The Corporation of the Town of Milton

Report To:	Council
From:	M. Paul Cripps, P.Eng., Commissioner, Engineering Services
Date:	June 24, 2019
Report No:	ENG-022-19
Subject:	Milton Transit Operations Centre Feasibility and Functional Design Study
Recommendation:	**THAT ENG-022-19 be received;** **AND THAT staff be directed to continue to identify site alternatives and move forward on next steps to pursue the opportunity for a transit facility;** **AND THAT staff report to Council in the future to recommend future direction.**

EXECUTIVE SUMMARY

The purpose of this report is to present the Milton Transit Operations Facility Feasibility and Functional Design Study (Appendix 1), outlying long-term program and functional space needs.

REPORT

Background

A fully functional, transit operations facility (also known as transit garage or depot) is the backbone to the efficient and effective delivery of transit service by way of providing a safe and secure environment to maintain/service public-facing transit assets in a state-of-good-repair. This infrastructure support is a multi-year initiative that necessitates long-term commitment, strategic coordination and investment.

Milton Transit provides conventional and specialized services to the public with a diverse fleet of 23 buses (18 conventional, 5 specialized) and three (3) supplementary/ supervisory vehicles. Currently, Milton Transit services are contracted to a third party service provider, Diversified Transportation Ltd. (PWTransit) who is responsible for fleet operations, storage, servicing and maintenance. All transit fleet is stored at a contractor-

leased industrial facility in Milton at 420 Morobel Drive, modified/retrofitted to accommodate service delivery functions. PWTransit has leased the facility at 420 Morobel Drive since initiating contracted service in 2010 (CORS-007-10). The Town owns all transit fleet assets, onboard equipment, revenue collection systems and one (1) mobile lift/hoist system.

Year-over-year Milton Transit ridership growth, service growth and transit vehicle acquisition have reached a critical threshold under the current service delivery arrangement with PWTransit at 420 Morobel Drive. Despite limitations with site layout and vehicle maneuverability, deficiencies have not yet significantly affected typical service delivery functions. However, current facility capacity constraints have introduced increasing complexity and manual operational workarounds that affect productivity, while limiting the potential for service growth (ENG-021-16, CORS-042-18). Forecasted service growth outlined in the 2019-2023 Milton Transit Service Review and Master Plan Update (ENG-021-19) is not achievable under the current facility arrangement, given space requirements for bus storage, maintenance, administration and employee parking.

There continues to be limited transit facility options readily available in the Milton marketplace without significant modification and/or investment. The absence of facility options (either Town-owned or other alternative) remains a barrier in soliciting competitive interest for contracted services delivery. CORS-042-18 recommended a contract extension with PWTransit while key studies were conducted to help identify and define transit service and infrastructure needs.

As part of the 2018 Budget, the Town retained Stirling-Rothesay and Stantec Consulting to complete a **Transit Operations Facility Feasibility and Functional Design Study** (herein referred to as “Transit Facility Study”) to assess infrastructure needs for storing, servicing, maintaining and operating transit fleet assets and house service delivery functions. The goal of this study is to define and articulate facility program requirements and subsequent budget. Program objectives include:

- Satisfy the storage and servicing needs of forecasted fleet, equipment
- Improve safety and labour/operational productivity
- Provide supportive administrative and employee amenities
- Sustain operating costs and improve service delivery

Study outcomes will provide staff and Council guidance on program infrastructure needs for delivering transit services in Milton.

Discussion

The Transit Facility Study (Appendix 1) analyses considers transit facility infrastructure needs relative to the following policy and service delivery directives:

- 2019-2023 Milton Transit Service Review and Master Plan Update (2019)
- Town of Milton Transportation Master Plan (2018)
- Town of Milton Asset Management Plan (2017)
- GTHA and Halton Region strategic initiatives (ongoing)

The purpose of this assessment is to develop a functional space program that defines long-term transit operations facility needs and estimated capital and operating budget impacts. The functional space program identifies both the internal and external space and adjacency requirements, to develop a conceptual layout design.

The Transit Facility Study incorporates industry best practices in functional space planning based on program space needs over a 20-year service horizon. While the final design layout is subject to change and is dependent on ultimate site selection, configuration and constraints, program space needs remain constant. The primary functional areas for a typical transit operations facility include:

- Administration and Supportive Amenities (supervisory, dispatching)
- Servicing Lane (fueling clearing washing)
- Indoor and Outdoor Storage (fleet parking)
- Maintenance Area (fleet maintenance and parts storage)
- Staff Parking

Site requirements incorporate industry standards and practices relative to the proposed scale and scope.

Findings and Outcomes

The 2019-2023 Milton Transit Service Review and Master Plan Update (ENG-021-19) anticipates up to 70 buses required (including spares), to deliver forecasted service growth over a 20-year planning horizon. To accommodate this capacity, including supportive functional areas, the Town will require a facility that is approximately 143,030 ft^2 (13,288 m^2) in size. The space allocation for each functional area was determined from industry best practices in facility and yard layout design, including fleet storage, maintenance, human resource capacities and employee amenities.

To manage capital cost impacts, the Transit Operations Facility may be developed in two (2) phases. A Class D cost estimation provides an order of magnitude cost, with a variance of +/- 20%. Cost estimates reflect current market conditions, and will require further review during the detailed design stage. The following items have been excluded from the cost analysis:

- Escalation/scope increases related to proposed phasing of the work
- Detailed facility design (typically 6-10% of estimated construction costs)
- Land acquisition and development fees
- Environmental/hazardous material consulting/removals
- Building commissioning/start up by third party agency/consultant

Alternative Design Considerations

As part of the 2019 Budget process, Council directed staff to review alternative building styles for the transit operations facility (Res. 004-19). Stirling-Rothesay have provided an ideal facility recommendation based on best practice design and program accommodation to reflect Milton Transit service needs. Program spaces are chosen, sized, and positioned accordingly to maximize the efficiency and effectiveness of transit operations.

Due to regulatory/code requirements, there are limitations to the types of materials and designs that can be used for a transit operations facility. For example, roof, walls and building structures need to reflect heating, ventilation and air conditioning (HVAC) considerations for air exchange requirements. Nonetheless, further alternative design considerations for building materials not affecting regulatory/code requirements will be assessed as part of the detailed design phase.

Regional Considerations

Recommendations and/or regionalization efforts specific to transit operations in the Greater Toronto and Hamilton Area (GTHA) have yet to be determined. While strategic coordination efforts are ongoing, investments toward regional infrastructure benefits remain absent. The Transit Facility Study defines Milton's transit facility infrastructure needs relative to strategic regional benefits for service growth, and demonstrates requirements to solicit external funding from various levels of government.

Next Steps

The Transit Facility Study is intended to provide practical guidance identifying, defining and articulating long-term Milton Transit facility infrastructure needs. Capital and

operating impacts have been estimated based on program space requirements relative to anticipated service growth. With this information, staff will continue to identify and address strategic options for securing transit facility infrastructure needs. Staff will report to Council in the future to recommend direction.

Financial Impact

High-level capital and operating costs have been estimated for a Transit Operations Facility as outlined in the Transit Operations Facility Feasibility and Functional Design Study. In order to manage cost, the study identifies the potential to build a new facility in two phases. Financial impacts are presented in Section 6.0 & Appendix C of the report and are summarized in the table below.

It is important to note that these estimates do not include a number of specific exclusions and therefore the amount that the Town may need to budget will likely exceed the amounts below (full list of exclusions is presented on page 33 and includes land cost, site fees, design, etc.). All costs will require updating with more fulsome inputs and assumptions through detailed design and site-specific considerations.

	Two-Phase Construction		One-Phase Construction
	Phase 1	Phase 2	
Size (sq. ft.)	99,175	36,989	136,164
Construction Cost (Note 1)	$26,516,864	$13,494,813	$36,331,274
Operating Budget Impact (Note 2)	$1,174,897	$417,592	$1,592,489

Note 1: Class D estimate (+/-20%) of facility and equipment cost in $2020 and excluding amounts related to land, design, fees and a number of other items listed fully on page 33 of report.

Note 2: Includes utilities, materials, repair and maintenance in $2018, along with annual contributions to fund the future capital rehabilitation and replacement needs.

The 2019 Budget and Forecast included a total of $40.6 million for a Transit Facility between the years 2019 and 2022. This amount included $10.5 million for land acquisition, along with funding for consulting services, project management and contingency. $20.8 million of the forecasted amount related to the construction contract. Funding sources projected included development charges, capital provision

and Town sources such as property taxes and reserves. These funding sources will also require further review through the detailed design stage. The Town will also look to identify opportunities to secure funding through third parties, such as through federal or provincial infrastructure programs.

Respectfully submitted,

M. Paul Cripps, P. Eng.
Commissioner, Engineering Services

For questions, please contact:	Tony D'Alessandro, Manager, Transit	905-878-7252 x2548

Attachments
Appendix 1: Milton Transit Operations Facility Feasibility and Functional Design Study

CAO Approval
Andrew M. Siltala
Acting Chief Administrative Officer

Stirling Rothesay CONSULTING, INC.

Milton Transit Operations Facility Feasibility and Functional Design Study

FINAL REPORT

Presented by: Stirling Rothesay Consulting Inc.

Date: June 10, 2019

Table of Contents

1.0 EXECUTIVE SUMMARY

A Transit Operations Facility is a multi-year initiative that requires long-term commitment, strategic coordination and funding. In Milton, continued year-over-year service growth and vehicle acquisition have reached a critical threshold where coordinating service efforts and service delivery options are increasingly impacted by the lack of a dedicated facility support. A fully functional, transit garage facility is a backbone component to the efficient and effective delivery of transit service by way of managing customer-facing assets in a state-of-good-repair.

The Town of Milton has retained Stirling Rothesay Consulting and Stantec to complete a **Transit Operations Facility Feasibility and Functional Design Study** to assess short-and-long-term needs for storing, servicing, maintaining and operating Town-owned transit fleet assets and associated service delivery functions. This study outlines facility needs for local transit service operation over a 20-year facility lifecycle.

Milton Transit provides conventional and specialized services to the public with a fleet of 23 buses and three (3) supplementary/supervisory vehicles. Currently, Milton Transit services are contracted to a Third-Party service provider who is responsible for fleet operation, storage, servicing and maintenance. All transit fleet is housed at a contractor-leased industrial facility in Milton that has been modified to accommodate transit vehicles and supportive servicing, maintenance and operational functions. Since this facility is not purpose-built for transit, it contains numerous operational deficiencies that affect the efficient handling and maintenance of buses. Some deficiencies are attributed to inadequate dedicated space for certain functions, such as:

- **Indoor Storage**: The facility is too small to store the fleet indoors. It is widely accepted, within the Transit Industry, that indoor storage increases the longevity and operating performance of vehicles and is, therefore, an important part of minimizing operating costs and satisfying service level requirements;
- **Dedicated Service Lane:** There is no dedicated service lane for onsite refueling, lubricant top-up, vacuum systems or automatic bus wash systems. Typically, these functions are performed overnight within a service lane, by general labourers who prepare buses for next day bus services. Failure to house these functions on-site decreases the efficiency of the bus maintenance program. It may also result in less than optimal vehicle care;
- **Degreasing Bay:** There is no designated degreasing bay to steam clean bus undercarriages prior to performing maintenance which may affect the ability of mechanic technicians to efficiently identify certain types of issues requiring maintenance;
- **Inspection Pit:** There is no inspection pit to allow the mechanics to conduct quick underside inspections, negatively affecting employee productivity;

- **Maintenance Bays:** As fleet growth continues, maintaining additional buses will require several more maintenance bays. However, current facility space is not available nor expandable to maintain several vehicles at the same time.

Environmental Context

Public transit remains a critical component for building a complete community. Milton is one of the fastest-growing communities in Halton Region and within the Greater Toronto and Hamilton Area (GTHA), with a 2016 Census population exceeding 110,000. Through Best Planning Estimates (Regional Municipality of Halton, 2011), Milton's population is expected to reach 164,750 in 2021, 195,735 in 2026 and 228,084 in 2031. While the importance of public transit has grown regionally, Milton continues to advocate for more regional coordination of services, as well as increased GO Transit services and associated infrastructure, including: Two-way, all-day GO Train service and additional GO Station commitments. Further transit regionalization efforts have yet to be determined. However, strategic investments into a transit operations facility should continue to recognize regional, long-term benefits.

Since 2009, Milton Transit ridership has increased at more than twice the rate of population growth. Planned population and employment growth will continue to drive demand for transit service within Milton, as well as connections to surrounding jurisdictions and the GTHA regional transit network. Changes in technology, environmental and legislative requirements will further increase the need for dedicated transit resources and supportive infrastructure.

