Achieving Sustainable Safety Through School Site Design - The St. Albert Community Initiative

Raheem Dilgir, David Dean, Alex Tahmazian and Ryan Martinson

Abstract. In 2014, the City of St. Albert (City), Alberta, in conjunction with its partners in school traffic safety, commissioned a comprehensive review of traffic safety for its schools, using a holistic 4-E approach (Engineering-Education-Encouragement-Enforcement). Safe Journeys to School (SJ2S) was an initiative of the City, overseen by a Joint Public Steering Committee (JPSC). The objectives of the initiative were to:

- Gather information and feedback through extensive community engagement at all 26 St. Albert schools (including Elementary, Junior High and High School), towards identifying student traffic safety risks.
- Identify the most effective engineering, education, enforcement and encouragement strategies to mitigate the identified risks and enhance student travel safety among all schools.
- Develop recommendations and specific action plans to enhance student and school traffic safety at each of the 26 existing schools and two new school sites.

Site visits were conducted to each and every school, during the pick-up or drop-off period, and during off-peak times. The site visits covered on-site characteristics, on-street characteristics and a review of the surrounding roadways. Notes were made of parking utilization, pedestrian facilities, traffic controls, driver and pedestrian behaviours and "close-calls". Concerns raised during the community engagement were specifically investigated and reported on.

This paper describes how the project galvanized the community. Secondly, it aims to convey the holistic, sustainable approach to school traffic safety taken by the City, both in terms of governance aspects and the shift to more active transportation modes. Third, it will demonstrate how the engagement and engineering activities were conducted in conjunction with one another to effectively address the issues. Finally, it will provide specific examples of how changes to the infrastructure, both on site and the adjacent roadway, can alleviate much of the traffic safety problems around schools or prevent them from occurring through effective design.

BACKGROUND

In 2013, the death of a young boy on the way to school in a collision with a school bus significantly impacted the community. Although a growing city, St. Albert is very compact and close-knit and therefore the incident hit very close to home for all students, parents, staff and neighbours.

In 2014, the City of St. Albert (City), in conjunction with its partners in school traffic safety, commissioned a comprehensive review of traffic safety for its schools, to minimize the risk of collisions and injuries involving students by identifying specific strategies and programs through a holistic 4-E approach (Engineering-Education-Encouragement-Enforcement). The City accessed funds from its automated speed enforcement program and reinvested them into traffic safety through this initiative.

Safe Journeys to School (SJ2S) was an initiative of the City, overseen by a Joint Public Steering Committee (JPSC). The JPSC was chaired by a City Councillor and composed of members of the City administration, all four School Divisions, the RCMP and five members of the public. The structure emphasized collaboration, engagement and accountability to the public, and regular meetings were held to direct the consultant review and coordinate the engagement activities. The objectives of the SJ2S initiative were to:

- Gather information and feedback through extensive community engagement at all 26 St. Albert schools (including Elementary, Junior High and High School), towards identifying student traffic safety risks.
- Identify the most effective engineering, education, enforcement and encouragement strategies to mitigate the identified risks and enhance student travel safety among all schools.
- Develop recommendations and specific action plans to enhance student and school traffic safety at each of the 26 existing schools and two new school sites.

REVIEW METHODOLOGY

The review methodology is summarized in FIGURE 1.

