Public Works Operations Centre Space Needs Assessment and Concept Design for the Township of Wilmot

Presented by: Stirling Rothesay Consulting Inc.

in association with 3RD LINE STUDIO

Date: September 16, 2022

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1.0 EXECUTIVE SUMMARY

The Township of Wilmot retained Stirling Rothesay Consulting and 3RD LINE STUDIO to complete a Facility Space Needs Assessment and Concept Design that will recommend to Council the best solution to address the current and future space and operational needs of the Township's Public Works and Engineering Department.

The Public Works group (within the larger Department) provides services throughout the Township of Wilmot from one central facility, at 2719 Sandhills Road in Baden, where they occupy six buildings on an 8.3-acre site. However, the Engineering Services staff are located in the Township's Administrations office at 60 Snyder's Road West, Baden.

The Township of Wilmot's residential population is forecast to increase by 30% (to 29,500) by 2051. To sustain this growth, new core infrastructure will be required, which will need to be maintained, in part, by the Township's Public Works and Engineering Department. Furthermore, changes in technology, government legislation, condition of infrastructure, environmental requirements, and service level requirements will further increase the demand for maintenance resources. Therefore, to satisfy this increased demand in services, it is forecast that the Department's workforce will also grow, over the next 30 years.

To satisfy immediate operational needs and growth requirements (for a time horizon of 30 years), the Public Works and Engineering Department requires an Operations Centre that is approximately 47,614 ft^2 (4,423 m^2) in size with an adjacent 21,692 ft^2 (2,015 m^2) salt/sand storage facility. The space required for each of the functional areas is summarized in Table 1.1, below (the details are shown in Appendix A).

Table 1.1 Functional Area Space Requirements

Functional Area	Total Area Required in 2052 (ft^2)	Total Area Required in 2052 (m^2)
Administrations	7,693	715
Employee Amenities	4,195	390
Fleet Services Shops	6,980	648
Public Works Shop	1,536	143
Public Works Parts Store	2,250	209
Public Works Indoor Tool Storage	625	58
Indoor Bulk Materials Storage	1,520	141
Vehicle Wash Bay	2,420	225
Indoor Work Vehicle Storage	20,394	1,895
Total Facility	**47,614**	**4,423**
Salt/Sand Storage Facility	21,692	2,015

Therefore, given these space requirements, and the fact that the current facilities and site are:

- Too small to satisfy the future growth requirements;
- Poorly laid out and, therefore, present numerous limitations to the safe, and efficient flow of the employees;
- Not in compliance with Provincial accessibility requirements (AODA);
- Not able to meet current industry best practices in design to efficiently satisfy operational needs.

we recommend that the Township should (1) purchase land so as to significantly expand the size of the operational environment, and (2) construct a new Public Works Operations Centre, on the expanded site, to meet space and adjacency requirements, and modern best practices and design trends in facility design for Municipal Operations.

The benefits of a new Operations Centre would include:

- The provision of a safe, efficient and accessible work location for the Township's employees;
- The ability to satisfy the space requirements for the forecasted growth in resource requirements, over the next 30 years, so as to maintain service levels to the community;
- The ability to increase the synergies and collaboration between the departmental employees so as to increase employee productivity;
- The ability to reduce utility costs due to new sustainable facility design features (see section 3.2.5);
- The ability to reduce operating costs due to improved parts storage/inventory management;
- The ability to minimize future fleet costs (due to increased asset life and functionality) by having the added capacity to store all new vehicles indoors rather than in the yard;
- The potential to reduce fleet maintenance costs due to the consolidation of Fleet maintenance into one well equipped facility;
- The potential to service the Township's entire fleet of vehicles (except Fire Trucks) with a refueling station, and a wash bay.

For the purpose of this report, the space requirements outlined in Table 1.1 include the potential to accommodate the Engineering space needs currently located at 2719 Sandhills Road. The impact of these needs is represented largely within the Administrations and Employee Amenities portion of the Table. However, with consideration to the on-going employee planning for the Corporation of the Township of Wilmot, as a whole, this may not be the final outcome for the Engineering staff who may, instead, be accommodated at the Administration complex on Snyder's Road.

A Preferred Conceptual Site Plan, for a new Public Works Operations Centre, was developed utilizing additional land deemed necessary in order to meet the future (2052) space needs for the Public Works and Engineering Department.

The conceptual site plan utilized additional land to the north and east of the current site (which measures 33,589 m^2 (8.3 acres)). In total, an additional 72,439 m^2 (17.9 acres) of land were required and utilized in the conceptual site plan. This brought the size of the proposed site (to satisfy a 30-year time horizon) to 106,028 m^2 (26.2 acres).

However, given that the life expectancy of the new buildings will be approximately 60 years, we, therefore, recommend that the Township purchase at least 101,171 m^2 (25 acres) of adjacent, useable land to satisfy a 60-year time horizon.

The Conceptual Site Plan is shown in Appendix B (along with a Site Plan showing how the site could be developed in two phases).

The estimated hard and soft construction costs for developing the new Public Works Operations Centre are shown in a separate report. These construction costs provide a Class D estimate of the fair market value for the construction costs associated with the proposed space programs and concept design drawings attached to this report (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 the estimates, the actual marketplace price of the project will not be known until the results of tenders have been received.

It should be noted that the estimated construction costs reflect the impact of the recent global pandemic and supply chain shortages on material and labour costs. These costs have dramatically increased over the last three years – often doubling. We expect market conditions to begin to settle down now that the Bank of Canada has begun trying to reduce inflation. This should have a favourable impact on future construction costs – especially if the Township plans to proceed with a phased construction approach.

2.0 INTRODUCTION

The Township of Wilmot retained Stirling Rothesay Consulting and 3RD LINE STUDIO to complete a Facility Space Needs Assessment and Concept Design that will recommend to Council the best solution to address the current and future space and operational needs of the Township's Public Works and Engineering Department.

Like many Municipal Operations Centres, the requirements placed on the current buildings have evolved since they were originally built. As a result, the current space capacities have become insufficient to satisfy the current and future space requirements. Also, the current use of space has become, in some areas, inefficient due to poor building and site layout; and the flow of employees, materials, equipment and vehicles has become non-compliant with operational needs, AODA, and industry best practices and emerging trends. Furthermore, site security and environmental contamination are a concern, and some of the buildings are in poor condition requiring major repairs or replacement within the next ten years.

The Township is forecast to experience significant growth in population over the next 10 to 30 years. As a result, Township services will need to expand in order to keep pace with this growth, and continue to maintain community service levels. It is anticipated that the facility will need to house the Roads, Water/Wastewater Divisions, as well as the administration and engineering staff. It may also need to house additional operations elements including mechanics bays, wash bays, snow storage and improved bulk materials management.

Therefore, the Township requires a study that will complete (1) a background review, (2) a facility indoor/outdoor Space Needs Assessment (including whether the size of the site needs to be expanded), (3) a preferred Conceptual Site Layout Design, (4) a list of opportunities for green initiatives that can be integrated into the site, and (5) a project cost estimate for the recommended construction requirements.

Of critical importance will be the need to ensure that there is a full understanding of (1) the underlying issues affecting the employee and departmental needs, (2) the expected growth in resource requirements (i.e., employees, vehicles, and equipment) over the next 30 years, (3) the potential opportunities to improve the layout of the existing buildings and site, (4) the potential opportunities to increase space utilization and reduce space requirements by co-locating the departments, (5) the potential opportunities to increase the synergies and collaboration between the employees, and (6) the need to repair/expand/replace some of the buildings so as to achieve the modernization objectives of the study, and the ability of the departments to continue to meet their service level requirements for the long term.

The objectives of the study will include making recommendations that will (a) provide safe, efficient work conditions for the employees, (b) make best use of the existing site and

facilities to minimize capital construction costs, (c) provide efficient flow of employees and vehicles through the yards to maximize employee productivity, (d) meet industry best practices in facility and yard layout design, (e) satisfy Provincial requirements for employee accessibility and gender-neutral washrooms, (f) meet the operational growth requirements over the next 30 plus years so as to maintain service levels to the community.

3.0 NEEDS ASSESSMENT

This section of the Needs Assessment describes the (1) current state services, resources and facilities, (2) deficiencies with the current facilities and site layout, (3) building condition issues (4) site environmental compliance issues, (5) future state resources and facilities estimated to be required by the Public Works and Engineering Department, in 2052, (6) opportunities to reduce space and improve the facility design, (7) Best Practice facility design needs, (8) recommended space and adjacency requirements, (9) preferred conceptual site layout, and (10) estimated project costs.

3.1 CURRENT STATE

The Public Works and Engineering Department provides services throughout the Township of Wilmot from one central facility, at 2719 Sandhills Road in Baden, where they occupy six buildings on an 8.3-acre industrial site. However, the Engineering Services staff are located in the Township's Administrations office at 60 Snyder's Road West, Baden.

The current state services, resources and facilities, as well as the design and facility condition deficiencies (with the current buildings, soil and site layout) are described below.

3.1.1 Services

The Public Works and Engineering Department is comprised of three divisions offering the following service functions:

Roads Operations and Maintenance (Transportation Services)
This division operates a fleet of vehicles and equipment from the current Operations Service Centre to provide a range of activities including the operation, maintenance and capital planning for the Township's roads, sidewalks, bridges and culverts.

Water/Wastewater Operations and Maintenance (Environmental Services)
This division also operates a fleet of vehicles and equipment from the Operations Service Centre to provide a range of activities including the operation, maintenance and capital planning for the Township's water distribution, stormwater management, and sanitary conveyance systems.

Engineering Services
The Engineering Division also provides services for review, comment and inspection of private development projects and road corridor/core infrastructure management.

3.1.2 Resources – Employees and Vehicles

Employees

The total number of employees currently in the Public Works and Engineering Department is shown in the table below.

Table 3.1 – Current Number of Employees

Department	Full Time	Seasonal	Total
Roads	8	4	**12**
Water/Wastewater	5	0	**5**
Administration & Engineering Office	8	1	**9**
Total in Peak Season (Summer)	**21**	**5**	**26**

Note: The maximum number on-site at one time is 26 employees

Work Vehicles

The total number of work vehicles currently assigned to the Department is shown below.

Table 3.2 – Current Number of Public Works Vehicles

Department	Work Vehicle Description	Quantity of Vehicles	Type of Storage
Roads	Dump Truck/Plow (Tandem Axle)	4	Indoor
	Dump Truck/Plow (Single Axle)	6	Indoor
	Loader	1	Indoor
	Articulated Loader	1	Indoor
	Grader	2	Indoor
	Backhoe	1	Indoor
	Utility Tractor (Sidewalk)	1	Indoor
	TOTAL	**16**	
	Pick-up Truck	4	Outdoor
	Sign Truck	1	Outdoor
	TOTAL	**5**	
Water/Wastewater	Vactor Truck	1	Indoor
	TOTAL	**1**	
	Pick-up Truck	6	Outdoor
	Locate Truck	1	Outdoor
	TOTAL	**7**	
Engineering Services	Pick-up Truck	1	Outdoor
	TOTAL	**1**	

Some of the vehicles and equipment require indoor storage (as listed in the table) while for the rest it is more cost effective to store outdoors (typically, vehicles under $100,000). However, the current site lacks adequate security measures. So, storing vehicles outdoors increases the risk of vandalism and theft.

Materials

The Public Works Department stores several types of materials on the current site for use throughout the Township. The materials of greatest quantity and consumption are road salt, hot sand, and pickled sand for winter roads maintenance. Also stored on-site are various materials (in small quantities) for day-to-day road repairs (e.g., asphalt and granular stone).

3.1.3 Facilities

The Public Works and Engineering Department's current Operations Service Centre occupies six buildings – an administrations office, three shops/vehicle storage buildings, a sign storage building, and a sand/salt storage structure.

The site is, approximately, 8.3 acres and mostly surfaced with gravel. There is a parking lot to the north of the administration's office for employee and visitor parking. The site has landscaping features including sodded and treed areas on the south side of the property.

One entrance is located on the north-west side of the site, providing access from Sandhills Road.

Administrations Office

The office staff occupy an administrative building (built in 1996 and totalling 2,300 ft^2) with space for offices, a meeting room, printers, and various types of storage. A very small reception area is also in place for visitors to the site. The outdoor staff have use of a training room (in the basement). It is also used as a place to discuss daily work assignments at the beginning of the shift. Some of the outdoor workers (typically, Lead Hands) have access to a touch-down station (with computer terminal) to input data at the end of the shift. We note that the Engineering staff at the Township's Administrations office, in Baden, occupy 1,115 ft^2.

Shops/Vehicle Storage Buildings

There are three separate Shops/Vehicle Storage Buildings – East, South, and North.

