SPENCER ENVIRONMENTAL
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[redacted]
Principal, Environmental Scientist
Thurber Engineering Ltd.
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Date: 3 August 2007
[redacted]

Dear Mr. [redacted]

Re: Wildlife Overview Study for the Proposed Meadows Transit Centre

Introduction

The construction of a transit centre along 17th Street just south of Whitemud Drive has been proposed as part of the overall transportation plan for southeast Edmonton. As part of the environmental review requirements for this construction project, Spencer Environmental Management Services Ltd. conducted wildlife surveys in an area centered on the proposed transit centre site. Those surveys concentrated on avian surveys, medium and large mammal movement corridors and wildlife-habitat relationships. The objectives of those surveys were to determine what the potential impacts of construction and operation of the project would have on wildlife species and their habitats, suggest appropriate mitigation measures to reduce any adverse impacts and identify any environmental permitting requirements there may be for the project.

Study Objectives

The objectives of this environmental assessment were to:

- Review existing environmental information as well as recent aerial photographs of the study area.
- Conduct wildlife investigations, focusing on available habitat, habitat use and regional wildlife movement corridors.
- Determine if there are any wildlife species listed under the federal government's *Species at-Risk Act* that could be affected by the project through a review of the Alberta Fish and Wildlife Management Information System.

- Prepare a draft report which will map and describe existing conditions, potential impacts associated with the Meadows Transit Centre project and identify any environmental permitting requirements.

Study Area

A study area was chosen to reflect the diversity of wildlife habitats in the region immediately surrounding the Meadows Transit Centre project site. The study area is approximately 258 m X 258 m and covers an area 6.7 ha (16.4 acres) in size.

The study area is located along the east side of 17th Street in southeast Edmonton, within the northwest quarter of section 8, Township 52, Range 23, West of the 4th Meridian. This area lies within the Central Parkland Natural Subregion of the Parkland Natural Region (Natural Regions Committee 2006).

The landscape in and around the study area is being developed for a variety of purposes. The land immediately to the west of the project site has recently been converted to commercial businesses, with residential housing further to the west. The area to the southwest has recently been developed as a residential neighbourhood, with a storm water management facility (SWMF) adjacent to the southwest side of the intersection of 17th Street and 38th Avenue. The landscape to the south of the proposed transit centre is an open field that is currently being developed as a residential neighbourhood.

Assessment Methods

Aerial Photograph Analysis

Air photos were used for delineation of the study area boundaries, habitat mapping and analysis of ecological connectivity and wildlife corridors. The aerial photography used to produce the wildlife habitat map was City of Edmonton black and white photography flown in late April of 2005.

Review of Existing Information

A literature review was done for existing information on the wildlife of Alberta and for the analysis of natural areas and habitat connectivity within the City of Edmonton done by Spencer Environmental Management Services (2006).

Site Investigations

One site investigation trip was made to the proposed transit centre site, on 25 June 2007, for the purpose of carrying out wildlife surveys and general site reconnaissance. Wildlife information was obtained using breeding bird surveys and completing a general survey of the study area for animal tracks, nest sites and evidence of browsing. Notes were taken regarding plant types within differing habitats in and around the study area.

Breeding Bird Surveys

Breeding bird surveys were done according to widely accepted protocols for point count surveys:

- Surveys were conducted between one half hour before sunrise and 10:00 a.m. from late May to the end of June and surveys were done only during periods of good weather with low winds.
- All birds within a 100m radius count circle were recorded during an eight minute count period.
- All birds heard or seen within the count circle were recorded on data sheets, with locations marked so as to minimize the possibility of counting one individual multiple times.

Additional information was recorded while walking through the study area while doing habitat mapping and taking photos. This included informal wildlife observations, looking for wildlife tracks, pellets, nests and evidence of browsing activity.

Study Limitations

Site investigations were restricted to two visits. Additional visits during the early spring and the late spring/early summer seasons may have provided additional information regarding amphibian and bird populations. Winter investigations may have permitted track counts to provide an indication of the density and diversity of mammal species.

Existing Conditions

Regionally Sensitive Natural Features

The Fulton Marsh, located approximately 300 m directly east of the proposed transit centre site, is considered an important wetland for waterfowl (City of Edmonton 2006).

Wildlife Habitats

Air photos were used for delineation of the study area boundaries, habitat mapping and analysis of ecological connectivity and wildlife corridors. The aerial photography used to produce the wildlife habitat map was City of Edmonton black and white photography flown in late April of 2005.

Wildlife habitats in and around the proposed transit centre site were delineated primarily according to the dominant physiognomic vegetation. There were six main habitat types found within the study area (Figure 1). [A complete plant list is provided in Appendix A, with naming conventions following those published in Royer and Dickinson (1999) and Johnson *et al.* (1995)].

