

**Fort Edmonton Park
Administration Building
Environmental Screening Report
Volume I
Final Report**

Prepared for:

**City of Edmonton
Asset Management and Public Works
Edmonton, Alberta**

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Project Number (EP-306)

August 2007

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1.0 INTRODUCTION

1.1 Background

Fort Edmonton Park is the largest living museum in Canada (2001 – *Fort Edmonton Park Land Use Master Plan Update*). Occupying an area of about 64 ha in Edmonton's North Saskatchewan River valley, the park has recreated several key periods in Edmonton's development through in-time infrastructure and active programming. Although modified and updated since 1968, the original park Master Plan approved by City council provides the overall development framework. With the updated versions of that document as a guide, the Fort Edmonton Historical Foundation has undertaken a number of the projects to enhance and expand the park's displays and facilities.

Development within Fort Edmonton Park is regulated through its Master Plan and its land use zone, the Metropolitan Recreation Activity Node (AN). This land use zone, a special zone applied to specific recreational facilities in the river valley in 2001, allows developments to proceed within the park without rezoning, as was required under the previous Metropolitan Recreation (A) Zoning. The new zone is linked to the master planning process and permitted and discretionary uses are limited to those projects identified within the park's current master plan (the 2001 *Fort Edmonton Park Land Use Master Plan*). Those plans are developed with consideration for other broader planning frameworks (e.g., the *Ribbon of Green Master Plan Policy*), and thus maintain consistency with other City policies.

1.2 Fort Edmonton Administration Building Project

Fort Edmonton Park is now considering constructing a new administration building to replace the existing one, which has mould contamination. Replacement of the administration building was proposed as one of 31 priority projects in the Council-approved 2001 – Fort Edmonton Park Land Use Master Plan Update. Discovery of the mould contamination within the building in 2005 further emphasized the need for the project, as staff could no longer use the building. Park administration personnel were moved to temporary quarters in the park train station and temporary trailers and have been housed there since.

The existing Fort Edmonton Park administration building was originally a schoolhouse that was moved onsite in 1972. Because of the poor condition of the building, eliminating the existing mould problem and taking the necessary steps to prevent its reoccurrence would have been costly and impractical. Further, growth of the park and its administrative staff had now created the need for a larger administration building designed to accommodate all administrative functions and to enhance administrative and operational efficiencies. Instead, the old administration building will be converted to a permanent storage facility supporting other uses in the park.

Through 2006, the Fort Edmonton Park Historical Foundation, with assistance from Edmonton Community Services and Edmonton Asset Management and Public Works solicited conceptual designs from local architects. These were reviewed and modified

based on comments from the foundation and park staff. Several conceptual design options for the new administration building emerged from that process; two prepared by Anthony K. Eng Architect Ltd. were finally selected in the winter of 2006-2007. The Fort Edmonton Foundation, with its City department advisors selected their preferred option in the spring of 2007. The design is now proceeding to the detailed design stage. All work is proposed for the winter of 2007-2008.

Because the work would occur within the North Saskatchewan River Valley, the proposed work triggered an environmental assessment under the River Valley Area Redevelopment Plan Bylaw (City Bylaw 7188). Edmonton Planning and Development, who administer the bylaw, recommended an Environmental Screening Report (ESR) to address potential issues at the site.

Edmonton Asset Management and Public Works requested Spencer Environmental Management Services Ltd. (Spencer Environmental) to prepare an ESR for the proposed work (renovation of the old administration building and the proposed development of the new building). This report provides the results and conclusions of that assessment.

1.3 Bylaw 7188 Environmental Review Process

Bylaw 7188 outlines the scope and process for environmental assessment for any development project proposed within the North Saskatchewan River Valley and its tributaries. The process is administered by Edmonton Planning and Development, who can tailor the assessment scope to address concerns specific to the location and type of development. In this case, Mr. Garth Clyburn and Mr. Ed Edgedy of Planning and Development have indicated a screening level assessment will satisfy the requirements of the Bylaw 7188 process.

Accordingly, this assessment was prepared to address potential impacts to the biophysical and socio-economic resources, as required under the bylaw. Key issues specific to the project were identified through consultation with Edmonton Planning and Development (Section 4.0). Those issues received particular attention in the impact analysis, although all relevant aspects of the environment were addressed in the assessment. The completed document has been provided to the Planning and Development Department, who will circulate it for review and comment to affected municipal departments and other jurisdictions with management interests in the project. Once any concerns are addressed, Edmonton Planning and Development will approve the assessment and the work can then proceed. Because municipal funding is required, the proponent department will forward the report to the Transportation and Public Works Committee through a separate, parallel process. Council approval of funding will not be required; therefore, council review of the ESR will not be necessary.

1.4 Report Organization

This report comprises 8 chapters. Chapter 1 provides background information related to the project and describes the report organization. Chapter 2 contains the detailed project description, including the project justification, scope of work, scheduling, and applicable

regulatory requirements. Chapter 3 outlines the impact assessment methodology. Chapter 4 summarizes the key issues associated with the project, incorporating professional and regulatory concerns identified in early stages of the assessment.

Chapter 5 describes the existing biophysical and socio-economic conditions at the site, which sets the context for the impact analysis in Chapter 6. Chapter 7 summarizes the findings of the assessment, and recommended mitigation and monitoring commitments. It also reviews the means by which key issues identified in Chapter 4 were resolved over the course of the assessment. Lastly, Chapter 8 provides all literature and personal communications cited in the report.

Three appendices with supporting documentation are also attached to this report:

- Appendix A: Wildlife Species Potentially Within the Study Area
- Appendix B: Environmental Site Assessment Reports
- Appendix C: Historical Resources Overview Report

2.0 PROJECT DESCRIPTION

2.1 Background

2.1.1 Proponent Information

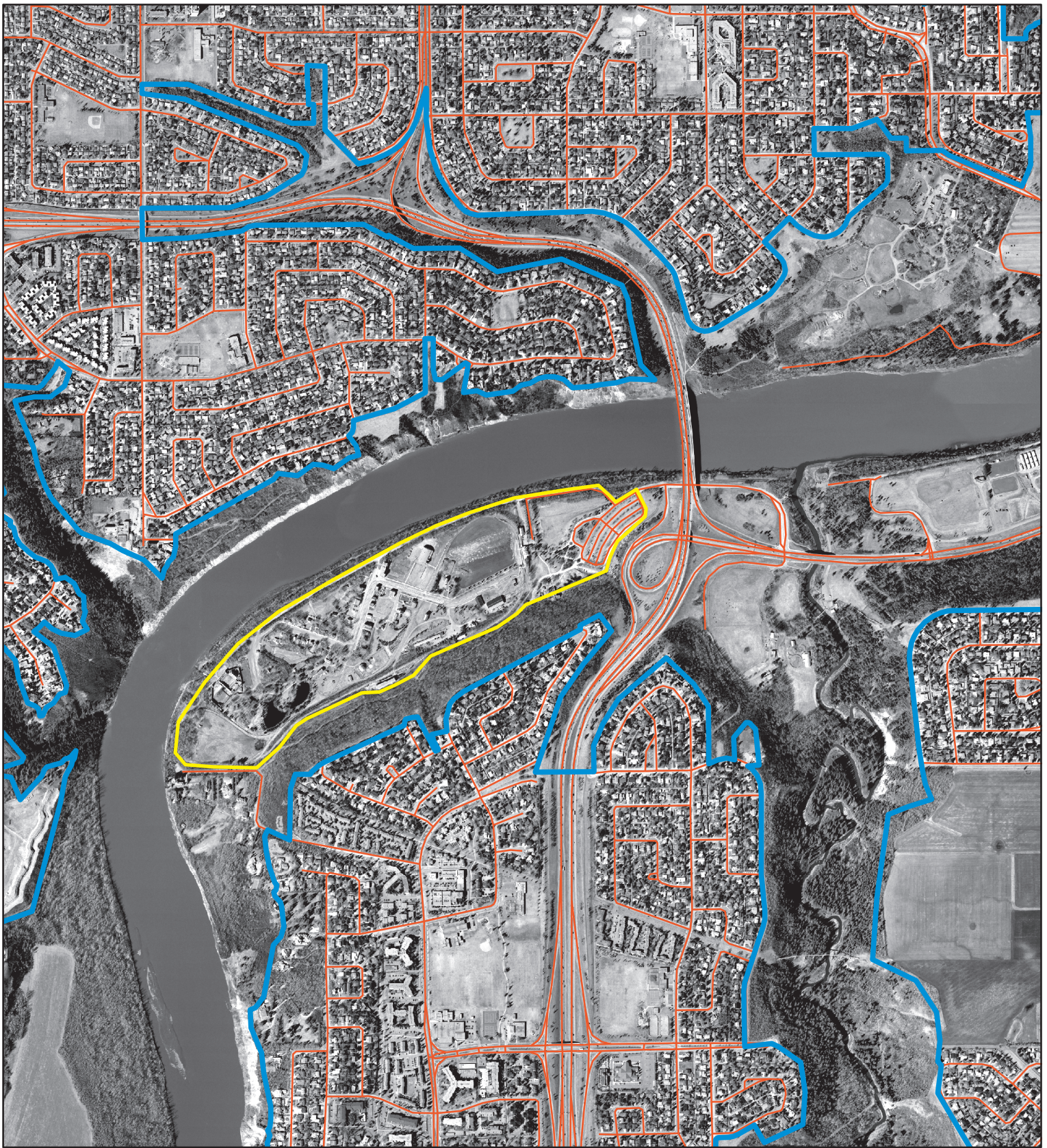
The proponent for the Fort Edmonton Park administration building development project is the City of Edmonton's Asset Management and Public Works Department, who are acting on behalf of Fort Edmonton Park. The proposed administration building designs were developed by Anthony K. Eng Architect Ltd. Spencer Environmental was retained by Edmonton Asset Management and Public Works to prepare the ESR for the project and to coordinate environmental review and permitting. Spencer Environmental, in turn, requested PHH ARC Environmental Ltd. to conduct an Environmental Site Assessment for both the old and proposed new building sites, and a Hazardous Materials Assessment of the old administration building. Altamira Consulting Inc. was also retained to conduct a Historical Resources Impact Assessment of the proposed new building site. The results of these studies were incorporated into this report.

This report represents the findings and conclusions of the environmental consultants, but it also incorporates suggestions and comments from the proponent, the design team and regulators. The specific mitigative measures outlined in this document will be implemented by Edmonton Asset Management and Public Works and its contractors as part of their commitment to environmental best management practices and technologies.

2.1.2 Project Setting

Both the old and proposed administration buildings are within Fort Edmonton Park, which is within the boundaries of the North Saskatchewan River Valley Area Redevelopment Plan (Bylaw 7188) (Figure 2.1). Both sites are on a lower terrace on the south side of the North Saskatchewan River. Fort Edmonton Park is bounded by the river to the north and west, Whitemud Drive to the east and the river valley slope to the south. Vehicle access is limited to a single road off Fox Drive and parking is provided by several gravel lots within the park area. Pedestrians can access the park from a multi-use (paved) trail that runs along the North Saskatchewan River.

The old administration building is located within the site services yard, inside Fort Edmonton Park, south of 1920 Street on the access road that runs between Al Rashid Mosque and the Motordrome. Fort Edmonton Park's train tracks lie to the southeast of the building. The site lies at the base of the naturally vegetated valley slope, just below the neighborhood of Brander Gardens.



Legend

- Roads
- NSR Area Redevelopment Plan Boundary
- Fort Edmonton Park

1:15,000

Figure 2.1 Regional Setting



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The proposed administration building will be located just outside the main entrance gate of Fort Edmonton Park, but still within the park's boundaries, within a manicured lawn area (Figure 2.2). An access road to the proposed administration building site lies immediately to the west (West Access Road). The park train station is southwest of the proposed building site. South of the proposed administration building are several pedestrian walkways that lead to the main gate of Fort Edmonton Park and to the John Janzen Nature Centre, which is directly south of the proposed site. The manicured lawn area in which the proposed building will be located is occasionally used for overflow parking and for recreational events such as the Highland Games. Large ornamental trees and shrubs border it and the West Access Road. North of the manicured lawn is the North Access Road into Fort Edmonton Park and beyond it, the river.

All of the construction work will be confined to previously disturbed areas within Fort Edmonton Park. Several ornamental trees and shrubs around the manicured area may need to be removed to construct the proposed building. Construction access to the proposed site will be off the West Access Road and staging will be within the existing graveled train maintenance yard. Construction access to the old building will be from a service road that runs south of the building.

2.1.3 Project Planning Process

Projects such as the Fort Edmonton Administration Building require several levels of departmental consultation, in several stages of the design process. In this case, the proposed building design was developed in consultation with the Fort Edmonton Foundation, the Fort Edmonton Advisory Committee and park staff. The project will soon undergo the next step of detailed design review by the Edmonton Design Committee, which requires additional consultation with other potentially affected City Departments. In this next stage, landscaping and other details of the structure's design will be developed and refined through discussions with the committee. Consultation with other City departments will be an important part of this next stage of the design process to ensure the project will have no impact on other department projects or jurisdictional interests. This consultation has already been initiated with some departments: arrangements are already in place between the project's architect and Edmonton Parks Branch to ensure that their input is incorporated into the landscape design during the next stage of design.

Previous stages of design development have focused on incorporating into the building those facilities and functions required by the administrative staff who will occupy the completed building. Various planning documents that outline design and development criteria, including exterior finishing and general siting guidelines, were also consulted early in the design process. Both Fort Edmonton administration staff and the Fort Edmonton Advisory Committee were involved in these preliminary stages of design, which were intended to ensure that the building would meet the Park's and the public's needs and be consistent with existing policy outlining future plans for the Fort Edmonton site.



Legend

- Roads
- NSR Area Redevelopment Plan Boundary

Figure 2.2 Local Study Area

1:2,500



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The requirement for a new administration building was identified during the most recent Master Planning exercise at the park. The new administration building is listed as project #30 in the Council-approved, *Fort Edmonton Park Land Use Master Plan Update* (2001). The master plan did not identify a location for the building, only the need for the new building. The master plan does, however, establish certain criteria for development of new operational facilities, including general siting criteria to ensure that the park's "in-time" elements remain isolated from any "out-of-time" elements. The project is also consistent with the *Whitemud Integrated Plan*, which stated that the three area facilities within that planning area (Whitemud Equine Center, John Janzen Nature Center and Fort Edmonton) could implement their master plans within their existing boundaries. Although outside the park gates, the proposed building site is within park boundaries. It is also outside of the historical "in-time" sections of the park, as required by the *Master Plan Update*.

The site outside the park gates was selected for several reasons. First, the mould contamination of the current administration building necessitated relocation of all work stations to a new location in the park. As no existing facility was available, a new building was required, and the project was, therefore, included in the *Revised Master Plan*. This provided the opportunity to accommodate the growth of staff that has occurred over the past several years, and to consolidate all administration staff in one location. Previously, administration staff were distributed across the park within existing buildings (including the old building), some of which comprised "in-time" program areas. This presented a difficulty in terms of communication and coordination of operations, but also introduced elements out of context with the active programming area of the park. Logistically, location of the new administration center within the active programming area or future programming areas would pose a similar difficulty, as its operation would require modern elements out of context with the park. The proposed location, outside the park gates, ensures that potential conflict with programming areas is minimized now and as the park is expanded in the future. It also provides better access for the public with park staff responsible for rental and program bookings. In that sense, the proposed location will achieve two goals: improve the operation of the park and further the planning concepts outlined in the park's master plan.

2.2 Project Overview

In order to support continued use of the old administration building, renovations will remove any hazardous materials and redevelop the building as cold storage space for farm implements. The building floor will be removed so that the farm implements can be stored on-grade within the building. The building was formerly an old schoolhouse that was brought onsite in 1972 and was likely constructed well before that time (PHH ARC 2006b). It is currently being used for storage. The single-storey building is approximately 235 m² and was constructed with a wood frame and wood siding. The building also has a sloped shingle roof and a compacted gravel foundation. The interior has painted gypsum board, with carpet and vinyl tile flooring and ceilings of drywall covered with cellulose ceiling tiles. The building is heated by a natural gas-fired forced air furnace.

Two proposed administration building designs were presented to Edmonton Asset Management and Public Works by the architect. Both designs reflect the natural setting within which the building will be set and will integrate its architecture with the existing natural and designed landscaping (Anthony K. Eng Architect Ltd. 2007). Both designs aimed to define the route to the park entrance, transition the visitor to the exhibit area and create a welcoming space for public congregation within its courtyard. The building is being designed and will be constructed in an environmentally sustainable manner, following the LEED principles and requirements for certification. The LEED system is a green building rating system for new construction projects that was designed to guide and distinguish high-performance commercial and institutional projects (USGBC 2007). Currently, Edmonton Asset Management and Public Works plans to achieve the Silver standard for this building.

Of the two options provided to the client, Option 1 was the preferred building design. The two designs are of similar size and could occupy the same site; they differ mainly in structural form. To aid in the final selection process, both options were assessed in the ESR, to identify whether significant environmental concerns might be minimized by one or the other. Option 1 has an estimated building footprint of 1123 m² and is a single storey structure with a partial basement (Figure 2.3; Anthony K. Eng Architect Ltd. 2007). Option 2 has an estimated footprint area of 890 m² and is a 1½ storey structure with a full basement (Figure 2.4). Both building designs will have foundations of grade beams and foundation walls on cast-in-place concrete piles. These piles will likely be to a depth of 7.5 to 10 m from lower floor level. The lower floor or basement (for both options) will be 3 m below grade level. Slab on-grade concrete floors will be constructed for all floors lower than grade level. The proposed designs consist of masonry surface finish on exterior steel stud walls, with steel roofing on sloped roofs and SBS membrane on flat roof areas.

Two ‘green-roof’ sections will also be added to the selected structure, one over the gift shop space, the other over the staff office area. This last area will slope to ground level and the public will be allowed to access this space during building operation hours. A security fence will block after-hours access. Exterior views of the preferred, Option 1 building design are provided in Figures 2.5 and 2.6. Floor plans of the basement and main floor are provided in Figure 2.7.

Windows will have a double glazed low-E curtain wall with pressure equalized sections to fulfill the LEED rain screen envelope design principles. Thermal and moisture protection to LEED requirements will also be incorporated in the building’s construction. Wheelchair access requirements will be included in the building as well as exterior areas. Any paving stone used for the courtyard will be placed over 200 mm of granular leveling materials compacted to 100% Standard Proctor Density (CT & Associates Engineering 2006).

Heating will be provided from a gas-fire boiler heating system with radiant heating panels. Cooling and ventilation will be zoned to different areas of the building, so that settings can reflect different time periods of occupancy. Photovoltaic panels are being

considered for installation on south-facing sloped roofs as a secondary source of energy to enhance the eco-friendly strategy.

Surface drainage will be directed overland onto the surrounding landscaping and/or collected in stormceptor catch basins. Some precipitation will also be collected on the green roofs, reducing overall run-off from the building. Finished grades will be completed such that all surface water is drained away from all buildings and structures, as recommended by CT & Associates Engineering (2006).

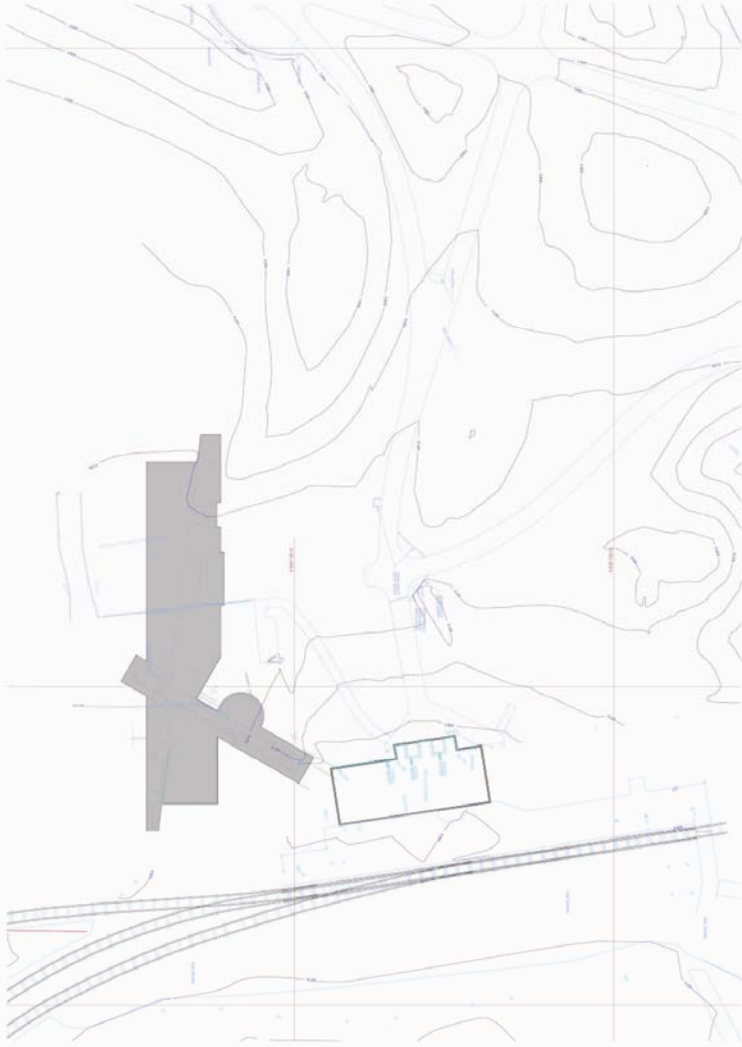
Parking for the proposed administration building will be accommodated in the currently graveled lot alongside the West Access Road. This lot is now used by administrative staff housed in the temporary facilities, at the train station and elsewhere in the park: no additional parking space will be required for staff within the new building.

Utilities to the existing train station and maintenance shop lie close to the site of the proposed administration building and include power, telephone, gas, water, storm sewer and sanitary sewer lines (Anthony K. Eng Architect Ltd. 2007). Only short connections between the proposed building and these utilities will be required to provide servicing. Utility trenches will be 3 m to 5 m deep (CT & Associates Engineering 2006).

2.3 Project Need/Rationale

The old administration building was condemned due to the presence of mould. Currently, the train station and temporary trailers are housing the administration staff, serving as an interim office space. The temporary trailers are not consistent with river valley design standards. Also, this arrangement further isolated these administrative staff from their colleagues inside the park, reducing efficiency in operations. Park staff are now housed in various locations across the park (which previously included the old administration building), as the staff growth in recent years could not be accommodated in one building.

The park's *Revised Master Plan* (2002) identified the need for a replacement of administration building to provide an improved facility for administration staff and functions. The new building offered the opportunity to accommodate growth of the administration staff and to consolidate all administrative staff in one location. It also offered the opportunity to remove administration facilities from active programming areas (and future areas), which would avoid potential conflict of historical zones with modern operations. Such a move is consistent with the *Revised Master Plan*, which requires "out-of-time" elements to be separate from "in-time" program areas. The design offered other benefits, including housing Fort Edmonton Foundation staff, providing additional meeting space, and creating a larger gift store and bookings area in a location more accessible to the public. These needs have arisen as the park has grown and expanded the services it provides.



