Complete Streets Design Guidelines – Transportation Network Design and Operational Impacts

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Report Summary

This report provides information on the Complete Streets Design Guidelines and their impact to the design of the transportation network.

Relationship to the Strategic Plan, Health Impact Assessment and Climate Action Plans

This report refers to “providing quality multimodal transportation alternatives for roads, transit, trails, paths, sidewalks, and connecting neighbourhoods and communities within Greater Sudbury” which is identified in the Strategic Plan under the strategic objective of Create a Healthier Community. This report also supports the “achieve 35% active mobility transportation mode share by 2050” as identified in the City of Greater Sudbury Community Energy and Emissions Plan (CEEP) by improving walking infrastructure.

Financial Implications

There are no financial implications associated with this report.

The Complete Street Design Guideline provides a set of consistent guidelines and tools to inform the design and implementation of road infrastructure projects within the capital budget and is subject to Council approval.

Any incremental operating costs from new or expanded assets are reflected within the budget document for Council’s consideration in conjunction with the approval of the capital budget.

Introduction

This report outlines proposed changes to the City's cross sections, including 2:1 ditch slopes, narrower lanes, wider sidewalks, expanded cycling infrastructure, and added landscaping. The goal is to enhance safety, promote Complete Streets principles, and optimize space within the right-of-way.

Complete Streets Design Guidelines for Greater Sudbury

The guidelines aim to ensure safe, accessible, and sustainable transportation for all users, building on the 2018 Complete Streets Policy. Each street has a unique role and context, requiring a sensitive, context-driven design approach.

Key Objectives:

- Context-sensitive Design: Tailor street designs to their specific roles within the transportation network.
- Vibrant Public Spaces: Design streets to attract pedestrians, cyclists, and community members, encouraging social interaction and local commerce.
- Prioritize Transit and Active Transportation: Integrate safe and efficient walking, cycling, and transit options to reduce dependency on private vehicles.
- Safety and Accessibility: Ensure streets accommodate users of all ages and abilities, promoting inclusivity and supporting a healthier community.
- Connectivity: Enhance the connectivity of the transportation network by linking key destinations.
- Cost-effectiveness: Consider environmental, social, and economic benefits and costs in street design to improve long-term resiliency.

By integrating Complete Streets principles, Greater Sudbury will create a sustainable, inclusive, and efficient transportation system, enhancing quality of life, reducing emissions, and boosting community engagement. These design changes will support city growth, economic activities, and public health, complementing the City's commitment to increasing transit service hours and promoting active mobility. This investment will ensure greater accessibility and convenience, encouraging sustainable commuting options. Incorporating Complete Streets will also improve safety and accessibility, boost economic growth through higher property values and lower vehicle operating costs, create vibrant social spaces, and reduce carbon emissions while enhancing green spaces.

Review Process

The review of proposed road cross section changes included public consultations, stakeholder feedback, and analysis of existing guidelines. Key focus areas were lane widths, sidewalk widths, ditch slopes, landscaping, snow storage, and emergency vehicle access. The goal was to develop guidelines aligning with industry standards, best practices, and the city's climate. The review considered the City’s Official Plan, Transportation Master Plan, Community Energy and Emissions Plan (CEEP), and Accessibility for Ontarians with Disabilities Act (AODA), supporting sustainable and active transportation and broader strategic goals. These guidelines ensure the infrastructure meets all road users' needs.

Lane Widths

The review included the Geometric Design Guidelines for Low-Volume Roads, which provide recommendations for designing roads with average daily traffic volumes of up to 2,000 vehicles per day, specifically on local and minor collector roads. Studies show that narrower lanes help reduce vehicle speeds, which in turn lowers the frequency and severity of collisions. A common misconception is that narrowing lanes leads to congestion. However, the Transportation Research Board’s Highway Capacity Manual shows that reducing lane widths to 3 meters doesn’t affect the amount of traffic a road can handle, especially when intersections interrupt the flow of traffic. Traffic flow on city roads is mostly influenced by intersections, not the speed between them. The current standards for roads in Greater Sudbury are 6.7 meters for rural roads and 9 meters for urban roads. The Complete Streets Design Guidelines propose narrowing lane widths to 3.5 meters across arterial and collector road cross sections and local road widths of 7.5 meters for urban streets and 6 meters for rural streets. Since local and minor collector roads make up approximately 95% of the City's entire road network, these changes would have a significant impact on overall road safety by reducing speeds and improving the driving environment.

