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WINNIPEG TRANSIT SYSTEM

New Satellite Transit Garage

Analysis of Three Additional Locations

April 9, 2019



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Transit Satellite Garage – Analysis of Three Additional Locations

Dear Mr. Radstrom:

We are pleased to submit our report on the analysis of three additional locations for a new transit satellite garage that is planned to replace the existing North Garage on Main Street.

Thank you for the assistance provided by you and by transit staff in the Plant and Equipment Division and in the Schedules Section during the study.

Sincerely,

DILLON CONSULTING LIMITED

A handwritten signature in blue ink, appearing to read "Taran J. Peters".

Taran J. Peters, P.Eng.
Partner

Our file: 14-9501

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Executive Summary

In a previous assignment conducted in 2014, Dillon Consulting Limited (Dillon) assessed three potential sites to accommodate on City-owned lands a new satellite transit garage with a capacity of two hundred buses. A final report, submitted in July 2015 identified the Tyne Tees property (undeveloped lands located south of Thomas Avenue between Foster Street and Chester Street) as the preferred location amongst the three options to site a two hundred bus garage.

In 2018, Winnipeg Transit requested Dillon to review three additional sites to accommodate a larger garage. Based on forecasts of operational needs developed by Winnipeg Transit following submission of the initial report, a garage that can store up to five hundred buses with a full complement of bus maintenance and bus servicing facilities is required.

Winnipeg Transit requested that the following three sites be reviewed:

- *Site A – Alsip/BP*: Bounded approximately by Cole Avenue on the north, Grey Street on the east, CN Mainline on the south, CP Emerson line on the west;
- *Site B – Cambrian Equipment*: Bounded approximately by Thomas Avenue on the north, Panet Road on the east, CN Mainline on the south, Public Works East Yard on the west; and,
- *Site C – Pandora East and Ravenhurst*: Bounded approximately by Pandora Avenue East on the north, Ravenhurst Street on the east, CN Mainline on the south, 766 Pandora Avenue East (a trucking company) on the west.

Winnipeg Transit specified that the functional space requirements and layout for a 500 bus garage (with staged implementation capacities for 250 and 350 buses), as prepared by WSP, be used for this assignment.

Dillon assessed each of the three additional locations on the following dimensions:

- Preparation of site layout plan and utility service requirements;
- Impact on the aggregate duration of pull-out and pull-in trips;
- Review of applicable zoning for a transit garage use; and,
- Review of existing documentation to identify any potential environmental issues.

Of the three alternative garage locations, **Option A – Alsip/BP** is the preferred one for the following reasons:

- It is sufficiently large to accommodate the required garage capacity and associated site requirements;
- It provides convenient access to the arterial street system for buses pulling in and out of service;
- The estimated impact on annual pull trip operating costs is similar to those for Site B and significantly better than those for Site C;

- For Bus Operator and staff access, it is reasonably close to frequent transit service operated on Nairn Avenue and to proposed alignment options for the Eastern Transit Corridor;
- It is compatible with existing land uses in the area;
- It is proximate to existing municipal servicing; and,
- It is not located on a former landfill site.

The detailed evaluation contained in the report is summarized in the following chart. For each criterion, the alternative locations are ranked (1.0 is best, 3.0 is worst). If locations were tied on a particular criterion, an average rank amongst the tied options was assigned.

Criterion	Site A: Alsip/BP	Site B: Cambrian Equipment	Site C: Pandora East and Ravenhurst	Comments
Land Area Capacity	2.0	3.0	1.0	<ul style="list-style-type: none"> • Site B is too small to accommodate required garage capacity
Access to Street System/ Transit Service	1.0	2.0	3.0	<ul style="list-style-type: none"> • Site A has least congested access to arterial streets • Site C is very isolated from transit network
Municipal Servicing Costs	1.5	1.5	3.0	<ul style="list-style-type: none"> • Site C municipal servicing costs are highest
Impact on Pull Trip Durations	1.5	1.5	3.0	<ul style="list-style-type: none"> • Sites A and B have similar impacts on pull trip costs • Site C is very isolated
Planning and Land Use Considerations	1.5	1.5	3.0	<ul style="list-style-type: none"> • Site C has the greatest potential for land use conflicts
Potential Environmental Issues	2.0	3.0	1.0	<ul style="list-style-type: none"> • Site A is not located on former landfill • Site B is located on a former landfill • Site C is predominantly located on Greenfield lands
Sum of Ranks	9.5	12.5	14.0	

While the Alsip/BP site is preferred to the other two locations that were assessed, initiatives to proceed with the site for a new East Garage will require:

- Further investigation of the environmental issues identified in this report;
- Consideration of property acquisition costs (as parcels on the site are currently owned and used by existing businesses); and,
- Analysis of electrical supply requirements should battery electric buses be stored at the garage.

1.0 Background

In a previous assignment conducted in 2014, Dillon assessed three potential sites to accommodate on City-owned lands a new satellite transit garage with a capacity of 200 buses. A final report, submitted in July 2015, identified the Tyne Tees property (undeveloped lands located south of Thomas Avenue between Foster Street and Chester Street), as the preferred location, amongst the three options, to site a 200 bus garage.

In 2018, Winnipeg Transit requested Dillon to review three additional sites to accommodate a larger garage. Based on forecasts of operational needs developed by Winnipeg Transit following submission of the initial report, a garage that can store up to 500 buses with a full complement of bus maintenance and bus servicing facilities is required.

Winnipeg Transit requested that the following three sites be reviewed:

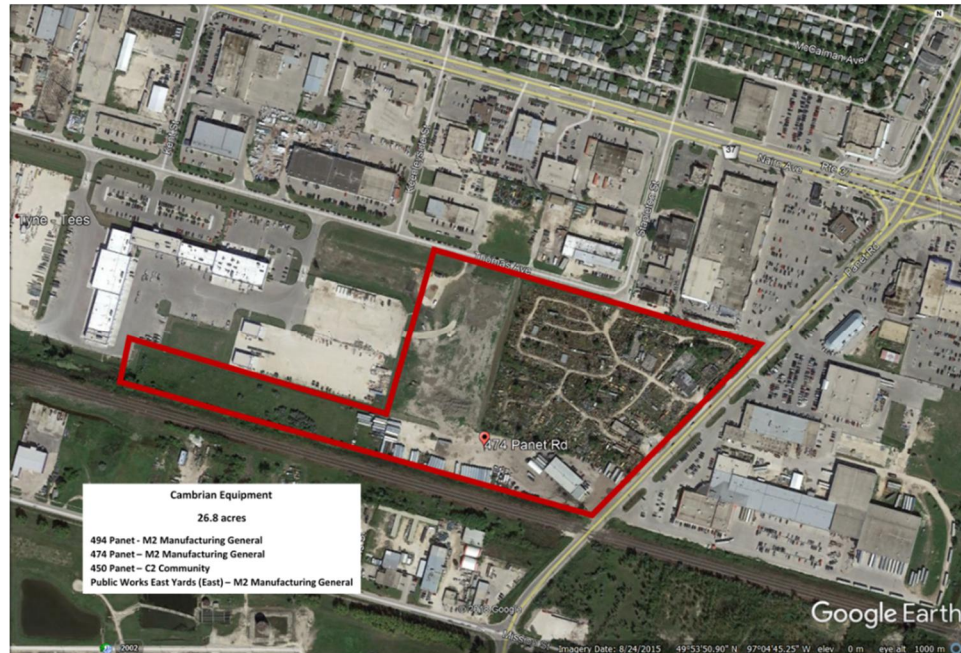
1.1 Site A – Alsip/BP

Site A is bounded approximately by Cole Avenue on the north, Grey Street on the east, CN Mainline on the south, CP Emerson line on the west.



1.2 Site B – Cambrian Equipment

Site B is bounded approximately by Thomas Avenue on the north, Panet Road on the east, CN Mainline on the south, Public Works East Yard on the west.



1.3 Site C – Pandora East and Ravenhurst

Site C is bounded approximately by Pandora Avenue East on the north, Ravenhurst Street on the east, CN Mainline on the south, 766 Pandora Avenue East (a trucking company) on the west.



2.0 Project Scope

The scope of Dillon's assignment included the following:

- Acquire information required to evaluate the three additional sites (e.g. aerial photos, LIBS drawings, transportation system information, and nearby utility alignments);
- Acquire functional space requirements and garage layout for a five hundred bus garage (with staged implementation capacities for two hundred and fifty and three hundred and fifty buses) prepared by WSP and already approved by Winnipeg Transit;
- Assess each of the three additional locations on the following dimensions:
 - Preparation of site layout plan and utility service requirements;
 - Impact on the aggregate duration of pull-out and pull-in trips;
 - Review of applicable zoning for a transit garage use; and,
 - Review of existing documentation to identify any potential environmental issues.
- Consult with the City staff to identify any potential impediments to the development of a transit garage on the alternative sites; and,
- Prepare a brief project report.

3.0 Garage Space and Site Layout Analysis

3.1 Garage Functional Design

Winnipeg Transit specified that the functional space requirements and layout for a five hundred bus garage (with staged implementation capacities for 250 and 350 buses), as prepared by WSP, be used for this assignment.

WSP provided the garage layout plan for the 500 bus garage to Dillon in PDF format. It is shown in Figure 1: Garage Layout Plan Prepared by WSP.

Dillon reviewed the WSP plan with Winnipeg Transit's Manager of Plant and Equipment to gain an understanding of the plan's elements and vehicle flows, and to identify any potential rearrangement of garage elements that could be considered during the preparation of site plans for each of the three alternative sites.

