Valley Line Southeast Light Rail Transit (LRT) – Connors Road Post-Construction Wildlife Movement Monitoring

Final Report

Please note specific information around wildlife camera locations has been redacted from this report to protect the monitoring cameras from potential theft and vandalism.

Prepared for:
LRT Expansion and Renewal
City of Edmonton
Edmonton, Alberta

On behalf of:
ConnectEd Transit Partnership
Edmonton, Alberta

Project Number EP-670
April 2025

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1.0 INTRODUCTION

1.1 Program Background

The City of Edmonton, Light Rail Transit Expansion and Renewal (LRT E and R) expanded their LRT network with construction of the Valley Line Southeast LRT – Phase 1 (Southeast), which connects the city center to communities in southeast Edmonton. Construction spanned the period March 2016 to November 2023, when the Valley Line officially opened for passenger service. The Valley Line crosses the North Saskatchewan River Valley (NRSV), through Louise McKinney Riverfront and Gallagher Parks and parallels the north side of Connors Road, on what is referred to as Connors Hill (Figure 1.1). The trackway is located within Connors Road right-of-way (ROW).

The NSRV and ravine system is recognized as an important municipal and regional wildlife movement corridor, in general. In this location anecdotal evidence and local landscape features suggested a preferred wildlife movement corridor comprising lower Mill Creek Ravine, Gallagher Park and Cloverdale Ravine, bisected by Connors Road (Figure 1.1). The Valley Line Environmental Impact Screening Assessment (EISA) (Spencer Environmental 2013) prepared prior to LRT construction noted that the Valley Line had potential to adversely impact wildlife movement in the vicinity of Connors Road, as it would widen the existing transportation corridor, and was expected to incorporate additional impediments to movement, such as slope retaining walls, jersey barriers and a fence. To that end, the EISA recommended the project include installation of a wildlife passage structure under Connors Road and the future Valley Line to accommodate wildlife movement across that ROW, at an appropriate location between Mill Creek Ravine Park and Gallagher Park. The recommended wildlife passage structure was a culvert designed to accommodate movement of the City's Medium Terrestrial Ecological Design Group (e.g., coyote, porcupine), based on the size of structure that could be accommodated by the local terrain and the reasoning that this group of wildlife included animals thought to be relatively abundant in the area and particularly at risk when attempting to cross the new ROW. It was recognized early on that an underpass large enough for deer, even if proven warranted, could not be accommodated by the local grades.

Suitable locations for installing a structure large enough to pass medium-sized animals were limited by numerous factors including existing topography, existing roadway width and the anticipated addition of noise and retaining walls south of Connors Road. The assessment also noted some uncertainty regarding the benefit derived from such a structure since the level of wildlife movement in the area was not documented. The Biodiversity + River Valley Planning Unit of the City of Edmonton's then Sustainable Development department, therefore, recommended undertaking baseline monitoring of wildlife movement in the Connors Road vicinity.

A baseline (pre-construction) monitoring program was conducted over two years: Year One (June 2014 – mid-April 2015) and Year Two (mid-April 20-December 2015). The termination date of the program was selected based on potential initiation of LRT construction in January 2016. Results of the baseline program were documented in Year One (interim results) and Year Two (final report) reports prepared for LRT D&C

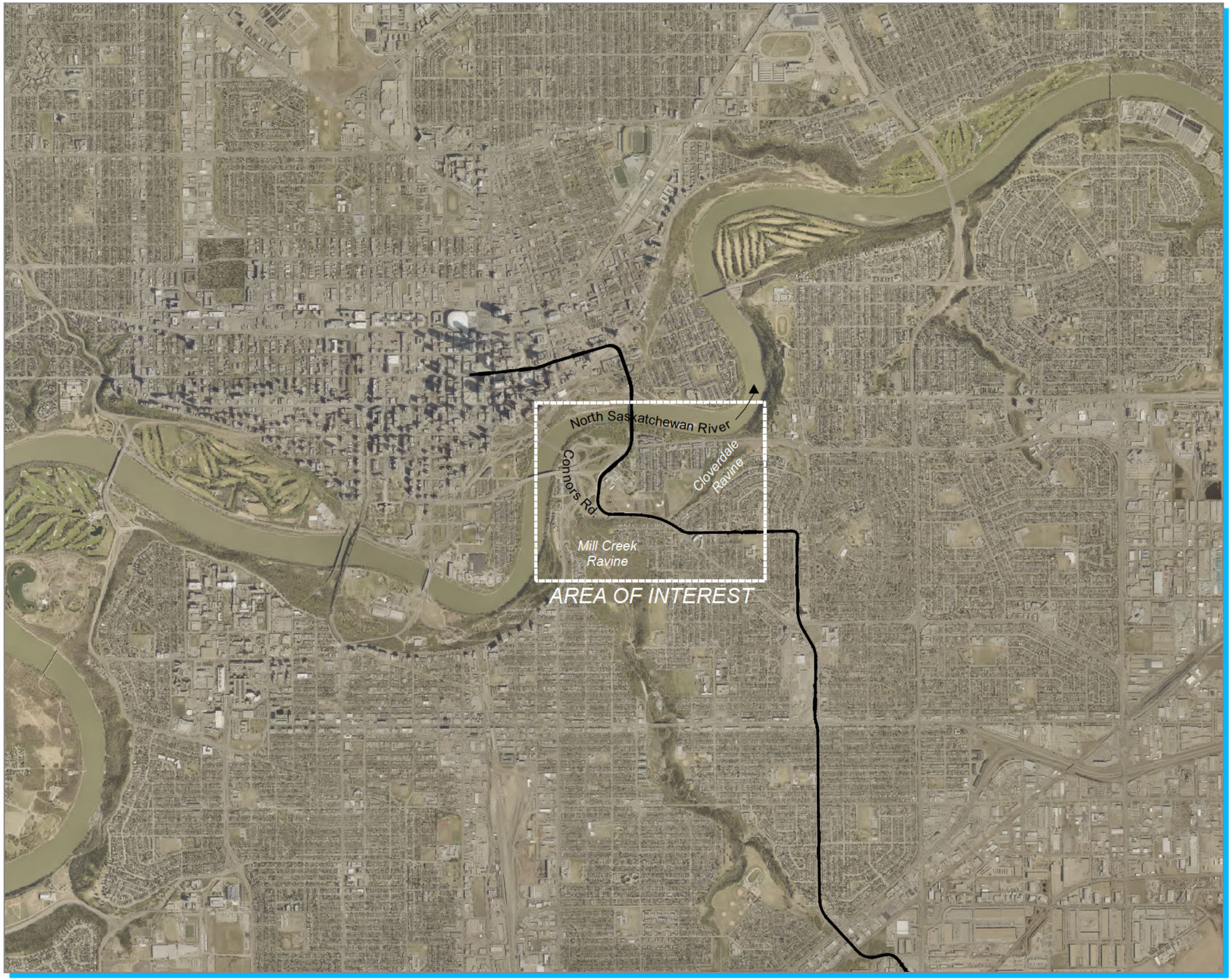

Figure 1.1.
Wildlife Movement Area of Interest (Year One)

Post-Construction Wildlife Movement Monitoring
City of Edmonton LRT Valley Line - Phase 1

Legend

Valley Line Alignment (Indicative Only)

0 250 500 1,000 Meters

1:30,000

Map Date: 23 May 2025
Imagery Mosaic: May-July 2023 (COE)

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(Spencer Environmental 2015 and 2016). Overall, results of the baseline monitoring program supported construction of a wildlife crossing culvert structure mid-slope along Connors Road and underscored the importance of a post-construction wildlife movement study.

