Title: Practical and Proactive Environmental Assessment Follow-up at the City of Calgary

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Abstract

The City of Calgary (the City) applied and received funding through the Infrastructure Canada-Alberta Program (ICAP). This program directs over 500 million dollars in federal, provincial and municipal funding towards infrastructure projects in Alberta, including green infrastructure. There have been 36 approved ICAP projects in the City, which range from renovations of existing buildings, to affordable housing initiatives, to storm sewer and flood alleviation projects.

In Alberta, ICAP is implemented by Western Economic Diversification Canada, a Federal Authority; therefore, projects funded through ICAP frequently trigger the need for an environmental assessment (EA) under the *Canadian Environmental Assessment Act* (CEAA or the Act). The City has developed an approach to EA follow-up for the ICAP construction projects that includes communication of mitigation measures, onsite inspections, documentation, and corrective action. The tools to accomplish the program were also developed i.e., hiring a fulltime inspector, creating a checklist, and developing a schedule. The ICAP follow-up program

ensures that the City meets its requirements under CEAA, as well as the commitments under the City's Environmental Management System and sustainability initiatives.

As of March 2004, over 30 EAs were completed and 23 ICAP projects monitored. Some of the most common issues that have been addressed are erosion and sediment control, fuel management and spill prevention, historic contamination discovery, tree protection and waste management. While the learning curve was steep, the program has resulted in many successes. Environmental effects from ICAP projects have been minimized through improved communication and corrective action for ineffective mitigation measures, such as unmaintained erosion and sediment control measures. Impractical mitigation measures, such as those initially used for fuel management onsite, were revised. When mitigation measures were broad or less specific, follow-up documented innovative practices that were developed to address potential environmental effects, such as waste recycling initiatives for a streetlight retrofit project.

The City intends to extend the success of ICAP follow-up to other City construction projects through four initiatives: Environmental Construction Operations Plans (ECO Plans), a potential municipal EA process, consideration of EAs for development applications, and through contractual obligations.

Key Words: Environmental Assessment, Follow-up, Municipality, Infrastructure Canada-Alberta Program, City of Calgary

Introduction

The City of Calgary (the City) applied and received funding through the Infrastructure Canada-Alberta Program (ICAP), which was introduced in October 2000. This program directs over 500 million dollars in federal, provincial and municipal funding towards infrastructure projects in Alberta. ICAP's first priority is to fund green municipal infrastructure, which includes projects that improve the energy efficiency of municipally owned buildings or facilities, water and wastewater system projects, water management, solid waste management and recycling projects. Currently, the City has 13 green infrastructure projects approved under ICAP. The remainder of the projects fall under the secondary priority of the program, which addresses improvements to local transportation, cultural and recreational facilities, tourism infrastructure, affordable housing, and high speed Internet access. The overall objectives of ICAP funded projects include supporting long-term economic growth, enhancing the environment, improving community infrastructure, and building 21st century infrastructure.

Projects funded by ICAP may require an environmental assessment under the *Canadian Environmental Assessment Act* (CEAA or the Act). Section 5(1)(b) of CEAA requires an environmental assessment (EA) where a Federal Authority "makes or authorizes payments or provides a guarantee for a loan or any other form of financial assistance to the proponent for the purpose of enabling the project to be carried out in whole or in part." In Alberta, ICAP is implemented by Western Economic Diversification Canada, a Federal Authority; therefore, projects funded through ICAP frequently trigger the need for an environmental assessment.

In addition to completing EAs prior to project implementation, the City has established a follow-up program for their ICAP projects. The ICAP follow-up program is required to:

- Ensure compliance with CEAA requirements
- Ensure environmental effects are minimized
- Ensure mitigation measures are correctly implemented and are effective
- Ensure corrective action is taken, where required
- Prevent loss of ICAP funding
- Avoid costly project delays

Follow-up is defined in Section 2(1) of CEAA as a program for verifying the accuracy of EA of a project, and determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project. Follow-up refers to monitoring, auditing, evaluation, post-decision analysis and post-decision management (Arts *et al.* 2001). It ensures that the expected benefits of EA mitigation measures are achieved during project implementation and management. Without follow-up, an EA may be "little more than a paper-based exercise to obtain project approval" (Morrison-Saunders *et al*. 2001, pg 289).