The East structure is a 5-bay, single storey structure, constructed in 2012, that is 5,000 ft^2 and houses shop and vehicle storage space for the Water/Wastewater Division.

The South structure is a 5-bay, single storey structure, constructed in 1995, that is 5,000 ft^2, and also used for shop and vehicle storage space for the Water/Wastewater Division.

The North structure is a 5-bay, single storey structure, constructed in 1984, (with small mezzanine) that is 13,500 ft^2 and used for shop and vehicle storage space for the Roads Division. Along the west side of the building are rooms used for a lunch room, washroom, and shower. A large storage mezzanine is located above these rooms and used for miscellaneous storage, and an office.

Sign Storage Building

The sign storage building is 2,000 ft^2 and was constructed in 1983 of wood frame and exterior. It is used for storing signs and miscellaneous small equipment.

Sand/Salt Storage Building

The sand/salt storage building is 12,000 ft^2 and was constructed in 2005 from steel tube frame and PVC fabric. It is used for the bulk storage and loading of road salt, hot sand, and pickled sand for winter Road Maintenance operations. The salt is stored indoors to protect it from the rain.

The Yard

The yard is used for the outdoor storage of work vehicles, equipment and materials (such as gravel, cold-patch, etc.). There is also a re-fueling facility providing fuel (gas, diesel and coloured diesel) to vehicles stored on site, and an employee parking area (beside the Administrations Office).

3.1.4 Facility and Site Deficiencies

In this section, we discuss the deficiencies of the Public Works Operations Service Centre due to its location, size, design, and layout.

The safety and productivity of the employees working at the current Public Works Operations Service Centre is directly affected by the design, size, and condition of the buildings, and the layout of the site. Overall, the facility appears to be in poor to good condition but is poorly laid out, too small for current needs, and presents numerous limitations to the safe, efficient flow of the employees and work vehicles. Hence, the level of safety, efficiency and effectiveness at which the employees work is compromised. The most obvious example is the lack of proper employee amenities (i.e., lunch room, change rooms, and washrooms). In addition, there are no proper Fleet maintenance or vehicle wash bays, and the shop space does not meet current industry best practices in design to efficiently satisfy operational demands (yet alone future Township growth requirements).

The total size of the site, at 8.3 acres, is too small to satisfy current needs yet alone future growth requirements for indoor and yard space (see section 3.2.7 for details).

The shortage of yard space results in an unsafe, inefficient flow of employees and vehicles through the site. Those employees who must walk through the cramped yard to get to their work vehicles or equipment run the risk of being hit by a vehicle. This risk will only increase as the Department expands in size to satisfy higher service levels resulting from Township population growth, in the coming years.

Location

The current Operations Yard is located close to the geographical centre point of the Township. It is located on the north-east corner of the intersection of Highway 8 and Sandhills Road. Surrounding the site is, for the most part, agricultural land.

In general, the Yard is considered, by staff, to be in a good location relative to the area that it serves throughout the Township. However, below, we will analyse this location by assessing how it affects employee productivity and service delivery:

1) **Travel Distances for Work Crews:** As mentioned above, the Yard is located close to the geographical centre point of the Township. Therefore, for the Roads Division, the Yard is well located to minimize the total travel distance and time required by work crews to travel to their work sites each day. This includes optimizing plow snow routes for winter roads maintenance. For the Water/Wastewater Division, it would be preferable, currently, if the Yard was located further west towards where most of the pipe networks are located – between New Hamburg and Baden. This would minimize the total travel distance and time required by work crews to travel to their work sites each day. It should be noted that the entire Township Fleet (except for the Fire Trucks) refuel at the Yard and, therefore, benefit from its central location.

2) **Traffic Congestion Faced by Work Crews:** The Township of Wilmot is largely rural so there is little to no traffic congestion, at this time, affecting travel times for work crews. However, the Yard is located on a major road network (adjacent to Highway 8) with good access to all parts of the service territory throughout the Township. This will be important, longer term, at the population of the Township grows and road traffic increases.

3) **Location of the Yard Versus Future Population and Employment Growth:** In the near term, New Hamburg and Baden are expected to continue to expand in population. In the long term, the proximity of the City of Kitchener, along the eastern boundary of the Township, is expected to continue to increase the desire to further develop this area. This will have an impact on the Water/Wastewater Division as new water, storm and sewer systems are built in the area to service the growth. Therefore, from a long-term perspective, the Yard is well positioned to minimize travel distances and times for work crews on a daily basis.

4) **Impact of the surrounding Neighbours on Yard Operations:** The preferred site should for any Public Works Yard is in an industrial park with compatible surrounding properties that aren't significantly affected by the noise, traffic or air-born emissions resulting from the Yard operations. Furthermore, a Yard should not be located immediately adjacent to environmentally sensitive areas such as a watercourse or wet lands. Given these requirements, the current Yard is in a relatively good location. However, concern would increase if the agricultural land, to the east of the site, were to become rezoned for residential use.

Size, Design and Layout

The safety and productivity of the employees currently working at the Public Works Operations Yard is directly affected by the size, design and layout of the buildings and the yard. Below, we discuss these issues and how they are adversely affecting employee safety, productivity, and the efficient utilization of space.

The size of the site, at 8.3 acres, provides insufficient space for the construction of new buildings, and for safe and efficient yard activities over the next 30 years. The size and layout of the buildings and yard reveal that they do not incorporate modern design trends and best practices for Municipal Operations. For example:

Yard Design and Organization

- There is no security fencing around the site, and no external lighting, security cameras or motion alarms;
- There is no automated/controlled gate to exclude people and vehicles from the site that are not part of the operations.

Yard Entrance

- There is only one site egress point which is shared by employee vehicles and the work vehicles.

Yard Configuration

- The movement of work vehicles, within the yard, is not configured for one-way flow, utilizing primarily left-hand turns, and separate from the flow of pedestrians (for safety reasons);
- The yard is not laid out such that the items that are most frequently used are closest to the main yard flow;
- The buildings are not situated on the site so as to provide room for expansion as operational growth demands greater capacity.

Yard Parking

- Employee parking lacks good outdoor lighting and adequate security;
- Employee parking is not situated immediately beside the employee amenities;
- Where work vehicles are parked in heated indoor spaces, there are not adequate ventilation measures taken to prevent accumulation of fumes;
- The outdoor work vehicles are not, necessarily, parked within the yard so as to minimize employee walking distances;
- There are no facilities to promote environmentally friendly modes of transportation. Buildings are not equipped with lockable storage for bicycles, and preferred parking spaces are not made available for car-pooling and energy efficient vehicles.

Yard Storage

- Plastic and rubber items, including piping and fittings, are not stored in shelters that protect these materials from deterioration from the sun;
- Bulk materials are not stored in well-designed bunkers or storage bins that allow easy access for loading yet contain the material in a neat and orderly manner;
- The desiccant drying area should be paved.

General Office Configuration

- There is no public waiting area or counter in the Administration Building to provide space for seating or discussion with an employee;
- The office area is divided into separate offices/rooms that discourage communication and collaboration;
- The offices are larger than they need to be and there are no touchdown stations;
- There are no meeting rooms for small group discussions;
- Electronic swipe entry cards are not used for employee entrance into the building. Employee security and safety is not incorporated into the design of the facility;
- The facility is not “barrier free” and does not comply with provincial requirements for accessibility. The training room (in the basement) is not accessible;
- The office area is too small for current needs, and presents numerous limitations to the efficient flow of employees;
- There is no consideration for gender-neutral facilities.

Employee Amenities

- The employee lunch room, in the North Garage, does not accommodate more than four employees at a time. The other two structures do not have a lunch room;
- There are no washrooms or locker rooms that are gender-neutral;
- The employee shower does not satisfy modern standards, and is unable to satisfy employee demand for showers;

- There is no Dry area for employees arriving from their work site carrying mud or other contaminants, so that contaminated clothing can be removed, dried and cleaned without coming into the main building;
- The design of the facility is not “barrier free” and does not comply with provincial requirements for accessibility. The training room (in the basement of the Administration Building) is not accessible;
- There is no consideration for gender-neutral facilities.

Vehicle Fueling

- The entire tank area, along with the pumps, is not mounted on a concrete pad that is elevated above high level for any surface water in the area;
- There are no canopies and lighting such that vehicles can be fuelled in the dark and in inclement weather without delaying operations;
- The fuelling area lacks a drain to prevent spilled fuel from entering ground water;
- Electric recharging stations have not been made available for electric vehicles.

Vehicle Washing

- There is no concrete pad (immediately outside the door of the wash bay) with radiant heating to prevent the formation of ice during the winter;
- The wash bay is not equipped with an access platform where operators can access the tops of their vehicles safely without climbing onto the vehicle itself;
- The wash bay is not equipped with a steam cleaning system to remove grease from vehicles and engine parts;
- A drainage system and sump are not in place to collect grey water.

Wash Tanks and Equipment

- An underground rain water cistern tank is not in place to capture rain water from roofs for use as wash water;
- The initial gray water rinse from dirty vehicles is not directed through a cleaning system and then to a brine makeup tank.

Salt/Sand /Brine Storage and Loading

The overall system for supplying salt, salt/sand mixture, and brine is designed to be environmentally sustainable by containing the salt and making best use of water for brine makeup (if applicable), while eliminating the discharge to the sewer. The facility has the following characteristics:

- Delivery and loading of salt are not located under one roof to minimize ground water contamination;
- The existing salt storage building is not well designed and in need of repair.

- The use of a fabric clad structure has proven to be unreliable and has required significant maintenance since the building was constructed.

Fleet Maintenance

- There is no proper vehicle maintenance bay with sufficient vertical clear height to provide room for lifting the vehicles with a hoist, and to provide space for the various hose reels;
- There is no system for managing the Fleet maintenance parts, and the storage system is inefficient;
- There is insufficient floor space for storing miscellaneous equipment (e.g., stands, jacks, floor sweeper, propane fork lift, Gator, waste steel bin, etc.);
- There is no tool crib room, janitor room, oil pump room, or large waste steel dumpster located outside the parts storage area;
- There is no proper space for oil storage, solvent storage, battery storage and painting, to ensure that no toxic fumes enter into the maintenance garage work space.

Indoor Vehicle Storage Garage

- There are no electric recharging stations for future electric vehicles.

Sustainability

- The buildings are not energy efficient or designed to current OBC or LEED standards to minimize negative effects on the environment.

Photos 3.1 and 3.2 – Current Employee Lunch Room and Washroom

3.1.5 Building Condition

A Building Condition Assessment (BCA) was completed for the individual buildings at the Public Works Operations Service Centre, in 2020, by Englobe Corp.. A high-level summary of the conclusions is shown in Table 3.3, below. For more details, please see the original report.

Table 3.3 – Building Condition

Building	Structure	Exterior Siding	Mechanical Systems	Electrical Services
Administration Bldg.	Fair to Very Good	Fair to Very Good	Verry Poor to Poor	Good Condition
North Garage	Fair Condition	Very Poor Condition	Good Condition	Good Condition
South Garage	Fair to Good	Fair to Good	Good Condition	Poor to Good
East Garage	Good Condition	Good Condition	Good Condition	Good Condition
Sign Shop	Fair to Good	Fair to Good	None	Very Poor to Good
Sand/Salt Storage	Good Condition	Need Replacing	None	None

The indication from the BCA and from discussions with staff is that the North Garage (having been built 38 years ago) is near the end of its expected asset life and struggles to meet the needs of a modern Roads operation environment. Similarly, the Sand/Salt Storage Building requires the replacement of its PVC fabric, and repairs to its concrete structure (at significant cost). However, the other buildings still have useful asset life, and are expected to only require moderate expenditures to maintain them in a state-of-good repair under the current operational model. That said, none of the buildings have been designed to meet current Provincial Accessibility requirements, and all of them are at or beyond their rated capacity for vehicle and equipment storage.

There are currently no restoration or renovation projects underway or scheduled in the short term.

3.1.6 Environmental Compliance Issues

A Contaminant Delineation Report was completed by Jeffrey Environmental Consultants Inc. for the Township of Wilmot in 2011. The objective of the study was to determine the extent of hydrocarbon contamination in the soil and groundwater in the vicinity of the former underground fuel storage tanks on the site close to the current Sign Shop. Further details, if required, can be found in the Report. Since this report was completed, further measurements have been conducted by the Township to monitor for any appreciable changes to the location and concentration of the contamination levels. For the purposes of this study, the contamination confirmed in the soil and groundwater (by the original Environmental Study and subsequent measurements) is not expected to adversely affect the layout design or cost of a new, expanded Operations Centre.

It is important to note that the design of the site, and certain operations, are not adequate to prevent contamination of the soil and groundwater. For example, the loading of salt is conducted outdoors, thereby, allowing salt to escape into the groundwater. Furthermore, the removal of grease from vehicles in the outdoor wash bay is permitted to flow into the nearby soil and groundwater.