Consequently, the City of Edmonton committed to conducting post-construction monitoring once the Valley Line SE LRT was operational and associated landscaping activity had ceased. To best document the effect of the new infrastructure on deer and coyote movement, the City's post-construction monitoring program was to mirror the pre-construction baseline study by including a combination of wildlife cameras and snow tracking survey types. The program was to focus on the area at the bottom of Connors Road at Mill Creek Ravine [redacted] in addition to a Comparative Movement Study Area (CMSA) to determine if and how wildlife movement has changed in the area of interest, particularly for coyote and deer, and whether the wildlife passage structure is functioning as intended.

This report documents the results of Year One (May 2024-March 2025) of the post-construction wildlife movement monitoring program. A more comprehensive assessment comparing pre-and post monitoring results will be completed after the second year of monitoring when there is a more complete dataset.

1.2 Monitoring Program Objectives and Study Area

Year One of the post-construction wildlife movement monitoring program targeted movements of medium- and large-sized wildlife in the vicinity of Connors Hill in the first year following the completion of construction activities. The study had three main objectives:

- to study the use of the wildlife passage structure under Connors Road
- to facilitate a comparison with pre-construction wildlife movement data
- to document and inform an understanding of the presence of medium- and large-sized wildlife in the vicinity of Connors Hill, post-construction

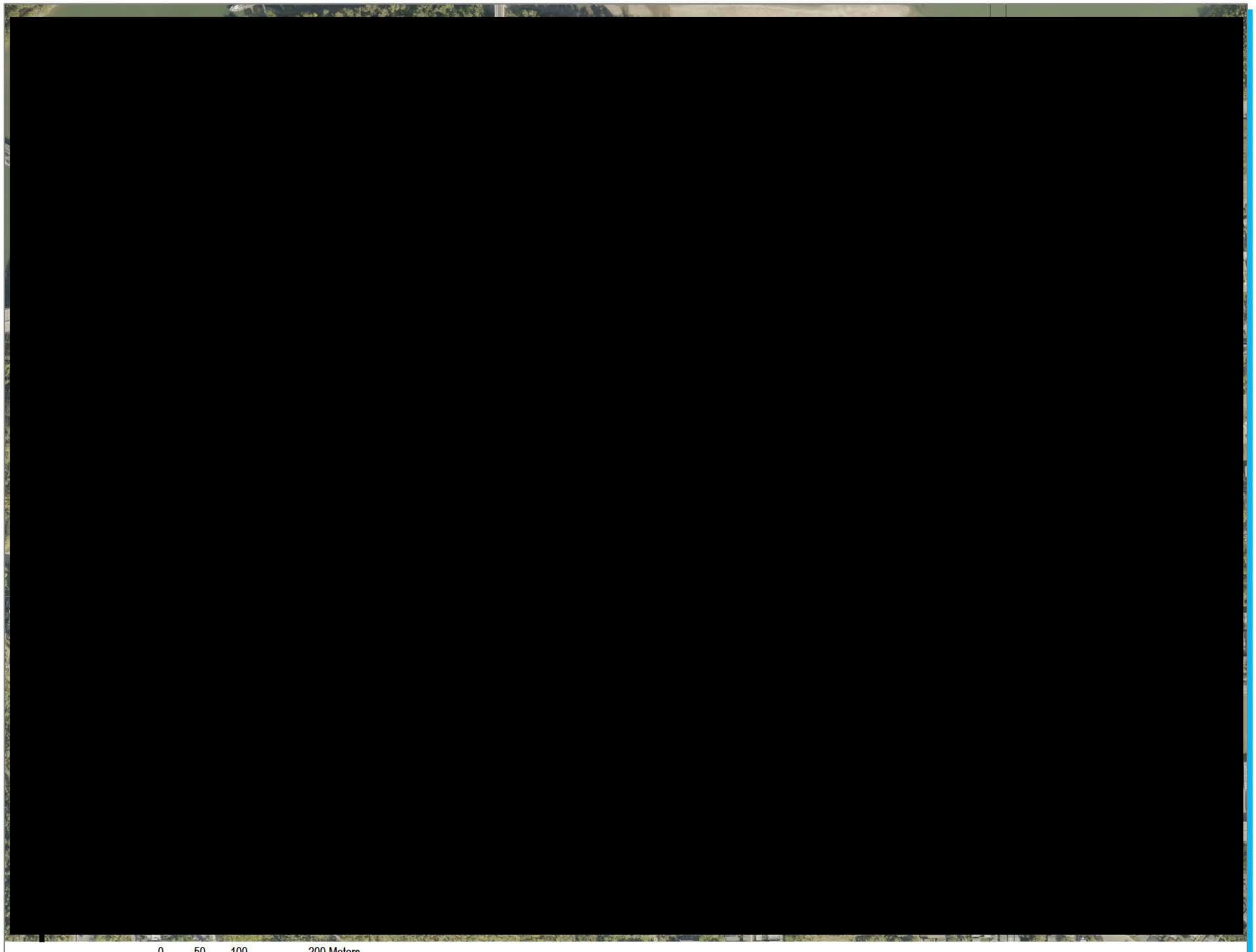
The focal study area comprises a corridor encompassing Connors Road and the Valley Line alignment, extending from the intersection with Cloverdale Road to the lower terminus of Mill Creek Ravine ("Connors Road Study Area") (Figure 1.2). That study area was expanded slightly to the north compared to the pre-construction movement study area to account for the wider ROW that now includes the LRT tracks. A second, comparative study area, comprised two disjunct areas and each focused on a nearby roadway, Scona Road located in Mill Creek Ravine, and 98 Avenue at the base of Cloverdale Ravine (together comprising the comparative movement study area [CMSA]), to allow a comparison of wildlife movement at Connors Hill to movement in the vicinity of other nearby roads. In addition, the CMSA allows for detection of post-construction changes in slightly larger scale wildlife movement patterns, recognizing that if LRT construction and operation has

created or exacerbated a barrier to wildlife movement across Connors Road, wildlife may alter their local movement patterns. The Valley Line post-construction wildlife movement monitoring program provides a comparison to pre-construction (baseline) conditions of the surrounding ecological network, as per the City of Edmonton's Natural Connections Strategic Plan (2007).

1.3 Program Duration and Schedule

Year One of the post-construction monitoring program began in mid- March 2024 with a preliminary snow tracking exercise to groundtruth our desktop study area delineation and data collection locations. Year One data collection began in May 2025 and extended to 11 March 2025. This Year One post-construction report presents results for the first spring/ summer/winter of the program (01 May 2024 – 11 March 2025).

Figure 1.2.
Wildlife Movement Study Areas and Location of Surveys (Year One)
Post-Construction Wildlife Movement Monitoring
City of Edmonton LRT
Valley Line - Phase 1



Connors Road Study Area
Comparative Movement Study Area
Wildlife Passage Structure
Retaining Wall
Fence

Survey Method

Wildlife Camera (ID#)
Winter Tracking Transect

1:5,000

0 50 100 200 Meters

Map Date: 23 May 2025
Imagery Mosaic: May-July 2024 (COE)

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2.0 METHODS

Year One of the post-construction program comprised two types of investigations: 1) remote wildlife cameras, and 2) wildlife winter tracking.

2.1 Remote Cameras

Remote wildlife cameras were positioned to survey wildlife species present in the near vicinity of Connors Road, document use of the wildlife passage structure and document relative levels of wildlife activity in adjacent lands in the two study areas.

2.1.1 Camera Equipment

The remote cameras deployed were Browning Dark Ops Full HD Trail Cams, which use passive infrared radiation (PIR) sensors to detect motion (Plate 2.1). The cameras trigger each time there is a change in the amount of infrared radiation (i.e., heat) emitted or reflected from an object (e.g., when an animal passes by). Each camera was set to record a series of three consecutive six-megapixel (6M) photographs when triggered. The PIR sensor was set to the highest sensitivity setting on each camera with a 1-5 second delay set between trigger events to minimize the chance of missing wildlife events. Each camera was contained within a locked metal box and secured to the structure it was deployed on (tree or post) in order to prevent theft and/or vandalism. A sticker was applied to the front and/or side of each metal box to explain the purpose of the camera and provide contact information for the program to members of the public that might notice the camera.