Several researchers have considered the topic of follow-up in EAs (see Arts *et al.* 2001; Morrison-Saunders *et al.* 2001; Morrison-Saunders and Bailey 1999). Existing research examines follow-up methodologies, rationale, accuracy of predictions, and relationships with monitoring. The City ICAP projects provide the opportunity to review the effectiveness of mitigation measures in an urban setting through routine monitoring, reporting and corrective action. The purpose of this paper is to examine the successes and challenges of the City's ICAP follow-up program, and to discuss its application to future City initiatives.

Context

Proponents for ICAP projects within the City include Calgary Wastewater, Waterworks, Corporate Properties and Buildings, and Parks Business Units, as well as Civic Partners[1]. There have been 36 approved ICAP projects; three of these have been further divided into 19 subprojects. Projects range from renovations of existing buildings, to affordable housing initiatives, to storm sewer and flood alleviation projects. Table 1 summarizes the City's approved ICAP projects.

[1] Civic Partners are not-for-profit organizations that have a formal and legal relationship with the City to provide services or programs with or on behalf of the City (City of Calgary 2000).

Table 1 ICAP Projects at the City of Calgary

ICAP Projects	
Energy Upgrades to the Dover Duplexes	Expansion of Forest Lawn Library
Landfill Gas Extraction and Potential Use for Energy Generation	New Cabling Infrastructure for Heritage Park
Residential Street Lighting Retrofit throughout City	Construction of Affordable Housing in Downtown Core (Manchester)
Retrofit Deane House/Historic Park Development for Fort Calgary	Renovation of Downtown/Heritage Firehall
Affordable/Social Housing Project at Canadian Forces Base West	MacLeod Hall Upgrades at Telus Convention Centre
Heating Infrastructure for the Calgary Fire Department	Construction of the Nose Creek Recreation and Library Centre
Calgary Northwest Soccer Centre Upgrades	Griffith Woods Natural Area Park Rehabilitation
Parks Water Management Program	Prince's Island Park Redevelopment
The Calgary Zoo Green Initiatives	Thornhill Pool/Murray Copot Arena Renovation
Rotary Challenger Park Infrastructure	New Education Centre in Epcor Centre for Performing Arts
Glenbow Museum New Space Development	Calgary Police Service District Office Additions
Retrofit/Expansion of the Family Leisure Centre	Historic Electric Street Lighting Retrofit for Heritage Park
New Northwest Calgary Library (Crowfoot Library)	North America Exhibit/Public Address System Upgrades at Calgary Zoo
Killarney Aquatic and Recreation Centre Renovation/Upgrade Phase 2	Reader Rock Garden Restoration
New North Central Library (Country Hills Library)	Storm Sewer/Flood Alleviation for Crowchild Trail
Refurbishing of Australasia Complex at the Calgary Zoo	NW Calgary Storm Sewer Upgrade Phase 1 and 2
New Children's Discovery Centre at Science Centre	Three Storm Sewer and Flood Alleviation Projects (19 subprojects)

The City's ICAP follow-up program is encompassed within a larger context of responsible municipal environmental management and leadership, including sustainability initiatives and a corporate Environmental Management System. As stated in its Environmental Policy, the City is committed to becoming an environmentally sustainable community. This commitment extends to all operations within the City, including infrastructure construction projects, which have the potential to affect air quality, water quality, soils and vegetation. To move towards sustainability, the City is taking a leadership role to integrate sustainable economic, social and environmental objectives into their decision-making processes.