1 SITE PLAN
1 : 500



2 PERSPECTIVE VIEW

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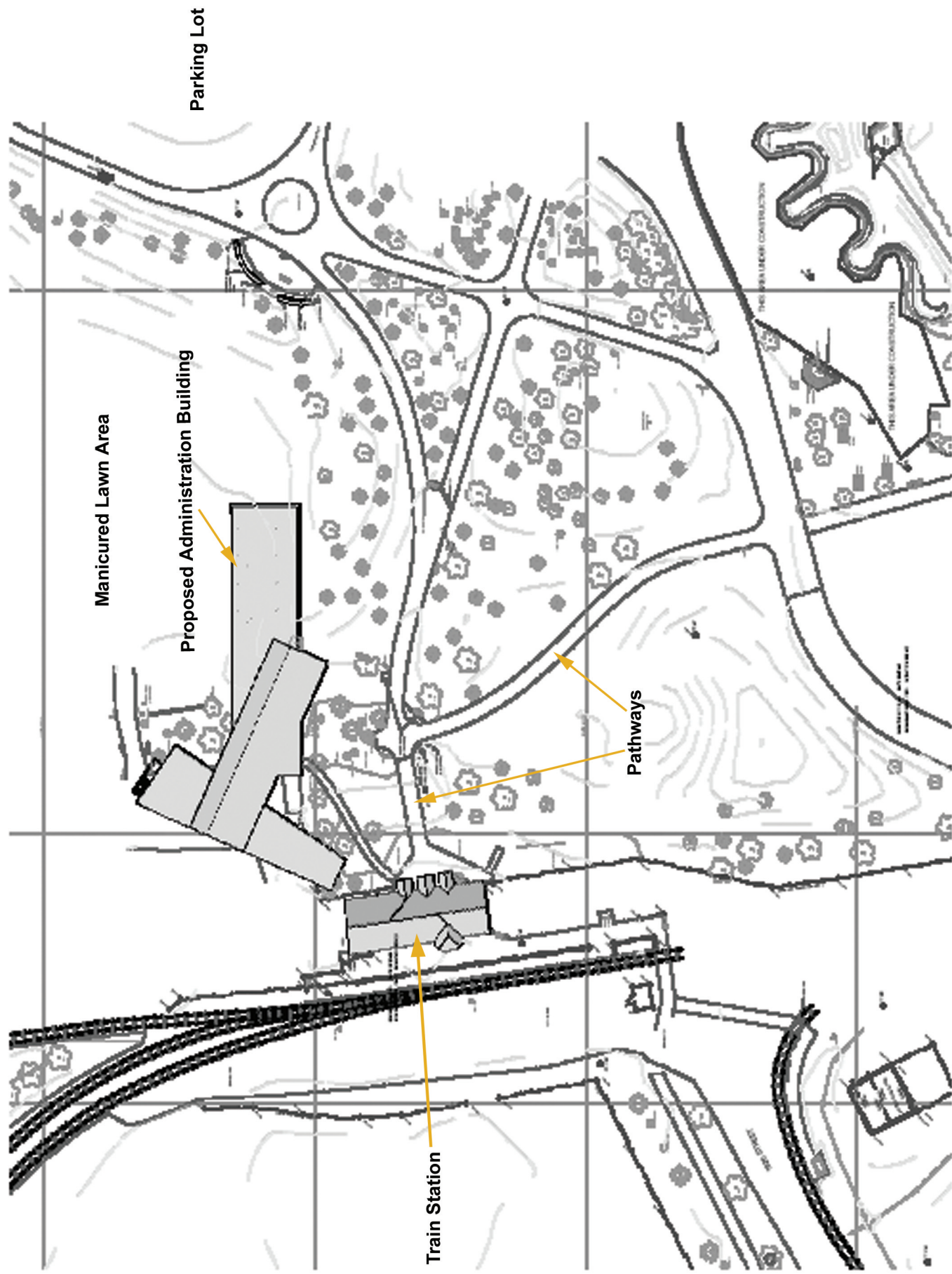
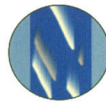
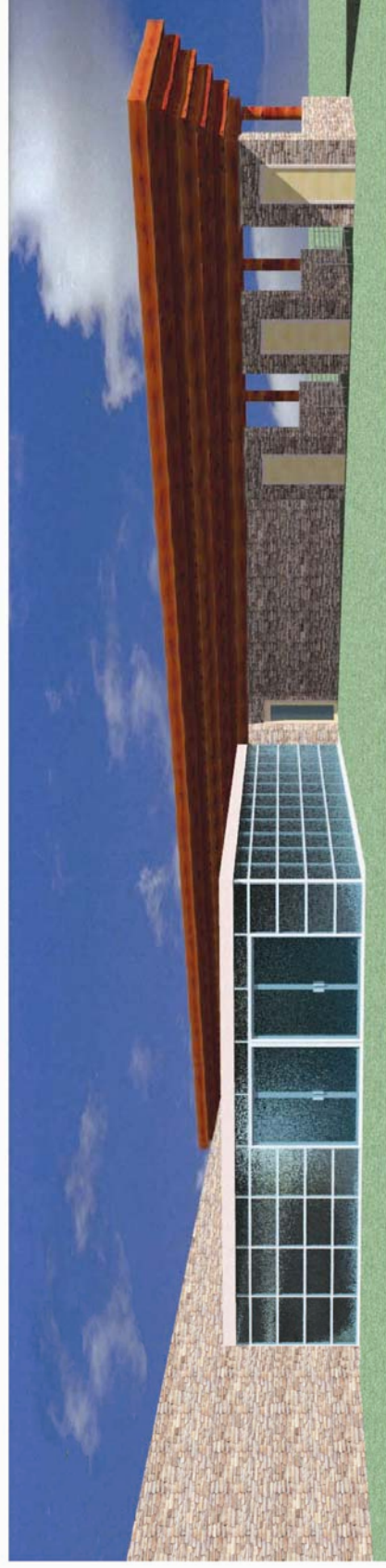


Figure 2.4 Proposed Administration Building Option 2





REC. No.	REC. Description	date	REC. Co.

Category	Item	Value
Total	Grand Total	
	Subtotal	
	Net Total	
	Grand Total	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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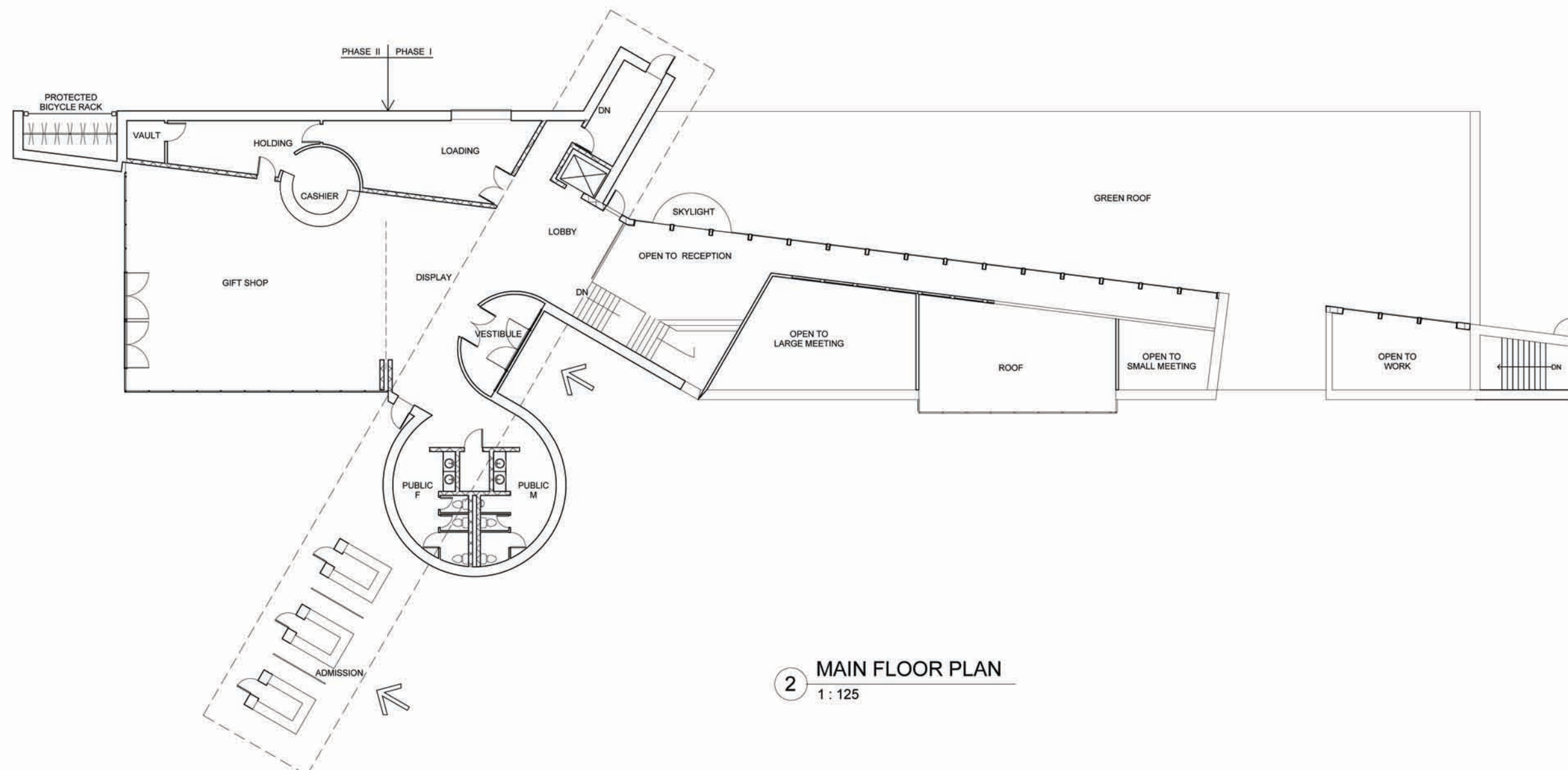
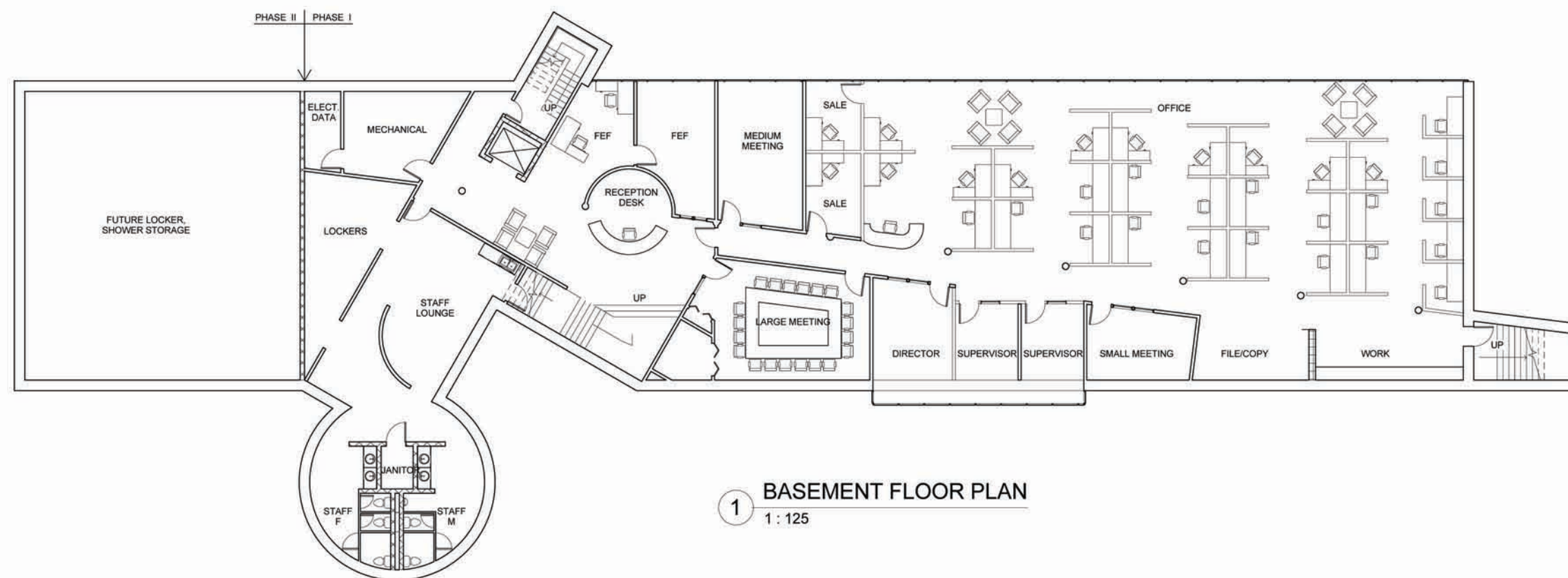
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THE CITY OF
Edmonton
ASSET MANAGEMENT
AND PUBLIC WORKS

FT. EDMONTON PARK
ADMINISTRATION
BUILDING

Figure 2.6.
Option 1
Perspective Views

entry	of document no. in sublibrary	
class by #	drawing no.	
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class by #	11-01-001	
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REC. No.	REC. Classification			REC. No.
Seq.	種別記号(10桁)		年月	日付(8桁)

Issue Text	Date
ISSUED FOR EIGHT APPROVAL	
ISSUED UNDER	
ISSUED FOR FINAL REVIEW	
AS BUILT	

<p>1000</p>	<p>1000</p>
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Edmonton THE CITY OF **ASSET MANAGEMENT AND PUBLIC WORKS**

FT. EDMONTON PARK
ADMINISTRATION
BUILDING

Figure 2.7. Option 1 Building Floor Plans

2.4 Detailed Project Description

2.4.1 Key Project Activities

The project will include four main phases: renovation of the old building and site preparation, construction and commissioning/operation of the new administration building. Renovation of the old building will require removal of materials affected by the mould and disinfection of the remaining walls. After mould removal, the building will be converted into a storage facility. This will involve removing the floor so that items can be stored on grade within the building. Relatively few supplies will be required to renovate the building.

For both design options, site preparation for the new administration building may require removal of a small number of trees and will require stripping soils. Once the site has been cleared, construction for the new administration building can begin. Piping for servicing connections will also be laid at this time. The structure foundations will be constructed of grade beams and piles, reinforced with rebar and covered by a poured-in-place floor slab. After finishing the concrete with a hardening agent, the building will be constructed. During the last stage, landscaping will be completed around the building. The operation phase will encompass typical operations and maintenance activities associated with an administration building.

2.4.2 Construction Environmental Protection Measures

Edmonton Parks Branch will be contacted to estimate the value, under the Corporate Tree Policy, of any trees to be removed during the project. Compensation will be negotiated prior to construction. Spill kits and a secure storage area will be provided for hazardous materials, including fuels, oils, lubricants, concrete sealants and paint used during construction. No other environmental protection measures will be required during construction, as both the old and proposed building sites are located in previously disturbed areas with limited natural features.

2.4.3 Resource and Materials Requirements

Key construction materials for the proposed administration building will include poured concrete and concrete forms, masonry blocks, wood and steel studs, plywood, wood roofing trusses and drywall. Potentially hazardous materials will be likely be limited to concrete hardener for the floors, paint and any fuels, oils and lubricants required for the equipment. The concrete foundation will require poured-in-place concrete, likely delivered through concrete mixing trucks. All other materials will be delivered by truck.

2.4.4 Construction Equipment

Earthmoving and excavation equipment, such as backhoes and small dozer will be required for excavation work. A concrete mixing truck will likely deliver the pour-in-place concrete. Large delivery trucks will be used to move other construction materials to the site and/or staging area. A small crane may be required to lift equipment and piping into place.

2.4.5 Waste Disposal

All construction wastes become the property of the Edmonton Asset Management and Public Works Department and its contractors. Specific methods of disposal will be at the Department or contractor's discretion, but will conform to all environmental regulations. That includes any hazardous material that may require special handling or disposal.

2.4.6 Construction Storage Areas and Access

A project staging area will be established within the existing gravel train maintenance yard, west of the project site. That will provide ready access to the construction area and will require no disturbance of manicured or natural parkland. Construction traffic can access the site from Fox Drive and the North and West Access Roads.

2.4.7 Construction Schedule

Tender documents are proposed to be released in the autumn or late winter of 2007 and construction is anticipated through the winter of 2007-2008.

2.5 Alternatives Considered

In addition to the two options provided by the architect for the project, Edmonton Asset Management and Public Works did consider several other options to replace the condemned administration building. Initially, the park and Asset Management and Public Works considered renovation of the old administration building for continued administration use. With the general age and condition of the structure, the extent of the existing mould problem and the steps necessary to prevent its reoccurrence, renovation was a costly and impractical solution. Also, staff size has grown since 1972, when the building was first established for administration use, and a building with more space was desired.

Several other options were presented by another architecture firm, early in the design development process, but subsequently abandoned as they did not meet the park's requirements.

2.6 Environmental Permitting Requirements

There is no requirement for any federal environmental assessment for this project as the project will not affect any watercourses, involve federal lands or affect other resources requiring federal environmental permitting. Also, the project will receive no federal government funding. In the absence of federal permitting requirements or funding, an environmental review pursuant to the *Canadian Environmental Assessment Act* was not required.

There are no triggers for environmental permitting or environmental assessment under the *Alberta Environmental Protection and Enhancement Act*. Although a recreation project, it is below the size criteria for review under the Natural Resources Conservation

Board (NRCB) environmental assessment process. Given that no surface water bodies will be directly impacted, no permits under the *Water Act* will be required.

The area has been previously disturbed and impacts to historical resources were thought unlikely. Regardless, a clearance from the Historic Resources Management Branch of Alberta Tourism, Parks, Recreation and Culture, who administers the *Historical Resources Act*, was required. A Historical Resources Overview (HRO) was prepared to meet this requirement. Altamira recommended that a Historical Resources Impact Assessment (HRIA) be conducted prior to development, a recommendation supported by Alberta Tourism, Parks, Recreation and Culture. The HRIA was completed in July 2007 and was submitted to the Historic Resources Management Branch for that department's review and comment (Appendix C). A *Historical Resources Act* clearance was issued for the project upon completion of that review (Appendix C).

The main regulatory trigger for environmental assessment for this project is limited to the City of Edmonton Bylaw 7188 policy. That bylaw requires any development proposed within the North Saskatchewan River Valley or its tributaries to undergo an assessment to identify and mitigate potential impacts to the valley environment. Accordingly, this ESR was prepared to meet the requirements under Bylaw 7188.

Although federal and provincial permitting will not be required of this project, other legislation could influence the project's construction or operation phases. These requirements, and the responsible regulatory authority, are listed below. These agencies will be requested to review the Environmental Screening Report and comment on compliance issues with respect to their areas interest as part of the Bylaw 7188 review process.

- A minimum amount of clearing of vegetation may be required to prepare the site for construction. Under the provincial *Wildlife Act* and the federal *Migratory Birds Convention Act*, mortality to certain wildlife species and their habitat is prohibited. Alberta Sustainable Resource Development and Environment Canada administer the two Acts respectively, and will be asked to provide expert advice on the project, to ensure that project design and scheduling do not lead to contravention.
- Trees and shrubs within the City of Edmonton are protected under the *Corporate Tree Policy* administered by Edmonton Parks Branch. That policy requires development to avoid or, if avoidance is not possible, compensate for loss of trees and shrubs on City lands. The Parks Branch will be asked to provide an assessment of compensation requirements for those trees likely to be lost during construction. They will continue to be involved in the project as negotiations for compensation are finalized and implemented.
- Edmonton Parks Branch administers Bylaw 2202, concerning the use of park areas as lay down areas in support of construction. Although such use is not

proposed, the department will be asked to review the assessment to confirm compliance with this bylaw.

- Edmonton Transportation and Streets typically reviews applications for developments with potential geotechnical concerns, including both site stability and contaminated sites issues. The construction area is level and no significant excavation that would cause geotechnical concerns will be required. However, because the old administration building does contain certain hazardous materials, the ESR will be circulated to that department for review and approval of any mitigation recommended.
- Although the proposed work is upland, construction or operation of the site could affect surface water through stormwater management. Alberta Environment and Environment Canada, who administer the *Alberta Water Act* and the habitat protection aspects of the *Fisheries Act*, respectively, will be asked to comment with respect to their jurisdictions.

3.0 METHODS

3.1 General Approach

Following are brief descriptions of the methods and steps employed in the preparation of this ESR.

- We met with Edmonton Asset Management and Public Works to develop a detailed project description for the environmental assessment.
- We also met with City of Edmonton Planning and Development to describe the project to them and to confirm the level of environmental review required pursuant to Bylaw 7188.
- We obtained a geotechnical assessment from CT & Associates Engineering Inc. prepared in support of this current proposal. Edmonton Asset Management and Public Works also provided to us other technical information of an engineering nature (e.g. utilities locations).
- We prepared a description of the biophysical conditions at the site, relying on previously collected data and site visits.
- Altamira Consulting Ltd. prepared a Historical Resources Overview for the project, based on a review of past archeological and historical records from the study area. Upon request from the Historic Resources Management Branch of Alberta Tourism, Parks, Recreation and Culture, Altamira conducted a Historical Resources Impact Assessment and submitted that report to the branch for review.
- PHH ARC Environmental prepared a Hazardous Building Materials and Demolition Review of the old building, as well as a Site Contamination Phase 1 Environmental Site Assessment (ESA) of both the old and new building sites.
- Based on the existing conditions and the project description, we next analyzed potential impacts of the project, which included a characterization of their significance. Where feasible, we applied mitigation measures within the project design to reduce the level of impact. The residual impact remaining after mitigation was again characterized, to assess the effectiveness of mitigation.
- A preliminary draft report documenting the assessment process, impact analysis and a summary of the assessment was prepared and provided to Edmonton Asset Management and Public Works for review.
- Comments from the internal review of the preliminary draft report were used to update the report to a draft, which was then submitted to Edmonton Planning and Development and other relevant agencies providing expert review.

- Based on comments received from regulatory reviewers, the report will be revised and updated to a final version. That final report or an addendum will be submitted to Edmonton Planning and Development and the regulatory reviewers for their approval and sign-off on the review process.

3.2 Detailed Methods

The following sections describe in more detail the approach used in preparing this ESR.

3.2.1 Scoping the Screening Assessment

The screening assessment scope confirms the process and key regulatory stakeholders to be involved in a given project. Scoping determines the level of assessment, identifies the specific issues to be addressed (including permitting requirements), and establishes the spatial and temporal boundaries of the study area. Means of selecting spatial and temporal boundaries and identifying key issues and Valued Ecosystem Components are described here.

3.2.1.1 Spatial and Temporal Boundaries

Spatial and temporal boundaries appropriate to the resource are selected to help focus an assessment on an area/timeframe most likely to be affected by the proposed project. In this way, the ESR is specific to the project and the resources of concern. For most resources, the assessment focused on the two areas identified in Figure 2.1, around the old and the proposed administration buildings. In some instances, this area was expanded or contracted for specific Valued Ecosystem Components (VECs). Where deviations were used, they are mentioned in the description of existing conditions for the applicable resource.

Temporal boundaries were tailored to the degree of disturbance resulting from the project and the type of VEC being assessed. Components of the project could affect VECs differently in terms of time to manifest or recover from an impact. For this reason, temporal boundaries were identified for each VEC individually, and are specified in the description of existing conditions in Chapter 5 and in the evaluation of impacts in Chapter 6.

3.2.1.2 Issues Identification

ESR issues were identified through the following means and sources:

- We met with Edmonton Asset Management and Public Works staff to obtain a fundamental understanding of the project's design and any design issues.
- We determined through discussions with Edmonton Planning and Development the appropriate level of environmental assessment, scope of work and issues to be addressed in the ESR.
- A literature review and GIS mapping were used to identify issues pertaining to biophysical and socioeconomic resources.

- Qualitative reconnaissance and site investigations for wildlife, vegetation, sensitive species, hazardous materials and historical resources were conducted to identify other potential issues. Geotechnical investigations conducted by other sub-consultants to the City of Edmonton identified issues specific to terrain, soils and groundwater.

From these various sources, we developed a list of issues, which served as a preliminary Terms of Reference for the ESR. The list also provided a starting point to identify VECs for the ESR. Note that issues identified in this process are potential concerns. The extent to which the proposed project may affect the VEC is confirmed through the impact assessment process. In some instances, a perceived concern may not be affected by project activities, but once identified; it must still be analyzed and characterized to satisfy the requirements of the impact assessment process.