3.2 FUTURE STATE

In this section, we will document the forecasted resources and facility space required by the Township of Wilmot's Public Works and Engineering Department, in 2052, so that the employees may work safely, efficiently and effectively, and satisfy service delivery requirements.

3.2.1 Growth

The Township of Wilmot's residential population is forecast to increase by 30% (to 29,500) by 2051. To sustain this growth, new infrastructure will be required, which will need to be maintained, in part, by the Township's Public Works and Engineering Department. Furthermore, changes in technology, government legislation, condition of infrastructure, environmental requirements, and service level requirements will further increase the demand for maintenance resources. Therefore, it is recommended that the Department's buildings be designed to handle service requirements 30 years into the future (2052), and that the size of the site be capable of handling requirements at least 60 years into the future (which is the expected asset life of new buildings).

Below, we describe many of the factors expected to affect the number of resources (employees and work vehicles) required by the Public Works and Engineering Department by 2052.

Population and Infrastructure Growth

The Township's population, over the next 30 years, is expected to grow significantly. We believe that this growth will have a direct impact on the Public Works and Engineering Department as it will put increased pressure on the Township for new infrastructure (such as residential roads, sewers, and sidewalks) and infrastructure maintenance. In addition, population demographics will continue to change towards residents with higher service expectations which will also increase the demand for services from the Department.

Increased population within the Township will likely result in a number of changes which will further affect the resource requirements for the Department. Examples include:

- Longer travel time to get to job sites within the growth areas;
- Reduced speed and distance for plowing resulting in the possible splitting of routes;

- Increased use of smaller equipment that is more suited to sidewalks and partially restricted narrower streets;
- Extended traffic congestion, affecting work site interference.

Infrastructure Deficit

Across Canadian municipalities, aging and deteriorating infrastructure has resulted in a large and growing infrastructure deficit. Of particular concern is the deterioration of road infrastructure.

As infrastructures (e.g., bridges, roadways, and sidewalks) begin aging and deteriorating, more of the Department's efforts will be focused on maintaining and replacing these infrastructure elements. This will add to the daily requirements of the workforce.

Increasing Legislative Regulations, Standards and Associated Costs

A trend towards increasing government regulations, standards and their associated costs impacts the ability of the Public Works and Engineering Department to deliver core services, meet public expectations and maintain the assets that the Township already owns. The Department is continually affected when regulations, policies and standards are passed or changed. Liability or potential liability claims, can also affect the Department's ability to manage within existing budgets and resources.

Changing Technology and Community Expectations

The Township has, over the years, adapted to many technology changes and methods that will continue to affect the way operations are carried out. These changes save labour requirements, and the environment. However, community expectations are also changing. Citizens are expecting greater communication, transparency and service levels in the planning and spending of their tax dollars. This means that the Department will continue to require more formal procedures and monitoring to prove that the funds are being spent effectively.

Therefore, the number of Public Works and Engineering employees and work vehicles required in the coming years will be influenced by the above factors. These factors will likely lead to an increase in the number of employees and work vehicles required. However, there is no precise way to know how all of these issues (along with funding capabilities) will unfold, interact and affect the Department over the next 30 years.

This report will address the factors outlined above to develop a plan for growth that will be consistent with lean, efficient and competitive operations that the Public will be proud to support.

3.2.2 Resources – Employees and Vehicles

Section 3.2.1 discussed the predominant factors that will affect the Township's Public Works and Engineering Department over the next 30 years. This section discusses the

likely impact of those factors on the Departments resource requirements – namely, the employees and work vehicles:

Among the key factors discussed in section 3.2.1, population growth will have the largest effect on the Department. The construction of new residential area roads, as well as storm and sanitary sewers, will necessitate a significant increase in resources.

By 2051, the Township forecasts that its residential population will increase by 30% from 22,700 to approximately 29,500 people. Added to this forecast will be other factors affecting the need for more resources:

- Increases in lost time due to increases in traffic congestion;
- Increases in work content due to aging infrastructure;
- Increases in work content due to higher service level expectations;
- Increases due to legislation and environmental requirements.

Employees

The Public Works Operations Yard should be sized to accommodate the expected growth in employee and work vehicle levels over the next 30 years (2052). The total number of employees expected to work in the facility, in 2052, is shown below in Table 3.4.

Table 3.4 – Future Number of Employees

Department	Full Time	Seasonal	Total
Roads	11	6	**17**
Water/Wastewater	10	0	**10**
Administration & Engineering Office	17	2	**19**
Total in Peak Season (Summer)	**38**	**8**	**46**

Work Vehicles

The total number of work vehicles expected to be at the Yard, in 2052, is shown in Table 3.5, on the following page.

Table 3.5 – Future Number of Public Works Vehicles

Department	Work Vehicle Description	Quantity of Vehicles	Type of Storage
Roads	Dump Truck/Plow (Tandem Axle)	7	Indoor
	Dump Truck/Plow (Single Axle)	7	Indoor
	Bucket Truck (Single Axle)	1	Indoor
	Grader	2	Indoor
	Sidewalk Articulated Tractor	1	Indoor
	Street Sweeper	1	Indoor
	Utility Tractor (Sidewalk)	1	Indoor
	Skid Steer	1	Indoor
	Boom Lift	1	Indoor
	TOTAL	**22**	

Table 3.5 – Continued

Department	Work Vehicle Description	Quantity of Vehicles	Type of Storage
	Excavator	1	Outdoor
	Loader	1	Outdoor
	Articulated Loader	1	Outdoor
	Backhoe	1	Outdoor
	Pick-up Truck	4	Outdoor
	Sign Truck	1	Outdoor
	Stake Truck	1	Outdoor
	Roller Pro System	2	Outdoor
	TOTAL	**12**	
Water/Wastewater	Vactor Truck	2	Indoor
	Light Duty Dump Truck	1	Indoor
	TOTAL	**3**	
	Mid-sized Excavator and Trailer	1	Outdoor
	Pick-up Truck	10	Outdoor
	Locate Truck	1	Outdoor
	TOTAL	**12**	
Engineering Services	Pick-up Truck	2	Outdoor
	TOTAL	**2**	

3.2.3 Opportunities to Reduce Space Requirements

In this section, we will discuss a number of Best Practices for reducing space requirements within a Public Works Operations Centre. Reducing space requirements would help to reduce the size of a new addition or building within the facility.

Outsource Scheduled Maintenance for Light Duty Vehicles (Class 1 & 2) (to reduce maintenance costs and maintenance bays)

Outsourcing scheduled maintenance for light duty vehicles (Class 1 & 2) to a Third-Party Provider, often, reduces maintenance costs and permits Fleet Services to focus on unscheduled maintenance and heavy vehicles. This may reduce the required number of maintenance bays, and parts storage requirements. However, maintaining Class 1 & 2 vehicles in-house has the benefit of eliminating the downtime required to shuttle vehicles to off-site Third-Party Providers.

Optimize the Inventory Levels within the Stores Department and at the Point-of-Use Storage (to reduce costs versus using a Vendor or 3PL, and to minimize space)

Stores Department and point-of-use inventory levels should be analysed and optimized to minimize space requirements, inventory costs and stockouts.

There are two primary ways to minimize space requirements for the storage of parts:

1. Reduce inventory levels
2. Increase the density of storage

Improve Vehicle Availability (to reduce spare vehicles)

It is common for municipal operations to have vehicle availability problems which severely constrain their ability to meet service requirements. Typical factors which may create a problem include:

- Difficulty in obtaining parts to carry out repairs which, in turn, may have been caused by:
  - Inadequate inventory;
  - Having too many types of equipment requiring too many types of spare parts;
  - Damage caused by operations resulting from inadequate training of operators or other factors resulting in unnecessary breakdowns;
  - Outdoor storage of vehicles, particularly sidewalk plows and blower attachments for loaders;
  - Failure to complete annual preventive maintenance and inspections;
  - Poor communications with Fleet Services.

Steps that can be taken to improve vehicle availability include:

- Improve operator training on vehicle damage issues;
- Improve communications with Fleet Services;
- Provide indoor parking for vehicles to reduce failure rates;
- Contract out seasonal inspections/refurbs if Fleet Services is unable to ensure completion;
- Improve standardization of vehicles/equipment – buy fewer specialized units;
- Accept mechanics with heavy equipment ticket;
- Have operators report equipment problems directly to Fleet Services (while also advising their Supervisor);

- Provide faster feedback to operators on preventable damage occurrences;
- Establish a process to have Fleet Services and Operators formally review failures and repair delays every two weeks to identify issues. The result could be changes in operating practices and/or inventory levels required and/or notice/directive/training for vehicle users;
- Improve training, of operators aimed at reducing equipment damage, improving operator familiarity and skill with equipment for snow operations.

Incorporate Technology to Optimize Vehicle Service Routes (to reduce fleet size, employee parking, and fleet maintenance)

The Roads Division should use computer programs to plan, balance, develop and optimize vehicle service routes for winter maintenance (i.e., plowing and salting). The objectives of the programs are to, in part, reduce deadhead time, and maximize the overall efficiency of the routes and required fleet of vehicles. This helps to reduce operating costs and improve service delivery. By optimizing the service routes, the Division will minimize the size of its Fleet. This reduces vehicle maintenance requirements as well as the space required for work vehicle and employee parking.

Optimize the Average Age of the Fleet (to reduce fleet maintenance, and the number of spare vehicles)

There are many issues that will affect the determination of the optimal number of vehicles in the Fleet - shift work structure, design of service routes, age of the Fleet and requirement for spares, use of contractors, and mix of vehicles. In this and the following two sections, we discuss the importance of fleet age and utilization, and the mix of vehicles within the Fleet.

The optimal service life of a work vehicle varies based on class, duty and utilization. Vehicles which are kept longer than their optimal service life require increasing amounts of maintenance – both scheduled and unscheduled. Older vehicles, therefore, consume more maintenance time and are out of use longer. This puts a heavier burden on Fleet Services and lowers the productivity of the work crews. To compensate, Public Works Departments, typically, carry a number of spare vehicles which require space to park when not in use. Therefore, the Public Works and Engineering Department is recommended to replace vehicles once they are beyond their optimal service life.

Optimize the Mix of Vehicles (to reduce fleet size)

There is a need to rationalize the Fleet, for the services provided, to ensure that there is the optimal mix of vehicles and equipment based on best practices. For example, when possible, vehicles should be deployed for multiple uses (e.g., plow, wing, spread, haul – with full capacity).

Incorporate Transit Bus Style of Parking for Vehicles (to reduce space)

Within the Transit industry, it is best practice to store buses indoors in long lanes (typically, 6-8 buses deep). This approach should be considered for other municipal fleets that

require indoor storage and can operate with a first in, first out philosophy. This would include those winter maintenance vehicles that leave the yard at the same time.

Therefore, the approach to designing the layout for the indoor storage of work vehicles should (1) identify those vehicles that can be stored in long lanes (versus those that require independent use and, therefore, cannot be blocked within a long lane), and (2) identify the optimal width and length of each lane to minimize the total area requirement.

Reduce the Use of Salt for Winter Maintenance (to minimize the size of salt storage buildings)

The Roads group needs to store salt indoors for winter roads/sidewalk maintenance. The best practice approach for salt storage is the combined storage and loading into one facility. The alternative approach is to store the materials inside but to conduct the loading outside.

To minimize the size and capital cost of any new salt storage facilities, the Roads group should consider additional ways to reduce its annual consumption of salt.

- Should undertake pre -wetting in all spreading activity. Pre-wetting is a very effective practice and should be included in all spreading activity. The entire spreading fleet should be outfitted with pre-wetting capability. The purpose of pre-wetting is to wet the salt for several reasons:
    - In the case of cold pavements, it enables the grain to freeze to the pavement
    - In the case of snow packed surfaces, it enables the grain to “melt” into the snow pack rather than “blowing” off
    - In the case of de-icing, it begins the brine making process by reacting with the crystalline salt to produce a brine concentrate which then lowers the freezing point of contact resulting in melting
    - In the case of traffic, it mitigates bounce off (up to 30% has been measured) by making the grains “stickier,” similarly with windy conditions.

  In general, the benefits include granules that adhere to the surface better, have a faster and longer-lasting effect, and can be spread more quickly.

  The practical result of pre-wetting should be a reduction in the resources necessary. The investment in brine making equipment would reduce the cost of supplying the brine. There is no advantage to using chemicals such as calcium chloride. Water could be used to similar benefit if it could be prevented from freezing in the tanks. With improved calibration and controls in spreader vehicles, it is reasonable to establish a range of spread rates to be applied under certain conditions;

- Should compare actual material spread rates for each route and vehicle unit across winter seasons (time series analysis);

- Should implement disciplined spread management practices supported and refined by spread rate benchmarking and measurement. The benchmarking approach is practical because it is internal in focus (avoiding complex apple to apple issues across other municipalities), and it is firmly linked to the enforcement of service levels, individual operator behavior, and cost savings targets.