The 2019-2023 Milton Transit Service Review and Master Plan Update (June 2019) defines current and future transit service needs. Recommendations include introducing new mobility applications, addressing service reliability, expanding / extending the local fixed route network, connecting to the regional transit network and establishing a management program to maintain transit assets. To accommodate forecasted growth on the conventional and specialized systems, fleet requirements will increase over the next twenty (20) years. It is forecasted that up to 70 buses (including spares) will be required to satisfy 2038 service needs.

Functional Space Requirements

To sustain an anticipated 70 vehicle capacity, including supportive functional areas, Milton Transit will require a facility that is approximately 143,030 ft^2 (13,288 m^2) in size. The space allocation for each functional area was determined from industry best practices in facility and yard layout design, including fleet storage, maintenance, human resource capacities and employee amenities, as summarized in Table 1.1 (details in Appendix A). Given these requirements, and the constraints of the current transit facility, it is recommended that a new dedicated facility be built that will (1) satisfy industry best practices in facility and yard layout design, and (2) meet the operational growth requirements over the next 20 plus years.

Table 1.1 Functional Area Space Requirements (2038 Full Build-Out)

Functional Area	Total Area Required in 2038 (ft^2)	Total Area Required in 2038 (m^2)
Administrative	6,286	584
Employee Amenities	4,006	372
Bus Maintenance Garage	48,551	4,511
Indoor Bus Service Lane	9,790	910
Indoor Bus Storage	61,047	5,671
Contingency (5%)	6,484	602
Total Facility	136,164	12,650

It is anticipated that the Transit Operations Facility may be constructed in two (2) phases to manage capital costs. This approach can be achieved by constructing the maintenance and indoor bus storage areas in two phases to meet the fleet growth demand. In the interim, buses can be stored outdoors provided they are supplied with electrical connection posts for pre-heating.

For Phase 1 (with a time horizon of 2028), the operational needs are shown in Table 1.2. Appendix A provides further detail on functional area space requirements.

Table 1.2 Functional Area Space Requirements (2028 Phase 1)

Functional Area	Total Area Required in 2028 (ft^2)	Total Area Required in 2028 (m^2)
Administrative	6,286	584
Employee Amenities	4,006	372
Bus Maintenance Garage	37,991	3,529
Indoor Bus Service Lane	9,790	910
Indoor Bus Storage	36,380	3,380
Contingency (5%)	4,723	439
Total Facility	99,175	9,214

Conceptual drawings were developed for a new Milton Transit Operations Facility that will satisfy operational needs and space programs, separated into two (2) phases: 2028 (Phase 1) and 2038 (Phase 2). Each of the conceptual drawings show the initial build-out to satisfy the 2028 Phase 1 Program as well as the expansion required to meet the 2038 Phase 2 Program (Appendix B).

Conceptual drawings have been prepared to depict an **Optimal Site Plan**, showing an ideal facility layout and site no limitations imposed by the size or configuration of the site.

Costing Estimates

Estimated costs are intended to provide a Class D order of magnitude assessment associated with the proposed work, as described by the functional space programs and conceptual design drawings (Appendix A and B).

A Class D estimate provides an 'order of magnitude' cost for the project with a variance of +/- 20%. Although every attempt has been made to reflect market conditions in this estimate the actual marketplace (and actual price of the project) will not be known until the tender procurement process. The following items have been excluded from the cost analysis:

- Escalation / scope increases related to proposed phasing of the work
- Detailed facility design (typically 6-10% of estimated construction costs)
- Land acquisition and development fees
- Environmental / hazardous material consulting / removals
- Building commissioning / start up by third party agency / consultant

The total estimated capital costs for the Transit Operations Facility are shown in Table 1.3.

Table 1.3 – Estimated Capital Costs

	Capital Cost for 2028 Phase 1 Program ($)	Incremental Capital Cost for 2038 Phase 2 Program ($)	Capital Cost for 2038 Program ($) (built in one phase)
Construction Equipment	26,516,864 713,164	13,494,813 76,276	36,331,274 789,440
Total	27,230,028	13,571,089	37,120,714

Construction costs have the following contingencies added:

- Escalation contingency of 2.5% per annum to 2020 to allow for inflation
- Estimation/design contingency of 20% to allow for Class D cost variance of +/- 20%
- Construction costs of 5% to allow for changes due to owner requested, unknown site conditions and coordination.

The annual utility/repair/janitorial/plowing/lawn maintenance costs (in 2018 $) for the 2028 and 2038 phases are estimated to be approximately **$601,902** and **$826,392**, respectively.

2.0 INTRODUCTION

A fully functional, transit garage facility is the backbone to the efficient and effective delivery of transit service by way of maintaining public-facing assets in a state-of-good-repair. This infrastructure support is a multi-year initiative that necessitates long-term commitment, strategic coordination and investment. In Milton, continued year-over-year ridership growth, service growth and transit vehicle acquisition have reached a critical threshold. Current facility deficiencies and site capacity constraints are limiting service growth and delivery functions. However, the capital investment necessary to address transit infrastructure needs remains significant. The goal of this study is to define and articulate Milton Transit facility program requirements and subsequent budget.

The Town of Milton has retained Stirling Rothesay Consulting and Stantec to complete a **Transit Operations Facility Feasibility and Functional Design Study** to assess short-and-long-term needs for storing, servicing, maintaining and operating Town-owned transit fleet assets and associated service delivery functions. This study outlines facility needs and budget implications for local transit service operation for a 20-year time horizon.

Milton Transit provides conventional and specialized services to the public with a diverse fleet of 23 buses (18 conventional, 5 specialized) and three (3) supplementary/ supervisory vehicles. Currently, Milton Transit services are contracted to a third-party service provider who is responsible for fleet operation, storage, servicing and maintenance. All transit fleet is stored at a contractor-leased industrial facility in Milton, modified to accommodate transit vehicle storage, servicing, maintenance, operational and customer service/administrative functions.

Public transit remains a critical component for building a complete community. Milton is one of the fastest-growing communities in Halton Region and within the Greater Toronto and Hamilton Area (GTHA), with a 2016 Census population exceeding 110,000. Best Planning Estimates (Regional Municipality of Halton, 2011) forecasts that Milton's population will reach 164,750 in 2021, 195,735 in 2026 and 228,084 in 2031. While the importance of public transit has grown locally, Milton continues to advocate for more regional coordination of services, as well as increased GO Transit services and associated infrastructure, including: Two-way, all-day GO Train service, GO Bus service and additional GO Station infrastructure commitments. While further transit regionalization efforts have yet to be determined and/or realized, any strategic investment into a transit operations facility should recognize regional, long-term benefits and the ability to support service coordination while protecting local interests.

Since 2009, Milton Transit ridership has increased at more than twice the rate of population growth. Planned population and employment growth will continue to drive demand for transit service within Milton, as well as connections to surrounding jurisdictions and the GTHA regional transit network. Changes in technological,

environmental and legislative requirements will further increase the need for dedicated transit resources and supportive infrastructure.

The Milton Transit Operations Facility Feasibility and Functional Design Study will analyse and consider the following policy and service delivery directives:

- 2019-2023 Milton Transit Service Review and Master Plan Update (in development)
- Town of Milton Transportation Master Plan (2018)
- Town of Milton Asset Management Plan (2017)
- GTHA and Halton Region strategic initiatives (ongoing)

The purpose of this assessment is to (1) help justify commitment for a new Transit Operations Facility from a variety of sources, and (2) develop a Functional Space Program that will define Milton Transit short and long-term facility needs for storing, servicing, maintaining and operating conventional and specialized transit fleet, and associated service delivery functions.

The Functional Space Program will identify both the internal and external space and adjacency requirements, and will lead to the conceptual layout design of an optimal Transit Operations Facility. The transit operations facility will incorporate industry best practices in functional space design to meet the following goals:

1. Satisfy the storage and servicing needs of forecasted fleet, equipment
2. Improve safety and labour/operational productivity
3. Provide supportive administrative and employee amenities
4. Sustain operating costs and improve service delivery

The optimal facility and site layout provides a conceptual configuration of the functional space program based on program space needs. While the final design layout is subject to change and is dependent on actual site configurations and constraints, program space needs remain constant.

3.0 NEEDS ASSESSMENT

This section describes the current and future state of transit assets and facility infrastructure. While Milton Transit provides an efficient and effective service for customers, defining back-end infrastructure and program supports will help to satisfy ongoing service delivery requirements. The needs assessment will be referenced in subsequent sections to identify future space requirements and develop conceptual facility layout drawings.

3.1 CURRENT STATE

The Town of Milton currently owns a fleet of buses and supplementary vehicles for delivering Milton Transit services. Additionally, Milton owns a number of equipment assets including, farebox system hardware (and revenue collection components), automatic vehicle location (AVL) system hardware and a mobile column lift system. Under a third-party service delivery agreement, Diversified Transportation Ltd (PWTransit) leases all Town-owned vehicles. PWTransit stores, serves, maintains transit fleet and associated equipment within a leased, repurposed, industrial building on Morobel Drive. Operator scheduling and bus dispatching occur from this location on a regular basis. At this time, there are no anticipated changes to the contracted service delivery approach. The current service delivery contract with is valid to June 30, 2020.

3.1.1 Resources – Employees and Vehicle Assets

Contracted Employees

All staff at the current bus storage and maintenance facility on Morobel Drive are employees of PWTransit. Table 3.1 summarizes the current number of contracted staff.

Table 3.1 Current Number of Contracted Employees

Functional Area	Contracted Employees		Total
	Full Time	Temporary	
Administration Services Bus Operators Maintenance	5 33 5	0 0 0	5 33 5
Total in Peak Season	43	0	43

Vehicles Assets

Milton has procured fully accessible transit fleet since 2008. Table 3.2 summarizes the total number of buses currently assigned to the bus storage and maintenance facility.

Table 3.2 Current Number of Active Vehicles (Indoor/Outdoor)

Vehicle Description	Quantity	Type of Storage
Conventional (12 metre) Specialized (9 metre) Supervisory Maintenance	18 5 2 1	Outdoor Outdoor Outdoor Outdoor
Total Active Vehicles	26	

All vehicles are diesel-powered and fully accessible. As referenced in the Town of Milton Asset Management Plan (2017), almost 70 percent of transit assets have been rated Very Good or Good (based on replacement values). The 2015 replacement value of Milton Transit buses is $7,734,000[1].

3.1.2 Facility

Milton Transit operates service out of a repurposed, industrial building located at 420 Morobel Dive. PWTransit leases the facility from a property owner. Upon site review, the current facility is not representative of typical design best practices based on functionality and size, relative to the scale of Milton transit operations and associated fleet compliment. To this point, PWTransit have managed facility and site constraints without significant impact to operations. Figure 3.1 displays the current site and facility boundaries on Morobel Drive.

The current transit operations facility on Morobel Drive includes the following functional programs:

Administration Office, Revenue Collection

The administrative office is a single storey area consisting of a small reception area, individual offices, closet/storage space, lunchroom and washrooms.

[1] 2015 Replacement value as indicated in the Town of Milton Asset Management Plan (2017).

Milton Transit currently operates the GFI Farebox system, which requires a secure room for data storage and revenue collection/processing. It is anticipated that Milton Transit will evolve the fare collection system to provide mobile fare payment options that may affect the scale of revenue collection process (e.g. higher use of mobile payment options compared to cash fares).

Bus Storage Area

The bus storage area is located outdoors within the yard, adjacent to the facility.

Maintenance Garage

The maintenance garage provides adequate accommodation for two (2) maintenance bays, a manual wash station, as well as a small parts storage area. There is also a small mezzanine area (for miscellaneous storage). All major rebuilds/body work or painting are subcontracted and performed off-site.

Re-Fueling (off-site)

There is no re-fueling facility at the site. All fueling is completed offsite at a third-party fueling station by transit operators.

Figure 3.1 Milton Transit Facility Site Plan on Morobel Drive, outline of site boundary

3.1.3 Facility Limitations and Deficiencies

The design, size, and condition of the facility building, with an irregular yard layout, directly affect the productivity of the employees currently working at the facility on Morobel Drive. In general, the existing facility is a very low-cost, repurposed industrial space that is not representative of a typical transit facility design.

The facility building is in fair condition but contains numerous deficiencies, which negatively affect the handling, servicing and maintenance of Milton Transit fleet and associated equipment. While assets remain in good operating condition, a number of manual workarounds are required to address facility limitations. Some deficiencies are directly attributed to inadequate dedicated space for key functions, such as:

- **Indoor Storage**: The facility is too small to store the fleet indoors. It is widely accepted in the Canadian transit industry that indoor storage increases the longevity and operating performance of vehicle assets and is, therefore, an important part of minimizing operating costs and satisfying service level requirements;

Figure 3.2 Current Parking at Milton Transit Facility on Morobel Drive

- **Dedicated Service Lane:** There is no dedicated service lane for onsite refueling, lubricant top-up, vacuum systems or automatic bus wash systems. Typically, these functions are performed overnight within a service lane, by general labourers who prepare buses for next day service. Failure to house these functions on-site decreases the efficiency of the bus maintenance program. It may also result in less than optimal vehicle care;

- **Degreasing Bay:** There is no designated degreasing bay to steam clean bus undercarriages prior to performing maintenance which may affect the ability of mechanic technicians to efficiently identify certain types of issues requiring maintenance;
- **Inspection Pit:** There is no inspection pit to allow the mechanics to conduct quick undercarriage inspections, negatively affecting employee productivity;
- **Maintenance Bays:** As fleet growth continues, maintaining additional buses will require several more maintenance bays for proactive and running repairs. However, current facility space is not available nor expandable to maintain several vehicles at the same time. This limitation makes it a challenge to schedule preventative maintenance programs.