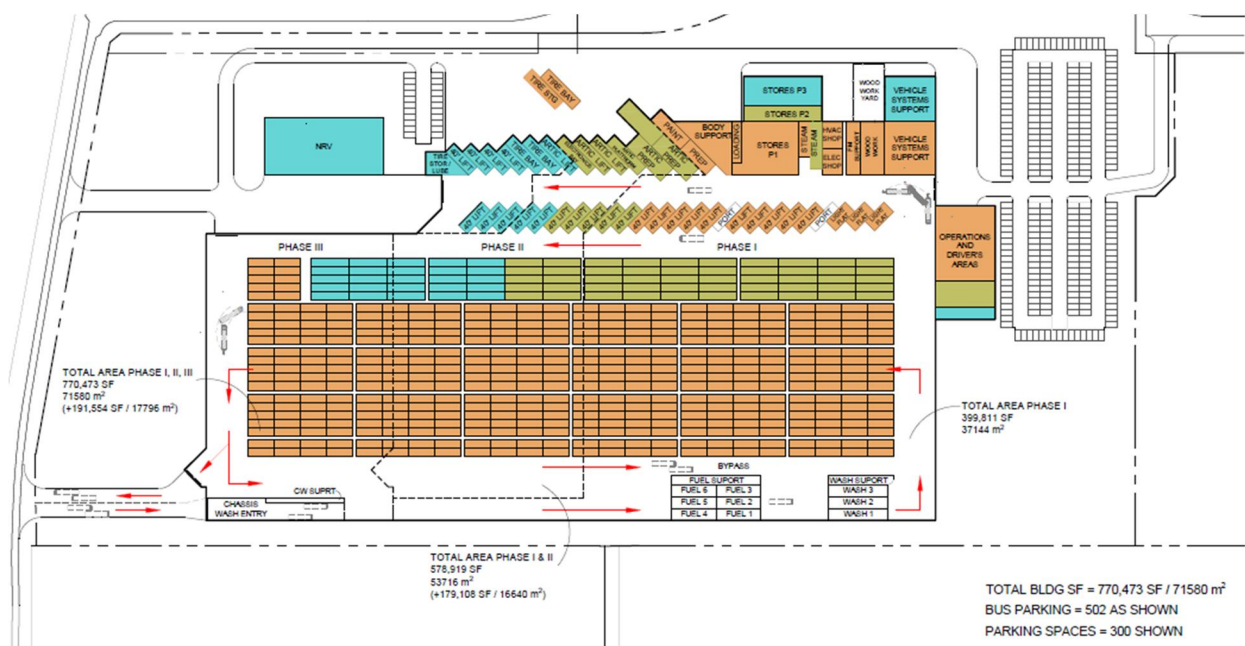


Figure 1: Garage Layout Plan Prepared by WSP

3.2 Guidelines Used in the Analysis

During the development of the garage layout and site plans for each of the three alternative locations, the following guidelines were used:

- The garage is to accommodate up to a maximum of five hundred buses, with interim building phases of two hundred and fifty and three hundred and fifty buses;

- If any of the sites could better accommodate a garage with a lower capacity (at least four hundred buses) than it could a garage with a capacity of five hundred buses, then a garage with the lower capacity was considered at such sites;
- The garage layout prepared by WSP was altered, where necessary, to best fit the garage on any of the alternative sites;
- Where alterations were required to the garage layout prepared by WSP, preference was given to bus storage areas that were “wider and shorter” rather than “narrower and longer”; and,
- The anticipated fleet mix to be stored at the satellite garage was assumed to be 85% standard (12 m) and 15% articulated (18 m).

3.3 Site A: Alsip/BP – Garage Layout and Site Plan

The site layout for the garage footprint, ancillary buildings, circulation roadways, parking lots, and municipal servicing connections are shown in:

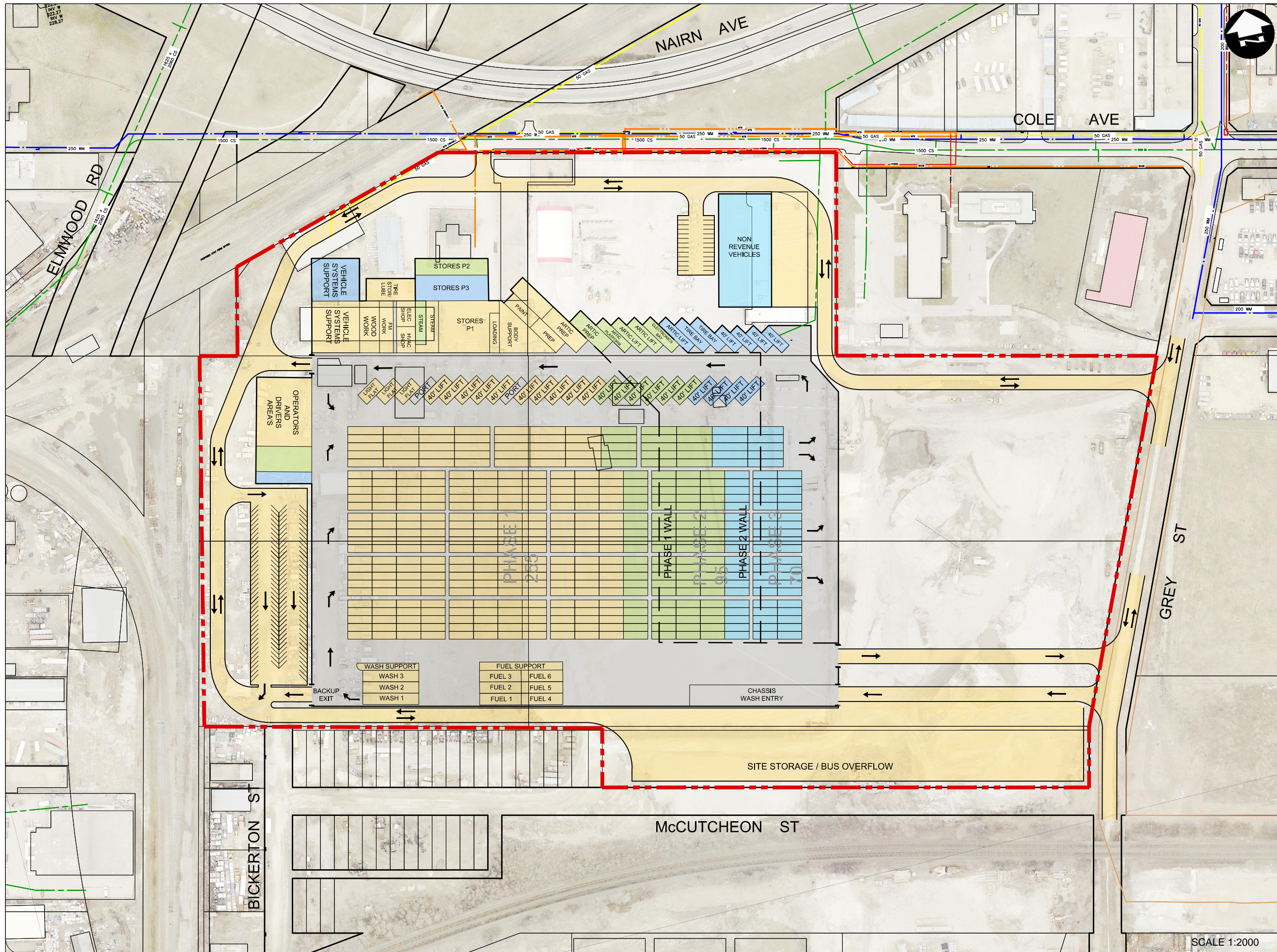
- Figure 2: Site Layout Plan; and,
- Figure 3: Municipal Servicing Connections.

3.3.1 Land Area Capacity and Access/Egress

The site is approximately 35.5 acres, and the proposed layout of the building is somewhat constrained by the irregular shaped parcel, but is still functional, even at full buildout to Phase 3. The building is located on the western side of the property, against the CPR line. This leaves space along the Grey Street frontage for further expansion, storage, or other purposes. There is adequate space on the site for a separate facility for non-revenue vehicles.

Bus access/egress to the site is to/from Nairn Avenue (an arterial roadway) via Grey Street. The Nairn and Grey intersection is currently signalized. There is an existing westbound left turn storage lane on Nairn approaching the intersection. Immediately south of Nairn, there are two lanes in each direction on Grey Street. An extension/reconstruction of Grey between Cole Avenue and the undeveloped McCutcheon Street right-of-way would be required to accommodate vehicular access to the site.

An access via Grey Avenue and Cole Avenue would provide primary access to employees and visitors to the Bus Operator/Visitor parking area.



