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Edmonton Joint Use School Site Functionality Study

Final Report

Prepared for

City of Edmonton, Joint Use Steering Committee

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Prepared by

Bunt & Associates

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CORPORATE AUTHORIZATION

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EXECUTIVE SUMMARY

E.1 Introduction

The City of Edmonton in conjunction with its partners the Edmonton Public School Board (EPSB), the Edmonton Catholic School Division ECSD) and the Greater North Central Francophone School Board (Conseil Scolaire Centre-Nord, CSCN) commissioned the City of Edmonton School Site Functionality Study to allow for a more definitive understanding of the dynamics of transportation operations around school/park sites in the City.

The primary purpose for completing this project was to identify methods for improving traffic operations in the immediate vicinity of school/park sites, outlining how issues are identified, how policies, land use and engineering solutions could be modified and how solutions can be selected to address identified issues. Although the City of Edmonton has established a number of safety related protocols in school/park areas, the City's goal through the completion of this study is to identify other opportunities and solutions to enhance student safety. A fundamental purpose for the study's completion is to provide consistency in the application of improvement measures across the City of Edmonton and to review functionality related issues associated with joint school/park sites.

E.2 Issue Identification

Observations were completed at 15 elementary/Jr. High Schools in the City of Edmonton to better understand existing issues and concerns.

High volumes of traffic at schools during arrival and pick-up times can lead to poor traffic circulation and often unsafe conditions for pedestrians, bicyclists and parents. For example, vehicle congestion and queuing during drop-off and pick-up times can conflict with pedestrian and bicycling circulation; students walking or bicycling to or from school may not use or have access to sidewalks or crosswalks; school parking areas may be of insufficient supply and unorganized, and lack of traffic controls and markings; and school buses may block visibility of pedestrians and bicyclists.

Some of the recurring issues observed at the school sites surveyed include the following:

- Parking and leaving vehicles unattended in drop-off areas;
- Parking in bus loading zones;
- Parents using bus-only zones for drop-off;
- Double queuing in drop-off areas with no space for vehicles to bypass;
- On-site bus loading zones not sufficient to accommodate all buses, buses blocking sidewalk;
- Parents parking across sidewalks;
- Parents using staff parking lot for drop-off and pick-up (Ellerslie North and Princeton);
- Reversing movements within drop-off area due to parked vehicles (mainly at St. John Bosco);

- Queue entering drop-off area backing up onto roadway, blocking through traffic; and
- Left turns entering and exiting drop-off areas creating queues and congestion on- and off-site.

Some of the recurring issues observed off-site include the following:

- Adjacent local roadways with parking on both sides leave one shared lane for two-way travel, causing congestion;
- U-turns on roadways adjacent to the school;
- Parents parking in no parking areas on-street; blocking sight lines around school or creating shared two-way single travel lanes on adjacent roadways;
- Students and parents jaywalking across roadways adjacent to the school;
- Off-site bus loading areas not sufficient to accommodate all buses; buses blocking travel lanes; and
- Parking in ETS zones.

Where some of the issues identified above existed at the surveyed school sites, school administrators have successfully implemented mitigation measures to improve operations. Some of the effective mitigation strategies employed include the following:

- Staff members directing the flow of traffic at school accesses (i.e. allowing right turn movements only) to minimize the impact on through traffic on adjacent roadways and to prevent vehicles from blocking sidewalks (i.e. Johnny Bright School and Michael Strembitsky School);

- Staff members monitoring on-site drop-off/pick-up areas to enforce loading/unloading activity only and to ensure parents are not parking and walking students into the school (i.e. Johnny Bright School, Michael Strembitsky School, St. Kateri School);

- Staff member monitoring on-site drop-off/pick-up area exit onto adjacent roadway to enforce left turn ban during peak periods; (i.e. Michael Strembitsky School);

- Pylons blocking half of entrance to drop-off/pick-up area to prevent double queuing; however, this minimizes the opportunity for vehicles to fill available spaces further along the drop-off zone (i.e. Johnny Bright School and Michael Strembitsky School); and

- Staff parking lot entrances blocked off to prevent drop-off/pick-up activity in parking lots. (i.e. St. Martha School, St. John Bosco School, Delton School, St. Kateri School, St. Augustine School).

E.3 New School Site Selection

Transportation should be a fundamental consideration when selecting a new school site. Identifying and selecting school/park sites with fewer potential transportation issues or concerns could eliminate the need for costly retrofits in the future or ongoing safety/congestion related concerns.

Based on a review of the literature, it has been determined that key factors to be considered from a traffic accommodation and neighbourhood integration perspective include the location of the school/park site relative to its surrounding land uses (proximity to commercial, multi-family etc.), neighbourhood connectivity and catchment area impacts. School site selection best practices are summarized in **Table E.1**.

Table E.1: School Site Selection Best Practices

Key Guidelines
• *Identify at the earliest planning stage parent and bus drop off requirements to assist in determining school/park site frontage requirements, access control opportunities, availability of on-street parking, etc.*
• *School/park sites should be situated centrally within a service area.*
• *School/park sites should abut two roadway frontages with at least one of the roadways being a collector roadway to efficiently and safely serve school populations.*
• *Adjacent residential land uses located across the street from school park sites should ideally be either of a flanking nature of be of a backing-on format.*
• *Elementary school sites should desirably be located as close as possible to the residential areas with provision for safe pedestrian and bicycle accessibility to minimize walking distances and reduce traffic congestion.*

E.4 Physical Design Measures

Increased traffic congestion on and around school sites, as a result of increased vehicle trips to and from schools, means increased potential conflict points between vehicles and between pedestrians and vehicles. Given the short duration of peak school-generated traffic activity, off-site roadway improvements solely for the benefit of the school are not necessarily the answer. Conversely, on-site roadway design measures to reduce congestion cannot be implemented without considering their integration with adjacent roadways. Careful planning in the design of school traffic accommodation and circulation measures to minimize traffic congestion, conflict points, and safety concerns must be considered both on- and off-site.

Ideally, accommodation of the various travel modes should be physically separated from a design perspective and should be enforced from an operations perspective.

Passenger Loading Areas

An on-site drop-off/pick-up area that is separated from other transportation uses represents the best practice for a passenger loading area.

In addition to safety considerations, the extent to which parents will choose to leave the adjacent roadway to use a provided on-site drop-off/pick-up area is related to the efficiency of its design and operation. For

example, delays in the drop-off area as a result of double-parked vehicles or vehicles waiting to make a left turn onto the adjacent street upon exit discourage its use by parents seeking efficiency over order.

To promote the use of on-site passenger loading areas, the following best practices in design and operation, summarized in **Table E.2**, should be followed.

Table E.2: On-Site Passenger Loading Area Best Practices

Key Guidelines
• *Based on the literature review in combination with the site observations completed, it is anticipated that in the order of 0.5m per student is required to accommodate queues generated by drop-off/pick-up activity (combined on-site and off-site demand).*
• *Where feasible and practical, construct new on-site parent drop-off/pick-up facilities.*
• *The passenger loading/unloading area should be separated from school bus loading and pedestrian and cyclist arrivals.*
• *Drop-off area design should never require vehicles to reverse.*
• *Drop-off/pick-up areas should operate as one-way counter-clockwise circulation so that students are loaded and unloaded directly to the curb/sidewalk without having to cross a vehicular path. One travel lane should be provided adjacent to the loading lane to allow vehicles to pass.*

Although it is preferable to accommodate designated passenger loading on-site, formalizing the use of on-street curb for passenger loading should be considered for existing sites that do not have available on-site space and for new sites where accommodating an adequate linear length for passenger loading is not feasible.

Passenger drop-off/pick-up should not be permitted on the side of the street opposite the school site. Although crosswalks should be provided to facilitate the safe crossing of pedestrians and cyclists, every effort should be made to encourage and accommodate on-street passenger loading/unloading in locations that do not require students to cross streets. Best practices with respect to off-site passenger loading areas are summarized in **Table E.3**.

Table E.3: Off-Site Passenger Loading Area Best Practices

Key Guidelines
• *Based on the literature review in combination with the site observations completed, it is anticipated that in the order of 0.5m per student is required to accommodate queues generated by drop-off/pick-up activity (combined on-site and off-site demand).*
• *Reallocate curb side space for drop-off/pick-up activities where feasible and practical.*
• *Restrict parking on the far side of the frontage roadway.*

School Bus Loading Zones

Best practices and guidelines recommend the provision of an independent, dedicated, bus loading area. Although the needs of a site may be difficult to predict and may change over time as attendance boundaries change with demographics over time, **Table E.4** summarizes the preferred characteristics of bus loading areas.

Table E.4: School Bus Loading Zone Best Practices

Key Guidelines
• *Independent, dedicated, bus loading areas should be provided.*
• *Every identified school bus parking space should be 15m in length.*
• *A single-file counter-clockwise drop-off design (passenger loading occurring adjacent to the school) which does not require buses to reverse is the preferred staging method.*
• *School buses should be oriented such that students' path to school does not cross driveways or parking lots.*

Adjacent Streets

Based on the site observations completed, it was clear that where parking was available on both sides of a frontage roadway, parents used both curbsides to pick up and drop off students. Parent parking on both sides of a roadway in front of a school creates additional pedestrian crossing movements and is a safety concern. **Table E.5** presents the best practices with respect to streets adjacent to school sites.

Table E.5: The Design of Flanking Roadways Best Practices

Key Guidelines
• *School/park sites should be located such that adjacent land uses either flank or back onto a shared roadway.*
• *The adjacent roadway should be narrowed to accommodate two basic travel lanes and a single school-side curbside drop-off/parking lane. The curbside lane should be protected by sidewalk bulbing.*
• *Adjacent travel lanes should be in the order of 3.6m wide and the adjacent parking lane should be about 3.0m wide to accommodate door swings.*

Site Access and Circulation

One-way circulation on school sites should be promoted, resulting in at least two (if not more) site accesses. School site accesses should be located on roadways with a relatively flat grade to ensure good sight lines. The location of site accesses should also consider the predominant direction of traffic and

student origins so that most drivers turn right when exiting the school. **Table E.6** presents the best practices with respect to site access and circulation.

Table E.6: Site Access and Circulation

Key Guidelines
• *All site and regulatory signage and markings shall comply with the Manual on Uniform Traffic Control Devices (MUTCD).*
• *Enforcing a right-turn outbound movement from a school site (through temporary curbing or traffic monitor) improves traffic flow on-site and reduces vehicle queues.*
• *Facilitating legal U-turn movements through a roundabout downstream or upstream (as required) from the school to facilitate access/egress and reduce around-the-block movements should be considered.*
• *The use of separate driveways for parent traffic and bus traffic at elementary schools is preferred. A single site access which then splits on-site is also an appropriate design tactic.*
• *Driveways should not be located too close to nearby intersections. The City of Edmonton Access Control Management Guideline should be referenced.*

E.5 Procedures Relating to Education and Encouragement

Education, encouragement and enforcement solutions, as well as school policies that address arrival and dismissal times and define expectations for parents and students should also be part of an overall school traffic mitigation toolbox. **Table E.7** presents the best practice guidelines in regards to education and encouragement.

Table E.7: Education and Encouragement Best Practices

• *The City of Edmonton in combination with the local area school boards should develop a series of educational guidebooks intended to build a foundation of information that will assist schools and school boards in developing safe learning environments and associated traffic safety related procedures.*
• *Educate parents about having their children choose alternative transportation modes to and from school including parent outreach programs (conferences, flyers, police presentations, school newsletters, school websites and personal contact).*
• *Employ enforcement techniques as and when required to address such issues as speeding through school zones, illegal or unsafe manoeuvres or parking violations.*

There are many competing functions and user groups in and around school sites. Students, staff, parents, pedestrians, transit users and cyclists all demand accommodation from a mobility perspective. Municipalities and school boards are challenged to safely provide safe routes and options for all population user groups within sites that are sometimes physically constrained.

1. INTRODUCTION

1.1 Study Context

Transportation to and from schools is a major and growing traffic concern. If all modes of school related traffic movements are not treated appropriately, the consequences could include real impacts on safety around school sites, the environment and overall neighbourhood liveability.

Public transit and school buses move students more efficiently, are typically safer than cars, promote physical activity by requiring students to walk to transit stops and represent sustainable alternative travel modes. Balancing the mobility needs of pedestrians and bicyclists with those of vehicular traffic, acknowledging the multiple factors at play, is a common challenge across cities and jurisdictions.

The City of Edmonton in conjunction with its Joint Use partners the Edmonton Public School Board (EPSB), the Edmonton Catholic School Division (ECSD) and the Greater North Central Francophone School Board (Conseil Scolaire Centre-Nord, CSCN) commissioned the City of Edmonton School Site Functionality Study to allow for a more definitive understanding of the dynamics of transportation operations around school/park sites in the City.

In response to this initiative, and in advance of making changes to school and school park locations and related traffic and parking facilities, Bunt & Associates was retained by the City of Edmonton to create a strategy roadmap for the implementation of City wide approaches for improving traffic operations in the immediate vicinity of school/park sites, outlining how issues are identified, how policies and engineering solutions could be modified and how solutions can be selected to address identified issues.

This study paid particular attention to a number of fundamental school site related issues including planning for and selecting the location of new school sites and a number of basic design related elements that require attention when planning for new school sites such as length of parent and school bus drop off/pick up frontage.

1.2 Project Intentions and Project Outputs

Like many other municipalities of similar size, Edmonton is experiencing increased travel to school by private auto. The City of Edmonton and Joint Use partners are interested in reviewing specific planning activities, infrastructure and measures that impact the functional design and layout of school/park sites.

Given the continued significant population growth within the municipality, the City and its Joint Use partners have identified the need to ensure reasonable and practical measures are in place to ensure that all children can get to and from school and park facilities safely upon their arrival or departure from a school/park site and in general to enhance student safety in and around school sites.

Although the focus of the assignment was to investigate a suite of mitigative countermeasures to improve the overall safety characteristics associated with the construction and operation of school/park sites, the study reviews off-street parking, on and off-street student drop-off requirements, school/park roadway frontage requirements, abutting roadway design requirements, location within the neighbourhood, adjacent land use, and ancillary social related aspects associated with traffic and pedestrian movements in the vicinity of school/park sites.

Project outputs are intended to improve safety for pedestrians, parents and bicyclists. Fundamental and basic modifications to school related facilities and operations during arrival and departure time periods can make a difference in safety for these users. Although a number of the suggested strategies could enhance school safety characteristics and improve site generated traffic operations, some of the suggested strategies may have the negative consequence of reducing background vehicle traffic operating characteristics.

1.3 Study Purpose

The primary purpose for completing this project is to identify criteria for the selection of future school sites and recommend changes to the initial planning considerations of school site location, adjacent land uses, and roadway design. In addition, the purpose is to identify methods for improving traffic operations in the immediate vicinity of school/park sites, outlining how issues are identified, how policies, land use and engineering solutions could be modified and how solutions can be selected to address identified issues. Although the City of Edmonton has established a number of safety related protocols in school/park areas, the goal through the completion of this study is to identify other opportunities and solutions to enhance student safety. A fundamental purpose for the study's completion is to provide consistency in the application of improvement measures across the City of Edmonton and to review functionality related issues associated with joint school/park sites.

This primary goal was achieved through the development of an assessment toolkit and framework that can assist City agencies and school boards in addressing traffic safety concerns associated with school/park sites in suburban and urban areas.

1.4 Scope of Work

The project included a review, assessment, and evaluation of related available data, completion of broad based consultations with the EPSB, the ECSB and CSCN, and compilation of all pertinent data into a final report with recommendations on ways to enhance the safety of students on their journeys to and from school. Study findings and recommendations can be applied to both remediate issues at existing schools and to address potential issues when planning new school/park sites.

The following general issues were investigated:

- Active transportation on the school site and in the surrounding area;
- Vehicular safety on the school site and in the surrounding area; and
- Procedural changes that can be made by the school to improve traffic safety.

Treatments to address safety related issues such as engineering, education, encouragement, and enforcement solutions, as well as school policies (i.e. school arrival and dismissal times and parent and student expectations) were considered.

1.5 Study Goals and Objectives

The primary goal was to develop preliminary design and planning solutions for existing and future school /park sites which will provide a safe and less congested environment for students to travel to and from school. The main objectives included:

- Gather information and feedback through consultations with City agencies (school boards, City of Edmonton Police department, office of traffic safety, etc.) responsible for the planning, design and operations of school/park sites with the intent to evaluate and identify measures that would mitigate concerns surrounding student travel safety;
- Undertake site review and observations at a select number of EPSB and ECSB elementary schools;
- Identify effective engineering, site design, education, enforcement, and encouragement measures which have proven potential to enhance student travel safety (measures that have been proven through engineering studies in North American jurisdictions to be effective in mitigating safety concerns); and
- Develop and outline recommendations and specific action plans to enhance traffic and student safety and reduce traffic collisions and near misses related to school travel routes at existing sites and when planning for new school/park sites.

1.6 Study Methodology /Work Program

The Consultant completed the following:

- Reviewed previous and ongoing studies relevant to the project;
- Reviewed Zoning Bylaw school/park site parking and parent drop-off requirements;
- Completed transportation reviews for a selected number of school/park site campuses (including school population profiles and characteristics) to analyze the amount of off-street parking spaces required (parking demands), drop-off spaces required, adjacent roadway characteristics, school

park frontages, other park activities and time frames and other variables to establish the quantitative and functional requirements of access, bicycle, storage, parking and loading for students, teachers and staff, visitors, buses, service vehicles, and student drop-off/pick-up zones, etc.;

- Reviewed parking lot sharing (school/community league) and or drop-off location sharing (school buses and parent).
- Undertook consultation with all agencies responsible for the planning and design of school/park sites including busing operators;
- Reviewed EPSB, ECSB an CSCN school safety programs and provide recommendations or enhancement where appropriate;
- Identified best practice strategies and opportunities realized through examination of other Canadian and International municipalities and identify and develop where appropriate planning and policy strategies to deter unsafe behaviors of drivers, pedestrians, and bicyclists;
- Identified traffic control requirements and/or enhancements where appropriate along the major routes adjacent to school/park sites including signals, crosswalks, signs, parking restrictions, etc. The traffic control requirements and/or enhancements recommended should have proven records of reducing crashes, and/or incidents for school travel;
- Identified opportunities or other measures to minimize the need for students to cross major arterials, high traffic volume intersections, or unprotected intersections and recommend improvements or other enhancements to support student safety;
- Identified educational strategies (including who should lead/implement the educational programs) for parents, students, and drivers;
- Identified enforcement and encouragement strategies (including who should lead/implement the educational programs) for activities related to creating safe walking and bicycle routes to schools and pedestrian safety and driver safety awareness;
- Identified opportunities for innovative pedestrian safety enhancements or solutions;
- Developed engineering approaches for design, implementation, operation, and maintenance of physical measures such as traffic calming (note these must also be considered in context with the City's overall management of the transportation network to ensure consistency throughout the City);
- Identified alternative modes of supervised transportation such as walking school bus, car sharing etc.; and
- Identified a series of measures of effectiveness.

1.7 Literature Review

The City of Edmonton and its partners wished to identify good practices across various school board systems. The following references were reviewed as part of this project:

- City of St. Albert Safe Journeys to School, Final Consultants Report, March 2015
- Safe Routes to Schools Briefing Sheets (Miscellaneous), Institute of Transportation Engineers:
- School Area Transportation Safety Guidelines, MMM Group, TAC Conference Presentation, 2015
- The Development of School Area Traffic Safety Guidelines for Manitoba, MMM Group Ltd., TAC Conference Presentation, 2013
- Retooling School Drop-Off/Pick-Up Zones to Meet Demand, Keith Higgins, Hatch Mott MacDonald
- School Site Planning, Design, and Construction, Institute of Transportation Engineers Traffic Engineering Council, 2013
- Traffic Operations and Safety at Schools Recommended Guidelines, Texas Transportation Institute, The Texas A&M University System, January 2004

As part of the overall literature review, the City of Edmonton's Office of Traffic Safety was contacted. It is understood that the Office of Traffic Safety is completing a concurrent, independent study related to improving the safety at various school sites in the City. Results of this study were not available at the time of preparation of the Edmonton Joint Use School Site Functionality Study report.

1.8 Report Organization

In addition to this introductory chapter, this report is segmented into seven additional chapters. **Chapter 2** identifies existing challenges. **Chapter 3** presents a summary of the site visits and observations completed at existing school sites. **Chapter 4** outlines measures to enhance safety at and around school sites. **Chapter 5** presents criteria to consider in site selection, **Chapter 6** presents physical design measures, and **Chapter 7** presents non-physical measures to alleviate congestion and improve safety. The study conclusions and recommendations are summarized in **Chapter 8**.

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A number of factors have led to the reduction in walking to school and the increased congestion and traffic problems at schools. Some problems are created by schools established long ago at poor locations requiring students to walk further or cross busy streets. Some factors are related to the school location that has resulted in unintended negative consequences. This chapter of the report presents a summary of the literature review and stakeholder interviews related to the basic factors that contribute to congestion around school/park sites.

2. IDENTIFYING THE CHALLENGES

2.1 Underlying Issues at Schools

School bussing is provided for students who are eligible for bussing. Anecdotally and observationally however, more parents than ever before are driving children to school. It is suggested that less than ideal traffic operations at some school sites, increasing travel distances, busy family lives, limited school busing activity, schools constructed in mature City neighbourhoods without the benefit of off-street parent or bus drop-off/pick-up facilities and other factors have all contributed to the daily decisions made by individual families to drive their children to school.

High volumes of traffic at schools during arrival and pick-up times can lead to poor traffic circulation and often unsafe conditions for pedestrians, bicyclists and parents. For example, vehicle congestion and queuing during drop-off and pick-up times can conflict with pedestrian and bicycling circulation; students walking or bicycling to or from school may not use or have access to sidewalks or crosswalks; school parking areas may be of insufficient supply and unorganized, and lack of traffic controls and markings; and school buses may block visibility of pedestrians and bicyclists.

In response to some of these issues, parents have been observed to engage in a variety of illegal or unsafe behaviors including parking in crosswalks, double-parking, speeding, parking in “no parking” areas, ignoring turn restrictions or parking in locations that encourage their children to cross travel lanes.

2.2 Fundamental Factors that Contribute to the Risk of Congestion/Safety Concerns around School/Park Sites

Based on a review of the literature, school traffic congestion is one aspect of a larger set of problems related to school traffic. There are a number of factors that contribute to traffic congestion and safety concerns on, adjacent to, and around school sites. Underlying factors include student population, school size, school site location, and campus design. Elements that affect the degree to which the various user groups manoeuvre in a complimentary fashion include the following principal factors and their associated influencers.

2.2.1 Student Population Changes

While many factors contribute to the problem of school traffic congestion, the growth in school-aged population over a relatively short time is one of the underlying factors for school traffic congestion. Combined with urban sprawl and the growth in car ownership and use, there has been a decline in the number of children walking or cycling to and from school independently. Based on a report prepared for the Edmonton Public School Board, it has been predicted that student enrolment will rise over the next 15 years and by 2029 there could be up to 36,000 more students in the system.

The demographics-based report looked at school-aged children between the ages of five and 17. A citywide forecast for student enrolment showed that a low forecast of 1.5 percent growth would equate to 29,681 additional students and a high forecast of 1.7 percent growth would see 36,610 additional students.

2.2.2 Increased School Sizes

School enrollments of between 400 and 700 students are not uncommon. More recently elementary/ junior high schools of 800 to 1,000 students are operating in suburban locations. In some cases, larger school populations are reflective of larger attendance boundaries which can mean longer walking distances. Longer walking distances can discourage walking and alternative modes and create traffic problems.

The aforementioned realities and many of the other issues associated with traffic around schools, make it important to aggressively consider the location of the school/park site within a neighbourhood and the abutting roadway system and its inherent design to ensure the safest possible traffic environment. Equally important is the consideration of the internal design of the school site, preferably during the planning stages, in order to establish safe and efficient operations.

2.2.3 School Site Location

A key factor when considering traffic congestion in the vicinity of school/park sites is the relative location of the school/park within a community taking into account the number of athletic fields, the number of students enrolled and the number of students bused to school.

If not well planned from a locational perspective, constructing a new school in a neighbourhood may result in traffic congestion. New schools are typically constructed to accommodate anticipated growth associated with new residential development. However, the new schools may not have been appropriately accounted for when considering new site generated traffic on the abutting and area roadways. Roadway networks (number of travel lanes and overall width, horizontal and vertical alignment and length of frontage) adjacent to identified school sites should be planned to respond to the needs of all users, including school site traffic demands.

Even new residential developments designed to be pedestrian-friendly with walkways through the neighborhood have encountered congestion problems around schools. Locating school sites within new plan areas should consider the future influence of upstream and downstream pedestrian corridors, traffic signals and other traffic control devices. Selecting a school site location in a new area should be done at

preliminary planning stages where there continues to be flexibility in the roadway design/alignment in the planning of the area/neighbourhood.

In addition, the construction of a new residential subdivision may lead either the EPSB or the ECSD to change school enrollment boundaries. Such changes have the potential to alter the school composition, with younger students' generating more parent drop-offs and pick-ups, and students arriving from more remote destinations leading to an increase in congestion.

2.2.4 Campus Design

The physical design of the school/park campus including the abutting roadway network is directly tied to the predominant mode of transportation to and from schools, the private automobile.

If abutting roadways include narrow streets that allow parking on both sides, it is unlikely that ample room for cars to maneuver will be provided. Alternatively, wider roadways may also lend themselves to undesirable traffic operations.

Inadequate drop-off/pick-up areas for school buses and parents, inappropriate traffic control signs and poorly timed traffic lights, entry and exit routes designed without consideration of overall commuting patterns and inadequate frontage curb space (and inappropriate use of curb space causing visibility concerns) all represent possible sources of traffic congestion around school/park sites. Other considerations include:

- Building development and orientation (the size and location of school buildings and other school park facilities and their orientation and interface with the abutting roadway system);
- Building site coordination (loading areas, emergency access routes, illumination, signing, security);
- Older schools which are not designed to accommodate current drop-off/pick-up activity; and
- Parking Infrastructure (the size, orientation, configuration, circulation, access, inventory to meet staff, student and visitor parking demands and shared parking opportunities).

2.2.5 Design of the Adjacent Roadway Network

Schools should be accessible from adjacent roadways which are both capable of handling school and background (current and projected) traffic movements. Roadway design elements that require attention include right-of-way availability for sidewalks, bike lanes, and possibly curb parking lanes.

2.3 Stakeholder Consultation

Throughout the course of the study, Bunt & Associates consulted with a number of local stakeholders to gain a better understanding of current issues, constraints, concerns, and opportunities based on the experience and the role that the individual stakeholders hold. The following summaries identify the principal feedback received.

(Informal consultation with individual school staff members and administration was also completed during site investigations. Insights gleaned during these conversations are included in the site-specific summaries included in Appendix A and referenced in Section 3).

2.3.1 Edmonton Public Schools: Jon Dziadyk, Planner

- Current City culture is to drive kids to/from school
- High visibility sign pilot project currently in place at a number of schools
- Front drives across from schools are not ideal
- School start times are at discretion of principals – staggered start times an option for shared sites
- Ideally, school locations should be centrally located within catchment areas/neighbourhoods to reduce walking distances for all
- Schools are windrow-free zones (as of last few years) and this seems to help with winter congestion
- Multi-storey schools with reduced footprints could free up site area for on-site drop-off accommodation. Reluctance to multi-storey schools: Cost, Barrier-free challenges
- Roadway signage change requests made by EPSB to City are typically approved

2.3.2 Edmonton Catholic School Division: Rob Tarulli, Senior Land Use Planner

- Priority to mitigate any back-ups on streets and improve ways to get traffic off-street (buses and cars)
- New schools will accommodate buses on site; however, has not yet been tested for efficiency/effectiveness in mitigating traffic issues
- Concern about gridlock on streets during pick-up and students darting between buses and across streets
- Potential to combine ECSD and EPSB school busing
- In favour of multi-level schools as long as needs are met. Most schools are now two-storeys. Another level could be considered.
- St. Brendan replacement school (opening September 2016) will reflect latest design and will be a good test for many strategies employed there.

2.3.3 Edmonton Catholic School Division: Lori Kozak, Student Transportation Planner

- Some buses stop at multiple schools

- Parent concerns typically about distance to bus stop from home
- Parents pay for busing (same as transit pass, which is subsidized)
- No schoolboard-wide on-site transportation communication plan. Each school is different.
- School Act states a 2.4km walking radius – ECSD attendance area is well below that.
- Feasibility study has been done with respect to combining ECS & EPS busing. Efficiencies likely in reducing number of buses.
- Schools are planned from a population perspective, Transportation not consulted.

2.3.4 Edmonton Police Service: Constable Andre Paul

- Preference is on-site drop-off facilities
- Preference is restricted left-outs from on-site drop-off facilities
- Recommends keeping ETS stops away from immediately adjacent street frontages
- Enforcement is not a solution – does not have lasting impact

2.4 Guiding Principles – Policy Development

Results of the literature review and stakeholder interviews provided informative feedback and guidance to the project team about the need and basic methods to resolve transportation issues for all modes of transportation used in school areas.

Four (4) overarching guiding principles evolved from the literature review and stakeholder engagement program to minimize peak school traffic congestion. The guiding principles, which include strategies to reduce demand and in some cases increase available capacity, emphasize the need to protect the safety of children and the need to encourage increased active transportation options for trips to and from school sites.

In general, the following guiding principles represent a combination of planning, engineering, education, encouragement, and enforcement solutions.

- Enhance school site traffic, pedestrian and bicycle accommodation and operations through appropriate school site selection planning guidelines and policy principles;
- Reduce congestion through cost effective physical on- and off-site design and enhanced traffic control measures and methods (roadway design, dedicated routes for pedestrians and cyclists, school traffic plan design including parent and school bus drop-off and pick-up lanes, on-site reservoir space, etc.)

- Reduce congestion through school-related policies including encouraging more school bus operations, carpooling, wider arrival windows, and refined school protocols;
- Reducing congestion through education, encouragement and enforcement (walking school buses, bike trains, in-classroom curriculums, etc.).

The physical location of school park sites in combination with traffic operational improvements and on-site design improvements can influence safety around school park sites during arrival and departure time periods. Prior to selecting a school site and making changes to associated traffic operations, a thorough understanding of the school's functional program and the dynamics of traffic characteristics around a school is required. This chapter of the report presents a summary of the existing school site observations and surveys completed.

3. REVIEW OF EXISTING SCHOOL SITES

3.1 Site Survey Overview

3.1.1 Existing Site Identification

In order to gain a further appreciation of issues, constraints, and challenges that currently exist at elementary school sites and combined elementary/junior high school sites in the City of Edmonton from a transportation accommodation perspective, a series of existing school site observations were completed. The surveys were completed during both the morning and afternoon peak periods of traffic and student activity.

The Edmonton Catholic School Division and the Edmonton Public School Board both identified a number of school sites for review purposes and further identified overall traffic operations at the respective sites as either exhibiting overall desirable transportation characteristics or exhibiting overall less than desirable transportation characteristics. Notwithstanding the initial categorization, it should be noted that certain elements on the sites listed in the undesirable category (i.e. school bus operations, drop-off operations) may exhibit desirable characteristics (and vice versa). The categorization reflects overall operations taking into consideration on-site and off-site operations as well as adjacent roadway and adjacent land use influences.

Table 3-1 summarizes the school sites identified for site visit and observation. Information provided by the school boards also included the current school utilization rates.

Table 3-1: ECSD and EPSB School Site Identification

	School Board	Grade Level	Student Enrollment	% Utilization	School Capacity*
Exhibits Overall Desirable Transportation Characteristics					
St. Martha School	ECS	K-6	219	99%	222
St. Augustine School	ECS	K-6	320	92%	348
St. Mary School	ECS	K-6	403	89%	453
Good Shepherd Elementary School	ECS	K-6	345	86%	402
St. Kateri School	ECS	Pre-K-6	490	103%	476
Winterburn School	EPSB	K-9	550	93%	592
Princeton School	EPSB	K-6	144	36%	400
Hardisty School	EPSB	K-9	650	69%	943
Exhibits Overall Undesirable Transportation Characteristics					
St. John Bosco Catholic School	ECS	K-6	522	104%	502
Delton Elementary School	EPSB	K-6	426	64%	666
Johnny Bright School	EPSB	K-9	952	95%	1003
Michael Strembitsky School	EPSB	K-9	889	88%	1011
Edmonton Christian Northeast School	EPSB	K-9	546	78%	700
Elizabeth Finch School	EPSB	K-9	966	95%	1017
Ellerslie North Campus	EPSB	K-9	836	116%	721

*School capacity based on enrollment and utilization provided by the school boards.