Sidewalks

The guidelines propose widening sidewalks from 1.5 meters to 1.8 meters to better accommodate mobility devices and strollers. This will improve pedestrian mobility, especially in high foot traffic areas.

Ditch Slope Analysis (2:1 vs. 3:1)

Using MTO's Roadside Safety Manual, the analysis compared 2:1 slopes with existing 3:1 slopes. The 2:1 slope creates space for sidewalks and bike lanes, enhancing safety without expanding the roadway. Both designs have low expected collision frequencies, supporting their safety.

Landscaping

Integrating trees and landscaping aligns with the Urban Forest Master Plan and the City's Official Plan, enhancing the urban tree canopy. These features offer aesthetic and environmental benefits, such as improved air quality and stormwater management. While landscaping may require ongoing maintenance, it contributes positively to urban health and beauty, enhancing safety by preserving sightlines and minimizing hazards.

Emergency Vehicles

Street design must prioritize access for emergency vehicles, such as fire trucks, which are about 3 meters wide and can extend up to 4.2 meters. The guidelines suggest minimum road widths of 7.5 meters for urban streets and 6 meters with a 0.5-meter shoulder for rural streets. These widths accommodate emergency vehicles while promoting safer driving speeds.

Public Consultation

The Complete Streets Design Guidelines for Greater Sudbury have undergone extensive consultation to ensure they reflect the needs and priorities of the community. This process engaged a diverse range of stakeholders, including transportation professionals, community groups, accessibility advocates, and residents, to create a comprehensive and inclusive plan.

The draft road cross sections were first presented to the Operations Committee in June 2022. Following this, a public consultation period was held, lasting until September 30, 2022. During this time, staff actively engaged with the public at key events such as the Sudbury Market and Rib Fest. Additionally, staff presented the proposed cross sections to various advisory groups, including the Population Health Advisory Committee, the Seniors Advisory Panel, the Community Action Network Chair meeting, and the Development Liaison Advisory Panel (DLAC).

Feedback was collected through surveys, offering residents the opportunity to voice their opinions on critical elements such as cycle tracks, sidewalks, pedestrian amenities, parking, and more. The survey results indicated strong support for safer and more inclusive infrastructure, with a particular emphasis on separated and protected bike lanes, the creation of multi-use paths, and the need for improved pedestrian amenities such as benches and greenery.

Key insights include:

- **Cycle Infrastructure**: Need for dedicated, separated cycling lanes and multi-use paths, especially connecting the city's cycling network.
- **Sidewalks and Pedestrian Safety**: the importance of wide, well-maintained sidewalks, particularly in residential and downtown areas. Winter maintenance and accessibility for people with disabilities were common concerns, with calls for safer pedestrian routes and improved snow removal.
- **Public Transit**: Enhancing public transit infrastructure, including more frequent services, better bus stops, and designated lanes.

- **Parking and Traffic Flow**: There were mixed opinions about on-street parking for businesses in downtown areas, with some supporting its presence for local businesses, while others expressed concern about the negative impact of parking on traffic flow and safety, particularly near busy pedestrian areas. For local residential roads, there is a preference for parking on one side, with a growing emphasis on incorporating cycling infrastructure and ensuring safe, accessible spaces for pedestrians.

Internal stakeholders and operational staff were also consulted for technical feasibility and long-term maintenance considerations. This comprehensive consultation process shaped the guidelines, ensuring they reflect the values and priorities of Greater Sudbury's residents and stakeholders. The feedback will guide the development of safer, more inclusive streets that promote active transportation and improve overall quality of life.

Case Studies and Best Practices

Complete Streets offer several benefits, primarily by promoting road safety through design elements that cater to all modes of transportation. By integrating features such as separated bike lanes, wider sidewalks, and efficient public transit systems, Complete Streets contribute to speed reduction and mode separation, which reduce the frequency and severity of collisions. Studies show that protected bike lanes, for example, have collision rates two to eight times lower compared to roads without infrastructure for bicycles (Cartwright, 2024).