TRANSIT SATELLITE GARAGE
SITE ASSESMENT

SITE A
ALSIP / BP

LEGEND

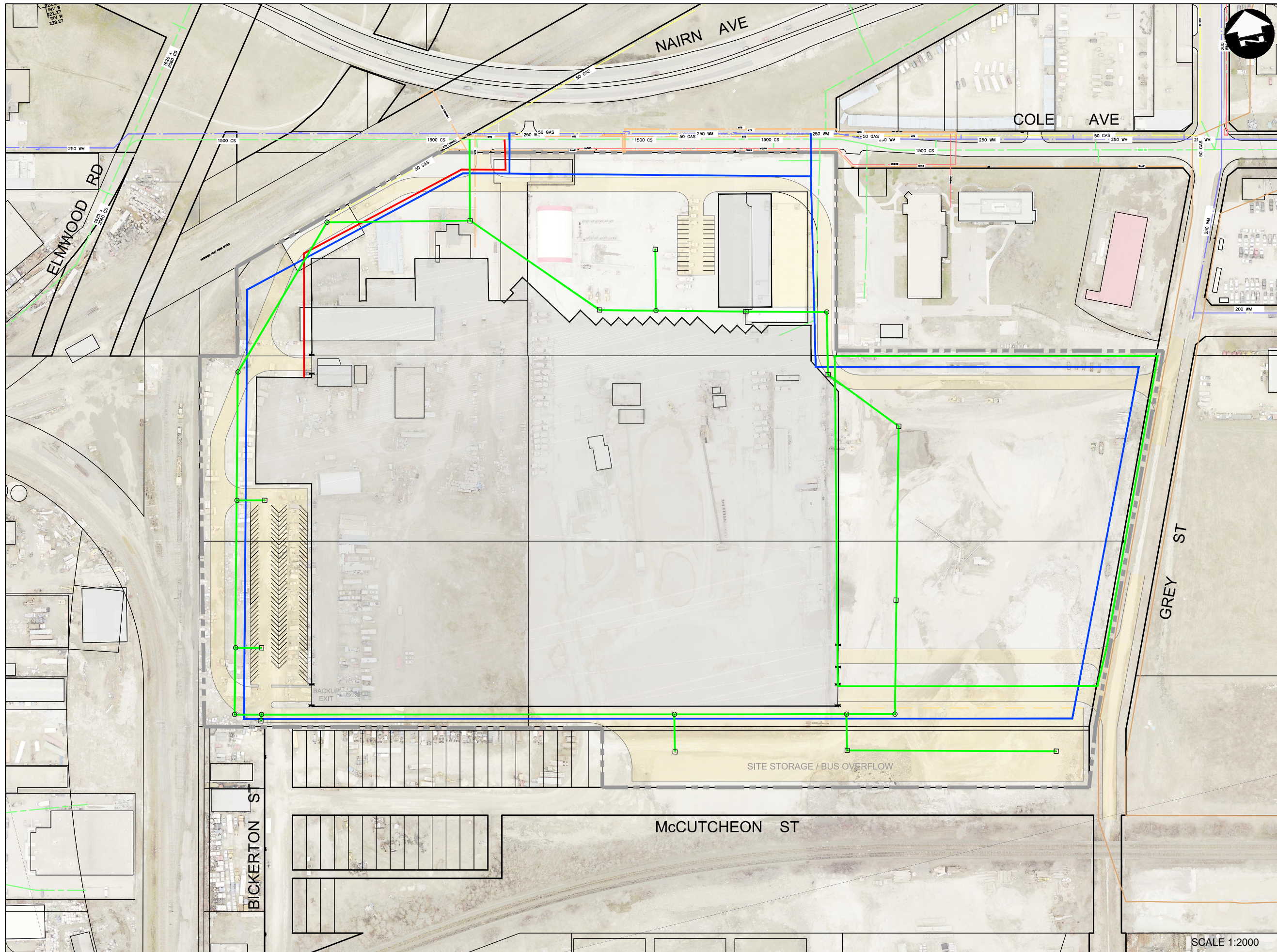
- PHASE 1
- PHASE 2
- PHASE 3
- PROPOSED PROPERTY



FIGURE 2

SCALE 1:2000

G:\CAD\MK0033-0505-Transit_Study\Drawings\Transit_Study\Report\MK0033-0505-RPT-AL-SIP-BP SITE-V2 Site Servicing.dwg



TRANSIT SATELLITE GARAGE
SITE ASSESMENT

SITE A
ALSIP / BP

SERVICE LEGEND

- WATERMAIN
- LAND DRAINAGE
- WASTE WATER
- PROPOSED PROPERTY



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SCALE 1:2000

FIGURE 3

3.3.2 Operational Features

Operational features for this site are illustrated in Figure 2 and described below in Table 1.

Table 1: Site A – Alsip/BP – Operational Features

Item	Feature	Description
1	Bus Operation Through Bus Storage Area	<ul style="list-style-type: none"> West to East.
2	Bus Operation through Bus Servicing Lanes	<ul style="list-style-type: none"> East to West.
3	Bus Operation through Maintenance Area	<ul style="list-style-type: none"> West to East.
4	Bus Connections with Street System	<ul style="list-style-type: none"> Access via Nairn and Grey signalized intersection to southbound Grey Street to site access. Egress via northbound Grey Street to Nairn and Grey signalized intersection. Northbound median lane on Grey to be designated left turn only. Curb lane on Grey to be designated for through and right turn movements.
5	Bus Storage Capacity	<ul style="list-style-type: none"> Phase 1: 255 buses. Phase 2: 350 buses. Phase 3: 420 buses.
6	Parking Lot	<ul style="list-style-type: none"> Located on west side of site, immediately adjacent to Bus Operator/Dispatch area. Approximately 142 parking spaces..
7	Vehicular Access	<ul style="list-style-type: none"> Access via Nairn and Grey signalized intersection, then southbound Grey Street, and westbound Cole Avenue or site circulatory road. Egress via eastbound Cole Avenue or site circulatory road to northbound Grey Street to Nairn and Grey signalized intersection.
8	Non-Revenue Vehicle Area	<ul style="list-style-type: none"> Located north of garage building.

3.3.3 Municipal Servicing

Municipal servicing connections are illustrated in Figure 3.

There is an existing 250 mm diameter watermain adjacent to the proposed site along Cole Avenue to the north. There are no other watermains adjacent to the site. A 200 mm diameter loop around the perimeter of the site is proposed with two connection points to the existing 250 mm diameter watermain on Cole Avenue. The watermain loop and dual connections will provide redundancy for water service and fire protection. Adequate flow and pressures will have to be verified with the City upon detailed design.

There is an existing 1500 mm diameter combined sewer along Cole Avenue flowing to the west adjacent to the north side of the site. There are no other wastewater sewers or combined sewers adjacent to the

site. A 250 mm diameter wastewater service is proposed to service the site and connect to the 1500 mm combined sewer along Cole Avenue.

The existing 1500 mm diameter combined sewer along Cole Avenue will need to be used for land drainage discharge from the site. The land drainage pipes are assumed to be between 300 mm diameter and 450 mm diameter. The transit garage site is large with a significant amount of impervious cover that includes concrete/asphalt for parking areas and laneways as well as the building and peripheral structures. This will yield a significant amount of storage that will have to be held back at a twenty-five year storm event as required by the City. It is proposed that a combination of roof storage and surface storage at catch basin locations be incorporated in the design to meet the City's storage requirements. Should it be found during detailed design that the storage volume exceeds that available on the building roof and on the surfaces (parking and grass), then a pond or underground tanks may be required. Underground tanks could be considered if sufficient surface area is not available for a pond.

The estimated cost to connect municipal services to the site, exclusive of ponds or underground tanks, is \$3.3 million.

3.4 Site B: Cambrian Equipment – Garage Layout and Site Plan

The site layout for the garage footprint, ancillary buildings, circulation roadways, parking lots, and municipal servicing connections are shown in:

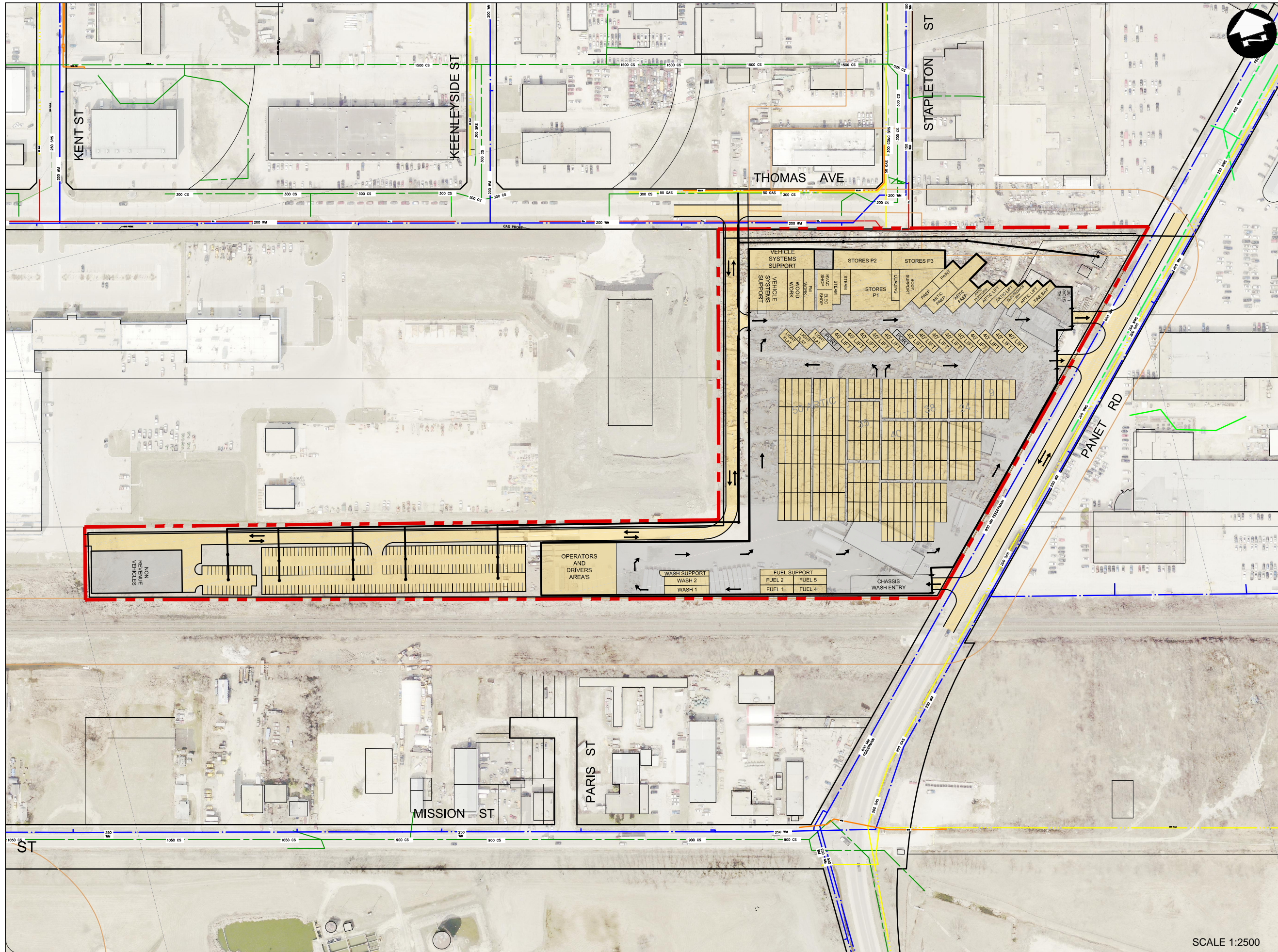
- Figure 4: Site Layout Plan; and,
- Figure 5: Municipal Servicing Connections.