The facility on Morobel Drive is too small to satisfy current requirements, yet alone future expansion requirements for indoor storage and maintenance of transit assets. Given these site constraints, as well as limited options for site expansion, it is recommended that Milton begin pursuing options for a new Transit Operations Facility, conforming to industry best practice standards for layout design, while satisfying future growth and operational functions.

3.2 FUTURE STATE

This section estimates the future state of resources and facility space requirements for delivering Milton Transit services over the next 20 years (to 2038), to satisfy forecasted service delivery needs.

3.2.1 Growth

Milton remains one of the fastest-growing communities in Halton Region and within the GTHA, with a 2016 Census population exceeding 110,000. Best Planning Estimates (Regional Municipality of Halton, 2011) forecasts that Milton population will reach 164,750 in 2021, 195,735 in 2026 and 228,084 in 2031. While the demand for public transit services has grown locally, Milton continues to advocate for more regional coordination of services, as well as increased GO Transit services and associated infrastructure, including: the acceleration of two-way, all-day GO Train service and additional GO Station commitments.

A number of key factors affect transit operations facility space allocations (employees and buses) required to support Milton Transit service growth: Population and Employment, Ridership Trends, Supporting the GTHA Regional Transit Network, Regional Developments-Governance, Financial Sustainability, Accountability and Value,

Changing Technology; Alternative Vehicle Technology, Short and Long Range Transit Planning.

Population and Employment

The population for Milton is expected to double by 2031. This growth will have direct impact on trip demand throughout Milton, with increased pressure for more public transit services to relieve peak traffic congestion. New developments and higher urban densities will likely result in further impacts on local and regional travel demand, including:

- Derry Green Business Park development
- Milton Transit Station Area (MTSA) development
- Trafalgar / Agerton Secondary Plan
- Boyne Survey development
- Milton Education Village (MEV)

These planned developments will increase the need for timely transit service implementation.

Ridership Trends

Since 2009, Milton Transit ridership has increased year-over-year, reaching 599,129 boardings in 2018 (Figure 3.2). Due to more service options, improvements and expansion over the last several years, ridership on Milton Transit has increased at more than twice the rate of population growth (Figure 3.3). Demand for service has been driven by youth and GO Transit markets. The specialized transit program has also experienced ridership growth mainly attributed to legislated requirements under the Integrated Accessibility Standards Regulation (IASR-191/11), Accessibility for Ontarians with Disabilities Act (AODA). Planned population and employment growth will continue to influence demand for transit service within Milton, as well as connections to surrounding jurisdictions and the GTHA regional transit network.

Supporting the GTHA Regional Transit Network

The 2041 Metrolinx Regional Transportation Plan (RTP) emphasises collaboration between various levels of government to build an integrated transportation system in the GTHA to support a high quality of life, a prosperous and competitive economy, and a protected environment (RTP, 2018). The intent is to align the GTHA transportation system to the Growth Plan for the Greater Golden Horseshoe (2017), setting the policy framework for managing growth in the region.

Milton is located the western edge of the GTHA, with regional services provided by GO Transit along the Milton Rail corridor (to Union Station in downtown Toronto). According to the 2016/2017 GO Transit Monthly Ridership Report; the Milton Line is the third most heavily used corridor on the GO Rail system, representing approximately 13 percent of

total system-wide boardings. Milton Transit customers represent approximately 12.8 percent of all GO Rail users at the Milton GO Station.

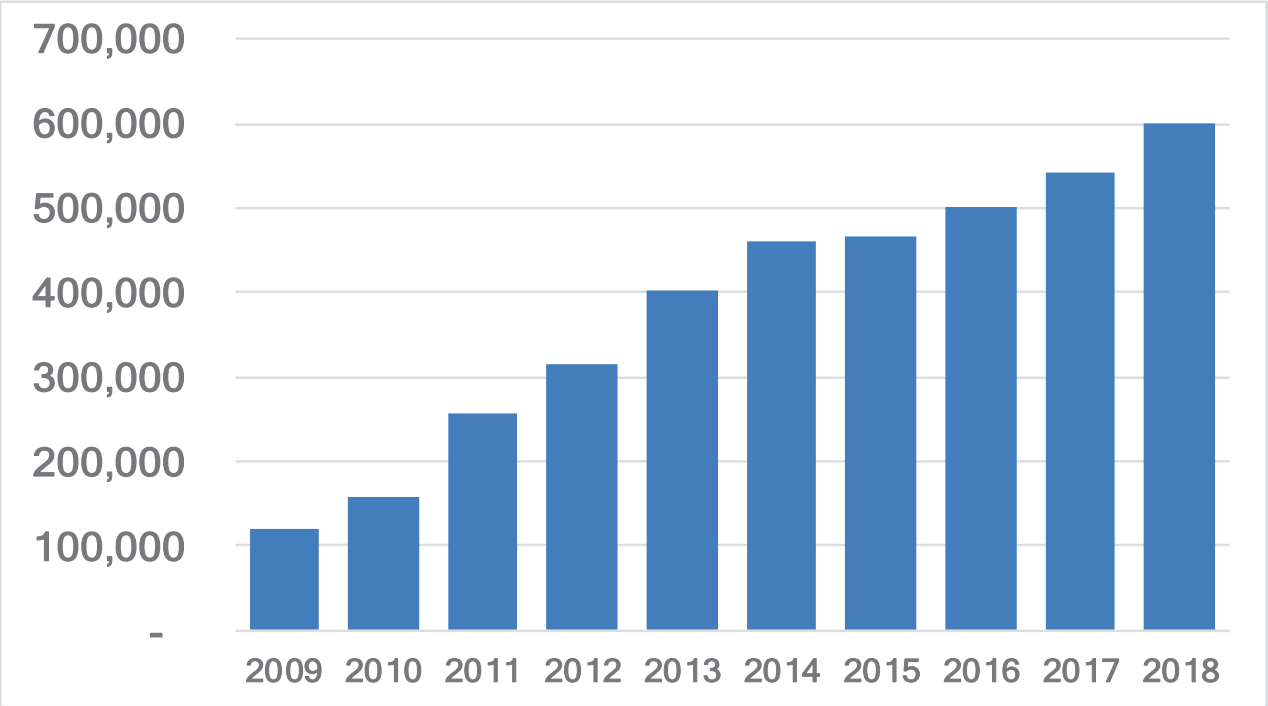


Figure 3.2 Milton Transit Ridership (annual boardings), 2009-2018

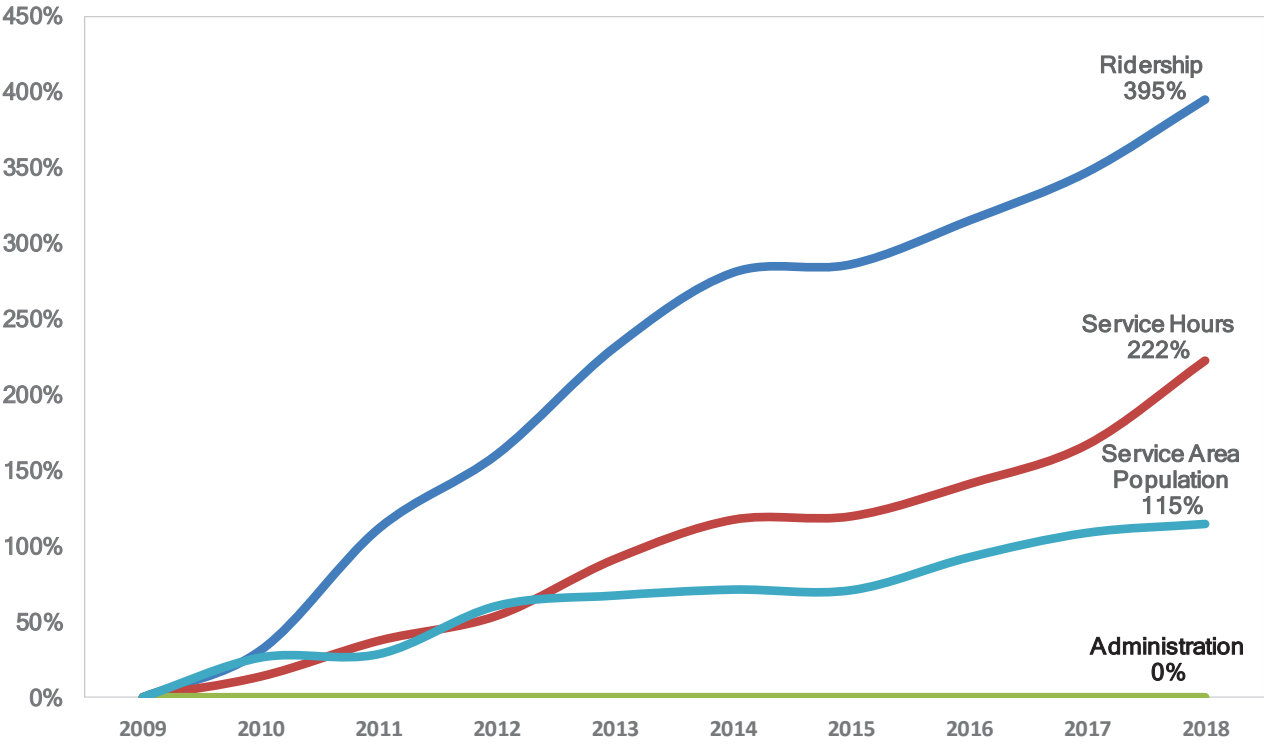


Figure 3.3 Milton Transit Ridership, Service Hours and Population, 2009-2018

One aspect of the RTP focuses on continued growth of the GO Rail system (Regional Express Rail, RER), including the development of the Frequent Rapid Transit Network (FRTN) for improved rail service to/from Milton. Additionally, the RTP looks to implement a Frequent Regional Express Bus Service that would improve regional bus connections throughout Halton. These planned developments will increase the need for local Milton Transit connectivity to the regional transit network.

Regional Developments, Governance

In 2019, the Ontario Government introduced a review of eight (8) regional governments, including Halton Region, to ensure they are working efficiently and effectively. The purpose of the review is to explore:

- Opportunities for residents and businesses to easily access municipal services;
- Processes to deliver efficient, effective services, respecting taxpayers' money;
- Methods to make municipalities open for business; and,
- Possibilities to cut red tape and duplication, and save costs.

Recommendations and/or regionalization efforts specific to transit operations have yet to be determined. Nonetheless, any strategic investment should be needs based and continue to recognize long-term benefits to protect local interests, while supporting future regional coordination efforts.

Financial Sustainability, Accountability and Value

Milton, like all municipalities, is under increasing pressure to sustain operational costs and deliver greater value. Continuous improvement programs are underway to eliminate waste and develop improved methods for delivering services at reduced cost to the taxpayer. This means that improved technology, increased training, more monitoring of employees, and overall increased transparency of operations will demonstrate to the public that they are receiving good value for money.

Changing Technology; Alternative Vehicle Technology

The Town has adopted many technology changes and methods that will continue to streamline service operations. These changes save money, time, and the environment. Community expectations are also changing. Residents are expecting greater communication, involvement and transparency in the planning and spending of tax dollars. This expectation means that operations will require procedures and monitoring to demonstrate effective use of public funds.

Some transit systems are planning to adopt alternative fuel vehicles to reduce energy consumption, pollution and greenhouse gas emissions. Battery electric buses are being evaluated by many transit operators, and likely will be the industry standard in the future. They are energy efficient, produce no local emissions, can use renewable electricity,

outperform diesel vehicles in acceleration and hill climbing, and currently claim lower maintenance effort and costs.

However, battery-electric buses are presently expensive, at approximately three times the price of diesel vehicles. They will require considerable infrastructure supports at the transit operations facility, such as overnight chargers, wiring and substations, notwithstanding electrical requirements for power charging.

Short and Long Range Transit Planning

The 2019-2023 Milton Transit Service Review and Master Plan Update (June 2019) defines current and future transit service needs. Recommendations include introducing new mobility applications, addressing service reliability, expanding/extending the local fixed route network, connecting to the regional transit network and establishing a management program to maintain transit assets.