As part of their commitment to sustainability, the City of Calgary is participating in the Sustainable Cities Initiative, and is developing a 100–year plan that would lead to urban sustainability. The initiative promotes urban sustainability through a network of 30 cities that share their experiences to implement long term plans towards sustainability. Issues that are addressed during this process include many of ICAP's funding priorities, such as:

- Housing and green buildings (including energy efficiency)
- Sustainable transportation
- Waste management and treatment (solid waste and liquid waste)
- Land use planning and urban design
- Sustainable tourism

One of the frameworks supported by the Sustainable Cities Initiative is adaptive management. Adaptive management involves monitoring results, and taking action throughout the life of a project to correct deficiencies (Cities Plus N.D.). The ICAP follow-up program ensures that green infrastructure and other construction activities are meeting the City's sustainability goals and that corrective action is taken when activities are not consistent with these goals.

In addition to sustainability initiatives, the ICAP program fits within the City of Calgary's overall ISO 14001 registered Environmental Management System (EMS). The City has adopted the ISO14001 EMS in recognition of its effect on the surrounding environment. The EMS applies to those environmental aspects[2]. over which the City has control or influence. It identifies the environmental risks in all areas of operations, including construction, and ranks risks to identify significant environmental aspects Follow-up of ICAP projects has been ranked as a significant aspect. The objective in the EMS related to ICAP follow-up is to ensure that project sites are in compliance with CEAA and other applicable environmental legislation. The overall target is for all ICAP projects to be assessed, monitored and documented.

Follow-up Approach

The City has developed an approach to follow-up for the ICAP construction projects that includes communication of mitigation measures, onsite inspections, documentation, and corrective action. Applications for projects that meet the criteria for ICAP funding are submitted

[2] An environmental aspect is an element of an organization's activities that can interact with the environment (ISO 1996).

to ICAP with an EA when required by CEAA. The EA addresses potential environmental effects that may result from the project's construction and operation, and outlines mitigative measures and best practices to minimize these effects. Once the project has been approved, communication of the mitigation measures to Contractors is essential. This is accomplished in several ways, such as including the mitigation measures from the EA as part of the Contractor's obligations. The City has also developed guidance for erosion and sediment control, spills and release reporting, contamination discovery and tree protection. This guidance has been combined into *A Contractor's Environmental Responsibilities Package* (City of Calgary N.D.). The purpose of the package is to communicate environmental responsibilities and the performance of contractual obligations to Contractors. The standard contents of the *Contractor Environmental Responsibilities Package* include:

- Environmental responsibilities information for Contractors working for or with the City of Calgary
- The City of Calgary Environmental Policy
- Contractor Environmental Acknowledgement

Contractors must sign the Environmental Acknowledgement Form that states they are aware of the City of Calgary's Environmental Policy, including the need to comply with all applicable legislation and continually improve performance. These requirements are in addition to the mitigation measures outlined in the EA.

Communication of the mitigation measures to Contractors is only the first step in developing the follow-up programs. The next step involves implementing and monitoring the mitigation measures required in the EA approval during the life of the project. A fulltime inspector visits each site biweekly, and develops a customized inspection checklist for each project, which includes mitigation measures and municipal bylaws (see Table 2). In general, inspections focus on fuel management, spill policy and procedures, erosion and sediment control, construction materials, recycling and disposal of construction waste, terrain disturbance, hazardous materials handling, air quality, traffic and construction access, public safety, wildlife, vegetation and aquatic effects, and historical or archaeological disturbances. Monitoring data are documented through digital photography, field note checklists and correspondence with Project Managers, Contractors and subcontractors. The City has enhanced the monitoring program with development of corrective actions that address common project issues. Issues of non-compliance are discussed with the Project Manager and the Contractor with supporting documentation. If the issues are not addressed, third parties such as Bylaw Services are contacted. A final report to ICAP thoroughly documents the follow-up program for each site, including the effectiveness of each mitigation measure.