Plate 2.1.

2.1.2 Camera Deployment

On 12 March 2024 we conducted an initial site reconnaissance and winter tracking session to inform remote camera locations in the new post-construction context. While the objective was to mimic pre-construction camera placement the introduction of the LRT had changed the study area character and required some camera location adjustment. Eight (8) remote wildlife cameras were deployed to document wildlife activity in the Connors Road Study Area, and the CMSA. Six (6) of those cameras were deployed in the Connors Road area, [redacted], and two (2) in the CMSA [redacted] Figure 1.2). This represents an increase of one camera over the seven that were used in the previous baseline study. Overall, the intent was to deploy cameras at similar locations compared to the baseline study, taking into account the new LRT infrastructure, safe accessibility to camera deployment locations and observations made during the March 2024 site reconnaissance and snow tracking visit. Options for optimally deploying cameras [redacted] were limited, [redacted] The location and set-up details for each camera in Year One post-construction are shown on Figure 1.2 and in Table 2.1, respectively.

Table 2.1. Camera ID, Location Description, Camera Effort and Set-up Details of Wildlife Cameras (01 May 2024 –11 March 2025)

Camera ID	Location Description[a]	Camera Effort in Year One (days)	Height (m)	Aspect (º)
Connors Road Study Area,				
[redacted]		314	[redacted]	120
		131		321
		314		341
		69		360
		314		12
		314		150

Camera ID	Location Description[a]	Camera Effort in Year One (days)	Height (m)	Aspect (°)
[redacted]				
Comparative Movement Study Area				
[redacted]		314	[redacted]	360
[redacted]		197	[redacted]	112

[a]See Figure 1.2 for the location of each camera.

2.1.3 Camera Data Collection

Cameras were visited approximately every two months between 1 May 2024 and 11 March 2025 to retrieve data, check battery levels, and adjust as necessary for vandalism or theft. To retrieve data, the memory card in each camera was replaced with a newly formatted, empty memory card. Batteries were replaced if the battery indicator on the camera indicated 1/2 or less battery life remaining. Table 2.2 presents camera deployment and check dates by camera for Year One post-construction.

Table 2.2. Camera ID, Deployment and Checks in Year One (01 May 2024 –11 March 2025)

Camera ID	Camera Deployment	Camera Check Dates	Notes
Connors Road Study Area			
[redacted]	1 May 2024	9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	
[redacted]	1 May 2024	9 July 2024, 10 September 2024	Camera was stolen sometime between 10 September 2024 and 05 November 2024
[redacted]	1 May 2024	9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	
[redacted]	1 May 2024	9 July 2024	Camera was stolen sometime between 09 July 2024 and 10 September 2024
[redacted]	1 May 2024	9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	
[redacted]	1 May 2024	9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	
Comparative Movement Study Area			

Camera ID	Camera Deployment	Camera Check Dates	Notes
[redacted]	1 May 2024	9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	
[redacted]	1 May 2024	16 May 2024, 9 July 2024, 10 September 2024, 5 November 2024, 30 January 2025, 11 March 2025	Camera was stolen between on 16 May 2024 and 09 July 2024; Camera was replaced on 10 September 2024

2.1.4 Camera Data Analysis

Camelot Project Software 1.6.16 (open-source camera trapping image management software) was used to organize a total of 188,477 images captured by eight (8) remote cameras in the study area. An experienced wildlife biologist used Camelot to visually examine all photographs to classify species and number individual animals captured on camera in each image. Visual examination of each photograph was required to eliminate any falsely triggered photographs (e.g., triggered by snow, rain, sun, moving vegetation, or recreationalists).

An "event" was considered independent if the species photographed was different from previous photographs or if there were more than 10 minutes between consecutive photographs (see glossary, Appendix A). The species and number of individuals were identified for each event through visual inspection of each photograph. The species was assigned "unknown" for events where the photograph was too dark, there was no obvious trigger for the event (i.e., there was no moving vegetation or other obvious reason for the camera to be triggered), the animal was too far away, or the animal was mostly out of frame and, therefore, was not identifiable to species. Unknown events were not included in the analysis. Deer were identified to species (white-tailed or mule) where possible but were categorized as deer for subsequent analyses because the majority of photographs did not provide sufficient evidence for identification to species. Photographs of birds and domestic animals were noted but not included in analysis because neither group was a study focus. Photographs of red squirrels were also excluded from analysis they were not considered informative regarding wildlife movement in the area of interest, owing to their relatively small home ranges.

Due to the volume of photographs collected and analyzed (approximately 188,477 for Year One of post-construction wildlife movement monitoring, the vast majority of which were not of wildlife), the processing of camera data into spreadsheet form was subject to a more focused quality assurance and control process. Using Camelot software, all photographs tagged as wildlife were reviewed to confirm the appropriate species tag had been applied and corrected as necessary during the quality assurance and control process. Photographs without wildlife tags, such as setup and wind triggered photographs, were not reviewed.

The number of events per species at each camera was summarized to describe overall wildlife habitat use. The number of events per species per camera was converted to an event capture rate per species per year (i.e., 365 days) of camera monitoring effort to allow for comparison to baseline data and account for differences in camera effort. In addition, the event capture rate of coyotes and deer photographed was plotted against month and time to identify trends in wildlife activity levels.

2.2 Winter Tracking

Standardized surveys of animal winter tracks in fresh snow can be used to determine location and direction of movement of select wildlife species. Winter tracking was conducted to supplement the camera data and provide a more definitive assessment of winter road crossings and movement through the Cloverdale Ravine and Mill Creek Ravine areas of the Connors Road and CMSA.

2.2.1 Tracking Transect Location

A total of seven (7) variable-length winter tracking transects were located within the two study areas (Figures 2a-c):

- two (2) transects in the Connors Road area, one along the north and one along the south side of the ROW.
- five (5) transects in the CMSA:
    - two in Mill Creek Ravine, parallel to Scona Road, to the east and west of the road
    - three in Cloverdale Ravine, one parallel to the south side of 98 Avenue and two perpendicular to 98 Avenue

All road ROW transects were located 2-3m back from the road/rail curb. Transect locations were selected to avoid heavy dog/people traffic areas while still capturing key areas of interest. Transect locations remained similar to baseline tracking transect locations, however, the transect to the north of Connors Road was necessarily shifted to the north to accommodate the new ROW width added by the LRT track.

2.2.2 Tracking Visits

Two winter tracking visits were conducted by a certified wildlife tracker in Year One of the post-construction wildlife movement monitoring program. Visits targeted two periods of wildlife movement activity over the winter:

- Visit 1: Early winter (21 December 2024)
- Visit 2: Mid-winter (03 February 2025)

Winter tracking visit dates were subject to snowfall availability (Table 2.3). Tracking visits were conducted after a “track obliterating event”, where all previous tracks have been erased (>1 cm snow). The more “days since snow” (DSS; i.e., days since a track obliterating event), the more time has passed for wildlife tracks to accumulate. Winter tracking protocols generally require 3 – 6 DSS; however, 1 – 3 DSS was used as the

requirement for the LRT post-construction wildlife movement monitoring program due to the high level of human activity in the Connors Hill area, creating potential for disturbance of tracks.

Table 2.3. Conditions During Winter Tracking Visits, Year One (01 May 2024 – 11 March 2025)

Visit #	Date	Weather	Temperature (ºC)	New Snow (cm)	Days Since Snow (DSS)
1	21 December 2024	Sunny	2-5	2	3
2	03 February 2025	Sunny	-25	10	3

During each winter tracking visit, each transect was walked at a rate of approximately 5 km/h. All wildlife tracks observed along each transect were identified to species, whenever condition allowed for that, with location of each observation recorded by a GPS. Snow conditions encountered during tracking can be variable and may affect track definition, making species identification on individual track pattern alone difficult. Accordingly, other factors including track stride and width were also considered along with behavioral clues to arrive at a species identification.

