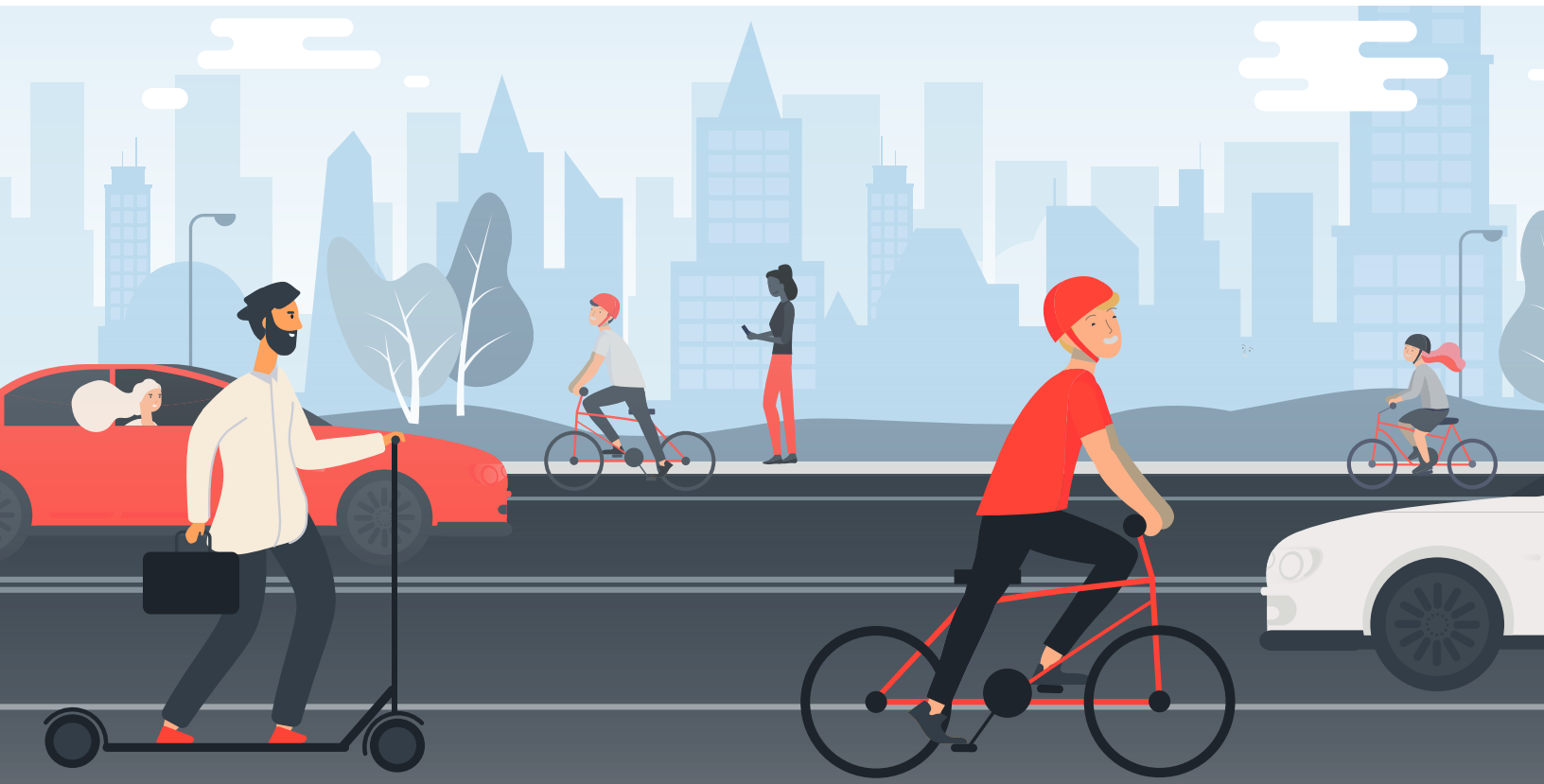


Complete Streets:

Latest Advancements and
Best Practices for Building
Thriving Communities



Communities across North America are rethinking their approach to road design to provide safe and convenient access for pedestrians, cyclists, and drivers, as well as people of varying ages and abilities. This report summarizes the latest trends and innovations that municipalities should consider when taking a Complete Streets approach to their projects.