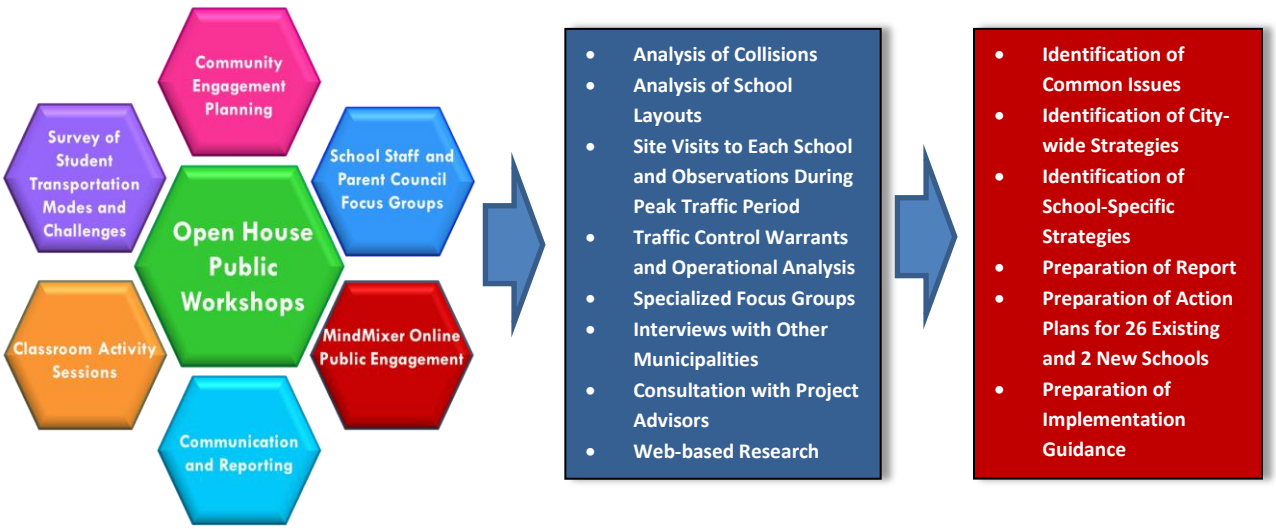


FIGURE 1 REVIEW METHODOLOGY

Community Engagement

Community engagement was the cornerstone of this initiative, and brought members of the community together to share their concerns regarding school travel safety.

Participation in the community engagement activities was wide and varied, and provided a diverse range of input methods and participants:

- Open house public workshops: A total of 24 workshops were held for the 26 schools (two were combined sessions with adjacent schools). 819 parents attended, and several hundreds of issues were noted by the project team.

- MindMixer: An on-line engagement tool, "MindMixer" was set up as another convenient source for input for the wider community. This platform drew 1,520 identified users and 7,350 total hits.

- Focus Groups: Facilitated discussions were held with school staff, parent councils, RCMP, School Bus Transportation providers and School District senior management. A total of over 100 individuals participated in these focus groups.

To provide an even wider and more statistically significant sample of parent and student inputs, questionnaires were developed and distributed by the engagement team and completed separately by parents and students:

- Parent questionnaire: 772 completed questionnaires were received between June 9 and September 30, 2014, including at least one from each school.

- Student questionnaire: 1,773 completed questionnaires were received between September 1 and November 7, 2014 from Grade 4 to 12 students at 12 schools.

All comments were organized by location for further investigation during the site visits. Examples of the types of comments are as follows:

- "people are jaywalking anywhere and everywhere"
- "there aren't enough crosswalks, and students are afraid to cross the road"
- "the snow stacks prevent children from getting from the car onto the sidewalk"
- "staff are parking in the visitors parking"
- "students walk across the pick-up drop-off area on the site, sometimes between buses"
- "there's not enough on-street parking for parents waiting to pick up"
- "drivers don't see when pedestrians come out from the bushes to cross the road"

Engineering Reviews

The engineering reviews consisted of a City-wide collision analysis and reviews of each school.

The collision analysis was based on pedestrian, bicycle and school bus collisions reported in the City between January 2009 and April 2014 (a period of 5 years and 4 months). Due to the difficulty in establishing which collisions in the City were school-related trips, as well as to address concerns regarding safety for pedestrians and cyclists, the analysis was focused on collisions involving pedestrians, cyclists and school buses. Collisions in the vicinity of each school were identified.

Site visits were conducted to each and every school, during the pick-up or drop-off period, and during off-peak times. Each site visit included the following components:

1. An inventory of on-site characteristics, including parking capacity and utilization, availability of bus and parent pick-up / drop-off space;
2. An inventory of on-street characteristics on the streets fronting the school, including crosswalk locations and type, parking/stopping regulations, school zone signage;
3. Assessment of the condition of the infrastructure, including traffic control and sidewalk;
4. An assessment of the operational aspects: including the extent of jaywalking, utilization of pedestrian facilities, driver and pedestrian behaviours, and traffic conflicts, or "close calls".
5. Observations of both the infrastructure and operations at the location where a collision occurred.
6. Observations of both the infrastructure and operations at the location identified in the public comments, in attempt to validate the issue/complaint and to identify contributing factors.