Old Field 1

This is an abandoned agricultural field which, according to aerial photography, had been cultivated as recently as 2005. The vegetation of this habitat is composed primarily of weed species, including Dandelions, Scentless Chamomile, Canada Thistle, Lamb's Quarters and Wild Mustard, all of which are abundant (Plate 1). Other species include Stinkweed, White Clover, Wild Buckwheat, Pineapple-weed and Sweet White Clover.

There are few grasses in this habitat but those present include Bluejoint, Foxtail Barley and Quack Grass.

The ground cover is approximately 50% exposed soil with some large patches (30 m X 20 m) of barren ground (Plate 2). There are also several spots which have been disturbed by construction activity, i.e., equipment staging or soil removal.

Old Field 2

This habitat is also a former recent agricultural field but has much denser vegetation than does Old Field 1. There is a tall (up to 1.0 m) forb layer composed of abundant Narrow-leaved Hawk's-beard, Canada Thistle, Hemp Nettle and Scentless Chamomile (Plate 3). There is also a very dense low forb layer composed mainly of Dandelions but with a few Bladder Campion (Plate 4). The ground cover is a relatively thick layer of plant litter with very little exposed soil.

Mesic Grassland

The mesic grassland habitat is characterized by continuous grass cover in an area which, according to aerial photography and the current vegetation composition of the site, had not been cultivated for at least several years. It is located in a lower topographic position compared to the old field habitats and likely has higher soil moisture levels.

The vegetation of this habitat is composed mainly of three graminoid species: Bluejoint, Slender Wheat Grass and Kentucky Bluegrass (Plate 5). Common forbs include Canada Thistle, Toadflax, Dandelion and Wild Vetch. Forbs such as Dock, Goldenrod, Bladder Campion and Wild Strawberry occur in small numbers as do small Prickly Rose shrubs.

Grassland cover is continuous except where a dirt road has been created.

Lush Grassland

This habitat type is quite similar to the mesic grassland but has much thicker and taller (up to 1.5 m) grass cover (Plate 6). This is likely due to two factors: a lower level of surface disturbance and, because it is a lower slope position that the mesic grassland, it has a higher soil moisture level. There are few forbs in this habitat and the density of grass cover, especially for Bluejoint and Slender Wheat Grass, is much higher. The graminoid species also include Hairy Wild Rye, Timothy and Rocky Mountain Fescue.

Other habitats found adjacent, or in close proximity to, to the study area include the following two habitats.

Hay Field

Adjacent to the Old Field 2 habitat is a hay field, composed almost exclusively of tall (1.5 m) Smooth Brome grass (Plate 7). There are almost no forb species except for a few Dandelions and Canada Thistle.

Decadent Marsh

About 160 m east of the proposed transit centre site is a small decadent marsh (Plate 8; Figure 2). It is considered a decadent habitat because most of the aquatic vegetation in this wetland was dead, with only a few scattered cattails growing in the marsh. This Class III wetland (Stewart and Kantrud 1971) has sustained some construction-related disturbances, i.e., heavy trucks driving through the shallow water and waste concrete and soil dumped along the periphery. The vegetation around this wetland consists of invasive weed species where surface disturbance has occurred and graminoid species of the lush grassland habitat in undisturbed areas.

Wildlife

Herpetofauna

No amphibians or reptiles were recorded during the site investigation. However, given the habitat types present, there are seven species which may potentially be found in the study area: two toads, two frogs, two snakes and one salamander. The Tiger Salamander, Wood Frog and Boreal Chorus Frog may all be found in the decadent marsh.

The FWMIS (Fish and Wildlife Management Information System) database has records for amphibians close to the proposed transit centre site (Figure 1). Vocalizations have been recorded for the Wood Frog for the years 1999 and 2002, with one adult found in 2002. Vocalizations for the Boreal Chorus Frog were recorded in 1997, 1998, 1999 and 2002. Also, at least 20 adults of this species were recorded during 1998, 1999 and 2001.

Wildlife surveys currently being conducted at the nearby Fulton Marsh recorded several individuals of both the Boreal Chorus Frog and Wood Frog in 2007 (Kershaw, *pers. comm.).*

A list of all herpetofauna which could potentially be found in the study area is listed in Appendix B.

Avifauna

Sixteen species of birds were recorded in and around the study area, during both the breeding bird survey and while other field work was being done. The breeding bird survey indicated a low level of avian diversity, with only three species recorded in an area which included the four main habitat types (Figure 1): House Wren, Savannah Sparrow and Clay-coloured Sparrow. The latter two species together form the majority of bird records for the area.

The most productive area for birds in the proposed transit centre region is the habitat edge between the two old field habitats and the mesic grassland. This is probably due to the fact that grassland species are able to find suitable nesting sites in the relatively undisturbed mesic grassland and can forage in the more open old field habitats.