Each school site was visited during the peak AM period of student arrival (parent drop-off, school bus, transit, active modes) and during the peak PM period of student departure (parent pick-up, school bus, transit, active modes) as determined based on the bell schedule of each individual school.

3.1.2 Site Characteristics and Operations

The site visits in combination with the review of cadastral plans and aerial photography allowed for an inventory of the transportation and traffic accommodation elements present at each site to be compiled. Potential on-site elements include parking accommodation (staff and visitor), school bus zones and passenger drop-off areas. Off-site characteristics include designated school bus zones and passenger drop-off areas adjacent to the site, on-street parking, the number and classification of adjacent roadways, and Edmonton Transit bus stops and zones.

Table 3-2 summarizes the basic elements present at each of the sites surveyed.

Table 3-2: School Site Characteristics

		On-Site Elements				Off-Site Elements			
	Students 2015/2016	School Bus Zone	Visitor Parking	Staff Parking	Student Drop-off	School Bus Zone	Designated On-Street Student Drop-off	Adjacent Facility parking lot	Two or more roadway frontages
Exhibits Overall Desirable Transportation Characteristics									
St. Martha School	219	●				●	●		
St. Augustine School	320			●		●	●	●	
St. Mary School	403		●	●	●	●		●	
Good Shepherd Elementary School	345			●					●
St. Kateri School	490			●	●	●			●
Winterburn School	550	●	●	●	●				●
Princeton School	144			●		●			●
Hardisty School	650		●	●		●	●		●
Exhibits Overall Undesirable Transportation Characteristics									
St. John Bosco Catholic School	522	●	●	●			●		
Delton Elementary School	426			●		●			●
Johnny Bright School	952		●	●	●	●	●		
Michael Strembitsky School	889		●	●	●	●			●
Edmonton Christian Northeast School	546	●		●	●	●			●
Elizabeth Finch School	966		●	●	●	●	●		●
Ellerslie North Campus	836		●	●	●	●			

3.1.3 Site Operations and Observations

Observations completed at each of the school sites noted adjacent land uses, the presence of student and staff patrols, the location and extent of passenger drop-off/pick-up activity, specific observations with respect to the movement of passenger vehicles, school buses, and pedestrian activity to/from and around the school site. Movements violating signage with respect to parking and traffic control were also noted. In

many cases, comments from on-site staff were also received during observations and were noted. Where applicable, mitigation strategies being employed were also noted.

Appendix A includes a site plan (identifying the on- and off-site transportation-related characteristics including the extent of roadway frontages used for passenger drop-off and pick-up activity) and a summary of site-specific observations for each of the school sites surveyed.

3.2 School Location/Adjacencies

Table 3-3 and **Table 3-4** summarize the surveyed site locations with respect to adjacent roadways and land uses. Roadway classification, on-street parking characteristics, and adjacent land use and access to adjacent land uses have an impact on traffic congestion surrounding school sites.

3.2.1 Roadway Frontages

Eight of the surveyed sites had a roadway running adjacent to two or more of the site's boundaries. All sites, with the exception of Hardisty School, Delton School, and Ellerslie North Campus, had at least one designated collector roadway frontage.

Roadways adjacent to school sites are often used for drop-off/pick-up activity in addition to the on-site facilities. The length of frontage was quite varied among the sites surveyed as some were part of larger park sites extending for some distance beyond the school. The literature review was not helpful in identifying an ideal frontage length as many factors must be considered together. In some cases, greater frontage length or an increased number of frontages can mitigate traffic congestion by allowing vehicles to arrive from multiple directions.

Parking during peak times, whether short term to drop-off a passenger or longer term to walk a passenger inside, tends to occur as close to the front door of the school as possible, despite any restrictions (i.e. no parking zones, adjacent driveways, transit zones) that may be in place.

Without enforcement or a physical barrier to doing so (i.e. narrow two-lane roads), parking activity was observed to occur as close to school entrances as possible despite restrictions.

Winterburn School was the sole site surveyed that did not have any frontages with permitted parking (although parking along the 96 Avenue collector did occur). Despite the presence of an on-site passenger drop-off area, the adjacent collector was also used for drop-off/pick-up movements, despite the signed parking restriction.

In many cases, roads and cul-de-sacs further removed from the sites and not directly adjacent to the school site frontages, were also used for drop-off/pick-up activity.

Table 3-3: Surveyed School Site Frontages

	# of Roadway frontages	Roadway	Classification	Width (m)	*Length of Site Frontage (m)	Permitted Parking	Observed drop-off activity (yes/no)	Adjacent Land Use
Exhibits Overall Desirable Transportation Characteristics								
St. Martha School	1	East: 180 Street	Collector	11.5	145m	Both sides	Yes	MDR
St. Augustine School	1	East: 106 Street	Collector	24.3	300m	West Side	Yes	MDR
St. Mary School	1	East: Rhatigan Road	Collector	11.5	210m	Both sides	Yes	Church Parking Lot
Good Shepherd Elementary School	1	North: 57 Avenue	Collector w/ ETS	11.5	175m	Both sides	Yes	LDR w/front driveways
St. Kateri School	2	North: 41 Avenue	Collector	11.5	330m	Both sides	Yes	LDR
		East: 38 Street	Collector w/ ETS	11.5		Both sides	Yes	LDR w/front driveways
Winterburn School	2	South: 96 Avenue	Collector w/ ETS	16.0	400m	None	Yes	LDR
		West: Winterburn Rd	Arterial	12.0		None	No	LDR
Princeton School	2	South: 130 Avenue	Collector w/ETS	11.5	300m	Both sides	Yes	LDR
		West: 78 Street	Local	9.0		Both sides	Yes	LDR
Hardisty School	3	North: 106 Avenue	Arterial	14.4	400m	None	No	LDR
		South: 104 Avenue	Local	9.00		Both sides	Yes	LDR
		East: 62 Street	Local	9.0		Both sides	Yes	LDR

*Lengths are approximate

Table 3-4: Surveyed School Site Frontages, cont'd

	# of Roadway frontages	Roadway	Classification	Width (m)	*Length of Site Frontage (m)	Permitted Parking	Observed drop-off activity (yes/no)	Adjacent Land Use
Exhibits Overall Undesirable Transportation Characteristics								
St. John Bosco Catholic School	1	North: 161A Avenue	Collector w/ ETS	11.5	375m	Both sides	Yes	LDR w/front driveways
Delton Elementary School	3	North: 122 Avenue	Collector w/ ETS	13.4	135m	None	No	Park space
		South: 121 Avenue	Local	9.3		Both sides	Yes	LDR
		East: 89 Street	Local	8.0		East side	Yes	LDR
Johnny Bright School	1	North: Rutherford Rd	Collector w/ ETS	11.5	282m	Both sides	Yes	MDR and LDR w/front driveways
Michael Strembitsky School	2	SW: Savaryn Drive	Collector w/ ETS	11.5	335m	Both sides	Yes	LDR
		Se: 22 Avenue	Collector w/ ETS	11.5		Both sides	Yes	LDR
Edmonton Christian Northeast School	2	South: 159 Avenue	Collector	11.5	415m	Both sides	Yes	LDR w/front driveways
		East: 59A Street	Collector w/ETS	14.5		Both sides	Yes	LDR
Elizabeth Finch School	2	North: 160 Avenue	Collector w/ ETS	11.5	450m	Both sides	Yes	LDR
		West: 139 Street	Collector	11.5		Both sides	Yes	LDR
Ellerslie North Campus	1	West: 66 Street	Arterial	19.2	250m	None	Yes	Country Residential

*Lengths are approximate

3.2.2 Adjacent Land Uses

One common factor among all sites surveyed is the propensity for people to park as close to the school as possible to pick-up and drop-off students. Adjacent land uses offer more or less opportunity for doing so safely and conveniently.

Those school sites with fewer barriers (those adjacent to MDR or park sites with fewer accesses and thus fewer potential conflict areas), operated more efficiently.

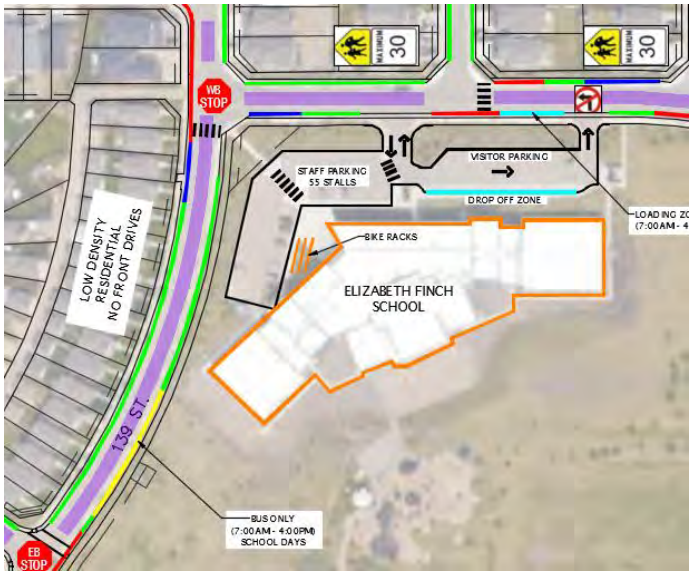
Two of the school sites surveyed, St. Augustine School and St. Mary School are adjacent to land uses whose off-street parking is used by school-generated traffic activity.

St. Augustine School is adjacent to the Duggan Community League and the associated 65 parking stalls. Much of the parent pick-up and drop-off activity occurs in the Duggan Community League parking lot. Many parents parked and walked their children inside the school. The community league parking lot is virtually full when the school bell rings.

The Riverbend Lutheran Church is located across Rhatigan Rd from St. Mary School. Given the location of the church access, multiple vehicles use the Riverbend Lutheran Church parking lot for circulation and to turn around after dropping off passengers in the bus layby along Rhatigan Road to go back north to Riverbend Road.

3.2.3 Example(s) of Desirable Adjacencies

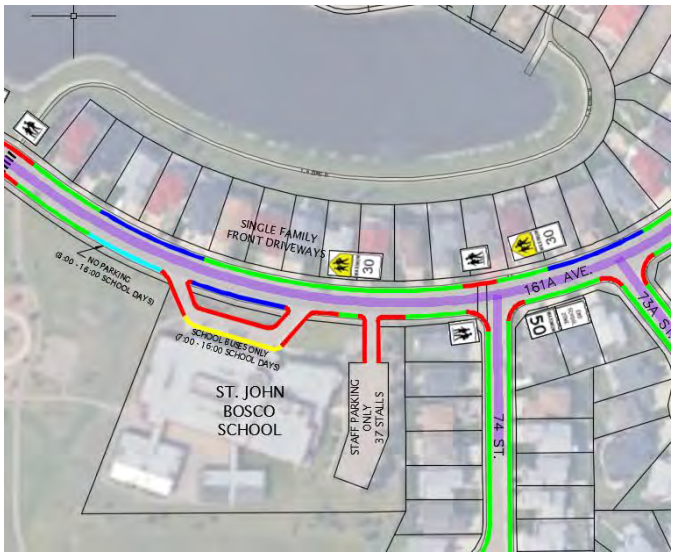
Despite being categorized as having overall undesirable operations (due to other factors), Elizabeth Finch School and Johnny Bright School are desirably located adjacent to two collector roadways with adjacent flanking/backing-on residential development. Additional enhancements to the two school plans could have included allowing for site access driveways to be developed to the staff parking facilities directly from the flanking roadway to better distribute traffic movements to the two flanking roadways.

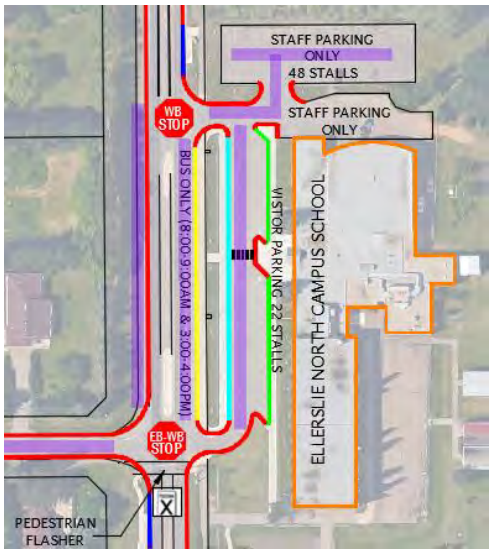


3.2.4 Example(s) of Undesirable Adjacencies

Schools like St. John Bosco that are adjacent to low density residential development with front drive access directly adjacent to the frontage of the school site experience more parking activity that is in violation of signage and in conflict with adjacent land users.

The Ellerslie North Campus was the only site that had an arterial roadway (rural in nature) as its sole adjacent roadway. Parent drop-off activity was observed to use the roadsides and students crossed the arterial roadway to access the school site.





3.3 School Busing

3.3.1 Provincial legislation

The Alberta School Act references 2.4 km as the distance to a school beyond which school boards are required to provide transportation to a student. This distance is often referred to as the walk boundary. Both EPSB and ECSD have identified that the walk boundaries of their schools are typically far less than 2.4km.

3.3.2 Edmonton Public Schools Busing Policy

Every home address in Edmonton has a designated public school based on boundaries established by the Edmonton Public School Board. Given boundaries established for efficient use of school capacities, the designated school isn't always the one closest to home.

Regular program elementary students are eligible for yellow bus service on fixed bus routes provided by Edmonton Public Schools to travel to/from school if the students:

- Attend their designated school;
- Live outside of the walk boundary;
- Live within the bus service area; and
- Are in K-Grade 6 (or K-12 in areas where ETS service does not meet standards).

In addition to the above criteria, Edmonton Public Schools provides yellow school bus service to a student's designated school if they live in a rural area, in neighbourhoods without a local school, or where Edmonton Transit service is not available/adequate.

Students on fixed bus routes typically walk a short distance from home to a designated bus stop location (i.e. ETS stop or intersection)

The attendance area established for some schools is entirely within the walk boundary and therefore no yellow school busing is provided to those sites. For example, the attendance area for Michael Strembitsky School and Johnny Bright School is within the walk boundary. The student population for these schools approaches 1,000 students, and no school buses are provided. Given the densely populated attendance areas within close proximity of these school sites, a high mode split to walk/bike could be assumed (and was observed during the spring school site survey); however, it is anticipated that during winter months, an increase in passenger drop-off/pick-up activity occurs representing a significant amount of traffic activity generated during peak times given the high student population.

3.3.3 Edmonton Catholic Schools Busing Policy

Each school in the Edmonton Catholic School Division has an Attendance Area and a Catchment Area. The Attendance Area represents the established boundaries of a school, which also generally represents a walk boundary. The Catchment Area is a broader area (which includes the Attendance area) from which the district has designated the school as the receiving school for students who are outside the Attendance area of a school.

Edmonton Catholic Schools arrange transportation for students who are entitled to transportation under the School Act (for students who reside 2.4 kilometers or more from the school to which the district has directed the student). In conversation with ECSD Transportation Planning, it is understood that the walk boundaries of their schools are typically far less than 2.4km.

3.3.4 School Busing – Surveyed Sites

It is of note that the number of buses at each school site may vary from year to year based on changing attendance areas as neighbourhood demographics change.

Of the sites surveyed, four sites were identified by their respective school board as not generating any regular program school busing. **Table 3-5** summarizes the number of school buses serving each school

(provided by the School Boards) during the 2015/2016 school year and the number of students using school buses to commute to/from school.

The number of students on yellow school buses ranged widely from virtually none (Johnny Bright School and Michael Strembitsky School) to almost 50% (Winterburn School).

Table 3-5: Student Accommodation – School Bus

	Student Population (students)	Student Ridership *includes regular bus, kindergarten, special needs, and 100 Voices students		# of Regular Program School Buses
		Students	% of Student Population	
Exhibits Overall Desirable Transportation Characteristics				
St. Martha School	219	55	25%	3
St. Augustine School	320	94	29%	4
St. Mary School	403	150	37%	4
Good Shepherd Elementary School	345	104	30%	4
St. Kateri School	490	91	19%	4
Winterburn School	550	258	47%	7
Princeton School	144	14	10%	2 special needs
Hardisty School	650	86	13%	3
Exhibits Overall Undesirable Transportation Characteristics				
St. John Bosco Catholic School	522	142	27%	5
Delton Elementary School	426	153	36%	6
Johnny Bright School	952	1	<1%	0
Michael Strembitsky School	889	6	<1%	0
Edmonton Christian Northeast School	546	66	12%	3
Elizabeth Finch School	966	48	5%	4
Ellerslie North Campus	836	12	1%	2

Table 3-6 identifies the curb length (in meters) of school bus accommodation provided both on-site and off-site at each site (estimated lengths of storage based on site visit). On-site school bus accommodation included, in some cases, exclusive school bus zones, while others had shared school bus/student drop-off zones.

Table 3-6: On and Off-Site School Bus Accommodation

	# of School Buses	On-Site School Bus Accommodation (Length in metres)		On-Street School Bus Accommodation (m)
		Exclusive School Bus Zone (m)	Shared School Bus/Student Drop-off (m)	
Exhibits Overall Desirable Transportation Characteristics				
St. Martha School	3	-	-	40
St. Augustine School	4	-	-	113
St. Mary School	4	-	-	53
Good Shepherd Elementary School	4	-	40	-
St. Kateri School	4	-	-	22
Winterburn School	7	73	-	-
Princeton School	2	-	-	36
Hardisty School	3	-	64	45
Exhibits Overall Undesirable Transportation Characteristics				
St. John Bosco Catholic School	5	37	-	-
Delton Elementary School	6	-	-	30
Johnny Bright School	0	-	-	68
Michael Strembitsky School	0	-	-	52
Edmonton Christian Northeast School	3	40	-	51
Elizabeth Finch School	4	-	-	53
Ellerslie North Campus	2	-	-	89

The majority of sites surveyed accommodated school buses on-street. It is understood that new schools being built and planned within the ECSD accommodate school buses on-site.

Schools with school buses accommodated off-site typically had staff accompanying students from the school doors to the designated on-street school bus area.

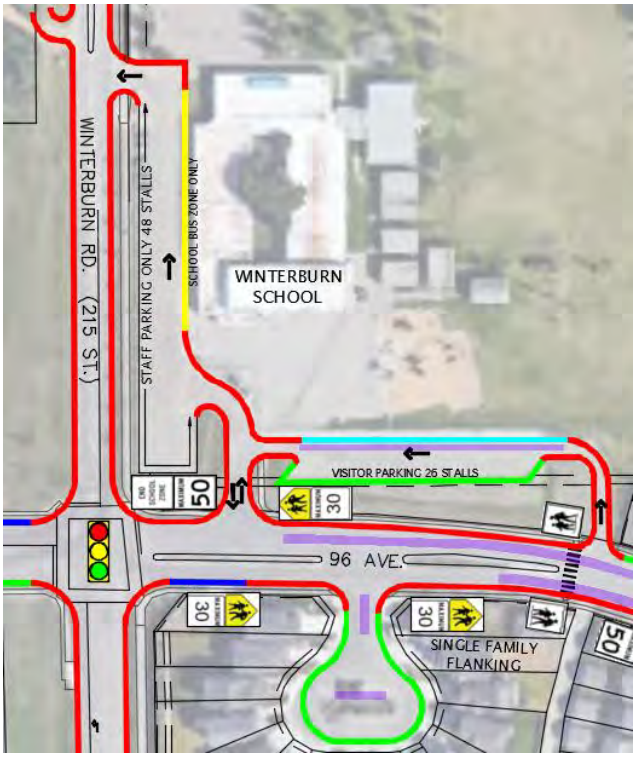
Schools with no regular busing program still had areas designated exclusively for school buses on-street. These areas often were underutilized as student drop-off/pick-up activity was not occurring due to signage restricting that type of activity.

Schools that used an off-site curbside parking lane for school bus operations instead of on-site bus lay-bys seemed to have more flexibility in terms of varying the length required as the number of school buses in the busing program may change every year.

It is generally not desirable to mix travel modes on-site. Two schools had a shared School bus/Student drop-off zone. Hardisty School has an on-site shared school bus and student drop-off/pick-up area as well as an exclusive on-street school bus area; however, the school has determined that separating the school bus and the student drop-off/pick-up activity during the AM peak relieves some of the congestion within the on-site drop-off area. In the PM peak, the school buses arrive on-site typically before parents; therefore, reserving the required spaces for the school buses before parents fill up the shared drop-off/pick-up area.

3.3.5 Example(s) of Desirable School Bus Accommodation

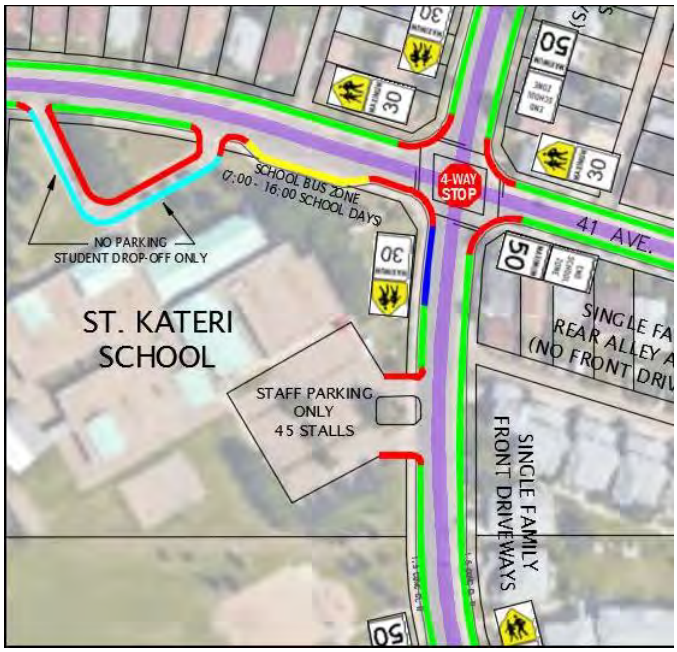
Winterburn School provides an on-site school bus lay-by that is accessed separately from the on-site parent drop-off/pick-up lay-by. Separating these movements reduces congestion at access and egress points.



3.3.6 Example(s) of Undesirable School Bus Accommodation

Schools like Good Shepherd School, with on-site shared school bus and student drop-off/pick-up areas did not operate as well as schools with separated school bus areas due to parents filling the drop-off zone and impeding the entrance of buses as they arrived. This leads to further congestion on adjacent roadways and as times blocks sidewalks and pedestrian paths.

Schools, like St. Kateri School, with on-street bus laybys could not accommodate the amount of buses required to park within the school bus area and therefore the bus queue spilled out into travel lanes causing congestion.



3.4 Student Drop-off/Pick-up

3.4.1 City of Edmonton Zoning Bylaw

The City of Edmonton Zoning Bylaw specifies the number of passenger drop-off spaces required at new schools. **Table 3-7** summarizes the requirement. As presented, a minimum number of drop-off spaces are required to be located on-site (i.e. on school lands), while the balance can be accommodated on City-owned property within the roadway plan (as approved by City Planning).

Table 3-7: City of Edmonton Zoning Bylaw Passenger Drop-Off Spaces Requirements

Land use	Total Drop-Off Spaces		On-Site Drop-Off Spaces	
	Spaces Required (min. 5 spaces)	Equivalent drop-off length (7m per space)	Spaces Required (min. 5 spaces)	Equivalent drop-off length (7m per space)
Elementary or Junior High School	3 spaces/ 100 students	0.21m per student	1 space/ 100 students	0.07m per student
High School	1.5 spaces/ 100 students	0.105m per student	0.5 spaces/ 100 students	0.035m per student

3.4.2 Surveyed Sites

Of the sites surveyed, eight sites had an exclusive on-site student drop-off/pick-up zone identified, six sites had an exclusive on-street student drop-off/pick-up zone and two had both. Two schools located in mature neighbourhoods did not have any signed student drop-off/pick-up zones, but this activity was accommodated on the adjacent street. It is noted that the afternoon pick-up activity is more concentrated within a shorter time period, while drop-off movements in the morning are more spread out over a longer period of time. Therefore, congestion and queues in the afternoon peak are generally greater and have a greater impact on adjacent roadways.

Table 3-8 summarizes the on-site and off-site curbside designated student drop-off/pick-up accommodation provided at the various school sites. Only designated curb space is summarized in the table. In many cases, additional curbside length was used for drop-off/pick-up activity on-street. The extent of off-site curb length (designated and undesignated for use for drop-off/pick-up) is identified in the individual site plans in Appendix A. In addition, on-site visitor spaces were also used for drop-off/pick-up activity.

It should also be noted that use of on-site (off-street) lay-by areas for drop-off/pick-up is also influenced by personal preference. For example, some parents choose to use on-street curb space even if on-site space is available.

Table 3-8: Student Drop-off/Pick-up Accommodation – Curb Length

	Enrolled Students	On-Site Student Drop-off/Pick-up Accommodation (Length in metres)		On-Street Student Drop-off/Pick-up Accommodation (m)
		Exclusive Zone (m)	Shared Zone with School Buses (m)	
Exhibits Overall Desirable Transportation Characteristics				
St. Martha School	219	-	-	28
St. Augustine School	320	-	-	16
St. Mary School	403	107	-	-
Good Shepherd Elementary School	345	-	40	-
St. Kateri School	490	60	-	-
Winterburn School	550	80	-	-
Princeton School	144	-	-	-
Hardisty School	650	-	64	70
Exhibits Overall Undesirable Transportation Characteristics				
St. John Bosco Catholic School	522	-	-	54
Delton Elementary School	426	-	-	-
Johnny Bright School	952	54	-	51
Michael Strembitsky School	889	56	-	-
Edmonton Christian Northeast School	546	70	-	-
Elizabeth Finch School	966	55	-	23
Ellerslie North Campus	836	93	-	-

Table 3-9 summarizes the equivalent number of drop-off/pick-up spaces accommodated by the on-site and off-site curbside designated student drop-off/pick-up accommodation. Only designated curb space is summarized in the table. **Table 3-9** also includes on-site visitor stalls used for drop-off/pick-up movements which is anticipated to be counted toward the Zoning Bylaw on-site drop-off/pick-up space supply.

Table 3-9: Student Drop-off/Pick-up Accommodation –Equivalent Spaces (assumes 7m/space)

	Enrolled Students	On-Site Student Drop-off/Pick-up Accommodation (Spaces)				On-Street Student Drop-off/Pick-up Accommodation
		Exclusive Spaces	Shared Spaces	Visitor Spaces	Total on-site spaces	
Exhibits Overall Desirable Transportation Characteristics						
St. Martha School	219	-	-	-	-	4
St. Augustine School	320	-	-	-	-	2
St. Mary School	403	15	-	8	23	-
Good Shepherd Elementary School	345	-	6	-	6	-
St. Kateri School	490	9	-	-	9	-
Winterburn School	550	11	-	26	37	-
Princeton School	144	-	-	-	-	-
Hardisty School	650	-	9	10	19	10
Exhibits Overall Undesirable Transportation Characteristics						
St. John Bosco Catholic School	522	-	-	-	-	8
Delton Elementary School	426	-	-	-	-	-
Johnny Bright School	952	8	-	11	19	7
Michael Strembitsky School	889	8	-	13	21	-
Edmonton Christian Northeast School	546	10	-	-	10	-
Elizabeth Finch School	966	8	-	12	20	3
Ellerslie North Campus	836	13	-	22	35	-

Table 3-10 summarizes the number of student drop-off/pick-up spaces per 100 students provided at the various surveyed school sites (including visitor spaces). The ratio has been calculated per 100 students of school capacity as opposed to 2015-16 enrolled students. Although additional off-site curb space may be used for drop-off/pick-up movements on many sites, only designated curb space is used in the calculation (for consistency when comparing to the City's Zoning Bylaw).

It is of note that while all of the schools surveyed that provide on-site drop-off spaces meet the requirement for on-site drop-off spaces (1 space per 100 students), only four of the sites surveyed currently achieve the total number of designated passenger drop-off spaces required based on the City of Edmonton Zoning Bylaw (3 spaces per 100 students).

Notwithstanding, undesignated on-street curb length was available for drop-off/pick-up at many the surveyed sites in addition to designated spaces. In many cases, although a school lacks designated spaces, undesignated on-street curb length was sufficient to accommodate drop-off/pick-up demands without causing congestion (i.e. St. Martha School, Princeton).

Table 3-10: Student Drop-off/Pick-up Accommodation – Spaces per 100 students

	School Capacity (Note1)	On-Site Student Drop-off/Pick-up Accommodation		On-Street Student Drop-off/Pick-up Accommodation		Total Drop-off/Pick-up Spaces per 100 students
		On-Site Spaces	Spaces/ 100 students	On-Street Spaces	Spaces/ 100 students	
Exhibits Overall Desirable Transportation Characteristics						
St. Martha School	222	-	0.00	4	1.81	1.81
St. Augustine School	348	-	0.00	2	0.66	0.66
St. Mary School	453	23	5.08	-	0.00	5.81
Good Shepherd Elementary School	402	6	1.49	-	0.00	1.49
St. Kateri School	476	9	1.89	-	0.00	1.89
Winterburn School	592	37	6.25	-	0.00	6.25
Princeton School	400	-	0.00	-	0.00	0.00
Hardisty School	943	19	2.01	10	1.06	3.07
Exhibits Overall Undesirable Transportation Characteristics						
St. John Bosco Catholic School	502	-	0.00	8	1.54	1.54
Delton Elementary School	666	-	0.00	-	0.00	0.00
Johnny Bright School	1003	19	1.89	7	0.70	2.59
Michael Strembitsky School	1011	21	2.08	-	0.00	2.08
Edmonton Christian Northeast School	700	10	1.43	-	0.00	1.43
Elizabeth Finch School	1017	20	1.97	3	0.30	2.27
Ellerslie North Campus	721	35	4.85	-	0.00	4.85

Note1: School Population estimated based on 2015-16 enrollment and % utilization provided by the school boards.

3.4.3 Example(s) of Desirable Student Drop-off/Pick-Up Accommodation

Winterburn School provides approximately 6.25 drop-off/pick-up spaces per 100 students on-site, which exceeds the City's Zoning Bylaw. (This translates into approximately 0.44m per student when translated into parallel parking length).

Although parking is not permitted along 96 Avenue, drop-off activity did occur along the corridor. When considering the length of curb used for drop-off/pick-up activity, an estimated 0.6m per student (combined on-site and off-site demand, parallel parking length equivalent)) was required to accommodate queues.

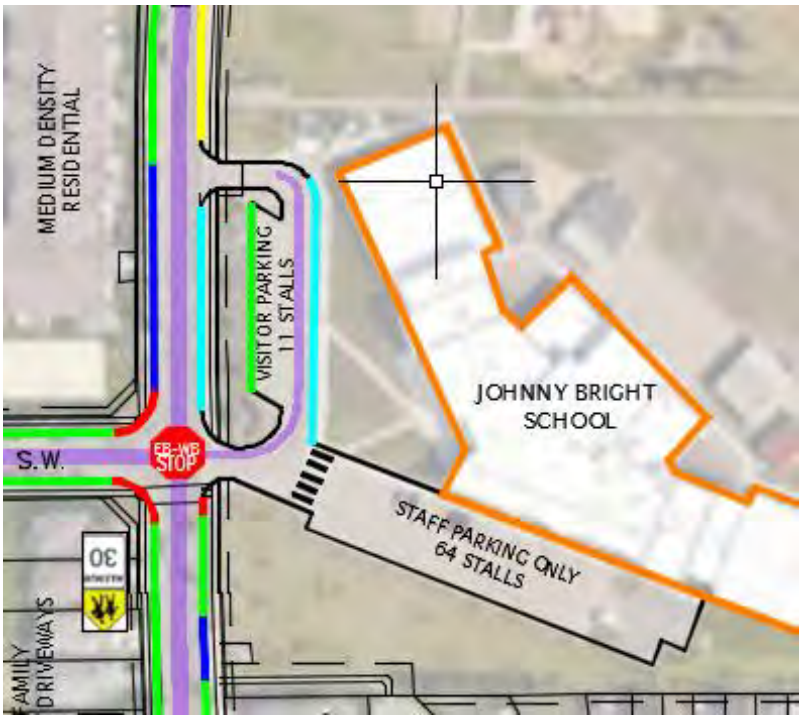
Vehicles exiting the site must turn right out of the drop-off lane because of the median along 96 Avenue restricting left turn movements and reducing on-site delay.

3.4.4 Example(s) of Undesirable Student Drop-off/Pick-Up Accommodation

Insufficient vehicle queueing space results in queues within on-site drop-off/pick-up areas extending out onto adjacent roadways causing congestion, particularly on two-lane roadways especially for vehicles waiting to make the left turn into the drop-off area.