Successful implementations in Ontario include:

Toronto: The Destination Danforth Complete Streets Pilot Project, implemented in 2020, transformed Danforth Avenue by adding protected bike lanes, reducing vehicle lanes, expanding sidewalks, and improving street aesthetics with art and plantings. The project aimed to enhance safety for pedestrians and cyclists, support local businesses with expanded outdoor patios, and facilitate physical distancing during the pandemic. Results included a significant increase in cycling activity (67-133%), a decrease in motor vehicle volumes (15-18%), and a 53% reduction in collisions, especially those involving cyclists. Public perception was largely positive, with 80% of cyclists feeling safer, though concerns about parking and traffic congestion were noted. The pilot received strong community support for making these changes permanent.

Toronto: The Bloor Street West Bike Lane Pilot Project, implemented in 2016, aimed to improve safety and reduce risks for cyclists and other road users on Bloor Street West between Shaw Street and Avenue Road. The project introduced separated bike lanes, reducing vehicle lanes and on-street parking. The pilot saw a 49% increase in cycling volumes, with 25% of those being new cyclists. Safety improvements were noted, with collisions and near-miss conflicts significantly reduced. Despite initial concerns from motorists and businesses about increased travel times, parking issues, and delivery disruptions, the project gained broad support, with cyclists and pedestrians reporting improved safety and comfort. The pilot resulted in increased local business activity and customer spending, particularly from cyclists. Based on the positive outcomes, the project was recommended for permanent implementation, with further design modifications to improve traffic flow and safety.

Markham/Richmond Hill: The Highway 7 East project focused on transforming a major arterial road into a Complete Street by introducing dedicated lanes for cyclists, expanded sidewalks, and a bus rapid transit (BRT) system. This redesign was aimed at increasing accessibility for all road users, including pedestrians, cyclists, and transit users. The outcomes were substantial: collisions dropped from 250-350 annually to 104 in 2015, with pedestrian counts increasing by 61% from six years prior. The addition of the BRT shortened transit commute times by 30%, while transit ridership rose by 10%. The project also resulted in 16,000 bicycle trips and 126,290 pedestrian trips in 2014 at a key location.

Kitchener: The transformation of King Street in Kitchener included major pedestrian and environmental improvements. The redesign resulted in nearly 200% more foot traffic, with pedestrian counts increasing from 3,000 to 8,900 daily. Attendance at street festivals also grew from 250,000 to 400,000 annually. Key changes

included the addition of 120 street trees for shade and air quality, wider sidewalks, new bike racks, and environmentally friendly planter beds. The number of summer patios increased from 5 to 16, further enhancing the street's vibrancy. These changes contributed to a rejuvenated downtown and won recognition from the International Making Cities Livable Council for revitalizing the area.

Current and Proposed Road Cross section Standards

In Greater Sudbury, road right-of-way (ROW) widths vary from 20 meters for local and collector roads and up to 90 meters for arterial roads. Local roads make up approximately 85% of the network, with 77% of local road cross sections classified as urban or semi-urban (a road with an open ditch on one side of the road and curb and storm sewer on the other side). Collector roads comprise about 11%, and arterial roads about 4% of the network, with roughly 18% of the roads featuring a rural cross section. Approximately 73% of the roads in Greater Sudbury have an average annual daily traffic Annual Average Daily Traffic (AADT) of 500 or fewer, and about 81% have an AADT of less than 2,000.

In Greater Sudbury, the current urban road cross section features a 9 meter road width, a 1.5 meter sidewalk, and a 1.5 meter boulevard for buffering. Utility trenches are located beneath the sidewalk, and light standards are positioned behind it to avoid obstructions. For rural roads, the cross section includes a 6.7 meter for local roads and 7.3 meter for collector road width with 1.0 meter gravel shoulders on each side and 3:1 slopes for drainage. There are no sidewalks, though the city has already implemented 2 meter paved shoulders on arterial roads and 1 meter paved shoulders on collector roads for active transportation, which are not yet reflected in the current standard. Landscaping in road projects typically includes sod for boulevards, tree replacement, restoration work, and benches at transit stops with shelters.