Table 1. Bird species recorded within the local region which includes the Meadows Transit Centre site

Common Name	Scientific Name
Canada Goose	*Branta canadensis*
Gadwall	*Anas strepera*
Mallard	*Anas platyrhynchos*
Gray Partridge	*Perdix perdix*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Killdeer	*Charadrius vociferous*
Ring-billed Gull	*Larus delawarensis*
Black-billed Magpie	*Pica hudsonia*
American Crow	*Corvus brachyryhnchos*
Common Raven	*Corvus corax*
Tree Swallow	*Tachycineta bicolor*
European Starling	*Sturnus vulgaris*
Clay-colored Sparrow	*Spizella pallida*
Savannah Sparrow	*Passerculus sandwichensis*
Red-winged Blackbird	*Agelaius phoeniceus*

The most abundant species recorded during the site visit were the Savannah Sparrow, which is a species common to grasslands, and Gray Partridges, several of which were flushed from the mesic grassland and the old field habitats.

Several species were found at the decadent marsh, including Mallards, Gadwalls and a Killdeer. Several broken goose eggs were found along the edge of the water so it is possible that Canada Geese were nesting in close vicinity to the transit centre site. Numerous Great Blue Heron tracks were found in the mud around the decadent marsh indicating its use as a feeding area.

Wildlife surveys currently being conducted at the nearby Fulton Marsh recorded 51 bird species (Kershaw, *pers. comm.)*. This higher diversity as compared to the avian diversity within and around the proposed transit centre, is due to the Fulton Marsh having a mixture of wetland, grassland and shrub-dominated habitats. The important feature of the Fulton Marsh is that with a higher diversity, it is likely that some species that were not recorded during the site visit would use the habitats around the proposed transit centre, either as feeding areas or during the post-breeding season dispersal period.

Because only one site visit was possible during the breeding season, an analysis was done of existing information to determine which other bird species should be present in the study area. There a total of 28 bird species which may be found in the area around the project site; these species are listed in Appendix C.

Mammals

Only three mammal species were recorded in the study area during the site investigation. The Northern Pocket Gopher was recorded through the presence of freshly dug tunnels in the mesic grasslands. An American Kestrel caught a small mammal in the mesic grassland which could only be identified as a microtine rodent. And fresh coyote scats were found along the edge of the decadent marsh.

According to Pattie and Fisher (1999), there are 22 mammal species which may occur within the study area (Appendix D), a list which includes 11 small mammals, 2 bats, one ungulate and 5 predatory species.

According to published habitat preferences, the highest levels of mammal diversity would be in the edge habitat between the mesic grassland and the old field habitats.

Fish and Wildlife Management Information System (FWMIS)

A search of the FWMIS database (FWMIS 2007) found that there are no reported records for special status species in the vicinity of the study area (John Folinsbee, *pers. comm*.).

Special Status Species

No Special Status species were recorded during the site survey nor have any been recorded in the FWMIS database.

Ecological Connectivity

Ecological connectivity/linkages are important for several reasons. They allow for nutrient circulation between ecosystems, genetic exchange for animals and plants and animal movement between patches of required habitat. Wide-ranging species that would be common in the general vicinity of the study area, such as White-tailed Deer (*Odocoileus virginianus*) and Coyotes (*Canis latrans*), need functional linkages between essential habitats to satisfy all life-stage requirements including food, cover, shelter and reproduction (i.e., access to potential mates). Smaller, but still highly-mobile animals like songbirds, utilize such corridors to move between areas of suitable habitat. Fragmented landscapes with large open areas and extensively developed lands are deterrents to many of these species, limiting their ability to move from one habitat patch to the next. For plants, proximity and the presence of the appropriate seed dispersal vectors are important to functional ecological linkages and connectivity.

Ecological corridors can be evaluated from the perspective of how they function to facilitate wildlife movement or how they facilitate maintenance of ecological function at the habitat patches they connect. The following addresses both aspects of the environment around the Meadows Transit Centre site.

We qualitatively evaluated both the physical and functional aspects of connectivity between the proposed transit centre site and the surrounding landscape, based on physical proximity and consideration of existing and future barriers. We defined a major wildlife corridor as one which was capable of supporting ecological functions in general and

could be used for movement by a broad suite of wildlife species. This latter characteristic was evaluated on the basis of:

- the presence of sufficient cover in the form of vegetation or terrain to provide security cover for larger species;
- being sufficiently wide and continuous to offer security and other life requirements (e.g., food, water, shelter) for mid- to large animals while moving through them; or
- the presence of a consistent hydrological linkage.

We defined minor corridors as those that offered cover and continuity as above, but to a limited degree. Minor corridors support ecological function but support movement for a smaller suite of wildlife species, typically smaller animals.

The landscape surrounding the proposed transit centre varies considerably (Figure 2). Immediately to the west and southwest of the project site the landscape has been converted to commercial businesses and residential neighbourhoods, and what little green space remains in those areas is confined to residential yards and a SWMF. In addition, with the busy 17th Street located along the west side of the site (with an average of 9400 vehicles per week day (City of Edmonton 2006)), there is essentially no wildlife habitat or unimpeded movement corridors to the west and southwest of the project site. The one exception is the small (3.0 ha; 7.4 acres) manicured parkland which contains the storm water SWMF.