For example, where the lack of on-street parking was identified, the site visit team specifically noted how far from the school vehicles were parked, and whether they were in no-stopping areas or blocking crosswalks or driveways. Where bushes were noted to be an issue, the team estimated the available sight distance to valid the issue, and considered whether it would be appropriate to trim bushes or move the crosswalk.

Current and Best Practice Review

The current and best practice review aimed to bring the best of other jurisdictions to St. Albert, and to spread the best of St. Albert across the City. Research and consultations were conducted in five specific areas:

- School Bus Transportation
- Crosswalk Safety / Patrols
- Active Transportation / Safe Routes to School
- Enforcement and Encouragement
- Provincial Regulations and Programs

The consultations included specialized focus groups, interviews with other Alberta municipalities, consultation with project advisors (subject-matter experts). The discussions with other municipalities suggested St. Albert is among the provincial leaders for similar-sized municipalities in its traffic safety programming.

REVIEW FINDINGS

From the engagement activities, seven common themes of traffic safety concerns emerged:

1. Pedestrian Crossing Control
2. Availability of Safe Walking Routes
3. Availability of Parking
4. Impact of Snow / Weather
5. Traffic Violations
6. Student Behaviours
7. School Bus Transportation Services

During the individual school visits, engineering team members noted several effective practices and common issues. Effective practices at each school are listed in the report. The common issues are summarized in TABLE 1.

TABLE 1 COMMON SCHOOL TRAFFIC SAFETY ISSUES

Driver-Related Issues	Pedestrian/Cyclist – Related Issues	Infrastructure-Related Issues
• Parked Vehicles Blocking View Of Pedestrians • Speeding In School Zones Outside Peak Periods • Inefficient Use Of Pick-Up And Drop-Off Facilities • Aggressive / Inappropriate Driving Behaviour	• Pedestrian Conflicts In Parking Lots • Pedestrians Jaywalking In Front Of School • Poor Crosswalk Awareness / Compliance • Pedestrian And Cyclist Routing Between Street And School	• Conflicts Between Bus And Parent Loading Activities • Short Term Demand For Pick-Up Drop-Off Exceeds Facilities • Winter Conditions Impact Accessibility • Inconsistent Application Of Standards

RECOMMENDATIONS

City-Wide Strategies

The recommended City-wide approach to improving the safety of journeys to school is depicted graphically in FIGURE 2. This holistic framework (nicknamed the "Safer Journeys Wheel") illustrates the key principles, strategies, tools and approaches that can be leveraged in support of safer journeys, with the perpetual goal of safer journeys, and the need for a cultural transformation among all stakeholders in order to achieve this ultimate goal.

This framework reflects the *Safer Systems* concept, in which success is achieved by realizing the co-dependency of and interactions between the various elements; and by recognizing that the most vulnerable users of the system must be placed at the highest priority and protected through measures such as improved facilities and lower vehicle speeds. The framework includes eight safer journeys principles (the blue boxes), which if adhered to can have a significant impact on school traffic safety. For each of the eight areas, multi-disciplinary strategies (incorporating the 4 E's) have been developed, and are summarized in TABLE 2.

