Attachment 1

City Operations:
Edmonton Transit Service

ETS Fare Gates Pilot Project Plan

Edmonton Transit Service
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1. Introduction

This document presents a detailed plan for a two-year pilot project to test fare gate technology at two LRT stations. The primary goal is to evaluate the feasibility, costs, and benefits of fare gates to inform future decisions about potential wider deployment at additional stations. It is important to note LRT expansion has adopted an urban-style design, which is not conducive to the use of fare gates at Valley Line stops.

The pilot will gather comprehensive data on the impact of fare gates, including implementation costs, their effectiveness in enhancing perceptions of transit safety, and their role in improving fare compliance. The plan also details the process of implementing fare gates at two Edmonton Transit Service (ETS) LRT stations.

2. Site Selection

The two LRT stations chosen for the ETS Fare Gates pilot are Belvedere LRT Station and Churchill LRT Station. The stations were chosen based on 2023 ridership data, safety and security incidents, preliminary implementation costs, and the design and limitations of the facilities. These criteria were applied to ensure the pilot would yield valuable insights into the effectiveness of fare gates within the ETS transit system.

Installing fare gates requires careful consideration of various factors, including integration with Arc smart fare payment, accessibility, exit options during emergency egress, rider flow, ensuring continued pedway access to the station for nearby communities, and potential reductions in platform or concourse space.

3. Fare Gate System Selection

Administration will engage suppliers during the project to select and install fare gates at the two selected locations. Drawing on insights from other jurisdictions and community feedback, the following principles were established to guide the pilot planning process and inform future decisions regarding fare gate design and implementation:

Table 1: Fare Gate System Principles

Accessibility	• Fare gates must be designed for accessibility, accommodating riders with mobility challenges, large items, bikes, or strollers. • Wide gates, at least 36 inches, marked with accessibility symbols, should be included at each entry and exit, and located near elevators and ramps.[1] • Tactile paving, auditory signals, and manual override features should be incorporated to assist riders who have sight loss and those unable to use standard fare methods. • Fare gates should be staffed to provide support and allow manual access for non-Arc fare riders (e.g. transfers).
Technology Integration	• The selected fare gates will operate on the regional Arc fare payment system used by ETS and regional partners, ensuring that the "tap" to register your fare and open the fare gate works like an Arc validator. Each tap should be registered accurately and provide 90 minutes of travel, including transfers.
Security Features	• The fare gates system should include anti-tailgating technology with sensors and algorithms to prevent multiple people from passing through on a single validation. • Alarms should be integrated into the gates to alert attendants of any improper use or forced openings, enabling a swift response to security breaches. • CCTV video surveillance should monitor fare gate areas to deter fare evasion and enhance overall security. • Emergency egress mechanisms should be incorporated to allow quick exits during emergencies, including automatic opening during power failures or alarms.
Durability and Maintenance	• Fare gate systems must be durable and easy to maintain. They should include features like shock absorption to withstand manual force, ensuring

[1] ETS is collaborating with the Canadian National Institute for the Blind (CNIB) through its **Clearing the Path** program to receive guidance on accessibility improvements and best practices.

	longevity, and reliable operation. • The fare gates should be constructed from materials that can endure high traffic and use. • Fare gates should be designed for ease of maintenance, with easy access to components for servicing and quick replacement, minimizing downtime, and ensuring continuous operation.
Universal Design	• The fare gates system should be designed with universal usability in mind, ensuring accessibility and ease of use for all riders. • Clear signage and instructions including clear and identifiable signage about where to tap an Arc card or ticket. This ensures that users from diverse backgrounds can easily navigate the system. • Aesthetic integration should be considered in the design of fare gates, ensuring they align with existing branding and symbols used elsewhere on the ETS network including wayfinding and clear signage. These features ensure that fare gates are user-friendly and visually harmonious within the transit system.
Flexible and Scalable Systems	• The fare gate system selected should be designed to be modular and scalable so that, if further adoption is pursued, the individual fare gates can be swapped in and out of service, or the bank of fare gates can be expanded to accommodate additional traffic if the space allows it.