The landscape to the south and southeast of the proposed transit centre has traditionally been used for cropland, even as recently as 2005. This entire field has been cleared of vegetation, was partially graded and is currently being transformed into a residential neighbourhood.

Two hundred metres north of the site is Whitemud Drive. It is a multi-lane, divided freeway with average weekday traffic volumes of 37,000 vehicles/day (City of Edmonton 2006). The size and structure of the freeway, coupled with the high traffic volume, make Whitemud Drive an effective, though not impenetrable, barrier to wildlife movement.

The grasslands around the north and east sides of the site are considered Natural Areas (Habitat Patches) within Edmonton's ecological network, which indicates they have adequate habitat within them through which wildlife species could disperse into adjacent habitats and core natural areas (Spencer Environmental 2006). According to a structural connectivity analysis which examined landscape elements that facilitated wildlife movement through the City of Edmonton, the mesic grasslands represent a habitat linkage of moderately low resistance to movement between the proposed transit centre site and the Fulton Marsh. (Spencer Environmental 2006). As such, the mesic grasslands can be viewed as minor wildlife corridors which offer continuous vegetative cover from the site to the Fulton Marsh and other habitat types further to the east (Plate 9).

Two obstacles are present between the proposed transit centre site and the Fulton Marsh: a vegetated berm recently constructed beside the railroad tracks to the east of the site, and the railroad tracks themselves with its associated barbed wire fencing. Neither of these obstacles is a serious impediment to wildlife movement in this region.

According to aerial photography, the decadent marsh was once connected to Fulton Creek and subsequently, to Fulton Marsh. That connection has now been compromised with partial filling of the decadent marsh with soil from construction activities (Plates 10 and 11) and a large concrete and steel drainage structure (approximately 120 m east of the decadent marsh) which will absorb storm water drainage which flows through the remaining marsh area.

Impacts

Habitat Impacts

1. Impact: Loss of terrestrial wildlife habitat

The proposed project site has already been disturbed by the construction of an informal dirt road which runs through the site. Further, it had been an agricultural field in previous years but has laid fallow for at least one year, with an attendant growth of weed plant species.

There is a low-angled slope between the relatively level old field habitats and the equally level mesic grassland such that the mesic grassland is approximately one metre lower than the old field habitats. Soil erosion during construction could result in surface material flows into the mesic grassland.

Mitigation measures for loss of terrestrial wildlife habitat

Minimize the footprint of the impact by limiting clearing activities to the area within the project site boundaries and using already disturbed lands adjacent to the project site as the vehicle access point and equipment parking and staging area.

2. Impact: Introduction of weedy species

Removing existing vegetation and exposing the surface soils during construction activities will increase the spread of weed species into adjacent natural habitats, a process which may alter the vegetation cover enough to change the use of that habitat by wildlife. This process will be accelerated by the fact the site already contains significant numbers of invasive and non-native weed species.

Mitigation measure for the introduction of weedy species

Precautions, such as cleaning construction equipment and vehicles used in weedy areas before moving into the proposed construction site, will help reduce the potential transfer and spread of weedy species. All exposed soil should be reclaimed as soon as construction activities affecting the ground surface are complete, i.e., sodding. Some weed-control may be required until desired vegetation becomes established, but the need for such measures can be assessed through monitoring.

Wildlife Impacts

1. Impact: habitat alienation during construction activities

The activity and noise associated with construction can prevent sensitive wildlife species from using adjacent habitat or traveling through wildlife movement corridors. This habitat alienation effect reduces the amount of habitat available to individuals and can impede movement for large- and medium-sized animals, although in the case of construction, the impact will be temporary. Those impacts should be considered in the context that there are few wildlife species to disturb in this study area.

The open fields around the proposed site would permit species to easily move away from any disturbance associated with construction activities.

Mitigation Measures for habitat alienation during construction activities

To mitigate the effect of disturbance and habitat alienation, particularly on species that are sensitive to disturbance, the length of the construction period should be kept to a minimum. Undisturbed habitat should remain in abundance in areas adjacent to the proposed site, providing alienated individuals with alternate areas of suitable habitat.

2. Impact: wildlife mortality caused by clearing of vegetation

Clearing of natural vegetation can cause wildlife mortality, particularly during the spring breeding season when the mobility of many species is restricted. At these times, adults remain close to dens and nest sites, and young are not yet able to move long distances. If mortality is high during spring, local populations may suffer short-term declines. This effect is even more dramatic in populations already at low levels, as is the case for some special status species. Migratory bird nests are protected under the federal *Migratory Birds Convention Act (MBCA)*, which state that nests cannot be disturbed or removed during the breeding season. There are also legal implications for mortality caused by clearing. Both the federal *Migratory Birds Convention Act* (MBCA) and the Alberta *Wildlife Act* prohibit activities that will lead to the destruction or disturbance of nesting sites of migratory birds. A recent amendment to the *MBCA* further protects disturbance to individual migratory birds. Direct mortality and nest site disturbance resulting from construction activity and clearing would contravene those Acts.