2.2.3 Tracking Data Analysis

The number of transect crossings were recorded and standardized per kilometer of transect per DSS. Note: this differed from the baseline snow tracking methodology, where only confirmed road crossings were included in the results - relevant to discussion, section 5). The number of transect crossings per species was then calculated for the Connors Road Study Area, and CMSA. Tracking data (including occurrences of attempted road crossings observed during winter tracking visits) were digitized in a Geographic Information System (GIS) and colour-coded to species, with a focus on medium- and large-sized wildlife transect crossings and road crossing attempts so that the data could be visually assessed for spatial patterns, particularly in the Connors Road Study Area.

2.3 Data Assumptions

The methods described above for Year One of the post-construction wildlife movement monitoring program rely on the use of electronic data collection equipment (remote wildlife cameras) and indirect evidence recorded by trained observers (winter tracking) to describe wildlife movement and habitat use. The wildlife movement analysis is, therefore, subject to several assumptions:

- Analysis of the remote camera data, and particularly the comparison between the Connors Road Study Area and CMSA assumes that there is an equal probability of documenting wildlife events at each camera, despite differences in the set-up details of each camera (e.g., height, aspect).
- The activity pattern analysis assumes that the probability of documenting wildlife events was equal across hours of the day and months of the year.

- The description of wildlife habitat use from the remote camera data assumes that wildlife events at each of the camera locations were not frequently missed by the cameras.

3.0 RESULTS

3.1 Remote Cameras

In Year One, over 10.5 months, eight wildlife cameras were deployed for a total of 2092 camera days (5.73 years of camera effort) and captured photographs of 292 wildlife events. Of those 292 events, 209 (72%) were medium- and large-sized wildlife species (hare or larger). An additional 24 events were labelled as unknown (see Section 3.1.2 for further results specific to the unknowns).

Camera data in Year One showed that the area around Connors Hill provided habitat for at least four (4) medium- to large-sized mammal species included in analysis: coyote (*Canis latrans*) (Plate 3.1-3.3), mule deer (*Odocoileus hemionus*), striped skunk (*Mephitis mephitis*) and hare (*Lepus spp.*). No white-tailed deer were positively identified to species in the camera images in Year One. Other species documented by the wildlife cameras in Year One, but not included in analysis, were red squirrel (*Tamiasciurus hudsonicus*), unidentified rodents, pileated woodpecker (*Dryocopus pileatus*), northern flicker (*Colaptes auratus*), downy woodpecker (*Dryobates pubescens*), black-billed magpie (*Pica hudsonia*), white-breasted nuthatch (*Sitta carolinensis*), American Robin (*Turdus migratorius*), white-throated sparrow (*Zonotrichia albicollis*), dark-eyed junco (*Junco hyemalis*), unidentified birds, and domestic dog (*Canis lupus familiaris*) (Table 3.1).

Plate 3.2. A coyote observed hunting [redacted] within the Comparative Movement Study Area

Plate 3.3. A coyote observed traveling [redacted] within the Comparative Movement Study Area

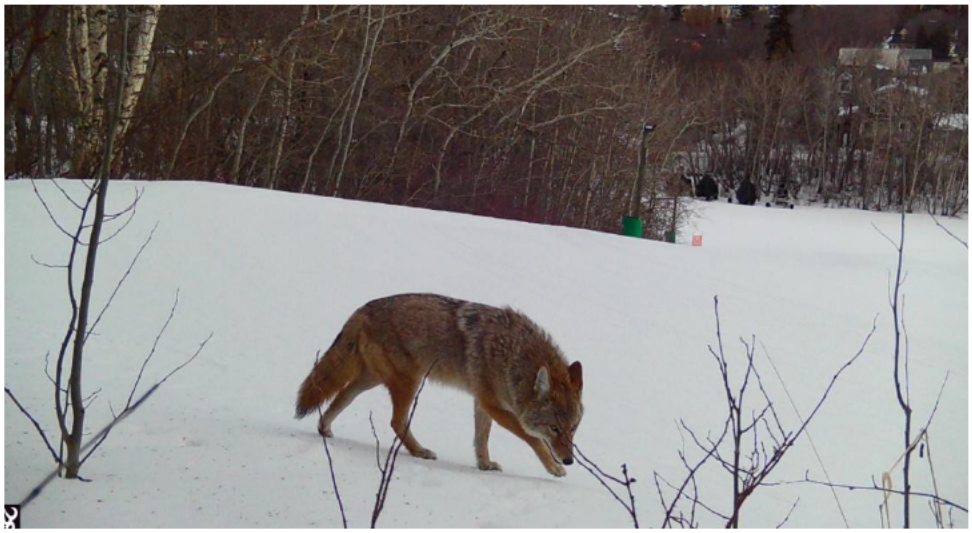


Plate 3.4. A coyote observed [redacted] within the Connors Road Study Area

Table 3.1. Individual Event Captures and Species, by Wildlife Camera ID, During Year One Post-Construction Wildlife Movement Monitoring (May 2024-March 2025)

		Comparative Movement Study Area		Connors Road Study Area,					
Common Name	Scientific Name	[redacted]							
Coyote	*Canis latrans*	20	18	16	7	52	4	3	23
Deer[a]	N/A	2	0	0	1	0	0	2	2
Striped skunk	*Mephitis mephitis*	0	0	0	0	2	0	1	0
Hare	*Lepus spp.*	3	0	0	0	23	0	0	34
Red squirrel	*Tamiasciurus hudsonicus*	0	0	0	0	0	2	0	9
Unidentified rodents	N/A	0	0	0	0	0	0	0	35
Pileated woodpecker	*Dryocopus pileatus*	0	0	0	0	0	0	0	2
Northern flicker	*Colaptes auratus*	0	0	0	0	2	0	0	1
Downy woodpecker	*Dryobates pubescens*	0	0	0	0	0	0	0	2
Black-billed magpie	*Pica hudsonia*	5	3	5	0	0	0	0	4
American robin	*Turdus migratorius*	0	0	0	0	0	0	0	3
White-breasted nuthatch	*Sitta carolinensis*	0	0	0	0	0	0	0	1
White-throated sparrow	*Zonotrichia albicollis*	0	0	0	0	0	0	0	1
Dark-eyed junco	*Junco hyemalis*	0	0	0	0	0	0	0	2
Unidentified bird species	N/A	0	0	1	0	0	1	0	0
Total		30	21	22	8	79	7	6	119

[a]Deer category includes the sum of events of mule deer and deer that were unidentifiable to species.
[b]Unknown events were not included in the total camera event capture rate due to the unknown nature of these images. The focus of analysis was on known species events.

A maximum of three medium- to large-sized mammal species were captured by any single wildlife camera during Year One, with [redacted] recording three species each. All eight cameras recorded coyote observations during Year One monitoring. Deer were recorded at four camera locations, including [redacted]. Hares were recorded at three camera locations, [redacted]. Striped skunks were recorded at two camera locations, [redacted] had the lowest medium- to large-sized mammal species diversity, with only one species recorded at each camera (Table 3.1).

A total of 143 coyote events, comprising 150 individuals, were documented across all eight camera stations in Year One. [redacted] in the Connors Road Study Area, (Figure 1.2) recorded 105 coyote events comprising 109 individuals. [redacted] in

the CMSA (Mill Creek and Cloverdale Ravines) recorded 38 coyote events comprising 41 individuals.
In total, seven (7) deer events comprising seven (7) individuals were documented at [redacted] in Year One. [redacted] in the Connors Road Study Area, recorded five (5) deer events comprising five (5) individuals. [redacted] n the CMSA (Mill Creek ravine) recorded two (2) deer events comprising two (2) individuals. No deer were documented at [redacted] Of the deer identified to species from camera images, three (3) mule deer were documented at [redacted] in the Connors Road Study Area. (Table 3.1).