3.2.1.3 *Selection of Valued Environmental Components*

No ESR can be so broad in scope that it investigates potential impacts on all components of the natural, social and heritage environments. To be effective, investigations must focus on selected environmental features that are considered most important within the context of the proposed development. While environmental impact assessment practitioners use a variety of terms to describe these features, in this report they are termed Valued Environmental Components (VECs). Three types of VECs were identified:

- **Valued Ecosystem Components:** species or features of the natural environment.
- **Valued Socio-economic Components:** features of human settlement / development or cultural values.
- **Valued Heritage Components:** sites, artifacts or structures of our natural and human history.

VECs were selected based on five criteria:

- relative abundance or status,
- public concern,
- professional concern,
- economic importance, or
- regulatory concern.

Relative abundance or status refers to those species within the study area that are considered rare, threatened or endangered at a provincial or national level. It can also include resources that have a limited distribution or abundance within the local or regional study area.

Resources of public concern include attributes or features that were raised as issues by the public during public consultation. Professional concerns are related to those features

of the environment known to be critical for sustaining the ecosystem, or maintaining social or heritage values within the affected site. Resources of economic importance are various and range from aesthetic values important for tourism to sport fisheries.

Lastly, features of regulatory concern apply to resources that have been identified as special concerns by provincial or federal regulatory agencies. These could include water quality, fish habitat, and rare or migratory species, depending on the project type and location. Selected VECs and the justification used for their selection for this project are listed in Table 4.1.

3.2.2 Description of Existing Conditions

The description of existing conditions provides a current snapshot of the project area, over which the proposed project can be overlaid to identify areas of potential concern (impacts). Existing conditions relative to wildlife, wildlife corridors, vegetation, potential special status species and significant biophysical features were identified during this assessment process. Socioeconomic conditions that could be affected by the project, including aesthetics, traffic and other land use, were also described in this stage of the assessment. A Historical Resources Impact Assessment was also performed for the proposed development area to identify potential impacts to historical, archeological or palaeontological sites. Specific methods used to describe the existing conditions vary slightly with each VEC, and so are described in the respective sections of Chapter 5.

3.2.3 Impact Analysis

Impact analysis is the final step in confirming the likelihood and severity of a potential effect of the project on the environment. In this step, concerns raised by the public, regulators and environmental scientists are evaluated with respect to the existing environmental conditions and characterized so that their significance can be assessed by the regulatory authorities responsible for the environmental assessment process. While some potential impacts might eventually be determined to be negligible, the potential interaction of a VEC with a given project activity must be described and documented in order to resolve the original concern. Impact analysis therefore involves a statement of the potential effect, followed by a description of the means by which the VEC may be affected, or remain unaffected, by the project. Lastly, the impact is characterized in terms of standardized descriptors to allow a reviewer to evaluate the significance of project effects. The various stages of impact analysis are outlined in more detail below.

3.2.3.1 Impact Identification

To identify ways that the proposed project could affect VECs, we used a matrix analysis, with project activities along one axis of the matrix and VECs along the other (Table 4.2). Potential interactions between the elements of each axis were then identified and assessed with regard to the type of change that would occur in the existing environment because of the proposed development. Each of these interactions was then described in terms of the project's effect on each VEC. For example, potential effects on wildlife from clearing vegetation include disrupting breeding bird use of nearby habitat because of construction noise and activity.

Table 4.1. Justification for Selection of VECs

Valued Environmental Components	Relative Abundance or Status	Public Concern	Professional Concern	Economic Importance	Regulatory Concern	Comments
Valued Ecosystem Components						
Geology and Soils			√		√	<ul style="list-style-type: none"> Erosion, loss of topsoil Alberta <i>Soil Conservation Act</i>
Air Quality		√	√		√	<ul style="list-style-type: none">
Hydrology and Hydrogeology		√	√	√	√	<ul style="list-style-type: none"> Alberta <i>Water Act</i> and the federal <i>Fisheries Act</i> Abundance and water quality
Vegetation <ul style="list-style-type: none"> - Native vegetation - Rare species 	√	√	√		√	<ul style="list-style-type: none"> Potential habitat loss Federal <i>Species at Risk Act</i>
Wildlife <ul style="list-style-type: none"> - Habitat - Rare species 	√	√	√		√	<ul style="list-style-type: none"> Federal <i>Species at Risk Act</i>, <i>Migratory Birds Convention Act</i> and Alberta <i>Wildlife Act</i> Potential habitat alienation, degradation or loss
Fish and Aquatic Resources	√	√	√		√	<ul style="list-style-type: none"> Federal <i>Species at Risk Act</i>, <i>Federal Fisheries Act</i> and Alberta <i>Wildlife Act</i>
Valued Socio-economic Components						
Land Use Disposition and Zoning		√		√	√	<ul style="list-style-type: none"> Requirement for rezoning or acquisition of additional land
Recreational Uses and Facilities		√	√	√		<ul style="list-style-type: none"> Disruption of existing use
Visual Resources		√	√	√		<ul style="list-style-type: none"> Detraction to aesthetic condition
Noise		√	√	√	√	<ul style="list-style-type: none"> Disturbance to adjacent residents of other land users Municipal Noise Bylaw
Utilities and Infrastructure		√	√	√	√	<ul style="list-style-type: none"> Potential disruption of existing utilities
Site Contamination Presence and Hazardous Building Materials		√	√	√	√	<ul style="list-style-type: none"> Potential release of hazardous material and exposure to workers or public
Traffic/ Public Safety		√	√	√	√	<ul style="list-style-type: none"> Construction adjacent to existing roadway
Valued Heritage Components						
Historic Resources		√	√		√	<ul style="list-style-type: none"> Alberta <i>Historical Resources Act</i>

Table 4.2. VEC Analysis Matrix

			Renovation		Site Preparation			Construction					Operation		
			Remove contaminated materials and flooring	Reconstruct walls	Establish working area	Clear and grub vegetation from working areas	Establish staging area	Locate and protect existing utilities	Construct administration building	Connect utilities	Waste disposal	Reclamation of disturbed areas	Administration building operation (including malfunction)	Administration building maintenance	
Valued Ecosystem Components	Valued Ecosystem Components	Geology/Soils	✓		✓	✓	✓	✓	✓	✓	✓	✓			
		Air Quality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Hydrology/Hydrogeology	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Vegetation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
		Wildlife	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
		Fish and Aquatic Resources	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Valued Social Components	Land Use Disposition/Zoning			✓			✓		✓		✓	✓		
		Recreation Uses and Facilities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Visual Resources	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
		Utilities/ Infrastructure			✓	✓		✓	✓	✓	✓		✓		✓
		Hazardous Building Materials/ Site Contamination Presence	✓						✓	✓	✓	✓			
		Traffic/Public Safety	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Valued Heritage Components	Historic Resources			✓	✓			✓	✓	✓		✓		

3.2.3.2 *Impact Description Characteristics*

For each potential impact identified, the extent and likelihood of the impact must be described and characterized. The characteristics used to describe impacts for this project were based on the requirements the federal *Canadian Environmental Assessment Act* and other applicable provincial and federal legislation.

Based on these guiding pieces of legislation, impacts were described and classified as to their magnitude/severity (negligible, minor, or major), direction (positive or adverse), duration (temporary or permanent) and confidence in mitigation or impact prediction (predictable effect/unknown effect). These criteria were defined follows:

Magnitude:

Negligible Impact: An interaction that is determined to have essentially no effect on the resource. Such impacts are not characterized with respect to direction, duration or confidence.

Minor Impact: An interaction that has a noticeable effect but does not affect local or regional populations, natural or historical resources or physical features beyond a defined critical threshold (where that exists) or beyond normal limits of natural perturbation. Also, an interaction that does not alter existing or future recreational pursuits at established facilities or well-used areas.

Major Impact: An interaction that affects local or regional populations, natural or historical resources, or physical features beyond a defined critical threshold (where that exists) or beyond the normal limits of natural perturbation; or alters existing or future recreational pursuits at established facilities or well-used areas.

Direction:

Positive Impact: An interaction that enhances the quality or abundance of physical features, natural or historical resources, or recreational pursuits or opportunities.

Adverse Impact: An interaction that diminishes the abundance or quality of physical features, natural or historical resources, or recreational pursuits or opportunities.

Duration:

Short-term Impact: An interaction resulting in a measurable change that does not persist for longer than one year post-construction.

Long-term Impact: An interaction resulting in a measurable change that persists longer than one year post-construction but at some point dissipates completely.

Permanent Impact: An interaction resulting in measurable change that persists indefinitely.

Confidence:

Predictable Impact: Effects are well understood through application in projects of a similar nature.

Uncertain Impact: Effect on VEC is not well understood due to lack of knowledge of the VEC and its response to disturbance, or a lack of previous experience with proposed mitigation measures in similar circumstances.

Project interactions presenting a risk to human health and safety were not characterized using the above definitions. They were instead assessed in terms of the degree of perceived risk (i.e., minimal vs. high risk).

3.2.3.3 Initial Impact Assessment and Mitigation Development

All interactions identified through the matrix approach were analyzed and described according to the characteristics defined above. While features of the project activities and planning that would reduce the degree of impact were reviewed at this stage, and used to assign the degree of impact, no additional mitigation measures were applied at this point.

In the next step of the assessment, mitigation measures were developed to address impacts that, if not addressed, would have an undesirable degree of impact on the VEC. All attempts were made to reduce impact severity in these cases; however, this was not always feasible or practical. For less severe impacts, mitigation measures were proposed if they were considered cost-effective and/or worked in concert with other proposed measures.

3.2.3.4 Residual Impact Assessment

Any effect remaining after mitigation is termed a residual impact. For the final stage of the assessment, residual impacts were classified according to the impact characteristics described above and summarized.

3.2.4 Public Consultation

Public consultation is recommended for environmental screening assessments under Bylaw 7188. This consultation process is designed to ensure that concerns of any stakeholders potentially affected by the project are addressed. In this case, the City had

already consulted with the Fort Edmonton Park Advisory Committee and the Fort Edmonton Historical Foundation to solicit feedback on the preliminary stages of project design. The advisory board includes local residents and citizens-at-large (on the advisory committee) who were able to provide indication of potential public and local resident concerns. Previous to this current process, during the preparation of the *2001 Fort Edmonton Park Land Use Master Plan Update*, the 31 priority projects were presented to stakeholders, surrounding communities and interest groups in an open house. No concerns were expressed during the open house and comments were generally favorable. Comments provided by stakeholder groups specifically reviewing the current administration building project have been similarly positive and constructive. Many of those comments have been incorporated into the project design.

Public consultation is intended to continue throughout subsequent development phases of this project. Edmonton Community Services, the City-department coordinating the new building's development in concert with Edmonton Asset Management and Public Works, has planned an extensive consultation plan for the next, detailed design phase of the project. The plan includes a stakeholder consultation program with public user groups and other City departments as well as a broader public communication program. Feedback from these programs will enhance the building's design and landscaping, but should not substantially alter the location or other major building details (e.g., LEED design elements and size). These elements of the project's design have already been vetted through park administrators and committees in the earlier, more specific stages of consultation, to ensure that the location and general design concept are consistent with existing policy and development criteria applicable to the park.

Given these previous and future planned consultation activities, a separate public consultation program was not thought necessary for the ESR. The design will be further refined based on comments from the proposed consultation program to follow this ESR, but any resulting changes should not be so substantial as to alter the conclusions of the ESR.

4.0 KEY ENVIRONMENTAL AND SOCIO-ECONOMIC ISSUES

The North Saskatchewan River Valley is considered to be a sensitive natural feature in the City of Edmonton, supporting a variety of wildlife habitats, vegetation communities and unique geomorphological features. Both renovation of the old building and construction of the new administration building will be largely contained within previously disturbed areas. Regardless, some disturbance will be required of natural features. Given the site location, the development may also affect Fort Edmonton Park's socio-economic environment (e.g. noise, aesthetics).

These issues and other issues were identified early in the assessment process by Edmonton Planning and Development and Spencer Environmental. They provide a focus for the EIA, highlighting areas that should be addressed within the assessment. The concerns identified by the regulators and the assessment team are outlined below. For each resource, a description of the potential issue is provided, followed by specific concerns in the form of a question.

4.1 Environmental Resources

4.1.1 Geology and Soils

No issues related to geology or slope stability have been identified for the project, as construction at the new site will be on level lands and will require relatively shallow excavation. However, construction of the proposed building will require surface disturbance that could impact soils. Although the site has been disturbed in the past, some clearing will be necessary within the manicured area around the proposed building. Soil quality could be impacted by improper soil stripping or handling. Any topsoil, the fertile layer of soil, should be conserved to prevent loss. Construction staging will be confined to the existing train maintenance yard and will be unlikely to disturb soils but soil contamination could occur through accidental spills.

- **How will excavated material be handled to avoid potential for mixing of topsoil and subsoil, causing reduced topsoil quality?**
- **Is there potential for damage or compaction to the soils in areas requiring surface disturbance, including soil stockpiling areas?**
- **Is there potential for soil contamination from accidental spills?**

4.1.2 Air Quality

Air quality in Edmonton is generally good, with an air quality index of Good more than 95% of the year (Clean Air Strategic Alliance 2006). This part of the river valley is developed for outdoor recreational use. Recreational users would be the key receptors of any localized air quality impacts that may result from the project. There are few other land use activities in or near Fort Edmonton Park that would reduce background air quality in the vicinity. The main exception is traffic on Whitemud Drive, from which vehicle emissions and dust may be produced.

- **Will construction activities produce dust or other emissions that might negatively impact air quality for recreational users in the area?**

4.1.3 Hydrology and Hydrogeology

Generally, groundwater along the North Saskatchewan River Valley slopes flows down from the adjacent tablelands toward the river. Because of the location of the old and proposed facilities on a lower terrace of the North Saskatchewan River Valley, shallow groundwater may be a concern, especially with regard to potential contamination from hazardous materials.

Although no surface water features exist in the vicinity of the old and proposed buildings, the proposed buildings courtyard will require stormwater drainage, which could affect water quality of the receiving waterbody (in this case the North Saskatchewan River).

- **How will hazardous materials be managed to avoid potential contamination of the shallow groundwater?**
- **How will stormwater drainage from the site be managed to minimize potential release of pollutants to adjacent waterbodies?**

4.1.4 Vegetation

The old administration building lies in a section of Fort Edmonton Park that is surrounded by natural vegetation. The proposed administration building footprint lies within a manicured lawn area surrounded by mature trees and shrubs. While renovation should not impact the native vegetation around the old building, construction of the new building may require removal of a small number of trees and shrubs. The City's Corporate Tree Policy will apply to any trees or shrubs removed by the project.

- **Will natural vegetation communities be impacted by renovation of the old administration building and construction or operation of the new building?**
- **Will any rare species or unique vegetation communities be impacted by renovation of the old administration building and construction or operation of the new building?**
- **How will the trees or shrubs impacted by construction be compensated under the City's Corporate Tree Policy?**

4.1.5 Wildlife

Although both the old and proposed administration buildings lie within a section of the river valley that has been developed for visitors attending Fort Edmonton Park, the sites do support some native and naturalized vegetation. Such communities can provide habitat for a variety of resident, breeding and migrant wildlife species. The habitat is also suitable for several larger mammals that may include the forest around the park in a broader home range.

- **What wildlife species are likely to be impacted by renovation of the old administration building and construction or operation of the new building?**
- **Will any sensitive species, including any federally or provincially listed species, be impacted by renovation, construction or operation of the buildings?**
- **Will travel corridors potentially used by wildlife with broader home range requirements be impeded by renovation, construction or operation of the buildings?**

4.1.6 Fish and Aquatic Resources

The old and proposed administration building sites are not located near aquatic resources or fish-bearing streams. However, the North Saskatchewan River does border Fort Edmonton Park. The river lies approximately 150 m north of the proposed administration building and is separated from it by the North Access Road. Stormwater will be directed through the existing system and into the North Saskatchewan River.

- **Are fish and other aquatic resources likely to be impacted by renovation of the old administration building and construction or operation of the new building?**
- **How will stormwater be handled to minimize the potential impact to fish or aquatic habitat?**

4.2 Socio-economic Resources

4.2.1 Land Use Disposition and Zoning

Cultural exhibits are permitted under the site's current zoning and administration functions would be included within that permitted land use. The City owns the entire park and no additional lands will be required for the project. No issues related to zoning or land ownership have been identified for the project.

4.2.2 Recreation Uses and Facilities

Fort Edmonton Park is located within the North Saskatchewan River Valley, in an area developed for various recreational uses. The park provides visitors with the opportunity to step back in time and experience the life of Edmontonians in the periods between Fort Edmonton's establishment and 1920. Outside and north of the Fort, a multi-use trail runs between the river and the North Access Road. Southeast of the Fort lies the John Janzen Nature Centre, a facility providing exhibits and information to encourage awareness and understanding of nature in an urban setting. A shared parking lot serves both Fort Edmonton Park and John Janzen Nature Centre. Nature trails from the John Janzen Nature Centre extend south of the building and paved walkways link it to the Fort's main gate.

- **Will any trail use be disrupted by construction?**
- **Will users of the new building have sufficient parking, or will additional space be required in the Fort Edmonton and John Janzen Nature Centre parking lot?**
- **Will access to the Fort Edmonton Park main gate be disrupted by the construction site?**
- **Will renovation activity at the old building detract from the historical experience within the park?**

4.2.3 Visual Resources

The old administration building is within a park managed to present a historical atmosphere but views of it are largely obscured from visitors by distance, other buildings and vegetation. The proposed building will be outside of the main park, to the east of the entrance and within a manicured area that is surrounded by mature trees. The main walkway to the park main gate passes by the proposed site.

- **Will the new administration building remain consistent with the historical theme of Fort Edmonton Park?**
- **Will areas disturbed by renovation and construction be restored to ensure that they do not detract from the aesthetics of the existing park and the entrance area?**

4.2.4 Noise

The old and proposed administration building sites are within a City park that provides multi-use trails and facilities for exploring Edmonton's history and natural environment. Land use in the immediate area is primarily devoted to recreational activities. The park lies to the west of a major commuting freeway (Whitemud Drive). Brander Gardens is the nearest residential area and it lies upslope, south of the park, and is separated from it by the wooded valley slope.

- **Will construction noise negatively affect the experience of recreational users of the park?**
- **Will construction noise impact Brander Garden area residents?**

4.2.5 Utilities and Infrastructure

The proposed administration building is near to several existing utilities service lines. Construction of short linkages to existing utilities may require some disturbance to natural areas but no new service lines will be required.

- **Will excavation required during construction of the new administration building impact any adjacent utilities lines?**
- **Will new utilities connections require additional clearing of natural vegetation?**

4.2.6 Potential Site Contamination and Hazardous Building Materials

Mould damage had been discovered within the old administration building but the presence of other hazardous materials that may pose a safety risk to workers was not known. The proximity of the old building to a public area could expose the public to a risk if hazardous materials are used or disturbed. Similar concerns exist at the new building site and staging area.

- **Are hazardous materials present in the old building that could pose a risk to workers or the public during the renovation phase of the work?**
- **Will any hazardous materials be used in the construction of the new building that could pose a risk to workers or the public?**

4.2.7 Traffic and Public Safety

Several access roads and pathways run through Fort Edmonton Park and pass by the old and proposed administration building sites. Renovation or construction activity at these sites that could impact the ability for park staff and visitors to use these travel routes would affect park function and visitor experience.

- **Will renovation or construction activities impact travel along existing roadways and/or pathways?**

4.3 Heritage Resources

4.3.1 Historic Resources

Major river valleys such as the North Saskatchewan were commonly used by early aboriginal tribes as campsites, as foraging areas and for travel. European settlers in the Edmonton region were also attracted to the river valley and the resources it provided. The down-cutting of deep river valley sections has also exposed fossils of much earlier plant and animal occupants. As a result, sections of the river valley often contain historic, archeological and even paleontological resources. The old administration building and the proposed administration building will be developed on a previously disturbed terrace of the river valley. There is the potential for artifacts to occur here that have been buried under past disturbance areas.

- **Is there potential for previously undiscovered heritage resources to occur at the project sites that could be disturbed by construction?**

5.0 EXISTING CONDITIONS

Two separate construction sites are considered within this assessment. The old administration building is situated at the base of a naturally vegetated slope and within the site services yard for Fort Edmonton Park (Figure 2.2). It is located within an already disturbed area and no additional surface disturbance will be required to renovate the building. The proposed administration building will also be located in a previously disturbed area. This building site is outside of the park main gate in a manicured lawn area. The sections below assess the potential impact posed by work of both locations. In addition, the assessment addresses the two proposed options for the new administration building currently under consideration.

5.1 Environmental Resources

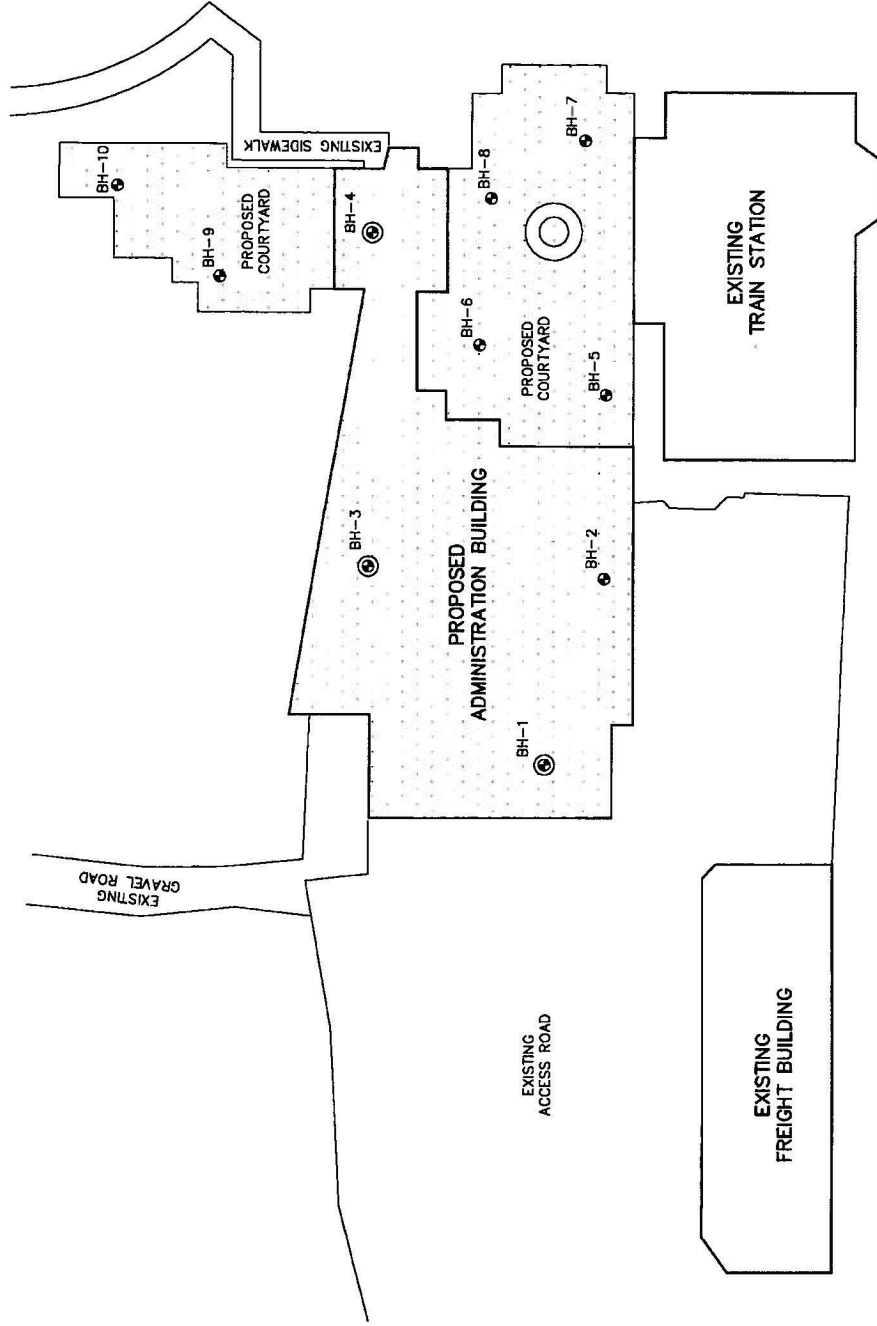
5.1.1 Geology and Soils

5.1.1.1 Methods

Geology and geomorphology of the Edmonton region have been documented in several resources that were useful for describing these features at the regional scale. The Edmonton Geological Society prepared a broad level review for Edmonton and surrounding areas (Godfrey 1993). EPEC Consulting Western Ltd. (1981) compiled a more thorough description of the biophysical resources of the North Saskatchewan River (NSR) Valley, specifically including geology and geomorphology. These resources provided a description of the broader regional context in which the project areas lies.