Table 2 Example Site Inspection Checklist for ICAP Follow-up

Project X		
Date	**Weather**	**Project Contact**
24-Mar-03	bright clear skies 3c	Project Manager contact information Contractor Site Supervisor contact information
31-Mar-03	95% overcast 7c	
08-Apr-03	50% cloudy 14c	
Etc.	Etc.	
Potential Impact	**Mitigation Measures**	**Comments**
Terrain disturbance	• Minimize extent of disturbance	Mar 24-03: Large area of excavated mud from site piled on west side of project; due to runoff from baseball field south of site.
	• Confine construction /operation to prescribed area	Mar 24-03: All other areas disturbed to a minimum; gravel hauled in to create roadway access.
	• Modify terrain, if required to ensure stormwater does not flood site	Mar 31-03: Spoke with Site Supervisor about large soil stockpile. He is arranging for a landscape architect to come onsite.
		15-Apr –03: Some pooling of water on low spots but contained within site.
	• Manage temporary soil stockpiles	01-May-03: Site still clearly delineated.
	• Import clean fill material	23-Apr-03: Bricks are stockpiled for recycling by third party.
	• Recycle suitable excavated material	20-May-03: Pallets being recycled from bricks and concrete blocks.
	• Dispose of unsuitable material appropriately	28-May-03: Materials being stockpiled and separated for recycling.
		03-Jun-03: Dumpster filled with construction waste. Requested recyclables be separated out.
Etc.	Etc.	Etc.

Results of Follow-up

Construction on all ICAP projects must be completed by March 2006. As of March 2004, over 30 EAs were completed and 23 projects monitored. It became apparent once monitoring began that what was agreed to contractually was not necessarily occurring in the field. Some of the most common issues which have been addressed as a result of ICAP's onsite monitoring are erosion and sediment control, fuel management and spill prevention, historic contamination discovery, tree protection and waste management. These issues are further discussed below.

Erosion and sediment control

Construction activities can result in an increase in soil erosion and sedimentation, particularly near water ways. Freeze-thaw cycles, wind and rain can affect the movement of soil on a site. If construction activities are left uncontrolled, they can harm the environment, including loss of valuable topsoil and sedimentation of rivers and other water bodies. Loss of topsoil affects vegetation and affects air quality, while sedimentation of water bodies can negatively affect water supplies, fish habitat and recreational activities (City of Calgary 2001). Erosion and sedimentation issues that arise due to City construction activities include:

- Mud tracking from construction sites onto adjacent properties or streets
- Silt and debris washed into the existing storm sewer system and entering receiving water bodies
- Wind blown dust

When properly applied and maintained, erosion and sediment control measures will result in construction without environmental degradation and with cost savings. Mitigation measures for erosion and sediment control are outlined in the project EA, and include compliance with the City's *Guidelines for Erosion and Sediment Control* (City of Calgary 2001). Erosion control is evaluated during all phases of construction; initially during the planning phase using a site analysis; during the design phase by developing an erosion and sediment control plan; and finally during construction.

During site visits, the inspector noted that erosion and sediment control measures were being implemented but not maintained, rendering the measures ineffective. Torn, dislodged filter socks, or heavy sediment accumulation caused excessive pooling around catchbasins. Tracking of mud offsite and onto roadways resulted in silt entering the stormwater system during rain events. Roadways in residential areas, in particular, were hard to maintain due to curbside residential parking. Wind erosion was present in many phases but most commonly seen during grading activities. Stockpiled soil that was not hydroseeded was another common source of wind erosion. For example, silt fencing for one project could not be properly installed due to unanticipated frozen ground conditions. As a result, erosion matting was used instead. Follow-up identified all of these issues and ensured corrective action minimized any environmental effects. Unscheduled site visits and follow-up recommendations reduced the perpetuation of erosion and sedimentation, as well as ensured the construction crew was educated on the best management practices and maintenance requirements.