To accommodate forecasted growth on the conventional and specialized systems, the fleet compliment will need to increase proportionally over the next twenty (20) years. To satisfy 2038 service program needs, up to 70 buses (including spares) will be required.

3.2.2 Service Delivery Structure

As discussed in section 3.1, the Town of Milton currently contracts out the operation of Milton Transit to a Third-Party Operator Diversified Transportation Ltd (PWTransit). PWTransit leases the buses from the Town and provides the operators, mechanics, staff and administration/maintenance/storage facility. Two (2) Town administrative staff oversee the service delivery contract. It is assumed that the contracted service delivery model will continue in the future. The current contract term with PWTransit extends to June 30, 2020.

3.2.3 Resources – Vehicles and Employees

Identifying the resources required relative to forecasted service growth guides the process of program space development. To accommodate forecasted growth outlined in the 2019-2023 Milton Transit Service Review and Master Plan Update (June 2019), there will be a need to plan for increased staffing and vehicle supports. This section estimates employee and vehicle needs relative to the scale of service anticipated supported by a new Transit Operations Facility.

- There are a number of factors associated with identifying vehicle and staffing compliments over a 20-year program, including:
- Forecasted service growth, vehicle requirements
- Estimates on operator requirements based on current service delivery model

- Industry ratios for staffing supports relative to vehicle servicing/maintenance functions (e.g. 1:7 mechanics/buses)
- Best practice allowances for administrative staffing supports; space/design

Vehicles

To accommodate anticipated service growth, the 2019-2023 Milton Transit Service Review and Master Plan Update (June 2019) estimates the incremental year-over-year increase of bus fleet. Table 3.4 provides a summary of the total number of buses and support vehicles forecasted by 2038. At this time, there are no plans to introduce articulated buses.

Table 3.4 – Forecasted Vehicles and Type of Storage (Indoor/Outdoor)

Vehicle Description	Quantity	Type of Storage
Conventional (12 metre) Specialized (9 metre)	60 10	Indoor Indoor
Total Active Vehicles	70	
Supplementary/Maintenance Fleet	5	Outdoor

Employees

Table 3.3 summarizes the anticipated number of staffing required to support forecasted service growth to 2038. This number includes both Town administrative staff (management/administrative functions) as well as contracted service provider staff.

Functional Area	Contracted Employees		Total
	Full Time	Temporary	
Administration Services Bus Operators Maintenance	22 120 12	0 0 0	22 120 12
Total in Peak Season	154	0	154

3.2.4 Functional Needs

This section details the primary functional areas for a typical transit operations facility, defining high-level spatial needs, site circulation considerations, access considerations, administration areas and storage/maintenance areas. Site requirements incorporate industry standards and practices relative to the proposed scale and scope.

General Site Requirements

The general site configuration is important for the safe and efficient circulation/movement of personal and commercial vehicles (e.g. transit fleet, employee vehicles, third party deliveries, etc.) as well as pedestrian activity. Site considerations should include any phased expansion opportunities to accommodate future fleet growth.

Common practice allocates an approximately 50-year lifecycle for a transit operations facility. General design recommendations include the following elements:

- Security fencing framing the site
- External lighting, security cameras and motion alarms
- Pavement markings, directional signage/wayfinding
- On-site and facility building electronic pass-access system(s)
- Indigenous, drought resistant shrubs and tree plantings
- Storm water retention
- Other building code, by-law, safety and/or legislated requirements

Yard Configuration

The yard should have separated access points for buses (ingress and egress). For safety purposes, yard movements should separate the flow of buses, pedestrians and employee vehicles. One-way traffic circulation with counter-clockwise turns improves operator visibility and vehicle maneuvering. Parts and equipment deliveries occur through a loading dock, strategically positioned to permit easy access for commercial vehicles (e.g. left turns for increased operator visibility).

Because of vehicle weight considerations, reinforcing surfaces with concrete prevents tearing on all bus-travelled areas. Passive landscaping of any non-developed parcel areas will permit storm water percolation.

Onsite refuelling station(s) are situated out of the main flow of traffic, and are designed to accommodate multi-vehicle line-ups, mitigating yard circulation and access issues.

Secured and illuminated employee parking should be located directly adjacent to the employee entrance. To optimize operational efficiency, it is important to minimize wait times and barrier-free, travel distances for employees throughout the facility.

Administrative Office and Amenities

Administrative, management, supervisory and dispatch functions are located in the administrative office area. Contracted management staff occupy private space within an open concept office design to facilitate collaboration amongst employees, reducing space requirements. A boardroom and smaller meeting rooms provide spaces for meetings and/or operator training. The dispatch area should be located adjacent to the lunchroom and/or locker room for efficient communication with operators. An electronic access card system secures the administrative area, including facility entry and exit points.

Various employee amenity spaces include:

- Lunchroom with kitchen
- Wellness/health space
- Storage/locker room(s)
- Restrooms
- Other ancillary amenities (if required)

The design of the facility should be barrier-free and comply with Provincial accessibility requirements.

Indoor Service Lane(s)

Upon completion of the service day, buses require preparation for next day service. This process includes servicing units to ensure that they are safe to operate. Typically, the indoor bus service lane accommodates daily services, including the following functions:

- Refuelling
- Fluid level checks, top-ups
- Tire pressure and belt condition checks
- Interior cleaning, vacuuming
- Exterior washing
- Other activities, including farebox data and revenue collection

The current and forecasted bus fleet composition is diesel-powered. However, alternative propulsion systems are entering the marketplace, including electric-based battery systems. While Milton has yet to confirm direction toward a new propulsion system, a transition from diesel-power to electric-power is anticipated at some point over the life of the facility. Therefore, the service lane design will need to be adapted/converted to accommodate diesel-powered vehicles in the short-to-medium term and electric-powered vehicles in the long term.

Typically, two (2) services lanes are required for fleets between 100-200 buses, each with full-service functions:

- Refueling station (with locking nozzle for fast fueling, spill avoidance)
- Lubricants/fluids refill station (including diesel exhaust fluid)
- Vacuum system
- Automatic exterior wash bay (including under carriage wash).

While the Milton Transit Operations Facility will accommodate up to 70 buses, there should be consideration for designing two (2) service lanes, but initially equipping one service lane. This proactive measure would have the following advantages:

- Minimize costs for dedicated service lane space for expansion
- Contingency/flexibility for service lane breakdowns
- Interim space used for vehicle storage and/or inspections

Each service lane should be approximately 25 feet wide to accommodate the flow of individual buses and to provide room for the refueling station.

One (1) diesel storage tank is located outdoors adjacent to the facility. It is common practice to store fuel tanks above ground to mitigate soil contamination. An additional outdoor gasoline fueling station may be considered for refueling supervisory/fleet vehicles, as well as other Town vehicles.

A heated floor in the wash bay area avoids ice formation during winter months. Equipment and/or items in the wash bay should be comprised of stainless steel and/or plastic materials where possible, and avoid the use of metal to prevent corrosion. To reduce water consumption, approximately 70% of the grey water from the bus wash bay could be recycled. This process would require a separate room for water softening, heating, filtering and vacuuming.

Bus servicing occurs at the end of each day by two (2) staff who work on an afternoon/night shift. The following provides a decryption of a typical service lane process:

- Service Person 1 operates and repositions bus from storage to service lane
- Farebox data is uploaded and cashbox is removed/deposited into a secured safe
- Bus operator logs are checked for mechanical issues
- Bus proceeds to refuelling station, and to have fluid levels, belts and tire pressures checked
- Hub meter reading is recorded; bus interior swept clean

- Service Person 2 operates the bus through the automatic wash bay and back into the appropriate bus storage lane
- Buses with identified problems repositioned in the maintenance staging area for prioritization and repair
- During this time, Service Person 1 will retrieve the next bus
- On a scheduled basis (typically monthly), buses will also be cleaned using a vacuum system

Indoor Bus Storage Area

Due to the significant capital investment of fleet and associated electronic onboard equipment, heated indoor storage is required to increase life span and minimize maintenance and operational issues. Table 3.5 summarizes further benefits of indoor vehicle storage. The design of the bus storage area should allow for fleet expansion, with transitional/phased storage space provided outdoors. Full Transit Operations Facility build-out should accommodate indoor storage of all fleet.

The internal bus storage area is maintained in the winter months to an optimal temperature of 10°C, ensuring that buses are prepared for next day service. The installation of insulated rapid motion doors will prevent the need for air curtains over the external doors (to maintain the internal ambient temperature). The external doors into the Bus Storage Area should be 14 feet high x 20 feet wide. All facility walls and ceiling surfaces should be white to enhance light reflectivity. The paint should be an industrial epoxy brand to withstand cleaning by high-pressure water.

Table 3.5 Benefits of Indoor Bus Storage

Benefits	Description
Improved Service Delivery	Diesel-powered buses are sensitive to cold temperature and, therefore, may experience starting problems if parked outdoors during the winter. Engines can suffer from jelling; hydraulic oil may have difficulty flowing; and fuel/air lines can freeze. Storing buses indoors will enhance performance, thereby, eliminating potential service delays associated with cold engines and frozen equipment. Cold weather can also affect electric-powered buses and/or components, influencing battery capacity/life.
Improved Asset Management	Indoor bus storage will reduce unscheduled maintenance costs and vehicle downtime, protect buses from environmental conditions that could increase maintenance costs and reduce vehicle life span, and protect the buses from potential vandalism or theft.

Improved Safety	Outdoor bus storage during inclement weather may expose staff to increased risks when preparing buses for service (e.g. snow clearing, slipping and falling, etc.).
Impact on Adjacent Neighbourhood	Outdoor bus storage increases noise outputs and exhaust emissions from the site. Buses stored outside will require extended periods of idling during the winter months, thereby, increasing inconvenience imposed onto neighbours.
Impact on Environment	Storing buses outdoors will negatively impact the environment because of oil, grease, and engine fluid entering the groundwater or storm water system. By comparison, any leaks that occur within a vehicle storage garage is captured/controlled in a closed floor drain system, thereby, preventing the fluids from reaching the environment.
Cost Savings	The additional costs associated with storing buses outdoors include: • Loss of labour due to delays in bus starts and preparing them for service; • Increased unscheduled maintenance costs; • Increased vehicle downtime and productivity loss; • Reduced vehicle life expectancy and accelerated bus replacement costs.

To meet full build-out needs, there should be indoor storage lanes for 70 buses: 60 conventional buses (12 metre) and 10 specialized buses (8 metre). The bus lanes should be 13 feet wide to permit walking space between the parked buses (which are approximately 9.5 feet wide plus the mirrors). Common practice defines a maximum lane depth of six (6) to eight (8) conventional buses. It is recommended that the bus storage area for the Milton Transit Operations Facility be designed to the following specifications:

- Six (6) lanes of conventional buses, six (6) deep; and
- One (1) lane of specialized buses, ten (10) deep

The bus storage area should be free of columns, where practicable, to avoid potential vehicle-barrier conflicts. Additionally, provision for the proper drainage of ice and snow from the floor area will be a critical safety design feature.

Similar to design adaptability considerations for the service lane area, the bus storage area should protect for the future conversion to electric-powered bus systems. This design would include protections for bus recharging/regenerating equipment and other supportive infrastructure. Additionally, one of the maintenance bays will need to provide an elevated walkway system for safe and efficient access on top of buses where electric batteries are located.

Bus Maintenance Area

The bus maintenance area is required to conduct both scheduled and unplanned maintenance services. It is acknowledged that paint and bodywork services will continue to be outsourced.

The initial size and configuration of the maintenance area support a one (1)-shift operation, with flexibility to accommodate a two (2)-shift operation in the future. Accommodating a two (2)-shift maintenance support would offer numerous operational advantages, including:

- Full fleet maintenance coverage throughout a daily operating period
- Spare vehicle reduction, as some maintenance could be completed during non-peak times (e.g. afternoon shift when some buses are offline)
- More effective use of maintenance facilities, deploying mechanical technicians throughout the day and increasing outputs

The entrance and exit doors for the maintenance area should be approximately 20 feet x 14 feet, with enough vertical clearance height for vehicle lifts and various hose reels. For a Transit Operations Facility to accommodate up to 70 buses, industry standards allocate a requirement for ten (10) lift/hoist bays, one (1) inspection pit bay, and one (1) degreasing bay, designed as follows:

- Ten (10) bays sized for conventional buses, with accommodation for specialized buses and buses (18 feet x 75 feet).
- One (1) degreasing bay (25 feet x 75 feet). Failure to accommodate a degreasing bay would require extensive bus washing in the auto wash system located in the service lane. However, this process would prevent grey water collection and recycling.
- One (1) inspection bay/pit (22 feet x 85 feet) for quick bus inspections.
- All maintenance bays should be equipped with suspended retractable hose reels for grease, engine oil, transmission oil, engine coolant, compressed air for small guns, compressed air for tire guns, 110 Volt power, return waste oil, and water. There should also be a fall arrest system for each bay.
- Supplementary mobile lifts to provide additional bus maintenance flexibility. Under an existing contract arrangement, the Town currently owns one (1) set of mobile lifts that can be transferred to the new Transit Operations Facility.
- Additional mechanics work bench and storage cabinet.