Table 3.6 - Industry Practices for Reducing Salt Consumption

Industry Practice
Removing as much snow from the roads as possible to minimize the amount of snow and ice that that needs to be melted (and the quantity of sand/salt required)
Using Material Loading Sheets that describe and limit the amount of sand/salt loaded into the sander/salter. This will prevent the driver from using excessive quantities of sand/salt.
Adjusting the quantity of sand/salt applied to the roads based on road surface temperatures, weather forecasts, and road conditions to prevent excessive use. This requires the use of road sensors, and road weather information systems
Optimize sand/salt application rates. For example, restrict application rates on arterial collector roads to 130 kg/lane km, and for local roads to 65 kg/lane km.
Pre-wetting of salt using brine to improve the utilization rate
Pre-wetting of sand using hot water to reduce bouncing and improve the utilization rate
Using computerized controls on spreader equipment that can accurately control the rate of sand/salt application so that the quantity applied to the roadway is minimized
Blend brine with other chemicals to produce “Hot Brine” that will be effective below -12^{o}C
Direct Liquid Application to replace the use of brine with a chemical that works as low as -30^{0}C
Using GPS systems on the trucks to (1) monitor the speed and location of the trucks through Automated Vehicle Location (AVL), and (2) provide route guidance and spreader control for the driver
Training staff so that they understand how to use the equipment and take other steps to minimize the application of sand/salt
Use loader scales to measure and record the quantity of sand/salt used by each truck and then use this information to identify opportunities to reduce consumption rates. If you don’t measure it, you can’t reduce it.
Store sand indoors as this will reduce the need for pickling with salt from 5% down to 3%.

Request that Field Crews Eat at their Work Site (to reduce the size of lunch rooms - only for inside workers)

Field crews should continue, when possible, to eat lunch at their work site rather than returning to the Yard to eat in the lunch room. Doing this will permit the lunch room to be sized only for those employees working full-time at the yard. This, in turn, will reduce space requirements.

Replace Touch-Down Desks with Dash Mounted Devices (to reduce space)

Some field employees/Lead Hands require limited access, each day, to a computer to receive work orders and to input information/data. Typically, work stations or "touch-down desks" are provided for these employees. The new trend is to provide these employees with access to mobile tablets or dash mounted devices to input the information/data. The benefit is increased employee productivity and a reduction in office space for the work stations or "touch-down desks".

3.2.4 Opportunities to Improve the Facility Design

In section 3.1.4 we listed a number of facility and site design deficiencies that are adversely affecting employee productivity, and the efficient utilization of space at the current Public Works Operations Service Centre. Below, we list a number of ways to improve the design of the facility.

Standardize - Utilize Corporate Space Standards for Offices, Employee Amenities and Shops (to reduce variation and space, and increase collaboration and productivity)

Standardizing the space requirements for offices will help to (1) reduce space requirements and variation amongst locations, and (2) promote employee collaboration, productivity and the desired corporate culture. For example, most municipalities are eliminating walls and modular office partitions in favour of an open concept office environment. Offices are becoming smaller or eliminated all together in favour of more meeting rooms. New office design trends include:

- Office staff should, where appropriate, be consolidated into one open concept administration office area. This will improve communication and collaboration between employees, and will optimize space utilization;
- Meeting rooms and training rooms (adjacent to the administration office area) should be made available for group activities and discussions requiring privacy;
- Touch-down stations should be consolidated (if not replaced with mobile devices or vehicles dash board units) between the different groups to reduce the number required and to reduce space requirements;
- Employee amenities (lunch room, change rooms and washrooms) should be consolidated and shared by all employees (including both office and unionized staff) to eliminate duplication and to efficiently utilize space. The employee amenities should be located on the ground floor level close to the work vehicle storage areas;
- Parts/materials stores, from different divisions, should be consolidated to eliminate duplication, and to implement technology and storage systems which will maximize the cube and more efficiently utilize space;

Design for Flexibility - Design Lunch Rooms to be Multi-purpose (e.g., crew meetings and training) (to reduce space)

When possible, facility areas should be designed for flexible use (with mobile partitions and

furniture). For example, lunch rooms should be designed for multiple purposes as a way of consolidating areas and reducing the total space requirements. Lunch rooms are often also used for start-of-shift crew meeting areas, and training rooms.

Design a Healthy Work Environment (to improve productivity)

A variety of research has shown that employees are both happier and more productive in office environments with natural light, views, and ventilation (which can be as simple as access to an operable window). Natural light has been shown to reduce seasonal affective disorder, increase visual clarity, help regulate sleep, reduce drowsiness, improve immune function, reduce sick days and increase productivity. Access to natural light, views and ventilation is the basis for three LEED points and is written into many other green standards. Many government organizations have codified the 'Right to Light' for their office design standards -- for example, Alberta Infrastructure's *Technical Design Requirements*.

Contemporary office design best practice places open workspaces toward the exterior of the floor plate, with private offices and meeting rooms closer to the center. In this way daylight reaches the greatest number of staff. Natural ventilation, including operable windows, should be incorporated wherever possible. Workshops should be treated similarly, maximizing use of natural light and air, with control of glare being critical. We have found that small areas of transparent glazing combined with larger zones of light-diffusing translucent panels provide ideal lighting conditions for fleet garages, wood and metal shops, and other similar environments.

Design for Safety

The flow of public and employee vehicles should be kept separate from that of work vehicles to avoid collisions. Furthermore, the flow of pedestrians (the public and employees) should not have to cross traffic in order to access the main building. Once in the building, the public should be greeted at a reception counter.

The flow of work vehicles through the yard must be provided with adequate and safe turning radii to avoid collisions and damage to vehicles or buildings. This includes insuring that parking stalls are adequately sized for the vehicles.

3.2.5 Facility Design Needs

This section describes the Best Practice Design Needs for each of the main functional areas within a modern Public Works Operations Centre.

Yard Design and Organization

- Public Works Operations Centres should be organized and designed to present a professional appearance. It is important that the public view of the yard, from all public roadways, appears to be attractive, well landscaped, well ordered, and well maintained without appearing extravagant. It should also try to highlight any design features promoting environmental sustainability;

- The most prominent and highly visible part of the yard should contain attractive landscaping and prominent signage that describes the yard operations and the municipality that it supports;
- Where necessary, landscaping buffers and/or berms should be employed to conceal parts of the yard from the public;
- Landscape plants should be comprised of native species that do not require irrigation;
- Full security fencing should be constructed around the yard, and external lighting, security cameras and motion alarms should be installed as well. Electronic pass-keys should be used within the building.

Yard Entrances

- Where possible vehicle entrances should be located at signal lights, especially on busy road ways;
- Where practical, vehicle entrances and exits should be separated;
- Entrances for employee and public vehicles should be kept separate from the flow of operational vehicles;
- Vehicle entrances and exits to the yard should be closed off with an automated gate to exclude people and vehicles that are not part of the operations;
- The entrance should be set back from the roadway, such that vehicles entering the yard are off from the main roadway, while waiting for the entrance gate to open.

Yard Configuration

- The site should be configured to provide for the safe and efficient flow of Township employees and vehicles (work vehicles and personal vehicles), and the public;
- The movement of work vehicles, within the yard, should be kept separate from the flow of pedestrians and employee vehicles (for safety reasons). Their movement should be configured for one-way traffic flow utilizing primarily left-hand turns to improve visibility for the driver;
- For trucks backing up to a truck dock (to deliver parts), they should be permitted to turn left so that the driver can readily see the back of the truck from his driver's position.
- Any refuelling stations located in the yard should be situated out of the main flow of traffic, and designed to be able to accommodate vehicle line-ups without blocking the general flow of traffic in the yard;
- The yard should be configured such that items that are most frequently used are closest to the main yard flow. Items less frequently used are placed near the back of the yard;
- The yard should be equipped with well-marked signage that clearly marks direction of travel, storage locations, and special movement and safety instructions;
- The building(s) should be situated on the site so as to provide room for expansion as operational growth demands greater capacity. Most facilities are built with an expected life cycle of well over 50 years.

Yard Parking

- Employee and public parking should be located outside of the fenced yard, with good lighting and adequate security. In some areas, this parking may be in a fenced zone;
- Employee parking should be situated directly adjacent to the employee entrance into the main building;
- Where vehicles are parked in heated indoor spaces, adequate ventilation measures must be taken to prevent accumulation of fumes and to prevent fumes from entering office areas;
- Outdoor operational vehicles should be parked within the yard so as to minimize employee walking distances;
- Where possible, parking surfaces are not paved to allow storm water to percolate naturally into the ground. When paving is required, materials that are permeable to water are recommended (e.g., permeable concrete);
- Wherever work vehicles turn in the yard, surfaces must be paved with concrete to prevent the tires from tearing the surface (if paved with asphalt). If an area does not need to be paved it should be landscaped so as to permit storm water to percolate naturally into the ground;
- Environmentally friendly modes of transportation should be promoted. Buildings should be equipped with lockable storage for bicycles, and preferred parking spaces should be made available for car-pooling and energy efficient vehicles;
- Light pollution can be reduced by installing fixtures that are down-lit. Ground covers and positioning of the fixtures on site would stop the light from over spilling to other adjacent sites.

Yard Storage

- Typically, most summer maintenance vehicles will be stored in unheated buildings over the winter, where they can be protected from the elements and sunshine;
- All plastic and rubber items, including piping and fittings, must be stored in shelters that protect these materials from deterioration from the sun;
- All items stored in the yard should be organized in well-marked storage locations;
- Bulk materials should be stored in well-designed bunkers or storage bins that allow easy access for loading yet contain the material in a neat and orderly manner;
- Items that must be kept clean, such as fittings for water services, should be stored such that they will not become contaminated with yard dust and debris;
- Outdoor storage areas should not be paved, unless needed (e.g., salt), to allow storm water to percolate naturally into the ground.

General Office Configuration

- The main public entrance is located in the most prominent position immediately beside visitor parking;

- The main employee entrance is kept separate from the public entrance and is beside the employee parking lot;
- A public waiting area will provide space for seating and brochure display and will provide a gender-neutral toilet facility. Any corridor off this public area will have restricted entry;
- This public waiting area should also be equipped with a counter so that a member of the public can speak to an employee;
- Operations offices should present a clean, well maintained, and professional appearance. Whether or not the public visits this facility, it should be maintained such that it is presentable and reflects the professional image required by the Municipality;
- Common spaces within the office area should be used wherever possible to avoid space duplication, and to encourage communication and collaboration. Common spaces should be used for the following: employee amenities; office spaces; meeting rooms; stores; crew rooms and training areas; and storage;
- Management, clerical, and planning staff will be located in the Administrative Office. Managers should have private offices. Otherwise, an open concept design (without the use of cubicles) should be incorporated to facilitate collaboration amongst employees, and to reduce the total space required. For private discussions, a board room and smaller meeting rooms should be utilized. The dispatch office should be located adjacent to the lunch room and/or locker room;
- Electronic swipe entry cards should be required to enter the office area. Employee security and safety must be incorporated into all features of the design of the facility;
- The design of the facility should be “barrier free” and comply with provincial requirements for accessibility.

Employee Amenities

- The main employee entrance area should be equipped with an information area and notice board that contains all of the vital safety and operations information generally needed by employees under the laws affecting employment. This includes safety standards, labour standards, environmental standards and WHMIS information. There should also be an area for employees to post information;
- The cafeteria should be designed such that all employees (office and outside workers) have breaks and lunch in the same space;
- Washrooms and locker rooms should, when appropriate, be gender-neutral and kept completely separate from the lunch room;
- Showers should be available for all outside workers;
- Where certain employees may arrive from their work site carrying mud or other contaminants, a separate entrance should be created with direct access to a mud/drying room so that contaminated clothing can be removed, dried and cleaned without coming into the main building;
- The design of the facility should be “barrier free” and comply with provincial requirements for accessibility.