3.4.1 Land Area Capacity and Access/Egress

This is the smallest of the three garage location options, encompassing approximately 27 acres, with 6 acres of the site located in a narrow parcel immediately south of the Public Works East Yard. The irregular shape of the site makes it difficult to arrange an efficient layout. Consequently, only a single phase of construction with storage for one hundred and ninety-six buses is possible on this site. Additional expansion to a larger garage is not possible.

Bus access/egress is via Panet Road with bus access to the garage building immediately adjacent to the roadway. There is virtually no on-site queuing space for arriving or departing buses, which would result in poor operations during periods of high dispatch activity. New turning lanes and signalization on Panet would be required at intersections with the access/egress approaches.

A completely separate access for other vehicular access to a Bus Operator/Visitor parking lot is via Thomas Avenue from Panet Road, Stapleton Street, or Keenleyside Street. The parking lot is located near the bus operator area of the garage. However, the walking distance between the bus operator area and the bus storage area is lengthy.



TRANSIT SATELLITE GARAGE
SITE ASSESMENT

SITE B
CAMBRIAN EQUIPMENT

LEGEND


-  PROPOSED PROPERTY



FIGURE 4

SCALE 1:2500

3.4.2 Operational Features

Operational features for this site are illustrated in Figure 4 and described below in Table 1.

Table 2: Site B – Cambrian Equipment – Operational Features

Item	Feature	Description
1	Bus Operation Through Bus Storage Area	<ul style="list-style-type: none"> • South to North.
2	Bus Operation through Bus Servicing Lanes	<ul style="list-style-type: none"> • East to West.
3	Bus Operation through Maintenance Area	<ul style="list-style-type: none"> • West to East.
4	Bus Connections with Street System	<ul style="list-style-type: none"> • Access via Panet Road (requires turning lanes). • Egress via Panet Road (requires signalization at egress approaches).
5	Bus Storage Capacity	<ul style="list-style-type: none"> • Phase 1: 196 buses. • Phase 2: Not possible. • Phase 3: Not possible.
6	Parking Lot	<ul style="list-style-type: none"> • Located on southwest portion of site, immediately south of Public Works East Yard. • Approximately 208 parking spaces.
7	Vehicular Access	<ul style="list-style-type: none"> • Access via Nairn & Panet (signalized), Nairn & Stapleton, or Nairn and Keenleyside (signalized) intersections, then Thomas Avenue to site circulatory road. • Egress via site circulatory road to Thomas Avenue and then to Nairn Avenue via Panet, Stapleton, or Keenleyside.
8	Non-Revenue Vehicle Area	<ul style="list-style-type: none"> • Located at western extremity of site (south of Public Works East Yard).

3.4.3 Municipal Servicing

Municipal servicing connections are illustrated in Figure 5.

There is an existing 900 mm diameter feedermain and a 200mm watermain to the east of the site along Panet Road. There is another 200 mm diameter watermain to the north on Thomas Avenue. Service connections to a feedermain are not typical, so the site is proposed to be supplied with potable water by the existing 200 mm diameter watermain on Thomas Avenue and on Panet Road. A 200 mm diameter loop around the perimeter of the site is proposed with two connections points to provide redundancy with for water service and fire protection. Adequate flow and pressures will have to be verified with the City upon detailed design.

There is an existing 300 mm diameter combined sewer along Thomas Avenue to the north of the site and an existing 200 mm diameter wastewater sewer to the east along Panet Road. Connecting to the wastewater sewer would be preferable but, given the proposed location of the Bus Operator area in the

garage, the sewer service would be required on the west side of the building with the most direct connection to the existing 300 mm diameter combined sewer along Thomas Avenue. A 250 mm diameter wastewater service is assumed.

Existing ditches on Panet Road collect the surface run-off from the site, which is then collected by an existing 450 mm diameter land drainage sewer further north on Panet Road. Along Thomas Avenue, the existing 300 mm diameter combined sewer is available to collect run-off. The runoff from the site is proposed to be collected by land drainage sewers of 300mm diameter. The proposed land drainage sewers will be connected to the 300 mm diameter combined sewer on Thomas Avenue. If the City prefers the runoff to be discharged to the ditches along Panet Road, the depths of the ditches will have to be investigated to determine if that alternative is feasible by gravity flows. Typically, ditches are not deep enough for this purpose. A lift station to deliver the runoff to the ditches may have to be considered.

The transit garage site has a significant amount of impervious cover that includes concrete/asphalt for parking areas and laneways as well as the building and peripheral structures. This will yield a significant amount of storage that will have to be held back at a twenty-five year storm event as required by the City. Roof storage and surface storage at catch basin locations is proposed to be incorporated into the design to meet these requirements. There is no space on this site for a pond, so if roof storage and surface storage need to be further supplemented, an underground tank may be required.

The estimated cost to connect municipal services to the site, exclusive of ponds or underground tanks, is \$3.3 million.

3.5 Site C: Pandora East and Ravenhurst – Garage Layout and Site Plan

The site layout for the garage footprint, ancillary buildings, circulation roadways, parking lots, and municipal servicing connections are shown in:

- Figure 6: Site Layout Plan; and,
- Figure 7: Municipal Servicing Connections.

3.5.1 Land Area Capacity and Access/Egress

This is the largest of the three garage location options, encompassing approximately 65 acres. Other than a former landfill site in the southwest corner of the property, there are few constraints on the garage layout and site plan. Consequently, the garage footprint can be an efficient “square” shape at full buildout, with relatively short track lengths.

As shown in Figure 6, the garage complex is oriented along the west and south limits of the property, with only a portion of a circulatory roadway positioned on the former landfill site. This arrangement leaves frontage property along Pandora Avenue East and along Ravenhurst Street for potential future development.

Bus access/egress is expected mainly from Pandora Avenue East, as Ravenhurst via Dugald would introduce schedule variability due to train crossings of the CNR Main Line on Ravenhurst. Although Figure 6 shows the bus access/egress to the garage building on the south side of the building, it may be beneficial to consider mirroring the building so that the bus access/egress is on the north side. This would shorten access/egress distances for buses operating to/from Pandora Avenue East (which is the most likely path used by most pull trips). As the Average Weekly Daily Traffic (AWDT) volume on Pandora Avenue East is approximately ten thousand vehicles, signalization is likely not required to maintain an acceptable level of service during major dispatch periods.

A major weakness of this site is that it is located a significant distance from proposed alignments for the Eastern Transit Corridor.

3.5.2 Operational Features

Operational features for this site are illustrated in Figure 6 and described below in Table 1.

Table 3: Site C – Pandora East and Ravenhurst – Operational Features

Item	Feature	Description
1	Bus Operation Through Bus Storage Area	<ul style="list-style-type: none"> North to South.
2	Bus Operation through Bus Servicing Lanes	<ul style="list-style-type: none"> South to North.
3	Bus Operation through Maintenance Area	<ul style="list-style-type: none"> South to North.
4	Bus Connections with Street System	<ul style="list-style-type: none"> Access via Pandora Avenue East or Ravenhurst Street. Egress via Pandora Avenue East or Ravenhurst Street.
5	Bus Storage Capacity	<ul style="list-style-type: none"> Phase 1: 273 buses. Phase 2: 364 buses. Phase 3: 519 buses.
6	Parking Lot	<ul style="list-style-type: none"> Located on north side of site. Approximately 137 parking spaces.
7	Vehicular Access	<ul style="list-style-type: none"> Access via Pandora Avenue East or Ravenhurst Street. Egress via Pandora Avenue East or Ravenhurst Street.
8	Non-Revenue Vehicle Area	<ul style="list-style-type: none"> Located on south side of site.

3.5.3 Municipal Servicing

Municipal servicing connections are illustrated in Figure 7.