Although the implementation of erosion control measures takes time during the construction phase, it could result in cost savings and avoided fines. By preventing erosion from occurring (e.g., placing silt fencing near waterbodies, maintaining vegetation on slopes, ensuring storm drains are protected, placing gravel at access points), Contractors reduce the time and money they would spend on clean-up and revegetation measures post-construction. In addition, Contractors and City staff spend less time addressing landowner complaints related to soil erosion, air quality, vegetation loss, sediment laden waterways, and damage to property. For example, Contractors can be held responsible for the cost of cleaning public vehicles that were parked on the street and damaged by uncontrolled dust and sediment.

Onsite Fuel Management and Spill Prevention

Onsite fuel management and spill prevention is a significant challenge on construction sites. Onsite fuelling is often required for equipment and vehicles, and can be accomplished through the use of jerry cans, slip tanks, or onsite fuel storage tanks. All of these have the potential to release hydrocarbons to the environment from normal operations, inadequate secondary containment, or through a lack of attention or maintenance. In the event of a spill, hydrocarbons can leach into the soil and enter the groundwater and migrate offsite. While there are procedures that can help reduce the likelihood of releases of hazardous substances to the environment, the potential for spills and releases still exists. With appropriate spill response equipment and training, environmental effects can be minimized.

During follow-up monitoring, the impracticality and the absence of fuel management and spill prevention mitigation measures were noted. Initially, many of the sites did not have spill kits available or, even when they were onsite, workers were not educated on their use. Spill kits were generally found in fuelling vehicles only, and these vehicles did not always remain on site. Follow-up communicated and promoted the use and location of spill kits at toolbox meetings and orientations. Without site visits, this simple step would have been missed.

One of the biggest success stories that emerged as a result of ICAP follow-up was the revision of fuel management mitigation measures. Initially, approved mitigation measures required 100m setbacks from waterbodies during fuelling of vehicles and equipment, and prohibited any onsite fuel storage. Site inspections revealed that these mitigation measures were impractical and rarely followed. Many project sites were near waterbodies, such as the Bow or Elbow Rivers, or catchbasins, which are classified as waterbodies, making the 100m setback impossible to maintain. Likewise, it was impractical for equipment and vehicles to travel offsite in search of the 100m setback. This discovery resulted in multistakeholder discussions between ICAP and the City to develop more practical mitigation measures. From these discussions, the refuelling setback for ICAP projects was changed from 100m to 30m, and fuel storage was allowed onsite in a secured, designated location on an impervious surface. A fuelling log sheet was developed for Contractors to fill out each time fuelling takes place on-site. As well, weekly fuel storage inspection logs were developed to ensure adequate spill prevention. These log sheets are now kept in a central area for the inspector to review.

Contamination Discovery

Construction sites are typically pre-screened for potential contamination by the Environmental Management Business Unit at the City. Some ICAP projects were not following the established process for pre-screening sites, and historic or third party contamination from previous or adjacent land uses such as dry cleaning facilities or gas stations was occasionally discovered during excavation. Follow-up identified the lack of pre-screening and the lack of knowledge about what to do when contamination was discovered as a gap in the EA mitigation measures.

It became apparent after a few large ICAP projects encountered contamination that there was a need for further involvement by Environmental Management with the various city business units at the planning stages of their projects. Involvement with ICAP projects has resulted in the placement of vapour management systems into the project's design (Forest Lawn library, Crowfoot library, Calgary Police District) as well as the successful cleanup of third party contamination along a utility corridor at time of discovery. An Environmental Screening Process was put into place at both the planning stages and discovery stages along with Terms of Reference to ensure consistent Phase I and Phase II environmental site assessments (ESA), if required. The Environmental Management Business Unit established these Terms of Reference in response to the wide variance noted over the years in the quality of assessment work. Poor quality assessment reports may result in delays to development and regulatory approvals, and an increased level of risk borne by the proponent, the public and the environment due to insufficient or inadequate information captured in the report. A good quality Phase I ESA reduces the risk of the unknown by identifying known and potential environmental concerns. ICAP projects have encountered old landfills, hydrocarbon affected soils and salt recharge zones, all of which have been successfully addressed.