The proposed changes aim to improve road safety and inclusivity by better utilizing the available right-of-way. On rural collector and local roads, key adjustments include implementing 2:1 ditch slopes, narrowing lane widths to 3.5 meters for all cross sections or an overall road width to 6.0 meters for roads with one lane in each direction and adding a 1.8 meter sidewalk to local roads. For urban roads, the proposal includes widening sidewalks to 1.8 meters to accommodate mobility devices and strollers and reducing overall road widths to 7.5 meters for roads with one lane in each direction or 3.5 meter lanes on multi lane roads. The guidelines also propose adding cycle tracks or bike lanes on collector and arterial roads, and landscaping with trees and shrubs, along with benches for rest areas across all cross sections. Additionally, the guidelines propose parking on one side of local and collector roads that permit it. A summary of notable changes to cross sections is provided in the table below.

Comparison Table

Feature	Current Urban Cross section	Current Rural Cross section	Proposed Changes
Road Width	9 m	6.7 to 7.3 m	7.5 m asphalt road width for urban cross sections and 6 m with 0.5 m gravel (soft) shoulder for rural cross sections or 3.5 m asphalt lanes on multi lane for both urban and rural roads
Sidewalk	1.5 m	No sidewalk is included	Increase width to 1.8 m and add sidewalk to rural local roads in an urban area
Boulevard/Buffer	1.5 m boulevard	1.0 m gravel shoulder for local roads 1-2 m paved shoulder for Collector and Arterial roads	Increase width to 1.8 m boulevard for urban cross sections and 2 m paved shoulder for rural collector roads

Slopes	N/A	3:1 slope	2:1 slope for collector and local rural roads
Landscaping	Sod for boulevards, tree replacement, restoration work, benches at transit stops	Sod for boulevards, tree replacement, restoration work, benches at transit stops	Landscaping with trees and shrubs, benches for rest areas across all cross sections
Cycle Tracks /Bike Lanes	Separated cycle tracks (1.8 m boulevard space) or multi use paths on arterial roads, bike lanes on collector and some local roads	1-2 m paved shoulders for active transportation on collector and arterial roads	Separated cycle tracks (1.8 m boulevard space) or bike lanes on collector and arterial roads
Parking	One or both sides of local and collector roads. No parking permitted on arterial roads	One or both sides of local and collector roads. No parking permitted on arterial roads	Parking on one side of collector and local roads where permitted. No parking permitted on arterial roads

In dynamic street environments, a thoughtful design approach balances the needs of all users. The Guide offers flexible design values while upholding sound engineering principles. It draws on policies and best practices to encourage innovative solutions, ensuring streets align with their specific purpose and future role.

Implementation Strategy

The Complete Streets Design Guidelines were developed to support the Complete Streets policy and provide a consistent approach for integrating key elements into road projects and new roads. These guidelines focus on improving road safety, accessibility, and sustainability.

Currently, when a road is identified for reconstruction, 1.5 meter sidewalks are added on one side of local roads and on both sides of urban collector or arterial roads that do not already have sidewalks. For urban collector and arterial roads, cycle tracks or bike lanes are included where appropriate. For rural collector and arterial roads, 2 meter paved shoulders are added for active transportation.

The City currently has both rural local roads (where lot sizes are larger, and houses are farther apart) and rural local roads in urban areas (where lot sizes are smaller, and houses are closer together). There is currently only one standard for these types of roads. For rural local roads, the Complete Streets Design Guidelines propose a cross-section similar to the currently standard, with the key difference being narrower road widths and additional landscaping for trees and shrubs. For rural local roads in urban areas, rather than following the current practice of urbanizing the road (which involves adding curb, gutter, storm sewers, sidewalk etc.), the Complete Streets Design Guidelines propose a new cross-section that would retain the rural character (with open ditches) but add a sidewalk along with additional landscaping elements such as trees, shrubs and benches.

