet chestnut
Waferboards, Chipboards, Hardboards, Plywoods, Melamine-laminated Boards, Overlay Plywoods (substitute as above)	those with phenol formaldehyde, polyurea, epoxy adhesives, medium and high density overlays, ABS and phenolic laminates, exterior grade plywoods and particle boards	those with urea formaldehyde, polyformaldehyde, drying oil, rubber contact cement type adhesives, interior plywoods and particle boards, waferboard, chipboard, untempered hardboard, oil tempered hardboard, fiberboards
Papers, Cardboards	acid-free tissue, permalife paper, mat board, corrugated paper board, folder stock, honeycomb paper panels, non-woven spun bonded polyethylene sheeting	acidic newsprint, kraft papers, cardboard, common papers, glassine
Coatings, Paints, Varnishes, Stains	moisture-cured urethane, two-component urethanes and epoxies, polyurethane-based liquid plastics, acrylic latex emulsion, vinyl acrylics, acrylic urethane, butadiene-styrene vapour barriers	oil-based and alkyd paints, oil-modified polyurethane varnishes, latex varnishes, one-component epoxies, corrosion resistant paints, chlorinated rubber paints
Plastics	polyethylene, polypropylene, polyester, polystyrene, acrylic, Mylar (terephthalate), silicone, polycarbonates, air-bubble	chloride compounds, vulcanize or chlorinated rubbers, neoprene, polyvinylchloride, cellulose nitrate, cellulose acetate
Sheetings	polyurethane with polyesters, polyethylene, cross-linked polyethylene, PEVA, polypropylene, polystyrene, silicone	urea-formaldehyde impregnated paper, laminated paper boards
Foams	polyethylene foam, cross-linked polyethylene, white extruded polystyrene, ethylene/vinyl acetate copolymers, polypropylene, silicone	polyester polyurethane foam, polyether, chloroprene, polyvinyl chloride, rubber with sulphur vulcanizing agents
Plastic and Foam Boards	corrugated plastic boards, paper-faced laminated panel boards, styrene plastic-faced laminated panel boards, aluminum sheet coated on panel boards	urea-formaldehyde laminated panel, polyurethane, polyvinyl chloride foam boards
Wires and Tubes	nylon and polyester monofilament, plastic coated wire, polyethylene or silicone tubing, Teflon, glass	polyvinyl chloride tubing, vulcanized rubber, chloroprene rubber, neoprene
Adhesives and Tapes	polyacrylics, starch paste, 3M Scotchpar #415, two component epoxies, hot wax and polyethylene glues, polyvinyl acetate emulsions, animal glues, starch paste	most epoxies, polysulphides, most polyvinyl acetate emulsions and solids, cellulose nitrate, most contact cements
Textiles	unbleached cotton, linen, polyester, needlefelt, acrylic felt, nylon, hook and loop fasteners, polyacrilonitriles, non-woven polyester sheeting	wool, fabric treated with flame retardants, durable press finishes, rubber backed carpet

5.0 PREVENTIVE CONSERVATION CRITERIA

Water Damage

Water damage from both external and interior sources has been the cause of extensive losses in museum and archival collections. Particular care must be taken to ensure that the building envelope is weather tight, denying entry of rainwater under all conceivable weather conditions. Generally, it is poor planning to place collection materials in below-grade spaces. If unavoidable, particular care must be taken to ensure no infiltration of water through foundation walls, at service entry points, and through slabs on grade. In addition, providing for water removal through drainage, perimeter channels, etc. in the event of infiltration, is desirable.

Reliance on system components having a high maintenance requirement to remain effective, such as caulking, short life-span membranes, etc. should be avoided. Particular problem areas include: roof areas not properly drained, poorly detailed flashing, sloped glazing, skylights, snow build up against vertical surfaces, inadequate ground surface drainage, and poorly constructed operable windows.

Water damage can also result from interior sources such as sewer backup, leaking pipes, and blocked drains. Water-using mechanical equipment and water piping (except sprinklers) must not be located above collection spaces. These should be located in service corridors away from the collections. Where water is unavoidable in the collection areas, adequate drainage, as well as drip pans and alarms, should be placed under equipment and piping.

Physical Damage

Generally, physical damage is an operational concern. However, there are several design considerations that can contribute to lessening this area of risk. It is unacceptable to have mechanical and electrical equipment requiring maintenance located within collection spaces, since this results in risk of accidental damage to collections by workers carrying tools and equipment. Provision of properly designed corridors, doorways, elevators, dumbwaiters, loading docks, and related spaces facilitates the safe movement and handling of collection materials.

The concerns surrounding shipping and receiving collection materials combine those of artifact circulation generally, with the special needs that arise when items must move in or out of the building. Providing for easy access and turnaround for delivery trucks; an indoor (or as a minimum weather protected) truck bay; level loading / unloading facilities; easy security supervision; and direct access to the non-public circulation systems are essential.

One of the most common threats to collections is overcrowding in storage. This can create unsafe situations for retrieving an object when blocked by other objects, and through contact and movement between objects. Similarly, collection materials placed in aisles can lead to risks to both staff and collections. In some cases overcrowding can create micro-environments by not allowing adequate air circulation that in turn lead to mold and insect damage.

Design live loads can only be determined through a collaborative process in which intended storage configurations and planning assumptions are agreed. All collection storage space should assume use of compact storage throughout the space regardless of whether compact systems will be used initially. In areas where conversion of storage systems to compact systems will be done in future, depress slabs to accommodate future rails and fill to finish to floor level with lightweight concrete. This will permit future installation to avoid ramps.

Damage Due To Fire

Catastrophic losses of collections have occurred from fires, from smoke, and from the water used in firefighting. Although there is concern about water damage from accidental or legitimate discharge, fire authorities and experts and most conservation bodies agree that water sprinklers are the best single source of protection after prevention. The building codes generally permit the sprinkler system itself to function as the alarm (generally, water flow through an open head signals the alarm). Since in this scenario there is inevitably some level of fire, smoke, and water damage, an earlier warning system is desirable in museum and collection facilities. This is usually a smoke detection system which gives a warning earlier than sprinkler discharge and permits the possibility of intervention before discharge. Extra sensitive smoke detection systems such as VESDA are increasingly being used in collection storage facilities.

Compartmentalization is an effective way of minimizing the potential impact of a fire. This involves the arranging of collection storage rooms in as small a number of modules as can be functionally tolerated and constructing the divisions between them as well as all six sides of the perimeter of as high a fire rating as can be afforded. This should be arranged to coincide with separate environmental zones required for separate collection categories if possible.

In addition to sprinklers, the building must be equipped with a standpipe fire hose system and hand-held fire extinguishers of the most appropriate type, selected for the nature of the combustibles, the potential severity, the effectiveness of the extinguisher on the hazard, the potential for damage to collections from extinguisher agents, the ease of use, the personnel available to effectively operate the extinguisher, the adverse chemical reactions between the extinguishing agent and the burning materials, the safety of the operators, and the maintenance requirements for the extinguisher.