The deer category includes the sum of events of mule deer and deer that were unidentifiable to species. Unknown events were not included in the total camera event capture rate due to the unknown nature of these images. The focus of analysis was on known species events.

The event capture rate varied across the eight (8) wildlife cameras, with the highest event capture rate for medium- and large-sized wildlife at [redacted] events per year. [redacted] followed with 69 events per year. [redacted] had the lowest medium- and large-sized wildlife event capture rate with only seven (7) events recorded per year. [redacted] followed with the lowest rates of event capture with only 19, 21, and 22 events recorded per year respectively. Event capture rates by species varied between the Connors Road Study Area, and the CMSA, particularly for coyote and deer. Coyote and deer recorded event capture rates were higher in the Connors Road Study Area, compared to the CMSA. Coyote event capture rates were highest at [redacted] with 60 events per year [redacted], while deer event capture rates were highest at [redacted] with three (3) events per year. The CMSA capture rates were slightly lower, with the coyote event capture rates at [redacted] being 23 and 33 events per year respectively, and the deer event capture rate at [redacted] being two (2) events per year (Table 3.2). Camera effort was lowest for [redacted], as a result of camera theft. Despite the low effort. [redacted] recorded the third highest number of coyote events. Despite the relatively high coyote activity in the vicinity [redacted] did not capture evidence of use of the structure.

Table 3.2. Event Capture Rates by Wildlife Camera ID and Species During Year One Post-Construction Wildlife Movement Monitoring (May 2024-March 2025)

Camera ID	Camera Effort (years)	Event Capture Rate (Events/ Year of Camera Effort)				
		Coyote (*Canis latrans*)	Deer[a]	Hare (*Lepus* spp.)	Striped Skunk (*Mephitis mephitis*)	Total Camera Event Capture Rate[b]
Connors Road Study Area						
[redacted]	0.86	19	0	0	0	19
	0.36	19	3	0	0	22
	0.86	60	0	27	2	90
	0.19	21	0	0	0	21
	0.86	3	2	0	1	7
	0.86	27	2	40	0	69
Comparative Movement Study Area						
[redacted]	0.86	23	2	3	0	29
	0.54	33	0	0	0	33

[a]Deer category includes the sum of events of mule deer and deer that were unidentifiable to species.
[b]Unknown events were not included in the total camera event capture rate due to the unknown nature of these images. The focus of analysis was on known species events.

Across the two study areas in Year One, coyote capture events were more frequent during winter, spring, and fall. Coyote events dropped off during June, July and August (summer). Deer capture events were more frequent in the summer and infrequent to absent the rest of the year (Figure 3.1).

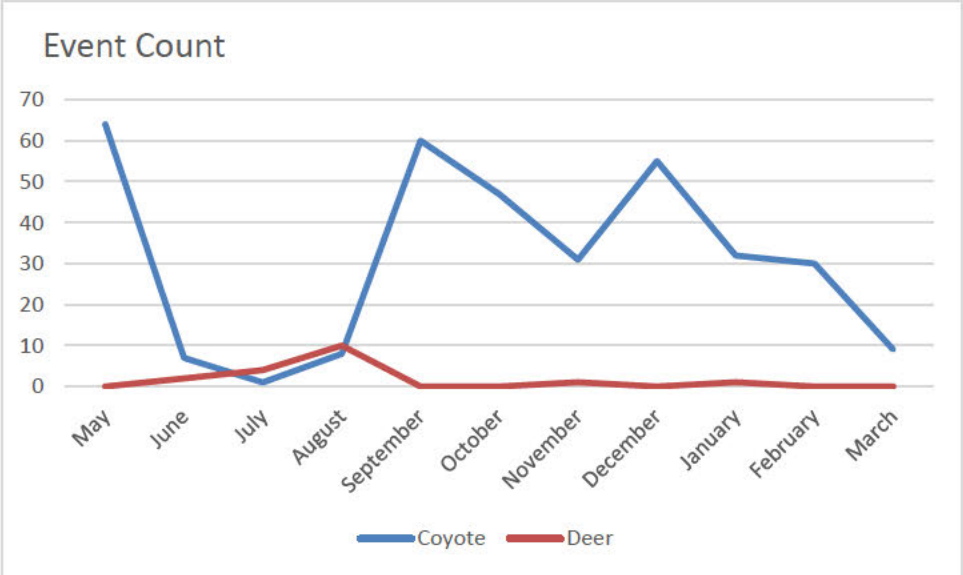


Figure 3.1. Deer and Coyote Events per Month in the Overall Study Area (Year One) (May 2024-March 2025)

Coyote events were highest during the evening, overnight and early morning hours, peaking around 07:00 and lowest during the afternoon and early evening period. This is consistent with the known tendency toward nocturnal activity level patterns of urban coyotes. In comparison, deer activity occurred in low numbers during the overnight to early morning period with some activity mid-day before dropping off between 13:00 and 23:00 (Figure 3.2).

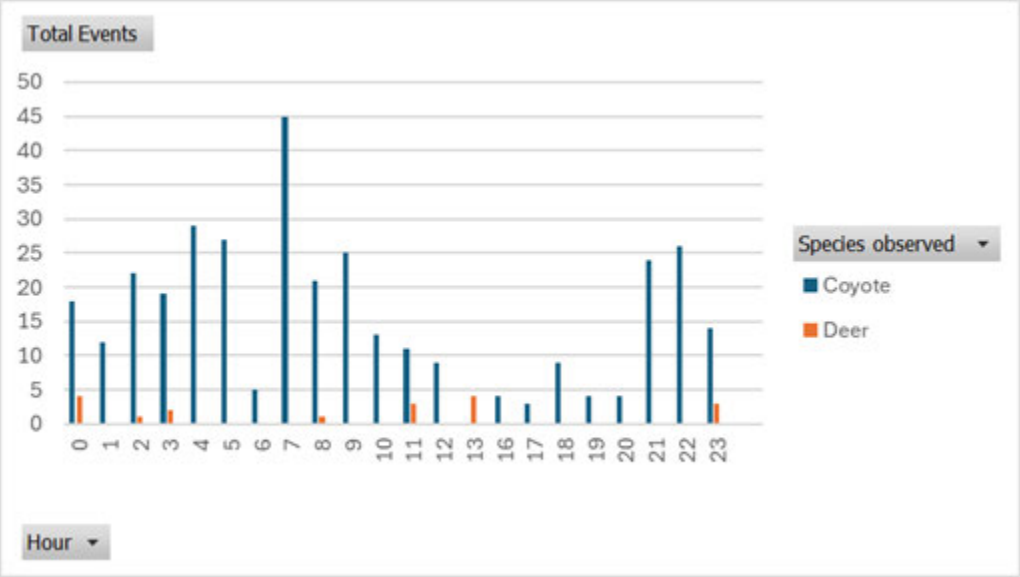


Figure 3.2. Number of Deer and Coyote Events Captured per Hour of Day in the Overall Study Area (Year One) (May 2024-March 2025)

3.2 Winter Tracking

A total of 142 medium- and large-sized wildlife transect crossings (coyote, deer, striped skunk, hares) were observed across both study areas over the two Year One winter tracking visits. Of the 142 tracks, 58 and 11 comprised coyotes and deer, respectively (Table 3.3). The remaining 71 tracks recorded were identified as hare. The number of tracks observed each visit was higher in December compared to February for both coyotes (38 vs 20) and deer (7 vs 4). Observed coyote track totals were higher in the CMSA during both visits compared to the Connors Road Study Area. In contrast, deer track observations were higher in the Connors Road Study Area during both visits compared to the CMSA (Table 3.3). Of the 58 total recorded coyote tracks observed across both study areas, six (6) were confirmed as road crossings: one in December 2024 and five (5) in February 2025 (Figures 2a-c). Four (4) of the total six (6) were across Scona Road (1 in December; 3 in February); one was at the western end of the Connors Road Study Area, (February); and one was at 98 Ave NW (February). Of the total 11 recorded deer transect crossings across both study areas, only one was a confirmed road crossing event (in December and at the western end of the Connors Road Study Area). When looking at the total transect crossing rate results, the CMSA had a higher transect crossing rate (crossings/DSS/km) of 24.2, roughly three times the total