Construction involving vegetation clearing during the breeding bird period (15 April to 31 July) has the potential to adversely impact breeding birds, as both adults of nesting individuals may care for young reducing their ability to escape, which in turn makes them vulnerable to injury or mortality during clearing activities. Mortality may also result later in the breeding season when fledgling (feathered young that are not yet able to fly) depend on vegetative cover for protection until they are able to fly.

Mitigation measures for wildlife mortality caused by clearing of vegetation

Any necessary vegetation clearing (including adjacent old field and grassland habitats) should be scheduled in the fall or winter months to avoid the spring breeding bird period (15 April to 31 July), thereby minimizing the potential for mortality. By fall, most species would be mobile and could easily evade construction equipment. In winter, many

migratory species will not be present, further reducing the risk. In addition to avoiding clearing during the spring, clearing limits should be marked with highly visible flagging or fencing to minimize accidental removal of habitat and the associated risk of wildlife mortality.

Clearing of vegetation in the old field habitats would not result in significant disturbance to wildlife due to the poor quality of those wildlife habitats. However, habitat quality is higher in the mesic grassland and lush grasslands, as evidenced by higher numbers of birds and the presence of small mammal signs.

3. Impact: disturbance to, or loss of, Special Status species

No Special Status Species were recorded in the study area nor are there any records of such species occurring near the site. However, the presence of the large mesic grasslands suggest the possibility that a grassland-specialist species may use the habitat.

Unless clearing occurs during the breeding season, it is unlikely that construction activities have the potential to directly impact any special status avian species suspected to use habitat in the grasslands.

Mitigation Measures for disturbance to, or loss of, Special Status species

Avoid vegetation clearing during the breeding bird season (15 April to 31 July) and keep the extent of clearing activities to a minimum.

Wildfire Impacts

Impact: wildfires caused by construction equipment

Construction activities will occur adjacent to a densely vegetated grassland in a region that has historically had some very dry summer months. In these dry conditions, grasses may present a fuel load for wildfires. During these dry periods, an accidental fire ignited by sparks from machinery, construction materials or workers' cigarettes could spread quickly.

Mitigation measures for wildfires caused by construction equipment

The following measures will help reduce the potential for construction activities, vehicles or personnel to initiate a wildfire:

- Fire fighting equipment will be available near any flammable storage sites, including fuels, lubricants and other petroleum projects.
- Smoking on the construction site will be prohibited, particularly near fuel storage areas or in treed areas. A designated smoking area will also be established.
- A procedure for on-site fire response will be developed and communicated to all site personnel. That plan will include contact information for the nearest Edmonton Fire Rescue Services station.

Environmental Permitting Requirements

Federal Government

Migratory Birds Convention Act (MBCA) and Species at Risk Act (SARA)

Environment Canada administers the MBCA and the SARA. Those Acts provide guidelines for enforcement only; neither the MBCA nor the SARA requires permitting or approvals specific to the proposed project. And although no approvals are required, violation of those Acts may result in penalties. Disturbance of an active nest would be a contravention of the MBCA. This ESR provides information that enables the proponents to comply with those Acts.

Provincial Government

Alberta Wildlife Act

The Alberta *Wildlife Act* prohibits disturbance to a nest or den of prescribed wildlife species. Although permitting is not required under that Act, violations may result in fines.

Conclusions

The site of the proposed Meadows transit centre has undergone considerable disturbance over the past several years. The site has a history of use for agricultural crops and has been left fallow for the past year. Revegetation of the site by invasive weed species, combined with concurrent disturbance from activities associated with nearby construction, has resulted in an area with poor quality wildlife habitat.

Much of the landscape adjacent to the proposed site has been converted to residential and commercial districts or is in the process of being converted to a residential neighbourhood. This has further reduced the total amount of wildlife habitat available in the area.

The most important habitat in terms of wildlife diversity is the mesic grassland.

Wildlife movement is restricted. There are no major wildlife movement corridors close to the proposed transit centre. A minor wildlife movement corridor which extends into the study area from the east now ends at the project site as wildlife can no longer move west of 17th Street due to the surrounding urban build-up. The positioning of the project site at the termination point of that wildlife corridor (17th Street) has reduced the importance of the site in the movement of local wildlife.

No Special Status or rare wildlife species have been recorded in or near the study area.

The site is at the edge of a rapidly expanding commercial and residential section of the City of Edmonton. The overall result is that the impact on wildlife from the proposed project will be minimal.

Recommendations

Following are our recommendations:

- To comply with the *Migratory Birds Convention Act* and the *Species At Risk Act*, project site clearing activities should occur before 15 April or after 31 July.
- Apply for project authorization under Alberta's *Environmental Protection and Enhancement Act* if storm water management facilities are required.
- Undertake surface erosion control measures on the site.
- Ensure that construction activities do not impede the ability of wildlife to access the mesic grassland habitat from the east.

We trust this wildlife assessment of the Meadows transit centre site provides the information required by your organization. If you have any comments regarding this report, please contact the undersigned.