Tree Protection

The City of Calgary's urban forest provides many benefits to the community, including improvement of air quality, absorption of carbon dioxide, storm water retention, noise absorption, wildlife habitat, and aesthetics. The intent of tree protection is to maintain these benefits, and ensure trees are long-term assets to the community. The goal is to protect mature trees, and not have saplings planted as compensation. Public trees have come under increased stress in recent years due to redevelopment and construction activities. After a tree is established, any activity that changes the soil conditions (i.e., grading, compacting, excavating), or disturbs tree branches, trunks and root systems is detrimental to the health of the tree. When construction activities occur on City lands or within 6m of a City owned or controlled tree, the City of Calgary Urban Forestry is notified to ensure proper tree protection.

Public trees are City of Calgary property and their protection is mandated by municipal bylaws (Tree Protection Bylaw 23M2002). The Tree Protection Bylaw was passed to prevent:

- Cutting, removing, moving or pruning of City trees
- Penetrating the bark of trees
- Planting trees or shrubs on City land
- Spraying trees with any substance except water

- Attaching electrical cords or other objects to trees
- Unauthorized entry or interference with a tree protection zone

Trees injured during construction often do not show signs of decline until years after the damage occurred. As a result of the City's growth, guidelines have been established under the current Bylaw specifically seeking to avoid the negative effects that can occur during construction (City of Calgary 2003). These guidelines address:

- Mechanical injury to roots, trunks or branches
- Compaction of soil by heavy machinery
- Changes to existing grade which may expose or suffocate feeder roots

As part of the Tree Protection Bylaw, a Tree Protection Plan is required when construction activities occur within six metres of a City tree. During follow-up, it became apparent that some Civic Partners were not aware of the Tree Protection Bylaw or the requirement for Tree Protection Plans. On some projects, trees were cut down to gain access to an area, were damaged by machinery, suffered severe root compaction, or had large volumes of stockpiled material placed on their root zone. Follow-up identified the lack of communication to Project Managers and Contractors about tree protection mitigation measures, and prevented the need for future compensation for tree losses.

Waste Management

Construction sites are generators of waste streams that can include lumber, paper, cardboard, metals, brick, concrete, carpet, plastic, pipe, drywall, rocks, soil, and organic waste related to land development. Each waste stream, when not recycled, requires the Contractor to pay twice for the materials; once for the original purchase and again when the usable material is disposed. The City of Calgary Waste Bylaw 20M2001 states that the Contractor bears some responsibility for any waste generated at the sites, and that proper disposal of waste is essential.

Mitigation measures for ICAP projects require waste be minimized and/or recycled where possible, and disposed of properly. Specifics on how to minimize or recycle waste are left to the Project Manager and Contractor. Follow-up identified waste management as a common issue among projects, and illustrated a variety of ways to achieve effective waste minimization. Some projects were proactive in their commitment to recovery of recyclable waste, and had separate waste stream bins onsite for metal, wood, cardboard, and cement. One project ensured effective waste minimization by construction of a localized cement wash out area that allowed for the recovery of waste/wash cement and, at the same time, avoided cement disposal near a water body. The streetlight retrofit project, which was designed to reduce light pollution and cost by replacing existing streetlamps to flat lens style, was able to recover wire, glass, lampheads and mercury for recycling. The project also reduced carbon dioxide, thereby helping the City meet its commitment to reducing greenhouse gas emissions. Other projects incorporated recyclable material into their project e.g., crushed asphalt or concrete rubble was used for temporary roadways to decrease mud tracking.

Again, follow-up identified the need to communicate mitigation measures to Contractors prior and during construction, and provided an opportunity to observe and document innovative ways to meet less explicit mitigation measures.