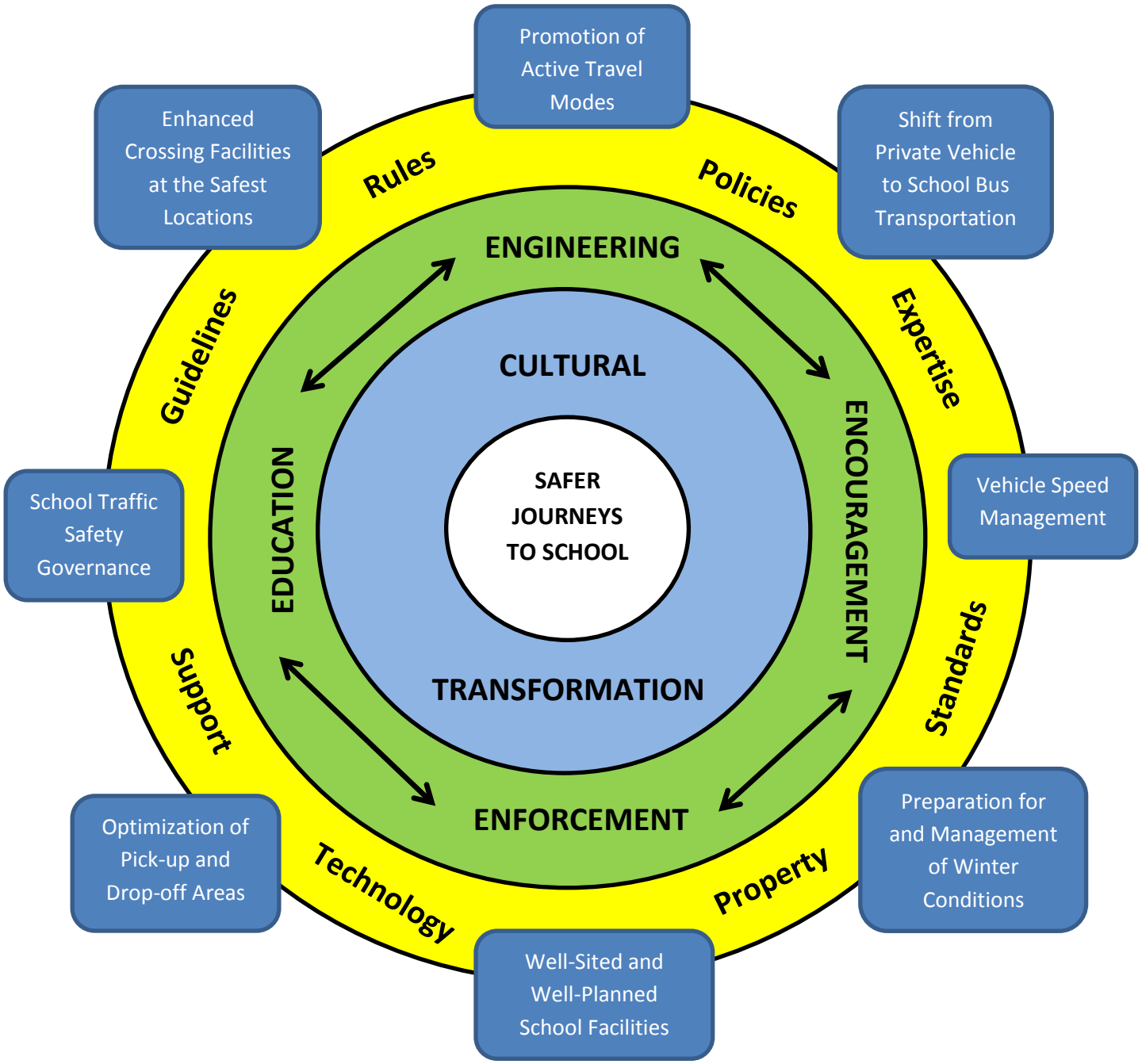


FIGURE 2 HOLISTIC FRAMEWORK ("WHEEL") FOR SAFER JOURNEYS TO SCHOOL

TABLE 2 CITY-WIDE STRATEGIES FOR SAFER JOURNEYS TO SCHOOL

Principle #1: Promotion of Active Travel Modes	**Strategies/Programs**
For students living closer to school, the promotion of walking and cycling will lead to a more sustainable reduction in congestion and safety issues around schools. This can be pursued both through encouragement, by understanding the barriers and providing resources, collaborating with advocacy groups, and providing infrastructure that more safely accommodates these modes, particularly for cyclists. An enhanced walking and cycling culture is expected to increase the safety of these modes by making their presence more visible, predictable and acceptable. While an increase conflicts may occur in the short term, they are expected to decrease over the longer term.	• "Walking/Cycling School Buses" • Theme days and contests • Discuss weather barriers • Walkabouts/cycle-abouts • Safe routes to school maps • Work with cycling groups • Pilot bike lanes / road diets • Rear pathways / alternate entrances • Keep facilities free of snow
Principle #2: Shift from Private Vehicle to School Bus Transportation	**Strategies/Programs**
For students living further from school, a shift from private vehicle to school bus transportation is expected to reduce congestion and the associated safety issues *provided* there is sufficient space for buses on-site, that no additional buses would be required (i.e. increase in utilization), and that improvements are made to attract more riders. The key measures to encourage this shift include increasing cost-effectiveness, improved safety and a superior on-board performance. Restoring a culture of safety on school buses will be a critical first step, which depends on the reliability and efficiency of the system, as well as the implementation of improvements to school bus transportation.	• Driver Training programs • More flexible cost structure • On-board storage • On-board surveillance • Address issues at bus stops • Optimize routes to avoid congestion • Proximity to school entrances • Collision avoidance technology • Winterization of school buses/tires • Spacious passenger waiting areas
Principle #3: Vehicle Speed Management	**Strategies/Programs**
Lower vehicle speeds result in higher yielding rates at crosswalks, make pedestrians and cyclists more comfortable when crossing the roadway, and reduce the risk of injury in the event of a collision. Compliance with school zone speed limits is best achieved through a combination of engineering speed reduction measures and education, encouragement and enforcement efforts. The most effective speed reduction measures are physical in nature (such as road narrowings); these can be supplemented by temporary measures such as patrols and cones during peak school traffic. Measures such as reader-boards can both educate and enforce.	• Gateway treatments • Real-time flashers • Speed zone reminders • Speed reader-boards and follow-up enforcement • Rewards for compliance • Raised crosswalks/curb extensions • Targeted speed enforcement • Automated speed enforcement

Principle #4: Preparation for and Management of Winter Conditions	**Strategies/Programs**