Sincerely,

Spencer Environmental
Management Services Ltd.

Andre M. Legris, M.Sc.
Environmental Scientist

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Personal Communications

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Kershaw, Eric. 13 July 2007. Wildlife Biologist, Spencer Environmental Management Services, Edmonton, Alberta.

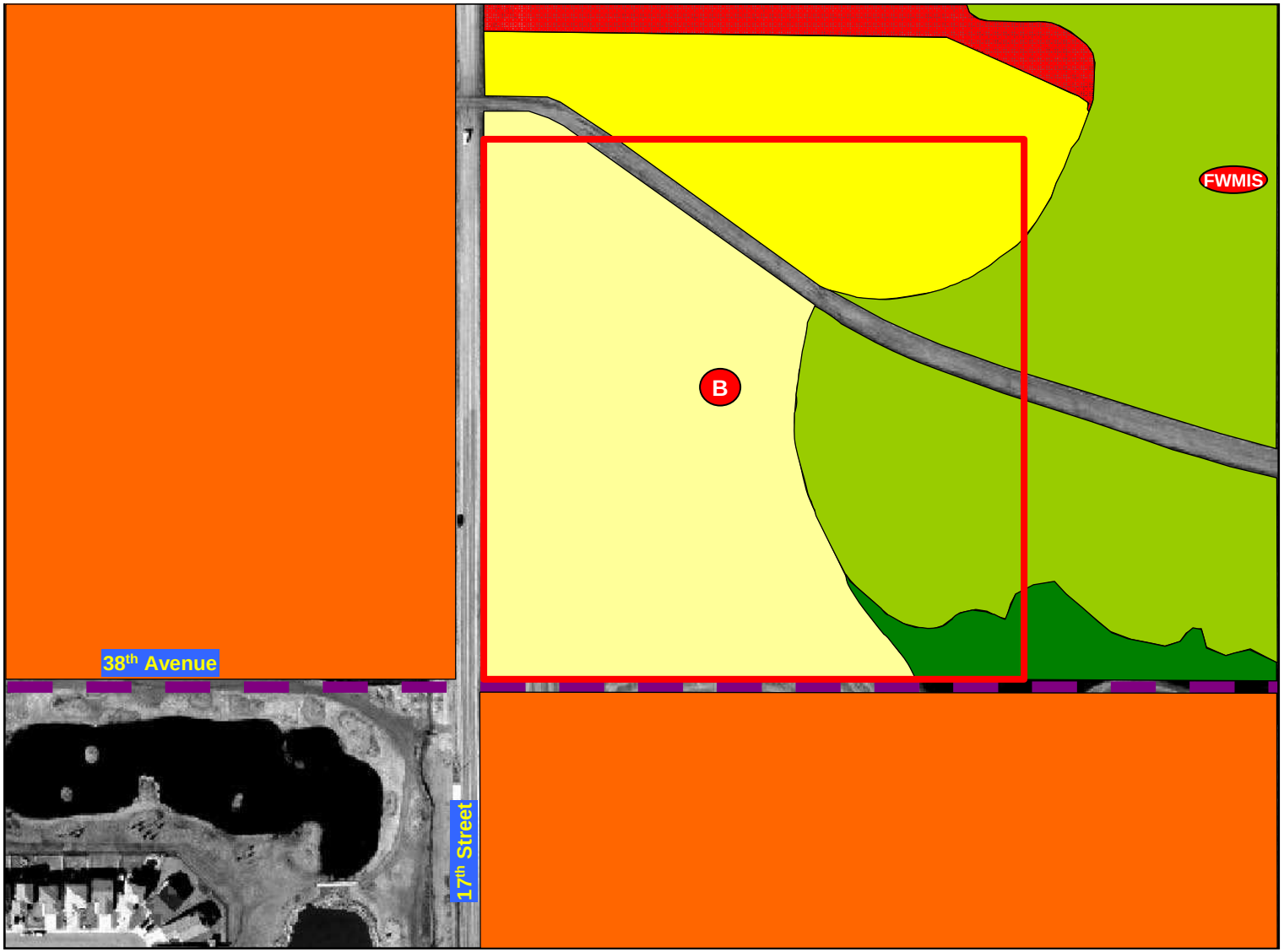

Figure 1. Meadows Transit Centre - Wildlife Habitats

Old Field 1
Old Field 2
Mesic Grassland
Lush Grassland
Hay Field
Current Commercial & Residential Construction Sites
Proposed Transit Centre Site
New Road
B Breeding Bird Survey Site
FWMIS FWMIS Data Site