Theft And Vandalism

Preventing intentional loss and damage is a preoccupation of those responsible for collections. The high commercial value of many works of art and artifacts is generally well known. The collections held by public museums represent a major asset. Many objects are irreplaceable. Some of these items can easily be carried and all are potentially subject to vandalism.

Security measures generally consist of an integrated combination of operational and facility means. The facility aspects, in turn, consist of two categories: electronic monitoring including detection, alarm, and communication systems, and physical barriers to access including zoning of access, design of spatial envelopes, and access control hardware. A security presence or monitoring is required at all points of entry and egress, including shipping/ receiving and staff entrances

6.0 TECHNICAL REQUIREMENTS

The following technical design criteria are, where applicable, based on the preventative conservation design principles presented in the previous chapter. They are organized under traditional building system disciplines.

6.1 Architectural Systems

Building Envelope

The building envelope is considered to include exposed and concealed walls and panels, windows, roof lights, glassed frames, penetrations (doors, shutters, louvres, etc.), slabs on grade or over unheated space, roof, terrace, or traffic deck. All components of the envelope must meet the following criteria:

The envelope must meet or exceed current regulations and best practice for energy conservation. Fire rating must be in accordance with the current National Building Code. The envelope must resist all external forces which can be reasonably predicted over a 100 year period, including air pressures and earth or structural movement. The envelope must permit the maintenance of the interior temperatures and humidities specified for particular museum spaces under predictable extremes. The insulative layer must be continuous throughout this envelope and tight to all penetrations. All elements positioned external to the insulative layer must be designed to accommodate expansion and contraction within the service temperature range of -40°C to +80°C. All elements which are within the insulative layer must be designed to accommodate expansion and contraction within the service temperature range of -20°C to +30°C.

The membrane air / vapour barrier must be properly placed in the wall construction, have very low permeability, and retain its performance under maximum wind load conditions or pressure differentials. The barrier must be rigid and durable and must be continuous through the envelope, with all elements of the barrier durably and functionally integrated at joints. Air / vapour exfiltration from the building must be tested following completion of air barrier installation and must satisfy criteria which support the specified interior environments without degradation of building components. The need for internal barriers between humidified areas and non-humidified areas, or areas intended for different set points, must be studied.

The envelope must secure the interior against invasion of pests, vermin, insects, plant and fungoid spores, and other organisms which may promote conditions which could cause deterioration of collections. The envelope must resist intrusion by unauthorized persons. Louvres, shutters, door and window frames, and other openings must be integrated with the building envelope.

Glazing systems must be designed and made to safely withstand local environmental conditions in accordance with the applicable building code. Metal glazing frames must be designed to prevent transmission of temperatures that would permit condensation to form on inner surfaces. Where extreme conditions may overcome the thermal break, the framing must accommodate, by design, the dispersal or disposal of condensate. Glassed areas must meet all envelope criteria except that thermal performance may be reduced. Colour temperature of daylight transmitted to the interior must not be appreciably changed in spaces where indicated.

6.0 TECHNICAL REQUIREMENTS

Exterior doorways must be constructed to minimize air passage, with durable effective weatherstrip on all sides, using the best technology available. Door frames must be designed to prevent condensation on inner surfaces and be integrated with the insulative layer and the air / vapour barrier. Doors must be insulated to keep inner surface temperatures above the dew point at lowest external design temperature. Ductwork connected to louvres forms part of the building envelope and must respond to all criteria.

Accessibility

Access for people with disabilities is a practical consideration in collection repository buildings, and the need for barrier free access for staff and visiting researchers must be given special consideration. The guiding principle must be that movement and access for users of wheelchairs and other mobility aids are fully integrated and as little distinguished from regular circulation as possible. Any public and staff spaces of the building, must be designed to accommodate the disabled. The paths of travel used by those in wheelchairs must be direct and integrated into general movement systems.

The design of the facility must be in accordance with current regulations and guidelines published by recognized accessibility advocate groups. Consultation with an advisory group or consultant during the design period is also recommended to achieve the most sensitive results.

Finishes

The finishes within all areas of the building must conform to the preventive conservation considerations outlined in the Chapter 5 section on Contaminants and at the same time be supportive of the architectural concept and the stated design objectives.

The design process must weigh each finish material and coating choice against the following criteria:

- functional performance: sound transmission, sound absorption, reflectance, stability
- durability
- maintenance: all finishes must be cleanable and require minimal maintenance
- ease of access for maintenance purposes
- acceptability from a collection conservation perspective based on stability over time
- reaction with other materials
- sustainable design considerations
- fire spread rating

Finishes in public areas with little or no supervision such as washrooms and corridors must be vandal-proof, easy to monitor for pests, and easily cleanable. Serious consideration should be given to upgrading the quality of finishes in mechanical and electrical spaces beyond usual practice to better support pest management practices.

Daylight

The implications of the admission or restriction of daylight to specific spaces must be analyzed. Generally, daylight should not be admitted to any areas where collection material will be present. However, daylighting may be considered in certain laboratory or reference areas if the design is such that light levels and distribution are controlled by architectural means, or provision is made to completely eliminate (blackout) the daylight, and the light that is admitted can be modulated to the intensity, ultraviolet, and infrared requirements of the space as described in the earlier section on light. Since mechanical blackout systems are prone to failure, the architectural solution is the preferred option.

In collection storage areas, the preferred approach is to provide good overall light levels for inspection, retrieval, and housekeeping, but switched in local zones that allow only the area being worked in to be lit at any one time. Operational practice will ensure that collection storage areas are dark most of the time.

Provision of collection work spaces close to the collection storage helps minimize the time that lights are on in the storage. Objects are brought out to the workspace for any lengthy process, permitting the general storage to remain dark.

Circulation

Circulation spaces and systems must respond to three primary criteria:

- the safe circulation of collection materials through the City Collection Repository with specific attention to the movement in and out of the building itself
- safe and straightforward movement of staff and visitors to the Office spaces.
- organization of circulation routes within a concept of access zones

All movement of collection materials, whether crated or not, should involve as little handling and as few hazards for the objects as possible, as well as avoiding damage to the building. To achieve this, the typical patterns of movement, and sequence of functions involved in the use of collection materials, must be considered and every effort made to minimize the distances and manipulations involved.

Conveyance vehicles should ride easily and smoothly; corridors should be wide enough for easy manipulation, and unobstructed, with as few turnings as possible; doors should accommodate vehicles and objects with ease; routes should be short and direct, with few doors. Changes in floor finish from room to room should not result in significant thresholds that would cause carts to be jarred.

If travel between floors is necessary, a freight elevator equipped to accommodate the largest object to be stored on the upper level should be provided. Where collection circulation requires movement to and from public or heavily trafficked areas, recessed entry ways are required.