Who is this street for, and how can it be designed to meet their needs?

This is a fundamental question engineers and planners must answer when designing any street. For the last several decades, the motorist has been the primary design user of the majority of Canadian streets, with far too little consideration given to the needs of people outside of a motor vehicle.

Today, municipalities across the country are working to repair this inequity, using a Complete Streets approach to give more consideration for all road users as well as thinking more about how streets can be better designed to support community-building objectives.

This paper captures the current “state of practice” of Complete Streets through three themes:

1. Integrating a street with its surroundings
2. Using innovative designs to improve comfort and safety
3. Applying Complete Streets as a change management tool.



Rendering of a protected intersection in Toronto

What are Complete Streets?

Streets can make up more than a quarter of a city’s urban area and are critical to creating vibrant, healthy, and prosperous communities. Communities across North America are increasingly taking a holistic approach to road design known as Complete Streets, which focuses on creating streets that are safe and convenient for people who walk, bicycle, take transit or drive, and people of varying ages and abilities. They also consider other uses like patios, street furniture, trees, utilities, and stormwater management.

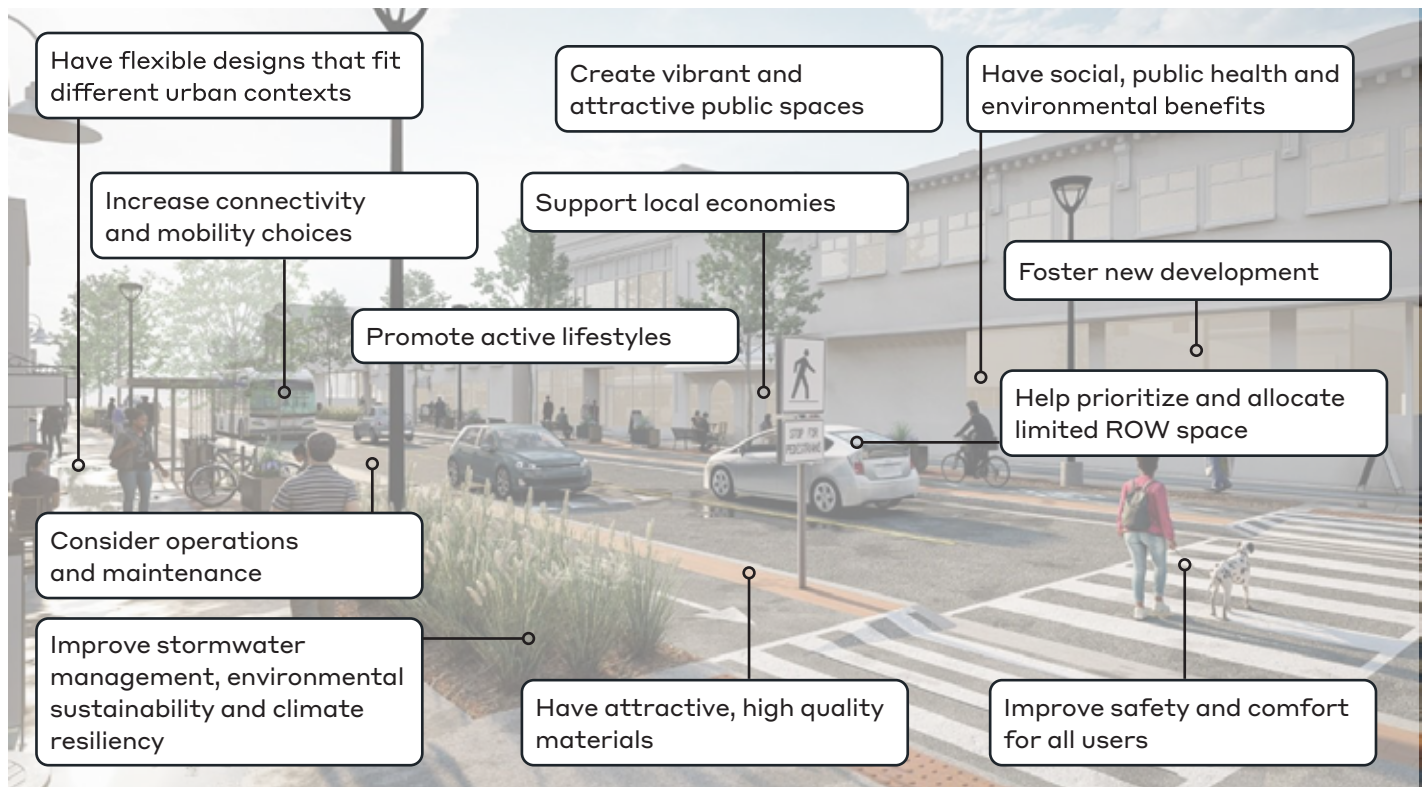


Figure 1: Benefits of Complete Streets in practice

Complete Streets come in all forms, and flourish in communities small and large; urban, suburban, and rural. There is no singular approach to creating a vibrant and successful Complete Street; in fact, Complete Streets actively respond to their surrounding environments, resulting in context-specific designs rather than a standardized approach. Design goals have changed from the traditional “centreline-out” approach, which focused on vehicular travel and left little boulevard for anything else, to an “outside-in” approach which considers multiple city objectives and results in a more complete street.

1. Integrating a Street with its Surroundings

A well-executed Complete Streets approach incorporates all of a municipality's street-related policies, including high level documents like its transportation master plan and official plan, as well as more focused strategies relating to stormwater management, utilities, road safety, and more. This section provides examples of how a Complete Streets approach can successfully incorporate often competing policies to create harmony at the street level.

Choose One: Mobility or Access

Complete Streets are also closely related to Vision Zero: A key design principle is that streets should be designed to serve a mobility function or an access function for vehicles — but not both. On mobility-oriented streets, the movement of people and goods is the priority, and there should be limited interactions between traffic and the surrounding environment – for example, by limiting private driveways fronting on these streets. On access-oriented streets, there is significant interaction with the environment, with vehicles frequently exiting or entering the roadway at low speeds.