Source: 2005 air photo
Scale: 1:3,159

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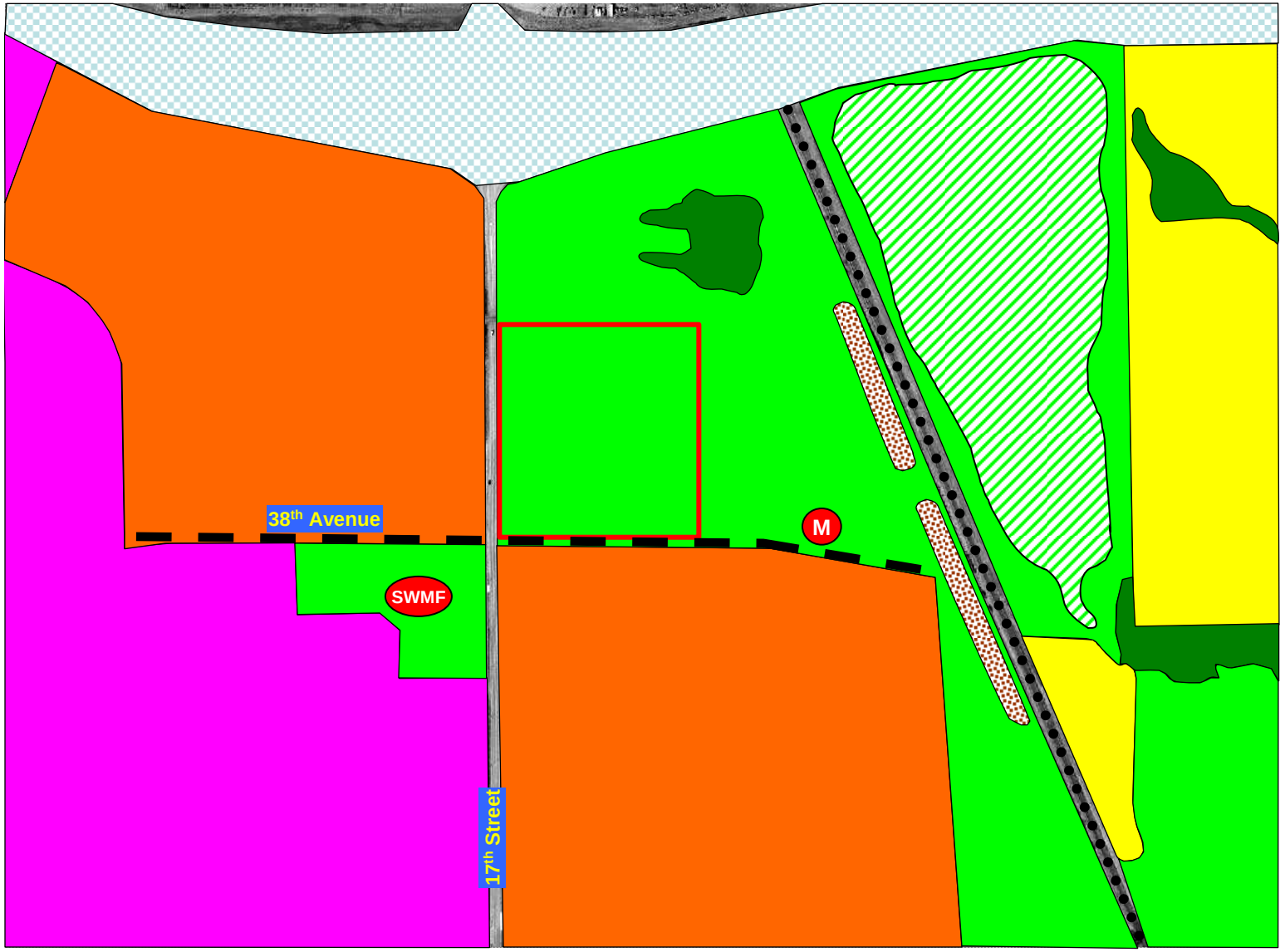
Figure 2
Meadows Transit Centre – Habitat Connectivity



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Source: 2005 air photo
Scale: 1:8,005

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- Green Space (Abandoned fields, grasslands, storm water management pond)
- Residential
- Current Commercial & Residential Construction Sites
- Whitemud Freeway
- Agricultural Field
- Fulton Marshland
- Tree Stand
- Berm
- M — Decadent Marsh
- Proposed Transit Centre Site
- New Road
- Railway Tracks
- SWMF — Storm Water Management Facility

Appendix A. Study area plant list

Physiognomic Layer	Common Name	Scientific Name
Shrub	Prickly Rose	*Rosa acicularis*
Forb	Dandelion	*Taraxacum officinale*
	Scentless Chamomile	*Matricaria perforata*
	Canada Thistle	*Cirsium arvense*
	Lamb's Quarters	*Chenopodium album*
	Wild Mustard	*Brassica kaber*
	Stinkweed	*Thlapsi arvense*
	White Clover	*Trifolium repens*
	Wild Buckwheat	*Polygonum convolvulus*
	Pineapple-weed	*Matricaria matricariodes*
	Sweet White Clover	*Melilotus alba*
	Narrow-leaved Hawk's-beard	*Crepis tectorum*
	Hemp Nettle	*Galeopsis tetrahit*
	Bladder Campion	*Silene cucubalus*
	Toadflax	*Linaria vulgaris*
	Wild Vetch	*Vicia americana*
	Dock	*Rumex sp.*
	Goldenrod	*Solidago sp.*
	Wild Strawberry	*Fragaria virginiana*
Grass	Quackgrass	*Agropyron repens*
	Foxtail Barley	*Hordeum jubatum*
	Slender Wheat Grass	*Agropyron trachycaulum*
	Bluejoint	*Calamagrostis canadensis*
	Kentucky Bluegrass	*Poa pratensis*
	Hairy Wild Rye	*Elymus innovatus*
	Timothy	*Festuca ovina*
	Rocky Mountain Fescue	*Phleum pratense*
	Smooth Brome	*Bromus inermis*