The concerns surrounding shipping and receiving collection materials combine those of artifact circulation generally, with the special needs that arise when items must move in or out of the building. Providing for easy access and turnaround for delivery trucks; an indoor (or as a minimum weather protected) truck bay; level loading / unloading facilities; easy security supervision; and direct access to the non-public circulation systems is essential.

6.0 TECHNICAL REQUIREMENTS

All interior doors and collection circulation routes, including freight elevator, in the path between collection shipping/receiving and all spaces designated as having collection present must accommodate the dimensional criteria noted in the Unit Space Sheets.

Doorways between the loading dock and the holding areas must be sized to accommodate the objects described above, with their crates and any conveyance needed to move these. Movement by forklift is common.

The ideal collection material loading condition is an enclosed truck bay to provide indoor parking for transport vehicles, including tractor-trailers with the door closed. To assist in side and rear loading of vehicles which will vary in size and height, and so that a minimum of lifting of heavy objects is required, generously sized hydraulic lifts are required along the back and one side of the truck bay. Direct access through security and the receiving / quarantine / fumigation area to registration and general collection circulation systems is required from the loading dock. The loading dock should also allow a forklift to drive on and off trucks for movement of large and/or heavy items, and there should be a permanent parking space for the forklift.

The design of circulation systems and mechanical and electrical spaces must allow for movement of maintenance materials and equipment, and for replacement of mechanical and electrical equipment. Access for all maintenance, adjustment, and monitoring requirements must be allowed for without requiring access through collection spaces.

6.2 Structural Systems

Choice of Systems

The purpose of this section is to identify criteria for consideration in structural system selection and design. In new construction, the inherent qualities of *poured-in-place reinforced concrete* structure offer many advantages, and facilitate meeting the specialized criteria for the collection storage building. The following advantages of concrete must be considered in the weighing of cost and other criteria during the system selection process:

- inherent fire protection and separation
- reduced structure-borne sound and vibration transmission
- simplified detailing of enclosure (air barrier) which is more likely to lead to a satisfactory result at less cost
- greater structural loading flexibility – i.e. better lateral distribution of loads

For large collection storage spaces, and workshop spaces for large artifacts where longer spans are required, structural steel framing may be preferred for floors or roofs above these spaces.

Design Loads

The structure of the building must be designed and executed in accordance with the applicable building codes including seismic considerations. Live load design criteria must also be discussed with City Collection, Archives, and Edmonton Public Art representatives in areas where the requirement may exceed code requirement including collection storage and collection processing spaces.

Design live loads can only be determined through a collaborative process in which intended storage configurations and collection processing assumptions are agreed. All collection storage space should assume use of compact storage throughout the space regardless of whether compact systems will be used initially. In areas where conversion of storage systems to compact systems will be done in future, depress slabs to accommodate future rails and fill to finish to floor level with lightweight concrete. This will permit future installation to avoid ramps.

6.0 TECHNICAL REQUIREMENTS

6.3 Mechanical Systems

Heating, Ventilating, and Air Conditioning Systems

The HVAC systems must provide precision environmental control to the building to the standards defined in the Unit Space Sheets, Chapter 7.

The following general criteria must be met:

- Systems must follow advanced practice for energy conservation and other principles of sustainable design *except where in conflict with continuity of interior environmental criteria*. In no case will energy saving measures be permitted to compromise the interior environmental criteria presented in this document. All mechanical systems must be thoroughly coordinated with the architectural design and not encroach upon critical spatial dimensions such as collection storage and circulation routes and exhibition space requirements.
- Systems must provide efficiency and economy in both capital and operating costs. Maintenance procedures must be clearly outlined in a preventive maintenance plan to encourage compliance and minimize system failures. Equipment must be arranged for easy access and replacement. Complete as-built drawings and equipment manuals must be furnished at completion.

Note the following observation by Stefan Michalski of the Canadian Conservation Institute that can also be applied to collection storage facilities:

“One unfortunate syndrome worldwide is the construction of an elaborate museum building by generous capital grants and outside technocrats, which is then operated on a shoestring by mere mortals. The result has been many white elephants built through the 1970s and 1980s. Our primary advice to museums now is: design building systems for reliability, for the long haul, and for local operating resources.”

Outdoor ventilation air must be supplied at rates which recognize concern for indoor air quality. All systems, considered in combination, must operate within the noise criteria limits prescribed in the previous section on acoustics. In order to reduce the demands on humidity control equipment, it is suggested that the outside air percentage be adjustable in response to occupancy loads.

The system must be designed to include redundant pieces of critical or difficult-to-repair or replace equipment, to permit the maintenance of critical environments in the event of equipment failure. The system must be designed to maintain the specified environments under emergency conditions, such as electrical power supply interruption. Under such conditions, collections and security staff would take appropriate operational precautions such as closing the Repository, removing most of the occupant load, etc. An assessment of the building's passive holding capacity and the reliability of electrical supply will be a factor in this consideration. Computer modeling of various emergency conditions is recommended. The systems must also be designed in a manner that avoids disruption to environmental conditions for equipment maintenance shutdowns.

6.0 TECHNICAL REQUIREMENTS

Direct exhaust must be provided for those spaces with an identified need. Energy recovery measures should be considered for all exhaust points. The properties of the exhausted air and the nature of its exhaust must comply with all applicable environmental regulations with staff safety being a primary consideration. Makeup air must be conditioned to maintain the environmental criteria for the given space. Make up air units must be acoustically isolated from the spaces they serve.

Mechanical equipment involving liquids (coils, humidifiers, condensers, etc.) must not be located above collection storage areas, or other spaces such as labs or collection processing spaces where collection material is likely to be present.

The mechanical systems must be controlled and monitored from a central microcomputer, with graphic display, keyboard, and printer. The system must sound an alarm if environmental conditions deviate from the prescribed limits, or if any component of the system fails. The control / monitoring system must also record, over time, the environmental conditions in all spaces. Reporting will be both to the office area and a designated remote City location.

Dual stage filtration including pre-filtration panels, and high efficiency bag filters shall be used in all air-handling units. Additional space should be reserved in the units for further future upgrading of the filtration component. Specific analysis of the ambient air at the building location is required to determine filtration requirements. Edmonton is considered generally to have medium-high air pollution levels.

The HVAC system must be carefully zoned (compartmentalized) so that a contamination in one area (smoke, insects, bacteria, etc.) does not spread to the entire facility, especially to or from collection workrooms, storage, and exhibition galleries; provide positive air pressure differential at entrances to minimize the infiltration of dust and other contaminants; and avoid the creation of micro-environments which may be outside the design parameters of the space.

Access arrangements for mechanical systems should minimize the need for access by maintenance personnel to collection spaces. Access should be designed to permit replacement of the largest components when required.

The HVAC system must have a provision for quick air evacuation from all areas of the building that can be used as a smoke evacuation system or for any other emergency. Access to this system must be restricted to prevent improper usage.