At the local scale, CT & Associates Engineering Inc. (2006) conducted a geotechnical study in October 2006 to evaluate the subsurface soil conditions and to develop design recommendations and construction guidelines appropriate for the proposed building site. A total of 10 boreholes were drilled and three piezometers installed during the geotechnical program (CT & Associates Engineering 2006). Existing conditions at the proposed building site were described using this assessment.

In the CT & Associates Engineering (2006) work, the 10 bore holes were drilled with a truck-mounted drill rig (Figure 5.1). Disturbed samples were taken from auger cuttings typically at 0.8 m intervals. Standard Penetration Testing was conducted at 1.5 m intervals, from which samples were also taken. Four boreholes were drilled within the building footprint to a depth between 8.8 m and 11.4 m. Six boreholes were drilled within the courtyard area to depths between 2.7 m and 3.0 m. Laboratory testing was conducted on representative soil samples to determine the natural moisture content, Atterberg Limits and soluble sulphate concentration.



LEGEND
● BOREHOLE LOCATIONS
⊙ MONITORING WELL LOCATION



Figure 5.1 Location of Boreholes from the Geotechnical Investigation

CIA CT & ASSOCIATES ENGINEERING INC.

CLIENT
THE CITY OF EDMONTON
PROJECT MANAGEMENT AND CONSTRUCTION



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5.1.1.2 Description

The NSR Valley is one of the most prominent geomorphological features of the Edmonton Area. The NSR separates the two main bedrock formations of the Edmonton area. South of the river lies the Horseshoe Canyon Formation and to the north is the Wapiti Formation (Godfrey 1993). Both formations originated in the Cretaceous period and are typically composed of sandstone, mudstone, shale, ironstone or coal deposits. The river valley was formed by post-glacial erosion through glaciolacustrine sediments and the soft Edmonton Formation sediments (Mackenzie Spencer Associates Ltd. *et. al.* 1987). The river has downcut through these sediments to create a deeply incised river valley, exposing bedrock in some locations (EPEC Consulting Western 1981). Within Edmonton, the river valley is characterized by sharply-cut river banks bordered by broad river terraces, and steep side slopes leading to the adjacent uplands.

Surficial geology within Edmonton consists mainly of glaciolacustrine deposits with variable, bedded, sandy, silty clay (Godfrey 1993). The North Saskatchewan River has downcut through those layers, exposing various underlying strata. The topography is locally varved¹ with pockets of till, sand, or sandy gravel. Surficial materials overlying the bedrock layers in the river valley, from youngest to oldest, include:

- postglacial or recent colluvial and alluvial materials;
- glacial till, lacustrine and outwash deposits; and,
- preglacial Saskatchewan gravels and sands (EPEC Consulting Western 1981).

The lower terraces of the river valley typically comprise post-glacial alluvium composed of silty-clay to sandy-silt and channel gravel and sand (EPEC Consulting Western 1981). Higher up the terraces, near the valley walls, surficial deposits are increasingly composed of alluvial sand and gravel. Colluvium deposited by localized slope failures occasionally occurs along the base of steep slopes, above terraces (EPEC Consulting Western 1981).

Fort Edmonton Park is located on a terrace along the south bank of the NSR valley, at an elevation of approximately 625 m (NRCAN 2006). South of the park the river valley wall steeply rises in elevation to the adjacent upland.

The soils in the Edmonton area developed from glaciolacustrine sediments from Glacial Lake Edmonton and typically have high clay content (Godfrey 1993). Within the NSR valley, Regosols of the Windemere soil group dominate the river bank and floodplain. Chernozems underlie the adjacent upland areas (EPEC Consulting Western 1981). The steep sections of the river valley are composed mainly of poorly developed Regosols, an influence of the actively eroding valley slopes. Both the Windemere soils of the river terraces and the Chernozems on the uplands are well-drained.

Studies conducted by CT & Associates Engineering (2006) found that the proposed building site was covered with surficial organic and clay fill, ranging in thickness from

¹ Sediment strata developed from annually deposited thin layers of clay and silt in a lake environment.

0.5 to 1.2 m (CT & Associates Engineering 2006). The clay fill was silty, with trace sand, moist and of medium plasticity. On the West Access Road, sand and gravel road fill was 0.2 m thick. Underlying the fill material was a firm, damp to moist, medium plastic native clay at an approximate depth of 0.7 m. Below the clay deposit, interbedded silt and sand layers were encountered to a depth of 8.3 m. The silt deposit was non-plastic, damp to moist and firm. The sand deposit was fine-grained, damp and loose to compact. The sand became wet at about 7 m below the ground surface. Underlying the silt and sand layers was bedrock of sandstone and clay shale that extended to the remaining depth of the borehole (11.4 m). The sandstone was very stiff, while the underlying clay shale was very stiff to hard. A coal layer, up to 0.5 m thick and at a depth of about 9.2 m, was encountered at the bottom of the sandstone deposit in most boreholes.

5.1.2 Air Quality

5.1.2.1 Methods

Data regarding the current state of air quality near Fort Edmonton Park were obtained from the *Clean Air Strategic Alliance* (CASA) data warehouse at www.casadata.org. Air quality in the Edmonton area is continually monitored by Alberta Environment and provided at the CASA website.

5.1.2.2 Description

The Edmonton South air quality monitoring station, located on 113 Street and 61 Avenue, is the closest station to Fort Edmonton Park. Various air quality parameters are monitored at this station on an hourly basis, including concentrations of carbon monoxide, ozone, nitrogen dioxide, and respirable particulate matter. Alberta Environment uses these data to calculate the Air Quality Index (AQI), a qualitative measure of general air quality condition. An AQI of 25 or less is considered *Good*. At the Edmonton Central station, the air quality was *Good* 95.7% of the time from 1 January 2006 to 31 January 2007. The majority of instances when the air quality was *Fair* or *Poor* were due to elevated ozone levels. These incidents are likely due to an atmospheric inversion preventing the ozone produced by Edmonton commuters from dissipating at the normal rate.

Within the local study area, air quality would likely be considered *Good* more often than at the Edmonton South air quality monitoring station. Winds most commonly blow from the southwest, carrying fresh air from the North Saskatchewan River Valley into the park and the commuter traffic fumes from Whitemud Drive away from the park. The most likely source of air pollution within the park would be from staff and visitor vehicles, as well as the park train.

5.1.3 Hydrology and Hydrogeology

5.1.3.1 Methods

Geotechnical assessments within the project area provided site-specific groundwater data for the proposed administration building site (CT & Associates Engineering 2006). The

locations and depths of the boreholes created during these studies were previously described in Sections 5.1.1. Piezometers were installed in three boreholes for groundwater measurements. At the completion of the drilling program on 25 October 2006, these boreholes were checked to determine groundwater conditions. On 9 November 2006, these boreholes were rechecked to determine static water level.

5.1.3.2 Description

No surface waterbody exists at the project site: the nearest water feature is the North Saskatchewan River, about 150 m north of the proposed administration building site. Surface water at the proposed building site drains overland, across the terrace on which Fort Edmonton Park is located, rather than collecting in stream channels or depressions.

Groundwater flow on the south side of the river valley trends north towards the North Saskatchewan River in this section of the valley (Bibby 1974), and a similar pattern of flow is also likely at the project site. During the initial drilling program, groundwater was encountered in the three boreholes at depths between 7 m and 9.8 m (Table 5.1). The groundwater measurements taken from three boreholes revisited on 9 November 2006 were between 7 m and 7.9 m depth.

Table 5.1. Summary of Groundwater Level Readings*

Borehole Number	Borehole Depth (m)	Groundwater Level (Depth to water, m)	
		25 October 2006	9 November 2006
BH-1	9.8	9.1	7.2
BH-3	9.9	Dry	7.0
BH-4	8.4	7.0	7.9

* Data from CT & Associates Engineering (2006).

5.1.4 Vegetation

5.1.4.1 Methods

Achuff (1994) provided a general overview of vegetation common for this region. Plant communities within the study area were described using the River Valley Alliance vegetation GIS dataset, developed in 2006 by Spencer Environmental. That study updated previous mapping of the river valley (EPEC Consulting Western 1981), identifying plant communities based on the original classification system. Past observations of rare species were obtained from the database maintained by the Alberta Natural Heritage Information Center (ANHIC). A site visit on 8 December 2006 confirmed areas where tree and shrub species may potentially be affected by the proposed development.

5.1.4.2 *Description*

Edmonton's river valley lies within the Central Parkland Natural Subregion of Alberta (Achuff 1994). The typical native vegetation of this subregion is open aspen parkland, with a gradual transition to closed aspen forest to the north. However, much of the subregion has been cleared for agricultural or urban development and few remnant native plant communities persist, mainly in undevelopable areas. Where native vegetation remains, aspen poplar and balsam poplar are common overstory species, particularly on moist sites. Edmonton's NSR Valley exemplifies the regional pattern of native vegetation: urban development extends back from the top-of-bank along the adjacent uplands, but the river valley remains relatively undisturbed, except where river terraces can be accessed and have been developed.

No rare plant species were listed in the ANHIC database for the Fort Edmonton Park area (ANHIC 2006). Considering the level of disturbance and non-native vegetation present around the project sites, it is unlikely that any rare plant species would be present.

The old administration building is located at the base of a naturally-vegetated slope (Figure 5.2). The slope is covered by an aspen-dominated deciduous forest, however, the old building lies within a site services yard that is level, disturbed and separated from the slope by the park train tracks.

The proposed administration building project site has been previously converted to manicured lawn, fringed with mature trees and shrubs (Plate 5.1). The mature trees are primarily trembling aspen, with white spruce, Manitoba maple and a variety of ornamental spruce. Shrub species present include willow, chokecherry and dogwood (Plate 5.2).



Plate 5.1. Manicured Parkland Around Proposed Administration Building Site.

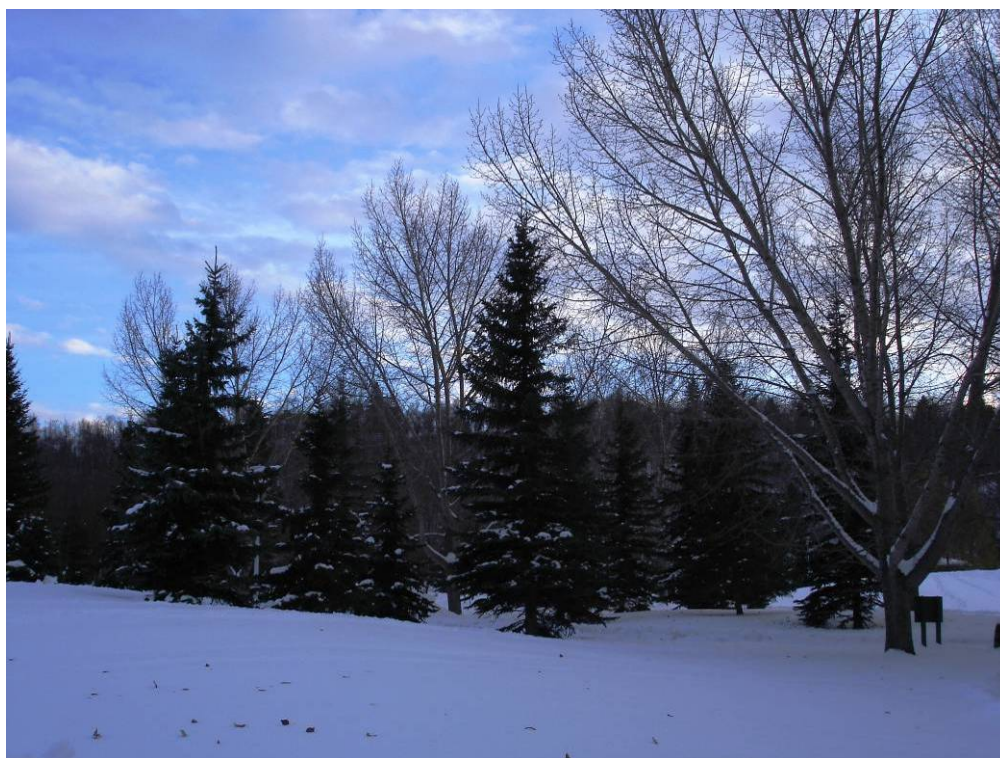


Plate 5.2. Vegetation Around the Proposed Administration Building Site.



Legend

- Roads
- NSR Area Redevelopment Plan Boundary

Land Cover

- Built-up Area
- Deciduous
- Manicured Area
- River

Figure 5.2 Plant Communities within the Study Area

1:2,500



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5.1.5 Wildlife

5.1.5.1 Methods

Literature sources were used to develop a list of wildlife species potentially present in the study area, based on the habitat available at the site and the species' provincial distributions (Semenchuk 1992, Pattie and Fisher 1999, Ritchie 2003, Russell and Bauer 2000). Rare, threatened or endangered species previously reported within the same township as the project area were identified from provincial sensitive species databases (FWMIS, ANHIC). Wildlife sign noted during a site visit to the proposed building site on 8 December 2006 provided additional information on wildlife use in the area.

5.1.5.2 Description

Habitat

Near the inner city core, where Edmonton's first residents settled, the North Saskatchewan River Valley terraces and valley slopes are more developed. Where access has permitted, some development has occurred within the City's river valley. As a result, continuous areas of habitat unobstructed by human development are limited to valley slopes and major creek ravines. On the river terrace where Fort Edmonton Park is located, roads and parks have been developed, separated by aspen-dominated forests.

Around Fort Edmonton Park, natural habitat is constrained to the steep valley slope south of the park, a narrow strip of vegetation bordering the river and forested areas on the west side of the park. Heritage farmlands and small wetlands within the park would provide additional suitable habitat for some wildlife species. The old administration building lies at the base of the steep slope but is otherwise surrounded by a service yard that is inhospitable to wildlife. The proposed administration building lies south of the river, approximately 115 m from the vegetated riverbank. While mature trees and shrubs fringe the site location, the majority of the land cover is manicured lawn. Natural habitat here is limited and undoubtedly influenced by human activities associated with the park.

Wildlife Movement Corridors

As a result of the development that has occurred within Edmonton's river valley and the further fragmentation by bridges and roadways, wildlife must negotiate less hospitable areas to access the remaining habitat. Despite this, major wildlife travel corridors do exist, linking this section of the river valley to lands outside of the City. Whitemud Creek ravine, which lies east of Whitemud Drive, is a relatively undisturbed natural habitat that effectively links the west end of the North Saskatchewan River Valley with lands south and west of the City's boundaries (Spencer Environmental 2006). The abundant vegetative cover, provision of wildlife passage under road crossings, and general lack of buildings or other infrastructure make for an easily traveled corridor within the ravine and at its confluence with the river valley.

Across the river from Fort Edmonton Park, the valley slopes are steep and native vegetation conducive to wildlife movement is confined to the narrow river edge. On the south side of the river, the park covers most of the terrace. Fort Edmonton Park lies

within the river valley section of the corridor and animals can move around and through it to access the creek valley or river valley lands further east and west. A narrow strip of native vegetation (40 m wide) borders the river and a band of vegetation approximately 130 m wide covers the slope to the south of the park (Figure 5.2). Forest patches remain within part of the Fort area and adjacent residential lands. Small gaps between these forest patches could be negotiated by breeding birds. Both deer and fox have also been observed within the park (Patriquin *pers. comm.*). Considering their home range sizes, they are likely using the habitat within the park as a travel corridor or as part of their home range.

Both the existing and proposed building sites lie within open, modified parts of the terrace. Although animals may move through the park, they may only infrequently pass through the two work sites.

Wildlife Species

Wildlife in the NSR valley tend to be restricted to those areas still supporting native vegetation. Where native vegetation is limited, those species tolerant of human presence may be the species most often present. Regardless, in order to satisfy regulatory requirements regarding rare and sensitive species, environmental assessments must address all wildlife species potentially present in a project area. Our assessment, therefore, describes all species that may occur within the proposed construction area, regardless of the frequency of occurrence.

The extent of urban development around Fort Edmonton Park leaves the wildlife habitat most suitable for urban-adapted species (e.g., fox, coyote, weasel, small mammals, certain raptor species and a variety of breeding bird species). High levels of human activity in and near the natural habitat remaining around the two work sites would discourage use by more sensitive wildlife species. However, the presence of wildlife corridors linking this section of the river valley to areas outside of Edmonton, as well as the native vegetation within Fort Edmonton Park and along the slope south of the park, allow for wildlife species to easily access and travel through this area. Given this setting, 142 species could use the habitat in the study area on a regular to occasional basis (Appendix A). Of these, the majority are birds (92 species).

Avifauna

Of the bird species that may occur in the study area, most of these (84 species) are species that breed in the Edmonton region (Ritchie 2003, Appendix A). Four species migrate through Edmonton on their way to breeding grounds further north but may use habitat within the river valley for staging. About 21 species are considered residents and are present year-round in the river valley and associated ravines. An additional 4 species are typically present in the area only in the winter.

Mammals

Although the river valley is now protected from development, well-established residential areas, bridges and roadways have reduced natural habitat to narrow strips and small

patches that are more suitable to smaller and urban-adapted mammal species. Forty-four mammal species may occur within the study area (Appendix A). The few large and medium-sized carnivores likely to occur within these inner city sections of the river valley include coyote and fox, which are more tolerant of urban settings (D.A. Westworth and Associates 1981). Tracks of coyotes were observed along the West Access Road, adjacent the proposed building site, during the site visit on 8 December 2006 (Plate 5.3).

The smaller furbearing species are expected to be relatively abundant within the study area. These include skunk, a common species within the river valley park system (D.A. Westworth and Associates 1981). Short-tailed and least weasels, which prefer riparian habitat, grassland and mixedwood forests, have been reported occasionally within the river valley and ravine parks in the system. Red squirrels and least chipmunks are also common in the mixedwood and aspen forests of the river valley.

Other smaller mammals expected to occur within the study area include the white-tailed jackrabbit, snowshoe hare, Richardson's ground squirrel, thirteen-lined ground squirrel, and porcupine (D.A. Westworth and Associates 1981). Tracks of a jackrabbit were observed along the West Access Road during the field visit on 8 December 2006 (Plate 5.3). Red-backed vole, deer mouse and masked shrew are common rodents within the river valley (D.A. Westworth and Associates 1981) and would be expected to use the forest habitat on the river valley slopes. Deer mice would also likely occur in the open fields within the study area. Little brown and big brown bats are common summer residents of the river valley forests, and are likely to roost or hunt over the deciduous woods along the river. Silver-haired and hoary bats are reported as uncommon to rarely observed within the river valley but may also use those same habitats.

White-tailed deer and mule deer use sections of the river valley and tributary ravine systems within Edmonton (D.A. Westworth and Associates 1981). Although deer have been observed within Fort Edmonton Park and Whitemud Creek Ravine, Fort Edmonton Park does not have enough habitat to support a resident population. Deer observed here likely rely on connections to habitats elsewhere in the valley to sustain them (i.e., the Park forms part of their home range). Deer do not likely use the immediate project areas on a frequent basis, as these areas are associated with high human activity and have limited habitat value.



Plate 5.3. Snowshoe Hare and Coyote Tracks Along the West Access Road.

Amphibians and Reptiles

Although some amphibians venture into terrestrial habitats for other stages of their life cycle, they require water for breeding habitat and are seldom found far from aquatic sites. Limited wetland breeding habitat is available for amphibians in the study area. Despite the proximity of the river, running water is not suitable for most amphibians for breeding habitat. The moist riparian woods along NSR, however, may support the terrestrial post-breeding stages for species such as the tiger salamander, which tends to occur further from wetland breeding areas than many other amphibians.

Only two reptile species, the red-sided garter and plains garter snakes, occur in this part of the province (Russell and Bauer 1993). Both would find suitable habitat in the deciduous woods within the study area. Snakes gather from over a relatively large area to overwinter in hibernacula (crevices or hollows below the frostline), where they are susceptible to disturbance and mortality. Hibernacula are sometimes located in exposed river valley slopes and banks. No hibernacula have been reported within the vicinity of Fort Edmonton Park (ASRD 2006).

Rare Species

There are 21 species considered to have low or declining populations provincially or nationally that may occur within Fort Edmonton Park (Table 5.2). Most of those are considered Sensitive provincially; however, there are also species that have the higher

provincial status of May Be at Risk and At Risk. Of those species, one has the COSEWIC status of Threatened.

The peregrine falcon is the only species potentially occurring within the study area that is ranked as Threatened provincially and nationally, indicating that it is a species that is likely to become endangered if the factors causing its vulnerability are not reversed. A FWMIS database search indicated that a peregrine falcon nested within the Fort Edmonton Park area in 1960. It has not returned in subsequent years and the nearest known nest site is on one of the buildings on the University of Alberta campus. Peregrines are most likely to use the Fort Edmonton area as part of their foraging territory but do not appear to use the park as nesting habitat currently.

The northern long-eared bat and the long-tailed weasel are ranked as May Be at Risk provincially, indicating that they may be at risk of extinction or extirpation and are therefore candidates for detailed risk assessment and management planning. Both would find suitable habitat in the deciduous forests surrounding Fort Edmonton Park; they would use the manicured and developed parkland areas only occasionally for foraging or travel.

Sensitive species are listed as a provincial status species because there is a need for management to ensure that these currently viable, but declining, populations are sustained. The hoary bat and silver-haired bat are the only two sensitive mammals potentially present within the study area. Of the sensitive bird species, the least flycatcher and barn swallow are commonly observed within the Edmonton region (Ritchie 2003). The Swainson's hawk and eastern phoebe are fairly common in the region. The northern goshawk, pileated woodpecker, purple martin and western tanager are all uncommon within the region. The osprey, bald eagle, broad-winged hawk, barred owl, common nighthawk and great-crested flycatcher are all rarely observed. Of these species, the osprey and bald eagle are migrants who may hunt and rest along the river valley but do not remain long in the area. The common nighthawk is the only bird of the Sensitive species that is currently also a low priority candidate for federal status. Low priority candidates have been identified as potentially being at risk; as such, they are candidates for detailed status assessment. The priority level reflects the relative urgency for assessment. All of the Sensitive species are woodland species that would not find suitable habitat within the two work sites.

Table 5.2. Special Status Species Potentially Occurring within Fort Edmonton Park

Common Name	Scientific Name	Provincial Status	COSEWIC	Edmonton Status
Peregrine Falcon	<i>Falco peregrinus</i>	At Risk (Threatened)	Threatened	Rare
Long-tailed Weasel	<i>Mustela frenata</i>	May Be at Risk	Not at Risk	Unavailable
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	May Be at Risk		Unavailable
Plains Garter Snake	<i>Thamnophis radix</i>	Sensitive		Unavailable
Red-sided Garter Snake	<i>Thamnophis sirtalis</i>	Sensitive		Unavailable
Osprey	<i>Pandion haliaetus</i>	Sensitive		Rare
Least Flycatcher	<i>Empidonax minimus</i>	Sensitive		Common
Eastern Phoebe	<i>Sayornis phoebe</i>	Sensitive		Fairly Common
Barn Swallow	<i>Hirundo rustica</i>	Sensitive		Common
Bald Eagle	<i>Haliaetus leucocephalus</i>	Sensitive	Not at Risk	Rare
Northern Goshawk	<i>Accipiter gentilis</i>	Sensitive	Not at Risk	Uncommon
Broad-winged Hawk	<i>Buteo platypterus</i>	Sensitive		Rare
Swainson's Hawk	<i>Buteo swainsoni</i>	Sensitive		Fairly Common
Barred Owl	<i>Strix varia</i>	Sensitive		Rare
Common Nighthawk	<i>Chordeiles minor</i>	Sensitive	Low Priority Candidate	Rare
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Sensitive		Uncommon
Great-crested Flycatcher	<i>Myiarchus crinitus</i>	Sensitive		Rare
Purple Martin	<i>Progne subis</i>	Sensitive		Uncommon
Western Tanager	<i>Piranga ludoviciana</i>	Sensitive		Uncommon
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Sensitive		Unavailable
Hoary Bat	<i>Lasiurus cinereus</i>	Sensitive		Unavailable

Additionally, the ANHIC database (ANHIC 2006) held recorded sightings of the European skipper (*Thymelicus lineola*), a rare butterfly species, along the forested slopes south of the park. The last recorded sighting of this species was 1999. The European skipper is ranked SNA provincially, indicating that conservation status is not applicable. This species is introduced and is not protected by the province.