Other functional spaces within the bus maintenance area include:

- Open floor space for miscellaneous equipment storage (e.g. stands, jacks, floor sweeper, propane forklift, waste bins, etc.).

- Parts storage space equipped with shelving and with footprint of at least 3,300 ft^2, including office space for a stores keeper function, a truck door (with dock leveller) and a man/access door.
- Amenity space including lunchroom, changing rooms, washrooms and showers for servicing and maintenance staff.
- Administrative space for maintenance supervisory staff.
- Tool crib room; janitor room; oil pump room for five (5) outdoor storage tanks.
- A large waste steel dumpster located outside the parts storage area.
- Specialty rooms for oil storage, solvent storage, battery storage and painting, to ensure that no toxic fumes enter into the maintenance garage workspace.

The bus maintenance area should be heated in the winter months with a radiant floor heating system. Large, 20-foot diameter ceiling fans assist with air circulation/movement. A high efficiency exhaust system with variable speed fans should be provided at each maintenance bay. The installation of insulated rapid motion doors will prevent the need for air curtains over exterior doors (to maintain the internal room temperature).

Outdoor Bus Storage Area

A designated area onsite could accommodate additional bus spillover storage. Outdoor storage shall consist of electrical receptacles/connections to permit overnight, block heating. Any outdoor parking stall should be 15 feet wide and 50 feet long (to store conventional bus lengths). Additional vehicle canopies can help mitigate winter impacts (e.g. snow/ice accumulation).

Outdoor Staff Parking Area

All employees arriving by personal vehicle are accommodate onsite via an outdoor staff parking area. The parking area is typically located adjacent to the staff entrance.

Sufficient parking should be available for all employees (at peak overlap between shifts) including accessible and visitor parking. The employee parking stalls should be located as close as possible to the separate employee entrance while ensuring that the employees are not crossing dedicated bus areas.

Sustainability

The level of environmental sustainability built into the design of new transit facilities varies depending on the level of importance agencies place on achieving and promoting Leadership in Energy and Environmental Design (LEED) designation. Achieving LEED designation typically adds 15-20% to the capital cost of the facility with comparatively small annual savings in energy costs.

However, there are design features that are cost effective and, therefore, recommended to minimize electrical and water consumption, and provide a better working environment for staff including:

- LED lighting systems, where possible, should utilize:
  - Motion detection to turn the lights on/off, and/or
  - Sensors to reduce electrical light when daylight helps to illuminate the space.
- Roof decking, structural steel and walls of the bus storage area painted white to reflect light.
- Where possible, skylights and windows are incorporated into the design of the maintenance and bus storage areas to reduce the need for light fixtures and to provide a comfortable working environment.
- Approximately 70% of the grey water from the bus wash bay could be recycled and heated using solar panels on the facility roof.
- Indoor bus storage area is heated in the winter months with a radiant floor heating system to a temperature of approximately 10°C to ensure that buses are ready for service in the morning. Insulated rapid motion doors prevent the need for air curtains over external doors (to maintain the internal room temperature). Doors with glass panels are desirable during the day to reduce lighting costs.
- High-performance building envelop should be used at floors, walls and roof to minimize heating and cooling costs.
- Building should be orientated so that windows for daylighting are on the north and south facades. This approach utilizes shading devices to deflect unwanted solar heat gain in the summer and permit desirable solar heat gain in winter.
- Generally, building materials used should be selected based on the following criteria:
  - Location of manufacture; closer is better.
  - Proportion of recycled content; the more recycled content, the better.
  - Avoidance of hazardous materials (in the manufacturing process or final product).
- Building mechanical systems should consider:
  - Use a highly efficient mechanical plant, i.e., geothermal systems with radiant floor heating and cooling delivery
  - Displacement ventilation, heat recovery systems and carbon dioxide monitoring controls for the delivery and exhaust of fresh air to the building.

The Transit Operations Facility development should inspire and enlighten occupants and users. It should celebrate the climate, culture, spirit and place appropriate to the projects function and create places that promote and provide healthy and desirable work environments. The project should also acknowledge the existing context and create places that fit humanely into the surrounding neighbourhoods. External light pollution is controlled via down-lit fixtures. Full-cut off, ground covers and positioning of the fixtures on site would stop light from over spilling to other adjacent sites.

Transportation Demand Management elements are to be incorporated into the facility. Buildings should be equipped with lockable storage for bicycles and preferred parking spaces for car-pooling and energy efficient vehicles.

4.0 FUNCTIONAL SPACE PROGRAM

This section documents the future space requirements for each of the functional areas within the new Transit Operations Facility. The program considers growth requirements, and operational needs for a time horizon of 20 years (to 2038). The program will include functional areas such as:

- Administration and dispatch;
- Fleet fueling, cleaning and washing;
- Fleet maintenance and parts storage (including receiving/shipping);
- Indoor and outdoor fleet parking;
- Employee lunch room, locker rooms, and washrooms;
- Training facilities; and
- Staff parking.

To sustain an anticipated 70 vehicle capacity, including supportive functional areas, Milton Transit will require a facility that is approximately 143,030 ft^2 (13,288 m^2) in size. The space allocation for each functional area was determined from industry best practices in facility and yard layout design, including fleet storage, maintenance, human resource capacities and employee amenities, as summarized in Table 4.1 (details in Appendix A). Please note that these space requirements meet the 2038 full build-out.

Table 4.1 - Functional Area Space Requirements (2038 Full Build-Out)

Functional Area	Total Area Required in 2038 (ft^2)	Total Area Required in 2038 (m^2)
Administrative	6,286	584
Employee Amenities	4,006	372
Bus Maintenance Garage	48,551	4,511
Indoor Bus Service Lane	9,790	910
Indoor Bus Storage	61,047	5,671
Contingency (5%)	6,484	602
Total Facility	136,164	12,650

Methods to minimize space requirements to reduce travel distances and construction costs while, achieving space adjacency preferences, have been considered and included in the recommended functional areas.

Space Adjacency Preferences

Space adjacency preferences are important to minimize travel distances by vehicles and staff within the building. Excessive travel distances add to operational costs. Of significant importance is the relationship between the employee amenities for bus operators/mechanics with the bus storage and maintenance areas. Where possible, the walking distances for bus operators/mechanics should be minimized.

Project Phasing

It is anticipated that the Transit Operations Facility may be constructed in two (2) phases to manage capital cost impacts. This approach can be achieved by constructing the maintenance and indoor bus storage areas in two phases to meet the fleet growth demand. In the interim, buses can be stored outdoors temporarily provided they are supplied with electrical connection posts for pre-heating.

For Phase 1 (with a time horizon of 2028), the operational needs are shown in Table 1.2. Appendix A provides further detail on functional area space requirements.

Table 4.2 Functional Area Space Requirements (2028 Phase 1)

Functional Area	Total Area Required in 2028 (ft^2)	Total Area Required in 2028 (m^2)
Administrative	6,286	584
Employee Amenities	4,006	372
Bus Maintenance Garage	37,991	3,529
Indoor Bus Service Lane	9,790	910
Indoor Bus Storage	36,380	3,380
Contingency (5%)	4,723	439
Total Facility	99,175	9,214

5.0 PREFERRED SITE CRITERIA

The proposed Transit Operations Facility should be located in Milton to meet the Town's transit operational needs. However, consideration should be given to finding a location that will also satisfy strategic regional requirements and a possible shared transit facility.

To determine the preferred site location for a new facility key criteria are selected to analyse potential sites. Criteria include:

Land Use Regulations

The preferred site should be in an industrial park setting with compatible surrounding properties that are not significantly affected by facility noise, traffic or air-born emissions.

Total Acreage Available

It was determined that the site should have a minimum of **11 acres** on which to build the new facility.

Shape and Topography of the Land

The site should be relatively flat and rectangular with an aspect ratio of 2:1.

Site Ease of Access

The site should permit at least two exits/entrances without interference from traffic flows/congestion (e.g. from cars waiting at an intersection or traffic lights).

Impact of the Location on Vehicle Deadheading

Ideally, the site would be located a short distance east of the geographical centre of the Town to minimise bus deadheading (i.e. the distance travelled by the buses, each day, from the bus garage to the start or finish of their bus routes. This travel distance is unproductive.

Environmental Considerations

Ideally, the site should avoid adjacency to environmentally sensitive areas such as a watercourse or wet lands.

Potential Cost of Providing Services (power, water, sanitary, storm)

Ideally, the site would be located within a developed area with access to services (power, water, sanitary, storm).

Cost and Ease to Purchase the Land

The Town would prefer not to expropriate land.

Greenfield versus Brownfield Location

Would prefer a Greenfield site in order to avoid the risk of site remediation.

Potential Impact on the Current Service Delivery Model

Drivers and maintenance will continue to be outsourced.

Land Use Regulations

The preferred site would be located within an industrial park with compatible surrounding properties that are not affected by facility noise, traffic or air-born emissions.

The Ideal Site Plan shows how we would lay out the facility and site if there were no limitations imposed by the size or configuration of the site (Appendix B). Design would need to be configurable for unique land characteristics.

6.0 CONSTRUCTION, EQUIPMENT AND ANNUAL UTILITY AND REPAIR COST ESTIMATES

6.1 CONSTRUCTION COSTS

Table 6.1 provides a summary of the total estimated construction costs for a typical Transit Operations Facility that satisfies functional space requirements. A further detailed breakdown is available in Appendix C.

Table 6.1 – Estimated Construction Costs

	Capital Cost for 2028 Phase 1 Program ($)	Incremental Capital Cost for 2038 Phase 2 Program ($)	Capital Cost for 2038 Program ($) (built in one phase)
Construction	26,516,864	13,494,813	36,331,274

The construction costs have the following contingencies added:

- Escalation contingency of 2.5% per annum to 2020 to allow for inflation;
- Estimation/design contingency of 20% to allow for Class D cost variance of +/- 20%;
- Construction costs of 5% to allow for changes due to owner requested, unknown site conditions, and coordination.

The costs are intended to provide a Class D order of magnitude assessment of the construction costs associated with the proposed work as described by the conceptual design drawings attached to this report (Appendix B). Estimated costs are based on the actual costs for the site development and construction of the new Niagara Falls Transit Facility (2012) with an annual escalation of 2.5% from 2012. The costs for the Niagara Falls Transit Facility are consistent with typical GTHA construction rates and, therefore, provide a good benchmark for the Town of Milton.

A Class D estimate provides an 'order of magnitude' cost for the project with a variance of +/- 20%. Although every attempt has been made to reflect market conditions in this estimate the actual marketplace (and actual price of the project) will not be known until the results of tenders have been received.

The following costs have been specifically excluded from this cost analysis. These exclusions should be read in conjunction with the cost estimates above:

- Land acquisition / development fees

- Escalation beyond summer 2020
- Escalation/scope increases related to proposed phasing of the work
- Detailed facility design (typically 6-10% of estimated construction costs)
- Minor variances
- Site plan agreement, legal fees
- Environmental/hazardous material consulting/removals
- Building commissioning/start up by third party commissioning agency/consultant
- Relocation and reconnection of existing equipment
- Temporary office facilities and/or moving costs
- Advertising + promotion

6.2 EQUIPMENT COSTS

The total equipment cost for the Bus Storage and Maintenance Facility (to satisfy the 2028 Program) was estimated to be $713,164. The total equipment cost to satisfy the larger 2038 Program was estimated to be $789,440. Appendix D provides a more detailed breakdown of these costs.

The construction costs have an escalation contingency of 2.5% per annum to 2020. A Class D order of magnitude assessment of the equipment costs is associated with the program and conceptual drawings.

6.3 ANNUAL FACILITY UTILITY, REPAIR AND MAINTENANCE COSTS

The average 2017 and 2018 budget Utility and Repair costs for a 78,000 ft^2 facility in Ontario are shown in Table 6.2, on the following page. We have scaled these costs up to reflect what they might be for the proposed Milton Transit Operations Facility (in 2018 dollars) if built to the 2028 and 2038 Space Programs.