The control of the relative humidity and temperature in spaces in which collections are present must be fully modulating or have enough steps to avoid rapid variations of the RH values. The priority must be given to RH over temperature, except for the cold rooms, where RH must nevertheless be tightly controllable. The programs for the regulation of temperature and relative humidity should implement the best available technology. The operator shall be able to modify any program during the operation of the system without affecting its performance. Humidity sensors should be of the best quality with minimal drift and simple to re-calibrate. Combined with high quality sensors, the means to control the relative humidity must be adequate to maintain the required deadband. Fully modulating or multi-stage capacity control for both humidification and dehumidification must be standard. All aspects of the mechanical system must be designed to control transfer of sound and vibration to public, staff, and collection spaces.

6.0 TECHNICAL REQUIREMENTS

In order to minimize the risk of water damage to the collection, water and drainage pipes (excepting the sprinkler system) must not pass over collection storage, or other areas where collection materials are housed. Floor drains must be provided in washrooms, mechanical rooms, loading dock, elevator pits, activity rooms, and all other spaces where water may accumulate.

Generally, collection storage spaces should not be located below grade. However, if this is unavoidable, a drainage system must be installed and sized to quickly carry away water in the event of water entry. Floor drains must also prevent backflow of water, entry of pests, and entry of sewer gases.

Fire Protection

The concern for life safety is paramount and should be met by thoughtful compliance with applicable codes and standards. However, the concern for the protection of the collections is not automatically accounted for by straightforward compliance with codes, and therefore requires special consideration.

Reference should be made to the applicable codes and design guidelines. Consultation with local fire-fighting authorities during the design stage is recommended. Every effort should be made to produce a building that will resist the spread of fire and not materially contribute to the fire load or fire growth rate. The integrity of the fire separations must not be compromised by the openings created to provide access, or by the design of HVAC equipment. As well, walls and ceilings must be finished with materials having a flame spread rating maximum of 25.

The dedicated collection storage area within the facility, that includes a number of individual collection storage vaults, requires a two hour fire separation to segregate the collection storage from other functions within the Repository. In addition, any collection storage vault that exceeds 464.5 sm (5,000 sf) should be compartmentalized into smaller areas that are segregated by a two hour fire separation. These requirements are in addition to and regardless of, the code requirements for the facility. All details normally required in a two hour rating such as fire dampers and rated doors shall be provided.

Access for the fire department to the property and to the building itself should be in accordance with applicable building codes. In addition, the fire department connection, which supplies water to both the sprinkler system and the standpipe system, should be well identified and easily accessible.

Care in the design and testing of the sprinkler system itself is also required to ensure reliability and to minimize the risk of accidental discharge caused by physical damage, freezing, or human error. The use of pre-action systems, self-closing heads, and other technical details can also be considered with a view to minimizing the risk of water damage beyond what is actually required to suppress the fire. Nevertheless, most experts recommend wet pipe systems because of their inherent reliability. Regardless of the system chosen, the following special measures can reduce the risk of collection damage from accidental or functional discharge: use of welded pipe to minimize joints, painting or marking of sprinkler pipes to prevent accidental cutting, protection of heads or concealed heads, regular inspection, strategically located shut-off valves, and pressure testing.

In addition to sprinklers, the building must be equipped with a standpipe fire hose system and hand-held fire extinguishers of the most appropriate type. Selecting the best fire extinguisher for the given situation depends on the nature of the combustibles, the potential severity, the effectiveness of the extinguisher on the hazard, the potential for damage to collections from extinguisher agents, the ease of use, the personnel available to effectively operate the extinguisher, the adverse chemical reactions between the extinguishing agent and the burning materials, the safety of the operators, and the maintenance requirements for the extinguisher.

6.4 Electrical Systems

Power

The electrical system must be designed to meet or exceed all applicable federal, provincial, and municipal codes. The electrical supply should exceed the immediate requirements of the building to allow for future requirements.

Cultural facilities are increasingly reliant on electronic data media. Consideration should be given to ensuring that all 110V convenience outlets in staff spaces are supplied with current within computer operating parameters, proper grounding, and power conditioning, including brownout and blackout protection, ideally by means of a true on-line Un-interruptible Power Supply (UPS), with adequate power backup at individual workstations. The relative cost of a building-wide solution must be compared with a workstation-by workstation solution for power conditioning. If including a central approach is not practical, then these parameters must be met on an individual basis for outlets in spaces designated by City Collection, Archives, and Edmonton Public Art representatives as being likely computer locations. Consideration should be given to cable / fibre routes throughout the facility, as well as wireless-friendly building materials, and the location of patch panel closets or repeater stations throughout. A dedicated power source is required for security systems.

Lighting

Lighting systems will provide a high degree of flexibility and must be capable of meeting the previous outlined preventive conservation criteria and the specific requirements presented in the Unit Space Sheets.

Backup Power

The electrical system must provide sufficient backup capacity to operate those systems required by code, emergency lighting, security alarm systems, and the HVAC equipment to a degree required to maintain the environment within the specified limits during an interruption in electrical supply. In order to calculate the minimum requirements, modeling of building performance under critical conditions, including operational measures, is required.

All servers, network infrastructure, 'mission critical' workstations, and other 'essential' computing resources should be protected in this way. However, any power conditioning / backup systems for these critical core computing resources should be on an entirely separate system. It is also imperative to have power and environmental monitoring capability in the collection staff offices, as well as at a remote City location.

The emergency power supply system should conform to CSA C282 Emergency Electrical Power Supply for Buildings. Due to the need for security measures, the emergency power supply shall be able to operate for long intervals without requiring special care (diesel units). Provision shall also be made for easy and safe connection of a rental power generator unit to the distribution panel or to the transfer switch in the central electrical power supply.

6.0 TECHNICAL REQUIREMENTS

Fire Alarm System

A two-stage, fully addressable, zoned, non-coded fire alarm system should be installed for the purpose of alerting the occupants of an emergency situation as well as initiating appropriate action of other building systems. The system should include the following:

- control panel to carry out fire alarm and protection function, including receiving the alarm signals, initiating general alarms, supervising the system continuously, activating zone annunciator, and initiating trouble signals
- trouble signal devices
- power supply facilities
- manual alarm stations
- automatic alarm initiating devices (addressable to locate signal)
- audible signal devices
- end of line devices
- annunciator panels
- visual alarm signal devices
- ancillary devices
- remote annunciator panels

Operation of any initiating device should cause the following:

- audible and visual signal devices to sound continuously throughout the building
- a signal to be transmitted to security or to an approved central station facility
- indication on the control panel and the remote annunciators of the zone from which the alarm originated
- automatic closing of fire and smoke doors that are normally left open
- immediate shutdown of the air conditioning and ventilation systems

The zoning of the fire alarm system should be based on floor area, building structural fire separations, and the severity of the hazard present within each area.

Fire Alarm Voice System

The facility must be equipped with a high quality fire alarm voice system to allow the delivery of emergency instructions (voice) to all areas of the building from the security control room.