Vehicles queued within travel lanes cause delays for vehicles not associated with the school, resulting in drivers making risky movements including jumping the queue using the opposing travel lane, putting pedestrians and other road users at risk. This activity was particularly observed at Johnny Bright School.

Double queuing or vehicles stopping in the travel lane on adjacent roadways to drop-off/pick-up students was also observed at schools with insufficient storage.



3.5 Lessons Learned from the Site Observations

3.5.1 Issues Identified

Some of the recurring issues observed at the school sites surveyed include the following:

- Parking and leaving vehicles unattended in drop-off areas;
- Parking in bus loading zones;
- Parents using bus-only zones for drop-off;
- Double queuing in drop-off areas with no space for vehicles to bypass;
- On-site bus loading zones not sufficient to accommodate all buses, buses blocking sidewalk;
- Parents parking across sidewalks;
- Parents using staff parking lot for drop-off and pick-up (Ellerslie North and Princeton);
- Reversing movements within drop-off area due to parked vehicles (mainly at St. John Bosco);
- Queue entering drop-off area backing up onto roadway, blocking through traffic; and

- Left turns entering and exiting drop-off areas creating queues and congestion on- and off-site.

Some of the recurring issues observed off-site include the following:

- Adjacent local roadways with parking on both sides leave one shared lane for two-way travel, causing congestion;
- U-turns on roadways adjacent to the school;
- Parents parking in no parking areas on-street; blocking sight lines around school or creating shared two-way single travel lanes on adjacent roadways;
- Students and parents jaywalking across roadways adjacent to the school;
- Off-site bus loading areas not sufficient to accommodate all buses; buses blocking travel lanes; and
- Parking in ETS zones.

3.5.2 Effective Mitigation Strategies Implemented

Where some of the issues identified above existed at the surveyed school sites, school administrators have successfully implemented mitigation measures to improve operations. Some of the effective mitigation strategies employed include the following:

- Staff members directing the flow of traffic at school accesses (i.e. allowing right turn movements only) to minimize the impact on through traffic on adjacent roadways and to prevent vehicles from blocking sidewalks (i.e. Johnny Bright School and Michael Strembitsky School);

- Staff members monitoring on-site drop-off/pick-up areas to enforce loading/unloading activity only and to ensure parents are not parking and walking students into the school (i.e. Johnny Bright School, Michael Strembitsky School, St. Kateri School);

- Staff member monitoring on-site drop-off/pick-up area exit onto adjacent roadway to enforce left turn ban during peak periods; (i.e. Michael Strembitsky School);

- Pylons blocking half of entrance to drop-off/pick-up area to prevent double queuing; however, this minimizes the opportunity for vehicles to fill available spaces further along the drop-off zone (i.e. Johnny Bright School and Michael Strembitsky School); and

- Staff parking lot entrances blocked off to prevent drop-off/pick-up activity in parking lots. (i.e. St. Martha School, St. John Bosco School, Delton School, St. Kateri School, St. Augustine School).

While traffic control and operations on a school campus are the responsibility of the school or school district, the City of Edmonton can provide school officials with guidance on how to better control and organize traffic on school/park sites. This chapter of the report presents a summary of the cornerstone strategies and tactics to enhance the safety characteristics on- and off-site and to reduce the volume of vehicular traffic at school/park sites. Some of the strategies employed are focused on reducing vehicular demands while other strategies are used to increase available capacity.

4. OVERVIEW OF MEASURES TO ENHANCE STUDENT SAFETY AND REDUCE CONGESTION ON AND AROUND SCHOOL SITES

4.1 Introduction

Based on the site observations completed and the preliminary review of the data collected at the school campuses, input received through the stakeholder interview process and the review of the literature (best practices), the consulting team identified a series of fundamental elements and guidelines that should be considered when preparing school/park transportation plans.

4.2 Best Practice School Site Planning Guidelines

The best practice guidelines integrate and incorporate mainstream guidance on how to design school/park facilities to improve safety and reduce local congestion. The best practice guidelines can be organized into categories including:

- ***Site selection***;
- ***On-site Physical Design Measures:*** i.e. Enhanced drop-off opportunities; multiple drop-off lanes; physically separated parking, drop-off, loading areas and pavement markings
- ***Off-site Physical Design Measures:*** i.e. roadway design, dedicated routes for pedestrians and cyclists, school traffic plan design, queuing accommodation, deceleration lanes, site access driveways and pavement markings;

- ***Education and Encouragement:*** i.e. Educating parents; encouraging alternative modes; walking school buses, bike trains, in classroom curriculum
- ***Policy:*** i.e. wider arrival windows; refined school protocols; student busing policy

The following chapters synthesize the best practice guidelines for the categories listed above.

A fundamental question to be answered when considering the location of new school /park sites is whether the site is situated in a convenient location to encourage a mix of travel modes to and from school. Transportation should be a significant consideration in the selection of new school sites. This chapter of the report presents a series of guidelines that should be considered at the planning stages when selecting new school/park locations.

5. PLANNING FOR NEW SCHOOL PARK SITES - SITE SELECTION

Transportation should be a fundamental consideration when selecting a new school site. The transportation needs of school sites should be integrated when planning new neighbourhoods. Identifying and selecting school/park sites with fewer potential transportation issues or concerns could eliminate the need for costly retrofits in the future or ongoing safety/congestion related concerns.

The basic criteria for selecting future school sites include demographics (i.e. population densities), proximity to compatible land uses, roadway and utility infrastructure requirements, parcel size, topography, location and accessibility relative to pedestrian and cycling facilities, transit accessibility and frontage space.

5.1 Neighbourhood Integration

Based on a review of the literature, it has been determined that key factors to be considered from a traffic accommodation and neighbourhood integration perspective include the location of the school/park site relative to its surrounding land uses (proximity to commercial, multi-family etc.), sidewalk connectivity and catchment area impacts.

Schools and in general school/park sites should have vehicle access from at least two different streets. More points of access will result in less congestion and more efficient traffic dispersion through enhanced traffic distributional characteristics.

Pedestrian and bicycle access should occur from all points around the school/park parcel and walking distances should be minimized. Neighborhoods with minimal pedestrian connectivity will provide poor pedestrian/bicycle access to schools and minimize walking. A grid neighborhood layout will provide the best connectivity between the school and the neighbourhood.

5.2 Location and Accessibility

While much of the research included in the literature review included guidelines focused on helping existing schools to make school area traffic safety improvements, sections of guidelines reviewed also included traffic and safety considerations that should be made when identifying the location of new school/park sites.

Recognizing that there are many other factors unrelated to transportation to consider when investigating the location of school/park sites and associated layouts, the consulting team's review of site selection criteria and guidelines reviewed information in the following categories: Site location; site size; site frontage; and building setback.

A fundamental question to be answered when considering the location of new school /park sites is whether the site is situated in a convenient location to encourage a mix of travel modes to and from school. Providing a range of potential mode choices is better than limiting choice to a small number of transportation modes.

5.2.1 Site Location

In general, attendance boundaries (which are established after a school /park site has been identified) should be established such that schools are located centrally to minimize walking distances. All efforts should be made to limit the number of children required to cross busy, high speed arterial streets to walk to school. In cases where students are required to cross, a safe route including a traffic controlled crossing should be integrated and identified.

Access to the school campus should occur from more than one frontage roadway and major driveways should be carefully located to avoid left-turn conflicts with driveways and intersections on the opposite side of the street.

From a practical standpoint, the selection of a site for a new school dictates the resulting design and operations of the facility. It is suggested that school/park sites be located such that the immediately adjacent land use either backs onto a shared roadway or flanks onto a shared roadway facility.

5.2.2 Site Size

The overall size of a school site is important to the design and layout of the necessary facilities (buildings, roadways, parking lots, recreational areas, etc.). Several agencies have also adopted other general guidelines for site size including:

- preference for rectangular shape (length to width ratio does not exceed 2:1), and
- the need to identify at the earliest planning stages the transportation requirements associated with the operation of school/park sites. The inclusion of transportation requirements at the earliest planning stages will ensure that transportation requirements are not considered as secondary considerations. This protocol would allow for the City of Edmonton and school planners

to identify parent and bus drop-off requirements in the early planning stages (ie. Area Structure Plan (ASP)) which assists in determining school/park site frontage requirements, access control opportunities, availability of on-street parking, etc.

5.2.3 Site Frontage

Closely related to the overall size of the site is the amount of frontage space. The literature review only identified a few agencies with existing guidelines for the required frontage space based on the school type. The City of Mississauga, Canada, ranged from 106.75 m (350 ft.) for an elementary school to 183 m (600 ft.) for a junior high and senior high school. The amount of frontage space is important to the transportation operations and design (primarily on-site queuing space/stacking length) of the site. Several other agencies have also adopted general guidelines relating to frontage space including:

- provide ample frontage to allow for separate car and bus entrances and exits;
- provide adequate frontage to avoid congestion at site entrances/exits;
- provide adequate frontage to provide safe access from roads or streets.

5.2.4 Building Setback Requirements

The review of existing guidelines for building setback requirements showed that no agencies had specific values for how far back from the roadway the school building needed to be placed. Building setback is an important consideration because the placement of the building significantly affects the traffic circulation and amount of on-site space for stacking of vehicles. School buildings should be set back on the site a sufficient distance from the adjacent roadways to ensure safe and adequate site storage or stacking of loading and unloading vehicles.

5.3 Site Selection Guidelines and Criteria for Site Location and Accessibility

In considering the relative location of a school/park site within a neighbourhood during planning stages to ensure the safest possible traffic environment in the immediate vicinity of the school/park site, and to establish safe and efficient operations, the following basic guidelines and criteria should be considered.

- The school/park should be situated centrally to a service area;
- Elementary school sites should desirably be located as close as possible to the residential areas with provision for safe pedestrian and bicycle accessibility to minimize walking distances and also reduce traffic congestion;
- School /park sites should not share a common frontage with roadways with front drive accesses due to the volume of traffic and driveway access interference;
- The school/park site should abut two roadway frontages preferably collector roadways to efficiently and safely serve school populations. The school/park site should not be located along

arterial roads. Providing access to more than a single frontage roadway will increase the site distributional characteristics of the site and will assist in separating traffic movements;

- Locate school sites adjacent to other community facilities where there is potential for shared use parking (e.g., parks, churches, etc.);
- The school/park sites should be located adjacent to or readily accessible to alternative transportation modes including public transit modes, pedestrian and bicycles corridors;
- Avoid locating school sites abutting each other on the same roadway frontage. Notwithstanding, should there be a need to operate two schools along a single roadway, within the same school park space, the schools should not be located in close proximity to one another to allow the individual schools' traffic plans to operate independently.
- School/park sites should be situated where the road alignment provides good visibility;
- Avoid high-volume traffic flow near elementary school entrances and exits;
- Where possible, school site driveway accesses should align with other intersecting roadways to create 4-way approaches;
- Consider pedestrian travel desire lines when locating schools near commercial centers; and
- Students approaching on foot should not have to cross main traffic arteries. In cases where students are required to cross, a safe route including a traffic controlled crossing should be integrated and identified.

As a result of increased vehicle trips to and from schools, increased traffic congestion on and around school sites means increased potential conflict points between vehicles and between pedestrians and vehicles. A well-designed school site should support the safe arrival and departure of students and parents. This chapter of the report provides information on key design or redesign elements to assist in the development of an appropriate and well-functioning school site.

6. PHYSICAL DESIGN MEASURES

Increased traffic congestion on and around school sites, as a result of increased vehicle trips to and from schools, means increased potential conflict points between vehicles and between pedestrians and vehicles. Given the short duration of peak school-generated traffic activity, off-site roadway improvements solely for the benefit of the school are not necessarily the answer. Conversely, on-site roadway design measures to reduce congestion cannot be implemented without considering their integration with adjacent roadways. Careful planning in the design of school traffic accommodation and circulation measures to minimize traffic congestion, conflict points, and safety concerns must be considered both on- and off-site.

Ideally, accommodation of the various travel modes should be physically separated from a design perspective and should be enforced from an operations perspective.

6.1 Passenger Drop-off/Pick-Up

As mentioned previously, the number of students being driven to/from school by private automobile appears to be on the rise. The design of new school sites are confronted with the challenge of providing a balance between accommodating traffic and providing facilities that encourage a mode shift from private vehicles to bus, transit, walking, and cycling.

A lack of designated and well-planned passenger loading areas can result in vehicle queues increasing congestion, parking on-street where it is unsafe and/or not permitted, negative impacts on adjacent neighbours, and students and parents jaywalking and jutting between vehicles; while an oversupply consumes otherwise programmable space and discourages the use of alternative modes.

6.1.1 Drop-off/Pick-up Queue Accommodation

It can be difficult to estimate space requirements for the queueing of vehicles dropping off and picking up students as a number of factors are at play including changing student enrollment characteristics.

On constrained sites, significant space for queued vehicles can also be difficult to provide, especially when providing limited on-site space to accommodate short-term activity competes with other on-site elements including play space, sports fields, and parking.

There have been a number of studies of queuing demand at Elementary Schools in large urban centres in recent years. ITE's publication, *School Site Planning, Design, and Transportation*, summarizes the results of two studies (one in Houston and one in Phoenix). A second paper published by ITE cites the recommendations of the North Carolina DOT, the South Carolina Dot, the Texas Transportation Institute, and a study by Hatch Mott MacDonald. The results of the studies cited in both publications are reproduced in **Table 6-1**. Results reported in feet have been converted to metres.

Table 6-1: Drop-off/Pick-up Queueing Needs – Summary of Research Reviewed

	Number of Schools Studied	Date of Study	Typical Queue
Houston Study	55	2006-2009	0.42m per student (1 vehicle for 6% of students)
Phoenix Study	38	2004-2009	0.56m per student (1 vehicle for 8% of students)
North Carolina DOT			0.50m per student
South Carolina DOT			0.60m per student
Texas Transportation Institute			0.46m per student
Hatch Mott MacDonald Study	5	2006	0.49-0.60m per student

Sources suggest that between 0.42m and 0.60m of drop-off/pick-up stacking length be provided per student (42m to 60m per 100 students, 6-9 spaces per 100 students).

The City of Edmonton's Zoning Bylaw currently requires the provision of 3 designated drop-off spaces per 100 students (with a minimum of 5 spaces or 1 space per 100 students (whichever is greater) being provided on-site). However, many existing school sites do not achieve this standard. Notwithstanding, it is of note that many sites have adjacent curbside parking that is used for these movements, though not formally designated and/or signed.

6.1.2 Best Practices – On-site Passenger Loading Design Considerations

An on-site drop-off/pick-up area that is separated from other transportation uses represents the best practice for a passenger loading area.

In addition to safety considerations, the extent to which parents will choose to leave the adjacent roadway to use a provided on-site drop-off/pick-up area is related to the efficiency of its design and operation. For example, delays in the drop-off area as a result of double-parked vehicles or vehicles waiting to make a left turn onto the adjacent street upon exit discourage its use by parents seeking efficiency over order.

To promote the use of on-site passenger loading areas, the following best practices in design and operation should be followed.

- The passenger loading/unloading area should be separated from school bus loading and pedestrian and cyclist arrivals;
- Drop-off area design should never require vehicles to reverse;
- Drop-off/pick-up areas should operate as one-way counter-clockwise circulation so that students are loaded and unloaded directly to the curb/sidewalk without having to cross a vehicular path. One travel lane should be provided adjacent to the loading lane to allow vehicles to pass;
- The loading lane should not be used as parent parking during AM and PM peak period time frames. Unattended vehicles in drop-off/pick-up zones, even for short stops, should not be allowed (and should be enforced). Designated visitor parking spaces and/or on-street parking should be used for this purpose;
- A designated drop-off zone should be established at the far end of the loading lane to ensure a continuous flow of vehicles. Queued vehicles within the lane should wait until they reach the drop-off zone before allowing their passengers to exit. Adult supervisors available to group children and escort them inside reduces the inclination for parents to exit their vehicles;
- During peak student pick-up, a waiting area for students at the far end of the zone should be established to maximize the effective length of curb space. Vehicles at the far end of the zone should load simultaneously. Once these vehicles have pulled away, the next group of vehicles should move forward to be loaded at the student waiting area;
- Loading students haphazardly along the entire frontage means that when a vehicle pulls away, a space is left behind not being used; and
- Highly visible adult loading supervisors should facilitate loading and unloading and ensure that drivers remain in their vehicles.

Multi-lane loading is not ideal as it requires students to cross the path of vehicle traffic. However, it could be considered for severely constrained sites or high-demand schools in combination with a robust safety and supervisory strategy.

6.1.3 Best Practices – Off-site Passenger Loading and Unloading Facilities

Although it is preferable to accommodate designated passenger loading on-site, formalizing the use of on-street curb for passenger loading could be considered for existing sites that do not have available on-site space and for new sites where accommodating an adequate linear length for passenger loading is not feasible.

Passenger drop-off/pick-up should not be permitted on the side of the street opposite the school site. Although crosswalks should be provided to facilitate the safe crossing of pedestrians and cyclists, every effort should be made to encourage and accommodate on-street passenger loading/unloading in locations that do not require students to cross streets.

Formalizing on-street passenger loading areas should consider the following.

- On-street passenger loading is best accommodated between curb bulbs to avoid obstructing through traffic and to reduce visibility obstruction for vehicles exiting site accesses;
- Temporary curbing (through the use of cones) or the reallocation of roadway curbs (i.e. relocating ETS stops) and signs can be used to implement drop-off/pick-up zones while reducing the number of through lanes adjacent to the school site during peak times; and
- Sidewalks immediately adjacent to curbside drop-off areas should be a minimum of 2.0m wide monowalks.

In high-demand locations with limited busing, off-site agreements with adjacent land uses (community centre, park, church) could be considered for remote student loading. A safe route between the adjacent land use and the school site must be available. Supervision of the off-site lot is also recommended given the introduction of reverse vehicle movements and pedestrian activity inherent to parking lots. Liability issues associated with off-site supervision would need to be addressed.

6.1.4 Study Findings

Based on the literature review in combination with the site observations completed, it is anticipated that in the order of 0.4m to 0.6m per student is required to accommodate queues generated by drop-off/pick-up activity. Based on these preliminary findings, it is suggested that the City of Edmonton revisit the current City of Edmonton Zoning Bylaw passenger drop off requirements for schools including the segmentation of parent drop-off spaces between on- and off-site spaces.

6.2 Bus Accommodation

6.2.1 School Bus Loading Zones

Although existing school sites have a combination of on-site and on-street yellow school bus accommodation, some dedicated to buses only and some shared with parent drop-off/pick-up areas, best practices and guidelines recommend the provision of an independent on-site, dedicated, bus loading area. Although the needs of a site may be difficult to predict and may change over time as attendance boundaries change with demographics, the following summarizes the preferred characteristics of on-site bus loading areas.

- Bus traffic and passenger vehicle traffic should not share a common driveway;
- A minimum of 15 m per bus should be allowed to accommodate bus parallel parking;
- The design should not require students to walk between buses and the loading area should be free and clear of pedestrian crossings;
- A single-file counter-clockwise drop-off design (passenger loading occurring adjacent to the school) which does not require buses to reverse is the preferred staging method;
- The student loading area should be of suitable size to allow large groups of waiting students and teachers to congregate;
- Provide two outbound lanes if possible: one for left-turning and one for right-turning buses, or restrict outbound movements to right turns only; and
- School buses should be oriented such that students' path to school does not cross driveways or parking lots.

Notwithstanding the above, if school busing does not represent the travel mode of a significant number of students or if the school site represents a constrained site, an on-site passenger loading area should be prioritized over an on-site school bus loading area. Introducing one or two buses on-site (accommodating few students) and dedicating space to them is not an efficient use of space, and mixing bus loading with passenger loading introduces a potential safety issue. In these situations, on-street bus loading along the school-side curb and generally adhering to the guidelines for on-street passenger loading (Section 6.1.3) could be considered.

Accommodating buses on-street may also allow for a more flexible loading strategy. For example, the area of curb required to accommodate the number of buses in a given year could be allocated through the use of cones, with the balance of curb space accommodating passenger vehicle loading.

6.2.2 Edmonton Transit

The relative location of Edmonton Transit stops in close proximity to school/park sites should be carefully considered. Although transit may be used by some school staff and volunteers, the use of transit by students is extremely low. If not located appropriately, Edmonton Transit stops could absorb valuable curb side drop off space which may be better utilized for yellow school bus operations or for parent drop off activity.

6.3 Frontage Roadway Design Considerations

Based on the site observations completed, it was clear that where parking was available on both sides of a frontage roadway, parents used both curbsides to pick up and drop off students. Parent parking on both sides of a roadway in front of a school creates additional pedestrian crossing movements and is a safety concern.

As mentioned previously, school/park sites should be located such that adjacent land uses either flank or back onto a shared roadway. In this scenario, given that one side of the roadway is not required for adjacent land use parking purposes, it is recommended that the roadway be narrowed to accommodate two basic travel lanes and a single curbside drop-off/parking lane. The curbside lane should be protected by sidewalk bulbing. The two travel lanes should be in the order of 3.6m wide and the parking lane should be about 3.0m wide to accommodate door swings.

Although eliminating the opportunity for parents to use both sides of the frontage roadway for pick-up and drop-off movements reduces the extent of on-street drop-off/pick-up capacity, it would reduce pedestrian crossing movements.

Traffic calming can also be used to enhance self-enforcing physical measures to reduce vehicle speeds and increase the safety for non-motorized street users. Traffic calming measures that could be used to achieve these goals around school sites include:

- Curb extensions;
- Road narrowing;
- Raised crosswalks/intersections;
- Roundabouts; and
- Forced-turn islands.

The design and use of any traffic calming measures should take into account how they would impact all road users including pedestrians and cyclists, emergency response vehicles and transit vehicles, and how they impact factors including neighborhood access, drainage, and snow removal.

6.4 Site Access and Circulation

One-way circulation on school sites should be promoted, resulting in at least two (if not more) site accesses. School site accesses should be located on roadways with a relatively flat grade to ensure good sight lines. The location of site accesses should also consider the predominant direction of traffic and student origins so that most drivers turn right when exiting the school;

- If two exits are designed separating buses and passenger vehicles, the bus exit should occur upstream of the automobile exit to reduce bus delay;
- The use of separate driveways for parent traffic and bus traffic at elementary schools is preferred. It is noted however that a single site access which then splits on-site is also an appropriate design tactic;
- The need to provide a dedicated left turn bay between a school's site accesses to accommodate the anticipated queue length for drop-off and pick-up times is not recommended; and
- The development of a right turn bay into a school/park site is not recommended.

The circulation of vehicles adjacent to the school site and the accommodation of vehicles on routes approaching and leaving the school site must also be considered. Enforcing a right-turn outbound movement from a school site (through temporary curbing or traffic monitor) to improve traffic flow on-site and reduce vehicle queues could result in negative downstream impacts (i.e. illegal/unsafe U-turns) if it does not represent the predominant direction of desired travel. Facilitating legal U-turn movements through a roundabout downstream from the school should be considered.

In a similar fashion, vehicles wishing to turn left into a school site may experience delay if there is congestion on-site and thereby increase congestion on the adjacent street. To reduce the propensity for drop-off/pick-up maneuvers on the curb across the street from the school by vehicles approaching from directions requiring a left turn movement to access the site, on-street features, such as a roundabout to facilitate U-turns and reduce around-the-block movements should also be considered.

6.5 Alternative Mode Accommodation

To encourage alternative modes, clear bicycle and pedestrian routes and on-site bicycle storage should be provided. The location of sidewalk connections to the adjacent street system should avoid mixing students walking and cycling with students waiting to load onto buses or into passenger vehicles.

Enhancing pedestrian safety through the presence of crossing guards at crosswalks in proximity to school sites encourages parents to allow children to use alternative modes.

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The source of many congestion problems stems from poorly planned drop-off and pick as well as parking-related physical design characteristics. Altering these rules and design characteristics can often mitigate and resolve congestion issues with little impact to parents' and students' daily routines. This chapter of the report presents a summary of the literature on implementing school traffic and safety related measures which do not require construction or modifications to existing infrastructure.

7. EDUCATION, ENCOURAGEMENT AND ENFORCEMENT

7.1 Introduction

Strategies and tactics to address traffic circulation and safety issues at schools do not exclusively represent physical improvements. Education, encouragement and enforcement solutions, as well as school policies that address arrival and dismissal times and define expectations for parents and students should also be part of an overall school traffic mitigation toolbox. The majority of these strategies are intended to reduce the number of vehicles generated by a school. Due to increased dwell time, space requirements for pick-up can be much longer than for drop-off. Separate policies for pick-up and drop-off may be necessary.

7.2 Non-Physical Education and Encouragement Programs

Education and encouragement programs can improve parent and student compliance with traffic regulations and improve the overall safety characteristics at a school site. Based on a review of the literature, the following principal non-physical strategies should be considered. In general, these types of measures may be the least expensive to implement, but require staff, volunteers or even a police presence to ensure these types of policies and programs are being followed.

7.2.1 Educate parents about unsafe driving behaviors and school transportation policies

Educate parents about having their children choose alternative transportation modes to and from school. Encourage parents to be safe. Ensure parents are aware of the dangers and legal consequences of traffic violations, and ways that parents play a role in reducing congestion and increasing student safety by following the rules of the road. This information can be provided in newsletters, in information bulletins handed to parents while they are waiting in school drop-off and pick-up zones.

Provide maps and instructions to parents on the school Web sites and in newsletters to describe the location and operation of the loading zone.

7.2.2 Encouraging students to walk or bike to school

Students should be encouraged to walk or bike to school particularly if the school curriculum integrates the health and environmental benefits of walking or biking to school into the school curriculum (e.g., encouraging pupils to consider the impact of different transportation choices on the environment as well as their own physical health). Such programs can be enhanced by enabling students to earn points and/or rewards based on how frequently they walk or bike to school. Programs such as Safe Routes to School employ tactics such as adding crosswalks and crossing guards and encouraging parents to have their children walk or bike to school. Providing lockers or cubbies and limiting the number of items children have to take to and from school could facilitate compliance.

7.2.3 Encouraging carpooling

Parents should be encouraged to carpool. School administrators could play a role in encouraging carpooling by generating lists of neighboring students and distributing them to parents. It recognized however that some parents may have privacy related concerns regarding sharing their children's names and addresses with others. To increase carpooling opportunities, a dedicated carpool area could be created to enable carpool drivers to get in and out of the school area efficiently.

7.2.4 Mapping out safe pedestrian routes

Mapping pedestrian routes to and from school represents a strategy to educe vehicular traffic activity and improve student health characteristics. One such program is called Safe Routes to School, which is designed to "improve children's health and that of the overall community by making walking and bicycling to school safer and easier." This is achieved by mapping out the safest ways (e.g., those that avoid busy intersections and use sidewalks) that children can travel by bike or walk to and from school, adding crosswalks and crossing guards, and encouraging parents to have their children walk or bike to school.

The City of Edmonton's Sustainable Development, City Planning agency represents a source of mapping expertise.

7.2.5 Implementing a Walking or Cycling School Bus Program

Similar to a bus route, a walking school bus represents a strategy predominantly implemented to increase pedestrian safety. Parents are asked to become a walking driver, walking along a predetermined route to pick up children who are registered in the program and to escort the children by foot to the school. Student school bag tags and bus stop signs are often used as part of this type of program. Providing lockers makes it easier for children to walk without having to carry a large volume of books and school supplies with them. These types of programs only work in neighborhoods where a significant number of children are located within easy walking distance of the school.

It is noted that safe routes may differ by transportation mode, requiring different maps for walkers versus cyclists.

7.2.6 Institute/Increase School Busing

While this option may be viewed and considered as cost-prohibitive, busing children to school is an effective means of reducing the number of children driven to school and the congestion that accompanies this transportation mode. Preferably, buses should be able to park within the confines of the school site and not on-street where they may contribute to a congestion problem rather than reducing it. Before initiating a new busing system, it may be useful to survey parents to confirm that they would use it.

7.2.7 Start times

Vary arrival and departure times (i.e. by grade, by mode) to reduce the number of students arriving at or leaving school simultaneously. Reinforce these messages with regular communications about the rules and with driveway monitors. Multiple schools on one site with shared drop-off facilities in combination with staggered start times could mean double the capacity for shared infrastructure.

Challenges associated with this measure include logistics for families with more than one child and additional supervision requirements.

7.3 Enforcement

Enforcement may be needed to ensure that separation is maintained between the modes, such as not permitting parent cars to use the bus-only areas.

- Employ targeted police enforcement;
- Conduct enforcement blitzes during peak periods as required;
- Structure fines to reflect the violation;
- Provide safety vests to crossing guards/students to reinforce authority; and
- Issue tickets/warnings for school parking lot violations. This would require support from Edmonton Police Service, Alberta Sheriff's Branch, and the City of Edmonton.

7.4 School Traffic Safety Information

The following information was provided through discussions with representatives of the Edmonton police Service (from the desk of Const. Andre Paul) in regards to ensuring that parents are reminded to keep the safety of all our children in mind when driving in school areas.

- U-turns are only permitted on private property, at dead-end roadways, and where permitted by signs. U-turns must be conducted safely.
- Even when occupied, vehicles can only be parked in designated locations regardless of whether parked on school property or public streets.

- Vehicles parked in front of fire hydrants, in crosswalks, no parking zones, park restricted zones, or handicapped zones can be given violation tickets and towed. Vehicle owners are responsible for all costs related to towing. Fines range from $57 (park within 5m of crosswalk/fire hydrant or corner of roadway intersection or park within 1.5m of driveway), $150 (park in emergency zone), to $250 (park in handicapped/disabled parking) and tow fees including storage can quickly exceed hundreds of dollars.

- Stopping to drop off or pick up a passenger in a marked crosswalk is illegal and drivers could face violation fines in excess of $575 (crosswalk violation when pedestrian present).

- It is illegal to stop in the middle of the road to pick up or drop off a passenger. Drivers could be fined between $115 (obstructing traffic flow) and $402 (stunting).

- While AMA crossing guards are not given specialized authority under the Traffic Safety Act, failing to abide by their direction could lead to a fine of $402 for careless driving.

- Blocking an intersection or crosswalk while attempting to enter a public or private roadway entrance or driveway can lead to charges ranging from $115 (obstructing traffic flow), $287 (fail to stop at crosswalk stop line near intersection), to $575 (pedestrian crosswalk violation).

- Failing to yield for a pedestrian in a marked/unmarked crosswalk can lead to fines of $402 (careless driving), $575 (crosswalk violation), and in special circumstances result in fines for both violations being issued.

- Failing to stop for a pedestrian in an unmarked crosswalk (corner to corner or mid-block, where indicated by a sloped mobility curb, to corner) will also lead to identical fines as indicated in Question 8.

- The City of Edmonton anti-idling bylaw indicates: A person shall not cause, permit or allow a motor vehicle to idle for more than five minutes' total in any 30 - minute period in any area identified as a no idling zone. Exceptions: "All motor vehicles when the outdoor temperature is less than zero degrees Celsius and only to allow safe vehicle operation and maintain clear windows… not to exceed three consecutive minutes, due to emergency, traffic conditions, or weather conditions." Fines start at $250 and double ($500) on consecutive convictions.

- Parent volunteers and school employees have authority to act as "agents of the property owner" and as such are granted authority under numerous regulations including: Trespass to Premise Act, Petty Trespass Act, and City of Edmonton bylaws (5590 specifically as related to parking and loading/unloading vehicles). Fines can range from $57 to $250 and in some more extreme cases parents can be banned from School property and peace bonds can be sought to restrict a parent's ability to access the property.

- City of Edmonton bylaw #6894 sets the speed limit at 30km/h and also sets the times as 8:00 AM to 4:30 PM on any day that school is held.

- Although children under the age of 12 generally cannot be charged with a traffic offence, parents of children who are observed to be encouraging or ordering their children to jaywalk can be issued tickets for fines of $402 (pedestrian stunting).

7.5 Communications and Outreach Program – An Implementation Plan

The City of Edmonton, in combination with the local area school boards, have the ability to collectively assist in developing an education and encouragement toolbox to enhance traffic safety at school/park sites. It is important that communication and coordination between the City of Edmonton and the local area school boards occur at every stage of school site planning and school site design.

One of the key roadblocks to increasing student walking is a parent's fear of safety for their children. The City of Edmonton and the local area school boards have gained significant experience in school site planning and in the design of school sites. The City and affected school boards should develop a unified education and encouragement communication plan which more definitively addresses the merits and benefits of alternative modes of transportation to school/park sites and which addresses the safety benefits of such programs.