5.1.6 Fish and Aquatic Resources

5.1.6.1 Methods

Potential for fish and aquatic resources to occur in the vicinity of the either construction site was confirmed by a site assessment conducted by Spencer Environmental on 8 December 2006. Rare, threatened or endangered aquatic species previously reported within the same township as the project area were identified from a provincial sensitive species database (ANHIC).

5.1.6.2 Description

There are no surface water resources within the area of the old or the proposed administration building sites and no aquatic habitat to support fish or other aquatic species. The North Saskatchewan River passes within 150 m of the proposed administration building site and provides regionally significant aquatic habitat.

The ANHIC database (ANHIC 2006) held recorded sightings of two special status fish species within the North Saskatchewan River. The lake sturgeon (*Acipenser fulvescens*) is ranked S2, indicating that it is relatively rare (6-20 occurrences within Alberta or many individuals in fewer occurrences). The silver redhorse (*Moxostoma anisurum*) is also ranked as S2 in Alberta. Sturgeon habitat management is a priority within the section of the North Saskatchewan River passing through the City. The City has participated in habitat enhancement projects with the Department of Fisheries and Oceans further downstream of Fort Edmonton, near the city centre. There are no known spawning areas or critical habitats for either species in this section of the river, however.

5.2 Socio-economic Resources

5.2.1 Land Use Disposition and Zoning

5.2.1.1 Methods

Land use zoning was identified from the City of Edmonton's land use bylaw (City of Edmonton 2001). Ownership of the project site area was confirmed from Edmonton Asset Management and Public Works.

5.2.1.2 Description

The area where the proposed redevelopment will occur is currently zoned as a River Valley Activity Node (Figure 5.3) (City of Edmonton 2001). The zone was created through an amendment to the Edmonton Zoning Bylaw, and is intended to ensure consistency of land management activities within Fort Edmonton with the existing planning and regulatory framework (which includes the requirements of the River Valley

Area Redevelopment Plan Bylaw (#7188)). In essence, the new zone identified permitted and discretionary land uses for the zone that were better aligned with the future plans of the park identified in its master plan documents. The new administration building, an operational support facility for the park, is a permitted land use within this zone.

The proposed administration building site is owned by the City of Edmonton and no additional land will be required to construct the new building. Further, the site is within the surveyed legal boundary of Fort Edmonton Park; no work will be required outside the park boundary.

5.2.2 Recreation Uses and Facilities

5.2.2.1 Methods

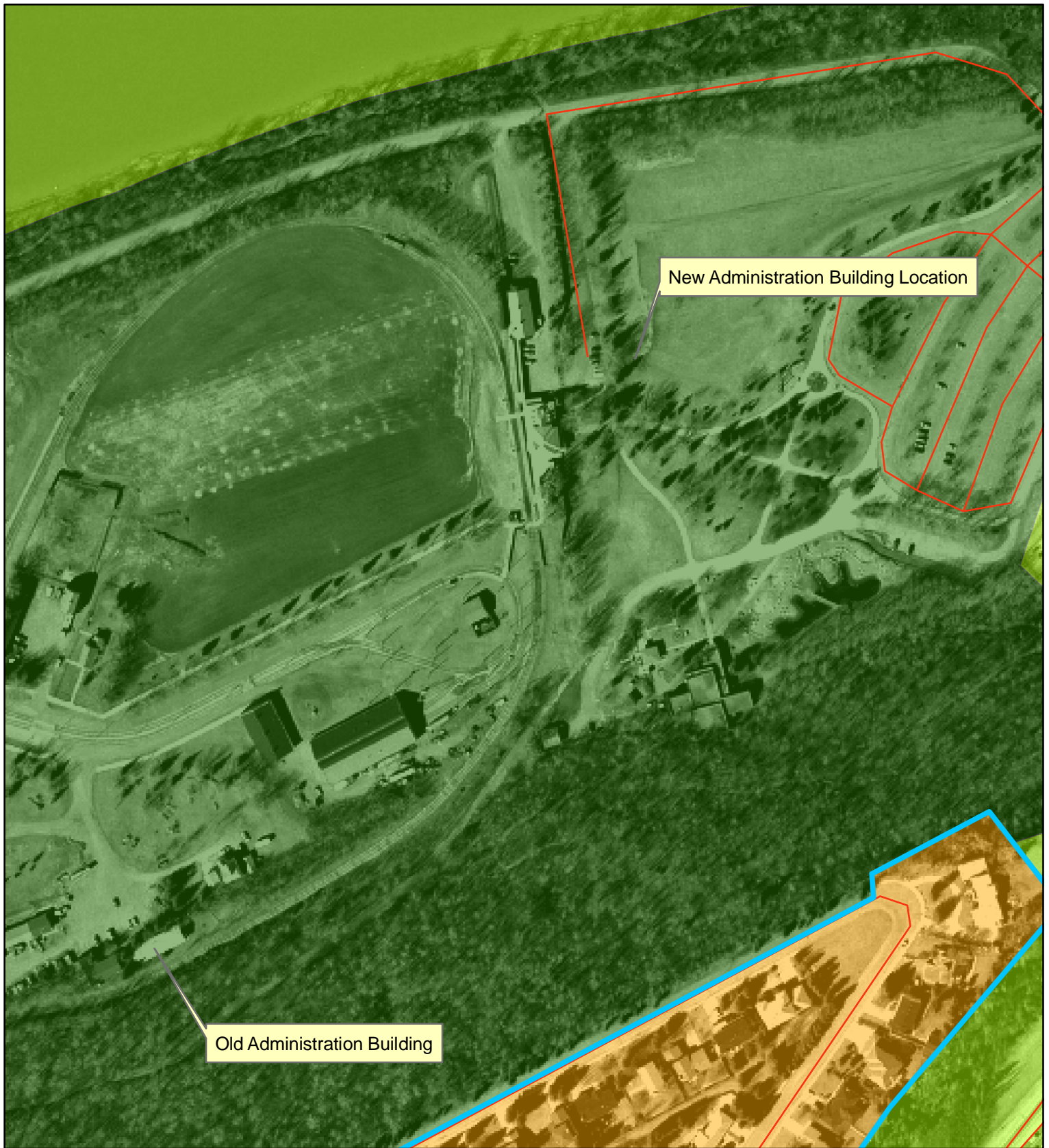
Recreation uses and facilities were assessed in a site visit conducted by Spencer Environmental on 8 December 2006. In addition, visitor counts for both Fort Edmonton Park and the John Janzen Nature Centre from the Recreation Facility Services Branch 2006-2008 Business Plan (2006) provided an estimate of the number of recreational users that typically use the Fort Edmonton Park area.

5.2.2.2 Description

Fort Edmonton Park is a popular destination within Edmonton. The park provides the unique opportunity for visitors to step back in time, visiting several time periods in Edmonton's history through historical buildings and the artifacts contained therein. A steam train provides tours around the park, as do several trolleys and horse-drawn wagons. Outside of the park's main gate, the manicured lawn area provides space for outdoor activities, including the Highland Games held every July. In 2005, Fort Edmonton Park had approximately 220,000 visitors. In that same year, John Janzen Nature Centre, located within the same parkland area, had approximately 42,000 visitors.

John Janzen Nature Centre offers indoor activities and opportunities to interact with nature through displays and programs. As well, interpretive hike programs along the nature trails to the south of Fort Edmonton Park are organized by the centre. Winter activities, such as snow-shoeing programs, are also offered by the Centre and sometimes use the open manicured lawn area outside of the main gate of Fort Edmonton Park (Figure 2.2). The Nature Centre shares the public parking lot with Fort Edmonton Park.

There are no recreational facilities or historical displays in the vicinity of the old administration building site. The old building is situated within a site services yard inside the park, beside the park train tracks. A trail used by visitors to the Nature Centre runs along the slope to the south of the building, across the train tracks and outside of the Fort property (Figure 2.2).



Legend

- Roads
- NSR Area Redevelopment Plan Boundary

Land Use Zone

- Metropolitan Recreation Zone (A)
- River Valley Activity Node Zone (AN)
- Single Detached Residential Zone (RF1)

1:2,500

Figure 5.3 Land Use Zoning Within the Study Area



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The nearest recreational facility to the proposed administration building is the Fort Edmonton train station and main gate, approximately 35 m to the southwest. Multi-use trails of the North Saskatchewan River Valley trail system border the river, about 150 m to the north of the proposed administration building site, and they also provide pedestrian access to the park. Paved pathways leading from the parking lot to Fort Edmonton Park's main gate and the John Janzen Nature Centre lie approximately 12 m to the south of the proposed site (Plate 5.4).

5.2.3 Visual Resources

5.2.3.1 Methods

Visual resources were assessed from aerial photographs and during a site visit conducted by Spencer Environmental on 8 December 2006. Existing views of the proposed administration building site were evaluated from several vantage points, including views from the West Access Road, around the existing temporary trailers, along the park's main access pathway and from the park entrance. Because no new building construction or extensive upgrading was proposed to renovate the old administration building, current aesthetic conditions were less formally assessed. In this case, aerial photography and site maps provided a basis for the review.



Plate 5.4. Pathway Leading to the Main Gate and Past Proposed Administration Building Site.

5.2.3.2 Description

The old administration building is located within the site services yard, an area restricted to park staff only (Figure 2.2). This area is obscured from view from the public access areas within the park itself. Its location at the base of the steep, vegetated embankment south of the park also conceals it from residences within Brander Gardens at the top of the slope. The old administration may be visible from the nature trail at the base of the vegetated slope, but vegetation would likely obscure it from clear view.

The proposed administration building will be located just outside the main gate to Fort Edmonton Park. The building will be located within a flat, manicured lawn surrounded by a fringe of mature trees. The North Access Road separates the manicured area from the river valley deciduous forest. Views of the manicured area from this vantage point are partially blocked by the surrounding fringe of trees. The tree fringe also partly blocks views from the West Access Road. Further north, across the river, residents along the north valley rim would have a clear view of the new building (Plate 5.5): John Janzen Nature Centre is clearly visible at the base of the vegetated slope from the north side of the river (Figure 2.2, Plate 5.6). Views of the proposed building site from the Nature Centre are partially obscured by landscaping (rolling terrain and scattered coniferous trees and deciduous shrubs). Views from Brander Gardens, at the top of the slope south of the proposed building site, are prevented by the slope angle and vegetation. From Whitemud Freeway, the new building will be set behind the public parking lot, partly obscured by the landscaping around the manicured area.



Plate 5.5. View of Residences Along the North Side of the River Valley from the Proposed Site.

5.2.4 Noise

5.2.4.1 Methods

Existing noise conditions were assessed based on observations made during a site visit on 8 December 2006 and information on traffic volumes for Whitemud Drive, adjacent the park. Traffic flow information was obtained from the Average Annual Weekday Traffic 2005 data produced by the City of Edmonton, Transportation Department.

5.2.4.2 Description

Fort Edmonton Park is adjacent to Whitemud Drive, a major freeway within Edmonton's road network. Quesnell Bridge, which crosses the NSR, averages 118,900 vehicles per day on weekdays. The traffic noise from this freeway is higher during the morning and evening rush hour periods, but persists throughout the day. Background noise levels from Whitemud Drive were evident during the site visit, even though the freeway is approximately 235 m from the proposed administration building site. Additional sources of noise come from the park train, which runs frequently during the summer season, from the train station around the outer perimeter of the park.



Plate 5.6. John Janzen Nature Centre and Valley Slope Below Brander Gardens.

5.2.5 Utilities and Infrastructure

5.2.5.1 Methods

Information regarding utilities was provided by Jack Ashton, Project Officer with Edmonton Project Management and Construction Branch. Infrastructure in the area was assessed through aerial photos and a site visit on 8 December 2006.

5.2.5.2 Description

The old building lies within the site services yard and has full utility service connections. Several other buildings are within the site services yard; the closest building is less than 10 m from the old administration building. The Fort Edmonton train tracks lie immediately to the southeast of the building.

The proposed administration building will require new utility connections extended from existing servicing at the train station; however, no new service lines will be required. The new administration building will be constructed in a manicured field with no other development, except several temporary trailers now used for administration staff. The park train station is the closest permanent building to the site and it is approximately 35 m from the building site. The main pedestrian pathway leading from the parking lot bounds the building site to the south and is approximately 12 m away. The West Access Road bounds the site to the west and is approximately 10 m away.

5.2.6 Potential Site Contamination and Hazardous Building Materials

5.2.6.1 Methods

PHH ARC Environmental Ltd. conducted a Hazardous Materials Assessment of the old Fort Edmonton Park administration building on 7 December 2006 (Figure 5.4) (Appendix B) (PHH ARC Environmental Ltd. 2006a). The surveyor accessed each functional space of the old building; ceiling and wall spaces were examined through existing access panels. In order to identify and estimate quantities of hazardous materials, small sections of walls, ceilings and shafts were selectively disturbed to obtain samples or access. Hazardous materials addressed in the assessment included asbestos-containing materials, lead-containing materials, mercury, mould, ozone-depleting substances, polychlorinated biphenyls and radioactive smoke detector components. Hazardous materials identified by the site assessment may require special handling during construction to reduce risk to public health and safety.

In addition to the Hazardous Material Assessment, PHH ARC Environmental Ltd. also conducted a Phase I Environmental Site Assessment of both sites on the 5th and 6th of December 2006 (PHH ARC Environmental Ltd. 2006b). The site assessment included a records review and a site visit. During the site visit, the interior and exterior of the old building, of adjacent properties and publicly accessible areas were examined to identify signs of actual or potential contamination. Because snow cover prevented observation of surface conditions, a follow-up site survey was performed on 20 July 2007 to determine if surface contamination was evident.

5.2.6.2 Description

The Hazardous Materials Assessment of the old administration building identified the following materials that are or may be in the old building (PHH ARC Environmental Ltd. 2006a):

- Asbestos may be present in floor tiles, plaster wall material and drywall joint compound.
- Asbestos-containing materials may be present in inaccessible areas.
- Lead is likely present in the emergency light batteries.
- Mercury is present in the fluorescent light tubes. Liquid mercury is present in the thermostats.
- Ozone-depleting substances may be present in the refrigerators.
- Radioactive materials are present in smoke detectors.
- Approximately 200 square feet of mould growth covers a wood wall, including framing and insulation.

The Phase 1 Environmental Assessment of both sites and the follow-up assessment of the proposed new building site identified no additional environmental concerns (see Appendix B for complete reports).

5.2.7 Traffic and Public Safety

5.2.7.1 Methods

A site visit on 8 December 2006 confirmed the location of several roads and pathways passing near the proposed administration building site. Review of aerial photos indicated where roads and pathways pass near the old administration building.

5.2.7.2 Description

The nearest pedestrian pathway to the old administration building is approximately 85 m north of the building. This pathway borders the main street running through the historical exhibits within Fort Edmonton Park. The park railroad tracks lie immediately southeast of the building and are paralleled by an access road. The site services yard parking lot is immediately northwest of the building.

Several roads pass the proposed administration building site (Figure 2.2). The West Access Road runs along the west side of the site to join the North Access Road running along the north edge of the manicured area (Plate 5.7). Another undeveloped road runs through the manicured area just north of the proposed site to join the West Access Road (Plate 5.8). A pedestrian pathway leads from the main parking area to the park entrance, approximately 12 m south of the proposed building site.



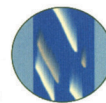
LEGEND

- VISIBLE MOULD
- A.01 ASBESTOS SAMPLE LOCATION
- Pb01 PAINT SAMPLE LOCATION



SUITE 200
9707-110 ST
EDMONTON, AB
T5K 2L9

Figure 5.4 Old Administration Building
Hazardous Materials Assessment Sampling Locations



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Plate 5.7. West Access Road to Maintenance Yard.

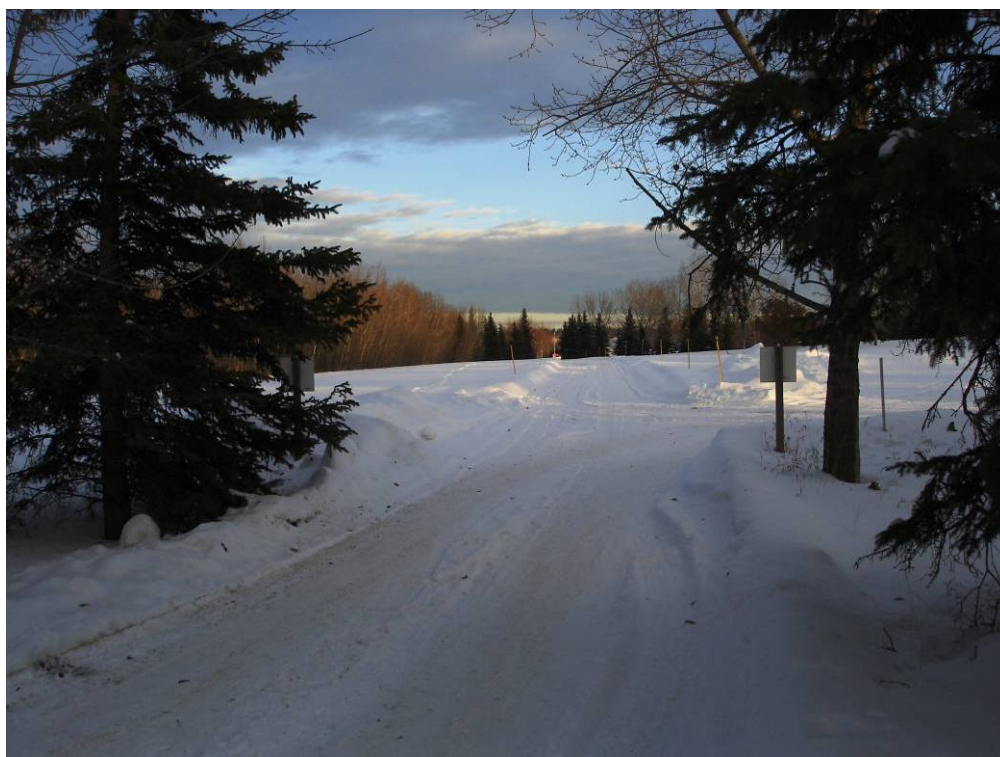


Plate 5.8. Undeveloped Road through Manicured Area.

5.3 Heritage Resources

5.3.1 Historic Resources

5.3.1.1 Methods

Altamira Consulting Inc. conducted a Historical Resources Overview (HRO) for the proposed administration building development. Altamira recommended that a Historical Resources Impact Assessment (HRIA) be conducted prior to development, a recommendation supported by Alberta Tourism, Parks, Recreation and Culture. That HRIA was completed in July 2007 (Appendix C). In-field investigations included a visual inspection of the project area and backhoe testing within select parts of the proposed development area. A total of 12 backhoe tests were executed during the survey. The HRIA was submitted to the Historic Resources Management Branch of Alberta Tourism, Parks, Recreation and Culture for that department's review and comment. The results of both the HRO and HRIA are summarized below. For additional information, please see Appendix C.

5.3.1.2 Description

The Historical Resources Overview confirmed that no known historic sites will be impacted by the project. However, one archeological site (FjPj-68) had been reported within the vicinity of the proposed administration building. This site was classified as a scatter of less than 10 artifacts (lithic debitage comprising two quartzite flakes) within an extensively disturbed area. One flake was found on the surface and the other in a shovel test. The artifact site was approximately 5 m in diameter.

Although the archaeological site was classified as extensively disturbed, because of its location within the river valley, there is potential for other intact cultural remains to be present. River valley terraces along the North Saskatchewan River were commonly used as campsites and hunting areas by prehistoric peoples, and the sediment layers underlying the proposed construction site, if undisturbed, could hold other artifacts from this period.

The HRIA confirmed that it is unlikely that any additional historic sites that have not been previously recorded will be impacted by the project. No archaeological sites, historic structures or palaeontological sites were noted during the HRIA. The HRIA concluded that no further historical resources impact assessment or mitigation work was warranted for this project. Based on that assessment, the Historic Resources Management Branch provided *Historical Resources Act* clearance for the project to proceed (Appendix C).

6.0 POTENTIAL IMPACTS AND MITIGATION

For each environmental, socio-economic and heritage resource considered within this assessment, impacts and mitigation measures were identified for renovation of the old administration building and both of the proposed new administration building options. In the sections following, impacts relevant to each resource are discussed and where necessary, mitigation measures are provided to minimize the extent of the effect. Summary tables provide an overview of the impact analysis at the end of each resource section. Because two design options for the new building are currently under consideration, the impact analysis addressed both options.

6.1 Environmental Resources

6.1.1 Geology and Soils

Potential impacts to soils from construction of the new Fort Edmonton Park administration building and renovation of the old building include:

- loss of topsoil or subsoil mixing during soil stripping;
- soil erosion;
- soil contamination resulting from accidental spillage of hazardous materials; and,
- damage or compaction of soils during construction, including soil stockpiling areas.

A detailed analysis of each impact follows below and is summarized at the end of this section in Table 6.1.

6.1.1.1 Soil Loss or Mixing

Impact

Topsoil conservation is an important aspect of any work requiring clearing or earthworks. Loss or degradation of topsoil can result in reduced soil fertility and lower productivity. If topsoil and subsoil layers with different textures and qualities are mixed during handling, adverse effects on soil drainage, compactability, and fertility can result, which ultimately, can impede reclamation.

The proposed work sites have been disturbed in the past; the old administration building is within a site services yard and the proposed building will be within a manicured lawn area. The construction staging area will be in the existing maintenance yard. All work at the old building will be within the interior; therefore, only construction of the proposed building will impact topsoil, as it will need to be removed before constructing the building foundation. During site preparation, topsoil will be stripped and stockpiled separately from subsoil for later use in reclamation. If necessary, a soil scientist will be present during stripping to ensure appropriate salvage depths are determined.

With the above-mentioned measures in place, the potential for topsoil loss or degradation will be negligible for both building design options. More soil will be disturbed if Option

1 is selected for construction, as it has a footprint approximately 233 m² larger than Option 2.

Mitigation Measures and Residual Impact

No additional mitigation is required other than the measures incorporated into the construction plan. The residual impact will remain negligible.

6.1.1.2 Soil Erosion

Impact

Soil erosion at the old administration building site will not be a concern because all work will be contained within the building. The proposed administration building site is flat and potential for erosion of disturbed areas to occur is low. Soil stockpile areas could, however, erode due to wind or water exposure. The LEED recommendation for sustainable sites includes reducing pollution from construction activities by controlling soil erosion (USGBC 2005). In order to meet this recommendation, LEED approval requires the creation and implementation of an Erosion and Sedimentation Control Plan that conforms to local erosion and sedimentation control standards and codes. This plan will describe the measures implemented to prevent any potential loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse. The City of Edmonton ISO 14001 requirements also stipulate that an Erosion and Sedimentation Control Plan be developed. The selected contractor will be required to prepare such a plan before construction begins.

With the above-mentioned measure in place, the potential for soil erosion at the proposed building site will be negligible.

Mitigation Measures and Residual Impact

Monitoring of erosion protection and revegetated areas as soon as possible will facilitate successful reclamation and retention of the replaced topsoil. Residual impact will remain negligible.