4. Stakeholder Engagement

The Fare Gates Pilot Project will include engaging various stakeholder groups. This section outlines the identification of stakeholders, the execution of rider research, and the incorporation of feedback into the project. At the outset, ETS will engage the following stakeholders to gather additional insights to inform the implementation plan:

- ETS riders at the two pilot stations
- Personnel in the LRT stations, including Transit Peace Officers, Community Outreach Transit Teams and others
- Accessibility groups representing people with disabilities
- Social agencies representing other user groups and vulnerable populations

The pilot's evaluation will utilize the existing ETS rider research program, collecting feedback through digital and in-person surveys. These surveys will capture insights on rider satisfaction, safety perceptions, ease of use, and suggestions for improvement. Baseline surveys conducted before and after fare gate installation will help assess changes in perceptions over time.

5. Staffing

A staffing model is necessary to support the operation of fare gates, ensuring they function smoothly and provide assistance to riders, particularly those who face accessibility challenges or use non-Arc payment methods (e.g., children, transfer payment riders, Canadian National Institute for the Blind members, EPS members). Staff presence also helps prevent damage to fare gates, protects infrastructure, and discourages improper entry by individuals attempting to bypass the gates. The required number of attendants will vary based on the number of access points.

This role will require comprehensive training and their responsibilities will include assisting transit users, operating fare gate equipment, troubleshooting minor issues, and understanding the fare system to support riders effectively. Additionally, staff must be capable of recognizing security threats, implementing emergency procedures, managing crowd control, and ensuring compliance with transit policies and accessibility standards. A more detailed job analysis will be completed during the implementation of the project to finalize the staffing plan.

6. Timeline and Milestones

The ETS Fare Gates Pilot project consists of several phases: additional project planning and design, stakeholder engagement, procurement, installation, operation and evaluation, rider engagement and research, and final evaluation and review. If approved, it is anticipated that the fare gates will take approximately 12 months to become operational, with the pilot expected to be completed by December 2027.

Appendix A: Evaluation Plan

The Evaluation Plan for the ETS Fare Gates Pilot project offers a comprehensive framework for assessing the project's effectiveness, viability, and impact. It includes a detailed cost analysis covering both capital and operating expenses, a benefits assessment to evaluate improvements in safety, security, and rider experience, and the use of Key Performance Indicators (KPIs) to measure the project's success against its objectives and current baseline.

By integrating these elements, the plan aims to provide a clear understanding of the fare gates' operational efficiency, their impact on the transit environment, and the overall return on investment. This will ensure that decision-makers are fully informed about the project's outcomes and its potential scalability within the ETS LRT network. The plan will also identify any unintended consequences of the pilot project and evaluate the implementation process to determine the effectiveness of the trial in achieving its intended results.

Cost Assessment for a Pilot

The objective of the cost assessment is to determine the financial investment required for the pilot, including procurement, installation, maintenance, staffing, and any necessary structural changes. The general methodology involves tracking and analyzing actual expenditures throughout the pilot period to capture a comprehensive picture of the financial cost. This will be integrated with other evaluation components to compare costs against benefits and KPI outcomes, assessing the financial viability and return on investment (ROI).

Benefits Assessment

The objective of the benefits assessment is to quantify, in financial terms, the positive outcomes of the pilot project, such as increased revenue from reduced fare evasion, increased ridership, and reduced costs associated with enhanced safety, including a reduction in vandalism. The general methodology involves using before-and-after comparisons, rider surveys, and operational data to measure improvements directly attributable to fare gate installation. This will be integrated with other evaluation components to assess the extent to which the benefits offset the costs and contribute to achieving the pilot's objectives.

Key Performance Indicators (KPIs)

The following Key Performance Indicators would be tracked in order to consider specific non-financial metrics to evaluate the pilot's effectiveness:

- LRT ridership
- Safety at LRT stations

- Perceptions of safety at pilot and non-pilot locations
- Rider capacity of gates
- Reduction in fare evasion
- Rider complaints
- Rider satisfaction

The general methodology involves collecting and analyzing data on each KPI before, during, and after the pilot to gauge performance and outcomes. This will be integrated with other evaluation components to refine risk management strategies and validate costs and benefits. Details on each KPI and the methodology to measure them is described in Table 4 below.