Vehicle Fueling

- Vehicle fuelling is typically set up such that vehicles returning to the yard (or other Township vehicles) can easily travel (without backtracking) from the yard entrance to the fuelling area and then to the parking area, in the most efficient way possible. Since there may be a line-up for fuelling it should be situated such that vehicle line-ups do not block the main access route around the yard;
- The fuelling area should be located well away from buildings and the property line to meet safety requirements;
- Fuelling traffic lanes are set up such that vehicles lined up waiting for fuel do not block yard circulation;
- Fuel tanks are located above ground with each tank contained within a separate outer containment tank that acts as a protective barrier around the main inner storage tank;
- The entire tank area, along with the pumps, is mounted on a concrete pad that is elevated above high level for any surface water in the area;
- The entire tank area should also be protected by heavy steel bollards and a crash resistant railing. This may in turn be enclosed with a fence to prevent entry or tampering;
- Fuel islands are set far enough apart that two full sized trucks equipped with ploughs can pass side by side between the islands and pumps;
- Fuel islands and pumps are set up such that they can be approached from either side. For most busy yards, two islands with pumps are set up such that four lanes of vehicles can be serviced simultaneously;
- Newer installations may be equipped with canopies and lighting such that vehicles can be fuelled in the dark and in inclement weather without delaying operations;
- The fuelling area does not have a drain so that spilled fuel will not enter local water courses;
- Electric recharging stations should be made available for electric vehicles.

Vehicle Washing

- The wash facility is, ideally, located near the brine make-up area.
- There should be 1 or 2 drive-through wash bays that can be accessed by vehicles without blocking traffic flowing through the yard;
- The interior clearance in the wash area is high enough to allow dump trucks to raise their dump box sufficiently for rinsing of the box;
- The interior is equipped with minimal heating to prevent freezing inside the facility;
- The concrete pad immediately outside the doors will require radiant heating to prevent the formation of ice during the winter;
- The space beside the wash bay is equipped with an access platform, where operators can access the tops of their vehicles safely without climbing onto the vehicle itself;

- Rapid roll up doors on each end of the wash bay prevent cold winds from going through the facility during winter;
- The wash bay is well lit and the interior lower sides of the wash bay are equipped with lighting for illumination of the underside of each vehicle;
- The building is equipped with a steam cleaning system to remove grease from vehicles and engine parts;
- The wash bay will utilize a high-pressure, hand held, spray wand. There should also be a fire hose and a built-in underbody spray;
- The equipment for the operation should be stored in a different room to avoid corrosion;
- A drainage system and sump will be required to collect grey water.

Wash Tanks and Equipment

The following equipment is located in or around the building:

- An underground rain water cistern tank that captures rain water from nearby roofs for use as wash water;
- A two-stage wash area:
  - Stage one uses clean gray water for the initial rinse of dirty vehicles entering the building;
  - Stage two uses rain water from the cistern or fresh water for a final wash and rinse of the cleaned vehicle;
- Each wash stage is equipped with water processing equipment which includes:
  - An oil and grease trap;
  - A sediment trap that can be easily shovelled out;
  - A settling tank;
  - A common water cleaning/hydro-clone system that removes the last of the sediment from the water;
- A final cleaned water tank that is ready for reuse;
- There should be an automated washing system for smaller vehicles;
- The initial gray water rinse of dirty vehicles is directed through the cleaning system and then to the brine makeup tank or to the water reuse system depending upon the amount of salt that is being removed from the washed vehicles in the stage 1 wash.

Salt/Sand /Brine Storage and Loading

The overall system for supplying salt, salt/sand mixture, and brine is designed to be environmentally sustainable by containing the salt and making best use of water for brine makeup (if applicable), while eliminating the discharge to the sewer. The facility has the following characteristics:

- Salt and sand delivery and loading, and brine makeup and loading are all located under one roof;

- Sand and salt should be dumped inside the building by the supplier and then conveyed to the top of the pile using a stacking conveyor. This will maximize the height of the pile and storage capacity of the building;
- Brine makeup utilizes the salt pile as a feedstock along with the weak salt solution coming from the truck wash combined with rainwater collected from the storage building roof and neighbouring driveways;
- The brine making area should be adjacent to the main structure (so that it does not block the flow of the loader during the loading process). Drywall should not be used within the brine pump room because of the moisture). The brine area should also include a washroom;
- The concrete wall surrounding the sand/salt storage area should be at least 20 to 25 ft. high to maximize the height of the pile within the cubic space of the building;
- The two drive-through doors for the sanders should be 20' wide and 20' tall. The two doors for the delivery truck should be 20' wide and at least 38' high (to avoid being hit by a tilted truck bed). Use of metal for the door sliding system should be avoided due to potential corrosion and premature failure;
- Salt, sand and brine loading should all take place on one side of the storage area in a covered drive through lane;
- The loading lane for the sanders/salters should be at least 144 ft long to allow space for three trucks to be loaded with sand/salt or brine simultaneously;

Fleet Maintenance

- The Fleet Maintenance area will be used to conduct both scheduled and unplanned maintenance. Paint and body work will be outsourced;
- We recommend that the size of the maintenance area be designed for a one shift operation. This will provide significant additional maintenance capacity should management decide, in the future, to change to a two-shift operation.
- A two-shift operation would offer numerous advantages including:
    - It would make better use of the maintenance facilities by deploying mechanics over two shifts and, therefore, doubling maintenance output;
    - It would reduce the requirement for spare vehicles because some of the maintenance can be done on the afternoon shift when the vehicles are not in use;
    - The buses would have full maintenance coverage throughout their operating period;
- The vertical clear height in the area should be sufficient to provide room for lifting the vehicles with the hoists, and to provide space for the various hose reels;
- 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, 110volt power, return waste oil, and water. There should also be a fall arrest system for each bay.
- We recommend some mobile hoists because they are flexible for use. They are

also about one third of the installed price of in-floor hoists. The bays should accommodate a mechanics work bench and storage cabinet.
- There needs to be open floor space for storing miscellaneous equipment (e.g., stands, jacks, floor sweeper, propane fork lift, Gator, waste steel bin, etc.).
- There should be a parts storage area, tool crib room, janitor room, oil pump room, and a large waste steel dumpster located outside the parts storage area;
- Special rooms are also recommended for oil storage, solvent storage, battery storage and painting, to ensure that no toxic fumes enter into the maintenance garage work space.

The Fleet Maintenance Garage should be heated in the winter months with a radiant floor heating system. Large 20 ft. diameter ceiling fans (e.g., Big Ass fans) should be used to assist with the movement of warm air, and 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 the exterior doors (to maintain the internal room temperature).

Indoor Vehicle Storage Garage

- Due to the high capital cost of many of the work vehicles (up to $270,000 for a plow), they should be stored indoors to increase their life span and to minimize maintenance and operational issues. Therefore, we recommend that the new Vehicle Storage Garage be designed so that it can be expanded as the size of the fleet grows. Additional outdoor storage will be provided, in the yard, where the expansion will, eventually, take place;
- The internal storage area should be heated in the winter months to a temperature of 10^{o}C to ensure that the vehicles are ready for service in the morning. The installation of insulated rapid motion doors will prevent the need for air curtains over the external doors (to maintain the internal room temperature). All walls and ceilings should be painted white (to present a clean appearance and to reflect light). The paint should be an industrial epoxy brand to withstand cleaning by high pressure water;
- Provision for the proper drainage of ice and snow from the floor area will be a critical safety design feature;
- The current fleet of vehicles are all operated with gas or diesel fuel. However, it is expected that, in the future, some or all of the vehicles will be electrically powered. Therefore, allowances should be provided for future electric recharging equipment.

Our methodology for designing the layout for the vehicle storage garage aims to minimize the total area required by (1) identifying those vehicles that can be stored in long lanes (versus those that require independent use and, therefore, cannot be blocked within a long lane), and (2) identifying the optimal width and length of each lane to minimize the total area requirement.

Sustainability

The level of environmental sustainability built into the design of new Public Works facilities varies depending on the level of importance the municipality places on achieving and promoting LEED certification (Leadership in Energy and Environmental Design). This is because achieving LEED certification, typically, can add 15-25% to the capital cost of the facility with comparatively small annual savings in energy costs. However, there are many design features that are cost effective and, therefore, recommended to minimize electrical and water consumption, and to provide a better working environment for employees. A list of these design features, that could be integrated into the design of a new Operations Centre, include the following:

- Buildings should be orientated so that windows for daylighting can be placed on the north and south facades. This approach allows shading devices to be used to deflect unwanted solar heat gain in the summer and permit desirable solar heat gain in winter months;
- All lighting systems should be LED and, where possible, should utilize (1) motion detection to turn the lights on/off, and/or (2) light sensors to reduce the electrical light when daylight helps to illuminate the space;
- Include a Building Management System (BMS) with automated lighting controls including daylight sensors and LED light fixtures;
- Where possible, skylights and windows should be incorporated into the design of the facility to reduce the need for light fixtures and to provide a better working environment;
- Allow staff to open windows or roll-up doors to cool, ventilate workspaces passively;
- Use Solar Chimneys for large spaces. These cool by allowing hot air to rise and exhaust through vents, or warm air that is heated by sun and pulled down;
- Use High Volume Low Speed fans for moving air and ventilating large spaces instead of relying solely on the building ventilation;
- Install green roofs to reduce runoff and improve insulation value;
- A high-performance building envelop should be used at floors, walls and roof of the building in order to minimize heating and cooling costs;
- Set higher insulation and building energy performance goals;
- Engage a building envelope consultant throughout design and construction to ensure air- and water-tightness benchmarks are met;
- Consider sustainably harvested timber structures where appropriate, especially for administrative buildings;
- The roof decking, structural steel and walls of the facility should be painted white to present a bright clean appearance and to better reflect light;
- Use cold water for fleet washing and hot for rinse to reduce energy use;
- Approximately 70% of the grey water from the vehicle wash bay should be recycled;
- Reuse building greywater and stormwater for vehicle washing, irrigation or flushing;
- The internal vehicle storage area should be heated in the winter months with a radiant floor heating system to a temperature of 10^{o}C to ensure that the trucks are

ready for service in the morning. The installation of insulated rapid motion doors will prevent the need for air curtains over the external doors (to maintain the internal room temperature). Doors with glass panels are desirable during the day to reduce electrical lighting costs;

- The shop area should also use a radiant floor heating system. The installation of insulated rapid motion doors will prevent the need for air curtains over the external doors (to maintain the internal room temperature);
- Reduce building footprints by sharing facilities between departments wherever possible (e.g., change rooms, lunch rooms);
- Building materials used for the construction of the building should generally be selected based on the following criteria:
    - Location of manufacture (closer is better);
    - Recycled content (the more recycled content the better);
    - Use materials that have low VOC content;
    - Avoid the inclusion 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 CO2 monitoring controls for the delivery and exhaust of required fresh air to the building.
    - Heat recovery systems design to capture heat from wastewater at showers and use it to heat domestic water for the building;
    - Install rooftop solar panels for electricity and/or domestic water heating;
    - Use low-flow plumbing fixtures;
    - Consider geothermal heating and cooling, or other high-efficiency systems such as a Variable Refrigerant Flow system;
    - Use Energy Recovery Ventilators, or Heat Recovery Ventilators to preheat/ precool fresh air.
- The storm water retention pond should include biofiltration;
- Should use exclusively naturalized, native, low-maintenance plantings that require no irrigation;
- Whenever possible, should use permeable paving to reduce stormwater runoff;
- Consider ‘grasspave’ at public and light-duty parking areas;
- Reduce the source of light pollution;
- Engage an energy modeller to record the effect of high-performance features and gauge the value of these over the life of the building.

3.2.6 Analysis of Indoor Vehicle Storage Requirements

This section will examine the benefits of constructing indoor storage space for work vehicles (versus storing outdoors).

BENEFITS

The primary benefits of storing vehicles indoors are listed below:

- Public Safety
- Employee Safety
- Improved Productivity and Response Time
- Improved Asset Management
- Impact on the Adjacent Neighbourhood
- Impact on the Environment
- Cost Savings

Public Safety

Vehicles such as plows are used to keep the roads safe, and to respond to emergencies. They are also sensitive to cold temperature and, therefore, may experience starting problems if parked outdoors during the winter. Diesel engines can suffer from jelling; hydraulic oil may have difficulty flowing; and air lines can freeze. In addition to starting problems, the driver/crew might be required to waste valuable time by having to warm-up and clean snow off their vehicle prior to responding to an emergency. This could result in unsafe conditions for the public.

Employee Safety

Storage of larger vehicles outdoors during inclement weather may require an employee to climb on the vehicle to clean it off and prepare it for use. This could expose the employee to unnecessary risks such as slipping and falling. In addition, employees must often access and connect smaller equipment to their vehicles (such as plow attachments and towed compressors). This could also pose unnecessary risks when conducted in inclement weather or in parts of the yard with inadequate lighting.

Improved Productivity and Response Time

Storing vehicles and equipment indoors will enhance the performance of the vehicles, thereby, eliminating potential delays associated with cold engines and frozen equipment. This will increase employee productivity and reduce response time. Furthermore, vehicles that are stored indoors can have their tools and related equipment left in the vehicle overnight. This reduces the need to unload and reload tools between shifts, thereby, increasing employee productive time.