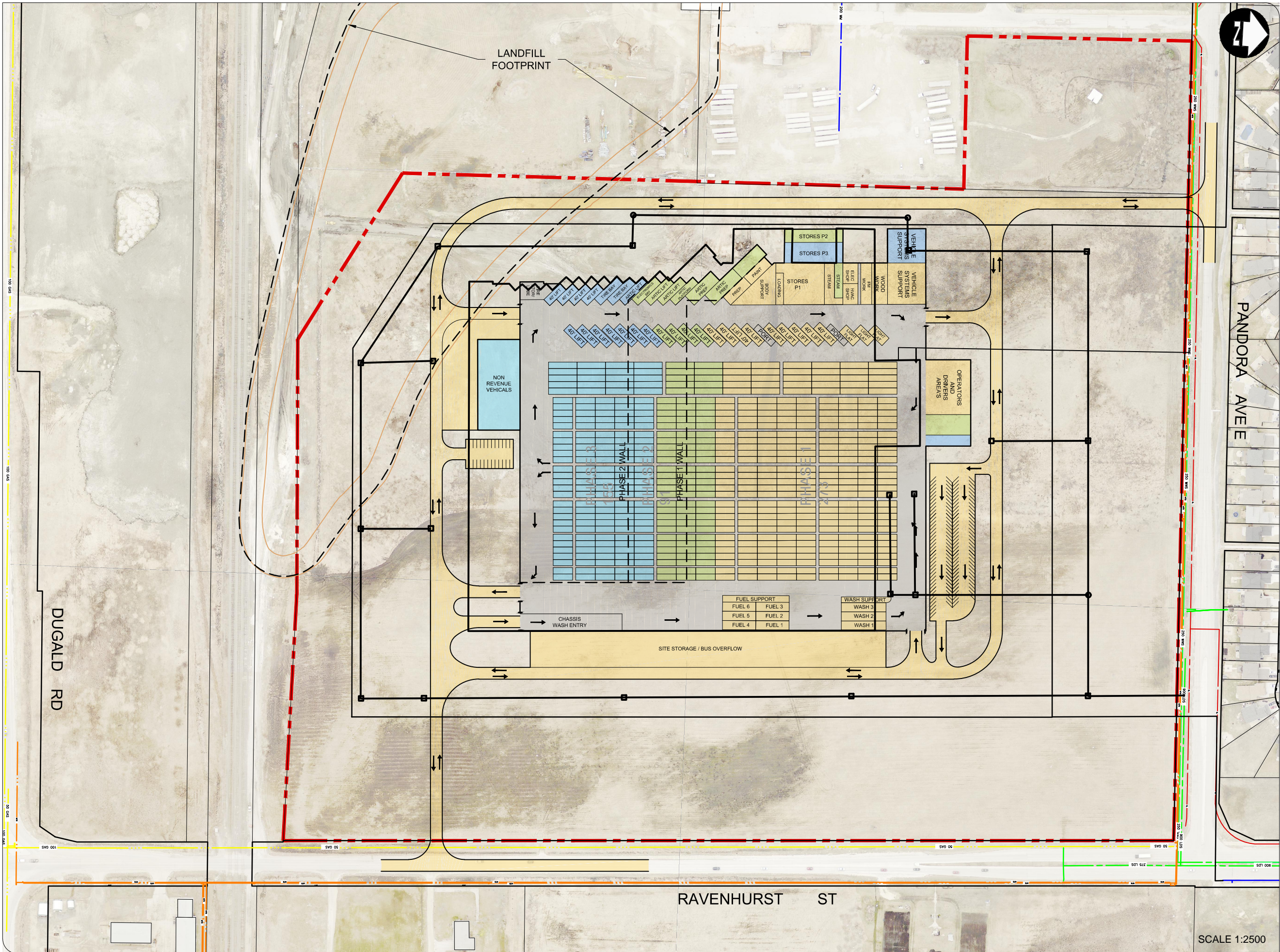
A 200 mm diameter loop around the perimeter of the site is proposed with two connections points to provide redundancy with respect to water service and fire protection. One connection to the existing system will be to the 300 mm diameter watermain on Ravenhurst Street just north of Pandora Avenue. The second connection will be to the 200 mm diameter watermain to the west of the site on Pandora Avenue at Redonda Street. Adequate flow and pressures will have to be verified with the City upon detailed design.

There is an existing 250 mm diameter wastewater sewer along Pandora Avenue north of the site. There are no other adjacent wastewater sewers or combined sewers. A 250 mm diameter wastewater service, connected to the 250 mm wastewater sewer along Pandora Avenue East, is proposed to service the site.

On Pandora Avenue East, there is a short segment of 900 mm diameter land drainage sewer that connects to the land drainage sewer flowing north on Ravenhurst Street. There is also a ditch along Pandora adjacent to the site. The site runoff will be collected by land drainage sewer proposed to be between 300 mm diameter and 450 mm diameter. The connection point will be to the existing 900 mm diameter land drainage sewer on Pandora Avenue. The depths of the ditch along Pandora Avenue may prohibit the gravity flow of the runoff from the site to the ditch. This can be investigated during a more detailed stage of design with the possibility of using a lift station to discharge to the existing ditch.

Roof storage and surface storage are considered to be adequate to meet the City's requirements. If it is found during detailed design that the storage volume exceeds that available on the building roof and on the surfaces (parking and grass), then a pond or underground tanks may be required. Space on the site for a pond may be limited if future development is planned on the southern frontage of Pandora or on the western frontage of Ravenhurst.

The estimated cost to connect municipal services to the site, exclusive of ponds or underground tanks, is \$4.5 million.



TRANSIT SATELLITE GARAGE
SITE ASSESMENT

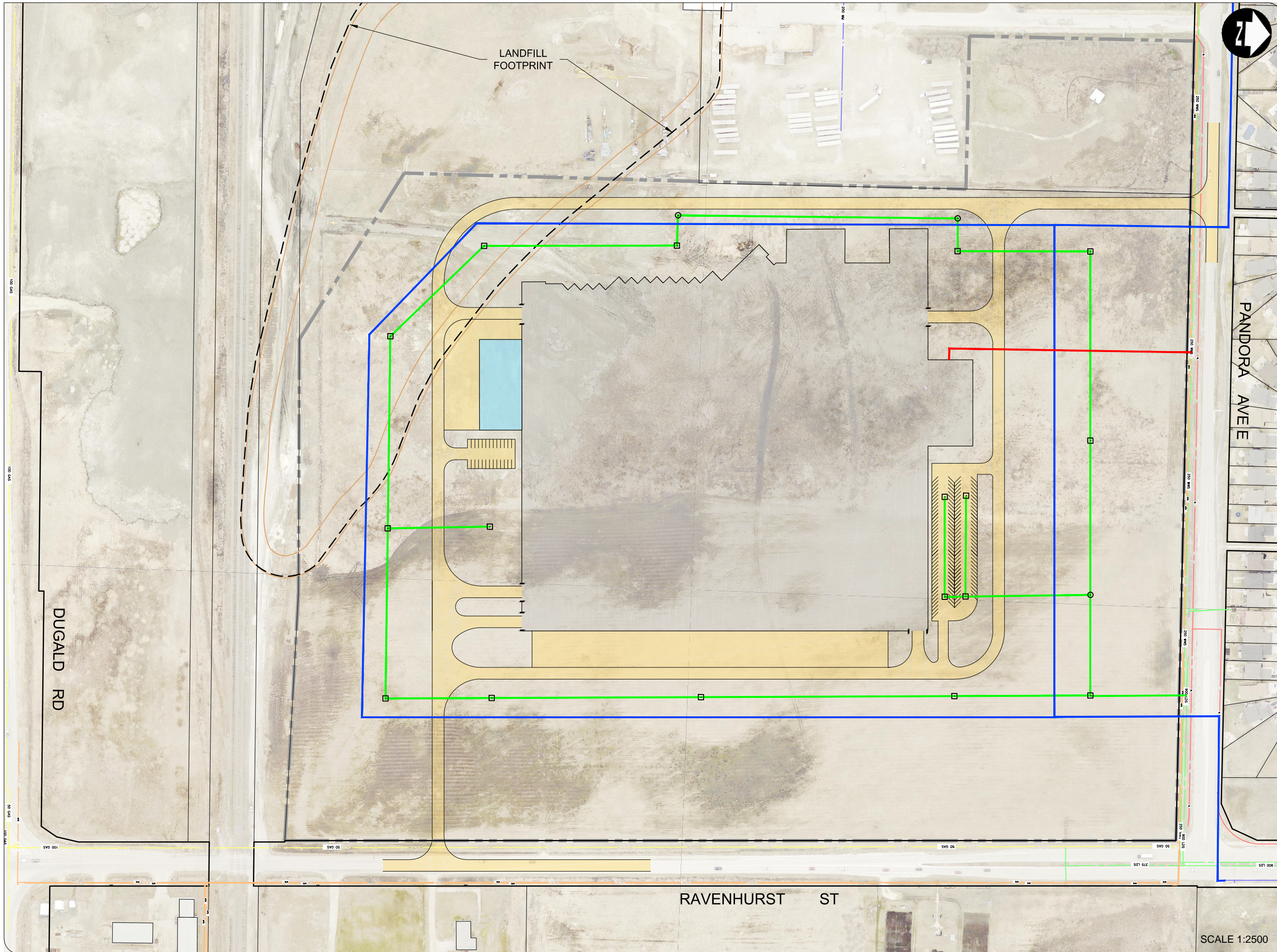
SITE C
PANDORA EAST
& RAVENHURST

- LEGEND**
- PHASE 1
 - PHASE 2
 - PHASE 3
 - PROPOSED PROPERTY



SCALE 1:2500

FIGURE 6



**TRANSIT SATELLITE GARAGE
SITE ASSESMENT**

**SITE C
PANDORA EAST
& RAVENHURST**

SERVICE LEGEND



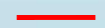

-  WATERMAIN
-  LAND DRAINAGE
-  WASTE WATER
-  PROPOSED PROPERTY



FIGURE 7

SCALE 1:2500

4.0 Pull Trip Analysis

4.1 Methodology

For this analysis, the aggregate daily duration and annual operating cost of pull trips for each alternative site in comparison to the daily duration and annual operating cost of such trips in the Winter 2017 booking was estimated.

Pull trips are defined as follows:

Type of Trip	Description
Pull-Out	A trip from the garage to a bus stop at a route terminal prior to the start of the in-service operation of the bus
Pull-In	A trip from a bus stop at a route terminal to the garage immediately following the end of in-service operation of the bus

The new satellite transit garage (referred to as the East Garage) will replace the existing North Garage on Main Street. North Garage is a relatively small facility in operation only on weekdays, and is used primarily for bus servicing, bus storage, and minor maintenance. For other maintenance and repairs, buses are required to be shuttled to the larger Fort Rouge Garage. Changeover trips are included in some vehicle schedules to accommodate this. The easterly location of the East Garage, therefore, will have the following impacts:

- All vehicle blocks (and their associated pull trips) currently operated out of North Garage will be re-assigned to operate out of Fort Rouge Garage, Brandon Garage, or the new East Garage;
- Some vehicle blocks (and their associated pull trips) currently operated out of Fort Rouge Garage or Brandon Garage will be re-assigned to operate out of East Garage; and,
- Changeover trips currently operated between North Garage and Fort Rouge Garage will operate between East Garage and Fort Rouge Garage.

Data on existing pull and changeover trips starting or ending at the three existing garages (North Garage, Fort Rouge Garage, and Brandon Garage) were extracted from Winnipeg Transit's most recent peak seasonal schedule (Winter 2017 booking – In operation between December 17, 2017, and April 7, 2018).