Since the school year coincides with the most adverse weather conditions and walking and cycling trips are relatively rare in the winter, an approach needs to be taken to both prepare students/parents/vehicles for journeys to/from school during winter conditions, as well as to minimize the impact of these conditions on journeys to school, including the preservation of facilities in the vicinity of schools. An emphasis on geometric measures and signage rather than pavement markings will increase the chances that facilities can remain effective during winter conditions.	• Discuss concerns with students • Reflective/climate-appropriate clothing • Snow blading policy • Sidewalk clearing policy • Windrow clearance policy • "Winter app" to report windrows • Enhanced signage and warning • Enhanced crosswalks
Principle #5: Enhanced Crossing Facilities at the Safest Locations	**Strategies/Programs**
Crossing facilities should be provided at locations where sight lines are clear, away from speed transitions and where sufficient demand for crossing exists - and not at other locations. The City has a policy for providing crossing facilities, which should be reviewed given the concerns raised during the engagement opportunities. Where crossing facilities are provided, they can be enhanced to make them more visible, to provide real-time controls, to ease the crossing manoeuvre, and to encourage lower vehicle speeds. Geometric enhancements such as curb extensions and raised crosswalks are expected to be the most effective upgrades. Each of these has advantages and disadvantages, which are described in this report. Keeping sight lines clear is a critical function and should also be carried out right away for locations with identified obstructions.	• Revised hierarchy of controls • No Stopping within 10 m of crosswalks • Curb extensions/in-street signs • Use of zebra/ladder markings at school crossings • Raised crosswalks • Higher visibility markings • Enhanced Student Patrols • Temporary measures (e.g. cones) • Illumination of pathways/crosswalks • Advance warning measures, including RRFB's, yield lines and crosswalk warning signs • Maintenance of shrubs • Automated pedestrian detection • Adult guards for unique situation
Principle #6: Well-Sited and Planned School Facilities	**Strategies/Programs**
The majority of safety and operational issues take place on the road with frontage to the school. Therefore, most of these could be prevented by moving some of the pick-up and drop-off facilities onto the school site and managing access and conflict points. Facilities that are new or being redeveloped should include features that support Principles 7 and 8. One of the most notable features is to make the school accessible from the rear for pedestrians and cyclists, to decentralize some of the activity from the front of the school. This may, however, require additional staff supervision to manage multiple student access points.	• Multiple frontage roads • Separates access points for buses and vehicles/staff • Staff parking in central part of lot • Location of school entrances • Fences to prevent jaywalking • Stacking at the downstream end • One-way on-site circulation • Sidewalks outside of driveways • Reverse-in staff parking • Consistent on-site sign content and format • Staggered hours for nearby schools