Improved Asset Management

Storing vehicles and equipment indoors will reduce maintenance costs and vehicle downtime, protect the vehicles from environmental conditions which could increase maintenance costs and reduce vehicle life span, and protect the vehicles from vandalism.

Impact on the Adjacent Neighbourhood

The outdoor storage of vehicles will increase the noise output and exhaust emissions from the site. The outdoor storage of vehicles will require extended periods of idling during the winter months, thereby, increasing the inconveniences to future neighbors.

Impact on the Environment

Storing vehicles and equipment outdoors will negatively impact the environment because of oil, grease, and engine fluid entering the groundwater or stormwater system. By comparison, any leaks that occur within a vehicle storage garage will be captured in a closed floor drain system, thereby, preventing the fluids from reaching the environment.

Cost Savings

The additional costs associated with storing the vehicles outdoors, as discussed above, include:

- Loss of labour from delays in starting the vehicles and preparing them for the road;
- Increased unscheduled maintenance costs;
- Increased vehicle downtime and resulting loss in productivity;
- Reduced vehicle life expectancy and accelerated vehicle replacement costs.

3.2.7 Functional Space Program and Adjacency Requirements

In this section, we will document the future space requirements for each of the functional areas within the Public Works Operations Service Centre. The program will consider growth requirements, and operational needs for a time horizon of 30 years (to 2052). The program will include functional areas such as:

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

The space required for each of the functional areas is shown in Appendix A. The key areas are summarized in Table 3.7, on the following page.

Table 3.7 Functional Area Space Requirements

Functional Area	Total Area Required in 2052 (ft^2)	Total Area Required in 2052 (m^2)
Administrations	7,693	715
Employee Amenities	4,195	390
Fleet Services Shops	6,980	648
Public Works Shop	1,536	143
Public Works Parts Store	2,250	209
Public Works Indoor Tool Storage	625	58
Indoor Bulk Materials Storage	1,520	141
Vehicle Wash Bay	2,420	225
Indoor Work Vehicle Storage	20,394	1,895
Total Facility	**47,614**	**4,423**
Salt/Sand Storage Facility	21,692	2,015

Within the program, we have looked for ways to minimize space requirements so as to reduce travel distances and construction costs while still achieving space adjacency preferences.

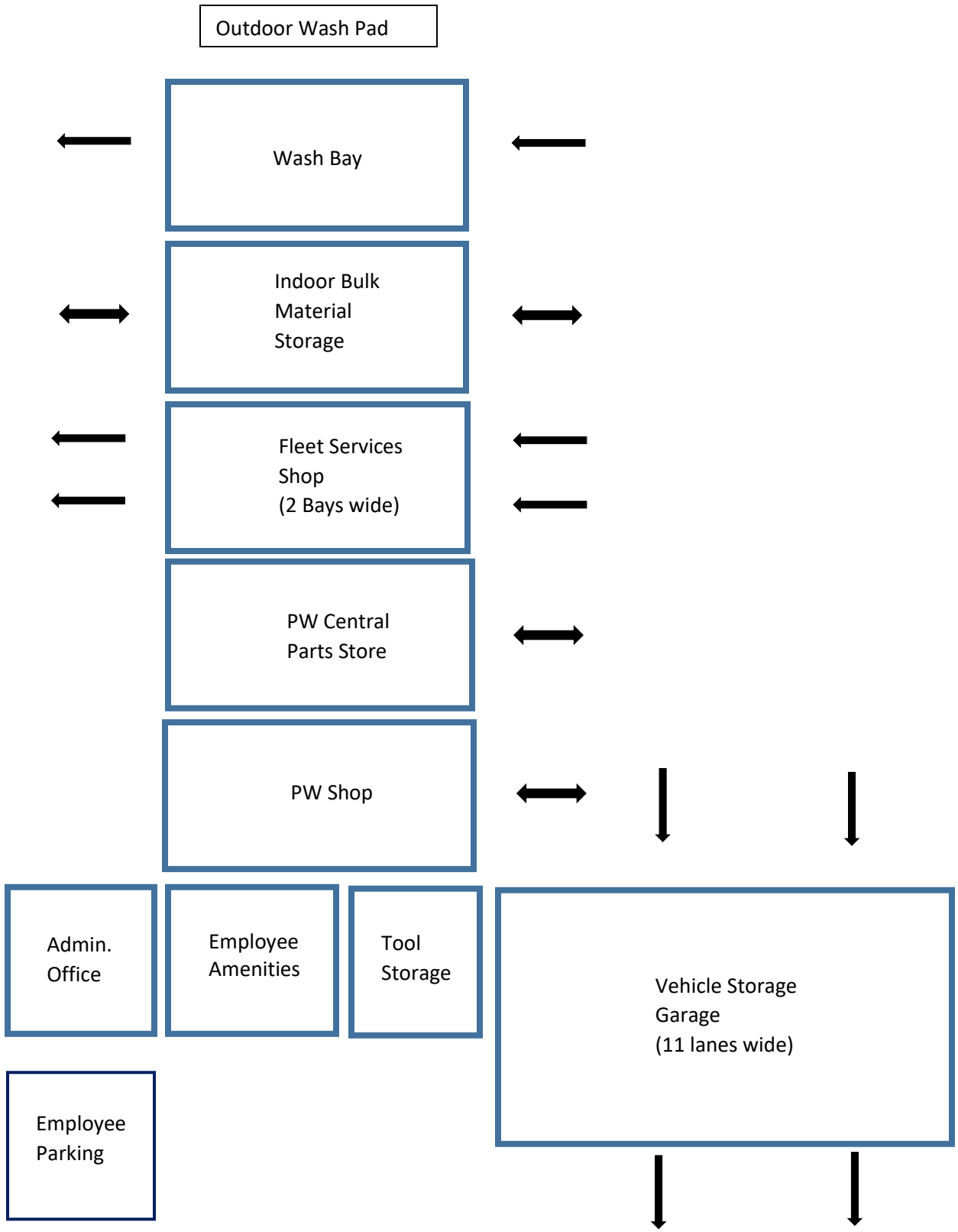
By comparison, the Public Works and Engineering Department currently occupies 28,915 ft^2 of space (plus 12,000 ft^2 for a salt/sand storage facility) at the Operations Service Centre, and the Township's Administrations office at 60 Snyder's Road West, Baden.

Space Adjacency Preferences

Space adjacency preferences are important to minimize travel distances by employees and vehicles within the building and yard. Excessive travel distances add to lower productivity levels.

Of critical importance is the relationship between the employee amenities for all outside employees and the storage location for their work vehicles. Whenever possible, the walking distances for the employees should be minimized.

Drawing 3.1, on the following page, is a high-level adjacency diagram showing the preferred locations of each of the major functional areas within the Operations Service Centre.


Outdoor Wash Pad
Wash Bay
Indoor Bulk Material Storage
Fleet Services Shop (2 Bays wide)
PW Central Parts Store
PW Shop
Admin. Office
Employee Amenities
Tool Storage
Vehicle Storage Garage (11 lanes wide)
Employee Parking

3.2.8 Ability of Existing Yard to Satisfy Space and Adjacency Requirements

As stated in Section 2.0, the objective of this study is to identify and recommend to Council the best solution to address the current and future (30-year horizon) space and operational needs of the Township's Public Works and Engineering Department. Our conclusion is that the Township should (1) purchase land directly to the north and east of the current Operations Service Centre so as to significantly expand the size of the site, and (2) construct a new Public Works Operations Centre, on the expanded site, to meet space and adjacency requirements, and modern best practices and design trends in facility design for Municipal Operations.

During the completion of our needs assessment, we documented the deficiencies with the layout of the site for the current Operations Service Centre, as well as with the design, and size of the buildings (see section 3.1.4).

The total size of the current site, at 8.3 acres, is too small to satisfy the indoor and yard space and adjacency requirements documented in section 3.2.7 on this report. The shortage of yard space results in an unsafe, and inefficient flow of employees and vehicles through the site.

The size required for the site (to meet the 30-year time horizon) will be identified through the creation of the preferred conceptual site plan in section 3.2.9 of this report. However, we recommend that the Township purchase enough land to satisfy at least a 60-year time horizon (which will be the expected asset life of the new Operations Centre).

Overall, the current buildings appear to be in poor to good condition but are too small for future needs (as per section 3.2.7), poorly laid out on the site, and present numerous limitations to the safe, efficient flow of the employees. Hence, the level of safety, efficiency and effectiveness at which the employees work is compromised. The most obvious example is the lack of proper employee amenities (i.e., lunch room, change rooms, and washrooms), and the lack of compliance with Provincial accessibility requirements (AODA). In addition, there are no proper Fleet maintenance or vehicle wash bays, and the shop space does not meet current industry best practices in design to efficiently satisfy operational needs (yet alone future Township growth requirements). Furthermore, the design of the salt/sand storage facility does not protect the site from further salt contamination, and the North Garage is at the end of its expected asset life.

We note that the size of the current facilities (including the off-site office space for the Engineering staff) is 28,915 ft^2 (with a 12,000 ft^2 salt/sand storage facility) whereas the space program, in section 3.2.7, recommends that the new facility be 47,614 ft^2 with a 21,692 ft^2 salt/sand storage facility.

In section 3.2.5 we documented the best practices and design trends in facility design for Municipal Operations. Achieving these facility design requirements (to achieve desired operational benefits) would not be possible by simply renovating or expanding the current buildings. To achieve them, a new Operations Centre would need to be designed and constructed. The benefits of a new Operations Centre would likely include:

- The provision of a safe, efficient and accessible work location for the Township's employees;
- The ability to satisfy the space requirements for the forecasted growth in resource requirements (see section 3.2.2), over the next 30 years, so as to maintain service levels to the community;
- The ability to increase the synergies and collaboration between the departmental employees so as to increase employee productivity;
- The ability to reduce utility costs due to new sustainable facility design features (see section 3.2.5);
- The ability to reduce operating costs due to improved parts storage/inventory management (see section 3.2.3);
- The ability to reduce fleet costs due to increased asset life and functionality for those vehicles that are able to be stored indoors rather than in the yard (see section 3.2.6);
- The ability to reduce fleet maintenance costs due to the consolidation of Fleet maintenance into one well equipped facility.

It should be noted that the construction of a new Operations Centre would make best use of the existing site and facilities to minimize capital construction costs. We also

3.2.9 Preferred Conceptual Site Plan

A Conceptual Site Plan, for a new Public Works Operations Centre, was developed to reflect the Functional Space Program (for 2052) developed in section 3.2.7. The Site Plan also incorporates (1) Industry Best Practices and design trends for the design of a new Operations Centre, and (2) functional space adjacency preferences to minimize travel distances and optimize flow. Particular emphasis was placed on assessing the impact of vehicle traffic within the yard, and how to optimize its flow and egress.

The Conceptual Site Plan required the use of additional land to the north and east of the current site (which measures 33,589 m^2 (8.3 acres)) in order to reflect the Functional Space Program (for 2052). In total, an additional 72,439 m^2 (17.9 acres) of land were required and utilized in the conceptual site plan. This brought the size of the proposed site (to satisfy a 30-year time horizon) to 106,028 m^2 (26.2 acres). However, given that the life expectancy of the new buildings will be approximately 60 years, we, therefore, recommend that the Township purchase at least 101,171 m^2 (25 acres) of adjacent, useable land to satisfy a 60-year time horizon.

The Conceptual Site Plan is shown in Appendix B. More detailed design would be required, at a future date, to develop construction-ready drawings. These drawings may utilize other options for laying out the site and the interior of the buildings. However, the same overall size of site (as recommended in this section) would likely be required.

3.2.10 Estimated Project Costs

The estimated hard and soft construction costs for developing the new Public Works Operations Centre are shown in a separate report. These construction costs provide a Class D estimate of the fair market value for the construction costs associated with the proposed space programs and concept design drawings attached to this report (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 the estimates, the actual marketplace price of the project will not be known until the results of tenders have been received.