A *Trips File* containing a record for each of the 2,156 pull and changeover trips operated for all schedule types (Weekday, Saturday, Sunday) was prepared with each record containing the following information for the trip:

- Run Number;
- Trip Type (Pull-out, Pull-In, or Changeover);
- Trip Start Location Information (Place Number, Stop ID, x-y Coordinates);

- Trip End Location Information (Place Number, Stop ID, x-y Coordinates);
- Trip Start Time;
- Trip End Time;
- Trip Duration (minutes);
- Trip Distance (kms); and
- Trip Speed (kph).

Several trips follow the same path between Trip Start Location and Trip End Location. Consequently, a *PathID* variable was created for each trip by concatenating the Trip Start *StopID* and the Trip End *StopID* (e.g., 19901-39902). The summarization of the Trips File by *PathID* revealed 618 unique travel paths used by the 2,156 pull and changeover trips.

The *PathID* File was provided to staff in Winnipeg Transit's Schedules Section to identify those pull trip paths that would be reassigned to a different garage when an East Garage replaced the existing North Garage. A summary of the reassignments is shown in Table 4.

Table 4: Summary of Reassignment of Pull Trip Paths

Existing Garage	Schedule Type	# of Existing Pull Trip Paths	After Reassignment: # of Pull Trip Paths Assigned to		
			Fort Rouge	Brandon	East
North	Weekday	141	54		87
	Weekday	283	230		53
Fort Rouge	Saturday	155	113		42
	Sunday	126	90		36
Brandon	Weekday	134		106	28

The *Network Analyst* application of the ArcView GIS suite of software was used to estimate the shortest path (in terms of travel time) between the non-garage end of the reassigned pull trip paths and each of the three alternative garage locations. The following assumptions were used for the simulations:

- The simulations observed the allowed direction of travel on all one-way streets and all turn restrictions at intersections in the Winnipeg street network;
- All simulations required trips to start or end on the same side of the street as the origin or destination bus stop;
- The simulations used residential streets as part of the shortest path only when there were no alternative collector or arterial streets available for use;
- After review of existing operational data and simulation iterations, the following commercial speeds were used in the final simulations to approximate actual bus operating conditions for pull trips:
 - Local Streets: 6 kph;
 - Collector Streets: 17 kph;

- Arterial Streets: 23 kph; and,
- Southwest Transitway: 30 kph.

For each pull trip path reassigned to a garage different from the one used for the Winter 2017 booking, its simulated duration to/from each location option (Site A – Alsip/BP, Site B – Cambrian Equipment, and Site C – Pandora East and Ravenhurst) was then matched to each pull and changeover trip in the *Trips File* that operated over that path.

The simulated durations for the reassigned pull trips for each East Garage location option were then reviewed by Winnipeg Transit’s scheduling staff for reasonableness and accuracy. Based on the advice of the scheduling staff, adjustments were made, as necessary, to the duration values for the simulated pull trips.

This augmented Trips File was then used to calculate the aggregate daily duration and annual operating cost of bus pull trips for each alternative site and is reported in the next section.

4.2 Results

Compared to the pull trips included in the Winter 2017 booking, Table 5 shows the estimated annual aggregate change in pull trip durations for each satellite garage location option.

Table 5: Estimated Annual Aggregate Impact on Pull Trip Durations

Schedule Type	Incremental Change in Bus Hours					
	Site A: Alsip/BP		Site B: Cambrian Equipment		Site C: Pandora E & Ravenhurst	
	Daily	Annual	Daily	Annual	Daily	Annual
Weekday	(25.0)	(6,275)	(28.5)	(7,154)	16.6	4,167
Saturday	(9.4)	(489)	(9.6)	(499)	(1.6)	(83)
Sunday	(7.4)	(459)	(7.7)	(477)	(1.5)	(93)
Total Bus Hours	(7,223)		(8,130)		3,991	
Incremental Annual Operating Costs ¹	(\$505,610)		(\$569,100)		\$279,370	

¹ Calculated at Variable Operating Cost per Bus Hour of \$70. This unit cost includes allowances for Bus Operator Wages and Benefits, Diesel Fuel, and Bus Parts.

Of the three alternative location options, Site B – Cambrian Equipment is ranked highest; it would result in a net annual saving in pull trip operating costs of approximately \$569,000. Site A – Alsip/BP has similar impacts on pull trip costs, a saving of approximately \$505,000.

Site C – Pandora Avenue East & Ravenhurst is ranked lowest as it would result in an increase in annual pull trip operating costs of approximately \$279,000.

5.0 Planning and Land Use Analysis

For the three alternative sites, the following information was collected:

- Existing uses and activities on-site;
- Complete Communities Direction Strategy (CCDS) land use designation;
- Zoning of the site; and
- Surrounding context and land use compatibility.

A comparative planning and land use analysis of the three sites is summarized in Table 6.

Table 6: Planning and Land Use Analysis of Alternative Sites

Indicator	Site A: Alsip/BP	Site B: Cambrian Equipment	Site C: Pandora E & Ravenhurst
Parcel Size	35.5 acres	26.8 acres	65.0 acres
Existing Land Use	<ul style="list-style-type: none"> • Aggregate and concrete yard • Outdoor storage and manufacturing. • Portions of site are vacant. 	<ul style="list-style-type: none"> • Wreckers yard. • Trucking and logistics yard. • Portions of the site are vacant. 	<ul style="list-style-type: none"> • Undeveloped land. • Portions of land may be required for planned twinning of Ravenhurst Street.
Zoning of Site	<ul style="list-style-type: none"> • M2 – Manufacturing General (northern portion of site). • M3 – Manufacturing Heavy (majority of site). • <i>Bus Depot</i>: Permitted Use in both M2 and M3. 	<ul style="list-style-type: none"> • M2 – Manufacturing General. • <i>Bus Depot</i>: Permitted Use. 	<ul style="list-style-type: none"> • M3 – Heavy Industrial. • <i>Bus Depot</i>: Permitted use.
CCDS Land Use Designation	<ul style="list-style-type: none"> • <i>Employment Lands - General Manufacturing</i>: • Encourages employment, industrial, and supportive commercial uses. • Transit Satellite Garage facility consistent with designation. 	<ul style="list-style-type: none"> • <i>Employment Lands - General Manufacturing</i>: • Encourages employment, industrial, and supportive commercial uses. • Transit Satellite Garage facility consistent with designation. 	<ul style="list-style-type: none"> • <i>Employment Lands - General Manufacturing</i>: • Encourages employment, industrial, and supportive commercial uses. • Transit Satellite Garage facility consistent with designation.
Surrounding Land Uses	<ul style="list-style-type: none"> • Rail, industrial, then Archibald Street to the west. • Rail and Nairn Overpass to the north. • Auto-oriented commercial and light industrial uses to the north and north east. 	<ul style="list-style-type: none"> • Auto-oriented commercial and light industrial, then Nairn Ave to the north. • Panet Road, then auto-oriented commercial and general manufacturing to the east. 	<ul style="list-style-type: none"> • Pandora Avenue East to the north, then residential areas to the north and northeast. • Ravenhurst Street, then vacant land designated for future residential growth to the east.

Indicator	Site A: Alsip/BP	Site B: Cambrian Equipment	Site C: Pandora E & Ravenhurst
	<ul style="list-style-type: none"> Insect Control Heliport, vacant land, Public Works East Yard, and industrial to east. Rail to the south. 	<ul style="list-style-type: none"> Rail, light industrial, then heavy industrial to the south. Public Works East Yard and vacant land to west. 	<ul style="list-style-type: none"> Industrial and vacant lands to the west and south. Transcona Rail Yards and rail lines located to southwest and south.
Development Patterns and Activity	<ul style="list-style-type: none"> <i>Minimal to Moderate:</i> Surrounding industrial and commercial areas largely built out. Redevelopment with minor to moderate intensification possible along future Eastern Transit Corridor. 	<ul style="list-style-type: none"> <i>Minimal to Moderate:</i> Surrounding industrial and commercial areas largely built out. Redevelopment with minor to moderate intensification possible along future Eastern Transit Corridor. 	<ul style="list-style-type: none"> <i>Significant:</i> Areas to north and northeast are largely built out. Areas to the east are designated <i>Recent Communities</i>, and are likely to experience significant growth in the next five to ten years.
Land Use Compatibility	<ul style="list-style-type: none"> Transit garage compatible with surrounding industrial and commercial uses. Operational requirements for Insect Control Branch's Heliport require consideration (although Heliport may be relocating). 	<ul style="list-style-type: none"> Transit garage compatible with surrounding industrial and commercial uses. Portions of site are on former landfill site. 	<ul style="list-style-type: none"> Transit garage moderately compatible with surrounding uses. Land use conflicts may occur with the residential areas to the north, and increase over time as areas to the east develop.
Bus Access / Egress To / From Regional Transportation System	<ul style="list-style-type: none"> <i>Good:</i> Direct access to Nairn Avenue (major arterial) one block to the north via Grey Street (signalized intersection). In close proximity to potential Eastern Transit Corridor alignments. 	<ul style="list-style-type: none"> <i>Good:</i> Direct access to Nairn Avenue (major arterial) one block north via Panet Road (signalized intersection), Keenleyside Street ,or Stapleton Street. In close proximity to potential Eastern Transit Corridor alignments. 	<ul style="list-style-type: none"> <i>Poor:</i> Direct access to Pandora Avenue (collector). Access to Dugald Road (arterial) via Ravenhurst Street (collector) and at-grade crossing of active rail line. Access to other arterial routes via existing residential and commercial areas. Remote from potential Eastern Transit Corridor alignments.

Indicator	Site A: Alsip/BP	Site B: Cambrian Equipment	Site C: Pandora E & Ravenhurst
Other Considerations	<ul style="list-style-type: none"> The Insect Control Branch Heliport is located immediately east of the site. Buildings beneath helicopter flight paths cannot exceed a maximum height envelope; however, heliport relocation is under consideration Alignment options for the proposed Eastern Transit Corridor may encroach on the site. 	<ul style="list-style-type: none"> Portions of site are located on former landfill site. Alignment options for the proposed Eastern Transit Corridor may encroach on the site. 	<ul style="list-style-type: none"> Isolated from overall transit network. At-grade rail crossing at Ravenhurst Street is quite active; may impact bus running times to access/ egress the site. Infrastructure capacity issues are present in portions of Transcona that could impact the site. Upgrades dependent on development growth in the area.