Smoke Detection System

An early warning smoke detection system, comprised of both ionization and photoelectric smoke detectors, should be installed throughout the building including areas served by sprinkler systems. This may exceed code requirements but is a requirement for the protection of the holdings to give advance warning ahead of sprinkler discharge. The type, design, spacing, and area of coverage must be selected to reflect the area, volume, ceiling height, and fire hazard condition, which might be encountered in the particular areas of the building. Consider a VESDA system for collection storage space.

In specific areas where investigation shows that the detectable quantity of heat might precede the detectable quantity of smoke, the detection system should be reinforced with strategically located heat detectors.

Equipment Location

Electrical switchgear, fuse boxes, or breaker panels, and all mechanical equipment requiring maintenance access, must be excluded from collection areas. All electrical equipment must be securely mounted a safe distance away from any combustible material.

Communication Systems and Related Cable / Conduit Requirements

The City of Edmonton will review its IT infrastructure requirements and will provide detailed requirements as the project develops.

6.0 TECHNICAL REQUIREMENTS

6.5 Security Systems

This section discusses a general model for collection storage facility security from general requirements for physical, operational, and electronic security to the identification of security zones and the application of requirements within each zone. It is recommended that the City of Edmonton have a professional security assessment completed prior to the design stage of the project.

Concept

The model concept of security discussed here is based on the utilization of several interacting security systems, which function in parallel and provide the levels of protection necessary to adequately safeguard personnel, collections, data, and assets from assessed threats. These interacting systems are described in the following sections.

Operational Security

In an ideal model, the building and site will have access to 24-hour per day, seven-day per week security coverage. After-hours guards must be able to monitor the entire building from a single position.

The number of security staff required will be determined by the vulnerability of the building to intrusions and the degree of protection afforded by the electronic security systems. The number of proprietary staff required to protect the collections when in use in the reference room or collection workrooms will be determined by the design of spaces (line of sight, viewing planes, etc.). The aim must be to minimize the number of staff by maximizing viewing planes between staff workspaces and areas which might contain collection materials.

Physical Security

The facility must be designed so as to effectively prevent illegal access by use of adjacent objects such as trees or parked vehicles. The building fabric should be designed so that walls and roofs cannot be penetrated or scaled without the greatest of difficulty. There should be no lower adjacent structures which can act as a route to the roof or upper stories. All openings in structures that allow entry, such as vents, ducts, trap doors, and roof hatches, must be securable and electronically monitored. Manhole entrances for site utilities such as gas, water, sewage, electricity, telephone lines, and drainage outlets which provide access to ductwork or pipes that lead into the building, and which are large enough to accommodate people, should be secured and monitored. All utilities should be protected and not accessible to the public.

Windows on the ground floor are a considerable weakness and should be designed, illuminated, and protected so as to prevent easy access. The use of polycarbonate laminates should be considered. In the case where a window may give access to a transitional area, the glass should be either polycarbonate laminate or 1/2" plate glass. Accessible operating windows are not acceptable.

The number of doors into and out of the collection repository should be no more than the minimum number of doors required for efficient operation and fire safety, but should include separate access for catering supplies and food waste, construction waste, and chemical waste disposal. Hardware requirements should be determined at the time of the security assessment. All entry points should be clearly visible from the adjoining streets and well lighted.

Electronic Security

All security electronics will report to a central security system monitored by the City / collection staff.

The following systems must be installed as directed in the specific 'security level' definitions which follow:

1. Electronic Alarm system: *Requirements to be determined through a security assessment at the schematic design stage.*
2. Closed Circuit Television System (CCTV): *Requirements to be determined through a security assessment at the schematic design stage.*
3. Card Access System: *Requirements to be determined through a security assessment at the schematic design stage.*
4. Security Communications: *Requirements to be determined through a security assessment at the schematic design stage.*

Security Levels

Within the building, spaces will require varying degrees of security based on the contents and activity of the space. Security requirements are given in three levels according to the following guidelines:

LEVEL I (highest)

- secure storage for extremely valuable and rare collections (currently not planned for CCR)
- exterior doors

LEVEL IIA (high - public access)

- lobby
- meeting room
- reference room

LEVEL IIB (high - non public access)

- secure storage for collections, curatorial work/storage lay-out areas, restricted areas (vaults)
- conservation laboratories
- workshop areas
- collection shipping / receiving area
- areas where sensitive records are stored
- audiovisual and high value attractive items
- any area that may contain collection material overnight
- chemical storage
- emergency supply cabinets

LEVEL III (basic)

- general office space
- general storage and supplies
- areas that never contain collection material or attractive, high value items
- mechanical rooms
- first aid room

6.0 TECHNICAL REQUIREMENTS

6.6 Commissioning

Commissioning is the process of managing the transition of the building from a construction mode to an operating mode. Attention to a well designed, well integrated commissioning process is particularly important to museum projects due to the reliance on the performance of systems for collection preservation. The objective of commissioning is to maximize the effectiveness of project delivery activities and of environmental support provided to museum staff and collections. Commissioning is a transitional process that moves the facility from a passive building to an active operating phase, ready for occupancy. Experience has shown that comprehensive commissioning is required in order to ensure that the intended museum requirements have been met.

Every building is unique. The nature and extent of commissioning varies according to the size, end-use, and complexity of the facility; and the types of systems installed. All systems must be commissioned. Commissioning will normally include the following:

Performance Verification

The purpose of verification is to ensure that the final product meets the initial requirements. Verification takes place as quality management activities during the implementation and commissioning phases of the product delivery system. It comprises examination of components, subsystems, systems, and environments.

Documentation

Complete, accurate, and usable documentation is needed to support those who deal with and operate the building. Resources must be allocated for the preparation of documents used to operate and manage the building in order to provide effective asset management.

Passive to Active Hand-Over

This transforms the static building facility into an active accommodation service ready for occupancy. Activities include:

- training of operating staff for normal and emergency conditions
- setting up service contracts
- installing signage
- establishing monitoring and information systems

7.0 UNIT SPACE REQUIREMENTS

Guide To Unit Space Sheets

The Unit Space Sheets (USS) present the detailed criteria for each individual space required in the facility. The types of entries indicated on these sheets are as follows: a yes indicated by \checkmark or a no indicated by a blank space when applicable to the category; a numerical value when applicable to the specific category; a code for each category and option (e.g. ENV 3 for Environment Type 3); and a reference to an explanatory note indicated by a number in brackets (e.g. (3)). More than one type of entry may be indicated for one category (e.g. code + note). The following is a description of the categories of criteria presented in the Unit Space Sheets and the meaning of each of the possible entries. References to the CCR pertain to the new City Collection Repository, and references to FEPR pertain to the new collection repository at Fort Edmonton Park (included for reference or comparison).

Space Name

Each space has been assigned a name that is used consistently throughout this project.