APPENDIX A – Space Program

Legend of Office Types & Sizes:

1	Director - 10x20ft Private Office
2	Manager - 10x15ft Private Office
3	Supervisor - 10x10ft Private Office
4	Eng/Tech Staff (w/ plans) - 8x10ft Open Office
5	Admin /Tech - 6x6ft Open Office
6	Hotel station - 6x4ft Open Office
7	Touchdown station - 4x2.5ft Open Office

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	1.0 Administration Office									
	Roads Department									
2	Manager PW	**PO**			1	150	1.4	210	20	
3	Supervisor Roads	**PO**	1		1	100	1.4	140	13	
5	PW Liscense Coordinator	OO			1	36	1.4	50	5	
7	Touchdown stations	OO			8	80	1.4	112	10	Lead Hand, Operators
	File Storage - Roads (1)	OO				60	1.4	84	8	
	Utilities Department									
3	Supervisor Utilities	**PO**	1		1	100	1.4	140	13	
7	Touchdown stations	OO			5	50	1.4	70	7	Lead Hand, Operators
	File Storage - Utilities (1)	OO				60	1.4	84	8	
	Engineering Department									
1	Director	**PO**	1		1	200	1.4	280	26	
2	Manager Engineering	**PO**	1		1	150	1.4	210	20	
4	Senior Technologist (w/plans)	OO	2		2	160	1.4	224	21	
4	Development Technologist (w/plans)	OO			1	80	1.4	112	10	
4	Engineering Technologist (w/plans)	OO	1		2	160	1.4	224	21	
4	GIS	OO			1	80	1.4	112	10	
5	Technical Prgram Coordinator	OO	1		1	36	1.4	50	5	
5	Inspector	OO			1	36	1.4	50	5	
5	Underground Locate Technician	OO			1	36	1.4	50	5	
5	Administration	OO			2	72	1.4	101	9	
6	Summer Students/ Hotel Stations	OO			4	96	1.4	134	12	2 students & 2 staff visiting
	File Storage - Engineering (1)	OO				60	1.4	84	8	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
1.0 Administration Office									
Engineering Department Continued									
Drawing & Report Production Space	**PO**				168	1.4	235	22	
Equipment & Sample Storage Space	**PO**				144	1.4	202	19	
Shared Areas for All Departments									
Public Lobby and Entrance Doors	OO				364	1.2	437	41	Seats 3 visitors
Public Gender Neutral Washroom (1)	**PO**				75	1.4	105	10	Accessible & Gender Neutral
Reception Desk/Public Counter	OO				90	1.4	126	12	
Public Winter Coat Closet	**PO**				12	1.4	17	2	for 6 people
Small Meeting Rm Adjacent to Lobby	**PO**				100	1.4	140	13	to meet with public (4 people)
Employee Winter Coat Closet	**PO**				32	1.4	45	4	for 20 people
Washrooms for 19 office staff (2)	**PO**				340	1.4	476	44	Male & Female washrooms
Accessible/ Gender Neutral Washroom (1	**PO**				120	1.4	168	16	Accessible & Gender Neutral
Miscellaneous Storage Room (1)	**PO**				150	1.4	210	20	
PPE & Clothing Storage	PO				100	1.4	140	13	
High Density File Storage Room (1)	**PO**				200	1.4	280	26	
Printer/fax/stationary (1)	**PO**				150	1.4	210	20	
Communications/IT Room	**PO**				200	1.4	280	26	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
1.0 Administration Office									
Continuation of Shared Areas									
1 on 1 Meeting Room / phone rm (1)	**PO**				70	1.4	98	9	(2 people) 1 room
Medium Meeting Rooms (2)	**PO**				400	1.4	560	52	(8 people) 2 rooms
Large Meeting Room (1)	**PO**				300	1.4	420	39	(12 people) 1 room
Janitors Rooms (1)	**PO**				80	1.4	112	10	
Sprinkler Room	**PO**				100	1.4	140	13	
Electrical Room	**PO**				150	1.4	210	20	
Mechanical Room	**PO**				400	1.4	560	52	
TOTAL					**5,547**		**7,693**	**715**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
2.0 Employee Amenities									
Common Areas for Both Divisions									
Male Washroom/locker room/showers	**PO**			46	1,097	1.25	1,371	127	Sized for 46 males
Female Washrm/locker rm/showers	**PO**			6	361	1.25	451	42	Sized for 6 females
Gender Neutral Washrm/lockers/showers	**PO**			6	348	1.25	435	40	Sized for 6 individuals
Employee Entrance to Work Yard	OO				50	1.25	63	6	
Employee Entrance to Employee Parking	OO				50	1.25	63	6	
Small storage room for employee bikes				**5**	150	1.25	188	17	Sized for 5 bicycles
Lunch Room with kitchenette	**PO**			**25**	704	1.25	880	82	Sized for 25 employees
Training Room (1) (**24** people)	**PO**				500	1.25	625	58	Require 1 room for 24 employees
First Aid Rooms (1)	**PO**				96	1.25	120	11	Require 1 Room
Outdoor Patio (1) (30 people)				30	725	1.25			Sized for 30 + BBQ
Outdoor covered storage for 10 bikes				10	200	1.25			Sized for 10 bicycles
TOTAL					**4,281**		**4,195**	**390**	

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	3.0 Fleet Services Shop									
	Fleet Mechanics Area									
	Washroom (1)	**PO**				75	1.4	105	10	Accessable & gender neutral
	First Aid Room	**PO**				96	1.4	134	12	
	Janitors Room	**PO**				80	1.4	112	10	
	Maintenance Office									
	Vestibule (single door from outdoors)	**PO**				35	1.4	49	5	
	Reception desk (key drop-off)	OO				100	1.4	140	13	
3	Fleet Mecanics Office	OO			1	100	1.4	140	13	
7	Mechanic Touch-Down Stations	OO			1	10	1.4	14	1	One Touch down station
	Mechanics Library with Touch-Down	OO			1	50	1.4	70	7	
	File Storage (1)	OO				10	1.4	14	1	
	Printer/fax/stationary (1)	OO				80	1.4	112	10	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Bays 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
3.0 Fleet Services Shop									
Maintenance Bays & Shop									
Maintenance Bays (Heavy Duty)	OO			**2**	2,880	1.1	3,168	294	**2 bays (24x60 ft each bay)**
(Drive-through)									
Machine/Tool Shop/welding area	**PO**				375	1.3	488	45	15x20 ft
Storage - Consumeables/fast movers	**PO**				128	1.3	167	16	Parts Storage 10x13 ft
Tool Crib	**PO**				210	1.3	273	25	15x14 ft
Fluids Pump Room	**PO**				180	1.3	234	22	15x12 ft
Tire Storage	**PO**				224	1.3	291	27	14'x16 ft
Compressor Room	**PO**				180	1.3	234	22	15x12 ft
Electrical Room	**PO**				200	1.3	260	24	
Mechanical Room	**PO**				600	1.3	780	72	
Sprinkler Room	**PO**				150	1.3	195	18	
TOTAL					**5,763**		**6,980**	**648**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Bays 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
4.0 PW Shop									
Maintenance Bays & Shops									
Work Shop bench area	OO			5	384	1.8	691	64	benches are 3x8 ft
Machine Shop/welding area									
Storage - Consumeables/fast movers	**PO**				150	1.3	195	18	10x15 ft
Shop Tool Crib / pipe threader	**PO**				150	1.3	195	18	10x15 ft
Area to back in small truck to off-load	OO				350	1.3	455	42	
TOTAL					**1,034**		**1,536**	**143**	

	Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
	5.0 PW Parts Store									
	Service Counter & Office									
	Service Counter and reception area	OO				130	1.4	182	17	
	for employees and delivery truck drivers									
5	Workstation for Stockeeper	OO			1	36	1.4	50	5	
	File Storage (1)	OO				10	1.4	14	1	
	Printer/fax/stationary (1)	OO				80	1.4	112	10	
	Roads Supplies/Parts									
	Parts Warehouse	OO				364	1.25	455	42	14x26 ft Road Signs
	Fleet Repair Parts									
	Parts Warehouse	OO				514	1.25	642	60	Parts for Fleet
	Utilities Supplies/Parts									
	Parts Warehouse	OO				364	1.25	455	42	Parts for Utilities (meters, valves)
										14x26 ft
	Common Area									
	Loading Dock	**PO**				272	1.25	340	32	1 man door
										and 1 drive-up door
	TOTAL					**1,770**		**2,250**	**209**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
6.0 PW Indoor Tool Storage									
Roads Department									
Small Tool Secure Cage	OO				250	1.25	313	29	pilons, shovels, chain saws, etc.
									10x25ft
Utilities Department									
Small Tool Secure Cage	OO				250	1.25	313	29	10x25ft
TOTAL					**500**		**625**	**58**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
7.0 PW Indoor Bulk Materials Storage									
Roads Department									
Bulk storage on wood pallets	OO				408	1.25	510	47	6 pallets on the floor
Bulk storage on floor	OO				200	1.25	250	23	cold patch,
Utilities Department									
Bulk storage on wood pallets	OO				408	1.25	510	47	6 pallets on the floor
Bulk storage on floor	OO				200	1.25	250	23	
TOTAL					**1,216**		**1,520**	**141**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Bays 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
8.0 Vehicle Wash Bay									
Wash Bay	**PO**			1	1,800	1.1	1,980	184	1 bay 30x60
Wash Water Filtration Room	**PO**				400	1.1	440	41	Adjacent to wash bay
TOTAL					**2,200**		**2,420**	**225**	

Functional Area	Office Type PO-Private OO- Open	Number of Trucks 2022	Current Area 2022 (sq.ft.)	Number of Trucks 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
9.0 Indoor Work Vehicle Storage									
Roads Department									
Indoor Work Vehicle Parking - Bldg 1	OO			22	16,200	1.03	16,686	1,550	Drive through vehicle storage
									9 lanes x100x18 ft
									Will eventually require electrical
									charging stations for equipment
Utilities Department									
Indoor Work Vehicle Parking - Bldg 1	OO			3	3,600	1.03	3,708	344	Drive through vehicle storage
									2 lanes x100x18 ft
Engineering Department									No vehicles indoors
TOTAL					**19,800**		**20,394**	**1,895**	
TOTAL INDOOR SPACE					**42,111**		**47,614**	**4,423**	

Functional Area	Office Type PO-Private OO- Open	Number of Employees 2022	Current Area 2022 (sq.ft.)	Number of Employees 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
10.0 Indoor Salt Storage									
Roads Department									
Indoor Salt Storage and Loading	**PO**				18,720	1.1	20,592	1,913	4,000 Tons of salt/sand (3 piles)
Indoor Brine Making & Storage	**PO**				1,000	1.1	1,100	102	100,000 litres of Brine
TOTAL					**19,720**		**21,692**	**2,015**	

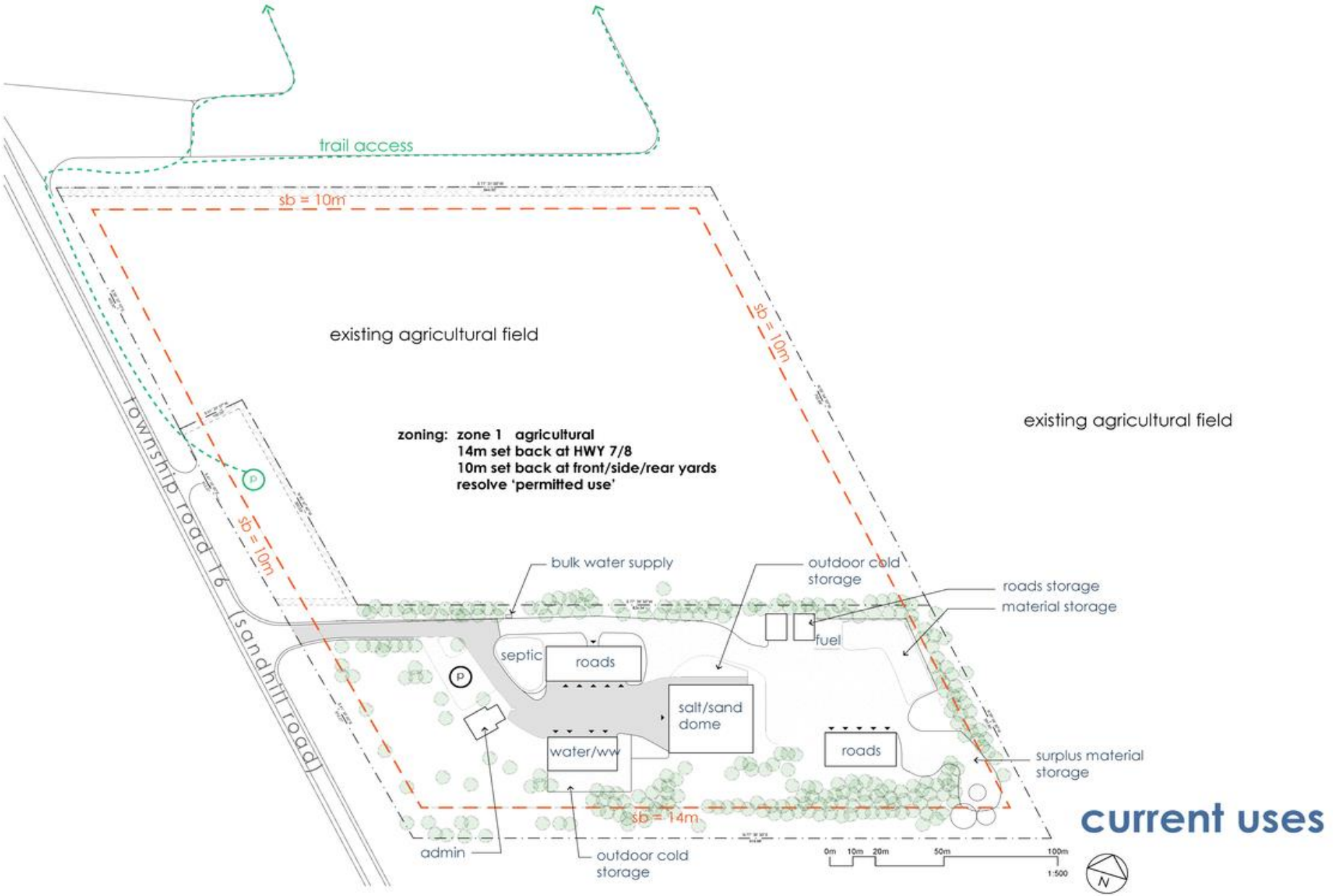
Functional Area	Office Type PO-Private OO- Open	Number of Vehicles 2022	Current Area 2022 (sq.ft.)	Number of Vehicles 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
11.0 City Employee Outdoor Vehicle Parking									
Township Employee Vehicles				51	14,706	1.35	19,853	1,844	110% of forcasted 46 employees
Visitor / handicapped Parking				10	2,906	1.35	3,923	365	
TOTAL					**17,612**		**23,776**	**2,209**	