Police enforcement is often seen as the first step to address traffic safety concerns, particularly associated with the reduced school zone speed limit policy. An increased police presence at the beginning of the school year and after winter break, for example, would reinforce appropriate and permitted activity surrounding school sites. Police enforcement should be combined with engineering, education and encouragement programs jointly administered by the City of Edmonton and school boards to affect the greatest positive change.

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School-related traffic congestion and the safety risks congestion creates for students, teachers, parents, residents, and motorists in and around school sites is a concern to the City of Edmonton and partner school boards. The Land Management Committee formed a Site Functionality Working Group to discuss ongoing school/park site issues and concerns from a transportation planning perspective. This chapter of the report presents the key findings of the School Site Functionality Study report.

8. SUMMARY AND CONCLUSIONS

8.1 Study Context and Scope

Given the continued significant population growth within the municipality, the City of Edmonton has identified the need to ensure reasonable and practical measures are in place to ensure that all children can get to and from school and park facilities safely.

The focus of the assignment was to investigate a suite of measures to improve the overall safety characteristics associated with the construction and operation of school/park sites. Emphasis was directed to school/park site location criteria, the review of abutting roadway (size, width, alignment and frontage) cross-sections, the review of on- and off-site physical design elements and how encouragement, education and enforcement can assist in mitigating traffic and pedestrian movement concerns and issues in the vicinity of school/park sites.

This project involved a significant review of available documentation and the completion of a number of individual interviews from a wide spectrum of stakeholders with various perspectives on school transportation plans. A significant component of the project included the completion of on-site observations at 9 EPSB and 6 ECSD schools. Study findings and recommendations should be able to be applied to both mitigate issues at existing schools and to address potential issues when planning new school/park sites.

Notwithstanding the above, it is critical that transportation plans for school/park sites be tailored to local area circumstances and conditions. In most cases, effective school/park site transportation plans will involve implementing several different strategies and tactics and will require an engaged school community.

8.2 Basic Toolbox Components

The following fundamental strategies provide a foundation of ideas for addressing existing and future school/park transportation related issues and concerns. The strategies and tactics are derived from a variety of research studies in combination with a review of a combined total of 15 EPSB and ECSD school sites and consultations with EPSB and ECSD representatives.

The consulting team organized the best practice guidelines into three (3) strategic categories. The key fundamental categories associated with the planning, design and redesign of a well-functioning and successful school site from a transportation accommodation perspective include:

- *School Site Selection;*
- *Physical Design Measures;*
- *Policies/Procedures related to Education, Encouragement, and Enforcement.*

8.3 Best Practice Guidelines – School Site Selection

Although it is recognized that there are many non-related transportation factors that are considered when identifying school/park sites, the purpose of this section is to identify transportation guidelines that should be considered when planning successful new school/park sites. Guidelines to minimize issues arising following the opening of a school are presented.

8.3.1 School Site Selection

School siting decisions influence neighbourhood growth and development patterns and are influenced by these patterns. In considering the relative location of a school/park site within a neighbourhood during planning stages to ensure the safest possible traffic environment in the immediate vicinity of the school/park site and to establish safe and efficient operations, **Table 8-1** presents the key guidelines that represent the most important principles/policies to be considered, in addition to summarizing other supporting strategies/policies.

Table 8-1: School Site Selection Best Practices

Key Guidelines
• *Identify at the earliest planning stage parent and bus drop off requirements to assist in determining school/park site frontage requirements, access control opportunities, availability of on-street parking, etc.*
• *School/park sites should be situated centrally within a service area.*
• *School/park sites should abut two roadway frontages with at least one of the roadways being a collector roadway to efficiently and safely serve school populations.*
• *Adjacent residential land uses located across the street from school park sites should ideally be either of a flanking nature or be of a backing-on format.*
• *Elementary school sites should desirably be located as close as possible to the residential areas with provision for safe pedestrian and bicycle accessibility to minimize walking distances and reduce traffic congestion.*
Supporting Strategies
• The school/park sites should be located adjacent to or readily accessible to alternative transportation modes including public transit modes, pedestrian and bicycles corridors.
• Where possible, school site driveway accesses should align with other intersecting roadways to create 4-way approaches.
• Avoid locating school sites abutting each other on the same roadway frontage.
• Locate school sites adjacent to other community facilities where there is potential for shared use parking (e.g., parks, churches, etc.).
• School/park sites should be situated where the road alignment provides good visibility.
• School/park sites should not be located too close to congested roadways that are noisy and which may cause delays or special hazards.
• Consider pedestrian travel desire lines when locating schools near commercial centers.
• Students approaching on foot should not have to cross arterial roadways. In cases where students are required to cross, a safe route including a traffic controlled crossing should be integrated and identified.

It is important to identify at the earliest planning stages the transportation requirements associated with the operation of school/park sites. Reviewing the transportation requirements of any particular school/park site at the earliest planning stages will ensure that transportation requirements are not thought of as secondary considerations. This process would allow for the City of Edmonton and school planners to identify at early planning stages parent and bus drop off requirements which assist in

determining school/park site frontage requirements, access control opportunities, availability of on-street parking, etc.

A building block criteria that should be considered when selecting a new school/park site is that new school/park sites should be located with appropriate access from the adjacent roadway network, walkways, and bicycle routes. Access from more than one roadway has several potential benefits, including easier separation of parent, bus and staff parking operations, better driveway spacing, and separation of traffic movements which results in greater dispersion of traffic to and from the site.

8.4 Best Practice Guidelines – Physical Design Measures

The transportation attributes associated with a well located and designed school/park site should support the safe arrival and departure of parents, pedestrians and cyclists in a safe, efficient and effective manner. Physical on- and off-site design measures to reduce congestion cannot be implemented without considering their integration with adjacent roadways. Careful planning in the design of school traffic accommodation and circulation measures to minimize traffic congestion, conflict points, and safety concerns must be considered both on- and off-site.

Based on the literature review in combination with the site observations completed, it is suggested that the City of Edmonton revisit the current City of Edmonton Zoning Bylaw passenger drop off requirements for schools including the segmentation of parent drop-off spaces between on- and off-site spaces.

8.4.1 On-Site Passenger Loading

In regards to physical design measures for on-site passenger loading areas, the best practice guidelines in design and operation, summarized in **Table 8-2,** represent the most important principles/policies to be considered in addition to supporting strategies/policies.

Table 8-2: On-Site Passenger Loading Area Best Practices

Key Guidelines
• *Based on the literature review in combination with the site observations completed, it is anticipated that in the order of 0.4m to 0.6m per student is required to accommodate queues generated by drop-off/pick-up activity (combined on-site and off-site demand).*
• *Where feasible and practical, construct new on-site parent drop-off/pick-up facilities.*
• *The passenger loading/unloading area should be separated from school bus loading and pedestrian and cyclist arrivals.*
• *Drop-off area design should never require vehicles to reverse.*
• *Drop-off/pick-up areas should operate as one-way counter-clockwise circulation so that students are loaded and unloaded directly to the curb/sidewalk without having to cross a vehicular path. One travel lane should be provided adjacent to the loading lane to allow vehicles to pass.*
Supporting Strategies
• The loading lane should not be used as parent parking during AM and PM peak period time frames. Unattended vehicles in drop-off/pick-up zones, even for short stops, should not be allowed (and should be enforced). Designated visitor parking spaces and/or on-street parking should be used for this purpose during the AM and PM peak.
• A designated drop-off zone should be established at the far end of the loading lane to ensure a continuous flow of vehicles. Queued vehicles within the lane should wait until they reach the drop-off zone before allowing their passengers to exit. Adult supervisors available to group children and escort them inside reduces the inclination for parents to exit their vehicles.
• During peak student pick-up, a waiting area for students at the far end of the zone should be established to maximize the effective length of curb space. Vehicles at the far end of the zone should load simultaneously. Once these vehicles have pulled away, the next group of vehicles should move forward to be loaded at the student waiting area.
• Loading and unloading students haphazardly along the entire frontage means that when a vehicle pulls away, a space is left behind not being used.
• Highly visible adult loading supervisors should facilitate loading and unloading and ensure that drivers remain in their vehicles.

8.4.2 Off-Site Passenger Loading

In regards to physical design measures for off-site passenger loading areas, the best practice guidelines in design and operation, summarized in **Table 8-3,** represent the most important principles/policies to be considered in addition to supporting strategies/policies.

Table 8-3: Off-Site Passenger Loading Area Best Practices

Key Guidelines
• ***Based on the literature review in combination with the site observations completed, it is anticipated that in the order of 0.4m to 0.6m per student is required to accommodate queues generated by drop-off/pick-up activity (combined on-site and off-site demand).***
• ***Reallocate curb side space for drop-off/pick-up activities where feasible and practical.***
• ***Restrict parking on the far side of the frontage roadway.***
Supporting Strategies
• On-street passenger loading is best accommodated between curb bulbs to avoid obstructing through traffic and to reduce visibility obstruction for vehicles exiting site accesses.
• Temporary curbing (through the use of cones) and signs can be used to implement drop-off/pick-up zones while reducing the number of through lanes adjacent to the school site during peak times.
• Sidewalks immediately adjacent to curbside drop-off areas should be a minimum of 2.0m wide monowalks.
• In high-demand locations with limited busing, off-site agreements with adjacent land uses (community centre, park, church) could be considered for remote student loading. A safe route between the adjacent land use and the school site must be available. Supervision of the off-site lot is also recommended given the introduction of reverse vehicle movements and pedestrian activity inherent to parking lots. Liability issues associated with off-site supervision would need to be addressed.

8.4.3 School Bus Loading Zones

Although most of the existing school sites have a combination of on-site and on-street yellow school bus accommodation, some dedicated to buses only and some shared with parent drop-off/pick-up areas, best practices and guidelines recommend the provision of an independent, dedicated, bus loading area. Although the needs of a site may be difficult to predict and may change over time as attendance boundaries change with demographics over time, **Table 8-4** summarizes the preferred characteristics of bus loading areas in addition to other supporting strategies/policies to be considered.

Table 8-4: School Bus Loading Zone Best Practices

Key Guidelines
• ***Independent, dedicated, bus loading areas should be provided.***
• ***Every identified school bus parking space should be 15m in length.***
• ***For on-site school bus loading, a single-file counter-clockwise drop-off design (passenger loading occurring adjacent to the school) which does not require buses to reverse is the preferred staging method.***
• ***School buses should be oriented such that students' path to school does not cross driveways or parking lots.***
Supporting Strategies
• For on-site school bus loading, provide two outbound lanes if possible: one for left-turning and one for right-turning buses, or restrict outbound movements to right turns only.
• Bus traffic and passenger vehicle traffic should preferably not share a common driveway.
• The design should not require students to walk between buses, and the loading area should be free and clear of pedestrian crossings.
• The student loading area should be of suitable size to allow large groups of waiting students and teachers to congregate.
• If school busing does not represent the travel mode of a significant number of students on a constrained site, an on-site passenger loading area should be prioritized over an on-site school bus loading area. In this situation, bus loading areas could be provided on the flanking roadway.
• Accommodating buses on-street may also allow for a more flexible loading strategy. For example, the area of curb required to accommodate the number of buses in a given year could be allocated through the use of cones, with the balance of curb space accommodating passenger vehicle loading.

8.4.4 Alternative Mode Accommodation

To encourage alternative modes, clear bicycle and pedestrian routes and on-site bicycle storage should be provided. The location of sidewalk connections to the adjacent street system should avoid mixing students walking and cycling with students waiting to load onto buses or into passenger vehicles.

Enhancing pedestrian safety through the presence of crossing guards at crosswalks in proximity to school sites encourages parents to allow children to use alternative modes.

8.4.5 Adjacent Streets

Table 8-5 presents the most important best practice principles/policies to be considered in regards to flanking frontage roadways and also presents supporting strategies.

Table 8-5: The Design of Flanking Roadways Best Practices

Key Guidelines
• *School/park sites should be located such that adjacent land uses either flank or back onto a shared roadway.*
• *The adjacent roadway should be narrowed to accommodate two basic travel lanes and a single school-side curbside drop-off/parking lane. The curbside lane should be protected by sidewalk bulbing.*
• *Adjacent travel lanes should be in the order of 3.6m wide and the adjacent parking lane should be about 3.0m wide to accommodate door swings.*
Supporting Strategies
• It is acknowledged that during winter periods, pavement markings are often snow-covered and the effective widths of roadways are often reduced. Current City practices of removing windrows in the immediate vicinity of school park sites should be maintained.
• Traffic calming measures including curb extensions, roadway narrowing, raised cross-walks, roundabouts and force turn islands can be used to slow speeds and improve safety around school sites.

8.4.6 Site Access and Circulation and Traffic Control Devices

One-way circulation on school sites should be promoted, resulting in at least two (if not more) site accesses. School site accesses should be located on roadways with a relatively flat grade to ensure good sight lines. The location of site accesses should also consider the predominant direction of traffic and student origins so that most drivers turn right when exiting the school. Where necessary, traffic control devices should be provided to assist school traffic in entering the regular traffic flow.

Table 8-6 presents the best practice guidelines, principles and policies for site access, circulation and traffic control devices that should be considered.

Table 8-6: Site Access, Circulation and Traffic Control Devices Best Practices

Key Guidelines
• ***All site and regulatory signage and markings shall comply with the Manual on Uniform Traffic Control Devices (MUTCD).***
• ***Enforcing a right-turn outbound movement from a school site (through temporary curbing or traffic monitor) improves traffic flow on-site and reduces vehicle queues.***
• ***Facilitating legal U-turn movements through a roundabout downstream or upstream (as required) from the school to facilitate access/egress and reduce around-the-block movements should be considered.***
• ***The use of separate driveways for parent traffic and bus traffic at elementary schools is preferred. A single site access which then splits on-site is also an appropriate design tactic.***
• ***Driveways should not be located too close to nearby intersections. The City of Edmonton Access Control Management Guideline should be referenced.***
Supporting Strategies
• If two exits are designed separating buses and passenger vehicles, the bus exit should occur upstream of the automobile exit to reduce bus delay.
• Where possible, school site access driveways should create the 4th leg of existing intersections. Closely spaces offset intersections can create erratic patterns and detract from drivers' abilities to look out for pedestrians.
• The need to provide a dedicated left turn bay between a school's site accesses to accommodate the anticipated queue length for drop-off and pick-up times is not recommended.
• The development of a right turn bay into a school/park site is not recommended.
• Install fences to prohibit students from crossing at inappropriate locations.

8.5 Best Practice Guidelines – Education, Encouragement and Enforcement

Education, encouragement and enforcement programs can improve motorist and student compliance with traffic regulations and facilitate good behaviors.

Strategies and tactics to address traffic circulation and safety issues at schools do not exclusively represent physical improvements. Education, encouragement and enforcement solutions, as well as school protocols that address arrival and dismissal times and define expectations for parents and students should also be part of an overall school traffic mitigation toolbox. The majority of these strategies are intended to reduce the number of vehicles generated by a school.

Procedures should be developed collectively with school councils, the local community and the school board, as well as other stakeholders. The City of Edmonton in combination with the school boards can help inform and recommend procedures such as those related to arrival and dismissal, which complement

infrastructure modifications. Parents should be notified about new procedures via mailings, calls, meetings, e-mail, and/or social media.

School safety programs require a broad based effort including enforcement. The most effective police enforcement will occur if police enforcement is as a result of a cooperative effort between the Police department, the City of Edmonton, the Office of Traffic Safety and local area school boards.

Table 8-7 presents the best practice guidelines in regards to education and encouragement.

Table 8-7: Education, Encouragement and Enforcement Procedures Best Practices

• ***The City of Edmonton in combination with the local area school boards should develop a series of educational guidebooks intended to build a foundation of information that will assist schools and school boards in developing safe learning environments and associated traffic safety related procedures.***
• ***Educate parents about having their children choose alternative transportation modes to and from school including parent outreach programs (conferences, flyers, police presentations, school newsletters, school websites and personal contact).***
• ***Employ enforcement techniques as and when required to address such issues as speeding through school zones, illegal or unsafe manoeuvres or parking violations.***
Supporting Strategies
• Train and employ community-based volunteers to monitor speeds.
• Encourage carpooling.
• Vary dismissal time or location by mode or grade to reduce the number of students driving to or leaving school simultaneously -particularly where two schools share the same development parcel.
• Implement a Walking or Cycling School Bus Program.
• Expand school busing programs.
• Encourage students to walk or bike to school through in-class curriculums.
• Provide maps and instructions to parents on the school Web sites and in newsletters to describe the location and operation of the loading zone. Due to increased dwell time, space requirements for pick-up can be much longer than for drop-off. Separate protocols for pick-up and drop-off activity may be necessary.
• Create protocols to discourage early arrival by parents during the afternoon pick-up period.

8.6 Conceptual Site Layout

As discussed, the layout of school sites is very much site-specific and driven by a number of on-site and off-site factors. The layout of a particular site is determined by the characteristics unique to that site. Including as many best practice design strategies as possible should provide traffic congestion relief and improve overall traffic operations at school sites.

The following school site layout (**Figure 8-1**) brings together components and elements identified as best practices. The layout is one option — many permutations and combinations are possible. The layout provides one sample of how best practices can be incorporated in the field.

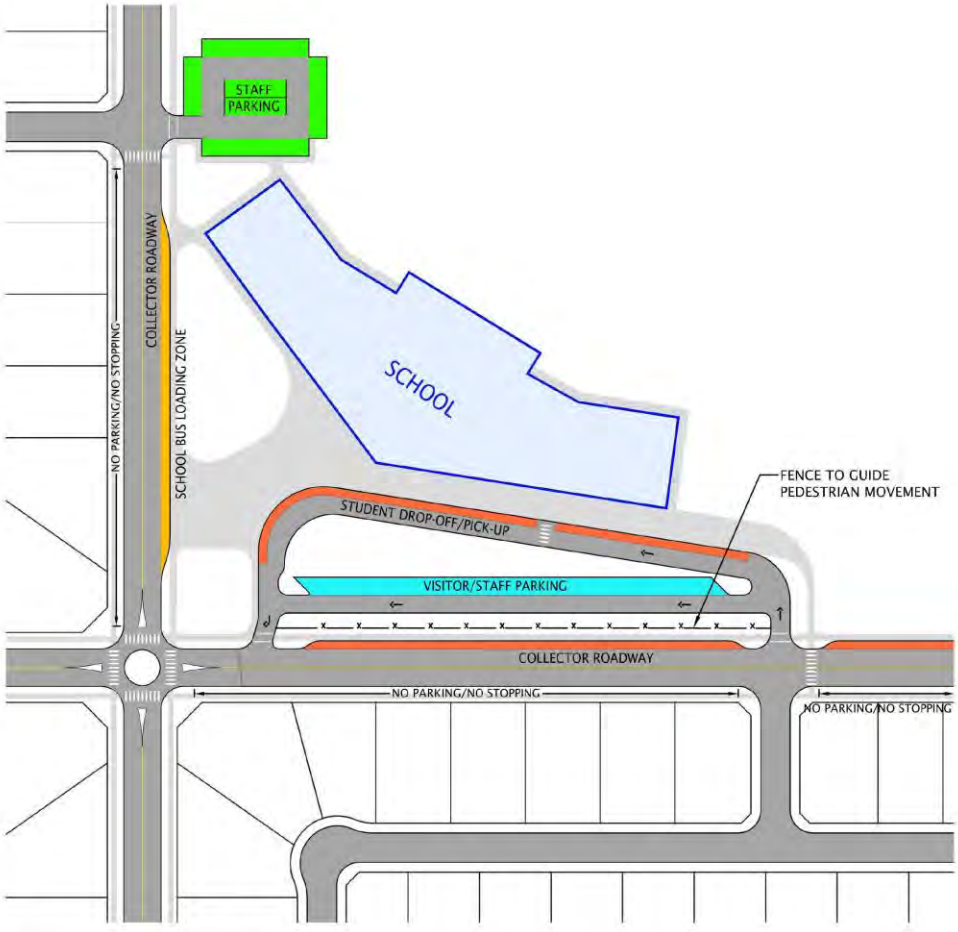

Figure 8-1: Conceptual school site layout

In addition to providing the appropriate traffic control devices, paintline markings and associated signing as per MUTCD guidelines (not shown in Figure 8-1), the conceptual site layout includes the following elements:

- Site is located at the intersection of two collector roadways serving as primary frontages for the school site;
- Adjacent residential development is backing-on format to reduce conflicts between residents and school-related vehicles;
- The curbside lane is protected by sidewalk bulbing, and the sidewalk bulbing reduces the physical crossing distance for pedestrians;
- Stopping/Parking is not permitted on the far side of adjacent roadways to discourage the jaywalking that results from drop-off/pick-up activity that would otherwise occur;
- A sidewalk network is developed with adequate marked crosswalks, and a monowalk is developed adjacent to curbside loading zones;
- Buses, parent/visitor traffic, and staff traffic are physically separated on-site.
- The drop-off/pick-up loop exit onto the adjacent street is right-turn only;
- A roundabout is located upstream of the drop-off/pick-up loop exit to facilitate U-turn movements; and
- A combination of on-site and off-site drop-off/pick-up accommodation is provided.

Figure 8-2 illustrates a permutation of the conceptual school site layout which includes accommodation for school buses on-site. Balancing on-site traffic infrastructure needs and park space is a challenge faced by school boards if the desire is to maximize the school park site for recreation purposes.

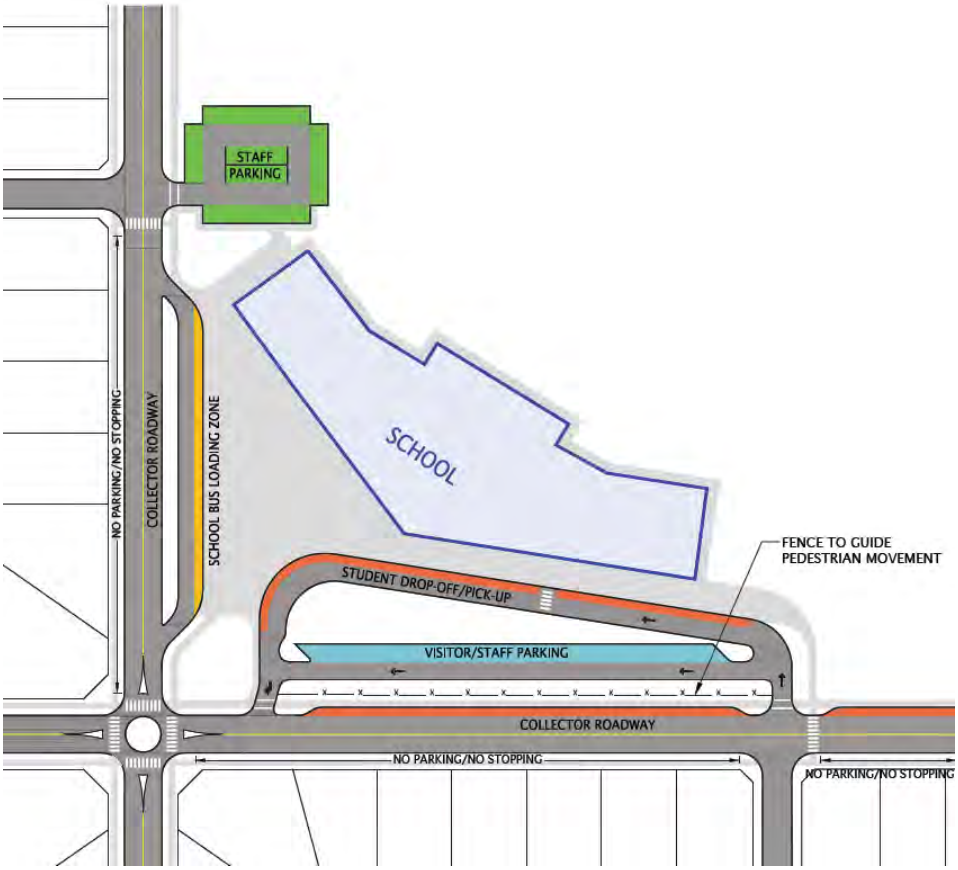

Figure 8-2: Conceptual school site layout with on-site school bus loading

Figure 8-3 illustrates an example of how an existing school parking lot which is located immediately adjacent to a community league building parking lot could be retro-fitted to include an on-site drop-off/pick-up area where one does not currently exist. In this case, staff parking and parking for the adjacent community league could be accommodated internal to a looped circulation roadway. The outside of the looped roadway could be used to provide accommodation for drop-off/pick-up movements without compromising the parking inventory or requiring students to cross the path of vehicles.

It should be noted that Figure 8-3 is not intended to suggest reduced community building zoning parking requirements.

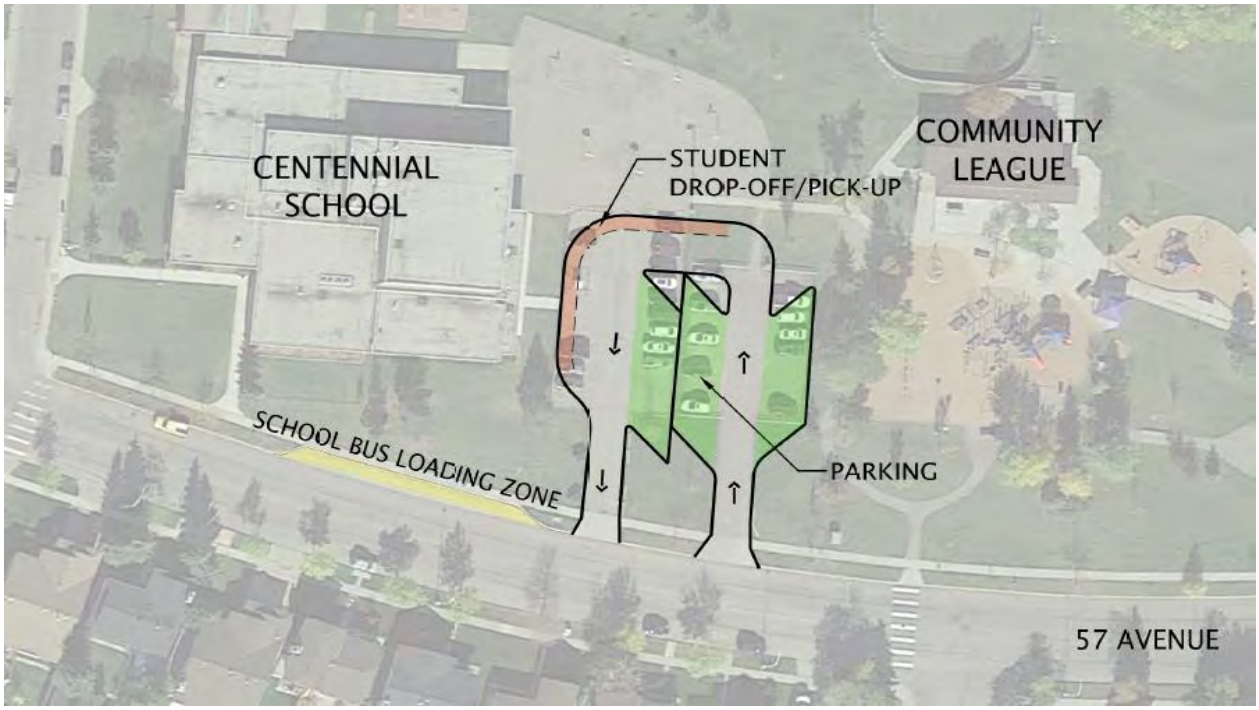

Figure 8-3: Existing school retro-fit to add on-site drop-off/pick-up

8.7 Measures of effectiveness

Success of the design measures and procedures can be assessed based on achieving the following goals:

- fewer vehicles around the school;
- reduced time spent by parents dropping off and picking up children;
- fewer complaints received by the school about traffic congestion;
- fewer complaints received by the police about traffic congestion;
- fewer vehicular collisions and near misses around the school;
- fewer pedestrian injuries and deaths around the school;
- fewer traffic violations and speeding around the school;
- lower percentage of parents using cars to take children to school; and
- improved perceptions of congestion among parents and staff.

8.8 Site Selection and Site Plan Review Checklist

Table 8-8 presents a checklist for use when considering school site selection at a neighbourhood planning level. **Table 8-9** presents a checklist for use when considering a school site plan at a more refined level of planning.

Table 8-8: School Site Selection Checklist – Neighbourhood Planning Level

	Guideline	Yes/No
Site Selection	Site is located centrally within the neighbourhood.	
	Site abuts two roadway frontages, at least one of which is a collector roadway.	
	Site Access can be taken from two roadway frontages.	
	Adjacent land uses either flank or back onto a shared roadway.	
	Safe and convenient pedestrian and bicycle accessibility is available.	
Adjacent Roadway Characteristics	Adjacent roadways can accommodate two basic travel lanes (3.6m lanes) and a single curbside drop-off/parking lane (3.0m lane) school-side.	
Site Access	Future access to the site can align with intersecting roadways to create 4-way approaches (where applicable).	
	Legal U-turn movements to orient school-generated traffic can be facilitated through design upstream and downstream from the school (where applicable).	

Table 8-9: School Site Plan Checklist– Design Stage

	Guideline	Yes/No
Passenger Loading	0.4 to 0.6 m per student of on-site drop-off/pick-up area is provided. (If visitor parking spaces are also used for escorted drop-off/pick-up, the lineal drop-off/pick-up length can be reduced by the length of an equivalent number of parallel parking spaces.).	
	On-site drop-off/pick-up area operates as one-way counter-clockwise circulation. One travel lane is provided adjacent to the loading lane to allow vehicles to pass.	
	Passenger loading/unloading area is separated from school bus loading and pedestrian and cyclist arrivals.	
	Curb bulbs delineate on-street drop-off/pick-up zones.	
	Sidewalks immediately adjacent to curbside drop-off areas should be a minimum of 2.0m wide monowalks.	
School Bus Accommodation	An independent, dedicated bus loading area is provided.	
	Bus passenger loading/unloading occurs adjacent to the school.	
	A single-file design which does not require the buses to reverse is provided.	
	15m of queue space per bus is dedicated, either in a dedicated layby or through the use of temporary cones.	
Adjacent Roadway Characteristics	Adjacent land uses either flank or back onto a shared roadway.	
	Parking is restricted on the far side of frontage roadways.	
	Adjacent roadways can accommodate two basic travel lanes (3.6m lanes) and a single curbside drop-off/parking lane (3.0m lane) school-side.	
	The curbside parking lane is protected by sidewalk bulbing.	
Site Access	Site access aligns with other intersecting roadways to create 4-way approaches (where applicable).	
	Outbound movements are restricted to right turns only during peak traffic periods (where applicable).	
	Legal U-turn movements are facilitated through design upstream and downstream from the school.	
	All site and regulatory signage and markings comply with MUTCD.	
Alternative modes	Clear bicycle and pedestrian routes are defined. Sidewalk connections to the adjacent street system avoid mixing students walking/cycling with students waiting to load/unload buses and passenger vehicles.	
	On-site bicycle storage is provided.	
	Crosswalks are located on pedestrian routes to identify preferred safe crossing locations.	