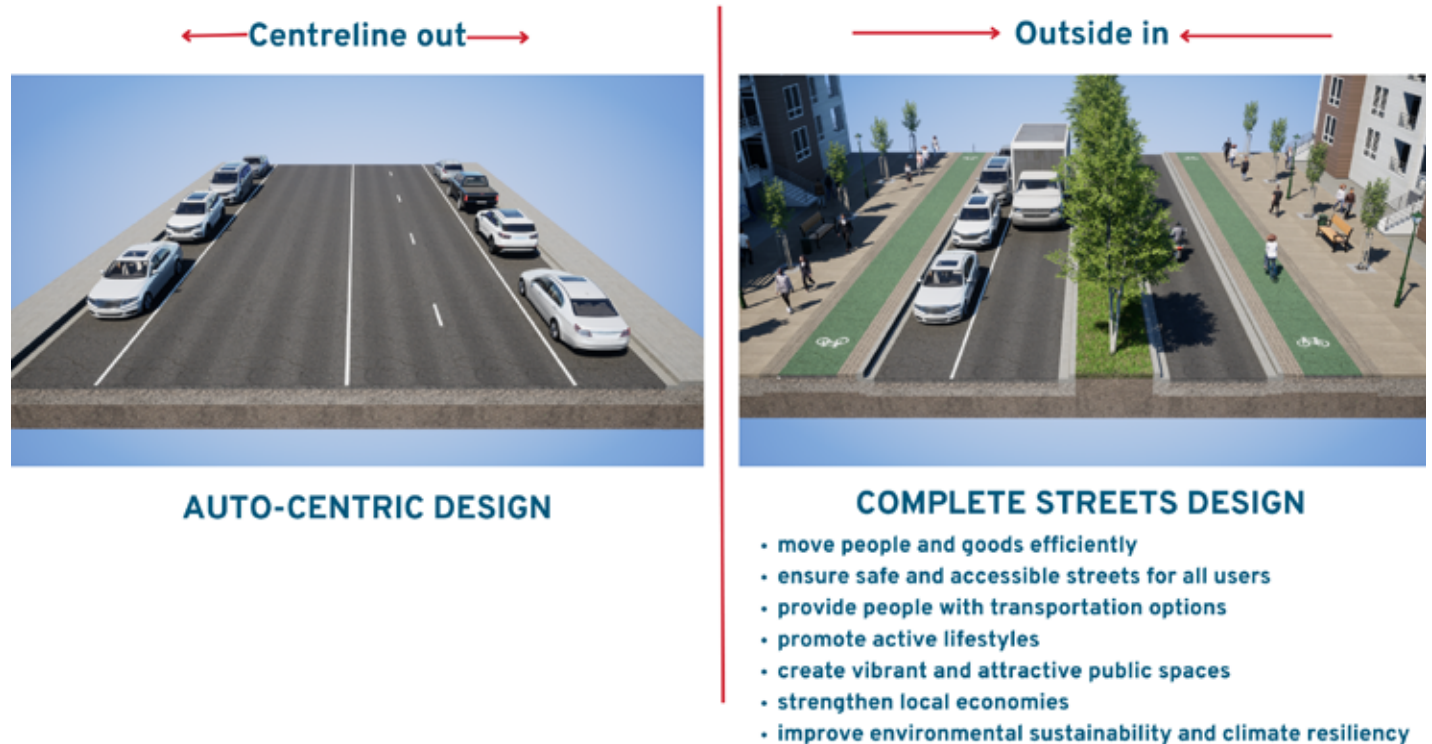


Figure 2: Street design goals have changed from the traditional “centreline-out” approach, which focused on vehicular travel and left little boulevard for anything else, to an “outside-in” approach which considers multiple city objectives and results in a more complete street



Figure 3: An example of a mobility-oriented Complete Street (Google Earth).



Figure 4: An example of an access-oriented Complete Street (Google Earth).

Both of the streets on the previous are examples of Complete Streets, but are incredibly different in their design, based on the difference between prioritizing mobility compared to access.

Achieve Harmony Between Transportation and Land Use Planning

Transportation and land use planning are often managed as separate entities. For example, an official plan may designate specific corridors or nodes as areas where mixed-use development is desired and pedestrians are intended to be prioritized, but a transportation master plan may classify the same street as an arterial roadway expected to move high volumes of vehicles at high speeds. Far too often these documents fail to speak to each other, the result being street-oriented mixed-use development along busy, noisy, vehicle-oriented roadways that fail to achieve the “pedestrian priority” intent.

The Complete Streets approach integrates land use and transportation planning to ensure that streets are built to complement existing and planned land uses. As an example, the City of Guelph’s Official Plan identifies intensification corridors where mixed-use development is planned, and its Transportation Master Plan acknowledges these areas by identifying them as “pedestrian priority areas” with basic design principles. As part of our work to develop the City of Guelph’s Complete Streets Design Guide, WSP is now bringing these objectives to life by developing design criteria and cross sections to realize the true potential of these streets to prioritize pedestrians and placemaking.



Find Alternatives to “Stroads”

Throughout North America, a common form of development features highly car-oriented land uses fronting onto high-volume multi-lane roads with frequent commercial driveway entrances. These streets, sometimes known as stroads (or a street/road hybrid), attempt to provide high degrees of both mobility and access simultaneously. The result is most often a street with very poor safety outcomes and with minimal accommodation for non-automotive modes of travel.



Figure 5: An example of a street that combines mobility and access functions, resulting in multiple high-speed conflict points.

The Complete Streets approach requires municipalities and designers to carefully consider how streets should evolve over time. A clear priority of either access or mobility – but not both – should be defined. If access is the priority, the street might evolve to feature denser, more street-oriented development, and greater complexity in its surrounding environment. Motor vehicle capacity may be reallocated to other purposes – for example, trading vehicle lanes for cycle tracks, wider sidewalks, planting zones, or on-street parking. And the operating speeds of the street may significantly decrease.

On the other hand, if mobility is the priority, the road should evolve to a less complex form over time, with driveways consolidated, access directed to adjacent streets, and interactions between the street and its surrounding environment being limited to intersections. This is not to say that development and intensification cannot occur in lands surrounding these roads, but simply that the development should not be oriented toward the road itself.