Table 3.3. Number of Coyote and Deer Track Transect Crossings Observed During Winter Tracking, Year One Post-Construction Wildlife Movement Monitoring (December 2024 and February 2025)

Transect	Transect Crossings Observed by Tracking Visit Date					Transect (km)	Transect Crossing Rate (crossings/DSS/km)
	21 December 2024		03 February 2025		Total - All Species		
Connors Road Study Area							
	Coyote	***Deer***	***Coyote***	***Deer***			
All Transects Within Connors Road Study Area	**13**	**7**	**9**	**3**	**32**	**1.5**	**7.1**
Comparative Movement Study Area							
	Coyote	***Deer***	***Coyote***	***Deer***			
[redacted]	4	0	3	1	8	0.5	5.3
[redacted]	21	0	8	0	29	0.4	24.2
CMSA Total	**25**	**0**	**11**	**1**	**37**	**0.9**	**13.7**
Total Both Study Areas	**38**	**7**	**20**	**4**	**69**	**2.4**	**9.6**

Figure 2a.
Wildlife Movement Area Transect Locations and Winter Tracking Results
[redacted]

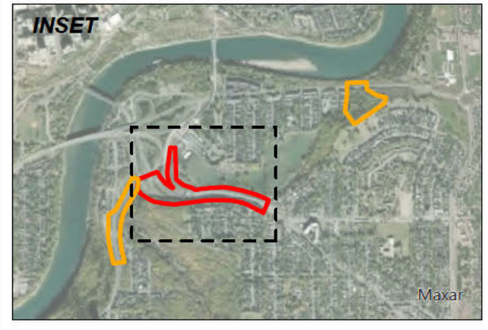
Post-Construction
Wildlife Movement Monitoring
City of Edmonton LRT
Valley Line - Phase 1

Connors Road Study Area
Comparative Movement Study Area
Wildlife Passage Structure
Retaining Wall
Fence

Survey Method
Wildlife Camera (ID#)
Winter Tracking Transect

Species Observed
Feb 3, 2025
Coyote
Deer
Dec 21, 2024
Coyote
Deer

Road & Track Crossing Attempt (indicative)
Coyote
Deer



Map Date: 23 May 2025
Imagery Mosaic: May-July 2024 (COE)

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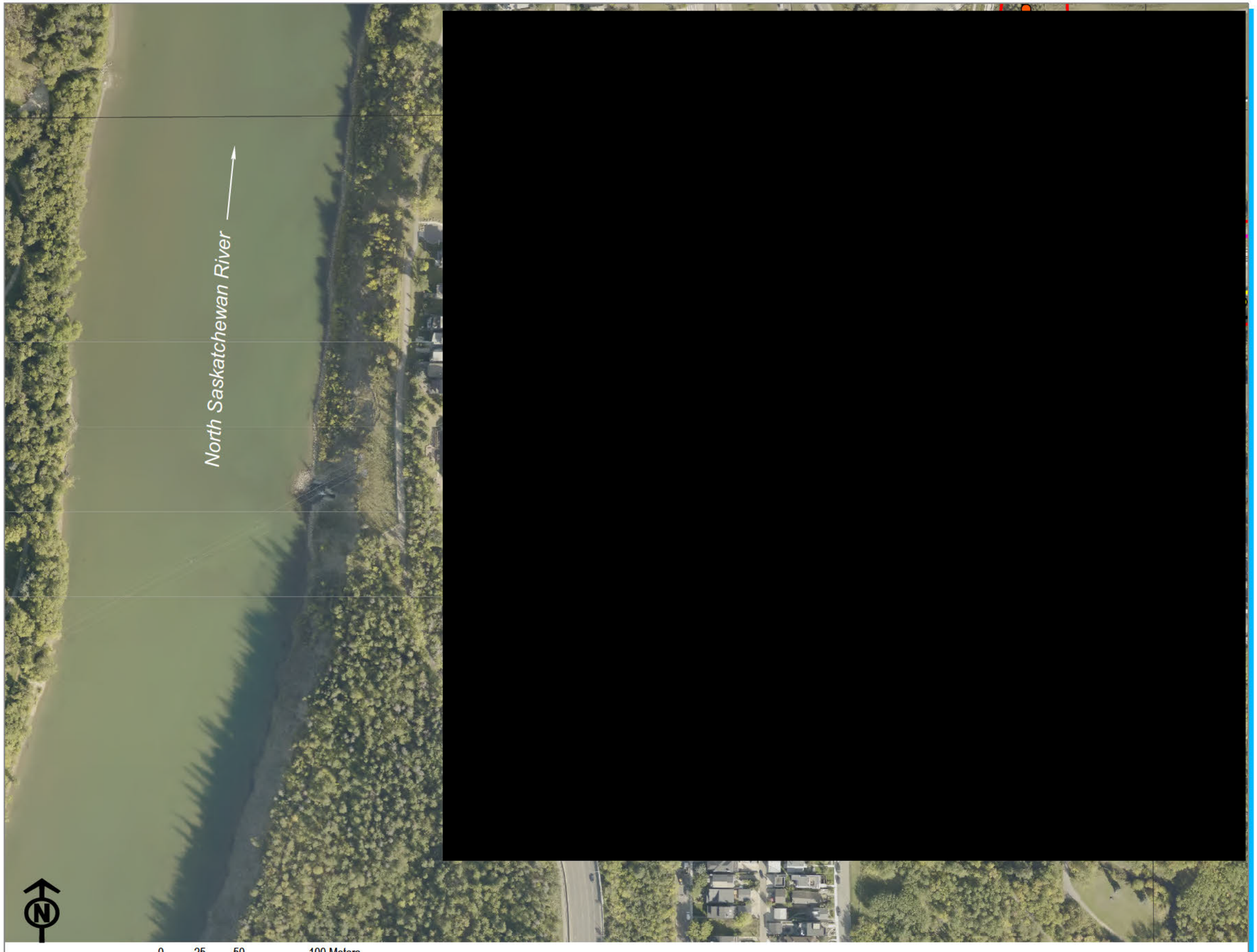
Figure 2b.
Wildlife Movement Area Transect Locations and Winter Tracking Results
[redacted]

Post-Construction
Wildlife Movement Monitoring
City of Edmonton LRT
Valley Line - Phase 1

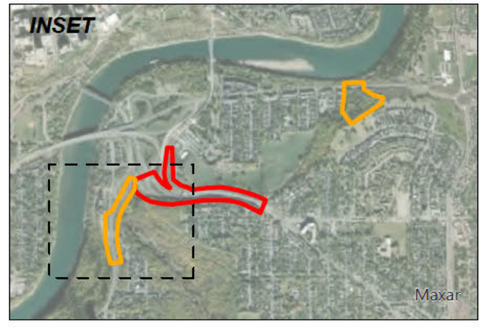


Connors Road Study Area
Comparative Movement Study Area
Wildlife Passage Structure
Retaining Wall
Fence

Survey Method
Wildlife Camera (ID#)
Winter Tracking Transect

Species Observed
Feb 3, 2025
Coyote
Deer
Dec 21, 2024
Coyote
Deer

Road & Track Crossing Attempt (indicative)
Coyote
Deer



Map Date: 23 May 2025
Imagery Mosaic: May-July 2024 (COE)

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Figure 2c.
Wildlife Movement Area Transect Locations and Winter Tracking Results
[redacted]