APPENDIX A

SITE OBSERVATION SUMMARIES

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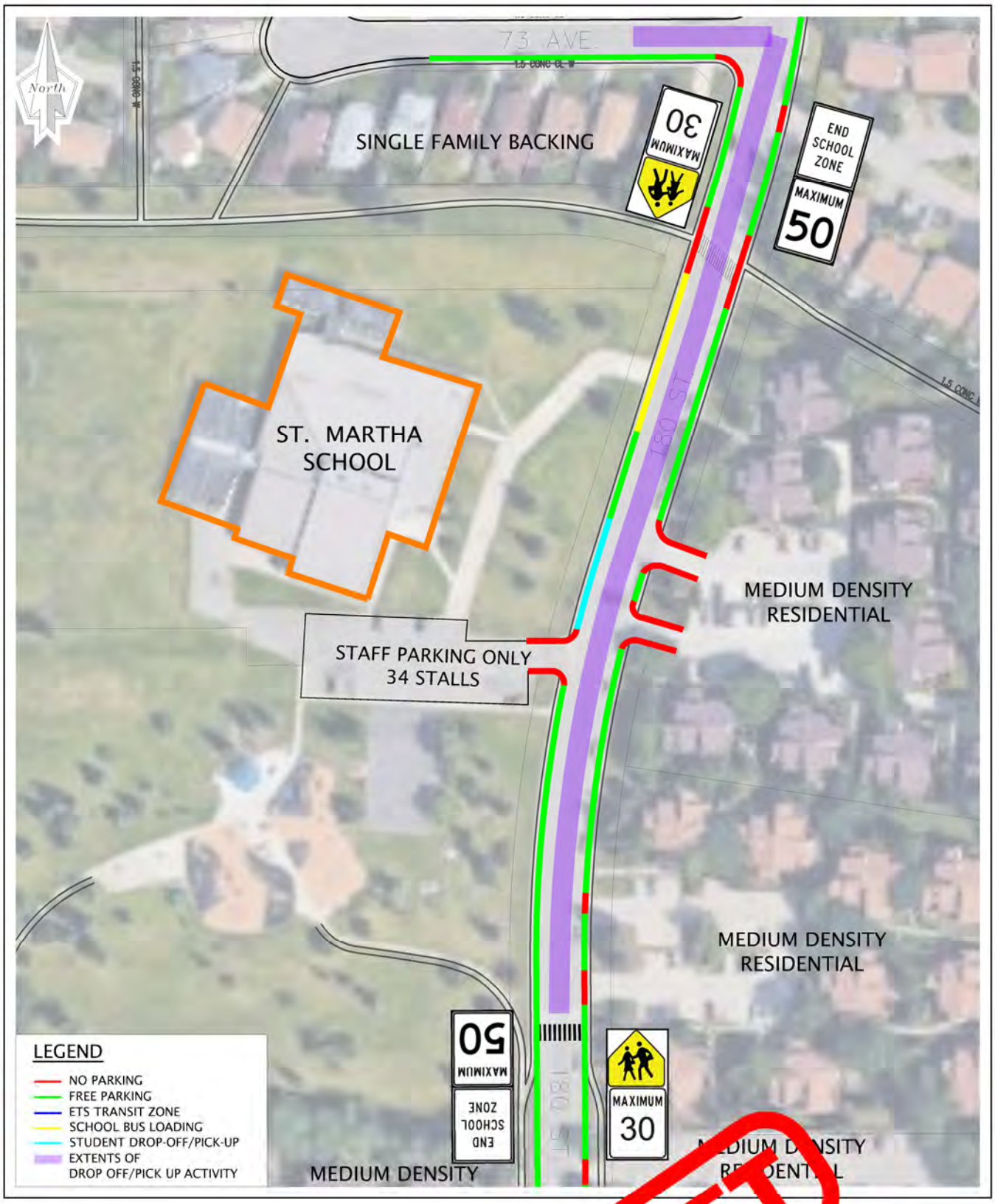

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Exhibit 13

St. Martha School
Existing Conditions

bunt & associates

St. Martha School (K-6)

Edmonton Catholic School Board

Address		7240 180 Street, Edmonton
Contact Info		780-487-4594
Typical School Hours		8:25 AM – 3:15 PM
Busing Program		Yes
Number of Buses	Fixed Route	2
	Fixed Route Noon	1
	Special Needs	
	Special Needs Noon	
Utilization (2014-2015)		99%
Adjusted Enrollment		219 students
School Board's Opinion (Issues/No Issues)		No Issues

Date of Site Visits

AM Drop-off Period: June 1, 2016 (Weather: Clear)
PM Pick-up Period: June 1, 2016 (Weather: Clear)

Surrounding Roadways

- ***180 Street –*** Collector roadway with parking permitted both sides, providing the only access to the school

Land Uses in Area

- Medium Density Residential across 180 Street from school
- Medium Density Residential south of school
- Single Family Residential north of school flanking towards 180 Street
- Monsignor Walter Fitzgerald Park south and west of school

Comments from School Board/School Staff

- No comments from school board or school staff

Student Patrols

- No student patrols in AM drop-off period

Staff Patrols

- Staff monitoring bus drop-off area
- Staff member sets up cones blocking entrance to staff parking lot 10 minutes prior to entrance bell (approx.. 8:15 AM)

AM Bunt Observations

- Students biking/walking to school
- Parents parking across 180 Street (on east side) and jaywalking with students
- Parents parking in school bus zone
- Drop-off starts as early as 8:05 AM

- Students jaywalking along in front of school across 180 Street
- Students playing in park or waiting outside school before entrance bell rings
- Lots of vehicles parked across street outside of MDR; doesn't really seem like they are associated with the school
- Staff arriving in staff parking lot
- 8:13 AM; Staff parking lot access blocked off with cones
- More students jaywalking, vehicles stopping to let them cross
- General speed of vehicles approx. 30 km/hr
- Staff arriving after 8:13 AM has to move cones
- Parents parking and walking students to door
- Parents parked in loading zone for long period (over 5 min)
- More jaywalking
- Parents respecting bus zone, daycare vans & school buses dropping students off
- Parents parked close to crosswalk using crosswalk
- 8:17 AM; one long and small – lots of students taking buses (approx. 40 students)
- Staff meet students at bus to monitor unloading
- As soon as students are off buss, they are directly on school property, no on-site drop-off facilities so nothing to cross or interact with
- Large separation from traffic when getting off bus or dropping off on school side (west side) of 180 street
- Extent of activity – north crosswalk to south crosswalk; both sides
- Lots of jaywalking across 180 Street in front of school
- If parents arrive early, stay in vehicles with students until closer to bell
- Parents walking students to door
- Staff arriving after cones are put out: at least 5 or 6
- Could use a crosswalk in front of school, so much jaywalking; 180 Street fairly active with non-school related traffic
- 180 Street parked up both sides from crosswalk to crosswalk, no double queueing
- U-turn using staff parking lot access to park on 180 Street and walk students to school because no parking available on east side
- 8:25 AM; bell rings, 3 or 4 vehicles using MDR accesses to park and walk students across 180 Street
- Parents also parking in MDR parking lot and walking students to school because no available space on 180 Street
- Truck idling for +10 mins in loading zone
- Vehicles still parked in loading zone
- If there weren't any vehicles parked in loading zone, it would allow space for last minute drop-offs close to front doors
- Still parents dropping-off at 8:30 AM
- U-turns in front of school using MDR access x5
- A lot of U-turns, parents leaving on-street parking or pulling through MDR site to turn around
- New congestion along 180 Street with all the U-turns and late drop-offs

PM Bunt Observations

- 3:10 PM; parents parked waiting either near school door or in vehicles along both sides of 180 Street between north and south crosswalks

- 3:10 PM; parents parked in MDR accesses
- 3:10 PM; vehicle parked at end of loading zone partially blocking staff parking lot access
- 3:10 PM; Staff parking lot access still coned off to restrict pick-up movements within the parking lot
- Parents parking and walking to school doors to collect students
- Parents cruising along 180 Street to find a spot to park; going into MDR site to park if no available space on 180 Street
- Parents parked in loading zone aren't in their vehicles
- 3:15 PM; dismissal bell rings
- Students jaywalking across street with and without parents
- Parking extent just beyond crosswalk at south end
- Staff have to move cones themselves to get out of staff lot
- Students jaywalking between vehicles across street
- One long bus and one daycare van present; students loading directly on bus (no staff member present)
- Parking extent just past crosswalk at north end
- Vehicles parked in no parking area near crosswalk at north end
- Lots of on-street parking available 5-10 mins after bell rings
- Vehicles using MDR accesses to turn around on 180 Street
- Some staff being picked up on-street
- Rush over 5-10 mins after bell rings
- Most parents arrived before bell rang, not many arriving after
- Most vehicles gone except along 180 Street near playground
- Wide sidewalks on-site
- Crosswalks are really far away and removed from the school

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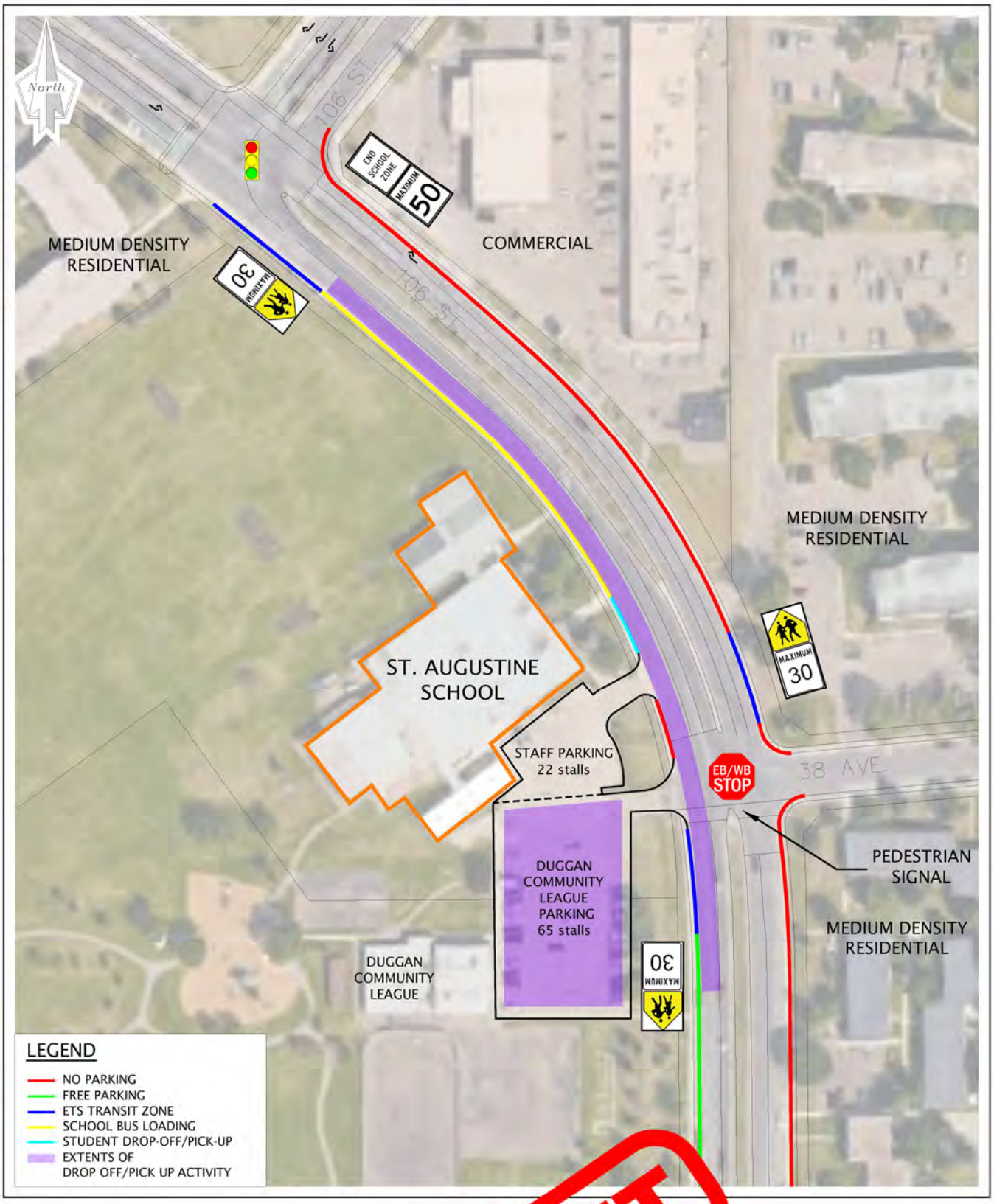

Exhibit 14

N.T.S.

St. Augustine School Existing Conditions

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St. Augustine School (K-6)

Edmonton Catholic School Board

Address		3808 106 Street
Contact Info		780-435-4949
Typical School Hours		8:25 AM – 3:06 PM
Busing Program		Yes
Number of Buses	Fixed Route	1
	Fixed Route Noon	1
	Special Needs	1
	Special Needs Noon	1
Utilization (2014-2015)		92%
Adjusted Enrollment		320 students
School Board's Opinion (Issues/No Issues)		No Issues

Date of Site Visits

AM Drop-off Period: June 2, 2016 (Weather: Clear)
PM Pick-up Period: To be completed

Surrounding Roadways

- ***106 Street –*** Collector roadway with parking permitted on the west side only in the vicinity of the school. Provides the only access to St. Augustine School.

Land Uses in Area

- Commercial land uses to the east of the school
- Duggan Community League to the south and west of the school
- Duggan School to the south of the school
- Medium Density Residential to the east of the school
- Medium Density Residential to the north of the school

Comments from School Board/School Staff

- Only one long school bus and one small bus this year; the school allows parents to park in the designated school bus zone along 106 Street because there is extra room with only having two buses
- Assistant Principal is out monitoring 106 Street unloading operations
- Assistant Principal hasn't noticed any issues with drop-off and pick-up operations
- Parents are encouraged to use Duggan Community League parking lot directly south of the school for drop-off and pick-up
- Next year the school with have two long buses and one small bus so they will have to put cones out on street to save enough space for buses to park within the school bus zone along 106 Street; Assistant Principal figured it would take about a year for parents to catch on
- 100 Voices Pre-K program at St. Augustine School
- Kindergarten AM and PM programs (buses arrive midday as well – not as congested)

Student Patrols

- Four student patrols at pedestrian signal crossing 106 Street south of the school (2 on each side of the 106 Street)

Staff Patrols

- Multiple staff monitoring drop-off/pick-up area in front of school
- Staff meeting students at bus when unloading

AM Bunt Observations

- Parents dropping-off on 106 Street, some parked and walking students in, some just dropping-off
- Students walking from adjacent community at pedestrian signal
- Parents using adjacent Duggan Community League parking lot for drop-off
- Monowalk along 106 Street, not a lot of separation between students and 106 Street traffic
- Speed along 106 Street seems faster than 30km/hr
- Fence up at school along 106 Street
- Loading zone in front of school main doors along 106 Street; 15 min passenger and 30 min commercial
- Staff parking lot access off 106 Street blocked off with cones
- Students/parents have to walk across staff lot to get to school from adjacent Duggan Community League parking lot
- Student patrols at pedestrian signal on 106 Street (4 total)
- Staff lot not blocked off near community league parking lot
- Parents not using staff lot for drop-off
- Lots of parking available in Duggan Community League parking lot
- U-turns after dropping-off in Duggan Community League parking lot
- Dropping-off in "X'd" out portion on north side of Duggan Community League parking lot; otherwise parking and walking students into school
- Lots of students walking from community to the east
- Assistant Principal meets students unloading long school bus
- Parents and students waiting outside school doors until entrance bell rings at 8:25 AM
- School close to St. Augustine School on 106 Street to the north has same bell times (lots of school buses in the area and on 106 Street, not related to St. Augustine)
- Small school bus able to find space on-street along 106 Street within designated bus zone
- Principal meets students off small bus (three students total including one handicapped student); Small bus able to pull up to curb along 106 Street directly in front of front doors for easy wheelchair access.
- Lots of parents walking students into school
- Student patrols gone at entrance bell (8:25 AM)
- Community parking lot virtually full
- 8:30 AM; second bell rings
- Most students in school after second bell
- Vehicles queued to get out of Duggan Community parking lot (4 or 5); vehicles waiting until pedestrian light is activated to exit parking lot (Pedestrian crosses and vehicles on 106 Street are stopped)

PM Bunt Observations

- 2:57 PM; Long bus parked in bus zone
- 2:57 PM; Parents parked along 106 Street
- 2:57 PM; Parents parked in Duggan Community League parking lot
- 2:57 PM; Parents waiting outside school doors or in vehicles on 106 Street for students
- Some parents waiting in vehicles in Duggan parking lot
- Mix of parents waiting in vehicles and actually parked on 106 Street
- 2 ETS buses parked at end (NW) for students from a different school (#44 TWIN BROOKS)
- Parking in no parking zone near pedestrian light
- 3:06 PM; Dismissal bell rings
- Vehicles parked after pedestrian light (south) on 106 Street, parents picking up students from St. Augustine School
- No parents parking on east/north side of 106 Street
- Student patrols out at bell to go to pedestrians light
- Students get on school bus directly, no monitor other than school bus driver
- Students walking/biking home
- One staff monitor out on sidewalk along 106 Street
- A lot of students walking along 106 Street in front of school from nearby junior high school
- 3:11 PM; available space for pickup along 106 Street near front doors
- Students lined up outside near front doors in pairs to walk to bus together
- Most vehicles queued in parking lot wait until pedestrian light switches before exiting
- Most students accompanied by parents back to Duggan parking lot
- 3:14 PM; rush over, school bus still in bus zone
- Not very many parents arrived after dismissal bell (most were already at the school)
- Students taking ETS south of pedestrian light, looked like junior high students from another school not from St. Augustine School
- Parking lane along 106 Street but not defined as a parking lane, just an extra wide curb lane
- 3:17 PM; bus leaves school, students patrols also finished
- Student patrols bring in cones blocking staff parking lot access to 106 Street
- 3:18 PM; small school bus arrives, 3 students get on including one handicapped students

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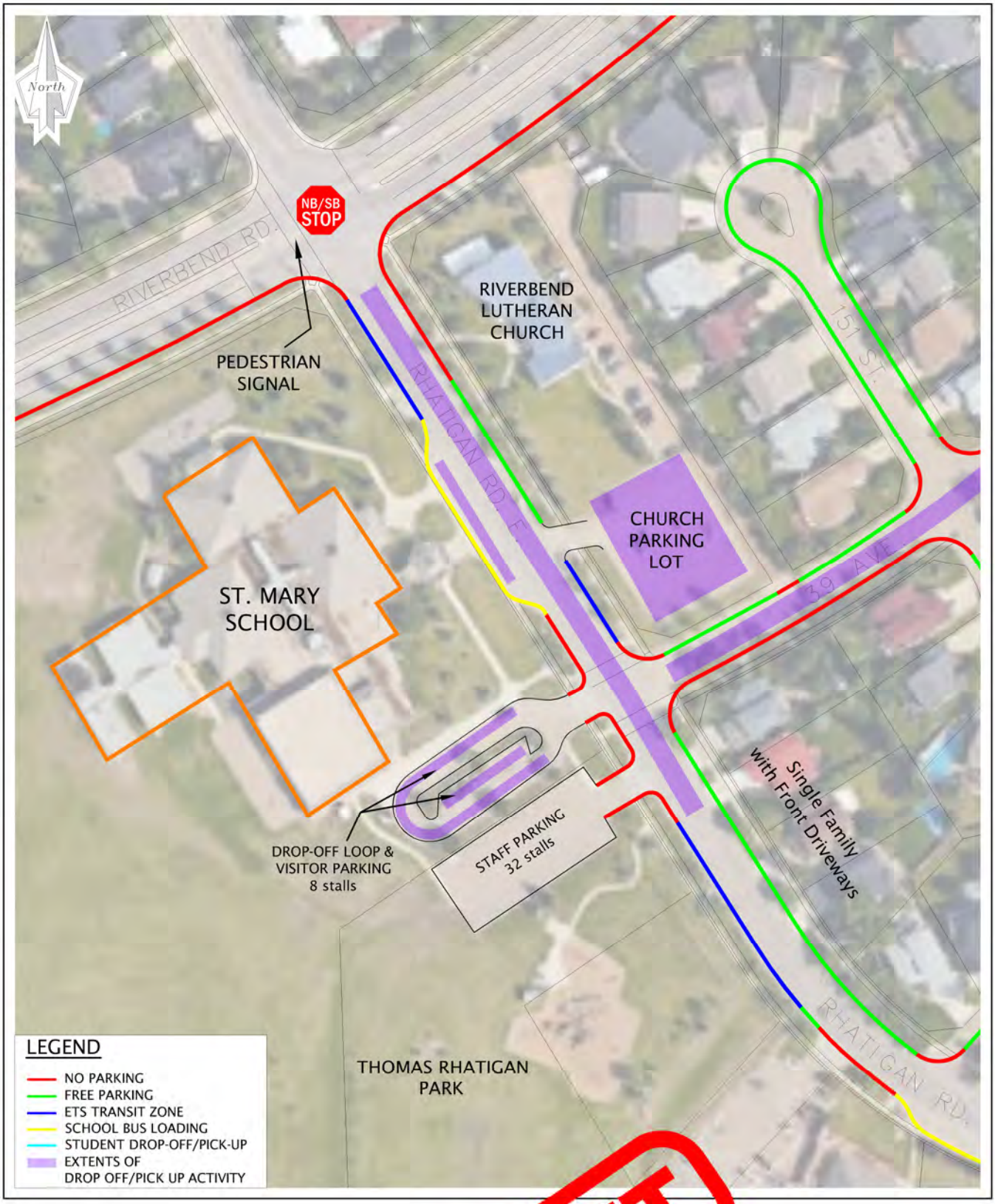

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Exhibit 15

N.T.S.

St. Mary School
Existing Conditions

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St. Mary School (K-6)

Edmonton Catholic School Board

Address		490 Rhatigan Road East
Contact Info		780-988-6577
Typical School Hours		8:25 AM – 3:10 PM
Busing Program		Yes
Number of Buses	Fixed Route	4
	Fixed Route Noon	
	Special Needs	
	Special Needs Noon	
Utilization (2014-2015)		89%
Adjusted Enrollment		403 students
School Board's Opinion (Issues/No Issues)		No Issues

Date of Site Visits

AM Drop-off Period: June 10, 2016 (Weather: Clear)
PM Pick-up Period: June 10, 2016 (Weather: Clear)

Surrounding Roadways

- ***Rhatigan Road East –*** Collector Roadway with parking permitted on both sides. Provides the only access to the school.
- ***39 Avenue –*** Local Roadway with parking permitted on both sides, roadway located in vicinity of school

Land Uses in Area

- Riverbend Lutheran Church to the east
- Single Family with front driveways to the east along Rhatigan Road East
- Field/Park to the west and south
- Earl Buxton School to the south
- Single Family to the north (across Riverbend Road) flanking and backing onto Riverbend Road

Comments from School Board/School Staff

- No issues

Student Patrols

- Student patrols at crosswalk along north approach of 39 Avenue/Rhatigan Road East intersection

Staff Patrols

- Three or more staff outside monitoring crosswalk, drop-off area, and bus unloading

AM Bunt Observations

- 8:04 AM; students being dropped-off, doors are open students are invited into school
- 8:04 AM; one vehicle parked in church parking lot

- 8:04 AM; two vehicles parked on south side of 39 Avenue
- 8:04 AM; parents dropping-off in drop-off loop
- 8:04 AM; one vehicle parked in drop-off loop
- Staff arriving in staff lot
- Students biking to school (bike racks in rear behind garbage bins in drop-off loop)
- 8:07 AM; long school bus arrives in bus layby
- Parents dropping-off in school bus layby
- Students arriving to Earl Buxton School to the south
- Staff monitor out to meet students off bus; students had to wait on bus until staff member present
- Some parents in visitor parking, walking students in
- 8:11 AM; Bus leaves as another one arrives (long bus)
- Parent asked to move out of way of bus in bus layby
- Student patrols on north approach of 39 Avenue/Rhatigan Road intersection
- 8:13 AM; third long school bus arrives, lots of students getting out
- 8:13 AM; no vehicles stopping in drop-off loop, working well
- Lots of parents dropping-off students in bus layby
- 8:14 AM; fourth long school bus arrives; parents asked to move out of way by staff member
- Most parents arriving from north (Riverbend Road)
- One U-turn on Rhatigan Road East from layby
- Multiple vehicles using Riverbend Lutheran Church parking lot for circulation and to turn around from the bus layby along Rhatigan Road to go back north to Riverbend Road
- One vehicle parked in church parking lot to drop-off students
- Two staff members out monitoring layby and crosswalk patrols/drop-off loop
- Drop-off loop working really well
- Dropping-off on north side of 39 Avenue
- Lots of turning around happening in church parking lot (left in, right out)
- Drop-off happening further south on Rhatigan Road East for Earl Buxton School; adds traffic going by St. Mary School
- Not much drop-off happening outside layby and drop-off loop; some on 39 Avenue but flanking lots so lots of available space on-street
- Parents not staying long in layby; high turnover
- Queued outside layby into ETS zone, just queued, not parked
- U-turn on driveway to the south of school along Rhatigan Road East (not associated with St. Mary School)
- Lots of parents parking in church lot and walking students in
- Some parents walking to school with students from surrounding community
- 8:25 AM; small school bus arrives, has to queue outside layby while parents move
- 8:25 AM; bell rings
- Parents still dropping-off on 39 Avenue, church lot, drop-off loop, and bus layby
- Lots of external extra traffic on Rhatigan Road (probable associated with Earl Buxton School, including buses)
- Staff member jaywalking across Rhatigan Road at church parking lot access
- Vehicles doing way more than 30 km/h; parent with small child trying to cross; vehicles not stopping (3 times in 2 mins); most vehicles doing over 30 km/h not associated with school
- Traffic volumes definitely increased, speed also increased

- Parent of student at St. Mary School demonstrating vehicles not stopping at crosswalk when she's there waiting to cross; most drivers unaware
- 8:34 AM; rush over but traffic volume on Rhatigan Road increased due to drop-offs with Earl Buxton School
- Speed of vehicles generally way higher than 30 km/h
- St. Monica School on 53 Avenue was recommended by a parent as another school to investigate
- Parents were concerned about pedestrian safety at 39 Avenue/Rhatigan Road East crosswalk
- Earl Buxton School Hours: 8:34 AM buses arrive, 8:39 AM assembly bell

PM Bunt Observations

- 3:03 PM; Parents parked in drop-off loop and visitor angled parking
- 3:03 PM; Parents parked along 39 Avenue both sides from Rhatigan Road to next local
- 3:03 PM; Parents parked in church parking lot (8 vehicles)
- 3:03 PM; Parents parked on Rhatigan Road East across from school and south of school
- 3:03 PM; Some vehicles arriving to staff lots (parents?); no signage restricting drop-off/pick-up activity in staff parking lot
- Parallel parking on south side of drop-off loop, permitted.
- Parents waiting outside school doors for students
- Not queuing from drop-off loop onto Rhatigan Road
- Two school buses (long) arrive
- One parent made a comment about how sometimes the drop-off loop is double queued
- U-turn in staff lot access
- Using church parking lot for pick-up
- School bus layby on Rhatigan Road can accommodate 4 long school buses
- Lots of students crossing Rhatigan Road to get to church lot, some with parents, some without
- Mix of parents parking and walking to school to pick-up students and some just staying in vehicles
- General speed of vehicles is slow, obeying 30 km/hr
- Queue getting into church parking lot
- Some parents parking on Rhatigan Road south of school but not many
- Three staff monitors out between school and Rhatigan Road observing school bus loading, students patrols and students crossing Rhatigan Road, and drop-off loop
- One staff member stops students from playing soccer in church parking lot
- Lots of circulation in church parking lot (high turnover and backing vehicles)
- 3:20 PM; buses leave together, buses fairly full (5 buses total?)
- Staff call students waiting for parents in church parking lot to come back to school side of Rhatigan Road to wait for parents… playing near church lot too dangerous; staff told parents to tell students to wait on school side of road and only cross Rhatigan Road when they see parents arrive
- Parents picking up in school bus layby once buses gone
- 3:24 PM; rush over; then congestion picks up for Earl Buxton School pick-up activity
- Parents picking-up students from Earl Buxton School using church parking lot and parking on Rhatigan Road south of St. Mary's school; some parents also using 39 Avenue

- 3:30 PM; Earl Buxton School bell rings

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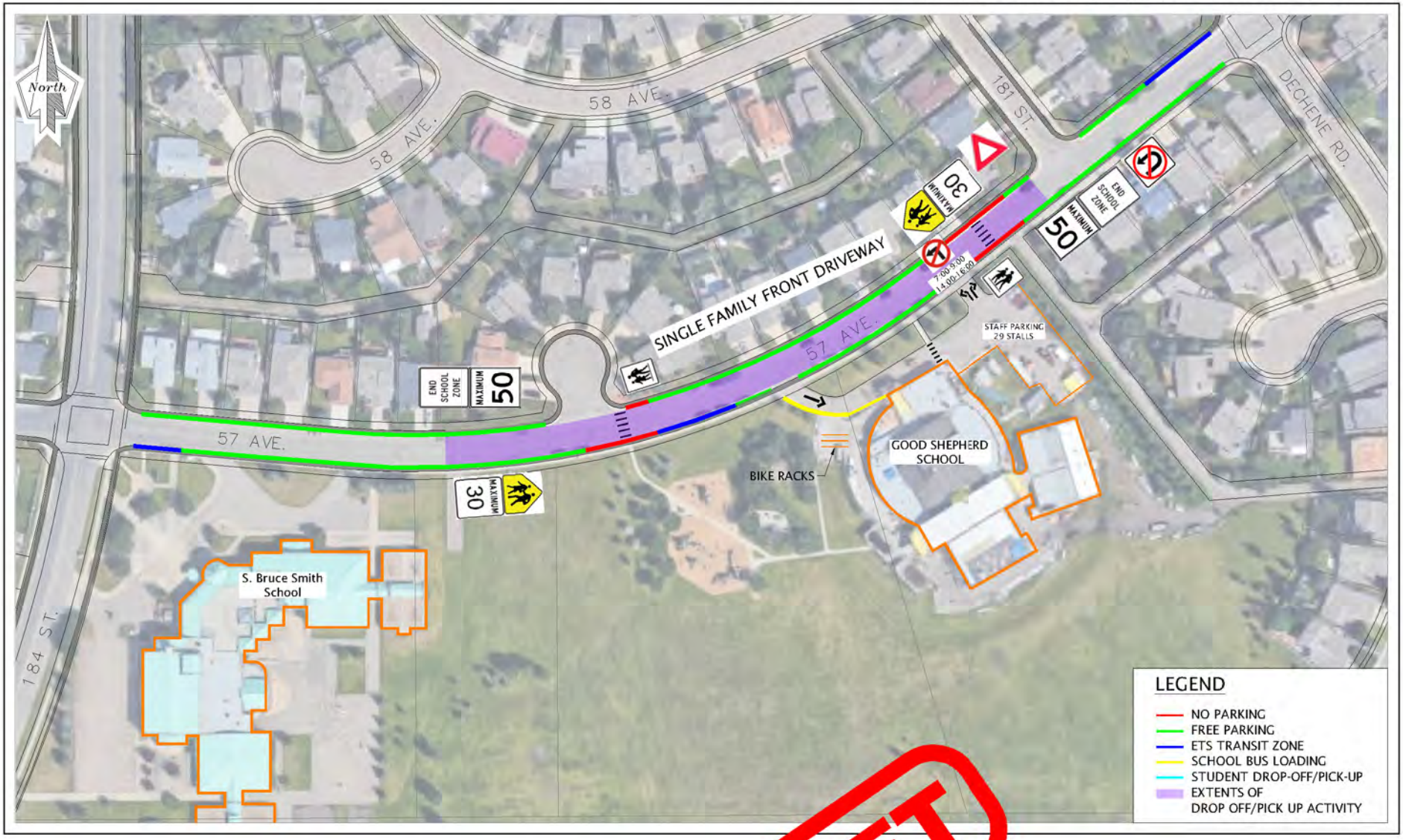

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Exhibit 8

Good Shepherd School
Existing Conditions

N.T.S.

bunt & associates

LMC School Site Functionality Study
bunt & associates | Project No. 3027.59

Good Shepherd Elementary School (K-6)

Edmonton Catholic School Board

Address		18111 57 Avenue, Edmonton
Contact Info		780-444-4299
Typical School Hours		8:35 AM – 3:15 PM
Busing Program		Yes
Number of Buses	Fixed Route	3
	Fixed Route Noon	1 (Kinder bus)
	Special Needs	
	Special Needs Noon	
Utilization (2014-2015)		86%
Adjusted Enrollment		345 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 11, 2016
PM Pick-up Period: April 11, 2016

Surrounding Roadways

- ***57 Avenue*** - Collector roadway with parking permitted both sides; only roadway providing access to the school
- ***N/S Alley*** immediately to the east; does not provide access to the school

Land Uses in Area

- Single Family with front drives along 57 Avenue directly across from school
- Single Family with front drives immediately east of school
- Dechene Park and S. Bruce Smith Junior High School to the west

Comments from School Board/School Staff

- Congestion along 57 Avenue; due to ETS buses
- Illegal U-turns along 57 Avenue in front of school
- Speeding along 57 Avenue

Student Patrols

- Crosswalk in Drop-off lane
- Crosswalk along 57 Avenue east of school
- Crosswalk along 57 Avenue west of school

Staff Patrols

- Monitoring near front door/drop-off lane

AM Bunt Observations

- Cones at crosswalks - set out during AM drop-off and picked up after PM pick-up
- Parents start arriving 8:20 AM
- Dropping-off in drop-off lane - not parking
- Dropping-off on-street - mix of parking and walking students into school and not parking, just dropping off
- Left turns out of drop-off lane backing up traffic through lane
- Some parents parking across the street (by residential); but if they are, parents walking students across 57 Avenue
- Parallel parking along school and park frontage
- Students crossing pedestrian crossing in drop-off lane backing up vehicles through drop-off lane to 57 Avenue
- Vehicles by passing buses in drop-off lane; able to make it by
- Drop-off lane backs up to 57 Avenue; students are then dropped-off along 57 Avenue
- Most vehicles arriving from the west, few left turns into drop-off from 57 Avenue
- When drop-off is full, left turns from the east along 57 Avenue into drop-off blocks westbound through traffic along 57 Avenue (approx. 10 sec.)
- Parents parking across 57 Avenue in front of residential, parking and jay-walking to walk students to the school
- Parents using outside lane of drop-off while buses are present
- Parents dropping-off at front door, not pulling up to next available space in drop-off lane
- Noticed vehicles speeding along 57 Avenue (not obeying 30 km/h signs)
- By 8:42 AM, vehicles are parked in drop-off lane; after rush is over.