Space Number

This number is unique to each individual space, and is composed of a group identification letter, and a space number. For example, space A.1.2 has the following characteristics:

Space Group	A	Visitor Services
Subgroup	A.1	Visitor Arrival
Individual Space	A.1.2	Main Lobby

Activity Description

This is a description of the primary functions or activities to be carried out in the space. It will include the primary activities and any additional activities that will require special consideration in design.

Facility Description

This is a description of required and/or desired attributes of the space. It will include the basic facilities that will be in the space and any equipment that will require specialized consideration of electrical, mechanical, and other building systems.

Notes

This section is used to expand on specific technical requirements.

7.0 UNIT SPACE REQUIREMENTS

Floor Area

The **net** functional area required to meet the functional requirements is indicated in square metres. All area figures express *net functional area*: true net space devoted to each function measured to inside face of defining partitions or boundaries. Internal circulation within exhibition spaces and aisles/manoeuvring space in collection storage spaces are counted as part of the *functional area*. Otherwise no circulation, building structure, or building service space is counted as functional area.

Users

The space may be used by *staff* (including security staff, contract personnel, and volunteers), *visitors* (including individual visitors and groups), and *others* (to be specified in a note). The presence of each type of user is indicated by ✓.

Hours of Use

The space may be used during normal City Collection Repository, Archives, and Public Art Department office hours, defined generally as 7:00 AM to 6:00 PM but also includes any hours in which staff are at their job (e.g. evenings, weekends). Special times refer to unusual events, such as weekend events, or any other special activities that occur outside of the Repository's general hours. These are indicated by a ✓ when applicable and are left blank when not applicable.

Critical Dimensions

Where one or more dimensions of a room or its proportions are critical to the planned operations, the dimensions are given here in feet and metres. Indicated ceiling heights in the Unit Space Sheets are a minimum and refer to the height from finished floor to the lowest obstruction at the ceiling plane.

This section is also used to define the access criteria for collection items of different size categories as follows:

ACC 1 Oversized Collection Objects

Extremely large artifacts are a small portion of the City Collection to be stored at the repository, however they represent a significant portion of the City of Edmonton's Public Art collection that will be temporarily stored at the Repository when undergoing conservation treatments. Therefore, the routes to and from Shipping / Receiving, Public Arts Temporary Holding Space, the Conservation Lab, and any space that might require the movement of Public Art objects or large City Collection objects must be sized to allow for transport of these objects.

Openings for oversized collection artifacts will require clear dimensions of 4.27 m (14'-0") high and 3.05 m (10'-0") wide. All oversized collection movement will have to accommodate the turning radii of objects 4.57 m (15'-0") long.

Maximum required dimensions and turning radii of objects must be verified with the City Collection Repository and Public Art department staff during the design phase.

ACC 2 General Collection Storage and Handling

The general minimum standard for City collection use and storage spaces including labs, workrooms, and collection storage is as follows:

Continuous route including doorways having clear dimensions of 2.13 m (10'-0") high and 1.82 m (8'-0") wide.

Maximum required dimensions and turning radii of objects must be verified with the City Collection Repository staff during the design phase.

Collections

The presence of the City of Edmonton's collection items in this space – whether permanently or temporarily – is indicated by a ✓. The presence of collection items means that technical criteria related to collection conservation apply to the design of building systems. This category also implies that the dimensions of the required access to the space must be of a scale to accommodate the movement of the collection materials.

No indication means that collection items will not be in this space and normal technical criteria apply.

7.0 UNIT SPACE REQUIREMENTS

Environment

The following summarizes the different categories of environmental criteria applicable to different spaces within the building complex. General application is indicated. Each category is indicated by a code.

CODE	CRITERIA								
ENV 1	<table border="0"> <tr> <td data-bbox="500 594 915 621">TEMPERATURE SET POINT</td> <td data-bbox="1065 594 1338 621">Summer 22° C</td> </tr> <tr> <td></td> <td data-bbox="1065 632 1338 667">Winter 20° C</td> </tr> </table>	TEMPERATURE SET POINT	Summer 22° C		Winter 20° C				
TEMPERATURE SET POINT	Summer 22° C								
	Winter 20° C								
GENERAL ENVIRONMENT	<table border="0"> <tr> <td data-bbox="500 732 992 760">RELATIVE HUMIDITY SET POINT</td> <td data-bbox="1065 732 1370 760">Summer ≤ 60%RH</td> </tr> <tr> <td></td> <td data-bbox="1065 770 1370 806">Winter ≥ 30%RH</td> </tr> </table>	RELATIVE HUMIDITY SET POINT	Summer ≤ 60%RH		Winter ≥ 30%RH				
RELATIVE HUMIDITY SET POINT	Summer ≤ 60%RH								
	Winter ≥ 30%RH								
<p>public areas, reference room, staff offices and non-collection workspaces</p> <p>human comfort and health criteria</p>	<p>PERMITTED FLUCTUATION</p> <table border="0"> <tr> <td data-bbox="500 947 878 974">Maximum Fluctuation/Time</td> <td data-bbox="1065 947 1182 974">± 1.5° C</td> </tr> <tr> <td data-bbox="500 984 867 1012">Fluctuation/Place to Place</td> <td data-bbox="1065 984 1182 1012">± 1.5° C</td> </tr> <tr> <td data-bbox="500 1022 932 1096">Maximum Rate of Temperature Set Point change (24hrs)</td> <td data-bbox="1065 1022 1182 1050">± 1.5° C</td> </tr> <tr> <td data-bbox="500 1106 854 1134">Maximum RH Fluctuation</td> <td data-bbox="1065 1106 1252 1134">± 5 % points</td> </tr> </table>	Maximum Fluctuation/Time	± 1.5° C	Fluctuation/Place to Place	± 1.5° C	Maximum Rate of Temperature Set Point change (24hrs)	± 1.5° C	Maximum RH Fluctuation	± 5 % points
Maximum Fluctuation/Time	± 1.5° C								
Fluctuation/Place to Place	± 1.5° C								
Maximum Rate of Temperature Set Point change (24hrs)	± 1.5° C								
Maximum RH Fluctuation	± 5 % points								
	<p>FILTRATION</p> <p>Follow ANSI/ASHRAE standard 62.1-2004 Ventilation for Acceptable Indoor Air Quality, Air Class 1</p>								

CODE**CRITERIA****ENV 2****TEMPERATURE SET POINT**

Summer	22° C
Winter	20° C

**GENERAL
COLLECTION****RELATIVE HUMIDITY SET POINT**seasonal change $\leq 5\%$ points/month

Summer	55%RH
Winter	40%RH

PERMITTED FLUCTUATION

Maximum Fluctuation/Time

 $\pm 2^{\circ} \text{ C}$

Fluctuation/Place to Place

 $\pm 2^{\circ} \text{ C}$

Maximum RH Fluctuation

up 5 % points
down 10% points

FILTRATION

Maximum level of gaseous pollutants:

Hydrogen Sulfide

 $\leq 0.1 \mu\text{g}/\text{m}^3$

Sulfur Dioxide

 $\leq 1.0 \mu\text{g}/\text{m}^3$

Nitrogen Dioxide

 $\leq 1.0 \mu\text{g}/\text{m}^3$

Ozone

 $\leq 1.0 \mu\text{g}/\text{m}^3$

Acetic Acid

 $\leq 100 \mu\text{g}/\text{m}^3$

Fine Particulates

 $\leq 1.0 \mu\text{g}/\text{m}^3$

7.0 UNIT SPACE REQUIREMENTS

CODE	CRITERIA		
ENV 3	TEMPERATURE SET POINT	Summer	22° C
		Winter	20° C
METAL COLLECTION	RELATIVE HUMIDITY SET POINT	Summer	30%RH
		Winter	30%RH
PERMITTED FLUCTUATION			
Maximum Fluctuation/Time		± 2.0° C	
Fluctuation/Place to Place		± 2.0° C	
FILTRATION			
Maximum level of gaseous pollutants:			
Hydrogen Sulfide		≤ 0.1 µg/m ³	
Sulfur Dioxide		≤ 1.0 µg/m ³	
Nitrogen Dioxide		≤ 1.0 µg/m ³	
Ozone		≤ 1.0 µg/m ³	
Acetic Acid		≤ 100 µg/m ³	
Fine Particulates		≤ 1.0 µg/m ³	

7.0 UNIT SPACE REQUIREMENTS

CODE**CRITERIA****ENV 4****TEMPERATURE SET POINT**

Summer	12.5° C
Winter	12.5° C

COOL STORAGE ENVIRONMENT**RELATIVE HUMIDITY SET POINT**seasonal change \leq 5% points/month

Summer	\leq 40%RH
Winter	\geq 30%RH

audio disks,
 videos,
 magnetic media,
 diskettes,
 CDs

PERMITTED FLUCTUATION

Maximum Fluctuation/Time

 \pm **2.5° C**

Fluctuation/Place to Place

 \pm **2.5° C**

Maximum RH Fluctuation

 \pm **5 % points****FILTRATION**

Maximum level of gaseous pollutants:

Hydrogen Sulfide

 \leq .01 $\mu\text{g}/\text{m}^3$

Sulfur Dioxide

 \leq 1.0 $\mu\text{g}/\text{m}^3$

Nitrogen Dioxide

 \leq 1.0 $\mu\text{g}/\text{m}^3$

Ozone

 \leq 1.0 $\mu\text{g}/\text{m}^3$

Acetic Acid

 \leq 100 $\mu\text{g}/\text{m}^3$

Fine Particulates

 \leq 1.0 $\mu\text{g}/\text{m}^3$

7.0 UNIT SPACE REQUIREMENTS

CODE	CRITERIA												
ENV 5	<table border="0"> <tr> <td data-bbox="500 407 915 432">TEMPERATURE SET POINT</td> <td data-bbox="1065 407 1333 432">Summer -4° C</td> </tr> <tr> <td></td> <td data-bbox="1065 447 1333 478">Winter -4° C</td> </tr> </table>	TEMPERATURE SET POINT	Summer -4° C		Winter -4° C								
TEMPERATURE SET POINT	Summer -4° C												
	Winter -4° C												
COLD STORAGE ENVIRONMENT	<table border="0"> <tr> <td data-bbox="500 548 992 573">RELATIVE HUMIDITY SET POINT</td> <td data-bbox="1065 548 1370 573">Summer ≤ 35%RH</td> </tr> <tr> <td data-bbox="500 583 959 619">seasonal change ≤5% points/month</td> <td data-bbox="1065 583 1370 619">Winter ≥ 25%RH</td> </tr> </table>	RELATIVE HUMIDITY SET POINT	Summer ≤ 35%RH	seasonal change ≤5% points/month	Winter ≥ 25%RH								
RELATIVE HUMIDITY SET POINT	Summer ≤ 35%RH												
seasonal change ≤5% points/month	Winter ≥ 25%RH												
film, negatives,	<p data-bbox="500 680 915 705">PERMITTED FLUCTUATION</p> <table border="0"> <tr> <td data-bbox="500 758 878 783">Maximum Fluctuation/Time</td> <td data-bbox="1065 758 1154 783">± 1° C</td> </tr> <tr> <td data-bbox="500 793 867 819">Fluctuation/Place to Place</td> <td data-bbox="1065 793 1154 819">± 1° C</td> </tr> <tr> <td data-bbox="500 829 857 854">Maximum RH Fluctuation</td> <td data-bbox="1065 829 1252 854">± 5 % points</td> </tr> </table>	Maximum Fluctuation/Time	± 1° C	Fluctuation/Place to Place	± 1° C	Maximum RH Fluctuation	± 5 % points						
Maximum Fluctuation/Time	± 1° C												
Fluctuation/Place to Place	± 1° C												
Maximum RH Fluctuation	± 5 % points												
	FILTRATION												
	Maximum level of gaseous pollutants:												
	<table border="0"> <tr> <td data-bbox="500 1087 743 1113">Hydrogen Sulfide</td> <td data-bbox="1065 1087 1247 1113">≤ 0.1 µg/m³</td> </tr> <tr> <td data-bbox="500 1123 699 1148">Sulfur Dioxide</td> <td data-bbox="1065 1123 1247 1148">≤ 1.0 µg/m³</td> </tr> <tr> <td data-bbox="500 1159 737 1184">Nitrogen Dioxide</td> <td data-bbox="1065 1159 1247 1184">≤ 1.0 µg/m³</td> </tr> <tr> <td data-bbox="500 1194 591 1220">Ozone</td> <td data-bbox="1065 1194 1247 1220">≤ 1.0 µg/m³</td> </tr> <tr> <td data-bbox="500 1230 656 1255">Acetic Acid</td> <td data-bbox="1065 1230 1247 1255">≤ 100 µg/m³</td> </tr> <tr> <td data-bbox="500 1266 737 1291">Fine Particulates</td> <td data-bbox="1065 1266 1247 1291">≤ 1.0 µg/m³</td> </tr> </table>	Hydrogen Sulfide	≤ 0.1 µg/m ³	Sulfur Dioxide	≤ 1.0 µg/m ³	Nitrogen Dioxide	≤ 1.0 µg/m ³	Ozone	≤ 1.0 µg/m ³	Acetic Acid	≤ 100 µg/m ³	Fine Particulates	≤ 1.0 µg/m ³
Hydrogen Sulfide	≤ 0.1 µg/m ³												
Sulfur Dioxide	≤ 1.0 µg/m ³												
Nitrogen Dioxide	≤ 1.0 µg/m ³												
Ozone	≤ 1.0 µg/m ³												
Acetic Acid	≤ 100 µg/m ³												
Fine Particulates	≤ 1.0 µg/m ³												