WSP Project: Toronto's Bloor West Bikeway Extension

Toronto's Bloor Street Bikeway is an example of a project that turned a road into an access-oriented Complete Street. WSP completed the design for a major extension of this corridor, working with the City of Toronto to repurpose peak-period vehicle travel lanes into protected bicycle lanes while maintaining street parking, supporting local businesses, and making it easier for people travelling by all modes to access destinations along the street.



Figure 6: Toronto's Bloor Street West after a Complete Street conversion to add permanent on-street parking and protected bike lanes. Seasonal street patios were also added..

2. Using Innovative Designs to Improve Comfort and Safety

Taking a Complete Streets approach lends the opportunity to discuss innovative design techniques to improve safety and accomplish other objectives such as improving the livability of a street. This section discusses three examples of leading-edge design treatments that are being incorporated into Complete Streets projects.

Continuous Sidewalks and Cycle Tracks

At typical North American intersections, when a sidewalk crosses a side street, it ramps down to the roadway. Though pedestrians have legal right-of-way in these situations, for the pedestrian this psychologically feels like crossing a vehicle space. Continuous sidewalks flip this priority, by maintaining a full-height, continuous sidewalk through the crossing and requiring vehicles to ramp up to sidewalk level on either side of the crossing. When a street includes both sidewalks and cycle tracks, the continuous crossing can include cycle tracks as well.

Continuous sidewalks are making their way into the Canadian context and built examples will soon be completed in multiple provinces including Ontario. WSP has been actively involved in supporting their design and implementation, including through the preliminary design of Scott Street in Ottawa, ON and 25th Side Road in Innisfil, ON, the development of Engineering Design Standards for Hamilton, ON, and participation in a TAC project to develop a Synthesis of Emerging Practice for continuous sidewalks.



Figure 7: Rendering of a continuous sidewalk at a T-intersection (Hamilton Complete Streets Design Manual).

Protected Intersections

Intersections pose a significant risk to vulnerable road users such as cyclists and pedestrians, and intersection design therefore is integral to the design of Complete Streets. Protected intersections are a design treatment that improve safety at intersections using a combination of geometric and operational elements. They help reduce crossing distances, improve visibility, and reduce the likelihood and severity of conflicts between motorists and vulnerable road users.

WSP has emerged as one of the leading Ontario firms in the planning and design of protected intersections. Our Active Transportation and Complete Streets team has been involved in the implementation of functional and detailed design as well as contract administration for over one hundred planned protected intersections across the province. Our team also authored the first design guidance for protected intersections in Ontario in the updated OTM Book 18, provided guidance for protected intersections in Hamilton's Complete Streets Design Manual, and is the lead author of Ontario's Protected Intersection Guide, expected later in 2023.



Figure 8: Rendering of a compact protected intersection (Hamilton Complete Streets Design Manual).

WSP Project: Ontario's Protected Intersection Guide

In response to a growing demand for guidance on designing protected intersections, the Ontario Traffic Council retained WSP to develop a Protected Intersection Guide catered to Ontario municipalities. The guide will capture latest best practice and lessons learned across Ontario, provide guidance scalable to all sizes of municipalities and budgets, and communicate design practices with a highly visual document. The guide is set to be completed in Summer 2023.

Slower Local Streets

In recent decades, local streets have often been built increasingly wide. Local street widths of 9 to 11 metres – enough for at least three full-sized lanes – can be found throughout many North American municipalities and are embedded in municipal engineering standards. These wide streets promote higher travel speeds, which often result in resident complaints and a need to retrofit traffic calming solutions shortly after a street's completion. Wide streets have been shown to be less safe, with an 11-metre-wide street experiencing a rate of nearly four times as many crashes as a narrow 7 to 7.5 metre street.¹

Narrower local streets align much more closely with Complete Streets objectives, and latest best practice calls for a return to the narrower street widths commonly found in older (pre-1940s) urban residential areas. Street widths of 7 to 7.5 metres support parking on one side and require some negotiation for space among vehicles travelling in opposite directions – a positive for local streets, where slow speed conditions are desirable. On streets without parking, widths can be reduced even further. WSP recommended the use of narrower local streets as part of Hamilton's Complete Streets Design Manual, and the City of Hamilton is now updating its engineering design standards to make these a standard component of new developments.