PM Bunt Observations

- 3:10 PM, both sides of 57 Avenue parked up
- 3:10 PM, bus lane full with school buses and daycare vans (2 school buses and 4 vans)
- Vehicles in illegal parking along street (near crosswalks or in front of hydrants)
- Parking further down 57 Avenue to the west of the school (might be related to S. Bruce Smith Junior High pick-up?)
- No opportunities for parent pick-up within drop-off lane at 3:20 pm because of buses and vans parked along access (access not wide enough to accommodate a bypass lane)
- School bus blocking sidewalk at access to drop-off lane
- School bus stopped along 57 Avenue to get into drop-off loop, blocking eastbound vehicles along 57 Avenue
- 3:24 pm; first 2 vans depart
- Parents parking in front of residential driveways across 57 Avenue from school
- Unused space in drop-off lane because parked bus is blocking (no pass by capability near access); finally moved up.
- 3:26 pm, space available along 57 Avenue for parents to park
- Buses in loop, not queued on 57 Avenue; still blocking drop-off lane (no room to pass by)
- U-turns noticed by vehicles parked on south side of 57 Avenue to go west on 57 Avenue
- 3:30 PM; buses depart
- After buses have left, parents using drop-off lane for pick-up

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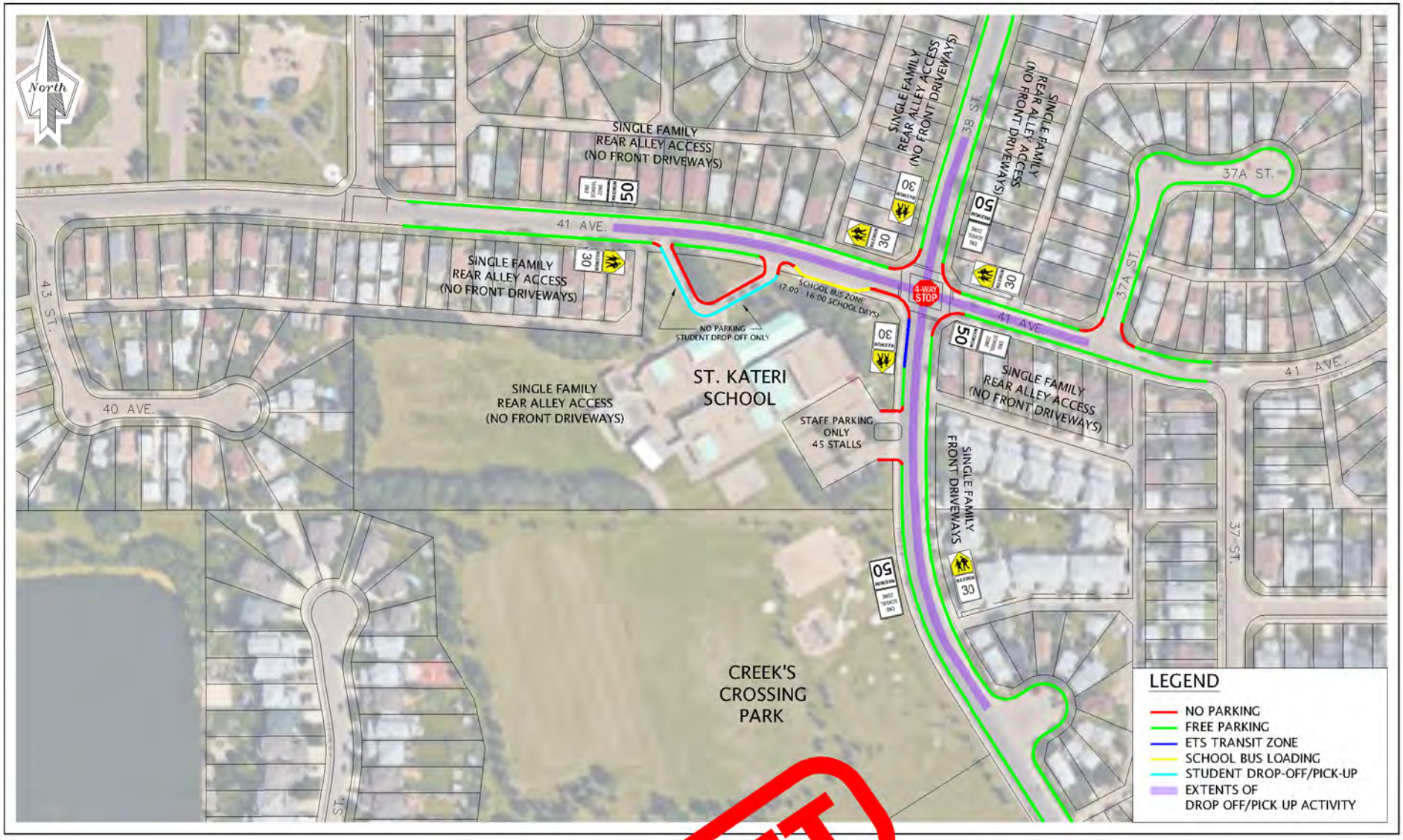

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Exhibit 3

St. Kateri School
Existing Conditions

N.T.S.

bunt & associates

LMC, School Site Functionaility Study
bunt & associates | Project No. 3027.59

St. Kateri School (K-6)

Edmonton Catholic School Board

Address		3807 41 Avenue, Edmonton
Contact Info		780-440-3322
Typical School Hours		8:39 AM – 3:10 PM
Busing Program		Yes
Number of Buses	Fixed Route	3
	Fixed Route Noon	1 (Kinder bus)
	Special Needs	
	Special Needs Noon	
Utilization (2014-2015)		103%
Adjusted Enrollment		490 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 19, 2016
PM Pick-up Period: April 19, 2016

Surrounding Roadways

- ***41 Avenue*** - Collector roadway with parking permitted both sides; one of two roadways providing access to school (main door along 41 Avenue)
- ***38 Street*** - Collector roadway with parking permitted both sides; second roadway providing access to school

Land Uses in Area

- Duplexes with no front drives across 41 Avenue north of school
- Single Family with front drives across 38 Street east of school
- Park/field south of school
- Duplexes with no front drives along 41 Avenue west of school

Comments from School Board/School Staff

Spoke with a staff member following AM drop-off period (Nicole):

- Parking in drop-off zone (disabled students)
- 41 Avenue/38 Street intersection congested, especially in PM pick-up period
- 2 long buses, 2 daycare bus/vans - layby along 41 Avenue not long enough for all buses, difficult for vehicles to get by on 41 Avenue
- Staff parking; not permitted for drop-off use, fairly certain that is respected by parents
- 100 voices program; all drop-off (no busing available for this program); parents have to park and come into school to drop-off and pick-up students (Pre-K program)
- Residents along 41 Avenue frustrated with parents parking in front of houses and blocking alley on north side of 41 Avenue
- Residents directly to the west of school along south side of 41 Avenue frustrated with parents using alley along west side of school as drop-off area - (there is a fence between alley and school)

- Parents drop-off students across 41 Avenue and jaywalk across to school

Student Patrols

- West and south crosswalk at 41 Avenue/38 Street intersection

Staff Patrols

- Staff member at 41 Avenue/38 Street intersection monitoring student patrols and pedestrian activity
- Staff member where school buses load/unload
- Staff member around drop-off loop to monitor drop-off/pick-up

AM Bunt Observations

- Dropping-off on 38 Street in transit zone
- Students walking and biking to school
- Parents dropping-off in loop and along 41 Avenue in front of school
- Vehicles parking in drop-off zone (within loop); Drop-off loop signed with "Hug and Go Zone; No Parking"
- U-turns along 41 Avenue in front of school

PM Bunt Observations

- 3:00 PM; Parents parking on both sides of 38 Street, passed curvature in roadway
- 3:00 PM; Parking on both sides of 41 Avenue
- 3:00 PM; One school bus in bus layby along 41 Avenue
- 3:00 PM; drop-off lane full (no double queueing)
- Mix of parents in vehicles waiting and vehicles parked with parents waiting by front door
- 3:00 PM; 9 vehicles in drop-off lane
- 72 students in 100 voices program; need to confirm when they all arrive and depart throughout the day
- Parents waiting for students by main door
- One vehicle on paved area by drop-off? Kind of a safety concern with pedestrians around... Later discovered was used for delivery, did not leave until after pick-up period was over
- 2 School buses in bus layby lane - max capacity without spilling onto 41 Avenue
- Vehicles parked on 38 Street north and south of 41 Avenue
- Vehicles parked on 41 Avenue east of 38 Street - observed some parents parking there and walking students from school to vehicle
- Students patrols on south and west leg of 41 Avenue/38 Street intersection
- Parents parking in transit stop on west side of 38 Street south of 41 Avenue
- Parents parking on north side of 41 Avenue and jaywalking across 41 Avenue to school
- After bell rings, another small bus in bus lane; doesn't fit in bus layby and extending out into eastbound travel lane along 41 Avenue
- Traffic slowing down on 41 Avenue due to bus partially blocking roadway
- ETS on 38 Street
- Vehicle parked in bypass lane of drop-off loop to pick up students; blocking lane

- Van parked on-street along 41 Avenue between bus layby and drop-off loop exit behind buses; making the right turn out of the drop-off loop difficult; less than 2 travel lanes on 41 Avenue now
- Parents walking with students to vehicles parked on north side of 41 Avenue; jaywalking across 41 Avenue and walking between buses (not visible)
- Left turn permitted out of drop-off loop
- Good turnover along 41 Avenue and in drop-off loop
- Slight congestion at 41 Avenue/38 Street intersection, but not bad
- A lot of pedestrians crossing west and south approaches of 41 Avenue/38 Street intersection
- Possible student pick-up in alley to the west of the school
- Staff member at 41 Avenue/38 Street intersection monitoring student patrols
- Some congestion along 28 Street south of 41 Avenue (2 ETS buses - school specials)
- Vehicles parked/picking-up in transit zone along 38 Street south of 41 Avenue
- The two large buses leave at similar times
- 38 Street becomes less parked up south of 41 Avenue after rush is over
- After student patrols leave, vehicles still aware of pedestrians at the intersection and stopping for them (4-way stop helps)
- No vehicles parking or picking-up in bus layby area, even after buses leave (not closest option to the front door of the school - drop-off loop closer)
- Lots of capacity for on-street parking after rush is over (especially around 41 Avenue/38 Street intersection)
- After rush, some vehicles parked along 41 Avenue west of school (residents?)
- After rush, some vehicles still parked along 38 Street in vicinity of school
- After rush, 4 vehicles parked in drop-off loop
- Most of vehicles parked along 38 Street and 41 Avenue gone by end of pick-up period (most parking probably school related)

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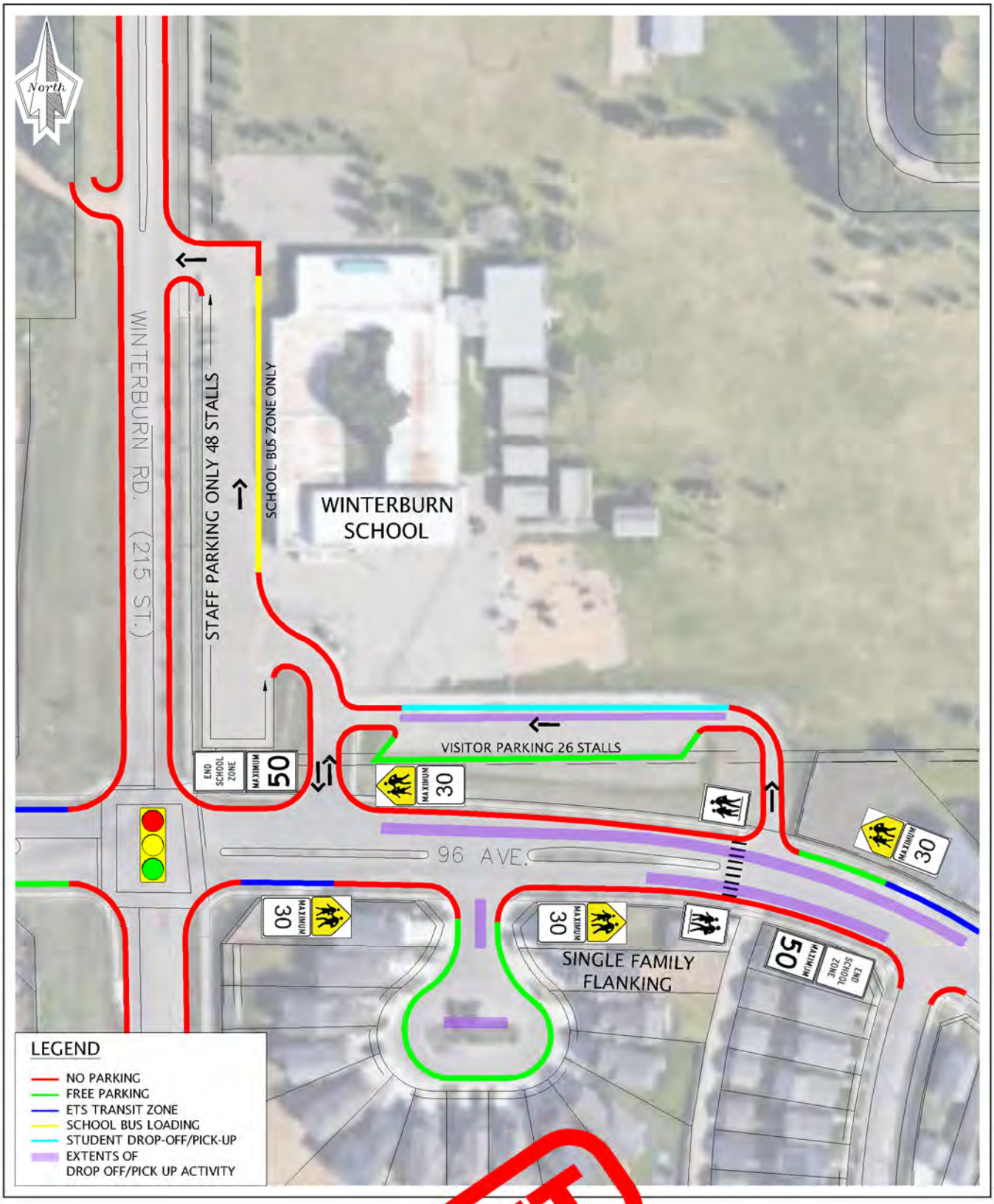

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Exhibit 2

N.T.S.

Winterburn School
Existing Conditions

bunt & associates

LMC, School Site Functionality Study
bunt & associates | Project No. 3027.59

Winterburn School (K-9)

Edmonton Public School Board

Address		9527 Winterburn Road, Edmonton
Contact Info		780-447-3566
Typical School Hours		8:24 AM – 3:05 PM
Busing Program		Yes
Number of Buses	Fixed Route	5
	Fixed Route Noon	2
	Special Needs	0
	Special Needs Noon	0
Utilization (2014-2015)		93%
Adjusted Enrollment		513
School Board's Opinion (Issues/No Issues)		No Issues

Date of Site Visits

AM Drop-off Period: April 15, 2016 (Weather: Clear)
PM Pick-up Period: May 2, 2016 (Weather: Clear)

Surrounding Roadways

- Winterburn Road (215 Street); Two lane undivided arterial roadway with parking not permitted on both sides of the roadway - does not provide access to school, but bus and staff exits to Winterburn Road
- 96 Avenue; Collector roadway with parking not permitted on both sides of the roadway - provides access to drop-off and bus/staff parking area

Land Uses in Area

- Single Family with front drives flanking onto 96 Avenue
- MDR Sites across Winterburn Road west of school
- Residential/Industrial north of school
- Residential backing on east of school

Comments from School Board/School Staff

- No issues identified by school board

Student Patrols

- No student patrols

Staff Patrols

- Staff monitoring school bus zone and assisting students

AM Bunt Observations

- Buses have separate drop-off from parent drop-off
- Buses in from 96 Avenue and out on 215 Street
- Long parent drop-off loop accessed via 96 Avenue

- No parking along 96 Avenue in vicinity of school (All drop-off is handled on-site)
- Some parents using cul-de-sac directly to the south of the school across 96 Avenue to park and walk students into the school
- Some parents dropping-off on 96 Avenue, even though not permitted; however, not parking
- Some parents parking in drop-off lane
- Must turn right out of parent drop-off lane because of median along 96 Avenue approaching 215 Street
- U-turns observed after median on 96 Street (EB to WB), and entering staff/bus area or dropping-off on 96 Avenue
- Observed vehicles entering drop-off loop exit (only permitted for buses) and heading towards staff/bus area
- Do not enter (except buses) signs on drop-off exit
- Parents parking in angled visitor parking stalls to walk students into school
- Some students walking to school, not many

PM Bunt Observations

- 2:53 PM; parents parked along drop-off loop
- 2:53 PM; parents parked in no parking along north side of 96 Avenue (4 vehicles)
- 2:53 PM; parents parked in angled parking
- Parents parked on-street along 96 Avenue not leaving vehicles unattended
- Parents parked in drop-off loop – mixture of parents waiting in vehicle and leaving vehicles
- U-turn on 96 Avenue at drop-off loop entrance
- 2:55 PM; one long bus parked along north side of 96 Avenue east of drop-off loop entrance
- 2:56 PM; one long bus parked in bus zone on west side of school
- 2:58 PM; lots of parents waiting in school near front office/waiting outside near school doors
- 2:58 PM; 3 school buses (long) in bus zone
- 2:59 PM; now 4 buses (long) in bus zone, plus one daycare van, buses move up to allow space for another bus at south end
- Parents parked all along 96 Avenue on north side between drop-off loop exit and drop-off loop entrance (3:02 PM; 7 vehicles)
- School bus east of drop-off entrance now gone, possibly waiting to get into to school bus zone at appropriate time
- Drop-off loop virtually full of parents waiting
- Parents double queuing in drop-off loop, no space for vehicles to bypass because of angled parking (approximately 4 vehicles double parked)
- Parents parking in cu-de-sac south of school and jaywalking across 96 Avenue to school
- 3:04 PM; dismissal bell
- Parents parking in staff lot to pick-up students (counted one vehicle)
- 3:05 PM; long bus arrives, able to fit along school frontage (now 5 buses)
- Parents not parking west of drop-off loop exit
- Vehicles ready to leave drop-off loop but can’t because of double queuing
- One vehicle parked on south side of 96 Avenue east of drop-off entrance in no parking zone
- One vehicle parked on north side of 96 Avenue east of drop-off entrance

- Parents not parking in drop-off entrance access because only one lane wide and no room to bypass
- Parent parked on sidewalk in cul-de-sac
- U-turn at cul-de-sac intersection: WB to EB (x2)
- 3:08 PM; drop-off loop moving well now that double queueing is gone
- Staff monitors near buses to help students
- No student patrols
- Students jaywalking across 96 Avenue at cul-de-sac intersection
- Lots of students crossing Winterburn Road along north approach into Secord
- Didn't notice any parents parking within Secord to pick-up students
- 3:12 PM; buses leaving
- 3:12 PM; only 1 vehicle parked along 96 Avenue
- 3:12 PM; lots of room in visitor parking
- 3:12 PM; room in drop-off loop
- Back up in drop-off loop because of vehicles turning right out of drop-off exit onto 96 Avenue and wanting to get into left turn bay to turn left onto Winterburn Road; Westbound left turn queue extending past drop-off exit; vehicles making WB through/right movements at 96 Avenue/Winterburn Road intersection bypass queue in drop-off exit and turn right; unsafe because vehicles cannot see pedestrians crossing north approach at 96 Avenue/drop-off exit intersection
- Some vehicles going through into Secord
- Didn't notice any more parents using staff parking for student pick-up
- Students jaywalking across 96 Avenue to get to vehicles waiting to pick-up students in cul-de-sac south of school
- 3:15 PM; one bus remaining in bus zone (left at 3:16 PM); now all buses gone
- Must turn right out of drop-off loop exit
- After buses gone, parents still not using bus zone for pick-up (no option but to go north on 215 Street)
- 3:17 PM; parents still arriving for student pick-up but rush is over
- Lots of students playing in playground
- Students walking/biking home
- One parent picked-up in drop-off loop then went through bus zone and parked in bus zone
- 3:17 PM; still 7 vehicles in drop-off loop (not all are occupied)
- Mix of actual pick-up activity and parking in drop-off loop

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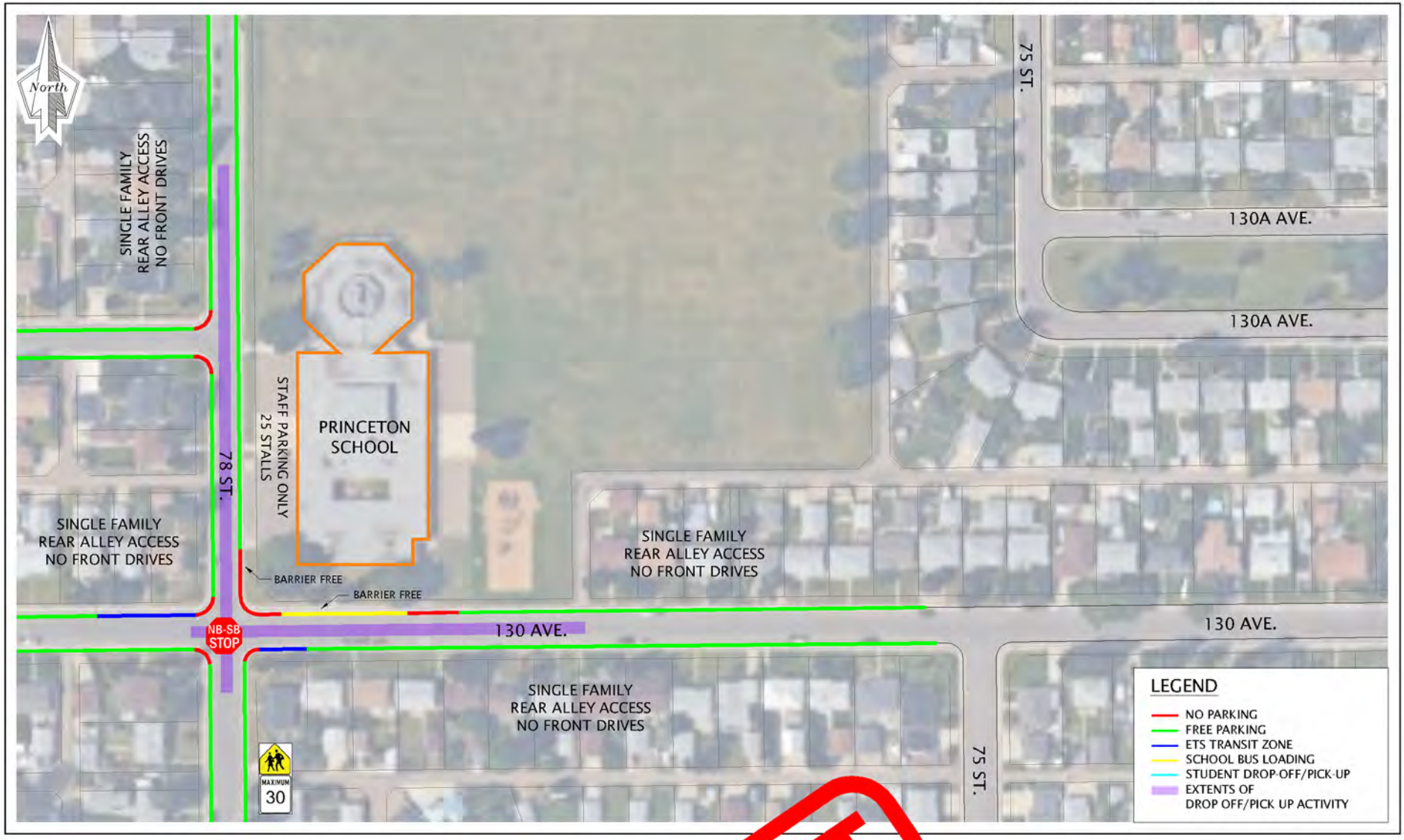

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Exhibit 5

Princeton School
Existing Conditions

N.T.S.

bunt & associates

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Princeton School (K-6)

Edmonton Public School Board

Address		7720 130 Avenue, Edmonton
Contact Info		780-476-2344
Typical School Hours		8:30 AM – 3:15 PM
Busing Program		Yes
Number of Buses	Fixed Route	0*
	Fixed Route Noon	0*
	Special Needs	0*
	Special Needs Noon	0*
Utilization (2014-2015)		36%
Adjusted Enrollment		144 students
School Board's Opinion (Issues/No Issues)		No Issues

*Reported by school board as having no buses; however, buses were observed on site.

Date of Site Visits

AM Drop-off Period: April 27, 2016 (Weather: Clear)
PM Pick-up Period: April 27, 2016 (Weather: Clear)

Surrounding Roadways

- ***130 Avenue –*** Collector roadway with parking permitted on both sides. One of the roadways providing access to the school
- ***78 Street –*** Local roadway with parking permitted on both sides. Provides access to the school as well as the staff parking lot

Land Uses in Area

- Single Family with rear alley access (no front drives) to the east, south, and west of the school
- Park/Field directly north and east of the school

Comments from School Board/School Staff

- By volume; low attendance, typical of many mature area elementary schools
- Buses throughout the day: 9:30 AM, 12:00, because of E4C classes

Student Patrols

- Student patrols at crosswalk along east approach of 130 Avenue/78 Street intersection

Staff Patrols

- No staff monitoring drop-off area, except when buses arrive, staff accompany students from buses to school

AM Bunt Observations

- Vehicles parked on 130 Avenue to walk students into school
- Students walking to school from east and west
- Students playing in park before school starts/doors open

- Student patrols at 130 Avenue/78 Street east approach crosswalk
- Parents dropping-off on both sides of 130 Avenue, students using crosswalk midblock on 130 Avenue to cross
- Parents walking/biking to school with students
- U-turn on 130 Avenue at alley east of school
- Parents obeying bus zone, lots of room on-street along 130 Avenue, not many residents parking in front of homes (in rear alley)
- Dropping-off on 78 Street as well; east side north of staff parking lot
- Lots of students walking to school from community
- Not a lot of traffic on 130 Avenue or 78 Street, some respecting 30 km/h zone, not all; roadway is wide and not a lot of drop-off activity or school activity
- Also dropping-off in front of staff lot access and south of south staff lot access
- Parents using staff lot for student drop-off
- Most parents either on north side of 130 Avenue or east side of 78 Street along school frontage
- Majority of parents walking students to school
- 8:29 AM; small bus arrives, approx. 3 students unload
- Vehicles coming from west along 130 Avenue use 78 Street for drop-off (left at 78 Street)
- Vehicles coming from east along 130 Avenue use 130 Avenue for drop-off
- 8:30 AM; second bus arrives (long); 3 students unload
- 8:30 AM; third bus arrives (small); 4 students with aides unload
- Buses stop within designated bus zone and leave right away
- U-turn on 78 Street after dropping-off
- 8:31 AM; fourth bus arrives (small); 3 students unload
- Staff member being dropped-off in staff parking lot
- Staff members or aides walking students from buses to school
- 8:33 AM; all three buses gone, 3-5 students per bus
- Plenty of space for buses (staggered arrival)
- Buses for students with disabilities
- 8:30 AM; student patrols gone when bell rings
- 8:36 AM; fifth bus arrives (small); one students unloads when staff member from school comes out to street to accompany student into school
- Parent parked in no stopping/parking zone at crosswalk to walk student into school
- Students don't get off buses until aide or staff member can walk them in, staff member comes from school to meet students

Drop-off Count in AM Drop-off Period (After 8:13 AM)

130 Avenue	78 Street	Staff Lot
16	10	2

PM Bunt Observations

- 3:15 PM; no buses
- Parents parking along 130 Avenue & 78 Street
- No parents parked in bus zone

- Parking Extents:
    - Up to field along 78 Street (east side)
    - Up to school building along 78 street (west side)
    - To fence on 130 Avenue (east of school/both sides)
- 3:15 PM; no student patrols
- Parents parking in ETS transit zone on south side of 130 Avenue
- Parents parking in staff lot to pick-up students by 78 Street
- Using alley east of school to turn around (reverse onto 130 Avenue) – seen 3 times in PM pick-up period
- Low volume on 130 Avenue & 78 Street
- Students jaywalking on 78 Street
- 3:24 PM; Patrollers out at east approach crosswalk of 130 Avenue/78 Street intersection
- Parents using crosswalk on 130 Avenue midblock
- Lots of students walking home
- Students talking ETS bus (Bus #154)
- 3:27 PM; Patrollers end
- Lots of students playing in park
- Using staff parking lot to turn around on 78 Street
- 3:28 PM; still no buses

Approx. Pick-up Count in PM Pick-up Period (3:15 – 3:35 PM)

130 Avenue	78 Street	Staff Lot
13	16	4

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Exhibit 8

N.T.S.