Table 6.2 – Estimated Annual Utility, Repair and Replacement Costs

	2017 / 2018 Average for 78,000 ft² Facility in Ontario ($)	2028 Milton Transit Facility at 99,175 ft² ($)	2038 Milton Transit Facility at 136,164 ft² ($)
Utilities **Materials** **Repair/Maintenance** **Janitorial/Plowing/Lawn**	260,000 14,200 152,000 N/A	330,583 18,055 193,264 60,000	453,880 24,789 265,345 82,378
Total	426,200	601,902	826,392
Replacement			
Facility (50 year)	--	537,337	726,625 (full build)
Equipment (20 year)	--	35,658	39,472

APPENDIX A – Space Programs (2028 & 2038)

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Employees 2028	Required Area in 2028 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
1.0 Administration Office									
Public Reception/Staff Entrance Area	OO	0		0	120	1.3	156	14	Disignated Fire Fighter Entrance
Milton Transit Operations Manager	PO	0		1	120	1.3	156	14	
Milton Transit Administration Assistant	OO	1		1	65	1.3	85	8	
Milton Transit Coordinator	OO	0		1	65	1.3	85	8	
Milton Transit Facility Supervisor	PO	1		1	120	1.3	156	14	
Fare Box Storage/Cash Coin Clerk	PO	0		1	450	1.3	585	54	Secure room for counting fares
									connects to fueling service lane
Contractor Operations Manager	PO	1		1	120	1.3	156	14	
Contractor Operations Supervisor	PO	1		1	120	1.3	156	14	
Contractor Driver Trainer	OO	0		1	65	1.3	85	8	
Contractor Human Resources	PO	0		1	120	1.3	156	14	
Contractor Payroll/Accounting	OO	0		2	130	1.3	169	16	
Contractor Dispatch	OO	3		6	468	1.3	608	57	Dispatch Office beside Lunch Rm
Contractor Inspector	OO	0		4	312	1.3	406	38	Inspector Office beside Dispatch
Contractor Coordinator/Exec. Asistant	OO	1		1	65	1.3	85	8	
TOTAL					**2,340**		**3,042**	**283**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2028	Required Area in 2028 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
1.0 Administration Office									
Hotel Offices	PO	0		1	120	1.3	156	14	
Hotel Offices	OO	0		1	65	1.3	85	8	
Board Room	PO	0		1	480	1.3	624	58	For 24 people
Meeting Rooms (2)	PO	0		1	150	1.3	195	18	need one for 8 people
Driver Training Room	PO	0		1	320	1.3	416	39	beside Board Rm with accordian
Office File Storage Room	PO	0		1	120	1.3	156	14	For general office storage
Printer/fax Room	PO	0		1	120	1.3	156	14	Photocopier, 2 printers & table
Coffee Room	PO	0		1	100	1.3	130	12	Sink, dishwasher, refridgerator
Office Washrooms (2)	PO	0		2	350	1.3	455	42	accessible
Coat Closet	PO	0		1	50	1.3	65	6	
Janitors Room	PO	0		1	80	1.3	104	10	
Communications Room	PO	0		1	150	1.3	195	18	
Electrical Room	PO	0		1	120	1.3	156	14	
Sprinkler Room	PO	0		1	270	1.3	351	33	
TOTAL					**2,495**		**3,244**	**301**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2028	Required Area in 2028 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
2.0 Maintenance Garage									
Inground Hoist Bays (4)	OO	0		0	5100	1.1	5610	521	4 bays for 40 ft. buses
Mobile Hoist Bays (2)	OO	0		0	2550	1.1	2805	261	2 bays for 40 ft. buses
Inspection Pit Bays (1)	OO	0		0	1,540	1.1	1694	157	1 bay for 40 ft. buses
Degreasing Bay (1)	OO	0		0	1750	1.1	1925	179	1 bay with scissor lift & steam
Open Bus Aisle for Access to Bays	OO	0		0	14500	1.1	15950	1,482	
Contractor Fleet Maint. Supervisor	PO	1		1	120	1.3	156	14	
Maintenance Work Order Office	OO	0		1	150	1.3	195	18	
Contractor Parts Inventory Coordinator	OO	0		1	65	1.3	85	8	Parts Order office, desk/counter
Parts Storage	PO	0		1	3000	1.1	3300	307	
Tire Storage	PO	0		1	400	1.1	440	41	1 truck dock & 1 man door
Receiving Docks (1)	PO	0		1	400	1.1	440	41	1 truck dock & 1 man door
Tool Crib	PO	0		1	300	1.1	330	31	fenced area with store
Office Washrooms (1)	PO	0		1	70	1.3	91	8	gender neutral & accessible
Large General Storage (Transit)	PO	0		1	600	1.1	660	61	
Mechanics Lunch Room	PO	0		0	350	1.2	420	39	Sized for 15 mechanics
Male washroom/locker room/showers	PO	0		0	631	1.2	757	70	for 12 double lockers
Female Washrm/locker rm/showers	PO	0		0	412	1.2	494	46	for 8 double lockers
Janitors Room	PO	0		0	80	1.3	104	10	
Electrical Room	PO	0		0	1,050	1.3	1365	127	
Mechanical Room	PO	0		0	-	1.3	0	-	Already counted in sprinkler rm
Oil Pump Room	PO	0		0	300	1.3	390	36	For 5 outdoor tanks & drums
Compressor Room	PO	0		0	600	1.3	780	72	
TOTAL					**33,968**		**37,991**	**3,529**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2028	Required Area in 2028 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
3.0 Employee Amenities									
For Drivers:									
Driver Co-ed Locker Room	PO	0		1	840	1.1	924	86	for 140 half lockers
Male washroom/locker room/showers	PO	0		1	480	1.2	576	54	for 80 males
Female Washrm/locker rm/showers	PO	0		1	480	1.2	576	54	for 40 females
Lunch room	PO	0		1	1,400	1.1	1,540	143	Sized for 70 drivers/stsff
Wellness Room	PO	0		1	120	1.3	156	14	
Uniform Room	PO	0		1	120	1.3	156	14	Uniforms for drivers
Separate Driver/Mechanic Entrance	OO	0		1	60	1.3	78	7	adjacent to employee amenities
									Barrier free access
TOTAL					**3,500**		**4,006**	**372**	
4.0 Heated Bus Garage									
Urban buses (35)					30,360	1.1	33,396	3,103	6 deep in 6 lanes plus walking
Cutaway buses (10)									Store outdoors
Fleet vehicles (5 cars)									Store outdoors
Turning bay					2,713	1.1	2,984	277	
TOTAL					**33,073**		**36,380**	**3,380**	

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2028	Required Area in 2028 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	5.0 Bus Service Lane									
	Bus Refueling/Fluid Top-up & Cleaning				0	5,400	1.1	5,940	552	2 Fueling/Fluid Top-Up Bays
	Bus Washing				0	2,700	1.1	2,970	276	2 Wash Bay
	Vacuum Room				1	300	1.1	330	31	
	Water Tanks/Recycling Room				1	500	1.1	550	51	collecting wash & roof water
	TOTAL					**8,900**		**9,790**	**910**	
	6.0 Outdoor Yard Storage									
	Fuel (above ground)					1500	1.1	1,650	153	gas, & diesel
	Oil/Fluid Tank Farm					2000	1.1	2,200	204	5 x 3,000 L outdoor tanks
	Brake test lane					2,250				
	Future Outdoor bus storage (40 ft.)					19,500				30 x 40 ft. buses
	Future Outdoor bus storage (Cutaway)					4,550				10 Cutaway buses
	Fleet Vehicle parking					1,620	1.1	1,782	166	Space for 6 work vehicles
	Employee parking					35,117	1.1	38,629	3,589	Space for 125 employee cars
	Note: Have not included roads/landscaping/setbacks/storm pond									
	TOTAL					**66,537**		**44,261**	**4,112**	
	TOTAL Indoor Space					84,276		94,452	8,775	
	Contingency (5%)					4,214		4,723	439	
	Grand TOTAL Indoor Space					**88,489**		**99,175**	**9,214**	
	Total Outdoor Space					66,537		44,261	4,112	
	Contingency (10%)					6,654		4,426	411	
	Grand TOTAL Outdoor Space					**73,191**		**48,687**	**4,523**	

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Employees 2038	Required Area in 2038 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	1.0 Administration Office									
	Public Reception/Staff Entrance Area	OO	0		0	120	1.3	156	14	Disignated Fire Fighter Entrance
	Milton Transit Operations Manager	PO	0		1	120	1.3	156	14	
	Milton Transit Administration Assistant	OO	1		1	65	1.3	85	8	
	Milton Transit Coordinator	OO	0		1	65	1.3	85	8	
	Milton Transit Facility Supervisor	PO	1		1	120	1.3	156	14	
	Fare Box Storage/Cash Coin Clerk	PO	0		1	450	1.3	585	54	Secure room for counting fares
										connects to fueling service lane
	Contractor Operations Manager	PO	1		1	120	1.3	156	14	
	Contractor Operations Supervisor	PO	1		1	120	1.3	156	14	
	Contractor Driver Trainer	OO	0		1	65	1.3	85	8	
	Contractor Human Resources	PO	0		1	120	1.3	156	14	
	Contractor Payroll/Accounting	OO	0		2	130	1.3	169	16	
	Contractor Dispatch	OO	3		6	468	1.3	608	57	Dispatch Office beside Lunch Rm
	Contractor Inspector	OO	0		4	312	1.3	406	38	Inspector Office beside Dispatch
	Contractor Coordinator/Exec. Asistant	OO	1		1	65	1.3	85	8	
	TOTAL					**2,340**		**3,042**	**283**	