Figure 9: An example of a 7 m wide local street accommodating street parking, two-way bike travel, and one-way vehicle travel.

¹ Neighborhood Street Design Guidelines, State of Oregon. November 2000.
[neighborhood_street_design_guidelines_oregon.pdf](http://nacto.org/neighborhood_street_design_guidelines_oregon.pdf) (nacto.org)

3. Complete Streets as a Change Management Tool

At its core, any Complete Streets process is an exercise in change management for a municipality and its residents. This section details some of the tools, techniques, and processes that have proven effective during recent Complete Streets projects to bring a community's big ideas about their priorities for their mobility system to life.

Create Better Outcomes through Community-Based Collaboration

A Complete Streets process allows for a more deliberate discussion about the ways that the allocation of space communicates the values of a community and helps internal and external partners to be more specific about what priorities and needs should be expressed through design. This process recognizing the central role that streets play as public spaces in our communities, integrating new perspectives and priorities.

Traditional street design processes have not made space for the kinds of collaboration and compromise that are the hallmarks of an effective Complete Streets process, so introducing new perspectives and priorities will inevitably result in some discomfort. When delivered effectively though, the effort of developing a Complete Streets process can create better outcomes through more collaborative decision-making within a community.

Learn What Matters

If you want to change how streets are designed, you need to understand the values that motivate a municipality's internal partners who build, maintain, and operate within those streets. Stakeholder Listening Sessions give you an opportunity to identify what really matters to the key players when it comes to Complete Streets processes.

Listening sessions should be held early in any Complete Streets project to build a foundation of understanding about what matters to the various people involved. Questions that should be asked include:

- What metrics do you use to measure success?
- What elements of street design do you view as essential?
- What aspects are you opposed to, or may require additional convincing?
- How have you felt your feedback has been incorporated in previous projects?
- What would you change about recent outcomes?

These kinds of questions allow a project team to get a feel for how the final product will be received and, more importantly, how it will be implemented. If key players see their feedback and values reflected in the final product, they are much more likely to serve as champions for its implementation.

Engage Equitably

Mobility is a Human Right, as defined by the United Nations Universal Declaration of Human Rights (1948). Access to that right, however, has not been applied equally within our communities, especially as infrastructure for cars has expanded and created a de facto requirement of car ownership to access employment and other daily amenities across North America.

When developing any Complete Streets materials, practitioners need to carefully consider how they can ensure that those who are closest to harm (or the potential for harm) are closest to power. In practice, this means identifying populations whose mobility has been constrained by previous transportation planning processes and reaching out to them to better understand their needs. In the context of a Complete Streets process, there are a few best practices that should serve as the foundation for any project.

Define equity for your community.	Who is being served by the existing mobility system? Who is being left out? Understanding how People with Disabilities, Seniors, Children, Communities of Colour, Indigenous Peoples and other equity-deserving communities are being impacted by your community's existing mobility system will help to identify whose voices need to be heard.
Meet people where they are.	Many of these populations have a low level of trust in the transportation planning process, and who can blame them? For years their needs have been ignored or, at best, included as an afterthought. It will take time and effort to build trust, which means that you need to show up multiple times on their terms, not on yours.
Value their lived experience	When you gather feedback from priority populations, don't just lump it into the feedback you've gathered during your engagement process. Valorize what is being said by the communities who are being most impacted by the existing system. Further, consider establishing honoraria for participants from equity-deserving communities to recognize the value of their feedback and the added burden being placed on them to participate.
Hold yourself and the process accountable.	While not all feedback from equity-deserving communities will make it into the final product, to continue to build trust with those communities it is important to clearly explain what decisions were made, what considerations went into those decisions and how the outcome was affected by the participation of those equity-deserving communities.