Functional Area	Office Type PO-Private OO- Open	Number of Vehicles 2022	Current Area 2022 (sq.ft.)	Number of Vehicles 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
12.0 Outdoor Yard Space									
Roads Department									
Township Work Vehicles				22	1,019	1.3	6,836	635	5+10 extra, 1 medium, 6 small
Attachments				15	1,050	1.3	2,821.00	262	open area for plow attachments
Open Space for Parts Storage					10,000	1.3	13,000	1,208	culverts, catch basin lids, etc.
Open Space for Bulk Materials					10,000	1.3	13,000	1,208	gravel,
Open Space for Bulk Materials					20,000	1.3	26,000	2,415	waste soil, wood chipping
Open Space for Bulk Materials					20,000	1.3	26,000	2,415	asphalt to recycle
Open Space for Miscellaneous Materials					40,000	1.3	52,000	4,831	Leaves, and snow
Fleet Services									
Township Work Vehicles				2	102	1.3	6,836	635	vehicles single deep
Vehicle staging - In & Out for Repair				10	4,500	1.3	5,850	543	5 in and 5 out
Waste Tires and Fluids					416	1.3	541	50	24 tires
Waste Metal Bins (1)					250	1.3	325	30	1 bin
Utilities Department									
City Work Vehicles				15	583	1.3	6,836	635	1 large + 3 extra, 11 small
Open Space for Parts Storage					20,000	1.3	26,000	2,415	pipe, hydrants, etc.
Catch Basin Decant Pits (2)					2,000	1.3	2,600	242	8 truckloads of material
Open Space for Miscellaneous Materials					15,000	1.3	19,500	1,812	gravel

Functional Area	Office Type PO-Private OO- Open	Number of Vehicles 2022	Current Area 2022 (sq.ft.)	Number of Vehicles 2052	Required Area in 2052 (sq.ft.)	Circulation Ratio	Total Required Area (sq.ft.)	Total Required Area (sq.m)	Comments
12.0 Outdoor Yard Space									
Engineering Department									
Township Work Vehicles				3	104	1.3	6,836	635	3 pick-up vehicles single deep
Common Areas									
Outdoor Wash Pad					1,375	1.3	1,788	166	Require catwalk beside wash pad
Bunker Material Storage (14)					8,400	1.3	10,920	1,015	14 bunkers for bulk materials
Fuel pumps & Tanks					5,000	1.3	6,500	604	3 storage tanks and 4 pumps
Open Space for Miscellaneous					5,000	1.3	6,500	604	
Waste Bins					1,000	1.3	1,300	121	4 large metal/waste bins
Public Bulk Water Station					**2,400**	1.3	3,120	290	approx. 20 ft wide x 120 ft. long
Septic Field					12,000	1.3	15,600	1,449	
Storm Water Pond					30,000	1	30,000	2,787	
									Excludes internal roads,
TOTAL OUTDOOR SPACE					**210,198**		**290,708**	**27,007**	landscaping and property
									line setbacks

APPENDIX B – Conceptual Drawings


NORTH GARAGE
ADMIN
EXISTING
SALT/SAND DOME
SOUTH GARAGE
EAST GARAGE
0m 10m 20m 50m 100m
1:500



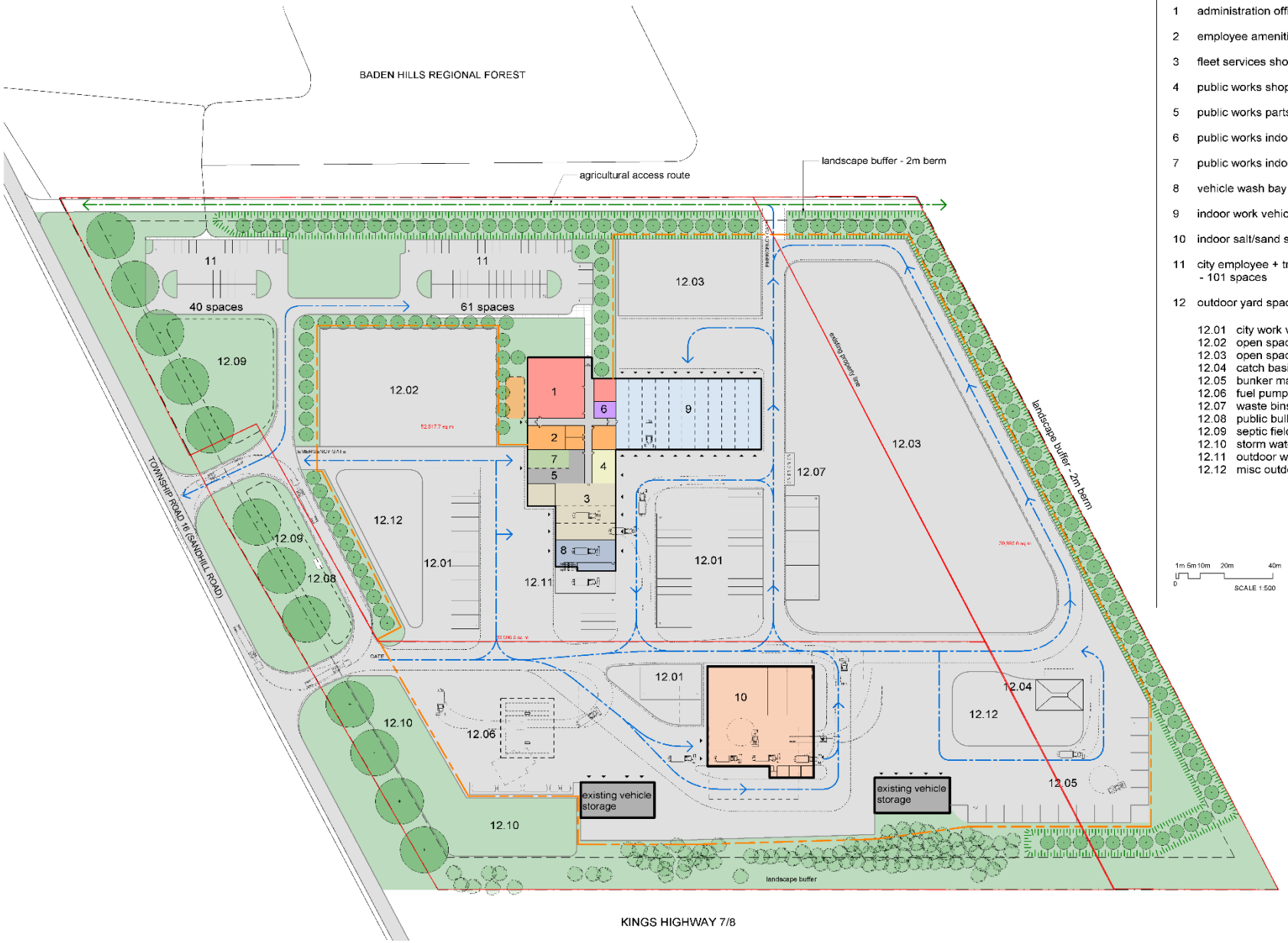
current uses

program

1 administration office
2 employee amenities
3 fleet services shop
4 public works shop
5 public works parts store
6 public works indoor tool storage
7 public works indoor bulk material storage
8 vehicle wash bay
9 indoor work vehicle storage
10 indoor salt/sand storage
11 city employee + trailhead vehicle parking - 101 spaces
12 outdoor yard space

12.01 city work vehicles + attachments
12.02 open space for parts storage
12.03 open space for bulk materials
12.04 catch basin decant pits
12.05 bunker material storage
12.06 fuel pumps + tanks
12.07 waste bins
12.08 public bulk water station
12.09 septic field
12.10 storm water pond
12.11 outdoor wash pad
12.12 misc outdoor storage

1m 5m 10m 20m 40m
0
SCALE 1:500



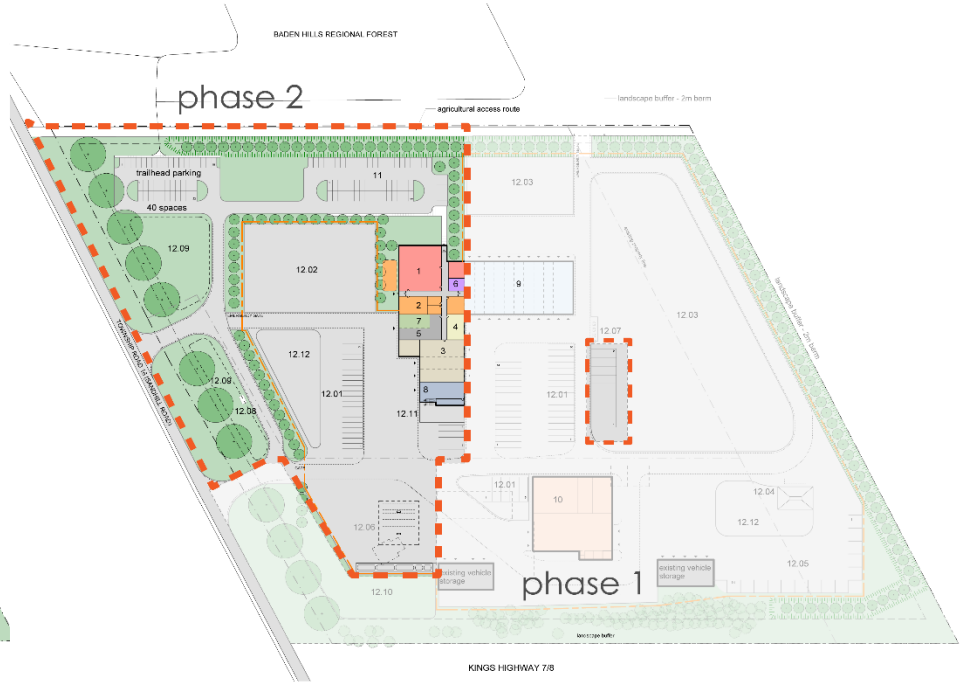
program

1 administration office
2 employee amenities
3 fleet services shop
4 public works shop
5 public works parts store
6 public works indoor tool storage
7 public works indoor bulk material storage
8 vehicle wash bay
9 indoor work vehicle storage
10 indoor salt/sand storage
11 city employee + trailhead vehicle parking - 101 spaces
12 outdoor yard space

12.01 city work vehicles + attachments
12.02 open space for parts storage
12.03 open space for bulk materials
12.04 catch basin decant pits
12.05 bunker material storage
12.06 fuel pumps + tanks
12.07 waste bins
12.08 public bulk water station
12.09 septic field
12.10 storm water pond
12.11 outdoor wash pad
12.12 misc outdoor storage

1m 5m 10m 20m 40m
SCALE 1:500

phase 1



phase 2

1 administration office
2 employee amenities
3 fleet services shop
4 public works shop
5 public works parts store
6 public works indoor tool storage
7 public works indoor bulk material storage
8 vehicle wash bay
9 indoor work vehicle storage
10 indoor salt/sand storage
11 city employee + trailhead vehicle parking - 103 spaces
12 outdoor yard space

12.01 city work vehicles + attachments
12.02 open space for parts storage
12.03 open space for bulk materials
12.04 catch basin decant pits
12.05 bunker material storage
12.06 fuel pumps + tanks
12.07 waste bins
12.08 public bulk water station
12.09 septic field
12.10 storm water pond
12.11 outdoor wash pad
12.12 misc outdoor storage