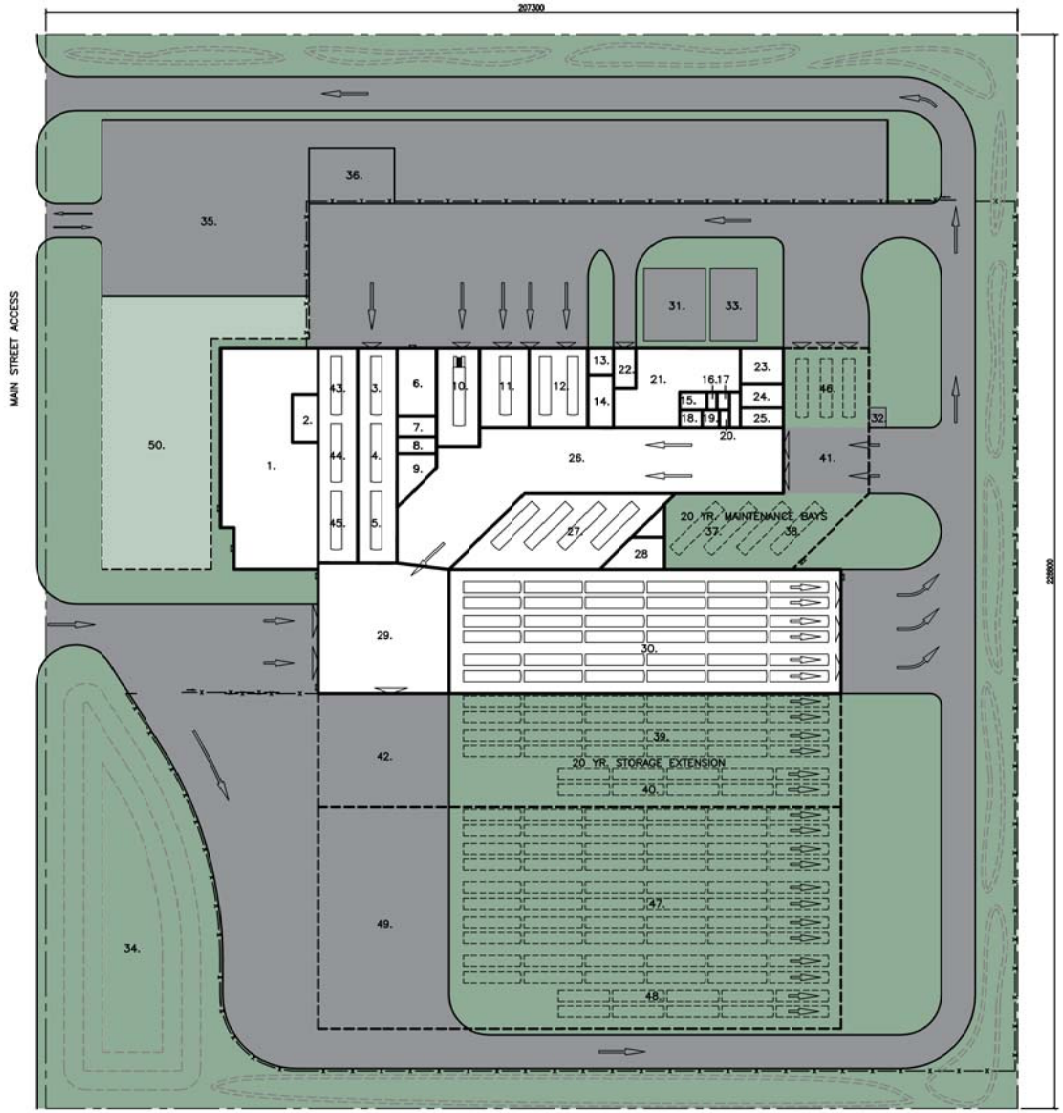
Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2038	Required Area in 2038 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
1.0 Administration Office									
Hotel Offices	PO	0		1	120	1.3	156	14	
Hotel Offices	OO	0		1	65	1.3	85	8	
Board Room	PO	0		1	480	1.3	624	58	For 24 people
Meeting Rooms (2)	PO	0		1	150	1.3	195	18	need one for 8 people
Driver Training Room	PO	0		1	320	1.3	416	39	beside Board Rm with accordian
Office File Storage Room	PO	0		1	120	1.3	156	14	For general office storage
Printer/fax Room	PO	0		1	120	1.3	156	14	Photocopier, 2 printers & table
Coffee Room	PO	0		1	100	1.3	130	12	Sink, dishwasher, refridgerator
Office Washrooms (2)	PO	0		2	350	1.3	455	42	accessible
Coat Closet	PO	0		1	50	1.3	65	6	
Janitors Room	PO	0		1	80	1.3	104	10	
Communications Room	PO	0		1	150	1.3	195	18	
Electrical Room	PO	0		1	120	1.3	156	14	
Sprinkler Room	PO	0		1	270	1.3	351	33	
TOTAL					**2,495**		**3,244**	**301**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2038	Required Area in 2038 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
2.0 Maintenance Garage									
Inground Hoist Bays (7)	OO	0		0	8925	1.1	9818	912	7 bays for 40 ft. buses
Mobile Hoist Bays (3)	OO	0		0	3825	1.1	4208	391	3 bays for 40 ft. buses
Inspection Pit Bays (1)	OO	0		0	1,540	1.1	1694	157	1 bay for 40 ft. buses
Degreasing Bay (1)	OO	0		0	1750	1.1	1925	179	1 bay with scissor lift & steam
Open Bus Aisle for Access to Bays	OO	0		0	19000	1.1	20900	1,942	
Contractor Fleet Maint. Supervisor	PO	1		1	120	1.3	156	14	
Maintenance Work Order Office	OO	0		1	150	1.3	195	18	
Contractor Parts Inventory Coordinator	OO	0		1	65	1.3	85	8	Parts Order office, desk/counter
Parts Storage	PO	0		1	3000	1.1	3300	307	
Tire Storage	PO	0		1	400	1.1	440	41	1 truck dock & 1 man door
Receiving Docks (1)	PO	0		1	400	1.1	440	41	1 truck dock & 1 man door
Tool Crib	PO	0		1	300	1.1	330	31	fenced area with store
Office Washrooms (1)	PO	0		1	70	1.3	91	8	gender neutral & accessible
Large General Storage (Transit)	PO	0		1	600	1.1	660	61	
Mechanics Lunch Room	PO	0		0	350	1.2	420	39	Sized for 15 mechanics
Male washroom/locker room/showers	PO	0		0	631	1.2	757	70	for 12 double lockers
Female Washrm/locker rm/showers	PO	0		0	412	1.2	494	46	for 8 double lockers
Janitors Room	PO	0		0	80	1.3	104	10	
Electrical Room	PO	0		0	1,050	1.3	1365	127	
Mechanical Room	PO	0		0	-	1.3	0	-	Already counted in sprinkler rm
Oil Pump Room	PO	0		0	300	1.3	390	36	For 5 outdoor tanks & drums
Compressor Room	PO	0		0	600	1.3	780	72	
TOTAL					**43,568**		**48,551**	**4,511**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2038	Required Area in 2038 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
3.0 Employee Amenities									
For Drivers:									
Driver Co-ed Locker Room	PO	0		1	840	1.1	924	86	for 140 half lockers
Male washroom/locker room/showers	PO	0		1	480	1.2	576	54	for 80 males
Female Washrm/locker rm/showers	PO	0		1	480	1.2	576	54	for 40 females
Lunch room	PO	0		1	1,400	1.1	1,540	143	Sized for 70 drivers/stsff
Wellness Room	PO	0		1	120	1.3	156	14	
Uniform Room	PO	0		1	120	1.3	156	14	Uniforms for drivers
Separate Driver/Mechanic Entrance	OO	0		1	60	1.3	78	7	adjacent to employee amenities
									Barrier free access
TOTAL					**3,500**		**4,006**	**372**	
4.0 Heated Bus Garage									
Urban buses (60)					48,300	1.1	53,130	4,936	6 deep in 10 lanes plus walking
Cutaway buses (10)					4,485	1.1	4,934	458	10 deep in 1 lane
Fleet vehicles (5 cars)									Store outdoors
Turning bay					2,713	1.1	2,984	277	
TOTAL					**55,498**		**61,047**	**5,671**	

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2018	Current Area 2018 (sq.ft.)	Number of Rooms 2038	Required Area in 2038 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	5.0 Bus Service Lane									
	Bus Refueling/Fluid Top-up & Cleaning				0	5,400	1.1	5,940	552	2 Fueling/Fluid Top-Up Bays
	Bus Washing				0	2,700	1.1	2,970	276	1 Wash Bay
	Vacuum Room				1	300	1.1	330	31	
	Water Tanks/Recycling Room				1	500	1.1	550	51	collecting wash & roof water
	TOTAL					**8,900**		**9,790**	**910**	
	6.0 Outdoor Yard Storage									
	Fuel (above ground)					1500	1.1	1,650	153	gas, & diesel
	Oil/Fluid Tank Farm					2000	1.1	2,200	204	5 x 3,000 L outdoor tanks
	Brake test lane					2,250				
	Future Outdoor bus storage (40 ft.)					19,500				30 x 40 ft. buses
	Future Outdoor bus storage (Cutaway)					4,550				10 Cutaway buses
	Fleet Vehicle parking					1,620	1.1	1,782	166	Space for 6 work vehicles
	Employee parking					35,117	1.1	38,629	3,589	Space for 125 employee cars
	Note: Have not included roads/landscaping/setbacks/storm pond									
	TOTAL					**66,537**		**44,261**	**4,112**	
	TOTAL Indoor Space					116,301		129,680	12,048	
	Contingency (5%)					5,815		6,484	602	
	Grand TOTAL Indoor Space					**122,116**		**136,164**	**12,650**	
	Total Outdoor Space					66,537		44,261	4,112	
	Contingency (10%)					6,654		4,426	411	
	Grand TOTAL Outdoor Space					**73,191**		**48,687**	**4,523**	

APPENDIX B – Conceptual Drawings



No.	PROGRAM	AREA (m^2)
	INTERIOR	
1.	ADMINISTRATION	902
2.	FARE BOX STORAGE	54
3.	RE-FUELING/FLUIDS	128
4.	BUS VACUUM STATION	128
5.	BUS WASH	128
6.	ELECTRICAL ROOM	127
7.	OIL PUMP ROOM	36
8.	VACUUM ROOM	31
9.	WATER TANKS/RECYCLING	51
10.	INSPECTION PIT BAY	193
11.	DEGREASING BAY	179
12.	MOBILE HOISTS	210
13.	TIRE STORAGE	34
14.	PARTS STORAGE	307
15.	TOOL CRIB	31
16.	INVENTORY LIBRARY	8
17.	JANITOR	10
18.	WORK ORDER OFFICE	18
19.	MAINTENANCE SUPERVISOR	14
20.	UNIVERSAL WASHROOM	8
21.	GENERAL STORAGE	61
22.	RECEIVING BAY	41
23.	MENS W/C AND LOCKERS	70
24.	WOMENS W/C AND LOCKERS.	46
25.	MAINTENANCE LUNCH ROOM	39
26.	OPEN ACCESS AISLE	1335
27.	IN-GROUND HOIST BAYS	521
28.	COMPRESSOR ROOM	72
29.	TURNING BAY	770
30.	URBAN BUSSES STORAGE	2215
		7767
		83603 ft²
	EXTERIOR	
31.	OIL / FLUIDS TANK FARM	204
32.	OUTDOOR STAFF AMENITY	80
33.	GAS / DIESEL	153
34.	STORM WATER RETENTION POND	2057
35.	STAFF AND VISITOR PARKING	3589
36.	FLEET VEHICLES	166
		6249
		67264 ft²
	FUTURE (20 YR.)	
37.	IN-GROUND HOIST BAY (+3)	370
38.	MOBILE HOIST BAY (+1)	202
39.	URBAN BUSSES (+24)	1270
40.	CUT AWAY BUSSES (+10)	753
41.	ACCESS AISLE EXTENSION	255
42.	TURNING BAY EXTENSION	675
43.	RE-FUELING/FLUIDS (BYPASS)	128
44.	BUS VACUUM STATION (BYPASS)	128
45.	BUS WASH (BYPASS)	128
		3909
		42076 ft²
	FUTURE (30 YR.)	
46.	MOBILE HOIST BAY (+3)	309
47.	OUTDOOR URBAN BUSSES (+60)	3264
48.	OUTDOOR CUT AWAYS (+10)	697
49.	TURNING BAY EXTENSION	1321
50.	STAFF & VISITOR PARKING	1622
		7213
		77640 ft²

GROSS SITE AREA: 4.7 ha / 11.7 Ac

YR.	PARKING TYPE	COUNT	OTHER
10.	STAFF & VISITOR PARKING		125
	FLEET VEHICLES		6
	URBAN BUSSES	36	
20.	URBAN BUSSES (ADD)	24	
	CUT-AWAY BUSSES (ADD)	10	
30.	URBAN BUSSES (OUTDOOR)	60	
	CUT-AWAY BUSSES (OUTDOOR)	10	
	STAFF & VISITOR PARKING		55
Total:		140	186

MILTON Stantec

0 10 20 50 100

Site:

Rev.	Date	Description
2.	10/16/2018	For client review
1.	8/7/2018	For client review

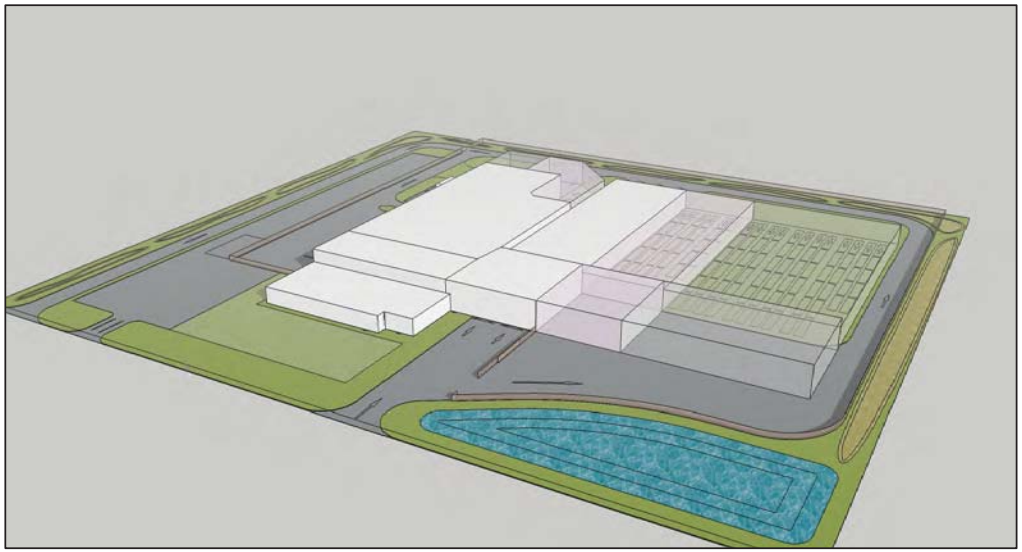
Title:
Milton Transit Facility
Option 1:
Ideal Site Plan

Project No.

Scale: 1:500

Revision Sheet

Drawing No. **001**



IDEAL CONCEPT SITE: Front View

IDEAL CONCEPT SITE: Back View

MILTON Stantec

Site:

Rev.	Date	Description
2.	10/16/2018	For client review
1.	8/7/2018	For client review

Title:
Milton Transit Facility
Option 1:
Ideal Site Plan

Project No.