Translate Policies into Actions

Policies are aspirational in nature and cannot always be directly applied to every situation; in reality, streets are often too narrow to fit all desired elements. Implementation tools developed as part of Complete Streets projects help municipalities and their consultants implement the policy's intent to a much wider range of contexts.

As part of Hamilton's Complete Streets Design Manual, WSP developed an audit tool that assesses the completeness of street segments and help designers identify which Complete Streets elements are most important to prioritize. The tool is interactive, enabling users to select a Complete Streets typology, evaluate current or proposed street conditions for each element, and compare them to the desired conditions for that typology.

Another strategy to translate Complete Streets policies into results is to codify them in a municipality's engineering standards.

WSP Project: Hamilton's Roadway Engineering Standards Update

Following the publication of the Hamilton Complete Streets Design Manual, WSP is now working with the City to further support the implementation of Complete Streets through an update of its engineering standards, thus ensuring that future road works will be performed in line with Complete Streets principles. Additionally, WSP is working with the City to develop training on the Complete Streets Design Manual to ensure that staff become familiar with the manual and learn how to apply Complete Streets principles to future projects.

	Pedestrian Realm	Cycling Facilities	Transit Service	Through Movement	On-Street Parking	Green Infrastructure
Desired Condition for Complete Streets Typology	3	2	1	1	3	4
Current / Proposed Condition	2	1	1	4	2	2
Exceeds / Fails to Meet Priorities	-1	-1	0	3	-1	-2

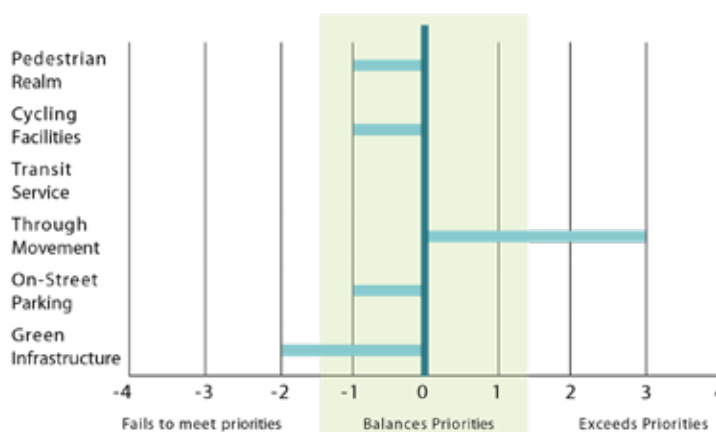


Figure 10: Example of an audit tool used to compare the existing and desired conditions for a Complete Streets project (adapted from Hamilton Complete Streets Manual). Source: WSP Planning Team

What's Next? More with Less

Complete Streets projects have typically sought to expand mobility options through the addition of new facilities. Often the addition of cycling facilities, sidewalks, trails or transit-priority spaces are done through roadway widenings, adding elements to the existing right of way. This approach of expanding choice through addition, however, has its limits.

In built-up urban areas where space is already limited, the addition of new elements within an existing right-of-way quickly bumps up against the limits of the available space on those corridors. As more cities begin to adopt Complete Streets policies and design practices, the success of those projects will be defined by how communities choose to allocate the limited amount of space available on our streets in the areas where the potential for multi-modal mobility is highest. The fundamental truth of transportation planning in the 21st century is that, in many North American cities, we are approaching the limits of automobile-based mobility. As more people move into our growing communities, if we continue to see a similar percentage of people using cars to get around, we will simply run out of space to accommodate them, and our communities will be even more congested than they are today.

The fundamental truth of transportation planning in the 21st century is that, in many North American cities, we are approaching the limits of automobile-based mobility.

Reallocating space within the densest part of a community—such as adding a bus lane through a downtown core, adding cycle tracks along a commercial street, or building a new multi-use path along a waterfront—will cause short-term pain as it exacerbates congestion. But without that reallocation – from a space that can move a thousand people per an hour to one that can move over seven times that amount – congestion will occur in that space regardless. For communities that want to keep their residents moving, that want to provide mobility choice to all and that want to plan for a “Future Ready” mindset, applying a Complete Streets approach to existing corridors provides one of the most effective, proven ways to do more with less.