Appendix B. Amphibian and reptiles species which may occur in the study area

Information used to produce this table was obtained from Russell and Bauer (2000).

Common Name	Scientific Name	Habitat
Tiger Salamander	*Ambystoma tigrinum*	Around marsh
Western Toad	*Bufo boreas*	Moist areas of grasslands
Canadian Toad	*Bufo hemiophrys*	Moist areas of grasslands
Wood Frog	*Rana sylvatica*	Around marsh
Boreal Chorus Frog	*Pseudacris maculata*	Around marsh
Plains Garter Snake	*Thamnophis radix*	Grasslands and marsh
Red-sided Garter Snake	*Thamnophis sirtalis*	Grasslands and marsh

Appendix C. Bird species which may occur in the study area

Existing information used to produce this table was obtained from Semenchuk (1992) and Fisher and Acorn (1998).

Common Name	Scientific Name	Recorded during site survey
Canada Goose	*Branta canadensis*	√
Gray Partridge	*Perdix perdix*	√
Ring-necked Pheasant	*Phansianus colchicus*	
Swainson's Hawk	*Buteo swainsoni*	
Red-tailed Hawk	*Buteo jamaicensis*	√
Killdeer	*Charadrius vociferous*	√
Willet	*Catoptrophorous semipalmatus*	
Ring-billed Gull	*Larus delawarensis*	√
Rock Pigeon	*Columba livia*	
Eastern Kingbird	*Tyrannus tyrannus*	
Black-billed Magpie	*Pica hudsonia*	√
American Crow	*Corvus brachyrhynchos*	√
Horned Lark	*Eremophila alpestris*	
Tree Swallow	*Tachycineta bicolor*	√
Barn Swallow	*Hirundo rustica*	
Black-capped Chickadee	*Poecile atricapillus*	
House Wren	*Troglodytes aedon*	
American Robin	*Turdus migratorius*	
European Starling	*Sturnus vulgaris*	√
Clay-colored Sparrow	*Spizella pallida*	√
Savannah Sparrow	*Passerculus sandwichensis*	√
Le Conte's Sparrow	*Ammodramus leconteii*	
Song Sparrow	*Melospiza melodia*	
Brewer's Blackbird	*Euphagus cyanocephalus*	
Common Grackle	*Quiscalus quiscala*	
Brown-headed Cowbird	*Molothrus ater*	
American Goldfinch	*Carduelis tristis*	
House Sparrow	*Passer domesticus*	
Red-winged Blackbird	*Agelaius phoeniceus*	√

Appendix D. Mammal species which may occur in the study area

Existing information used to produce this table was obtained from Pattie and Fisher (1999).

Common Name	Scientific Name
Hayden's Shrew/Prarie Shrew	*Sorex haydeni*
Silver-haired Bat	*Lasionycteris noctivagans*
Big Brown Bat	*Eptesicus fuscus*
Snowshoe Hare	*Lepus americanus*
White-tailed Jack Rabbit	*Lepus townsendii*
Woodchuck	*Marmota monax*
Richardson's Ground Squirrel	*Spermophilus richardsonii*
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*
Franklin's Ground Squirrel	*Spermophilus franklinii*
Northern Pocket Gopher	*Thomomys talpoides*
Deer Mouse	*Peromyscus maniculatus*
Heather Vole	*Phenacomys intermedius*
Meadow Vole	*Microtus pennsylvanicus*
House Mouse	*Mus musculus*
Meadow Jumping Mouse	*Zapus hudsonius*
Western Jumping Mouse	*Zapus princeps*
Coyote	*Canis latrans*
Red Fox	*Vulpes vulpes*
Long-tailed Weasel	*Mustela frenata*
Least Weasel	*Mustela nivalis*
Striped Skunk	*Mephitis mephitis*
White-tailed Deer	*Odocoileus virginianus*

Plate 1. Old Field 1.

Plate 2. Old Field 1.

Plate 3. Old Field 2.

Plate 4. Old Field 2.

Plate 5. Mesic grassland.

Plate 6. Lush grassland.

Plate 7. Hay field.

Plate 8. Decadent marsh.

Plate 9. Terrestrial habitat connectivity.

Plate 10. Wetland habitat connectivity

Plate 11. Wetland habitat connectivity