Principle #7: Optimization of Pick-up and Drop-off Areas	**Strategies/Programs**
It is not possible to significantly re-design most school sites; therefore, the pick-up and drop-off operations have to be optimized within the available space. Where possible, private vehicles and buses should be separated, with higher priority for buses (closer to school entrance or a dedicated school entrance), as well as revising the parking/stopping regulations to clarify the difference between stopping and parking and to give priority for immediate drop-off closer to the school entrance. Encouraging parking and walking from further away would also relieve congestion.	• Separation of buses and vehicles • Institute "No unattended vehicles" regulation • Shorter times for pick-up/drop-off parking • Restrict parking across the street • Possibility of shared zones outside of peaks • Use of positive/symbolic signing • Busing / parking patrols • Approach from/park on same side • Use of City parking lots where available
Principle #8: School Traffic Safety Governance	**Strategies/Programs**
The success of the above strategies will depend on the governance structures are put in place or maintained. School traffic safety will need to remain high on the City and School District priority list to continue the momentum and implement the findings of this report. The collaboration between the partners should be mirrored as much as possible at the School District and individual school levels. Besides increasing the chances of successful implementation, solid governance and leadership will set a good example for parents and students, which in turn will support the building of a stronger and more sustainable traffic safety culture. Keeping the public informed about school traffic safety initiatives may increase their support through improved behaviours, and continue to build a sense of community.	• Public traffic safety committee • School-based traffic safety committees • Dedicated funding for traffic safety • Continued and expanded collaboration between all partners • Standardized student newsletter content • Traffic fines that better reflect risk • RCMP members dedicated to school safety • Maintain Safe Journeys website • Implement/enhance curriculum • Review locations/corridors raised as concerns • Traffic Conflict monitoring program • Coordination with Alberta Traffic Safety Plan member

School-Specific Strategies

A *Safe Journeys to School Plan* was developed for each of the 26 schools. The plans summarized the specific safety issues that were identified, applicable City-wide strategies and specific school enhancements that would mitigate the identified safety issues. For each possible enhancement, the Plan noted who was responsible for its implementation (City, Police, School District, or individual School) and the time frame – thus creating an action plan for implementation.

SUSTAINABLE SAFETY

While there was tremendous support from the City and the stakeholders to improve safety at each of the schools, there was a desire that resulting actions would be sustainable and contribute to Safer Journeys to School in years to come. Key components of the program that contribute to the sustainability and good site design include the following three outcomes:

Principle #1: Promotion of Active Travel Modes

Form the parent survey, it was established that:

- Mode split is presently estimated at 47% school bus, 33% car, 16% walk and 3% bicycle;
- 16% of trips are within 1 km and 47% of trips are within 2.5 km; and
- The leading reason cited for mode choice was "convenience", followed by "safety" and "speed".

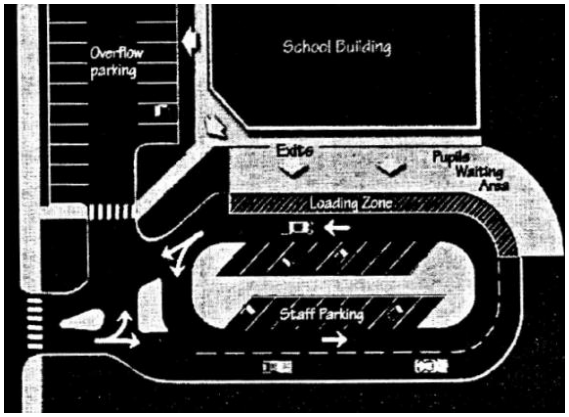
The student questionnaire responses indicated similar trends, with the exception that "fun" was a more prominent factor in student mode choice than "safety". The above trends indicate two mode shift opportunities:

- A shift from car trips to bus trips for distances over 2.5 km/h; and
- A shift from car to foot and bicycle trips for shorter distances.

Weather was also determined to be a significant barrier to walking or cycling, with a significant drop of 11% in winter (from 24% of trips to 13% of trips), as compared to fall and spring.