Successes and Future Plans

The follow-up program developed for the ICAP projects was a first within the municipality. For City projects that require an EA, the ICAP follow-up program ensures that the City meets its requirements under CEAA, as well as the commitments under the City's EMS and sustainability initiatives. The tools to accomplish the program had to be developed i.e., hiring a fulltime inspector, creating a checklist, and developing a schedule. While the learning curve was steep, the program has resulted in many successes. First and foremost, environmental effects from ICAP projects have been minimized through improved communication and corrective action for ineffective mitigation measures, such as unmaintained erosion and sediment control measures. Impractical mitigation measures, such as those initially used for fuel management onsite, were revised. When mitigation measures were broad or less specific, follow-up documented innovative practices that were developed to address potential environmental effects, such as waste recycling initiatives for the streetlight retrofit project.

ICAP follow-up was initially met with apprehension by Contractors and viewed as an additional cost. As the weeks progressed, however, the Contractors not only became enthusiastic about demonstrating their initiative, they welcomed the presence of the inspector onsite and were curious about what other Contractors were doing. Contractor awareness of environmental responsibilities improved. Follow-up resulted in the identification of mitigation measures that proved impractical in the field, which positively affected Contractors' operations. As a result, Contractors have begun to accept follow-up as part of their operations, and have applied mitigation measures to new ICAP projects. Many Contractors realized that being proactive instead of reactive improved the possibility for future work with the City. The City inspector is now recognized as part of the construction team, and attends start up meetings for all new projects.

The City intends to extend the success of ICAP follow-up to other City construction projects through four initiatives: Environmental Construction Operations Plans (ECO Plans), a potential municipal EA process, consideration of EAs for development applications, and through contractual obligations.

Follow-up on many of the ICAP project sites demonstrated a lack of awareness of mitigation measures by Contractors. Tools for communication of mitigation measures have been explored by other researchers and include Environmental Management Systems, crewbooks, and preconstruction meetings and training (Marshall 2001; Marshall *et al.* 2001). Another tool developed by the City that can assist in communicating mitigation measures to the construction crews is the ECO Plan. ECO Plans are project-specific documents that outline the Contractor's plan for satisfying the environmental requirements specific to a construction project. The intent of the ECO Plan is to identify what the environmental issues are, who is responsible for dealing with the issues at the project site, and to establish control measures to meet environmental requirements and minimize environmental effects (City of Calgary 2004a). ECO Plans have been

completed for several ICAP wastewater projects, and have proven to be a useful tool for Contractors. Although not a regulatory requirement, the City is exploring ways to integrate follow-up into the implementation and monitoring of ECO Plans for non-ICAP projects.

The City is also investigating the practicality and logistics of instituting a municipal EA process for major capital works projects that do not require EAs under federal or provincial legislation. Several municipalities currently have municipal EA processes, including Winnipeg, Edmonton, Canmore, Medicine Hat and Drumheller (AACIP 1996). Municipal EA is a planning process to "ensure that potentially adverse effects on the environment are considered in the planning and development review process" (AACIP 1996 pg. 1). The City is also exploring the use of environmental assessment as a tool in the Development Permit process. Currently, developers must submit site contamination statements in their development permit applications that discuss any environmental investigations that have occurred on site. This process could be broadened to include EAs in the planning stage for certain environmentally sensitive developments. These projects are in the exploration stages, but will have to involve a level of follow-up and corrective action within the process.

Follow-up of other City construction projects can also be assured by including it as a contractual obligation, either in the Standard General Conditions, as a Special Condition in a contract, or as part of the prequalification process for Contractors. Currently, the City has 16 environmental clauses in their Standard General Conditions to which Contractors must adhere, including requirements for release reporting, waste management, fuelling, soil conservation, and tree protection (City of Calgary 2004b). In the future, follow-up can be included as a clause in the Standard General Conditions. Alternatively, follow-up can be included in the Special Conditions of a contract, along with atypical conditions that will require any special environmental protection measures be addressed. Finally, established follow-up procedures can be included in the prequalification process. The City currently prequalifies their Contractors based on health and safety requirements, and is working to include environmental prequalification as a requirement prior to contracts being awarded.

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