While the *Complete Communities Direction Strategy* designations and zoning districts under City of Winnipeg Zoning By-law 200/2006 permit a “bus depot” on all three sites, the surrounding context, proximity to proposed Eastern Transit Corridor alignments options, and overall access to the wider regional transportation network are factors on which the sites vary.

Based on the land use and planning analysis above, the Pandora East & Ravenhurst Street site is the least desirable site for a future transit garage. While a bus depot is consistent with the zoning by-laws and *Complete Communities Employment Lands – General Manufacturing* designation for the site, overall access to a proposed Eastern Transit Corridor and regional transportation network is poor. Access is greatly impeded by lengthy distances to transit terminals, routings through existing built-up areas, and an at-grade rail crossing on Ravenhurst over a busy and active rail corridor. Land use conflicts may occur with the residential areas to the north and north-east, and with transit vehicles competing with private motor vehicle traffic on existing street networks. This may increase as the vacant lands to the east of the site develop in the near future consistent with the *Recent Communities* designation for the area.

Both the Alsip-BP and Cambrian Equipment sites are desirable from a land use planning and compatibility, *Complete Communities*, and zoning perspective. While both sites may be influenced by moderate intensification of development along Nairn Avenue over time, potential land use conflicts may be significantly lower than the Pandora East site. Ease of access to both a proposed Eastern Transit Corridor and to the wider regional transportation network via Nairn Avenue are reasonably good for each of the two sites.

6.0 Environmental Issues

A screening environmental review was completed for the three satellite garage locations. ERIS (Environmental Risk Information Services) was retained to conduct a search of federal, provincial, and private databases for each site and areas within 250 m of each site.

It should be noted that the extent of the historical information available varies with each database and the information in the databases is only current to what is publicly available. The intent of the search was to identify activities and/or infrastructure, either current or historic, which could potentially have caused contamination of soil or groundwater. The search also included neighbouring properties to address the possibility of offsite migration from these sites that could contribute to impacts on the subject properties. The results of the database search were used to identify potential environmental issues with the sites and to provide a basis for a relative ranking of environmental concern and to identify any need for further assessment.

To supplement the ERIS database search, on September 21, 2018 a meeting was held with Chris Kozak, Supervisor of Environmental Monitoring and Reporting, Solid Waste, Water and Waste Department, and Kevin Sturgeon, Senior Transit Planner, Transit Department. The intent of the meeting was to obtain additional information regarding the historic landfill operations associated with the three locations and clarify the requirements for site development.

6.1 Site A – Alsip/BP

6.1.1 Summary

The Alsip/BP site is located immediately west of the western limit of the control zone for the former Elmwood and Nairn Landfill. *For any development on the site, further site assessment to confirm the presence/absence of impacts based on current and adjacent site operations would be required.*

Given the amount of current and historic industrial development associated with the Alsip BP Site and surrounding area, coupled with the type of operations/infrastructure (e.g. fuel storage), further investigation is required to confirm the presence/absence of soil/groundwater impacts.

6.1.2 Historic Landfill Assessment

The Alsip BP Site is situated immediately west of the western limit of the control zone for the Elmwood and Nairn Landfill. As such the Water and Waste Department indicated there are no concerns regarding historic waste considerations for this site (Chris Kozack, personal communication September 21, 2018).

6.1.3 Relative Site Environmental Ranking

Moderate Concern

6.1.4	ERIS Search Results
6.1.4.1	<p>The following sites were identified on the contaminated/impacted sites list near the subject property.</p> <p>Building Products and Concrete Supply Ltd. (75 Cole Avenue)</p>
6.1.4.2	<p>This facility is located 20.33 m west-northwest, and at an equal or higher elevation than, the site of interest. The ERIS search flagged the site as potentially impacted or contaminated, and this facility is listed as File No. 44093 on the MSD <i>All Sites List</i>. The site is listed as both having fuel storage tanks (Site ID: 10891); and, as being a bulk fuel distributor with both underground (Permit No. 22700) and above ground storage tanks (ASTs) (Permit No. 22703).</p> <p>Eastwood Jeep Eagle (111 Cole Avenue)</p>
6.1.4.3	<p>This facility was located 175.43 m east-northeast, and at a lower elevation than, the site of interest. The ERIS report indicates that the now dismantled site (Site ID. 11162) historically had USTs. A 2270 L tank was installed in 1965 and was removed in 1982; and, a 22,730 L tank was installed in 1965 and was removed in 1987.</p> <p>Accurate Fire and Safety Ltd. (111 Cole Avenue)</p>
6.1.4.4	<p>This facility is currently operating at the location where Eastwood Jeep Eagle historically operated. It is listed on the MSD <i>All Sites List</i> as File No. 42770.</p> <p>Canadian Pacific Railway (1 Cole Avenue)</p>
6.1.4.5	<p>This facility is located 195.39 m west-northwest, and at an equal or higher elevation than, the site of interest. It is listed as of having fuel storage tanks (Site ID. 12616) however; the quantity and type of tanks are not provided in the ERIS report.</p> <p>City of Winnipeg Insect Control Branch (3 Grey Street)</p>
6.1.4.6	<p>This facility is located 259.96 m east, and at a lower elevation than, the site of interest. It has an entry on the MSD <i>All Sites List</i> as File No. 43488. The ERIS report indicates that the site has fuel storage tanks. Two 4545 L USTs were installed in 1960 and were removed in 1982; two 13,635 L ASTs were installed in 1966 and were removed in 1982; two 4545 L ASTs were installed in 1971 and removed in 1982; and, a final 9090 L UST was installed in 1982. This facility holds two bulk fuel distributor permits for both UST (Permit No. 20550) and AST (Permit No. 33965) infrastructure.</p> <p>Praxair (650 Nairn Avenue)</p>
6.1.4.7	<p>This facility is located 327.99 m east, and a lower elevation than, the site of interest. It is listed as a retail fuel storage tank site for propane tank refilling.</p> <p>Freeway Tire (670 Nairn Avenue)</p>
	<p>This facility is located 417.54 m east, and at a lower elevation than, the site of interest. It has two entries as a potentially impacted or contaminated site (File No. 1896 and File No. 20608). The later</p>

appears to have superseded the prior and is listed on the MSD *All Sites List*. The ERIS report indicated that the site (Site ID. 14643) is now dismantled but historically had a 2270 L capacity UST that was installed in 1976 and removed in 2001.

6.1.4.8 Talbot Service / Talbot Motors / Tempo Petroleum (**670** Talbot Avenue)

This location is 432.25 m northeast, and at an equal or higher elevation than, the site of interest. This site has an entry on the MSD *All Sites List* (File No. 44492) under the name of Talbot Service. Talbot motors is listed as having fuel storage tanks (Site ID. 12271). Three 9090 L capacity USTs were installed in 1968, removed in 1980, and replaced by three 22,730 L capacity USTs in 1980. Additionally, the site is listed as a bulk fuel distributor and is associated with two permits (Permit No. 23369 and Permit No. 23371). Lastly, there are three separate ERIS log entries for the facility having retail fuel storage tanks with the address and the facility name being slightly varied. However, each entry has an identical *Headcode* description (0118680).

6.1.4.9 Chazz's Auto Parts (**27** Watt Street)

This facility is 438.16 m west-northwest, and at an equal or higher elevation than, the site of interest. It is classified as an automobile wrecking and supply facility.

6.1.4.10 Shell Canada Products / Shell Canada Retail / Nairn Shell Self Service (**680** Nairn Avenue)

This facility is located 494.51 m east, and at an equal or higher elevation than, the site of interest. It has two entries as a potentially impacted or contaminated site (File No. 1085 and File No. 12275). The latter appears to have superseded the prior and is listed on the MSD *All Sites List*. Additionally, the site previously had fuel storage tanks (Site ID. 12275), with four 22,730 L capacity USTs installed in 1975 and removed in 1990.

6.1.4.11 Prime Motor Oils Ltd. (**34** Archibald Street)

This facility is located 498.66 m west-southwest, and at an equal or higher elevation than, the site of interest. It is listed as a dismantled fuel storage tank site (Site ID. 10833); however, the quantity and type of tanks previously on site are not listed.

There were no other findings reported within the ERIS report for this site. Recommend further site assessment to confirm the presence/absence of impacts based on current and adjacent site operations.

6.2 Site B – Cambrian Equipment – Contaminated/Impacted Sites

6.2.1 Summary

The Cambrian Equipment site is located within the footprint of the former Elmwood and Nairn Landfill. *For any development on the site, further assessment to confirm the presence/absence of impacts based on current/historic site operations and surrounding land use would be required. In addition, there would be a need to evaluate former landfill deposits in accordance with City of Winnipeg guidelines/policy.*

To comply with the City policy "Standards and Guidelines for the Mitigation of Methane Gas at Buildings and Utilities and Guidelines for Construction on Landfill Sites, December 2006" a site investigation is required to delineate the extent of waste on the property and to assess the potential for methane gas generation/migration:

- Note that approval of the intended site investigation program by the Water and Waste Department is required; and,
- Methane protective measures, approved by the Planning, Property and Development Department, must be incorporated in the design of any buildings or site services.

6.2.2 Historic Landfill Assessment

The Cambrian Equipment Site is situated within the footprint of the former Elmwood and Nairn landfill. City records indicate the eastern end of landfill below the site contained primarily construction and demolition debris (Golder, 2015 – Landfill Status Report for Closed Landfills Winnipeg, Manitoba). This is consistent with material encountered during construction of the Public Works East Yard immediately west of the site. There is the potential that some of the waste debris encountered during the Public Works facility construction (e.g. concrete rubble) may have been relocated to the east on the subject site (Chris Kozak, personal communication September 21, 2018).