6.1.1.3 Soil Contamination

Impact

Hazardous materials have been identified within the old administration building, including mould, asbestos, lead, mercury, ozone-depleting substances and radioactive materials (PHH ARC Environmental Ltd. 2006a). In addition to these substances, fuel or lubricants spilled over soils during construction equipment maintenance, through accidental spillage on-site or from leaks of stored supplies can cause localized soil contamination. If spills are large, there is potential for the material to spread over a broad area, placing local water sources and soils at risk.

Given the presence of hazardous materials within the old building, workers will need to adhere to established procedures for dealing with each hazardous material, including regulatory requirements for handling and disposal, as outlined by PHH ARC

Environmental Ltd. (Appendix B). Minor and major equipment repairs will be in accordance with the City of Edmonton's ISO 14001 requirements. These procedures address all activities related to storage and use of fuels, lubricants and other potential contaminants. Minor maintenance may be done at the construction site, but, major repairs will be done at the staging area or in the City maintenance yards. Fuels, oils and lubricants will be stored in a contained area on a paved or previously disturbed area. They will be stored with secondary containment to reduce spill potential. Spill kits will be carried on equipment or stored at nearby work locations, and all personnel will be trained to respond to a spill. Equipment used on site will be inspected regularly for leaks and repaired as required. If standard operating practices are followed, little potential exists for large spills, however, should one occur, the spill will be contained and disposed of following provincial and federal guidelines. Potential for hazardous materials spills resulting in soil contamination is, therefore, negligible.

Once renovation at the old administration building is complete, the building will be used for storage of farm implements. If any hazardous materials are stored or used within this facility, precautionary measures will be taken to avoid soil contamination. All fuels, lubricants and other contaminants will be stored in a contained area. Spill pans and other forms of containment will be used during maintenance of farm equipment. Stored equipment will be inspected on entry to the building and periodically during the storage period to check and repair any leaky, cracked or faulty components that may pose a risk. If standard operating practices are followed, little potential exists for large spills, however, should one occur, the spill will be contained and disposed of following provincial and federal guidelines. Considering these precautions, potential for hazardous materials spills resulting in soil contamination from operation of the storage building is negligible.

Mitigation Measures and Residual Impact

No mitigation measures other than standard operating procedures and adherence to provincial and federal regulations regarding hazardous material handling are needed. The residual impact will remain negligible.

6.1.1.4 Soil Compaction

Impact

Compaction of subsoils and fine topsoils can occur in any area where heavy equipment will be operating and after grading and placement of soils during reclamation. Abandoned roadbeds, staging and work areas that were compacted by construction activity will limit root penetration, reducing the ability of vegetation to re-establish and, therefore, the likelihood of successful reclamation.

No roadbeds will be abandoned around the project sites and the staging area will be located within an already disturbed, graveled maintenance yard. The old administration building renovation will be primarily contained within the building. Access to this site will be along an existing service road that parallels the train tracks south of the building.

The new administration building work area will be within a manicured lawn area. The construction area will be clearly delineated to avoid additional disturbance. Any disturbance outside the building footprint will be reclaimed. Access to this site will be along the West Access Road.

During reclamation, subsoils and topsoils will be replaced in separate lifts. Subsoils in disturbed areas will be ripped and topsoils will be worked once they are replaced to relieve compaction. Given these measures, the impact of soil compaction will be negligible.

Mitigation Measures and Residual Impact

To minimize soil compaction and rutting during site preparation and excavation, suspend construction after heavy rains. No other mitigation measures are required and the potential for compaction will remain negligible.

Table 6.1. Summary of Impact Analysis for Geology and Soils

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Loss or degradation of topsoil	Negligible	<ul style="list-style-type: none"> Follow proposed soil salvage techniques 	Negligible
Soil erosion	Negligible	<ul style="list-style-type: none"> Follow LEED recommendations Monitor erosion protection measures and revegetation 	Negligible
Soil contamination caused by hazardous materials spills	Negligible	<ul style="list-style-type: none"> None required other than standard operating practices, proposed construction techniques and adherence to provincial and federal guidelines Once renovation of the old building is complete, use standard operating/ maintenance precautions to avoid soil contamination 	Negligible

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Soil compaction in construction areas	Negligible	<ul style="list-style-type: none"> • Follow proposed construction and reclamation techniques • Suspend construction after heavy rains • Replace subsoils and topsoils in separate lifts in reclaimed areas • Rip/ till subsoil and topsoil to relieve compaction 	Negligible

6.1.2 Air Quality

Potential impacts to air quality are limited to the effects of dust generated by construction activities.

Impact

Air quality is unlikely to be significantly impacted by the renovation of the old building or construction and operation of the new administration building. However, a slight localized increase in dust may occur during the construction and reclamation phases of the new building component of the project. The amount of dust created may be marginally greater with Option 1 of the new administration building, given the slightly larger footprint that will be disturbed.

Dust is typically generated during earthworks and hauling but the volume of dust is dependent on the intensity, location and timing of the dust-generating activity. Dust will be released during construction activities but over a short period. Recreational users will be the main group potentially affected, particularly those entering Fort Edmonton Park along the main pathway. There should be little effect on these visitors given the relatively short time period that they will be in the vicinity of the construction area. Warning signage will be posted at the ends of the pathway to alert visitors to the situation. Dust levels will be monitored by construction staff. If dust levels become significant, dust control measures will be implemented. In addition, prior to major events held within the manicured lawn area, such as the Highland Games in July, consultations will be held with event organizers to mitigate potential concerns.

The LEED recommendation for sustainable sites includes reducing pollution from construction activities by controlling airborne dust generation (USGBC 2005). In order to meet this recommendation, LEED approval requires the creation and implementation of an Erosion and Sedimentation Control Plan that conforms to local erosion and sedimentation control standards and codes. This plan will describe the measures implemented to prevent dust and particulate matter releases. The City of Edmonton ISO 14001 requirements also stipulate that an Erosion and Sedimentation Control Plan be

developed. The selected contractor will be required to prepare such a plan before construction begins

With the above-mentioned measures in place, the potential for an impact to air quality will be negligible for both of the new building options (Table 6.2).

Mitigation Measures and Residual Impact

Should complaints be received from the public or park staff regarding work at either construction site, adapt construction where practical (e.g., apply tackifier, adjust hauling) to reduce impact in areas of concern. Residual impact will remain negligible.

Table 6.2. Summary of Impact Analysis for Air Quality

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Dust generated by construction affecting recreational users	Negligible	<ul style="list-style-type: none"> • None required unless complaints received from public or park staff • If required, spray problem areas with tackifier • Consult with Highland Games organizers to accommodate event requirements 	Negligible

6.1.3 Hydrology and Hydrogeology

No permanent surface water exists around the two project sites. Since construction at the old administration building site will be indoors, there is no risk to hydrological or hydrogeological features at this site. However, stormwater runoff and the relatively shallow groundwater levels observed during geotechnical studies, raise some potential concerns for construction of the new administration building. Potential impacts to hydrology and hydrogeology from the development of the proposed administration building include:

- alteration of the current surface water runoff patterns and
- contamination of groundwater by fuels, lubricants and other hazardous materials during construction.

A detailed analysis of each impact at the proposed building site follows below and is summarized at the end of this section in Table 6.3.

6.1.3.1 Alteration of Surface Water Runoff Patterns

Impact

Currently surface water at the proposed building site drains overland, rather than collecting in stream channels or depressions. However, without appropriate stormwater management, changes to the terrain during construction can cause ponds or streams to form. Water shed off the proposed administration building must also be handled appropriately to avoid potential erosion and sedimentation. This may be a greater concern for Option 1 of the proposed administration building designs, given its larger footprint and roof area.

The LEED recommendation for sustainable sites includes limiting disruption of natural water flows by managing stormwater runoff (USGBC 2005). To achieve this goal, a stormwater management plan that reduces impervious cover, promotes infiltration and captures and treats the stormwater runoff from 90% of the average annual rainfall, using acceptable best management practices, will be implemented.

With the above-mentioned measures in place, the potential for an impact to the surface water drainage by the new building will be negligible for both options.

Mitigation Measures and Residual Impact

No other mitigation measures are required and the impact will remain negligible.

6.1.3.2 Contamination of Groundwater

Impact

Groundwater within the river valley typically flows downslope, towards the river. Given that the only excavations at this site deep enough to reach groundwater will be for the pilings for the proposed building foundation, there should be a low risk of groundwater contamination. Boreholes from the geotechnical assessment indicated that groundwater may be encountered at a depth of 7 m. Pilings will be installed in holes drilled by an auger that will be filled with poured-in-place concrete. These piles will likely be to a depth of 7.5 to 10 m from lower floor level. The lower floor or basement (for both options) will be 3 m from grade level. Considering that groundwater was encountered at depths between 7 m and 9.8 m, the pilings will be within the groundwater table. Construction personnel should ensure that their equipment is clean and free of leaks before proceeding with the excavation or drilling. Hazardous materials should be kept at least 10 meters from the open holes. Once set, the new pilings will block any potential access to groundwater from the surface. Only during drilling is there potential for direct contamination of groundwater, when accidental surface spills of fuels, oils and lubricants from construction equipment could enter groundwater.

The options for the new administration building present different challenges in ensuring that groundwater is not contaminated. Option 1 disturbs a larger footprint area and includes a basement level that would extend deeper into the ground, thereby increasing

the chance of contacting groundwater. In Option 2, the lower level of the split-level design covers a larger area than the basement in Option 1 but is shallower.

In order to avoid potential groundwater contamination, regardless of the option selected, refueling or maintenance of construction equipment will follow the City of Edmonton's ISO 14001 procedures, as will minor and major equipment repairs. These procedures address all activities related to storage and use of fuels, lubricants and other potential contaminants and are designed to minimize potential spills and accidental releases. Key recommendations for hazardous materials handling were outlined in Section 6.1.1.3: their implementation should also prevent groundwater contamination.

With the above-mentioned measures in place, the potential for groundwater contamination will be negligible for both options (Table 6.3).

Mitigation Measures and Residual Impact

No other mitigation measures are required and the potential for groundwater contamination will remain negligible.

Table 6.3. Summary of Impact Analysis for Hydrology and Hydrogeology

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Alteration of surface water drainage	Negligible	<ul style="list-style-type: none"> None required 	Negligible
Groundwater contamination from accidental spills	Negligible	<ul style="list-style-type: none"> None required other than standard operating practices and proposed construction techniques 	Negligible

6.1.4 Vegetation

Potential impacts related to vegetation are limited mainly to construction of the new administration building. Renovation work at the old building will be only on its interior. The impacts to vegetation related to the new building include:

- disturbance to vegetation,
- introduction of weedy or invasive species,
- contamination resulting from accidental spills,
- loss of trees or shrubs requiring compensation under Edmonton's Corporate Tree Policy, and
- loss of rare plant species.

A summary of potential impacts, mitigation measures and residual impacts is provided in Table 6.4. Detailed analysis of each potential impact follows below.

6.1.4.1 Disturbance to Native Vegetation

Impact

Construction of the proposed administration building will occur within manicured lawn. Although construction may also remove some mature trees and shrubs fringing the lawn, there are no other native plants currently vegetating the site. Impacts to trees are discussed in Section 6.1.3.4 under the Corporate Tree Policy. Both options will permanently remove manicured lawn space, but Option 1 will remove 233 m² more of this vegetation than Option 2.

The construction area will be clearly delineated in order to avoid additional impacts to the surrounding lawn. The building plan includes landscaping within and around the building courtyard. Restoration will occur where the construction impacts areas outside of the building footprint. The LEED recommendation for sustainable sites includes restoring damaged areas to provide habitat and promote biodiversity (USGBC 2005). The LEED requirement to fulfill this recommendation is to restore a minimum of 50% of the site area (excluding the building footprint) with native vegetation or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds.

The lawn area is part of City park space, which also has requirements for reclamation and landscaping. Edmonton Asset Management and Public Works Parks Branch will be involved in reviewing the final reclamation plan to ensure it is consistent with parks planning standards and objectives. Disturbance to vegetation will be adverse, minor, permanent and predictable, but mitigated in part by eventual reclamation of the site.

Mitigation Measures and Residual Impact

No additional mitigation will be required, other than continuing to work with Edmonton Parks Branch to develop the landscaping plan for the site. The residual impact will remain adverse, minor, permanent and predictable.

6.1.4.2 Introduction of Weedy Species

Impact

Equipment can introduce weedy species through seeds deposited on the equipment while clearing in weedy areas elsewhere or on the site. Facilitating establishment of weedy species is not a desirable outcome in these parkland areas, as it may result in a future management concern for Edmonton Parks Branch.

All disturbed parkland sites will be revegetated to restore a weed-free community as soon as possible after construction is complete. The reclaimed areas will be monitored to ensure successful reclamation. Impacts from the introduction of weedy species will be negligible, given these considerations.

Mitigation Measures and Residual Impact

Precautions such as cleaning equipment used in weedy areas before moving to the project site will reduce the potential transfer of weeds. Using weed control on soil stockpiles left for periods of time long enough for weeds to become established will prevent seed deposition in stored topsoils. With these additional measures, the residual impact should remain negligible.

6.1.4.3 Accidental Spills of Contaminants

Impact

Fuel or lubricant spills can occur during refueling or as a result of equipment failure or accidents (e.g., broken hydraulic hose). Should spills occur in areas with natural vegetation, turf or soils, the area could be contaminated with hydrocarbons and heavy metals, which in turn could kill the vegetation. The potential for hazardous materials spills has been discussed previously in sections 6.1.1.3 and 6.1.3.2. Any spills would likely be small in nature, but if uncontrolled, could spread over large areas.

Fuels, lubricants and other potentially hazardous materials will be stored at the project staging area and equipment will be refueled and maintained there (except for minor field repairs). Fuel tanks will be secured within the staging areas and have some form of spill protection (e.g., spill pan) available. Spill kits will be carried or be readily accessible to equipment working on site and at the staging area. Construction personnel will be trained in the use of spill kits. Should a spill occur, personnel will be instructed to immediately contain and attempt to prevent the spread of the spilled material. With these measures in place, the impact of a contaminant spill on vegetation will be negligible.

Mitigation Measures and Residual Impact

No further mitigation is required beyond the measures described above. The residual impact will be negligible.

6.1.4.4 Compensation Under the Corporate Tree Policy

Impact

Mature trees and shrubs fringe the manicured lawn where the new administration building will be constructed, a few of which may need to be cleared to construct the new building. The tree species along the fringe include trembling aspen, white spruce, Manitoba maple and ornamental spruce. Shrub species include willow, chokecherry and dogwood.

The City of Edmonton's Tree Compensation Policy requires that any trees or shrubs removed during construction on City land must be compensated through financial or other means. The loss of City green space is not desirable and avoidance of loss of tree and shrub cover is the intent of the Corporate Tree Policy. Impact should be minimized as much as possible by siting the proposed building within the manicured lawn and away from mature trees. Where trees cannot be avoided, the landscaping plan will offer an opportunity to compensate on-site. The LEED recommendation for sustainable sites

includes restoring damaged areas to provide habitat and promote biodiversity (USGBC 2005). As mentioned above, the LEED requirement to fulfill this recommendation is to restore a minimum of 50% of the site area (excluding the building footprint) with native vegetation or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds. Compensation requirements will be determined in consultation with Edmonton Parks Branch. Any loss of trees and shrubs not otherwise replaced within the landscaping plan will be compensated through other means, in consultation with Edmonton Parks Branch.

Given the commitment to minimize impacts and compensate for unavoidable tree and shrub loss, the terms of the Corporate Tree Policy have been met. Impact with regard to the policy will be negligible.

Mitigation Measures and Residual Impact

Avoid damage to mature trees around the new administration building construction site by clearly marking limits of construction. Where avoidance of trees and shrubs is not possible, ensure that an assessment under the Corporate Tree Policy has been completed and compensation negotiated with Edmonton Parks Branch prior to construction. No mitigation is required beyond the measures described above. Residual impact will remain negligible.

6.1.4.5 Loss of Rare Plant Species

In review of provincial databases, no rare plants were identified in the vicinity of the old or proposed administration building sites that may be affected by the construction. Both sites have been developed to some extent and are either cleared or vegetated with non-native species. The possibility of a rare plant occurring in the proposed new building area that has not previously been described is unlikely. In addition, surface disturbance is required only at the new building site. No potential impacts to rare plants are likely to result from the proposed project. Impact to rare plant species will be negligible.

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

Table 6.4. Summary of Impact Analysis for Vegetation

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Disturbance to vegetation	Adverse, minor, permanent and predictable	<ul style="list-style-type: none"> Reclaim disturbed areas according to pending landscaping plan 	Adverse, minor, permanent and predictable
Introduction of weedy species	Negligible	<ul style="list-style-type: none"> Clean equipment used in weedy areas prior to moving to new areas Use weed control on stockpiled soils Monitor revegetated areas for weedy species and control if necessary 	Negligible
Damage to vegetation as a result of contaminant spill	Negligible	<ul style="list-style-type: none"> None other than standard construction measures 	Negligible
Compensation for tree and shrub loss under Corporate Tree Policy	Negligible	<ul style="list-style-type: none"> Assess lost trees/shrubs with Edmonton Parks Branch and negotiate compensation Replace lost trees/shrubs within landscaping plan 	Negligible
Rare plants	Negligible	<ul style="list-style-type: none"> None required 	Negligible

6.1.5 Wildlife

Potential impacts to wildlife due to this project include:

- habitat alienation due to construction noise,
- disturbance or mortality of migratory birds due to construction noise and activity,
- interference with wildlife movement due to construction in the river valley, and
- loss of rare wildlife species.

A description of each impact follows below. The wildlife impact analysis is summarized in Table 6.5.

6.1.5.1 Habitat Alienation Due to Construction Activity

Impact

Habitat alienation effects can prevent habitat use and so may indirectly cause habitat loss. Construction noise and the associated human activity have been found to discourage use of adjacent habitat by more sensitive wildlife species in some instances (Dahlgren and Korschgen 1992, Hockin *et al* 1992). In this circumstance, however, construction

activities will occur in an area where very little habitat is available, wildlife use is low, and the level of human activity is likely to be similar to existing conditions.

The old administration building is situated within a service yard at the base of a forested slope south of Fort Edmonton Park. The park train tracks run immediately south of the building, separating the building and service yard from the wooded slope. Given the activity associated with the tracks and service yard, renovation of the old administration building is unlikely to impact any wildlife in the area, especially since the majority of the work will be contained within the building.

The proposed administration building project site is outside the main gate of Fort Edmonton Park, which in 2005 hosted approximately 220,000 visitors (RFSB 2006). The project site is also used by numerous others throughout the year, including visitors to the John Janzen Nature Centre and special events like the Highland Games. Those species that may now use the manicured area within which construction will occur would likely be adapted to urban conditions, and the associated noise and human activity. Further, construction will be scheduled during the daytime shift and materials delivery will follow similar timing. Animals will experience less human disturbance in the evening and early morning hours, a time of day when many species are most active.

Given the existing habitat quality and levels of human disturbance and activity, and the urban-adapted species likely to use the construction areas, habitat alienation due to construction will be negligible.

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

6.1.5.2 Disturbance to Breeding Birds

Impact

Disturbance or mortality to migratory birds is prohibited under the federal *Migratory Birds Convention Act* and the provincial *Wildlife Act*. Such disturbance can occur most readily as a result of clearing of vegetation during the spring breeding season, which in the Edmonton area is between 15 April and 31 July. Construction of the new administration building will require disturbance mainly to a manicured area, which offers little habitat for nesting species. Some trees or shrubs on the edge of the manicured lawn area may also be cleared for construction, however, and these trees may support nesting birds.

The construction schedule for the new administration building has not yet been established. If construction were to occur in the breeding season, there is potential to disturb or harm migratory birds. In this situation, the impact would be adverse, minor, permanent and predictable.

Mitigation Measures and Residual Impact

Ensure that clearing is completed before the spring timing restriction period between 15 April and 31 July where vegetation (other than manicured turf) must be removed. Residual impact will be negligible.

6.1.5.3 Blocked Wildlife Movement Corridors***Impact***

Larger-bodied mammals such as deer, fox, coyote and other medium-sized animals require large home ranges and travel regularly within these ranges. They often use urban parkland, adapting to the disturbance caused by human activity and taking advantage of the food sources and protection from predators provided by an urban environment. However, use of urban parkland is dependant on access provided by travel corridors, areas offering suitable security cover (vegetation and terrain) and few obstacles. Travel routes can be impeded in the short-term by construction disturbance or, in the longer-term, by habitat removal or creation of barriers.

Within this section of the river valley in Edmonton, terrestrial animals are already presented with numerous barriers to movement. Roads, bridges, residential lots and open park space now occupy some river terraces, including that of Fort Edmonton. In deep, steeply-sloped river valleys such as the NSR, these terrace areas typically offer the most favorable terrain for wildlife movements. Where development has prevented travel on this flat terrain, animals will use the adjacent valley slopes, provided they are not too steep. In Edmonton's river valley, the fragmented forested slopes and less developed river terraces offer some potential travel routes, however, only a few large mammal species tolerant of human activities are likely to travel regularly along these sections of the river valley, including deer, fox and coyote.

Near Fort Edmonton Park, however, such use by wildlife would be relatively common, given the presence of forested habitat along the slope to the south of the park, along the river and in part of the park. In addition, Whitemud Creek, a major wildlife movement corridor into the city, lies just to the east. This corridor connects the habitat around Fort Edmonton Park to areas to the south and outside of Edmonton. Those animals that use this part of the river valley as part of a broader home range likely prefer moving along the forested valley slopes or along the river, which offer security cover lacking on the developed river terrace. As well, wildlife could move through the west end of the park, where the natural vegetation has been largely retained.

Around the old administration building, wildlife movement would not be impacted by the proposed work, as construction will be contained within the building and no new infrastructure will be constructed. Around the proposed new building site, wildlife movement would be fairly constrained already, given the extent of development, the open manicured area and the level of human use. Occasional movements by urban-adapted species could be permanently blocked by the new building. Option 1 will create a slightly larger barrier, given its larger footprint. Given the developed context of the

proposed new building site, impact of construction on wildlife movements will be negligible.

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

6.1.5.4 Loss of Rare Wildlife Species

Impact

Twenty-one special status wildlife species were identified as potentially occurring within Fort Edmonton Park (Table 5.2). The peregrine falcon hunts over open and forested areas but nests on cliffs or buildings. The only Threatened species within the project area, the peregrine is unlikely to be affected by the project. The nearest known nest site is at the University of Alberta campus and its prey, small birds taken by air, should not be impacted by construction or operation of the new and old buildings. Most other species were identified as being dependent on forested habitat. Within the park, forested habitat is found on the slope to the south and along the North Saskatchewan River. Scattered mature trees also fringe the manicured lawn where the proposed administration building will be constructed. Neither area will be significantly impacted by the project.

Although the old administration building is in close proximity to the naturally vegetated slope, renovation should not impact special status wildlife species. Work at this site will be confined to inside the building and transportation of materials to and from the site will be along an already existing road. No habitat will be removed; therefore, no special status species should be affected.

Similarly, construction of the new administration building should not impact special status species, as there is limited habitat available around this site. However, some mature trees fringing the construction site may need to be removed. Given that the majority of special status species are birds, construction timelines should ensure that no clearing of vegetation occurs during the spring breeding season, which in the Edmonton area is between 15 April and 31 July. Some species may use the manicured lawn area for foraging or travel; however, given the limited area the building will consume and the extent of lawn that will remain available, travel and foraging should not be impacted. Additionally, since construction will occur during the daytime and most wildlife species would not actively use the manicured lawn during this time, there should be no risk of direct mortality from construction activities. Impacts to rare wildlife species will be negligible.