Table 4: List of KPIs for Fare Gates Pilot Project

Key Performance Indicators		
Item	**Description**	**Methodology**
Increased Safety at Pilot Stations	Understand the impact of fare gates on safety and security incidents at pilot stations and those at non-pilot stations.	Compare safety incident reports and rates before and after the pilot to assess impact on safety.
Increased Safety at Non-Pilot Stations	Understand the impact of fare gates at ungated stations during the pilot period.	Monitor and compare safety incidents at non-pilot stations to identify any displacement effects.
Rider Capacity	Understand the impact of fare gates on the speed and efficiency of rider movement through the fare gates.	Evaluate entry and exit times through fare gates during the pilot and compare with baseline data.
Shift in LRT Ridership	Identify shifts in ridership in stations with the pilot and without the pilot under the assumption that rider may shift to non-fare gate stations	Analyze ridership data (LRT boardings) before and after fare gate implementation to identify trends and shifts.
Rider Complaints	Understand the impact of fare gates on rider complaints related to disorder, cleaning, and other topics at stations.	Review and analyze complaint trends and number of complaints submitted to ETS before and during the pilot to gauge changes in station conditions and public perception.
Rider Satisfaction	Understand the impact of fare gates on rider satisfaction with safety and other	Conduct surveys using QR codes at stations before and after the pilot to measure

	satisfaction metrics Review pre- and post- rider satisfaction scores for satisfaction with safety and other satisfaction scores (e.g. ease of use).	changes in satisfaction. Compare with non-fare gate stations.
Reduction in Fare Evasion Rates	Understand the impact that fare gates have on reduction of fare evasion at each location and compared to ungated locations. Set specific targets for reduction in fare evasion and measure progress against these targets.	Use fare gate transaction data and random checks to quantify fare evasion at the stations before and after implementation. Compare with non-fare gate stations.

Risk Assessment and Management

The goal is to identify potential technological, operational, and reputational risks to the pilot's success and develop strategies to reduce them. This involves continuously identifying and assessing risks, implementing mitigation strategies, and establishing contingency plans as needed. The following risks have been identified and mitigation strategies and contingencies have been established:

- Technical failure
- Installation delays
- Rider resistance
- Security vulnerabilities
- Data privacy concerns

Appendix B: ETS Fare Gates Pilot Estimated Cost

The ETS Fare Gates pilot project will have both upfront capital and operating expenses as well decommissioning costs should the pilot not be continued following the two years.

Table 2: ETS Fare Gates Pilot Project Estimated Cost

Station	Gates	Total Capital Cost	Total Annual Operating Cost Year 1	Total Annual Operating Cost Year 2	End of Pilot Decommissioning Costs	Total Costs
Churchill	20	$2,158,200	$995,762	$995,762	$60,000	$4,209,724
Belvedere	10	$2,081,290	$515,381	$515,381	$30,000	$3,142,052
Total	**30**	**$4,239,490**	**$1,511,143**	**$1,511,143**	**$90,000**	**$7,351,777**

As fare gates are typically built to order, it is difficult at the time of writing to estimate the cost of the fare gates across the Capital and Metro Line systems. The preliminary capital estimates provided are based on a per fare gate unit cost which includes the cost to manufacture the fare gate as well as ensuring there is a sufficient power supply and technology linkages to support the functioning of the fare gate. Capital cost estimates also include changes to flooring and the installation of non-fare gate barriers to restrict unauthorized access into the fare paying zone, as well as additional work to further understand the egress requirements at the stations selected.

Operating costs include staffing for three fare gate attendants in place during operational hours as well as ongoing maintenance and rider research as a component of the evaluation plan. Operational costs also include contingency for fare gate replacements due to vandalism or other circumstances.

The limited scale of the pilot makes any attribution of additional ridership driven by an increase in the perceptions of safety difficult to assess given the number of variables that drive ridership including population growth, residential or commercial development around stations, and shifts in demographics, etc. Due to the limited nature of the pilot, it is also challenging to estimate the potential revenue that could be generated from a pilot through reduction in fare evasion. The impact of fare gates on ridership and revenue would be a key learning from the pilot as outlined in Appendix A.