One of the recommendations for the School Districts in support of active transportation safety is for each school to work with the City in developing "Safe Routes to School" (SRTS). The outcome of this would be for each school to create a set of "maps" depicting "safe" walking/cycling routes, i.e. routes that include sidewalks, preferred crossing locations, and routes to walk/cycle from the road to the school entrance to minimize the chances of conflicts. Students are then encouraged to prepare a map of their own journey, that will likely include some of the routes shown on the school SRTS maps. There are several published best practices for SRTS mapping that the School Districts can access. It would be most effective if all four School Districts work together on this, and seek the City's guidance and expertise where required. The City may be interested in combining all SRTS maps onto one large map for public access.

Principle #6: Well-Sited and Well-Planned School Facilities



Plans for the two schools in development were audited. Planning and design principles regarding safe access, on-site circulation and parking layout, vehicle speeds, pedestrian desire lines and possible conflict points were applied based on best practices. Suggestions were made for revising cross-sections, access locations and links in the sidewalk network, in order to proactively address some the issues observed at other schools.

It is unknown to the project team what future schools are planned within the City. However, it is suggested that the School Districts and the City endorse a set of planning principles that support traffic safety. This set of principles should be shared with planners and developers so that their layouts can keep traffic safety as one of the considerations in their siting and planning of new schools. Learnings from the implementation of the suggestions for the two school plans reviewed in this report can be applied to the planning of future schools.

These strategies were developed based on all of the analyses and research conducted, including concerns raised in the engagement activities that were validated by the study team or reflect perceptions that negatively affect student behaviours. The strategies listed in TABLE 2 and the other recommended strategies are further described in the project report.

Safe Journey to School Plans

The potential for safety issues for the journeys to school and, in particular, the peak pick-up and drop-off activities will remain as long as there is a student demand. However, many of the proposed enhancements will be implemented over time as funding is available or implemented on an on-going basis. Personnel at the various implementation agencies may change over time so having a documented action plan to refer to each year (and update if necessary) provides a tool for sustainable safety. This is particularly important for each school's Parent Advisory Committees that are responsible for a lot of the volunteer efforts but have a high turnover as their children go through the school.

CONCLUSION

The St. Albert Safe Journeys to School review featured:

- Over 75 City-wide strategies
- Over 300 School-specific strategies
- A framework for continuous improvement

The project was unique and particularly effective in its:

- Proactive approach;
- Re-investment of funds in traffic safety;
- Comprehensive and holistic methodology; and
- Extensive community involvement.

The Safe Journeys to School initiative of the City of St. Albert and its partners set forth a blueprint for further enhancing traffic safety for students travelling to and from school. More than anything, it brought the community together on a common issue and empowered parents, students and the general public. Continued engagement and cooperation from all involved will ensure the success of the initiative.

ACKNOWLEDGEMENTS

The City of St. Albert, the RCMP, the St. Albert Catholic School District, the St. Albert Public School District, the St. Albert Francophone School District, the Sturgeon School District, and members of the public for directing the study; and to Green Communities Canada, the Alberta Motor Association, Alberta Transportation, Alberta Ministry of Education, and the municipalities of Edmonton, Calgary, Strathcona County, Leduc and Red Deer for providing information resources.

AUTHOR'S INFORMATION

Raheem Dilgir, P.Eng., PTOE, MBA
President, TranSafe Consulting Ltd.
908 – 1495 Richards Street
Vancouver, BC, Canada V6Z 3E3
Phone: (604) 563-9988
E-mail: raheem@transafe.ca

David Dean, P.Eng.
D.C. Dean Associates Inc.
32 – 1900 Irongate Place
Kamloops, BC, Canada V2H 0B1
Phone: (250) 372-9166
E-mail: dcdean@shaw.ca

Alex Tahmazian, C.E.T.
Traffic Safety Analyst, TranSafe Consulting Ltd.
448 Willamina Cr. S.E.
Calgary, AB, Canada T2J 2C1
Phone: (403) 888-5763
E-mail: alex@transafe.ca

Ryan Martinson, P.Eng.
Associate - Sustainable Transportation Specialist, Stantec
200 - 325 25th Street SE
Calgary AB Canada T2A 7H8
Phone: (403) 716-8138
E-mail: ryan.martinson@stantec.com