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

Table 6.5. Summary of Impact Analysis for Wildlife

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Habitat alienation as a result of noise and human activity	Negligible	<ul style="list-style-type: none"> None other than proposed construction techniques 	Negligible
Mortality or disturbance to nesting migratory birds caused by vegetation clearing	Adverse, minor, permanent and predictable	<ul style="list-style-type: none"> Ensure vegetation clearing completed prior to 15 April or after 15 July where vegetation other than manicured lawn must be removed 	Negligible
Interference with wildlife movement corridors	Negligible	<ul style="list-style-type: none"> None required 	Negligible
Loss of rare wildlife species	Negligible	<ul style="list-style-type: none"> Ensure vegetation clearing completed prior to 15 April or after 15 July where vegetation other than manicured lawn must be removed 	Negligible

6.1.6 Fish and Aquatic Resources

Potential impacts to fish and aquatic resources due to this project include:

- contamination of groundwater resulting in contamination of adjacent surface water bodies and
- release of sediments and contaminants in stormwater into the river.

A description of each impact follows below. The fish and aquatic resources impact analysis is summarized in Table 6.6.

6.1.6.1 Contamination of Groundwater

Impact

Both the old and proposed administration building sites are located away from surface water. However, the North Saskatchewan River lies approximately 150 m north of the proposed building. Two special status fish species occur within the river, the lake sturgeon and silver redhorse. Contaminants released by an accidental spill at the construction site that seep into the shallow groundwater could be carried to the river, impacting fish and aquatic habitat.

Sections 6.1.3.2 addressed precautions that should be taken to ensure that groundwater does not become contaminated. Implementation of these recommendations should

prevent contamination through groundwater of fish and aquatic resources. Impacts to fish and aquatic resources will be negligible (Table 6.6).

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

6.1.6.2 Stormwater Releases into the River

Impact

As stated above, both the old and proposed administration building sites are located away from surface water, but the North Saskatchewan River lies approximately 150 m north of the proposed building and supports two special status fish species. Stormwater collected from the new building area will be released to the river through an existing storm sewer outfall. Sediments and contaminants in the stormwater released into the river could impact fish and aquatic habitat.

All stormwater collected at the new administration building site will be treated before it is released into the river. Stormwater will be directed to catch basins and a groundwater contaminant separator (e.g. stormceptor) before release into the stormwater system already in use at Fort Edmonton Park. Given these measures, impacts from stormwater will be negligible.

Mitigation Measures and Residual Impact

No mitigation is required. Residual impact will remain negligible.

Table 6.6. Summary of Impact Analysis for Fish and Aquatic Resources

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Contamination from an accidental spill	Negligible	<ul style="list-style-type: none"> None required other than standard operating practices and proposed construction techniques 	Negligible
Stormwater releases into the river	Negligible	<ul style="list-style-type: none"> Ensure stormwater is directed through a stormceptor prior to release into the stormwater system 	Negligible

6.2 Socio-economic Resources

6.2.1 Land Use Disposition and Zoning

Impact

All of the lands on which construction is proposed are owned by the City and their current zoning supports facilities such as the proposed administration building. No new zoning is required and access to all lands necessary for construction has been secured. Land disposition and permits required under the zoning bylaw have been considered in the planning of the project, and should pose no impediment to its completion. Impact will be negligible (Table 6.7).

Mitigation Measures and Residual Impact

No mitigation is required other than to ensure all required development permits are obtained prior to construction. Residual impact will remain negligible.

Table 6.7. Summary of Impact Analysis for Land Use Disposition and Zoning

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Permits required under zoning bylaw	Negligible	<ul style="list-style-type: none"> Ensure all required development permits are obtained prior to construction 	Negligible

6.2.2 Recreation Uses and Facilities

The old administration building is not near any recreational facilities, including Park exhibits, and will not impact recreation uses. Construction of the proposed administration building will occur near multi-use recreational trails in Fort Edmonton Park and within an area used occasionally by John Janzen Nature Centre for outdoor educational activities. Further, the construction site lies near the main pathway leading to the park main gate. The aesthetics and noise impacts to recreational uses of the park are addressed in the sections on visual resources (6.2.3) and noise (6.2.4) respectively. Potential safety impacts to recreational users and visitors are addressed in Section 6.2.7. Other potential impacts related to recreational use of the park and its attractions include:

- disruption of walkways near construction areas,
- temporary disruption to events during construction, and
- loss of manicured areas used for recreational activities.

More detailed discussion of these impacts follows below. The impact analysis is summarized in Table 6.8.

6.2.2.1 Disrupted Trail Use

Impact

A paved walkway lies immediately south of the proposed administration building construction area and outside the area to be disturbed. This pathway is used by the visitors to Fort Edmonton Park to gain access to the main gate, which in 2005 totaled 220,000 people (RFSB 2006). Additionally, visitors to the John Janzen Nature Centre may also use this pathway. While construction would not directly impact the pathway, leading to its closure, the activity could pose a danger or disruption to passers-by.

In order to ensure public safety in this area, construction areas will be fenced and warning signs posted to direct park visitors away from the construction area. The walkway will remain clear of construction activity and access to the park main gate will be unimpeded. Given that the pathway should still be open to visitors, impact will be negligible.

Mitigation Measures and Residual Impact

Ensure fencing does not obstruct the pathway and post warning signs to direct visitors away from the construction area. Prior to construction start in any public park area, hold a pre-construction meeting with Edmonton Parks Branch and the Park Ranger Unit to clarify anticipated staging and construction needs, signage requirements and other relevant aspects of the proposed work. Provide a contact list of key project personnel to these departments to facilitate communication throughout the construction period. Residual impact to trail use should be negligible.

6.2.2.2 Temporary Disruption to Events during Construction

Impact

Fort Edmonton Park hosts the Highland Games every July in the manicured lawn area where the proposed building site will be located. As well, the John Janzen Nature Centre uses this manicured lawn area for some of their outdoor programs. Construction in this area could disrupt these activities because of the associated safety concern, dust, visual effect and noise. Safety concerns are addressed in Section 6.2.7.1. Both dust and noise are addressed in other sections: Air Quality (Section 6.1.2) and Noise (Section 6.2.4). The visual impact associated with construction occurring in the manicured lawn area will be unavoidable but temporary. The impact will be adverse, minor, temporary and predictable.

Mitigation Measures and Residual Impact

Work with both the Highland Game organizers and the John Janzen Nature Centre to minimize impacts during their use of the manicured lawn area. Residual impact will be negligible once construction is complete.

6.2.2.3 Loss of Manicured Recreational Space

Impact

The proposed administration building will be constructed within a manicured area that is used for recreational activities by the John Janzen Nature Centre and others. The Fort Edmonton Highland Games are held in this area every July and the John Janzen Nature Centre uses it for some of their outdoor programs, such as snowshoeing. Option 1 for the new administration building will remove approximately 1123 m² from the 15,000 m² manicured lawn area. This would be a larger impact area than Option 2, which has a footprint area of 890 m². While both options result in a permanent removal of recreational lands, the overall effect should be minimal given the relatively small footprint of the building and the extent of manicured area still available. The landscaping plan will also ensure that the building is screened from other user groups by vegetation and other landscaping features to minimize visual impact to these users. The building will also add value to Fort Edmonton Park by providing services to the public, such as a gift shop and public washrooms (available during office hours), and improving the transition area between the parking lot and the main gate. The impact will be adverse, minor, permanent and predictable.

Mitigation Measures and Residual Impact

The construction site should be clearly delineated to minimize the area disturbed. Residual impact to recreational users will remain adverse, minor, permanent and predictable.

Table 6.8. Summary of Impact Analysis for Recreation Uses and Facilities

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Potential temporary disruption of main pathway	Negligible	<ul style="list-style-type: none"> Fencing to prevent access and signage 	Negligible
Temporary disruption to events during construction	Adverse, minor, temporary and predictable	<ul style="list-style-type: none"> Work with both the Highland Game organizers and the John Janzen Nature Centre to minimize impacts during their use of the manicured lawn area 	Negligible
Removal of manicured lawn	Adverse, minor, permanent and predictable	<ul style="list-style-type: none"> Minimize construction footprint by clearly marking area to be disturbed Disturb as little manicured vegetation as possible 	Adverse, minor, permanent and predictable

6.2.3 Visual Resources

Impact

There will be no change in the exterior appearance of the old administration building following its renovation. Construction of the new administration building will present a temporary disturbance to the visual character of the park area. On completion, the new building will occupy part of the manicured area immediately outside the park main gate. The landscaping plan to be developed in the next stage of design and the green roof sections of the building will screen the buildings to some extent, but parts of the building will still be visible. Option 1 for the new administration building is 233 m² (25%) larger than Option 2, making its presence more noticeable. The new administration building will be visible to residents on the north side of the river and to all visitors to the park. Residents to the south will not be able to see the building, as the vegetated slope below the neighborhood will obscure the view.

Although the new administration building will change the view for park visitors, the building has been designed with visitor experience in mind. The new building will transition visitors from the parking lot to the historical setting of Fort Edmonton Park. The building design does not distract from the park train station and will blend with the natural surroundings. The adjacent land disturbed by construction will be landscaped with shrubs, grass and hard landscaping features that blend into the manicured parkland. The green roof areas will further blend the building into the surrounding landscape from perspectives near the structure, due to the sloped roof angles.

Given the improvement to the visitor's entry into the park and the additional landscaping, the new development will have a positive, minor to major, permanent and predictable impact on the aesthetics in this area.

The proposed building is approximately 450 m away from the residences on the north side of the river. At this distance, the building would create a minor change to the viewscape. Both building designs intend to blend the building into the existing landscape, highlighting the train stations facade. Landscaping following construction will likely enhance the view from the residences, as the intent is to restore the area with native species, potentially including shrubs and trees. The green roof sections will also help blend the building into the surrounding manicured lawn. This will create a positive, minor to major, permanent and predictable impact.

Mitigation Measures and Residual Impact

No mitigation is required of a positive impact. Residual impact will remain positive, minor to major, permanent and predictable (Table 6.9).

Table 6.9. Summary of Impact Analysis for Visual Resources

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Viewscales for park visitors and nearby residents	Positive, minor to major, permanent and predictable	<ul style="list-style-type: none"> None required 	Positive, minor to major, permanent and predictable

6.2.4 Noise

Impact

Noise associated with renovations to the old building and the construction of the new administration building will pose a potential disturbance over a period of months. Although construction will be scheduled during daytime shifts, in accordance with the Noise Bylaw, noise and traffic will be fairly constant over the workday. The nearest residential area is Brander Gardens and it is buffered from the construction site by the forested valley slope. For residents, construction noise would likely blend with background noise from the Whitemud freeway and be a virtually imperceptible change in noise levels. Noise impacts to nearby residents will be negligible (Table 6.10).

The noise will primarily affect recreational users. There were approximately 220,000 visitors to Fort Edmonton Park in 2005 (RFSB 2006). Most visitors would pass within 85 m of the old administration building as they walk along the park boardwalk and could potentially hear construction noise at the site. However, much of the work around this building will occur indoors, therefore noise should be minimal and the impact, negligible.

All of park visitors would pass by the new administration building location to gain access to the park main gate. Here, noise would be noticeable as construction would be occurring less than 40 meters from the park main gate and main pathway. Noise will have an adverse, minor, temporary and predictable impact.

Mitigation Measures and Residual Impact

No mitigation required, except if construction anticipated to generate noise in excess of permitted levels is scheduled to occur outside the hours listed in the Noise Bylaw. In that instance, an application for exemption from the Bylaw should be submitted by the contractor. Residual impact will remain negligible for nearby residents and visitors near the old administration building. Impact to visitors passing by the new building will cease once construction is complete. Residual impact to these visitors will be negligible.

Table 6.10. Summary of Impact Analysis for Noise

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Noise disturbance to residents	Negligible	<ul style="list-style-type: none"> • None required, provided noise is within Noise Bylaw levels • Apply for exemption under the bylaw, if bylaw limits cannot be met 	Negligible
Noise disturbance from the renovation of the old administration building on visitors	Negligible	<ul style="list-style-type: none"> • None required, provided noise is within Noise Bylaw levels • Apply for exemption under the bylaw, if bylaw limits cannot be met 	Negligible
Noise disturbance from construction of the new building on visitors	Adverse, minor, temporary and predictable	<ul style="list-style-type: none"> • None required, provided noise is within Noise Bylaw levels • Apply for exemption under the bylaw, if bylaw limits cannot be met 	Negligible

6.2.5 Utilities and Infrastructure

Renovation of the old administration building will not involve any utilities work. Two potential impacts were identified for construction of the proposed new administration building:

- damage or disturbance to existing utilities lines due to excavation, and
- additional surface disturbance required to connect the new building to existing services.

These impacts are discussed in further detail below. The impact analysis is summarized in Table 6.11.

6.2.5.1 Construction Damage to Existing Lines

Impact

Several utility lines lie in close proximity to the new administration building site and could be disturbed by construction. Excavation will be required to connect the new lines, construct the basement and install foundation pilings for the new building. Particularly for the pilings work, these excavations could damage the existing lines should they lie nearby. Prior to construction, routes for these lines will be located and marked to avoid

damage during excavation. With this precaution, impacts to existing utility lines should be negligible.

Mitigation Measures and Residual Impact

Where connections or modifications will be conducted, the lines will be exposed by hydrovac or hand to avoid accidental rupture with excavation equipment. Impact to shallow connections lines will remain negligible given design and standard construction precautions.

6.2.5.2 Additional Disturbance for Utilities Connections

Impact

As mentioned above, the proposed administration building is in close proximity to existing utilities lines. Little disturbance should be necessary to provide connection to the existing utilities lines, other than trenching over the short distance from the existing lines to the new building. Although the service line route has not yet been selected, gaps in the trees bordering the manicured area of the proposed building site will allow access without additional clearing. No new servicing or upgrading of those lines should be required, thus no additional disturbance to install utilities connections is anticipated. Impacts related to additional disturbance of trees fringing the manicured area to install utilities connections will be negligible. Reclamation of the disturbed area will follow the landscaping plan.

Mitigation Measures and Residual Impact

Ensure that the utilities connections do not disturb or remove vegetation. No other mitigation is required and residual impact will be negligible.

Table 6.11. Summary of Impact Analysis for Utilities and Infrastructure

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Damage or disturbance to existing lines during construction	Negligible	<ul style="list-style-type: none"> None required other than standard construction practice of line location and hand exposure 	Negligible
Additional disturbance for utilities connections	Negligible	<ul style="list-style-type: none"> Ensure that the utilities connections do not disturb or remove vegetation 	Negligible

6.2.6 *Potential Site Contamination and Hazardous Building Materials*

Risks to worker and public health and safety have been identified in part through a Hazardous Materials Assessment conducted for the administration building project by PHH ARC Environmental Ltd (2006a). Additional risks to the public from construction activity in the recreational area are addressed in Section 6.2.7.

Potential impacts to worker and public health and safety from site contamination and hazardous building materials at the old administration building are discussed in further detail below. The impact analysis is summarized in Table 6.12.

Impact

Given the confirmed presence of several hazardous materials within the old administration building, workers will need to adhere to established procedures for dealing with each hazardous material, as recommended by PHH ARC Environmental Ltd. (Appendix B). A Hazardous Materials Management Plan should be developed prior to construction and implemented. A summary of the measures required within that plan is provided below.

- Asbestos-containing materials must be removed prior to demolition activities in accordance with appropriate work procedures and disposed of in accordance with Alberta Environment regulations. Asbestos materials not removed in conjunction with the planned renovations must be managed through the development and implementation of an Asbestos Management Program.
- Any ballasts should be checked for PCB content at the time of decommissioning. Those found to contain PCBs must be handled, packaged and disposed of in accordance with local Environmental Protection regulations.
- If cutting, sanding or other abrasion of painted surfaces is required, further testing of those surfaces for lead is recommended. Other forms of lead, e.g., emergency light batteries, should be recycled when they are decommissioned.
- Fluorescent light fixture tubes and thermostats taken out of service should be recycled in accordance with Alberta Environment guidelines. Ozone-depleting substances should be recycled/recovered in accordance with the Ozone Depleting Substances Regulation.
- All smoke detectors should be examined for radioactive components at the time of decommissioning and disposed of accordingly.
- Intrusive investigation and sampling should be carried out to verify the extent of mould contamination. The cause of water damage should be investigated and rectified. Mould-contaminated material should be remediated in accordance with EPA Level 3 procedures.
- Test any items not surveyed or concealed items uncovered by renovation activities (PHH ARC Environmental Ltd. 2006b).

As public will not be near or have access to the building, there should be no risk to them. Workers should be unaffected provided the above measures are implemented. Impact will be negligible given these conditions.

Mitigation Measures and Residual Impact

No additional mitigation is required other than completion of the Hazardous Materials Management Plan and residual impact will remain negligible.

Table 6.12. Summary of Impact Analysis for Potential Site Contamination and Hazardous Building Materials

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Hazardous materials safety risks to workers and public	Negligible	<ul style="list-style-type: none"> • Complete Hazardous Materials Management Plan • Follow recommended procedures for handling hazardous materials 	Negligible

6.2.7 Traffic and Public Safety

Risks to worker and public health and safety have been identified in part through a Hazardous Materials Assessment by PHH ARC Environmental Ltd (2006a) (Appendix B). These risks were addressed in the preceding section. Additional risks to the public associated with the project could result from construction activity in the manicured lawn area.

Potential impacts to traffic and public safety include the following:

- accidental visitor entry into construction areas,
- degradation of road surfaces,
- collisions with construction vehicles,
- parking for administration staff, and
- parking for construction staff.

These impacts are discussed in further detail below. The impact analysis is summarized in Table 6.13.

6.2.7.1 Accidental Visitor Entry into Construction Areas

Impact

Renovation of the old administration building will occur within a service maintenance yard of Fort Edmonton Park and away from visitor attractions. Encounters between visitors and construction activities at this site should not be an issue. Construction of the proposed administration building will occur just outside Fort Edmonton Park's main gate, within a manicured area and adjacent to the main pathway leading to the park main gate.

As this area is accessible to the public, there may be some potential for accidental entry into the construction area and potential injury.

Work at the proposed administration building site will proceed over several months. The entire construction site will be fenced to prevent access and warning signs will be posted to direct visitors away from the site. During the day, construction crews will require open access, but at night, any gates will be locked. Signs will be posted to warn recreational users of the dangers around the construction site and to advise of entry restrictions. Given the precautionary measures to be implemented around the excavation, potential for injury to park visitors accidentally entering these areas should be negligible.

During certain events, however, it may be more difficult to manage public activities around the construction site. The Highland Games, held in July, and the John Janzen Nature Centre use the manicured lawn area for their programs. Considering the difficulty in managing the large numbers of visitors using this space during these programs, impacts could be adverse, minor, temporary and predictable.

Mitigation Measures and Residual Impact

Once the contractor has been selected and a schedule for construction established, contact the John Janzen Nature Centre to advise them of construction plans. Contact should be well in advance of anticipated construction periods to provide sufficient time to allow their staff to adjust any programs that may use the manicured lawn area. Provide notice to the Highland Games organizers as well and work with them to ensure their event can proceed safely. Post warning signage advising park users of the construction at Fort Edmonton Park several weeks prior to construction. A contact number should also be indicated on this signage. Prior to construction start in any public park area, hold a pre-construction meeting with Edmonton Parks Planning and the Park Ranger Unit to clarify anticipated staging and construction needs, signage requirements and other relevant aspects of the proposed work. Provide a contact list of key project personnel to these groups to facilitate communication throughout the construction period. Residual impact will be negligible.

6.2.7.2 Degradation of Road Surfaces

Impact

Materials will periodically be delivered to the construction areas at both the old and new administration building sites. Deliveries to the old building will be along a service road that parallels the train tracks. Deliveries to the new building site will be along the North Access Road and the West Access Road. These deliveries may also include heavier loads, leading to greater compaction of or damage to the road surface. The North Access Road is already used for major deliveries to the park and appears to be sustaining such use. The graveled West Access Road and the service road to the old building may not sustain traffic with heavy loads. In order to limit the intensity of this impact, heavy loads will not be transported when the roads are wet. Impacts to the roads should be negligible.

Mitigation Measures and Residual Impact

No mitigation is required other than those measures listed above. Should damage to existing access roads occur due to construction hauling, the road should be repaired to previous condition. Residual impact will remain negligible.

6.2.7.3 Collisions with Construction Vehicles***Impact***

Renovation of the old administration building will require construction traffic access to the site. A service road that runs to the south of the old building and around the main Fort attractions will provide access. Since this service road is not accessible to park visitors, potential for disturbance to park visitors or collisions should not occur. Impact will be negligible.

The North Access Road will be shared by construction vehicles, park staff and park visitors. That road provides access to the airplane hangar and the Selkirk Hotel inside the park, which are used year-round for daytime and evening events. Construction crews will be using this road to gain access to the new administration building site and staging area. To avoid accidents between construction vehicles and other motorists, signs will be posted to warn drivers about the construction traffic. Construction personnel will be required to adhere to posted speed limits and will be advised of shared road use areas. Given the precautionary measures to be implemented, potential for collisions in this area should be negligible.

Mitigation Measures and Residual Impact

No mitigation is required other than those listed above. Consider scheduling deliveries during off-peak hours, when visitor traffic volume would be lower. Residual impact will remain negligible.

6.2.7.4 Parking for Administration Staff***Impact***

Construction of the proposed administration building will occur just outside Fort Edmonton Park's main gate. The staging area will be within the train maintenance yard and construction vehicles will use the West Access Road to gain access to the site. This may disrupt use by those Fort Edmonton Park staff that currently use the West Access Road to gain access to the maintenance yard and parking. During construction, staff should still be able to access the maintenance yard but they may need to park in the visitor parking lot, depending on the size of work crew the contractor elects to use for the project. Alternatively, they may be instructed to park along the West Access Road. Any potential displacement would involve relatively few vehicles and only for the duration of construction. During construction, this displacement of staff vehicles will be an adverse, minor, temporary and predictable impact.

After construction is complete, parking for staff of the proposed administration building will be accommodated in the currently graveled lot alongside the West Access Road.

Administrative staff currently use this lot; no additional parking will be required to support the new building. Visitors to the administration building will be required to use the visitor parking lot, as in the past. Impact on parking at the site during operation of the administration building will, therefore, will be negligible.

Mitigation Measures and Residual Impact

Once the contractor is selected and construction parking requirements are better understood, parking areas within the visitor lot should be identified for administration staff. Ideally, the contractor will not displace staff parking for long periods, and can schedule their work to avoid such displacement during particularly busy visitation periods. Residual impact on the visitor parking lot could be reduced to a negligible level with these measures.

Potential impact on staff parking after construction is complete should not be affected by the project. No mitigation is required and residual impact will remain negligible.

Table 6.13. Summary of Impact Analysis for Traffic and Public Safety

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Accidental visitor entry into construction areas	Negligible	<ul style="list-style-type: none"> • None required other than proposed construction security measures 	Negligible
Accidental visitor entry into construction areas during programs held in manicured lawn area	Adverse, minor, temporary and predictable	<ul style="list-style-type: none"> • Prior to construction, contact the John Janzen Nature Centre to advise them of construction plans • Provide notice to the Highland Games organizers as well and work with them to ensure their event can proceed safely • Post warning signage advising park users of the construction at Fort Edmonton Park several weeks prior to construction 	Negligible
Degradation of road surfaces	Negligible	<ul style="list-style-type: none"> • Do not transport heavy loads while the roads are wet to avoid damage 	Negligible

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Collisions with construction vehicles	Negligible	<ul style="list-style-type: none"> None required other than proposed construction security measures Consider scheduling deliveries in off-peak visitor hours 	Negligible
Parking for administration staff during construction	Adverse, minor, temporary and predictable	<ul style="list-style-type: none"> Identify areas within visitor lot for staff parking, if required Schedule construction parking use (if required) to avoid displacement of staff parking during peak visitation periods 	Negligible
Parking for administration staff during building operation	Negligible	<ul style="list-style-type: none"> None required 	Negligible

6.3 Heritage Resources

6.3.1 Historic Resources

A Historical Resources Overview conducted by Altamira identified the potential for archaeological artifacts to be impacted by the construction of the new administration building. Their assessment identified one record of an archaeological site in the vicinity of the proposed administration building. Given the location of the project on a river terrace, the potential exists for other artifacts to occur in the area. Excavations of the site during construction could disturb sediment layers containing additional artifacts. In order to mitigate potential impacts, a Historical Resources Impact Assessment (HRIA) was conducted in July 2007 to assess the potential risk of encountering other archaeological sites. The HRIA concluded that no further assessment or mitigation work was warranted for this project. The report was provided to the Historic Resources Management Branch of Alberta Tourism, Parks, Recreation and Culture for review. The branch determined no further work was required and provided *Historical Resources Act* clearance for the project to proceed. Considering these results, no impacts to undiscovered historical resources are expected to result from the proposed project. The potential for disturbing any known or previously undiscovered historical sites is negligible.