6.2.3 Relative Site Environmental Ranking

High Concern

6.2.4 ERIS Search Results

The following sites were identified on the contaminated/impacted sites list near the subject property:

6.2.4.1 Former Elmwood/Nairn Landfill (960 Thomas Avenue)

This facility is located at the site of interest. It is listed on the MSD All Sites List (File No. 49661). *Note: the planned site location is entirely within the footprint of these former landfills.*

6.2.4.2 Linster Construction (1049 Mission Street)

This facility is located 189.07 m south, and at a lower elevation than, the site of interest. It is listed on the MSD All Sites List (File No. 40767).

6.2.4.3	Carlson Commercial and Industrial Services Ltd. (1035 Mission Street)
	This facility is located 192.20 m south, and at a lower elevation than, the site of interest. It is listed on the MSD <i>All Sites List</i> (File No. 43888).
6.2.4.4	East Winnipeg Resource Recovery Centre (Mission Road and Panet Road)
	This facility is located 235.18 m south, and at a lower elevation than, the site of interest. It is listed on the MSD <i>All Sites List</i> (File No. 65236).
6.2.4.5	Wayne's Towing (1107 Thomas Avenue)
	This facility is 303.75 m north-northeast, and at an equal or higher elevation than, the site of interest. It is classified as an automobile wrecking and supply facility.
6.2.4.6	Worm Trucking / Riverside Gravel (30 Stapleton Street)
	This facility is located 310.88 m north-northeast, and at an equal or higher elevation than, the site of interest. It has two entries as a potentially impacted or contaminated site (File No. 1937 and File No. 20888). The latter appears to have superseded the prior and is listed on the MSD <i>All Sites List</i> . The ERIS report indicated that the site (Site ID. 14038 and Site ID. 14639) is now dismantled but that it historically had a 22730 L capacity UST that was installed in 1976 and removed in 2001.
6.2.4.7	City of Winnipeg (501 Panet Road)
	This facility is located 323.67 m east-northeast, and at an equal or higher elevation than, the site of interest. It is listed on the MSD <i>All Sites List</i> (File No. 33161).
6.2.4.8	Focus Hyundai Ltd. (1066 Nairn Avenue)
	This address is listed as both 373.35 m north-northeast and 407.91 m north of the site of interest. In both entries this location is stated to be of equal or higher elevation than the site of interest. It is listed on the MSD <i>All Sites List</i> (File No. 34510). This site is also listed as having fuel storage tanks (Site ID. 13581) but, the quantity and type of tank is not provided.
6.2.4.9	Mr. Lube # 24 (1076 Nairn Avenue)
	This facility is located 383.77 m north, and at an equal or higher elevation than, the site of interest. It is listed as an active fuel storage tank site (Site ID. 13250) with two 22,730 L capacity USTs having been installed in 1985. This facility holds a bulk fuel distributor permit for its USTs (Permit No. 22346); and, it is listed as a retail fuel storage tank site for gasoline, oil and natural gas (Headcode: 01186800).
6.2.4.10	Nairn Self-Service / Nairn Petro-Canada (1180 Nairn Avenue)
	This facility is located 408.68 m northeast, and at an equal or higher elevation than, the site of interest. It is listed as an active fuel storage tank site (Site ID. 11903). There were 3 USTs of 22,730 L, 13,635 L, and 9090 L capacity installed in 1975 and then removed in 1976. Four additional 22,730 L capacity USTs were installed in 1976 and an additional tank of that capacity was installed in 1977. All five of these

tanks were removed in 1989 and they were replaced by three 45,460 L and one 22,730 L capacity USTs in 1989. In addition, this facility holds a bulk fuel distributor permit for its USTs (Permit No. 21942).

6.2.4.11 Frank Hermann and Sons Ent. Ltd. (1056 Nairn Avenue)

This facility is located 415.73 m north, and at an equal or higher elevation than, the site of interest. The ERIS report indicates that the now dismantled site (Site ID. 13580) historically had USTs. A 2270 L tank was installed in 1976 and was removed in 1993.

6.2.4.12 7-Eleven Gas Bar / 7-Eleven Food Stores / 7-Eleven Food Stores – Head Office (1131 Nairn Avenue)

This facility is located 490.95 m north-northeast, and at an equal or higher elevation than, the site of interest. It has two entries as a potentially impacted or contaminated site (File No. 0124 and File No. 49661). The latter appears to have superseded the prior and is listed on the MSD *All Sites List*. . In addition, this facility holds a bulk fuel distributor permit for its USTs (Permit No. 21151).

6.2.4.13 Nairn Self-Serve (1170 Nairn Avenue)

This facility is located 491.29 m northeast, and at an equal or higher elevation than, the site of interest. It is listed as a retail fuel storage tank site for gasoline, oil and natural gas.

There were no other findings reported within the ERIS report for this site. Recommend further assessment based on the current operations and former City Elmwood/Nairn landfill site.

6.3 Site C – Pandora East & Ravenhurst – Contaminated/Impacted Sites

6.3.1 Summary

The majority of the site appears to be greenfield based on review of the Google Earth images. Further inspection of historic air photos and/or review of chain-of-title records is suggested to confirm that no development has occurred on the open areas of the site.

There is an historic landfill located on the southwest corner of the property identified as CNR-Dugald Road Landfill. Note that only the eastern portion of the landfill is located within the Site C lands.

For any development on the site, further assessment of any potential historical operations on-site and confirmation of deposits of a former City landfill on-site is recommended.

To comply with the City policy "*Standards and Guidelines for the Mitigation of Methane Gas at Buildings and Utilities and Guidelines for Construction on Landfill Sites, December 2006*", a site investigation is required to delineate the extent of waste on the property and to assess the potential for methane gas generation/migration:

- Note that approval of the intended site investigation program by the Water and Waste Department is required and further approval is required for any site development pending the results of the investigation; and,
- Methane protective measures, approved by the Planning, Property and Development Department, must be incorporated in the design of any buildings or site services.

6.3.2 Historic Landfill Assessment

There is an historic landfill located on the southwest corner of the property identified as CNR-Dugald Road Landfill. Note that only the east half of the landfill is within the property. City records indicate that the landfill was formerly used for storage of demolished railcars. The start date and the type of waste placed in the landfill are unknown. A site inspection conducted in 2015 indicated there was some exposed debris at surface and that the unfenced portion of the site was actively being used for the disposal of fill material (Golder, 2015 – Landfill Status Report for Closed Landfills Winnipeg, Manitoba).

6.3.3 Relative Site Environmental Ranking

Low Concern

6.3.4 ERIS Search Results

The following sites were identified on the contaminated/impacted sites list near the subject property:

6.3.4.1 Canadian National Railways – Head Office (770 Pandora Avenue East)

This facility is located 490.79 m west of, and at an equal or higher elevation than, the site of interest. The ERIS database search flagged this site as a potentially impacted or contaminated site. It should be noted that this site has a Manitoba Sustainable Development, MSD, approval number of 20740 and that this site was listed on the *All Sites List*. However, a note in the ERIS search indicates, *Delete – Canadian National Railways – 770 Pandora Avenue*. Additionally, there is no entry for this approval number within the *All Sites List*.

6.3.4.2 Palliser Furniture Ltd. – Head Office (770 Pandora Avenue East)

This facility is located 490.79 m west of, and at an equal or higher than, the site of interest. The ERIS search flagged this site as a potentially impacted or contaminated site. The report also indicated that the site had two underground storage tanks (USTs). Each tank has a 4545 L capacity and was installed in 1981 and removed in 1991. It should be noted that this site is listed on the MSD *All Sites List* as File No. 20588.

There were no other findings reported within the ERIS report for this site.

7.0 Evaluation Summary

The evaluation of the alternative garage locations is summarized in Table 7. For each criterion, the alternative locations are ranked (1 is best, 3 is worst). If locations were tied on a particular criterion, an average rank amongst the tied options was assigned.

Table 7: Ranking of Alternative Garage Location Sites

Criterion	Site A: Alsip/BP	Site B: Cambrian Equipment	Site C: Pandora East and Ravenhurst	Comments
Land Area Capacity	2.0	3.0	1.0	<ul style="list-style-type: none"> Site B is too small to accommodate required garage capacity.
Access to Street System / Transit Service	1.0	2.0	3.0	<ul style="list-style-type: none"> Site A has least congested access to arterial streets. Site C is very isolated from transit network.
Municipal Servicing Costs	1.5	1.5	3.0	<ul style="list-style-type: none"> Site C municipal servicing costs are highest.
Impact on Pull Trip Durations	1.5	1.5	3.0	<ul style="list-style-type: none"> Sites A and B have similar impacts on pull trip costs. Site C is very isolated.
Planning and Land Use Considerations	1.5	1.5	3.0	<ul style="list-style-type: none"> Site C has the greatest potential for land use conflicts.
Potential Environmental Issues	2.0	3.0	1.0	<ul style="list-style-type: none"> Site A is not located on former landfill. Site B is located on a former landfill. Site C is predominantly located on Greenfield lands.
Sum of Ranks	9.5	12.5	14.0	

Of the three alternative garage locations, Option A - Alsip/BP is the preferred one for the following reasons:

- It is sufficiently large to accommodate the required garage capacity and associated site requirements;
- It provides convenient access to the arterial street system for buses pulling in and out of service;
- The estimated impact on annual pull trip operating costs is similar to those for Site B and significantly better than those for Site C;
- For Bus Operator and staff access, it is reasonably close to frequent transit service operated on Nairn Avenue and to proposed alignment options for the Eastern Transit Corridor;
- It is compatible with existing land uses in the area;

- It is proximate to existing municipal servicing; and
- It is not located on a former landfill site.

While the Alsip/BP site is preferred to the other two locations that were assessed, initiatives to proceed with the site for a new East Garage will require:

- Further investigation of the environmental issues identified in this report;
- Consideration of property acquisition costs (as parcels on the site are currently owned and used by existing businesses); and,
- Analysis of electrical supply requirements should battery electric buses be stored at the garage.