CODE**CRITERIA****ENV 6****TEMPERATURE SET POINT**

Summer	17° C
Winter	15° C

ARCHIVES/PAPER**RELATIVE HUMIDITY SET POINT**seasonal change $\leq 5\%$ points/month

Summer	40%RH
Winter	30%RH

technical drawings,
lithograph transfers,
paper based archival
material,
art works on paper,
photographic prints,
rare books

PERMITTED FLUCTUATION

Maximum Fluctuation/Time	$\pm 1.5^{\circ} \text{ C}$
Fluctuation/Place to Place	$\pm 1.5^{\circ} \text{ C}$
Maximum Rate of Temperature Set Point change (24hrs)	$\pm 1.5^{\circ} \text{ C}$
Maximum RH Fluctuation	$\pm 5\% \text{ points}$

FILTRATION

Maximum level of gaseous pollutants:

Hydrogen Sulfide	$\leq 0.1 \mu\text{g}/\text{m}^3$
Sulfur Dioxide	$\leq 1.0 \mu\text{g}/\text{m}^3$
Nitrogen Dioxide	$\leq 1.0 \mu\text{g}/\text{m}^3$
Ozone	$\leq 1.0 \mu\text{g}/\text{m}^3$
Acetic Acid	$\leq 100 \mu\text{g}/\text{m}^3$
Fine Particulates	$\leq 1.0 \mu\text{g}/\text{m}^3$

7.0 UNIT SPACE REQUIREMENTS

Security

This entry is a code for one of the following general security categories in a four level security program. These categories govern physical security, i.e., the construction and hardware required. Categories express level of security for function. Some spaces may derive their security from being within a space or grouping allowing some downgrading of individual spaces. This can be considered, in consultation with the Collection Repository, Public Art, and Archives staff, when layouts are final. Actual security measures used should be determined during the design process, in consultation with Repository staff, and may include an internal intrusion detection system, interior and exterior space surveillance system, exterior lighting, access control, and construction criteria.

Code	Criteria
SEC 1	Highest Security (not used)
SEC 2a	High Security – Public Areas
SEC 2b	High Security – Non-Public Areas
SEC 3	Basic Security

Finish Groups

Architectural finish requirements are presented in groups and are indicated by codes. The definitions of each group describes generic finish types and qualities where appropriate and permits greater discretion where selection is primarily a factor of architectural design. The intent of presenting these requirements is not to dictate specific finishes but to convey the functional criteria for those finishes. See also the “Contamination” segment in Chapter 5.0 and the “Finishes” segment in Chapter 6 Consider environmental and health implications of all materials.

The following categories are entered on Unit Space Sheets:

Code	Criteria
FIN 1	Floor high quality hard surface which is long wearing and easily maintained Wallspainted gypsum board Ceiling discretionary – not lay-in acoustic tile
FIN 2	Floor durable resilient flooring Walls painted gypsum board Ceiling accessible acoustic tile
FIN 3	Floor durable resilient flooring Walls painted gypsum board Ceiling painted gypsum board
FIN 4	Floor durable resilient flooring with lab quality chemical resistance, integral base preferred Walls painted gypsum board, painted concrete, painted concrete block Ceiling painted gypsum board

FIN 5	Floor	densified concrete
	Walls	epoxy coated concrete block, concrete
	Ceiling	sealed or coated to prevent insect movement and for dust control
FIN 6	Floor	hard surface long wearing low maintenance (e.g. ceramic tile)
	Walls	moisture proof material low maintenance (e.g. ceramic tile)
	Ceiling	painted moisture resistant gypsum board
FIN 7	Floor	sealed concrete
	Walls	painted concrete block
	Ceiling	painted gypsum board

Lighting

Lighting requirements are given in the form of descriptions of systems appropriate to a function or task and location. More than one system may apply to a particular space. Lighting codes may be further modified with a lower case letter to designate further criteria of lighting systems within a space.

Code	Criteria
L 1	Lighting systems for Collection Storage to provide 300 lux ambient range of illumination on the face of the lowest shelves.
L 2	Lighting systems to provide normal level of illumination for offices (500 lux). Consider indirect or baffled sources to minimize computer screen glare.
L 3	Same as L 2 but for labs, workshops, and workrooms, adjustable up to (800 lux)
L 4	Discretionary for circulation and lobby spaces, dimmable for special uses.
L 5	Design lighting systems for specific function.
a	Design lighting over collection areas to be locally switched so that maximum area can be off when not in use.

UV Exclusion

Spaces requiring screening of the ultra-violet content of both natural and artificial sources of light are indicated with ✓.

Daylight

This category identifies the requirement for or restrictions against the admission of daylight for operational or conservation reasons. If left blank, the provision of daylight is neither required nor restricted. The possible entries are indicated by a code and are the following:

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Code	Criteria
D 1	Daylight is required in the space.
D 2	Daylight must not be admitted to the space.
D 3	Provide daylight to this space if it is possible to do so.
a	The quantity of natural light admitted to this space must be manually controlled by blinds or drapery.

Plumbing

This category identifies the need for plumbing services and is indicated as a code.

Code	Criteria
P 1	Provide plumbing to suit equipment or facilities listed in the Space Description. Determine exact requirements in consultation with the Collection Repository during the design process.
P 2	Water and drainage pipes (except sprinkler systems) should not pass overhead.
P 3	During the design phase study measures to prevent accidental water damage through the accumulation of water with floor drains, either inside or outside the space, or by other means.

Electrical

This category identifies the requirement for electrical power. The possible entries are indicated by code. Electrical categories may be modified with a lower case letter indicating additional criteria. The possible codes and modifications are as follows.

Code	Criteria
ELEC 1	Provide normal distribution of power outlets following code requirements.
ELEC 2	Provide 110V outlets at counter height at 1.000 m spacing for work tables or where indicated.
ELEC 3	Provide overhead retractable extension cords.
ELEC 4	Provide power for additional computers: number of computers to be determined and/or verified in consultation with Collection Repository staff.
ELEC 5	Provide electrical power to suit specialized equipment indicated in the Space Description. Determine final requirements in consultation with Collection Repository staff during design phase. Verify special voltage and phase requirements.
a	Provide GFI protection for power outlets.

Telephone

Spaces requiring an outlet jack on the general building telephone system are indicated with ✓.

Information Technology

This category identifies the requirements for data and communication infrastructure.

Spaces requiring at least one data outlet are indicated with ✓. A complete review of the Collection Repository's detailed IT network needs should be undertaken as part of the building design phase.

Structural

The categories of structural loads for which to design are indicated by a code:

Code	Criteria
STRUC 1	Normal Code requirements for the designated function should be followed.
STRUC 2	Special live loads related to the functional requirements of the space to be determined in consultation with Collection Repository staff during the design process. The type of special loading to be expected in a space is indicated in the Space Description. The types of possible live loads include storage and movement of collections. Compact storage, whether installed or allowed for in future requires special considerations.

The Unit Space Sheets follow. The number on each sheet corresponds to one on the Space Requirements List in Chapter 3.0.

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