Hardisty School Existing Conditions

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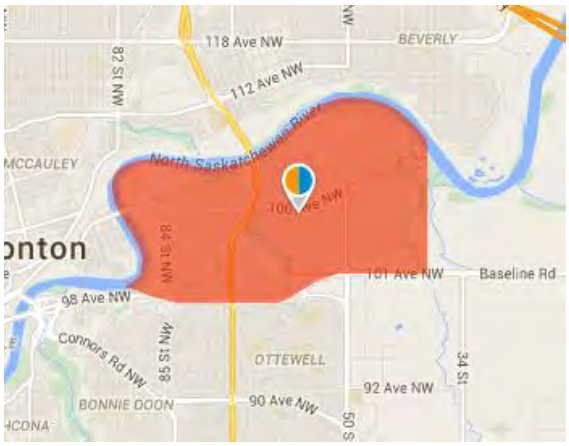
Hardisty School (K-9)

Edmonton Public School Board

Address		10534 62 Street, Edmonton
Contact Info		780-469-0426
Typical School Hours		8:30 AM – 2:55 PM
Busing Program		Yes
Number of Buses	Fixed Route	2
	Fixed Route Noon	0
	Special Needs	1
	Special Needs Noon	0
Utilization (2014-2015)		69%
Adjusted Enrollment		650
School Board's Opinion (Issues/No Issues)		Issues



Date of Site Visits

AM Drop-off Period: April 20, 2016
PM Pick-up Period: April 20, 2016

Surrounding Roadways

- ***62 Street*** - Local Roadway with parking permitted both sides; provides main access to school
- ***106 Avenue*** - Collector Roadway with parking not permitted on both sides - does not provide access to school
- ***104 Avenue*** - Local Roadway, parking permitted on both sides (located to the south of the school)

Land Uses in Area

- Single Family with no front drives east of school across 62 Street
- Single Family with front drives east of school across 62 Street just south of 106 Avenue
- Hardisty Fitness and Leisure Centre to the west of the school (access via 65 Street)
- Park/Field to the west of the school (south of the Hardisty Pool)

Comments from School Board/School Staff

- Buses drop-off near front door for students with disabilities
- Buses along 104 Avenue in AM to unload students; staff member present to accompany students from bus to school door
- Parents permitted to use drop-off loop for drop-off in the AM
- School working with Edmonton Police to get a crosswalk painted at the 104 Avenue/62 Street intersection - normally have a staff member monitoring
- Large number of students walk or bike to school
- Buses use drop-off loop in PM; arrive in time for bell, students are ready to go at dismissal bell and bus depart as soon as all students are on the bus (take attendance then go)
- Parents are also permitted to use drop-off loop for pick-up activity

- Parents park across 62 Street from school and jaywalk across 62 Street; staff monitoring try to remind parents to go to a crosswalk; however difficult when the crosswalks are far from front door
- Staff impression that not a lot of parents drive students to the school
- Originally built drop-off loop for buses; however, it worked better to separate vehicles and buses in the AM drop-off period
- Less interaction between buses and vehicles in drop-off loop during PM pick-up period due to buses arriving right at the bell and leaving as soon as possible
- If buses need to enter the drop-off loop and vehicles are in the way, staff monitoring the drop-off loop will ask parents to move
- Drop-off loop monitored

Student Patrols

- Student patrols at pedestrian crossing on west approach of 106 Avenue/62 Street intersection

Staff Patrols

- Staff near buses in AM along 104 Avenue
- Staff monitoring drop-off loop

AM Bunt Observations

- Parents parking along 62 Street along school frontage; parking and walking students into school
- Using drop-off lane south of school
- School buses parked along 62 Street in front of main school doors to drop-off students with disabilities in school bus only zone
- School entrance on south end near drop-off loop
- Dropping-off students on east side of 62 Street; students jaywalking across 62 Street
- Parents walking students to school across 106 Avenue at pedestrian lights
- No school bus zone along 104 Avenue where buses drop-off in AM
- Bike racks have quite a few bikes

PM Bunt Observations

- 2:45 PM; no parents in drop-off loop
- 2:45 PM; one large bus at end of drop-off loop
- 2:50 PM; approx.. 9-10 vehicles parked along west side of 62 Street
- 2:50 PM; approx. 13 vehicles parked along east side of 62 Street
- Mix of parents waiting in vehicles and parents waiting at door to pick-up students
- Student patrols at pedestrian signal on west approach of 106 Avenue/62 Street intersection
- Parents parking in school bus zone along 62 Street
- Parents walking/biking home with students
- 3:00 PM; two buses in drop-off loop; one parent in drop-off loop (in no stopping zone)
- Some activity in drop-off loop but not much
- Large number of students walking/biking home
- Most parents picking-up on-street along 62 Street; however there is still capacity on-street
- Students walking in large groups - daycare
- Parents parking on-street along 104 Avenue

- Students playing in playground after school
- 3:08 PM; first bus departs
- 3:10 PM; second bus departs
- 2 vehicles in drop-off; lots of capacity along 62 Street
- 4 vehicles parked along west side of 62 Street
- Still vehicles parked along east side of 62 Street - probable that these are residents parking and not school related
- No real rush or congestion at all after dismissal bell

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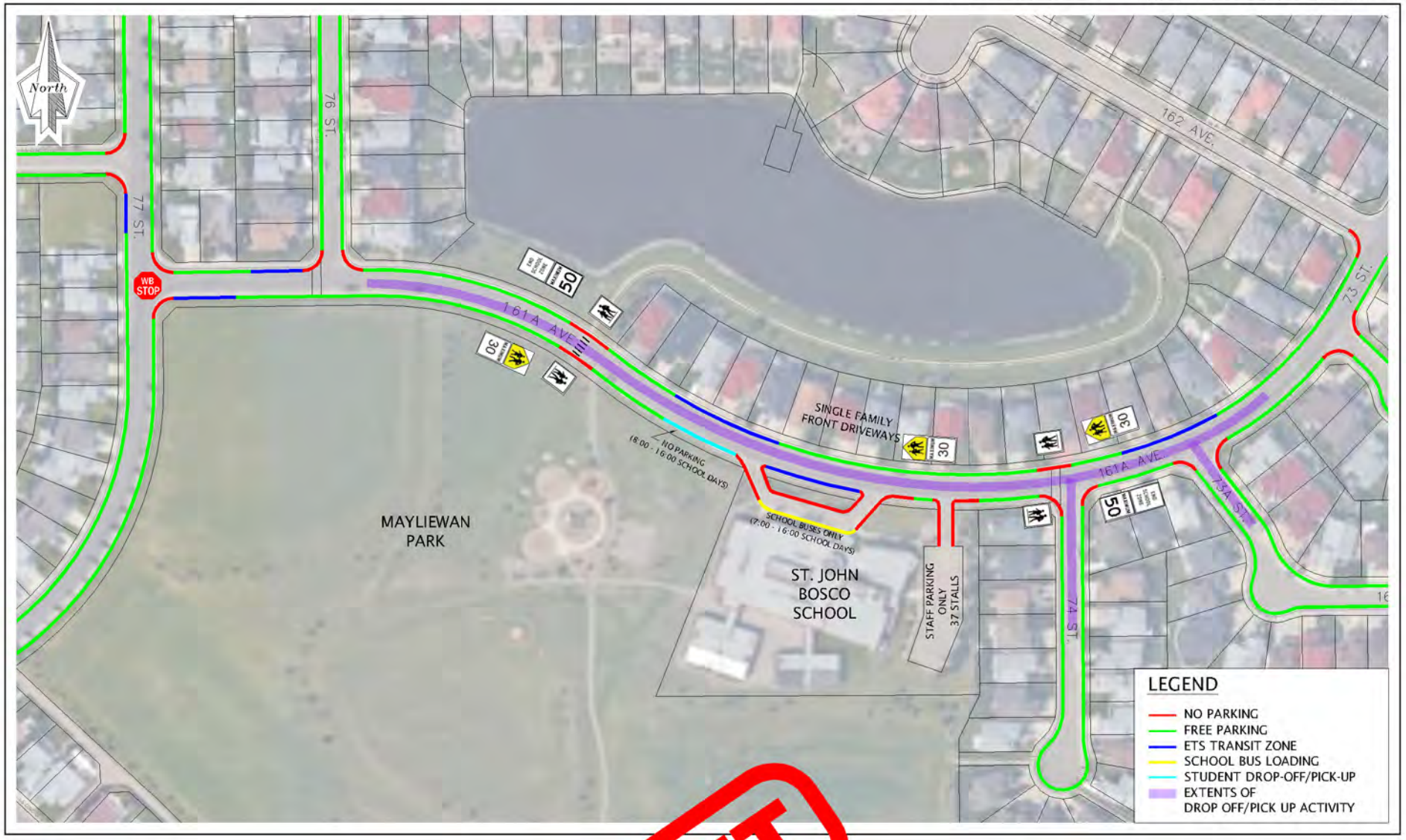

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Exhibit 4

St. John Bosco School
Existing Conditions

N.T.S.

bunt & associates

LMC, School Site Functionality Study
bunt & associates | Project No. 3027.59

St. John Bosco School (K-6)

Edmonton Catholic School Board

Address		7411 161A Avenue, Edmonton
Contact Info		780-471-3140
Typical School Hours		8:27 AM – 3:00 PM
Busing Program		Yes
Number of Buses	Fixed Route	4
	Fixed Route Noon	1
	Special Needs	0
	Special Needs Noon	0
Utilization (2014-2015)		104%
Adjusted Enrollment		522 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 25, 2016 (Weather: Cold/rain)
PM Pick-up Period: April 25, 2016 (Weather: Cold/rain)

Surrounding Roadways

- ***161A Avenue –*** Collector roadway with parking permitted both sides, providing the only access to the school

Land Uses in Area

- Single Family with front drives fronting along north side of 161A Avenue north of school
- Single Family with front drives flanking south side of 161A Avenue directly east of school
- Single Family with front drives fronting north and south sides of 161A Avenue east of school
- Mayliewan Park west and south of school
- Stormwater Management Facility along north side of 161A Avenue west of school
- Single Family with front drives flanking north side of 161A Avenue west of school/SWMF

Comments from School Board/School Staff

- No comments from school board/staff

Student Patrols

- No student patrols

Staff Patrols

- Staff monitoring near buses, taking attendance for buses at end of day
- Staff near front door
- EPS officer monitoring 161A Avenue at school bus loop entrance access

AM Bunt Observations

- Buses dropping-off in loop in front of school

- Parents dropping-off along 161A Avenue on both sides of roadway; jaywalking across 161A Avenue with students
- Some parents parking along street and some just dropping-off
- Parents parking in no parking zone east of drop-off loop exit
- Crosswalks located far from school to east and west
- Parents jaywalking half way turning around to go back – near miss with vehicle
- Vehicles stopping for jaywalkers
- 8:20 AM; entrance bell
- Parents dropping-off in ETS transit zone in front of school
- ETS bus #190 Clareview
- Transit stop takes up entire frontage of drop-off loop in front of school**;** promoting parents to drop-off on north side of 161A Avenue with no close crosswalk
- Some students walking/biking, but didn't notice many
- Parents dropping-off in drop-off loop after bell
- One bus still parked in drop-off loop, vehicles have enough room to bypass bus
- Parents dropping-off in middle of drop-off entrance, blocking entrance creating a queue along 161A Avenue
- 13 parents counted using drop-off loop after entrance bell rings
- No signage at entrance to bus drop-off loop that it is reserved for buses only (signs are within loop only)
- Vehicles reversing in loop to get around vehicles that are staying longer
- Parents dropping-off along park to the west of the school
- Next crosswalk to west at stormwater management facility for shared use path
- 8:27 AM; parents parking in drop-off loop, morning rush is over
- Students walking between vehicles across road then vehicles queued up because of vehicle dropping-off in entrance access to drop-off loop (unsafe)
- 8:28 AM; bus arrives can't get all the way into drop-off loop because parents parking within loop
- Staff at door but not really monitoring transportation concerns; crosswalks are too far away and nobody is patrolling drop-off to avoid parents parking in loop and buses not being able to park in bus zone
- Vehicle has to reverse in drop-off loop again to get around parked vehicle
- Did not notice any U-turns along 161A Avenue
- Did not notice students coming out of bus that arrived after entrance bell, might be a bus for a field trip (2 buses now waiting in drop-off loop; probably for a field trip)

PM Bunt Observations

- Vehicles parked on both sides of 161A Avenue from 77 Street to 73A Street, and within 74 Street south of 161A Avenue (north side – from west crosswalk to 73A Street & south side – from 77 Street to 73A Street)
- Not many places to park on north side of 161A Avenue in vicinity of school because driveways are close together and long ETS transit zones
- 2:55 PM; one bus in drop-off loop
- Parents parking within 74 Street and 73A Street (locals)
- Parents blocking driveways along north side of 161A Avenue across from school
- 3:00 PM; dismissal bell

- Vehicle parked up to staff parking lot chain, blocking sidewalk
- 3:02 PM; 2 long buses in drop-off loop, no parents parked or picking-up in loop
- Staff member at buses taking attendance
- Jaywalking across 161A Avenue
- Queue on roadway, vehicles waiting pulling into available space along 161A Avenue
- Vehicles picking-up in ETS transit zone, not parking
- EPS officer talking to parents; telling them not to block driveways north of 161A Avenue and to use crosswalks
- Vehicles picking-up in front of hydrants, not parking
- Parking all the way along the park to 77 Street on the south side of 161A Avenue
- EPS officer not allowing vehicles to stop in ETS transit zone in front of school
- Traffic moving slow on 161A Avenue, lots of traffic
- Staff parking lot chained closed to prevent parents from using lot for pick-up
- No parents stopping in ETS zone in front of school
- 3:10 PM; buses depart drop-off loop, right turns out of drop-off loop exit
- Congestion along 161A Avenue due to pedestrians crossing 161A Avenue at crosswalk to the east of the school
- Parents frustrated when students told to cross at crosswalk by EPS officer; parent drove around to proper side of street to pick-up students curb side in front of school, instead of students walking
- 3:10 PM; rush slowing down; staff parking lot re-opened
- Parents stopping in ETS transit zone; monitored by EPS officer, no ETS buses around
- Parents picking-up in drop-off loop exit (just passes ETS transit zone)
- EPS vehicle blocking entrance to drop-off loop to enforce “buses only”
- Some students walking; difficult to tell how many because parent pick-up parking and activity spans such a large area
- Some vehicles parked from morning on south side of 161A Avenue; one or two not school related
- Parents claiming to know people’s driveways and parking in front – EPS officer not allowing it
- 3:15 PM; less vehicles parked along both sides of 161A Avenue
- As soon as EPS officer leaves, parents using drop-off loop to park and pick-up students
- Parents now stopping to pick-up students in entrance to drop-off loop, now no vehicles can bypass
- 3:30 PM; 4 or 5 vehicles parked along both sides of 161A Avenue between 77 Street and 73A Street
- EPS officer telling parents to educate students to use crosswalks; parents asking if it is their right to walk anywhere, EPS told parent they could get a ticket for jaywalking
- EPS may have been giving tickets for parking in way of driveways on north side of 161A Avenue, but not sure

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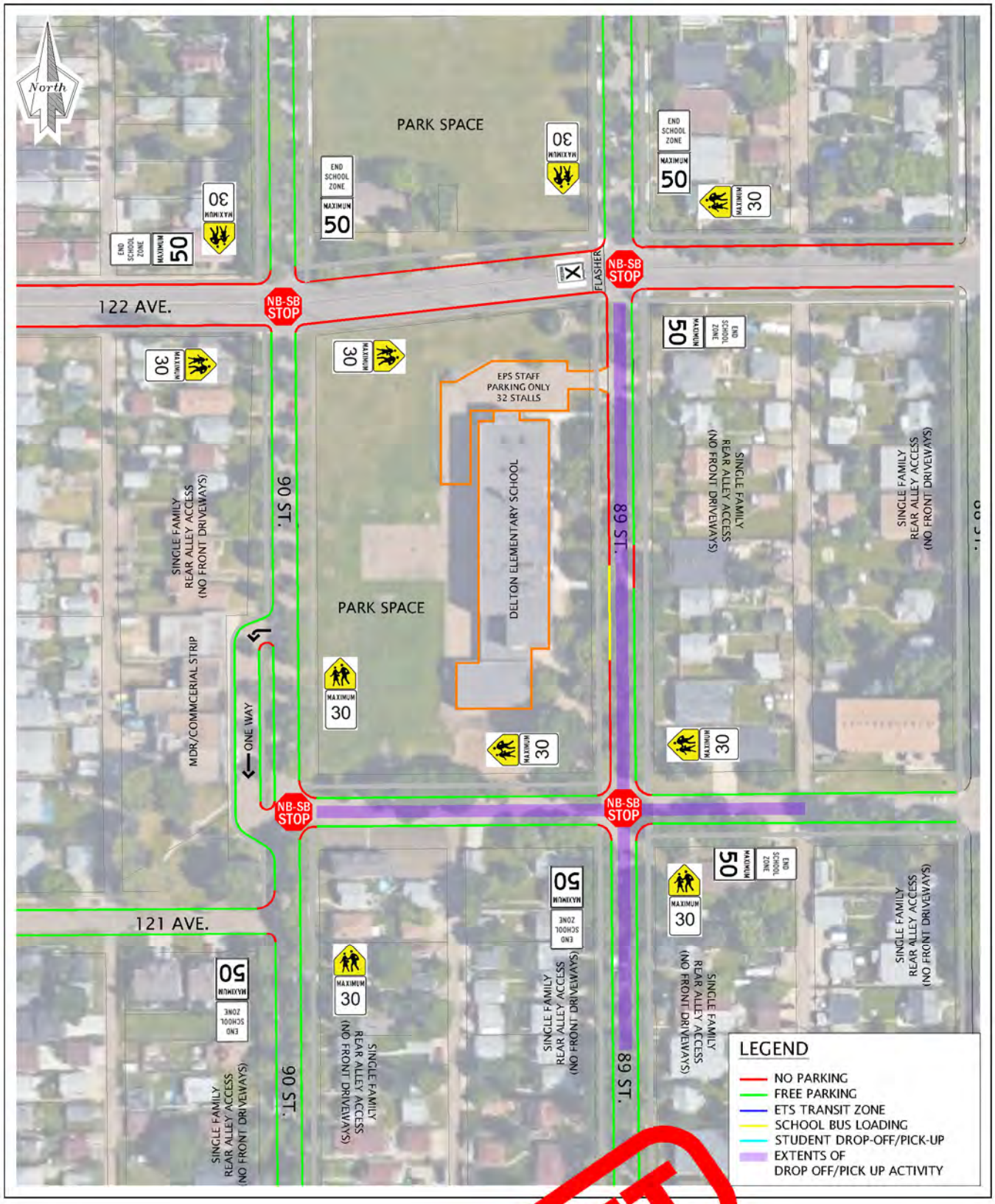

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Exhibit 1

N.T.S.

Delton Elementary School
Existing Conditions

bunt & associates

LMC, School Site Functionality Study
bunt & associates | Project No. 3027.59

Delton Elementary School (K-6)

Edmonton Public School Board

Address		12126 89 Street, Edmonton
Contact Info		780-477-8742
Typical School Hours		8:40 AM – 3:30 PM
Busing Program		Yes
Number of Buses	Fixed Route	3
	Fixed Route Noon	0
	Special Needs	3
	Special Needs Noon	0
Utilization (2014-2015)		64%
Adjusted Enrollment		426 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 13, 2016
PM Pick-up Period: April 13, 2016

Surrounding Roadways

- ***89 Street* -** Local roadway east of school providing main access to school with parking permitted both sides, one centre travel lane accommodating two-way traffic
- ***122 Avenue* -** Collector roadway north of school, parking not permitted on both sides of roadway
- ***121 Avenue* -** Local roadway south of school providing secondary access to school, parking permitted both sides with one centre travel lane accommodating two-way traffic

Land Uses in Area

- Single Family/Duplexes with no front drives east of school across 89 Street
- Single Family/Duplex with no front drives south of school across 121 Avenue
- Single Family/Duplexes with no front drives south of 121 Avenue, east of 89 Street
- Green space/Park north of school across 122 Avenue
- Single Family/Duplexes with no front drives north of 122 Avenue, east of 89 Street
- Small Multi-family building west of school across 90 Street (just north of 121 Avenue)
- Neighbourhood Commercial strip west of school, north of Multifamily building
- Single Family/Duplexes with no front drives west of school, north of commercial strip
- Commercial Strip and Multifamily building has service road along 90 Street

Comments from School Board/School Staff

- Narrow Roads

Student Patrols

- No student patrols

Staff Patrols

- Staff members near buses

AM Bunt Observations

- Buses drop-off students on 89 Street in a bus only zone
- Bus only zone is long and creates one lane of traffic for through vehicles along 89 Street in both directions because of residents parking on east side of 89 Street (as well as parents)
- Some parents dropping-off on east side of 89 Street
- Buses & daycare vans in bus loading area
- Parents walking students to school, crossing 122 Avenue
- Residential neighbourhood (with no front drives) = no real parking restrictions except for buses
- Parents find gaps in residential parking to park and walk students into school, unless dropping-off on west side of 89 Street (then just dropping-off)
- No on-site drop-off facilities
- Local roadways - parking permitted both sides leaves one shared through lane for two-way travel
- Students walking on their own to school as well
- Parents finding parking in the area of 121 Avenue/89 Street intersection to park and walk students to school
- 8:45 AM; rush is over
- School allows for students to arrive at 8:25 AM (staff monitored outside); bell rings at 8:40 AM, spreads out AM rush to drop students off
- Some students walking from across field (from 90 Street) - not sure if getting dropped-off along 90 Street of just walking from that side of the neighbourhood and cutting through field

PM Bunt Observations

- 3 buses and 4 small buses along west side of 89 Street at bell
- Some people parking on 90 Street but not many
- Parking south/east of 121 Avenue/89 Street intersection; until about 1/2 block down 89 Street south of 121 Avenue
- U-turns on 89 Street
- Students walking/biking home
- Bell at 3:30 PM; by 3:37 PM congestion is gone
- Buses leave once all students are on bus
- Parking lot on north end is chained closed for afternoon pick-up (staff not permitted to leave during pick-up period)

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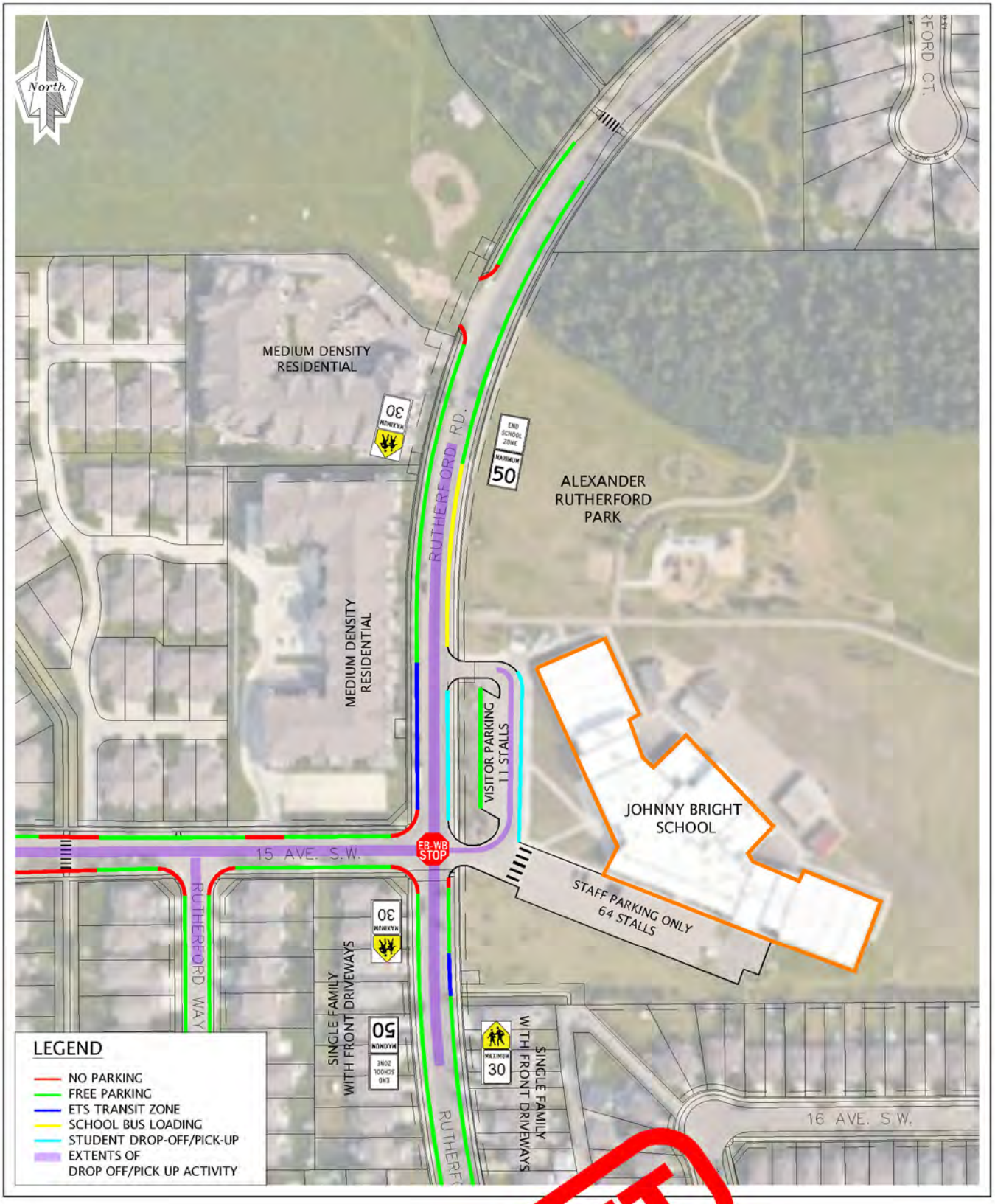

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Exhibit 7

N.T.S.

Johnny Bright School Existing Conditions

bunt & associates

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bunt & associates | Project No. 3027.59

Johnny Bright Elementary/ Junior High School (K-9)

Edmonton Public School Board

Address		1331 Rutherford Road, Edmonton
Contact Info		780-437-1341
Typical School Hours		8:30 AM – 3:27 PM (3:16 PM for JH)
Busing Program		No
Number of Buses	Fixed Route	
	Fixed Route Noon	
	Special Needs	
	Special Needs Noon	
Utilization (2014-2015)		95%
Adjusted Enrollment		952 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 12, 2016
PM Pick-up Period: April 12, 2016

Surrounding Roadways

- ***Rutherford Road*** **-** North/South collector roadway with parking permitted both sides; only roadway providing access to the school
- ***15 Avenue*** **-** East/West collector roadway in the vicinity of the school, west leg of intersection of School Access & Rutherford Road

Land Uses in Area

- Single Family with front drives along Rutherford Road south of school site
- Multi-family across from school, west of Rutherford Road
- Alexander Rutherford Park; Heritage Point Community League to the north of the school, east of Rutherford Road
- Single Family flanking along 15 Avenue (with the exception of the MDR site)

Comments from School Board/School Staff

- Too many students arriving
- Less frontage than Strembitsky
- Traffic for drop-off lane backs-up out to Rutherford Road and blocks through traffic on Rutherford Road
- ETS bypass queued vehicles and use opposing traffic lane to bypass

Student Patrols

- 15 Avenue (School Access) & Rutherford Road south approach crosswalk

Staff Patrols

- Principal directing traffic at 15 Avenue (School Access) & Rutherford Road intersection; monitoring traffic entering drop-off lane

- Staff monitoring drop-off lane
- Staff near front door

AM Bunt Observations

- 8:15 AM, parents and students arriving using parents drop-off, moving well
- Lots of students biking/walking (arriving in large groups - walking school bus?)
- Principal directing traffic into drop-off lane from intersection; telling vehicles to slow down as they drive through on Rutherford Road
- Student patrols at main crosswalk at 15 Avenue (School Access) & Rutherford Road intersection
- ETS on Rutherford Road
- Vehicles in drop-off not parking; leaving right away
- Drop-off backs up when vehicles do not go to end of drop-off
- Lots of parents walking to school with students
- Parents dropping-off at sidewalk path to main door at beginning of drop-off instead of moving up; blocks drop-off
- Staff blocked half of drop-off lane access; assuming to prevent double queuing in drop-off lane
- Parents using street to park and walk students to the school
- Vehicles parked along west side of Rutherford Road by MDR (no space for drop-off)
- 15 Avenue parked up both sides (assuming not parents because they were there before)
- Dropping-off at sidewalk path to door blocks drop-off
- Turning right out of drop-off loop, most parents respect no left turns
- Vehicles still parked in angle parking (no real turnover)
- Bus ETS 347 along Rutherford Road
- Did not notice a significant portion of students arriving on ETS buses (ask school for ETS pass numbers)

PM Bunt Observations

- Parent drop-off lane dull at 3:20 PM; backed-up to Rutherford Road
- Loading zone on-street full, including bus zones
- On-street parking along Rutherford Road full by MDR across from school
- On-street parking along Rutherford Road south of 15 Avenue full (driveways & bus stops)
- 15 Avenue full to crosswalk, both sides
- School bus signs on east side of Rutherford Road - space used for daycare vans; however not monitored (no school buses, ETS buses only)
- 3:28 PM, traffic backing up on Rutherford Road south of 15 Avenue waiting to turn right into drop-off lane
- Traffic queuing north of 15 Avenue waiting to turn left into drop-off alone
- Drivers asked by principal to drive away, turn around, and come back to get into drop-off lane when attempting to turn left from Rutherford Road
- Queue pm Rutherford Road south of 15 Avenue passed curve in roadway.
- Drivers trying to bypass queue on Rutherford Road to continue through on Rutherford Road
- Large amount of pedestrians crossing Rutherford Road; also contributing to traffic backing up on Rutherford Road
- Peds crossing south leg partially blocking to left turns on north leg getting into drop-off lane first
- Student patrols on south leg

- Balance between pedestrians, vehicles through on Rutherford Road and access to drop-off lane
- Staff leaving through drop-off lane
- ETS 39 - some students using ETS buses, not a large amount
- Queue on Rutherford Road resolved half at 3:36 PM
- ETS bus bypassing queue on Rutherford Road south of 15 Avenue to get through
- Large number of pedestrians crossing the south approach of the 15 Avenue/Rutherford Road intersection
- 3:38 PM; space in drop-off (7 veh capacity)
- Principal directing traffic, monitoring queues on Rutherford Road, priority to moving ETS buses through the intersection when possible
- Cones out to block double queueing in drop-off loop; removed at 3:41 PM
- 3:41 PM; rush is over
- Seems like a northbound right turn bay at 15 Avenue/Rutherford Road intersection would provide additional storage for vehicles waiting to enter drop-off loop (maybe ban parking on-street for that section)
- At end of pick-up period, 2 vehicles left on west side of Rutherford Road north of 15 Avenue
- At end of pick-up period, 2 vehicles left on east side of Rutherford Road north of 15 Avenue
- Drop-off lane exit is stop controlled; left turns not permitted
- At end of pick-up period, no vehicles parked on east side of Rutherford Road south of 15 Avenue to transit stop and past
- At end of pick-up period, 3 vehicles parked on west side of Rutherford Road south of 15 Avenue
- 15 Avenue still pretty parked up both sides until next local but not past first local like before classes ended

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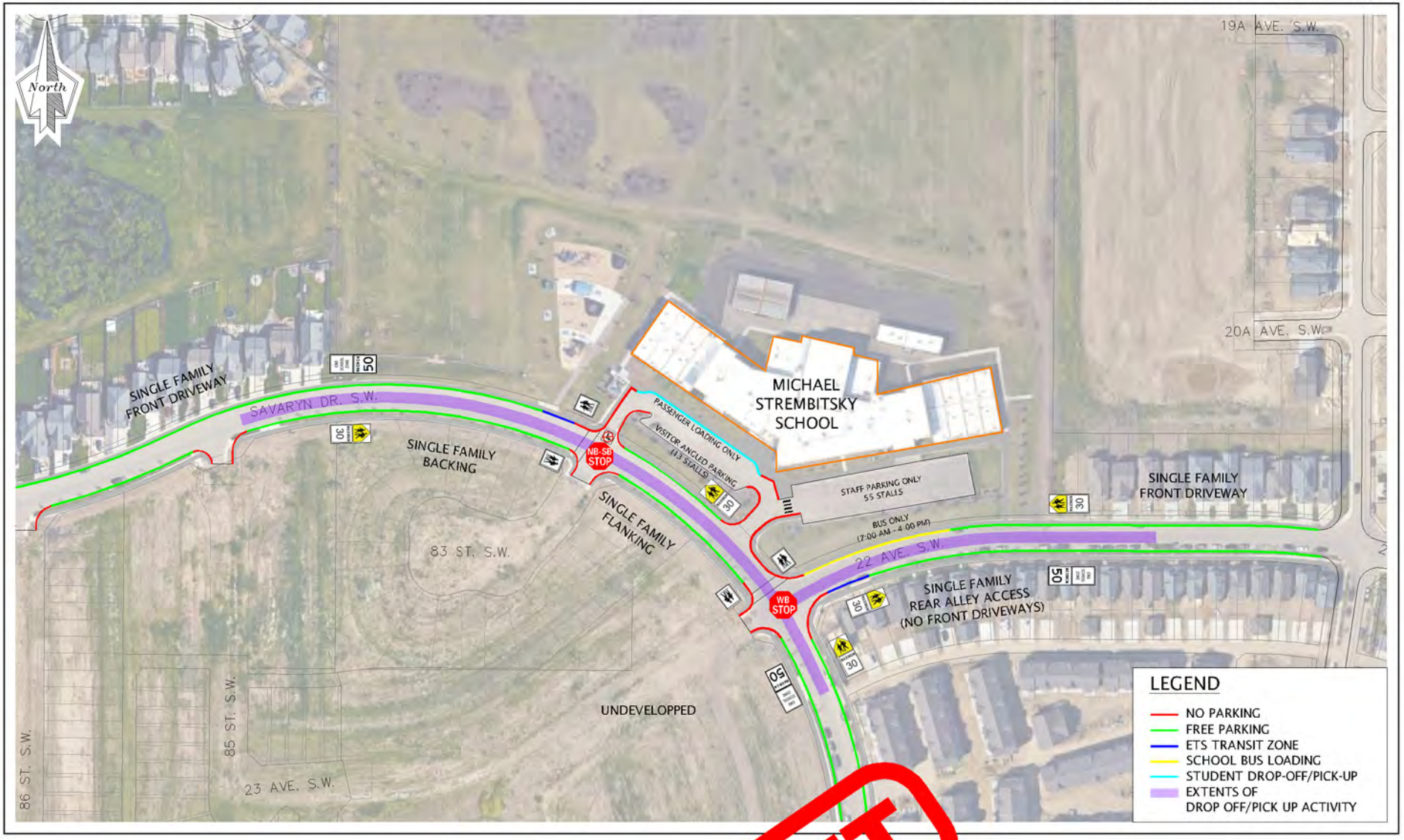

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Exhibit 6

Michael Strembitsky School Existing Conditions

N.T.S.

bunt & associates

LMC, School Site Functionality Study
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Michael Strembitsky School (K-9)

Edmonton Public School Board

Address		4110 Savaryn Drive, Edmonton
Contact Info		780-392-3500
Typical School Hours		8:20 AM – 3:00 PM
Busing Program		No
Number of Buses	Fixed Route	0
	Fixed Route Noon	0
	Special Needs	0
	Special Needs Noon	0
Utilization (2014-2015)		88%
Adjusted Enrollment		889 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 14, 2016
PM Pick-up Period: April 14, 2016

Surrounding Roadways

- ***Savaryn Drive*** - Collector roadway with parking permitted on both sides, provides main access to school
- ***22 Avenue*** - Collector roadway with parking permitted on both sides, provides secondary access to school (fence along school frontage and no door access from east side)

Land Uses in Area

- Single Family with no front drives east of school across 22 Avenue
- Single Family flanking south of school across Savaryn Drive
- Park/Field north and west of school
- Single Family with front drives north of school along 22 Avenue

Comments from School Board/School Staff

- Too many students arriving

Student Patrols

- No student patrols

Staff Patrols

- Staff member at the Savaryn Drive/22 Avenue intersection
- Staff member at the Savaryn Drive/Drop-off Loop Exit intersection
- Staff members near front door monitoring
- Staff member in drop-off lane monitoring

AM Bunt Observations

- Staff member directing traffic on Savaryn Drive for pedestrians crossing Savaryn Drive and to let vehicles out of drop-off loop (to make right turn out)
- Staff member patrolling Savaryn Drive/22 Avenue intersection, helping pedestrians cross
- No drop-off on 22 Avenue, other than further back closer to single family homes (found out later most of the roadway is buses only - but there aren't any buses)
- Cones blocking half of drop-off access similar to Johnny Bright to prevent double queuing in drop-off
- Just over 1,100 students enrolled in school according to front office staff
- Some students walking and biking; doesn't seem as many as Johnny Bright School
- Parents parking on-street along Savaryn Drive in front of school and further west; parking and walking students into school
- Staff member in drop-off lane monitoring
- Fence between staff parking lot and 22 Avenue
- No busing program - based on website; did not observe school buses at school
- Observed a couple vehicles making U-turns at Savaryn Drive/22 Avenue intersection
- Left turn not permitted out of drop-off lane
- Students playing in park/field before school, no entry until 8:20 when entry bell rings

PM Bunt Observations

- Bell at 3:00 PM
- Vehicles parked along 22 Avenue on both sides
- Space reserved for buses along 22 Avenue - 3 daycare vans, rest is empty (more than half empty) - unused space
- Drop-off queue along Savaryn Drive (left and right turns into drop-off)
- Vehicles parked all along Savaryn Drive east and west of school
- Queue of 4 vehicles on Savaryn Drive waiting to turn right into drop-off, queue of 4 vehicles on Savaryn Drive waiting to turn left into drop-off
- Parents moving up to available space in drop-off lane appropriately - sometimes, not always - could be better
- Queues from drop-off lane blocking sidewalk across entrance to drop-off lane; students walking between vehicles
- Staff patrol at Savaryn Drive/22 Avenue intersection with stop sign helping pedestrians cross on west and north approaches (stands in middle of approach when peds crossing)
- No real movement on-site, no circulation, other than when queue slowly moves up one of two vehicles at a time
- Queue on Savaryn Drive west of drop-off backing up traffic along Savaryn Drive no associated with school
- Some students walking and biking home with parents
- Queue moved up 4 times by one vehicles in 8 mins (3:08 PM)
- Traffic going to opposite lane to bypass queue on Savaryn Drive going west on Savaryn Drive
- Queue on Savaryn Drive eastbound also due to pedestrian activity at 22 Avenue

- 3:10 PM; lots of available space in drop-off lane
- Cones blocking half of drop-off access to prevent double queuing
- Roadways less parked up after pick-up period is over

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Exhibit 12

N.T.S.