Scale: 1:500

Revision Sheet

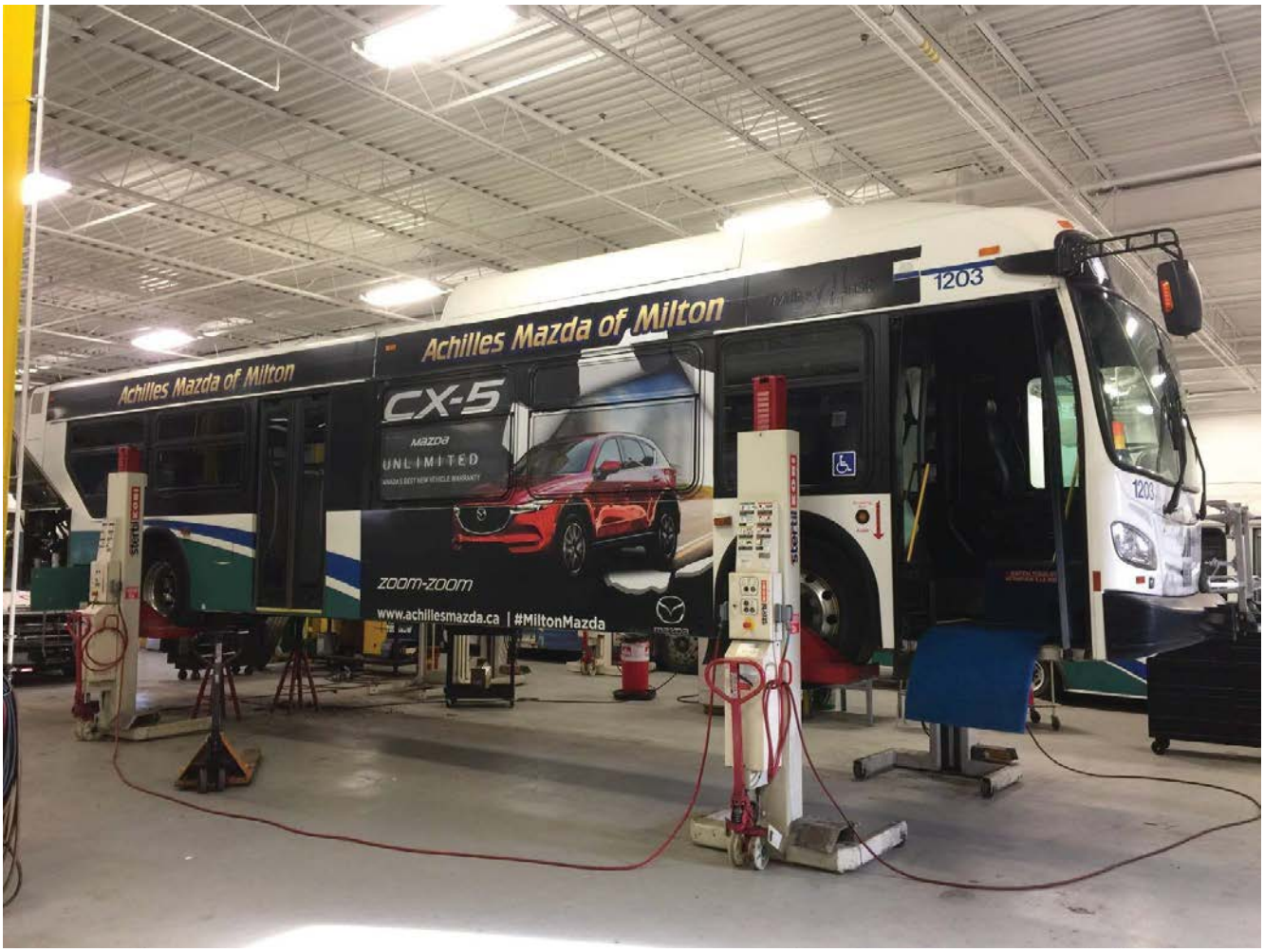
Drawing No. **002**

APPENDIX C – Construction Cost Estimates

	Order of Magnitude Cost - for year 2028 (General Assumptions: Based on Niagara Falls Transit Garage quality,for construction costs only procured under stipulated sum contract-excludes all land costs; professional and approval fees; owner legal and management costs; all sites to be conventional foundations and no significant soil contamination)
	Option 1: Ideal Site
Assumptions:	(municipal road frontage; all utilities available at road)
A. Site Development / Services	$3,000,000
B. Building Construction (99,175 sf)	$17,397,588
TOTAL CONSTRUCTION COST	**$20,397,588**
D. Contingencies	
1) Escalation Contingency (2.5% p.a. to 2020)	$1,019,879
2) Estimating/Design Contingency (20%)	$4,079,518
3) Construction Contingency (5%)	$1,019,879
TOTAL CONSTRUCTION COST + CONTINGENCES	**$26,516,864**

	Order of Magnitude Cost - for Phase 2 (General Assumptions: Based on Niagara Falls Transit Garage quality, for construction costs only procured under stipulated sum contract-excludes all land costs; professional and approval fees; owner legal and management costs; all sites to be conventional foundations and no significant soil contamination)
	Option 1: Ideal Site
Assumptions:	(municipal road frontage; all utilities available at road)
A. Site Development / Services	$1,237,500
B. Building Construction (36,989sf)	$9,143,126
TOTAL CONSTRUCTION COST	**$10,380,626**
D. Contingencies	
1) Escalation Contingency (2.5% p.a. to 2020)	$519,031
2) Estimating/Design Contingency (20%)	$2,076,125
3) Construction Contingency (5%)	$519,031
TOTAL CONSTRUCTION COST + CONTINGENCES	**$13,494,813**

	Order of Magnitude Cost - for year 2038 (General Assumptions: Based on Niagara Falls Transit Garage quality, for construction costs only procured under stipulated sum contract-excludes all land costs; professional and approval fees; owner legal and management costs; all sites to be conventional foundations and no significant soil contamination)
	Option 1: Ideal Site
Assumptions:	(municipal road frontage; all utilities available at road)
A. Site Development / Services	$3,900,000
B. Building Construction (136,164 sf)	$24,047,134
TOTAL CONSTRUCTION COST	**$27,947,134**
D. Contingencies	
1) Escalation Contingency (2.5% p.a. to 2020)	$1,397,357
2) Estimating/Design Contingency (20%)	$5,589,427
3) Construction Contingency (5%)	$1,397,357
TOTAL CONSTRUCTION COST + CONTINGENCES	**$36,331,274**



APPENDIX D – Equipment Cost Estimates

Table D.1 - Transit Maintenance Equipment Cost (2028)

Category	Function	Quantity	Rate ($)	Total Cost ($)
Lifting	Mobile hoists	4 pairs	25,000 per pair	100,000
	Inground hoists	4	160,000	640,000
	Equipment lift, 4500 lb	1	5,500	5,500
	High lift wheel dollies	1	7,700	7,700
	Bridge crane	1	160,000	160,000
	Axle stands	3	3,300	9,900
Cleaning	Drive-through bus wash	1	340,000	340,000
	Automatic parts washer	1	13,200	13,200
	Parts washing station	1	5,500	5,500
	Degreasing Spray Washer	1	25,000	25,000
Stores	Electric Pallet Jack	1	10,000	10,000
	Shelving for parts	1 sum	50,000	50,000
Body Repair	Sandblasting station	1	5,500	5,500
	Arc Welder	1	5,500	5,500
	Grinder	1	3,300	3,300
General	Antifreeze recycler	1	6,600	6,600
	Mobile Scaffolds	1	20,200	20,200
Facility	Fall arrests at hoist bays	6	1,650	9,900
	Aerial platform lift	1	55,000	55,000
Fuel Equipment	Diesel tank (double wall), 45,000 L	2	55,000	110,000
	Transfer pumps	2	8,200	16,400
	Fuel Dispensers	1	13,200	13,200
Tools & Equipment	Small tools such as work benches, drills, rivet guns, etc.	6 sum	4,000	24,000

Category	Function	Quantity	Rate ($)	Total Cost ($)
Processing Systems	Vacuum System	1	33,000	33,000
	Inspection pit equipment	1	50,000	50,000
Fresh Engine Oil System	Oil Tank 5000L	1	8,200	8,200
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	1,650	1,650
	Heat Tracing	1 sum	2,750	2,750
	Miscellaneous	1 sum	3,300	3,300
Fresh Transmission Oil System	Oil Tank 5000L	1	8,200	8,200
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600
Waste Oil System	Oil Tank 25000L	1	20,000	20,000
	Transfer pumps	1	3,300	3,300
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
	Receiver tank 25 gal	2	550	1,100
	Day tank 250 g	2	1,650	3,300
Grease Dispensing System	Drums 205L each	2	2,750	5,500
	Transfer pumps	2	2,750	5,500
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Fresh Automotive Antifreeze Tank	Oil Tank 5000L	1	11,000	11,000
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600

Category	Function	Quantity	Rate ($)	Total Cost ($)
Waste Antifreeze Oil System	Oil Tank 5000L	1	11,000	11,000
	Transfer pumps	1	3,300	3,300
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Gear Oil System	Oil Tank 5000L	1	8,300	8,300
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600
Windshield Washer Fluid System	Oil Tank 5000L	1	11,000	8,300
	Transfer pumps	1	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Urea Fluid System	Storage Tank 5000L	1	11,000	8,300
	Transfer pumps	1	3,300	3,300
	Miscellaneous	1 sum	7,700	7,700
Storm Water Collection System for Bus Wash	Storage Tank 35,000 gal	1	33,000	33,000
	Booster pumps	2	2,200	4,400
	Piping	100 m	100	10,000
	Filtration	1 sum	8,200	8,200
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	100,000	100,000
General Requirements and Allowances			10%	162,000
Total Maintenance Equipment Cost (Garage & Service Lane)				678,800 (including $162,000 for General Requirements and Allowances)

Note: We have equipped only one of the two bus service lanes (wash and fueling). All items in red have been excluded from the total equipment cost, as they have been included in the construction cost instead.

Table - D.2 Transit Maintenance Equipment Cost (2038)

Category	Function	Quantity	Rate ($)	Total Cost ($)
Lifting	Mobile hoists	6 pairs	25,000 per pair	150,000
	In ground hoists	7	160,000	1,120,000
	Equipment lift, 4500 lb	1	5,500	5,500
	High lift wheel dollies	1	7,700	7,700
	Bridge crane	1	160,000	160,000
	Axle stands	3	3,300	9,900
Cleaning	Drive-through bus wash	1	340,000	340,000
	Automatic parts washer	1	13,200	13,200
	Parts washing station	1	5,500	5,500
	Degreasing Spray Washer	1	25,000	25,000
Stores	Electric Pallet Jack	1	10,000	10,000
	Shelving for parts	1 sum	50,000	50,000
Body Repair	Sandblasting station	1	5,500	5,500
	Arc Welder	1	5,500	5,500
	Grinder	1	3,300	3,300
General	Antifreeze recycler	1	6,600	6,600
	Mobile Scaffolds	1	20,200	20,200
Facility	Fall arrests at hoist bays	10	1,650	16,500
	Aerial platform lift	1	55,000	55,000
Fuel Equipment	Diesel tank (double wall), 45,000 L	2	55,000	110,000
	Transfer pumps	2	8,200	16,400
	Fuel Dispensers	1	13,200	13,200
Tools & Equipment	Small tools such as work benches, drills, rivet guns, etc.	10 sum	4,000	40,000

Category	Function	Quantity	Rate ($)	Total Cost ($)
Processing Systems	Vacuum System	1	33,000	33,000
	Inspection pit equipment	1	50,000	50,000
Fresh Engine Oil System	Oil Tank 5000L	1	8,200	8,200
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Tank Insulation	1 sum	1,650	1,650
	Heat Tracing	1 sum	2,750	2,750
	Miscellaneous	1 sum	3,300	3,300
Fresh Transmission Oil System	Oil Tank 5000L	1	8,200	8,200
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600
Waste Oil System	Oil Tank 25000L	1	20,000	
	Transfer pumps	1	3,300	3,300
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
	Receiver tank 25 gal	2	550	1,100
	Day tank 250 g	2	1,650	3,300
Grease Dispensing System	Drums 205L each	2	2,750	5,500
	Transfer pumps	2	2,750	5,500
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Fresh Automotive Antifreeze Tank	Oil Tank 5000L	1	11,000	11,000
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600

Category	Function	Quantity	Rate ($)	Total Cost ($)
Waste Antifreeze Oil System	Oil Tank 5000L	1	11,000	11,000
	Transfer pumps	1	3,300	3,300
	Insulation to tank	1 sum	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Gear Oil System	Oil Tank 5000L	1	8,300	8,300
	Transfer pumps	1	3,300	3,300
	Immersion Heater	1	1,650	1,650
	Insulation to tank	1 sum	3,300	3,300
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	6,600	6,600
Windshield Washer Fluid System	Oil Tank 5000L	1	11,000	8,300
	Transfer pumps	1	3,300	3,300
	Miscellaneous	1 sum	6,600	6,600
Urea Fluid System	Storage Tank 5000L	1	11,000	8,300
	Transfer pumps	1	3,300	3,300
	Miscellaneous	1 sum	7,700	7,700
Storm Water Collection System for Bus Wash	Storage Tank 35,000 gal	1	33,000	33,000
	Booster pumps	2	2,200	4,400
	Piping	100 m	100	10,000
	Filtration	1 sum	8,200	8,200
	Heat Tracing	1 sum	5,500	5,500
	Miscellaneous	1 sum	100,000	100,000
General Requirements and Allowances			10%	162,000
Total Maintenance Equipment Cost (Garage & Service Lane)				**751,400** (including $162,000 for General Requirements and Allowances)

Note: We have equipped only one of the two bus service lanes (wash and fueling). All items in red have been excluded from the total equipment cost, as they have been included in the construction cost instead.