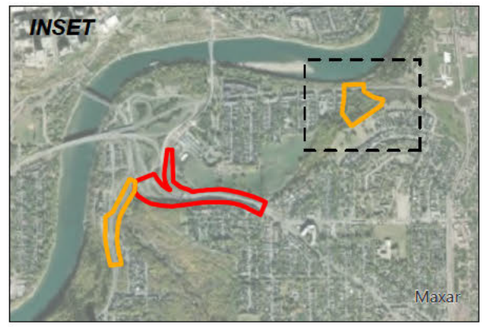
Post-Construction
Wildlife Movement Monitoring
City of Edmonton LRT
Valley Line - Phase 1

Connors Road Study Area
Comparative Movement Study Area
Wildlife Passage Structure
Retaining Wall
Fence

Survey Method
Wildlife Camera (ID#)
Winter Tracking Transect

Species Observed
Feb 3, 2025
Coyote
Deer
Dec 21, 2024
Coyote
Deer

Road & Track Crossing Attempt (indicative)
Coyote
Deer



Map Date: 23 May 2025
Imagery Mosaic: May-July 2024 (COE)

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transect crossing rate in the Connors Road Study Area (7.1). The coyote transect crossing rate [crossings/days since snow (DDS)/km] was higher within the CMSA than in the Connors Road Study Area: 9.3 and 4.1 crossings/DSS/km in the CMSA compared to 2.9 and 2.0 crossings/DSS/km in December and February in the Connors Road Study Area. For deer, transect crossing rates were higher within the Connors Road Study Area: 1.6 and 0.7 crossings/DSS/km compared to 0 and 0.4 crossings/DSS/km for the CMSA (Table 3.3).

No wildlife tracks were observed entering the wildlife crossing structure nor in the vicinity of the south structure entrance (Figure 2a). Coyote tracks were observed near the north structure entrance. Deer tracks were not observed in the vicinity of the structure but were observed to the west, along Connors Road south of the retaining wall.

4.0 DISCUSSION

With completion of Year One post-construction wildlife movement monitoring, the post-construction monitoring objectives, established as a result of the baseline monitoring program, have been achieved. Year One results document the continued presence of medium- and large-sized wildlife in the vicinity of Connors Hill following LRT construction and commencement of operations and illustrate, to some degree, their movement patterns. Year One data did not document use or attempted use of the wildlife passage structure. Remote camera monitoring provides longer term data on wildlife use from point sources, whereas winter tracking transects provide shorter term data on wildlife use and movement patterns over a wider linear range. Combining both remote camera monitoring and winter tracking transects has provided two forms of wildlife movement monitoring, with each providing their own insight into the activities and movement of wildlife within the Connors Road Study Area and CMSA.

Wildlife camera positioning near the structure was logistically challenging and the installed positions were not able to directly capture the wildlife passage structure entrances. Further, monitoring of structure use was impacted early on through the theft of Camera E, that was placed near the south structure entrance. However, [redacted] recorded observations of coyote activity in the vicinity of the north opening of the wildlife passage structure in the ski hill area and winter tracking data confirmed coyote activity in the vicinity [redacted]. The high event capture rates for coyote [redacted] on the ski hill qualitatively positively correlate with high hare usage in that same area. This suggests the high coyote activity at these cameras may be related to predatory behavior (Table 3.2). Cameras captured several hare and coyote images in that area taken within a short timeframe of each other. Despite data documenting medium- and large-sized wildlife present in proximity to the north wildlife passage structure opening, and (more) limited tracking observations at the south end of the wildlife passage, the loss of Camera E means that we cannot determine if animals present near the north underpass end moved through the wildlife underpass to the south or vice versa. Tracking evidence suggests they did not regularly use the structure, and may not have used it at all. This data collection issue will be addressed to some degree in Year Two. In late April 2025, a new camera [redacted] was installed [redacted]

[redacted] (Appendix B provides some preliminary analysis of Year 2 data collected by [redacted] over a nine (9) week period in spring 2025.)

Evidence of people using/occupying the wildlife passage structure was observed during site visits (see Plate 4.1). This human presence may be limiting wildlife use of the underpass. Wildlife activity was documented as higher during early morning and evening hours. If people were present in the underpass during those times human occupancy may have disrupted wildlife usage. To better determine the use of the wildlife passage structure by both wildlife and people we recommend an additional camera [redacted] be installed [redacted]. This would allow monitoring of activity [redacted] and better assess wildlife use of the underpass. [redacted]

Plate 4.5. Spray paint and garbage near the entrance of the wildlife passage structure showing signs of human activity in the area. Trash and fire remnants were also found in the structure.

During Year One of post-construction wildlife movement monitoring, remote camera event captures showed some similarities with results from baseline pre-construction monitoring. To date, both pre- and post-construction monitoring results show the highest event capture rate for medium- and large-sized wildlife to be within the Connors Road Study Area, with a capture rate of 90 events per year for Camera D in Year One post-construction and a capture rate of 39 at the corresponding Camera 4 across the two years of pre-construction study. This demonstrates that following construction activities, wildlife presence within

the Connors Road Study Area remained higher than within the CMSA. In addition, the post-construction event capture rates for medium- and large-sized wildlife across both study area were higher than during baseline monitoring. While the overall coyote population in Edmonton may or may not be increasing, there is evidence that coyote boldness and reports of coyote activity human interactions are on the rise in Edmonton. A 10-year database of citizen reported coyote observations in Edmonton showed a rise in coyote boldness and rising human-coyote conflict in the area (Farr *et al.* 2023). This increase in boldness may be allowing coyotes to spend more time within human occupied areas than before and may explain the increasing event capture rates of coyotes across both study areas during Year One of post-construction monitoring compared to baseline study results.

Recorded road crossings also provide some insight into local wildlife movement. In baseline Years One and Two, winter tracking visits documented 47 coyote road crossings across Connors Road; during post-construction Year One, only one Connors Road coyote crossing was recorded. Deer road crossings were less frequent than coyotes. No deer road crossings were observed during winter tracking baseline monitoring in Year Two, and only one deer road crossing was recorded in Year One, post-construction. Conversely, deer camera data suggest a reduction in deer activity, post-construction. During Year Two of baseline remote camera monitoring 25 deer events were captured, compared to Year One of post-construction remote camera monitoring where only 11 deer events were captured. These preliminary results suggest that while medium- and large-sized wildlife continue to utilize available habitat within the study area, the additional barriers to road crossing created by the LRT (wider ROW, retaining walls, fencing) have limited the number of medium- and large-sized wildlife crossings across the Connors Road ROW. Crossing may still be viable at the west end of Connors Road where fewer barriers are present. We recommend installing a wildlife camera [redacted] to facilitate more precise monitoring [redacted] of the Connor's Road Study Area, where numerous crossings were observed during the baseline study.

5.0 CONCLUSIONS AND RECOMMENDATIONS

While Year One data collection suggests the continued presence of species within the underpass design wildlife group (medium terrestrial) in both study areas, wildlife use of the passage structure remains undetermined. A comparison of baseline and Year One post-construction data suggested that wildlife presence within the Connors Road Study Area, continues to be more frequent/abundant relative to the CMSA. Remote camera monitoring results suggest coyote activity may be higher post-construction relative to the baseline study; however, winter tracking data does not support that conclusion. The City of Edmonton has committed to continuing post-construction wildlife movement monitoring in Year Two. The Year Two program began 12 March 2025. Some data collection improvements can be made and we recommend the following changes for the Year Two program:

- [redacted]
- [redacted]
- [redacted]

6.0 REFERENCES

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Appendix A: Glossary of Terms

Camera Effort – Number of days one or multiple wildlife cameras are deployed.

Capture – Documentation of an animal's presence by a wildlife camera.

Crossing – Unidirectional tracks on both sides of a roadway or transect.