For urban collector and arterial roads, there will be an increase in cost due to wider sidewalks and some additional landscaping, but this will be offset by decreased costs from narrower lane widths. Since cycle tracks and bike lanes are already being added to these types of road projects, there will be no change in cost for this element. For rural collector and arterial roads, there will be savings due to narrower lane widths, with a small increase for additional landscaping. Since the 2 meter paved shoulders are already being included in these types of road projects, the amounts for those elements remain the same.

The addition of sidewalks to all urban roads and rural local roads in urban areas without sidewalks aligns with current practices during road reconstructions. Since local roads make up 85% of the network, the proposed cross-section changes will improve the affordability of implementing Complete Streets principles and enable

more road projects. Savings from narrower lane widths on urban collector, arterial, and rural roads will further enhance cost efficiency, supporting the sustainable implementation of Complete Streets.

Long-Term Value

The Complete Streets principles, while presenting initial cost differences across various road types, will provide long-term value primarily through cost savings. As outlined earlier, the savings from narrower lane widths and more efficient use of materials will offset the additional costs of wider sidewalks and landscaping elements. In fact, the cost reductions on local roads (which make up 85% of the network) and the savings from narrower lanes on urban collector, arterial, and rural roads will make the implementation of Complete Streets principles more affordable, freeing up funds to be used for additional road projects.

Features such as sidewalks, trees, and benches typically require less ongoing maintenance compared to asphalt surfaces, which tend to experience wear and tear from weather conditions, leading to potholes and cracks that need patching and sealing. In contrast, sidewalks and landscaping elements tend to be more durable and require fewer repairs, reducing maintenance costs over time.

Additionally, Complete Streets features contribute to environmental and social benefits, such as improved air quality, reduced heat island effect, enhanced stormwater management, and increased safety for all road users. These long-term savings, along with enhanced road safety and accessibility, justify any upfront investments required to integrate Complete Streets principles into Greater Sudbury's road network.

By implementing Complete Streets in a phased, incremental approach, Greater Sudbury can create a more sustainable, accessible, and livable transportation network that benefits all road users, while maintaining budgetary discipline and addressing future growth needs.

Conclusion and Next Steps

The Complete Streets Design Guidelines offer a strategic, flexible approach to transforming Greater Sudbury’s transportation network into a safer, more accessible, and sustainable environment. The guidelines are adaptable to the unique context of each road and neighborhood. The city will monitor and adjust the guidelines as needed, incorporating concepts like infill development and low impact development.
If adopted, staff will complete a comprehensive review of all relevant City policies, procedures, best practices, and current standards to ensure consistency with Complete Streets principles. This review will ensure that the guidelines continue to align with the objectives of community impact, resource management, sustainable development, and quality control, with the goal of creating a well-organized, livable, and thriving community. The review will consider not only the integration of Complete Streets principles but also the impact from a road maintenance and sustainability perspective, ensuring that future developments are built with long-term viability in mind.

The city’s ongoing development of the Roads and Transportation Asset Management Plan will play a critical role in prioritizing capital road projects. During the development of the capital budget, the guidelines will be reviewed to determine which elements should be included in each project, ensuring that funds are allocated efficiently. A key part of this process will be the use of data like past collision history, traffic speeds, and active transportation user volumes to identify areas in need of Complete Streets upgrades. For instance, roads with lower Average Annual Daily Traffic (AADT) and lower speeds may not require dedicated cycling lanes or wider sidewalks, as the needs of these areas may differ. Additionally, the current sidewalk priority index will be reviewed to further guide these decisions. Staff will return with future reports which will expand on the criteria that will be used to guide this decision-making process.

Finally, the guidelines will be utilized during the detailed design phase of future capital projects. Staff will review the existing budget and scope of upcoming planned projects and seek opportunities to incorporate elements of the new guidelines where feasible. For projects that are already in design or underway, the proposed changes will be implemented only where there is no impact on the cost or schedule. Once Council adopts the guidelines, staff will begin applying the updated cross sections to new design projects moving

forward.

This comprehensive, data-driven approach will ensure that taxpayer funds are spent wisely and responsibly, resulting in a transportation network that is both sustainable and effective for the community.

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