Mitigation Measures and Residual Impact

Should archaeological, palaeontological or historical resources be encountered during construction, halt construction and immediately contact Alberta Tourism, Parks, Recreation and Culture for direction. Residual impacts will remain negligible (Table 6.14).

Table 6.14. Summary of Impact Analysis for Heritage Resources

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Potential to disturb undocumented historical resources	Negligible	<ul style="list-style-type: none"> If archaeological, palaeontological or historical resources are encountered during construction, halt work and immediately contact Alberta Tourism, Parks, Recreation and Culture for direction 	Negligible

7.0 SUMMARY ASSESSMENT

This chapter summarizes the findings of the impact analysis process and provides regulators with a reference for identifying the significant impacts of the project. The initial sections review the adverse and positive residual impacts remaining after mitigation has been implemented. Next, the issues identified in Chapter 3.0 are revisited to describe their resolution within the impact analysis process. Lastly, concluding statements regarding the overall significance of project impacts provide a summation of the analysis process.

7.1 Summary of Impacts

No adverse, major residual impacts were identified during the impact analysis process. Most potential impacts have been minimized through design or will be mitigated to a negligible level with the recommended actions. Regardless, two adverse, minor residual impacts will remain (Table 7.1). Loss of manicured lawn and the associated recreational space are the only adverse, permanent biophysical impacts resulting from the project.

One positive residual impact will remain upon project completion. Viewscapes for park visitors and nearby residents will be improved with the construction of a new administration building and associated landscaping.

Table 7.1. Summary of Adverse Residual Impacts

Impact Description	Impact Characteristics	Mitigation Measures	Residual Impact Characteristics
Vegetation			
Disturbance to vegetation	Adverse, minor, permanent and predictable	<ul style="list-style-type: none"> Reclaim disturbed areas according to pending landscaping plan 	Adverse, minor, permanent and predictable
Recreational Use			
Removal of manicured lawn	Adverse, minor, permanent and predictable	<ul style="list-style-type: none"> Minimize construction footprint by clearly marking area to be disturbed Disturb as little manicured vegetation as possible 	Adverse, minor, permanent and predictable
Visual Resources			
Viewscapes for park visitors and nearby residents	Positive, minor to major, permanent and predictable	<ul style="list-style-type: none"> None required 	Positive, minor to major, permanent and predictable

7.2 Summary of Mitigation Measures

Throughout Chapter 6, mitigation measures were recommended to reduce the potential impact related to a given resource. Those tended to be repeated, as similar mitigation may reduce the impact to several resources (e.g., contamination to soils, surface, groundwater and vegetation caused by spills of hazardous materials). Here, we summarize the recommended mitigation measures according to the project phases, to aid in their implementation by contractors and others involved in the project. Included in these measures are steps to meet the regulatory requirements identified in Chapter 2.

Permitting

- Ensure all municipal development permits required for surface works are obtained prior to construction.

Preconstruction

- Identify and detail the site drainage requirements around the proposed administration building. Submit the final design plans to Edmonton Planning and Development and Drainage Services for review and comment.
- Develop and implement a Stormwater Management Plan that reduces impervious cover, promotes infiltration, and captures and treats stormwater runoff from 90% of the average annual rainfall using acceptable best management practices.
- Coordinate with Edmonton Parks Branch to negotiate appropriate compensation for trees and shrubs to be lost to clearing, in accordance with the Corporate Tree Policy.
- Submit construction drawings for all areas where parkland may be disturbed to Parks Branch for review and comment. Drawings should include all associated disturbance and landscape changes (e.g., grading, installation of structures, vegetation removals or restoration). Immediately communicate any impacts within City parkland that were not predicted in the ESR to Parks Branch so that a mutually satisfactory mitigation strategy can be developed.
- Submit a detailed project schedule to Parks Branch to allow coordination of park management activities (e.g., maintenance, upgrading plans) within the context of proposed construction.
- Develop a Landscaping Plan for the proposed administration building with a landscape architect and submit to Parks Branch for review and comment.
- Prior to construction start in any public park area, hold a pre-construction meeting with Parks Planning, Parks Operation and the Park Ranger Unit to clarify anticipated staging and construction needs, signage requirements and other relevant aspects of the proposed work. Provide a contact list of key project personnel to facilitate communication throughout the construction period.
- Contact the John Janzen Nature Centre and the Highland Games organizers to advise them of construction plans and work with them to coordinate construction and event activities.
- Conduct a Historical Resources Impact Assessment to confirm whether artifacts are present at the construction site.

General Construction Measures

Clearing and Earthworks

- Locate all underground utilities before any surface disturbance construction begins.
- Expose utility lines by hand or hydrovac to prevent accidental rupture.
- Clearly delineate and mark all vegetated areas that require clearing to minimize accidental removal of vegetation.
- Ensure vegetation clearing is completed prior to 15 April or after 31 July at all sites where vegetation other than manicured turf must be removed. This will avoid disturbance of nesting migratory birds and contravention of the federal *Migratory Birds Convention Act* and provincial *Wildlife Act*.
- Strip and stockpile topsoil. Arrange for advice of a soil scientist for stripping of areas where soil layers are difficult to differentiate.
- Suspend construction in bare soil areas after heavy rains to prevent compaction of subsoils.
- If potential heritage artifacts are discovered during construction, halt work and contact Alberta Tourism, Parks, Recreation and Culture for direction.

Erosion Control

- Develop and implement an Erosion and Sedimentation Control Plan in accordance with the City's ISO 14001 procedures.
- Ensure erosion protection is installed as recommended in the Erosion and Sedimentation Control Plan and monitor and maintain throughout construction.

Noise and Other Public Impacts

- Adhere to the restricted hours prohibiting loud construction noise stipulated in the Noise Bylaw.
- Confine construction staging areas and access road corridor to the smallest area possible to minimize disruption of parking and traffic.

Weed Control

- Clean equipment used in weedy areas prior to moving to the project site.
- Use weed control on stockpiled soils.
- Monitor the project site for weedy species and apply appropriate weed control to eliminate weeds.
- Revegetate as soon as possible after construction is complete.

Hazardous Materials Handling and Storage

- Ensure that spill kits are readily accessible at all construction sites and that personnel are trained to respond immediately and effectively to any spill.
- Report any large spills to the appropriate federal, provincial and municipal officials immediately. Provide a list of emergency contacts to be notified in the event of a spill at the construction site. Ensure any spills are contained and disposed of following provincial and federal guidelines.

- Identify suitable storage areas, handling and containment requirements and refueling and maintenance procedures as outlined in the City of Edmonton's ISO14001 procedures.
- Remove all hazardous materials identified within the Hazardous Materials Survey, as recommended by PHH ARC Environmental Ltd.

Public Safety

- Post warning signage advising park users of the construction at Fort Edmonton Park several weeks prior to construction. A contact number should also be indicated on this signage.
- Clearly post construction hours on warning signage around the construction site to warn users of activity periods.
- Place protective fencing around all working areas to prevent public access. Store all hazardous materials within a secure staging area within the maintenance yard.

Reclamation

- Restore a minimum of 50% of the disturbed site area (excluding the building footprint) with native vegetation or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds.
- Implement reclamation plans outlined in the Landscaping Plan as soon as possible once construction is complete.
- Continue to work with Edmonton Parks Branch to coordinate post-construction reclamation.
- Replace subsoils and topsoils in separate lifts. To relieve compaction that may occur during earthworks, rip subsoils before replacing topsoil and till topsoil layer before seeding.
- Monitor revegetation efforts and maintain erosion controls until vegetation sufficiently well-established to provide effective erosion control.

7.3 Monitoring and Follow-up Requirements

Monitoring is required in order to maintain or adapt mitigation measures to ensure issues or concerns are adequately addressed during construction or during subsequent stages of reclamation or operation. For this project, monitoring will be required in areas with surface disturbance, to ensure the impact is minimized and reclamation is successful.

In accordance with the City's ISO 14001 procedures to minimize the potential adverse impacts of sediment release, erosion control measures will be installed in areas of surface disturbance. Those measures will be monitored and maintained as necessary until vegetation has become sufficiently established to provide erosion protection. Success of revegetation will also be monitored, to ensure that ground cover will adequately prevent erosion and that weeds do not become established. Weed control can be applied to those areas where significant populations have become established.

Follow-up items are also required of this project, including detailed plans for landscaping, reclamation and mitigation controls that cannot be developed until later in the detailed design process. These items were listed in the mitigation summary and include the following items.

- A Landscaping Plan is to be developed by a landscape architect for disturbed areas in Fort Edmonton Park. This plan should be developed in consultation with Edmonton Parks Branch. The architecture firm responsible for the detailed design stage (Anthony K. Eng Architect Ltd.) has confirmed a design schedule with their subconsultant landscape architect firm that includes several consultation steps with Edmonton Parks Branch.
- An Erosion and Sediment Control Plan prepared in accordance with the City's ISO 14001 policies and prepared in advance of construction.

7.4 Issue Resolution

In this section, the issues and concerns identified at the initial stages of the ESR process, which were documented in Section 3.0, are revisited to review the manner in which the concerns were addressed. For each of the environmental and socio-economic features potentially affected by the project, the original issue, phrased as a question, is restated in bold type and followed by the explanation of its resolution during the impact assessment process.

7.4.1 Environmental Resources

7.4.1.1 Geology and Soils

How will excavated material be handled to avoid potential for mixing of topsoil and subsoil and causing reduced topsoil quality?

Where soils will be disturbed, topsoils will be salvaged and replaced during site reclamation. If identification of topsoil depth is difficult, a soil scientist will be retained to assist in the salvage process.

Is there potential for damage or compaction to the soils in areas requiring surface disturbance, including soil stockpiling areas?

Subsoils and topsoils compacted during construction and restoration work will be ripped/tilled to release them prior to replacing topsoil or reseeding disturbed areas (respectively). Subsoils and topsoils will be replaced in separate lifts.

Is there potential for soil contamination from accidental spills?

Hazardous materials handling procedures outlined by PHH ARC Environmental Ltd. In their Hazardous Materials Assessment (Appendix B) will be implemented, which will minimize potential soils contamination.

7.4.1.2 Air Quality

Will construction activities produce dust or other emissions that might negatively impact air quality for recreational users in the area?

Construction activities will likely produce dust and vehicle emissions but the impact on recreational users in the area will be minimal. Dust release will be localized and temporary. As well, recreational users will likely only be exposed to the dust briefly, as most would be exposed only when passing through the area. Vehicle emissions should not impact recreational users, as the area is already exposed to traffic along the access roads and Whitemud Drive and construction equipment will be limited. If complaints are received from the public regarding air quality, construction will be adapted to reduce the impact. Such mitigation measures may include applying tackifier and adjusting hauling.

7.4.1.3 Hydrology and Hydrogeology

How will hazardous materials be managed to avoid potential contamination of the shallow groundwater?

Refueling or maintenance of construction equipment will follow the City of Edmonton's ISO 14001, as will minor and major equipment repairs. These procedures address all activities related to storage and use of fuels, lubricants and other potential contaminants and are designed to minimize potential spills and accidental releases. Their implementation should also prevent groundwater contamination. Key recommendations for hazardous materials handling were outlined in Section 6.1.1.3.

How will stormwater drainage from the site be managed to minimize potential release of pollutants to adjacent waterbodies?

The proposed building will be designed in the most environmentally sensitive way, following the LEED principles and requirements applicable for certification. LEED recommends limiting disruption of natural surface water drainage by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff, and eliminating contaminants (USGBC 2005). Additionally, LEED recommends limiting disruption and pollution of natural waters by managing stormwater runoff. Surface drainage will be addressed through overland drainage and infiltration into the surrounding landscaping and/or collection in stormceptor catch basins. CT & Associates Engineering (2006) recommended that finished grades should be completed such that all surface water is drained away from all buildings and structures.

7.4.1.4 Vegetation

Will natural vegetation communities be impacted by renovation of the old administration building and construction or operation of the new building?

The old administration building is at the base of a naturally vegetated slope. However, no vegetation should be disturbed in renovating the old building. Construction of the new building will occur within a manicured lawn area; native vegetation is limited to trees bordering the field. A few of these may be removed but that loss will be compensated for under the Corporate Tree Policy

Will any rare species or unique vegetation communities be impacted by renovation of the old administration building and construction or operation of the new building?

No rare or unique vegetation communities will be impacted by renovation of the old administration building, which will require no surface disturbance or exterior work. Construction or operation of the new building should not impact rare species, as the new building will be situated in a manicured lawn area that is unlikely to support rare species. An ANHIC database search indicated that no rare species have been previously identified in the area.

How will the trees or shrubs impacted by construction be compensated under the City's Corporate Tree Policy?

Site design of the new administration building will avoid existing trees as much as possible. However, some trees and shrubs may need to be cleared to create space for the new building. An assessment will need to be conducted by Edmonton Parks Branch to determine the compensation value for those trees on the project site that would require removal. Furthermore, landscaping is planned for the manicured area around the proposed administration building that may replace some trees and shrubs lost during construction.

7.4.1.5 Wildlife

What wildlife species are likely to be impacted by renovation of the old administration building and construction or operation of the new building?

The wildlife species most likely to be impacted by renovation of the old administration building and construction or operation of the new building are urban-adapted species, mainly small to medium-sized animals with small to moderate home range requirements (e.g., coyote, fox, songbirds, weasels) but also some larger species, such as deer. Many of these species are more generally tolerant of the high levels of human activity that exist in the area and would therefore, likely adapt to the disturbance created by construction and ongoing operation. If any vegetation clearing required for construction were to occur during the bird breeding season, there is the potential to disturb or harm migratory birds. By ensuring that any necessary vegetation clearing for the new building is completed before the spring timing restriction period (15 April to 31 July), migratory birds addressed in the federal *Migratory Birds Convention Act* and provincial *Wildlife Act* will be unlikely affected by this project.

Will any sensitive species, including any federally or provincially listed species, be impacted by renovation, construction or operation of the buildings?

Several rare or sensitive species may occur in the regional study area, including the provincially listed At Risk peregrine falcon, but none will be affected by renovation, construction or operation of the facilities. No natural habitat will be removed or disturbed in the course of construction. Construction is limited to interior renovation work and construction within a manicured lawn area. Some trees and shrubs may need to be removed for construction to proceed; however, all clearing will be completed outside of the spring timing restriction period between 15 April and 31 July.

Will travel corridors potentially used by wildlife with broader home range requirements be impeded by renovation, construction or operation of the buildings?

Edmonton's river valley system provides a corridor connecting habitats inside and beyond the city, including Whitemud Creek ravine. This ravine connects habitat outside of the city to the habitat along the North Saskatchewan River and near Fort Edmonton Park. Most animals using this corridor would then travel along the forested slopes around Fort Edmonton Park or along the North Saskatchewan River. These areas provide security cover no longer available in the developed and manicured lawn areas within the park, including the two project sites.

Considering that renovation of the old administration building will occur indoors and during the day when wildlife are generally not active, there should be minimal disruption to wildlife movement. As the proposed administration building will be within previously developed area that currently offers little cover to support wildlife movement, the new structure will not impede movement through this part of the river valley.

7.4.1.6 Fish and Aquatic Resources

Are fish and other aquatic resources likely to be impacted by renovation of the old administration building and construction or operation of the new building?

Two special status fish species, the lake sturgeon and silver redhorse, are found within the North Saskatchewan River near Fort Edmonton Park. However, these fish and other aquatic resources are unlikely to be impacted by the renovation, construction or operation of the old and new buildings. The distance separating the construction sites from the river will prevent any new release directly into the river.

How will stormwater be handled to minimize the potential impact to fish or aquatic habitat?

The potential impact on fish and aquatic habitat from stormwater will be minimized because all stormwater will be treated before release to the river. Stormwater will be directed either overland or to catch basins equipped with silt/oil/grease separators and then into the stormwater system already in use at Fort Edmonton Park.

7.4.2 Socio-economic Resources

7.4.2.1 Land Use Disposition and Zoning

Recreational facilities are permitted under the site's current zoning and the City owns Fort Edmonton Park. No issues related to zoning or land ownership have been identified for the project.

7.4.2.2 Recreation Uses and Facilities

Will any trail use be disrupted by construction?

All trails will remain open for the duration of the project, allowing use to continue during construction, including the main access pathway between Fort Edmonton and the main parking lot. Warning signs will be posted along trails that come within close proximity to the construction site to ensure the safety of park visitors.

Will users of the new building have sufficient parking, or will additional space be required in the Fort Edmonton and John Janzen Nature Centre parking lot?

Parking for the proposed administration building will be accommodated in the graveled lot alongside the West Access Road, which is currently being used for parking by administrative staff housed in the temporary facilities. Considering that the lot now meets the needs of the administration staff, this lot should provide sufficient capacity for administrative staff once construction is complete.

Will access to the Fort Edmonton Park main gate be inhibited by the construction site?

Access to the Fort Edmonton Park main gate should not be inhibited, as the walkway leading to the main gate will remain open. Signs will be posted along the walkway to alert visitors to the nearby construction.

Will renovation of the old building detract from the historical experience within the park?

Renovation of the old administration building should not detract from the historical experience within the park. The old building is within a service yard that is not accessible to the public. All hauling of materials to and from the site will be done along an access road that runs south of the park. Therefore, renovation activities should not be visible to the public.

7.4.2.3 Visual Resources

Will the new administration building remain consistent with the historical theme of Fort Edmonton Park?

The new administration building will be consistent with the natural setting within which it will be located. The building will transition visitors from the parking area to the historical train station, while not detracting from the presence of the station. The adjacent land disturbed by construction will be landscaped to reflect the natural setting.

Will areas disturbed by renovation and construction be restored to ensure that they do not detract from the aesthetics of the existing park and the entrance area?

A Landscaping Plan will be developed to address restoration of those areas disturbed by construction. The plan will be circulated to Edmonton Parks Branch for review and comment, to ensure that the plan meets the management objectives for the park.

7.4.2.4 Noise

Will construction noise negatively affect the experience of recreational users of the park?

Construction noise may negatively affect the experience of recreational users of the park. Much of the recreational activity occurs beyond the park main gate, which effectively creates a sound barrier for those visitors within Fort Edmonton. However, as visitors are entering the park they will need to pass by the construction site. John Janzen Nature Centre visitors may notice the sounds of construction during their outdoor activities within the manicured areas of the park. However, along the nature trails south of the

park, construction sounds should be muffled by the surrounding vegetation and the background noise produced by the traffic on Whitemud Drive.

Will construction noise impact Brander Garden area residents?

Construction of the proposed administration building should not impact Brander Garden area residents given that construction will be scheduled during the City's daytime shifts, in accordance with the Noise Bylaw. Vegetation in the area and the valley slope will also act as a noise buffer. Additionally, noise from construction of the administration building will likely not be noticed given the background noise from Whitemud Drive.

7.4.2.5 Utilities and Infrastructure

Will excavation required during construction of the new administration building impact any adjacent utilities lines?

Utility lines servicing the train station may lie near the proposed administration building site. The lines will be clearly delineated prior to construction to avoid any impact.

Will new utilities connections require additional clearing of natural vegetation?

No new, additional lines will be required. The new building will be serviced through connections to existing lines to the train station. Minor disturbance will be required to connect to the existing utility lines; however, no trees should be impacted given that the spacing of the trees makes avoidance possible. The impacted areas will be reclaimed according to the landscaping plan if they are not within the new building footprint.

7.4.2.6 Site Contamination Presence and Hazardous Building Materials

Are hazardous materials present in the old building that could pose a risk to workers or the public during the renovation phase of the work?

Hazardous materials were identified by PHH ARC Environmental Ltd. during their Phase 1 and Hazardous Materials Assessments. PHH ARC Environmental Ltd. recommended procedures for handling and removing these materials, which should be outlined in a Hazardous Materials Management Plan prepared before construction begins. Disposal of hazardous materials will comply with Alberta Environment and federal regulations.

Will any hazardous materials be used in the construction of the new building that could pose a risk to workers or the public?

Fuels, lubricants, solvents and paints will be required for construction of the new administration building. Construction will be conducted in accordance with the City of Edmonton's ISO 14001 requirements. These procedures address all activities related to storage and use of fuels, lubricants and other potential contaminants. Fuels, oils and lubricants will be stored in a contained area on a paved or previously disturbed area. They will be stored with secondary containment to reduce spill potential. Given these measures, there should be minimal risk to workers or the public.

7.4.2.7 Traffic and Public Safety

Will renovation or construction activities impact travel along existing roadways and/or pathways?

No pathways will be impacted by renovation or construction activities. Travel along the North Access Road will be shared by construction traffic and park users. Signs alerting drivers to the construction traffic will be posted along this access road.

7.4.3 Heritage Resources

7.4.3.1 Historic Resources

Is there potential for previously undiscovered heritage resources to occur at the project sites that could be disturbed by construction?

A Historical Resources Impact Assessment completed for this project identified no archaeological sites, historic structures or palaeontological sites in the vicinity of the proposed administration building. The Historic Resources Management Branch determined no further work was required and provided *Historical Resources Act* clearance for the project to proceed. Considering these results, it is unlikely that undiscovered heritage resources could be disturbed by construction. Should any undiscovered heritage resources be uncovered during construction, work will be halted and immediately Alberta Tourism, Parks, Recreation and Culture will be contacted for direction.

7.5 Summary Assessment and Conclusions

Renovation of the old Fort Edmonton Park administration building and construction of the new administration building will result in major improvements to Fort Edmonton Park. Administration functions and staff have grown since 1972, when the old administration building was established. The old building will be renovated to create additional storage space for park operation and the new building will provide improved administration space required to house the current administration staff. The new building will blend into the existing setting, creating a transition from the parking areas to the historic train station. By adhering to the LEED recommendations, the new administration building will also be a more environmentally sustainable facility.

Only two potential adverse environmental impacts were identified during the impact analysis process: disturbance and loss of manicured lawn around the new administration building site. Mitigation measures recommended in the ESR will limit the extent of this impact as much as possible. Overall, the majority of residual impacts can be reduced to negligible through mitigation.

In comparing the two options for the new administration building, Option 2 is the preferred choice from an environmental standpoint. However, from the park administration's perspective, Option 1 will best meet the staff needs. The slightly larger footprint associated with Option 1, as well as the deeper excavation required for the basement, may increase the potential impact to the resources in the area. Affected

resources would include soils, groundwater, air quality, vegetation and recreational space. The difference in footprint area between Option 1 and Option 2 is relatively small (233 m²) and the difference in impacts will likely also be relatively minor. While adopting a smaller footprint is generally preferable from the environmental standpoint, other project concerns must also be considered, including the requirements of the ultimate users. There may be opportunities to reduce the building footprint in the next stage of design: such attempts would certainly help to eliminate additional impact.

From the perspective of environmental concerns, we can see no reason for this project not to proceed, provided the recommended mitigation is implemented. This includes those measures to be addressed prior to and during detailed design. The slight difference between the two options should not pose a significant environmental cost, if Option 1 is implemented. Follow-up consultation with Parks Branch will help ensure the detailed design addressed that department's concerns with regard to landscaping, signage and coordination with other park planning initiatives. Monitoring will also be important on this project and should continue until no longer deemed necessary.

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8.2 *Personal Communication*

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