Crossing Attempt – Tracks that lead to a road edge and turn around.

Crossing Rate – Number of transect crossings documented per kilometre per DSS.

lDSS – Number of days that have passed between the most recent snowfall and the time that a winter tracking visit is conducted.

Event – One or multiple photographs taken by a wildlife camera documenting an instance of an animal's presence. Events are considered independent if the species photographed was different from the previous photograph captured by the camera, or if more than 10 minutes elapsed between consecutive photographs.

Event Capture Rate – Number of events captured by wildlife cameras per species per year of camera effort.

Appendix B: Connor's Road Wildlife Underpass [redacted] - preliminary analysis of select, early Year 2 data

We examined [redacted] data for the period 22 April 2025 through 24 June 2025, a total of 64 days of camera run time that covered most of the spring period. Over that period, [redacted] did not record any wildlife activity at the south end of the wildlife underpass, but humans were captured on the camera on 24 unique dates, or 37.5% of the total camera days. Camera data indicate that people were intermittently present at the south underpass entrance and were captured entering the underpass. Without a camera trained directly on the north end of the underpass, we were unable to determine if people were entering the wildlife underpass from the north to access the south end, or, if people spend significant time within the underpass itself. Debris (e.g., "campfire" remnants) observed in the underpass suggests that at least on occasion, people linger inside. Placement of a second camera at the north end of the passage would allow for a fuller understanding of wildlife and human use of the underpass and how the two relate.

Figure 1 illustrates the intermittent nature of human presence in proximity to the south end of the underpass during spring 2025, examined per day and by "human event". A human event was defined differently from an animal event (see Glossary, Appendix A), to address the propensity of humans to dwell longer in one specific location than other mammals. A "human event" was defined as one or multiple photographs taken by a wildlife camera documenting an instance of human presence. Events were considered independent if more than 10 minutes elapsed between consecutive photographs. In addition, for very long runs of multiple images, an event was capped at ten minutes in duration. The graph indicates variable degrees of human presence, ranging from no human presence (zero) to multiple events in one day. For example, on 16 May, five (5) separate human events were captured. During the nine-week period, multiple human events were recorded on 8 separate days, or 13% of total camera days.

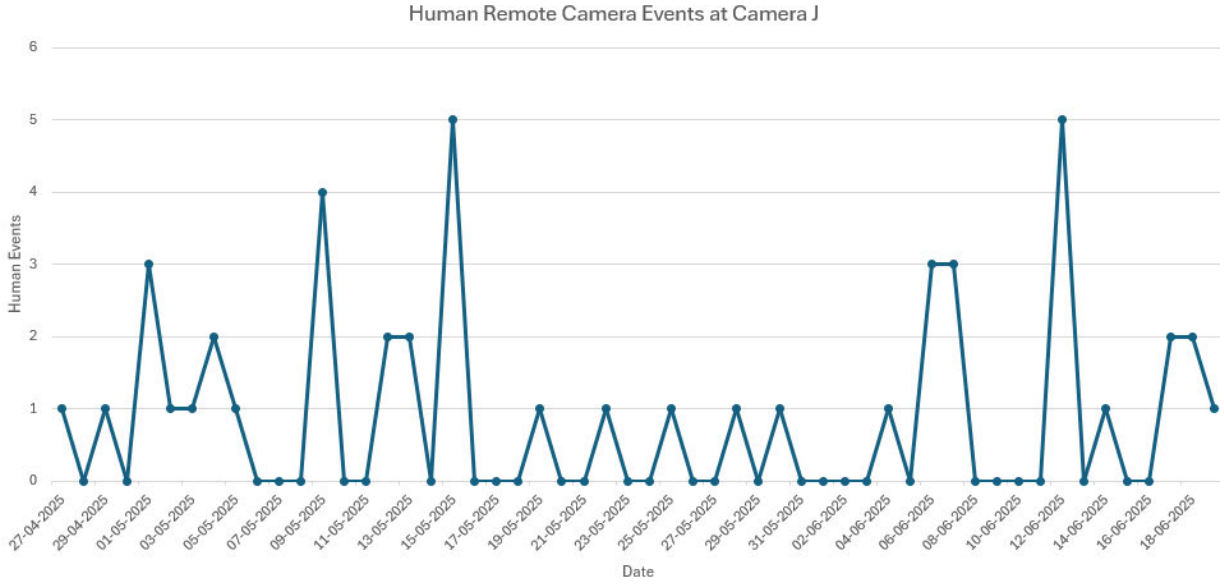

Figure 1. Human events per day, [redacted] 22 April 2025 through 24 June 2025

Figure 2 shows that during this period, human activity at the south end of the underpass appeared to be highest during the evening hours, i.e., between 16:00 and 22:00 hours. Evening human presence tended to comprise small groups of individuals congregating at the wildlife passage entrance. Year 1 wildlife movement data from across the two study areas indicated that for coyote (one of the underpass target species), the activity peak hour, as measured by camera captures, centered on 07:00. Further, in Year 1, higher coyote movement *activity periods* occurred from 21:00 to 10:00; the daytime period of 11:00 to 20:00 was determined to be a general period of lower wildlife activity, as measured by camera captures. The relatively high human activity period of 17:00 to 22:00 overlaps with the high coyote activity period.

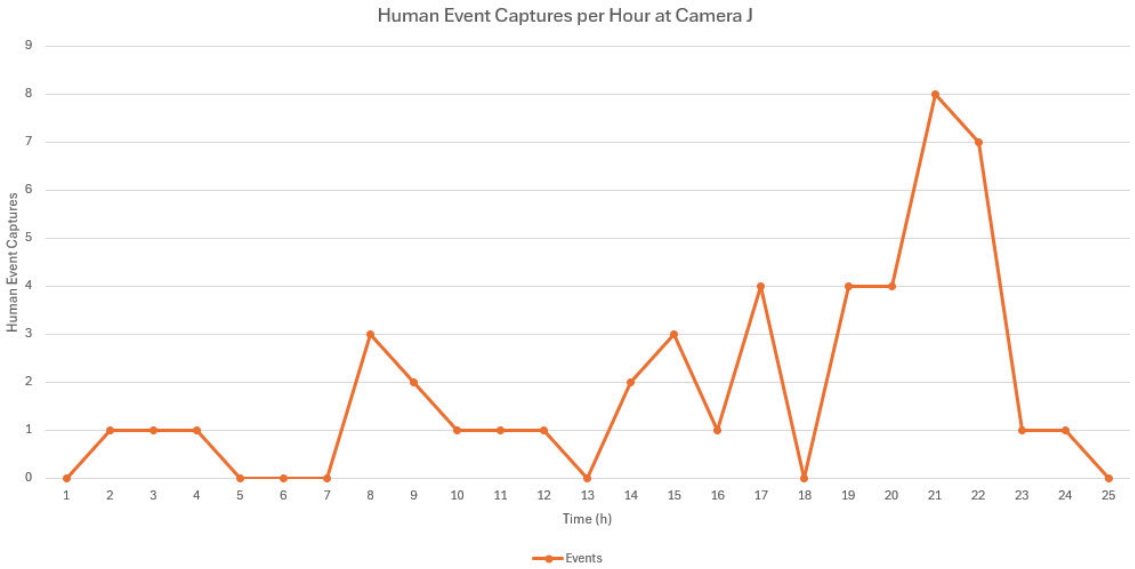

Figure 2. Human events per hour at [redacted] from 22 April 2025 through 24 June 2025

During Year One, across the two study areas, coyote camera capture events were much lower during the period June, July and August (2024) relative to other months, suggesting seasonal behavioural patterns. Therefore, is possible that factors other than human presence played a role in the lack of coyote captures at the south end of the underpass during late April through June 2025. This aspect can be more fully addressed when all of Year 2 data are available for analysis. It is also possible that for both wildlife and humans, activity near the underpass in other seasons will follow a different pattern.