Edmonton Christian Northeast School
Existing Conditions

bunt & associates

Edmonton Christian Northeast School (K-9)

Edmonton Public School Board

Address		5940 159 Avenue, Edmonton
Contact Info		780-408-7942
Typical School Hours		8:25 AM – 3:00 PM
Busing Program		Yes
Number of Buses	Fixed Route	0*
	Fixed Route Noon	0*
	Special Needs	0*
	Special Needs Noon	0*
Utilization (2014-2015)		78%
Adjusted Enrollment		546 students
School Board's Opinion (Issues/No Issues)		Issues

*Buses observed on-site

Date of Site Visits

AM Drop-off Period: April 21, 2016
PM Pick-up Period: Not yet completed

Surrounding Roadways

- ***59A Street*** **–** Collector roadway with parking permitted on both sides, provides access to bus drop-off loop and staff parking lot
- ***159 Avenue*** **–** Collector roadway with parking permitted on both sides, provides access to drop-off loop

Land Uses in Area

- Single Family with front drives fronting onto 159 Avenue south of school
- Single Family with front drives backing onto 59A Street east of school
- Single Family with front drives fronting onto 159 Avenue (both sides) west of school
- Matt Berry Park north of school

Comments from School Board/School Staff

- Gridlock on local roads

Student Patrols

- No student patrols

Staff Patrols

- Staff near front doors monitoring students waiting for school doors to be unlocked
- Staff member helping students cross 59A Street at crosswalk near east drop-off loop

AM Bunt Observations

- 8:10 AM; parents arriving in south drop-off lane

- Students walking to school (junior-high aged)
- One bus on-site in east drop-off loop; two buses on-street along west side of 59A Street, south of bus drop-off loop exit
- Staff member at school entrance near east drop-off lane
- Parents not using east drop-off lane
- Students walking/biking to school from neighbourhood
- Lots of activity in south drop-off loop
- Queue on 159 Avenue at entrance to south drop-off loop
- Parents dropping-off on-street along 159 Avenue, mostly north side
- Parents parking on-street along 159 Avenue (north side), and walking students into school
- Parents not parking in south drop-off loop, just dropping-off
- Not really using south side of 159 Avenue for drop-off and parking activity
- 8:20 AM; still lots of drop-off activity when bell rings (8:20 bell)
- U-turns on 159 Avenue from being parked along north side of 159 Avenue
- South drop-off loop well used
- Left turns are permitted out of south drop-off loop; works well, seems like volumes along 159 Avenue is fairly low
- Students dropped-off before school doors open wait by door or play in playground, helps stretch out drop-off time
- 8:25 AM; bell rings, one vehicle parked in south drop-off loop
- Cones at south drop-off entrance to prevent drop-off along access to loop (access not wide enough to accommodate a bypass lane)

PM Bunt Observations

- 3:00 PM; extent of parents parking west of the school along both sides of 159 Avenue to 62 Street
- Mix of parents walking/idling and parking to walk over to school to pick-up students
- Drop-off loop full, queue spilled out onto 159 Avenue, queue blocking WB through lane on 159 Avenue (vehicles bypassing queue must using opposing traffic lane)
- Parents crossing 159 Avenue at drop-off loop exit
- Three buses in east drop-off loop and one on-street along 59A Street south of east drop-off loop exit
- Parents parked between 159A Avenue and transit stop along east side of 59A Street
- Parents parked north of east drop-off loop entrance along west side of 59A Street along field
- No student patrols
- Lots of parents walking students to parked vehicles along 59A Street and 159 Avenue
- Lots of vehicles turning into 159A Avenue, turning around, and going south on 59A Street
- Some parents parked along 159A Avenue
- Parking extent to the north along 59A Street: All along field on west side of 59A Street to 162 Avenue
- Parking extent to south along 59A Street: not passed 159 Avenue/59A Street
- Not many parked north of 159A Avenue on east side of 59A Street
- 3:07 PM; buses leaving, parents now using east drop-off loop to pick-up students
- Junior-high entrance vs. Elementary entrance

- Lots of students walking/biking home
- No parents using staff parking lot for pick-up
- 3:08 PM; south drop-off loop queue resolved; rush over
- Parents respecting transit zones on 59A Street, school bus zone on west side of 59A Street (south of east drop-off loop exit), and no parking signs in cul-de-sac south of school
- 3:10 PM; lots of parking available on-street south and east of school and in south drop-off loop
- Vehicles turning left and right into south drop-off loop
- No double queuing observed in south drop-off loop
- Sign in south drop-off loop: STUDENT DROP-OFF ONLY BETWEEN 8:00 AM-8:30 AM & 2:50 PM-3:15 PM
- Lots of students playing in park after school, parents waiting around
- Junior high student jaywalking across 159 Avenue after rush is over
- Cones at south drop-off loop to parents parking in access
- Staff with vests, not sure where they were monitoring during the pick-up period, but walking into school after pick-up rush with cones from south drop-off loop

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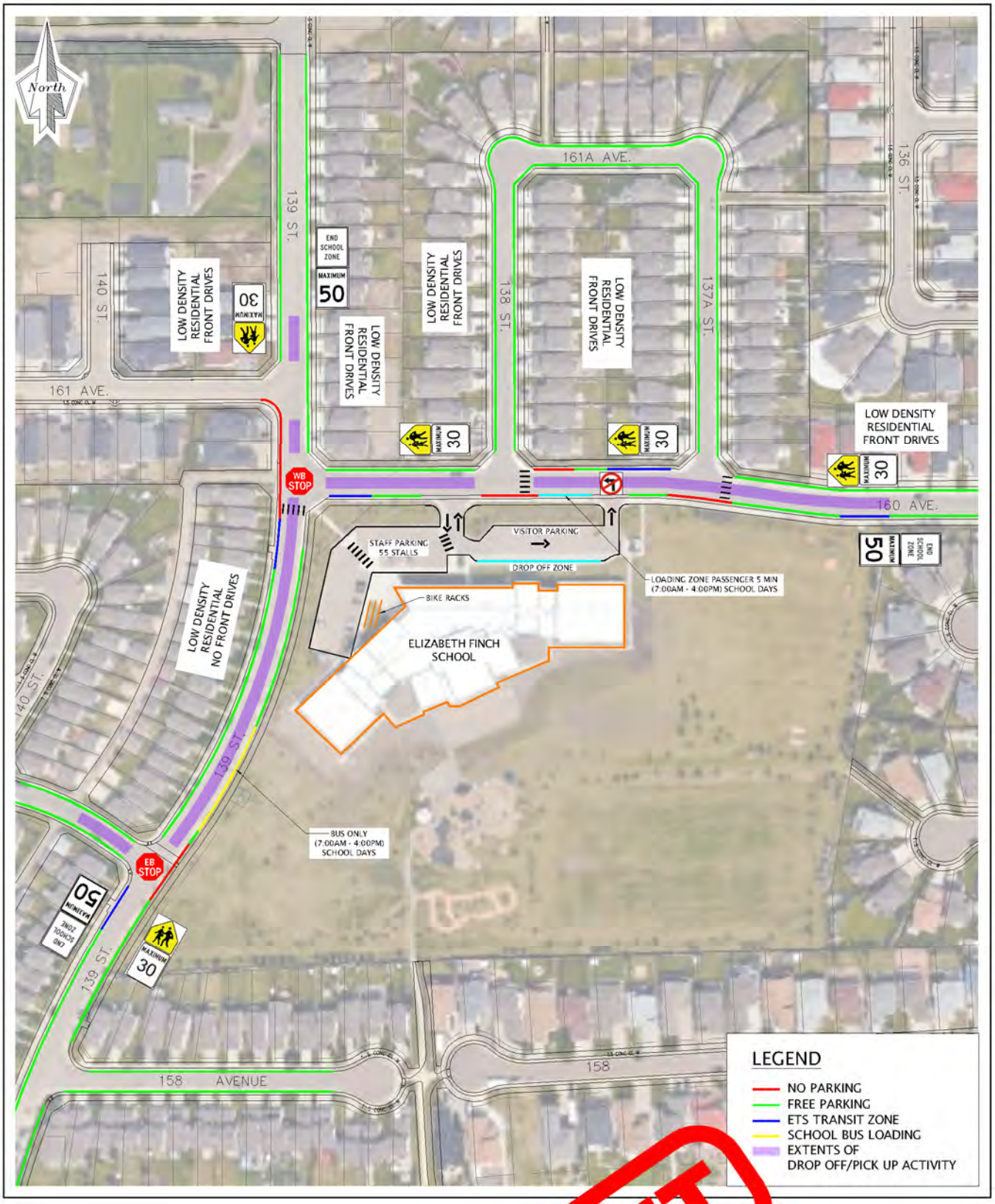

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Exhibit 11

N.T.S.

Elizabeth Finch School
Existing Conditions

bunt & associates

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bunt & associates | Project No. 3027.59

Elizabeth Finch School (K-9)

Edmonton Public School Board

Address		13815 160 Avenue, Edmonton
Contact Info		780-457-2022
Typical School Hours		8:28 AM – 3:20 PM
Busing Program		Yes
Number of Buses	Fixed Route	3
	Fixed Route Noon	1
	Special Needs	0
	Special Needs Noon	0
Utilization (2014-2015)		95%
Adjusted Enrollment		966 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 22, 2016 (Weather: Cool/rain)
PM Pick-up Period: April 22, 2016 (Weather: Cool/rain)

Surrounding Roadways

- ***160 Avenue –*** Collector roadway with parking permitted both sides, provides access to drop-off loop and staff parking lot
- ***139 Street –*** Collector roadway with parking permitted both sides, provides on-street parking for school buses

Land Uses in Area

- Single Family flanking 160 Avenue north of school
- Single Family backing onto south side of 160 Avenue east of school and Carlton Park
- Single Family with front drives fronting onto north side of 160 Avenue east of school and Carlton Park
- Carlton Park east of school
- Single Family with front drives fronting onto both sides of 139 Street north of 160 Avenue, west of school
- Single Family with no front drives fronting onto west side of 139 Street south of 160 Avenue, west of school

Comments from School Board/School Staff

- One of the better schools in the City for getting students to school, and parents dropping students off
- Room for improvement, but one of the better schools in the City

Student Patrols

- Students patrols at crosswalk along 160 Avenue at drop-off entrance

Staff Patrols

- Staff member near buses along 139 Street
- Staff member at crosswalk along 139 Street south of school, helping pedestrians cross 139 Street

AM Bunt Observations

- 8:10 AM; parents dropping-off in drop-off loop
- Staff arriving and parking in staff lot (shared access with drop-off loop)
- While drop-off is not busy, parents stopping and dropping-off at beginning of loop closer to front door instead of pulling up to the end of the loop
- Students walking/biking to school
- Parents not parking in drop-off lane
- Some vehicles parked in visitor parking (angled parking within drop-off loop)
- Quite a few students arriving via ETS (168 Eaux Claires – not a school special)
- 8:13 AM; Drop-off with 4 vehicles, parents pulling up to end of loop, still not parking within loop
- Left turns out of drop-off loop onto 160 Avenue
- On-street parking along 160 Avenue not very full (5 vehicles)
- 8:17 AM; drop-off loop becoming busier, moving well
- Staff parking on-street along 160 Avenue? Could be a visitor, no students.
- Visitor angled stalls in drop-off loop becoming busier, longer term stay rather than just dropping-off
- Vehicles respecting pedestrians at crosswalks along 160 Avenue
- Dropping-off along 160 Avenue on south side
- 8:20 AM; drop-off activity busier, more vehicles parked along 100 Avenue (still only 6 vehicles)
- 8:21 AM; student patrols out (4 total) at crosswalk along 160 Avenue near drop-off entrance
- Drop-off still running well
- Buses drop-off along 139 Street
- On-street parking along 139 Street virtually full south of 160 Avenue (both sides)
- On-street parking along 139 Street mix of parents parking and just dropping-off (east side)
- Residents parking along west side of 139 Street
- Staff member near buses
- Staff member at crosswalk along 139 Street south of school, helping pedestrians cross 139 Street
- Parents respecting bus only zone along 139 Street, also respecting hydrants
- Busy at 160 Avenue/139 Street intersection due to pedestrians crossing east and south approaches
- 8:31 AM; visitor parking almost full, drop-off loop busy but moving well
- Lots of on-street parking available on 160 Avenue in vicinity of school
- Parents respecting ETS transit stop zones
- Travel speed along 160 Avenue and 139 Street seems fine for the most park (going 30 km/h), every once in a while a vehicle will speed through (only when less busy and less congested)
- 8:34 AM; drop-off loop virtually empty
- 8:35 AM; second bell, most students should have arrived by now
- One drop-off in transit zone along 160 Avenue in front of school front doors, then U-turn on 160 Avenue to go back west on 160 Avenue and south on 139 Street

- Now drop-offs in drop-off loop happen closest to front doors (right at beginning) because students are late/in a hurry
- Students still walking/biking to school

PM Bunt Observations

- Parents picking-up and parking along both sides of 139 Street
- Drop-off loop very busy, queue backing up onto 160 Avenue in eastbound and westbound directions
- Pedestrians crossing 160 Avenue also delaying traffic along 160 Avenue
- Parents only picking up in drop-off loop (not parking)
- Not a whole lot of parents parking on north side of 160 Avenue
- Parking back past crosswalk south of school on 139 Street
- Lots of students walking/biking home
- Congested along 160 Avenue near drop-off entrance
- Parents parking on south side of 160 Avenue in permitted areas, loading zone respected as loading only)
- Lots of pick-up activity on 139 Street, parents respecting bus only zone
- Students waiting at ETS bus stop (6-8 students @ 3:35 PM); junior-high students taking ETS
- No left turn out of drop-off loop; parents still turning left out of loop (at times when 106 Avenue is less congested), not an issue in terms of backing up traffic within the loop
- Vehicles still parked along south side of 160 Avenue after rush is over, being used for longer term duration stay? (Free parking – no time restrictions)
- Definitely less vehicles parked along 139 Street after pick-up rush is over; however, still quite a few vehicles parked on west side of 139 Street, suspect a majority of residential parking (including a camper trailer)
- Students jaywalking across 139 Street when rush is over
- U-turns along 139 Street
- Could be staff parking along 160 Avenue in front of school, 6 vehicles still there at 4:08 PM

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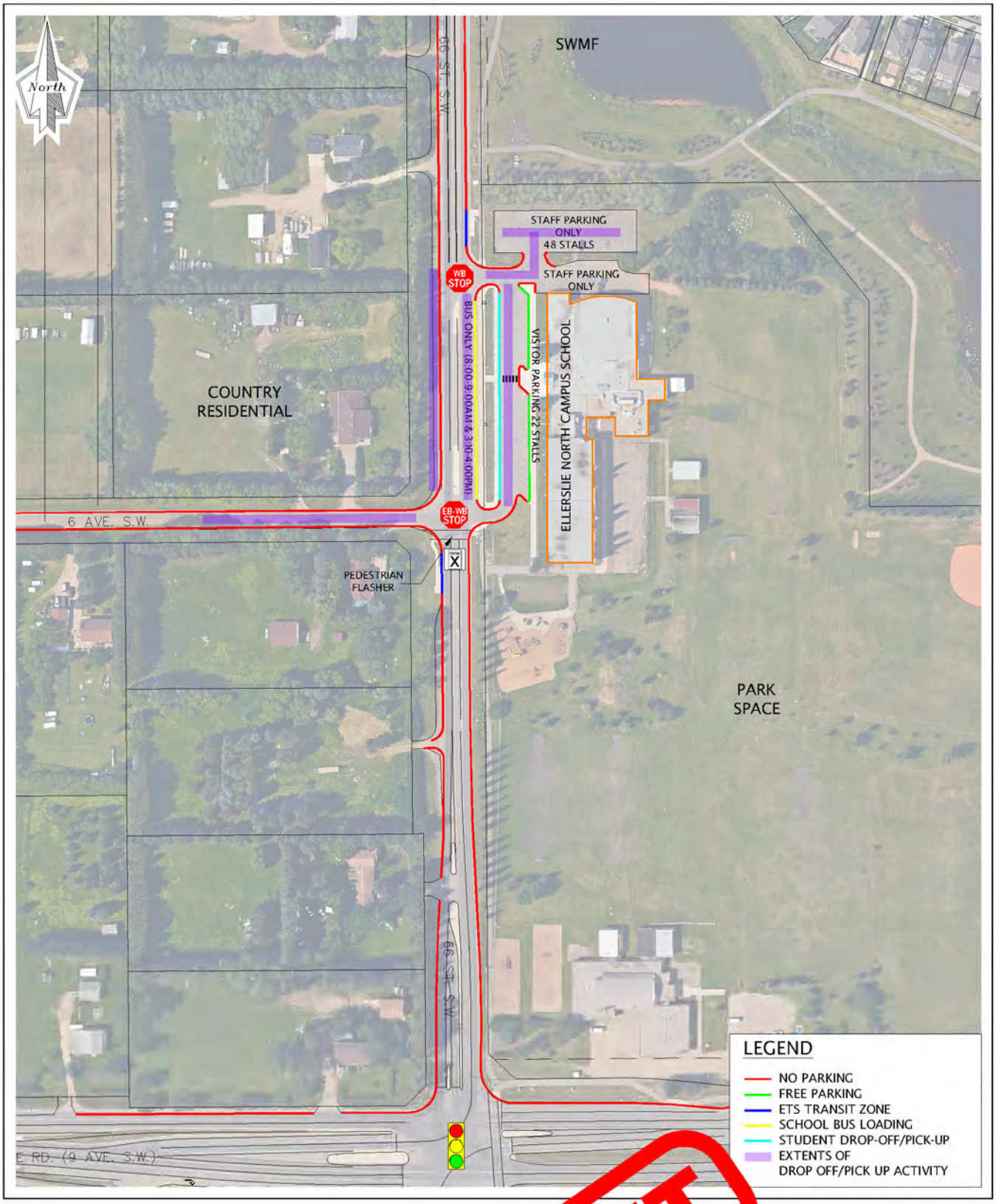

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Exhibit 10

N.T.S.

Ellerslie North Campus School
Existing Conditions

bunt & associates

Ellerslie North Campus School (K-9)

Edmonton Public School Board

Address		521 66 Street, Edmonton
Contact Info		780-988-5556
Typical School Hours		8:05 AM – 3:05 PM (2:33 PM for JH)
Busing Program		Yes
Number of Buses	Fixed Route	1
	Fixed Route Noon	1
	Special Needs	0
	Special Needs Noon	0
Utilization (2014-2015)		116%
Adjusted Enrollment		836 students
School Board's Opinion (Issues/No Issues)		Issues

Date of Site Visits

AM Drop-off Period: April 26, 2016 (Weather: Clear)
PM Pick-up Period: April 26, 2016 (Weather: Clear)

Surrounding Roadways

- ***66 Street –*** Arterial roadway with parking not permitted on both sides. Posted speed limit of 50 km/h (no school zone speed reduction). Provides only access to school staff parking lot, parent drop-off loop, visitor parking, and on-street bus layby.

Land Uses in Area

- Country Residential fronting 6 Avenue west of school, west of 66 Street
- Stormwater Management Facility north of school, east of 66 Street
- Ellerslie Primary School south of school
- Park/Field east of school

Comments from School Board/School Staff

- U-turns on 66 Street
- Winter is difficult because snow bank covers shoulder on west side of 66 Street where parents park in the afternoon, creates chaos
- Parents using northbound left turn lane at 6 Avenue/66 Street intersection to bypass traffic queued in single northbound through lane, vehicles merge from left turn lane into through lane at intersection
- Parents drop-off east side of 66 Street south of pedestrian flasher
- Special events throughout the year at the school are difficult and busy for parents trying to find parking. Parents park along west side of 66 Street and jaywalk across 66 Street to school. 6 Avenue both sides will also fill up with parent parking – creates narrow two-way shared lane
- School plows a portion of the field behind parking lot to allow parents to park during special events in the winter
- School has done a lot of work educating parents/students on:
    - Using pedestrian flasher instead of jaywalking across 66 Street

    - Not walking between vehicles queued on east approach of 6 Avenue/66 Street intersection (drop-off loop exit)
    - Not riding bike across east approach of 6 Avenue/66 Street intersection

Student Patrols

- No student patrols

Staff Patrols

- Staff member patrolling crosswalk in drop-off loop, helping pedestrians cross and making sure traffic is stopped for pedestrians
- Two staff members at 66 Street pedestrian flasher to assist students crossing 66 Street. Staff waits for pedestrians to group at intersection, pushes button to activate flasher, moves to centre of roadway with stop signs. After pedestrians have crossed, staff members keep traffic along 66 Street stopped to allow vehicles exiting drop-off loop or 6 Avenue to make left and right turns onto 66 Street
- Staff member monitoring front door of school when students gathered outside

AM Bunt Observations

- Bus only zone in layby along 66 Street (on-street)
- North access along 66 Street is a two-way access providing access to staff parking lot and drop-off loop
- South access along 66 Street is a one-way exit only providing access back onto 66 Street from drop-off loop
- Pedestrian flasher crossing along south approach of 6 Avenue/66 Street intersection
- Visitor angled parking along east side of drop-off loop
- Parents drop-off students on west side of drop-off loop, students then have to cross drop-off loop to get to school
- 7:45 AM; 2 vehicles parked in drop-off lane
- Drop-off lane (west side of drop-off loop) signed as “drop-off only”, but parking permitted
- Marked crosswalk centrally located in drop-off loop
- 7:45 AM; lots of traffic on 66 Street, steady
- 7:45 AM; not much drop-off activity, some staff arriving, staff parking lot is filling up
- Mixture of parents using angled parking and drop-off lane to drop students off
- Some students walking/skateboarding to school
- ETS along 66 Street, some students arriving via ETS bus
- Parents dropping-off students in school bus zone when buses are not present yet (looks like junior high students)
- Parents still parked in drop-off loop
- Student waiting outside front door while doors are locked until entrance bell rings
- 7:55 AM; lots of parents dropping-off in bus zone along 66 Street
- Parents able to leave drop-off loop fairly easily back onto 66 Street
- Students crossing at crosswalk in drop-off lane
- Students biking to school
- More parents dropping-off on-street in bus zone than in drop-off loop
- Dropping-off near staff parking lot, then U-turn in parking lot to leave via north access
- U-turn on 66 Street north of school

- Vehicles queuing in SB left turn bay on 66 Street at north access, queue not spilling out of turn bay
- Angled parking relatively full
- Lots of parents parking and waiting in angled parking and drop-off loop until bell rings
- 8:01 AM; not buses yet
- Drop-off lane becoming full because parents parking and waiting, not just dropping-off right away
- Signage in drop-off loop kind of suggests that parking is okay even through it says drop-off only
- Lots of vehicles in bus zone along 66 Street
- Queues not spilling back onto 66 Street from drop-off loop
- 8:04 AM; bus arrives in bus zone, drops off in line with crosswalk within drop-off loop, students go straight to front door
- 8:05 AM; bus leaves right away after finished unloading students
- Lots of students waiting outside of school
- Staff patrol monitoring front door of school
- Angled parking still virtually full, drop-off lane still has parked vehicles, bus zone has parents dropping-off but not really staying long
- Pedestrians crossing 66 Street using pedestrian flasher
- U-turns from on-street bus zone to go southbound on 66 Street (no median in line with crosswalk?)
- 8:09 AM; students still not going into school, doors not open yet, lots of students waiting outside
- 8:10 AM; bell rings, students can now enter the school
- Staff patrol at crosswalk
- Dropping-off in staff lot near north end of angled parking, U-turns in staff lot then exiting via north access (observed at least 7 times)
- 2 staff members at pedestrian flasher at 66 Street with stop signs, helping students cross
- Angled parking less full now that bell has rung
- Queue through drop-off because of traffic along 66 Street, vehicles having difficulty exiting at south access
- Queue all the way through drop-off loop so parents using staff lot as drop-off area then U-turn through the parking lot and leave via north access
- 8:15 AM; still lots of parents dropping-off along 66 Street
- Queue in half of drop-off lane, left turns difficult out of south access
- Staff hold traffic on 66 Street to let vehicles out of south access onto 66 Street
- Parents parking in staff lot to walk students to school or using angled parking, not using drop-off lane to park and walk students into school
- 66 Street busy – general speed of traffic more than 30 km/h; no school zone
- 8:19 AM; parents still using on-street bus zone for drop-off, still no buses present
- 8:20 AM; bell rings
- Steady traffic along 66 Street
- 8:20 AM; staff patrols on 66 Street done
- 8:20 AM; Parking in angled parking still more than half full
- 8:20 AM; parent dropping-off in front of crosswalk on east side of drop-off loop blocking traffic (because using the through bypass lane)
- 8:22 AM; parents still dropping off along 66 Street

- Angled parking south of drop-off loop crosswalk; barrier free stall backs into crosswalk, seems a little unsafe
- 8:23 AM; traffic seems to have slowed down along 66 Street
- 8:24 AM; parents still dropping-off in bus zone along 66 Street
- Pedestrian flasher along 66 Street, signed 30 km/h when lights flashing

PM Bunt Observations

- 2:56 PM; parents parking in staff parking lot waiting for students
- 2:56 PM; parents parked on side of staff lot (not in stalls)
- 2:56 PM; parents parked along bus zone along 66 Street
- 2:56 PM; parents parked along drop-off loop
- 2:56 PM; some vehicles parked in angled parking but not many
- 2:56 PM; parents parking along both side of 6 Avenue (2-3 vehicles on each side)
- 2:56 PM; parents parking along west side of 66 Street on shoulder/in ditch
- Traffic along 66 street fairly slow
- Some empty stalls in staff parking lot, being taken up by parents who arrive prior to dismissal
- Some parents waiting in vehicle, some walking into school to pick up students
- Students waiting at ETS stop on east side of 66 Street north of north access
- 3:01 PM; drop-off lane virtually full; parents now using staff lot or parking in angled parking
- 3:01 PM; 66 Street bus zone also almost full; no buses yet
- Parents parking randomly in staff lot (not in stalls, just pulling to side behind parked vehicles)
- Staff member at drop-off loop crosswalk
- Area coned off along 66 Street bus zone to reserve space for one bus at the south end
- Parents parked on west side of 66 Street on shoulder/ in ditch area between pedestrian flasher and north access; also parking on west side of 66 Street south of pedestrian flasher too (south of ETS transit zone)
- 3:05 PM; dismissal bell
- 3:05 PM; Angled parking, drop-off loop, bus zone on-street along 66 Street full
- Parked vehicles on west side of 66 Street, parents staying in vehicles
- Parents also parked along 6 Avenue in ditch/shoulder on north and south sides
- 2 staff members at pedestrian flasher helping students cross 66 Street on the east and south approaches of 6 Avenue/66 Street intersection (pedestrian flasher along south approach)
- Queue in drop-off lane immediately at 3:05 PM
- Traffic in drop-off loop waiting for staff member on 66 Street to stop traffic along 66 Street and given direction to turn left or right onto 66 Street after pedestrians cross (letting out approx. 10 vehicles at a time)
- Did not notice jaywalking across 66 Street; parents and students using pedestrian flasher
- Double queuing on 66 Street; waiting for a space in on-street bus zone
- 3:12 PM; students move cones for bus when it arrives; bus leaves right away once students are loaded

- Staff allows pedestrians cross, then EB traffic go, then WB traffic (up to 10 vehicles) go (most of which are turning left), all while traffic on 66 Street is stopped, then queue in drop-off loop builds up again
- No queues backing up to 66 Street due to traffic entering north access
- 3:14 PM; staff stops traffic on 66 Street, EB lefts go at the same time as pedestrians cross 66 Street at flasher, then 8 vehicles travelling WB (left and right) but mostly left to south on 66 Street
- Parents picking up along 66 Street on-street bus zone
- 3:16 PM; staff stops traffic on 66 Street, pedestrians cross 66 Street, 1 EB left, 9 WB left, 2 WB right (all the vehicles that were queued in drop-off loop)
- 3:17 PM; UPS truck in drop-off loop
- 3:18 PM; staff stops traffic on 66 Street, queues not bad on 66 Street, worse due to signal at Ellerslie Road/66 Street intersection (queue backed up along 66 Street SB from Ellerslie Road to pedestrian flasher); that queue did not hold up vehicles in drop-off loop because most vehicles that cycle were WB right turns going north on 66 Street (but could have been an issue if most went south)
- Queue SB on 66 Street backed up from Ellerslie to north of north school access
- 3:20 PM; only 3 vehicles queued to leave drop-off loop, vehicles wait for staff member to tell them to go, even if turning right
- Parents still picking up in drop-off loop and on-street along 66 Street bus zone
- Taekwondo after school bus picks up along 66 Street
- Students biking home
- 3:21 PM; no more vehicles parked on west side 66 Street or along 6 Avenue
- Pedestrian button pushed, pedestrians cross, 4 vehicles make WB left movement while traffic on 66 Street stopped
- 3:23 PM; queue from Ellerslie Road still backed up to pedestrian flasher
- 3:23 PM; rush mostly over, staff patrols at 66 Street pedestrian flasher leave
- Students waiting at ETS stop on west side of 66 Street south of pedestrian flasher
- 3:39 PM; queue on 66 Street (SB) from Ellerslie Road to north school access
- 3:48 PM; school rush over, queue on 66 Street (SB) from Ellerslie Road to almost 2 Avenue north of school