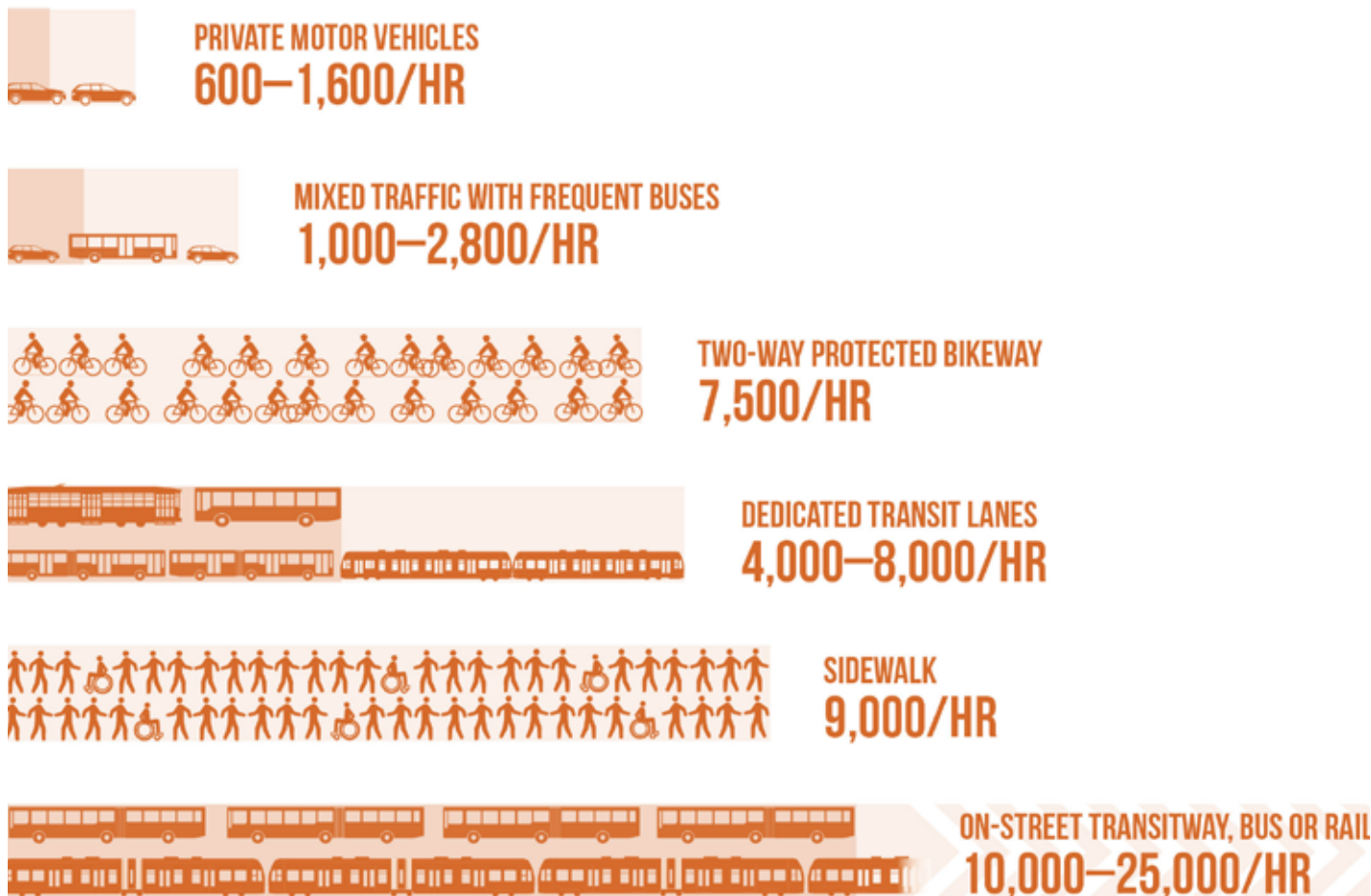


Figure 11: The capacity of a single 3 metre lane by mode at peak conditions with normal operations.
Source: NACTO.

Why your municipality Why Your Municipality Should Consider a Complete Streets Approach

There is no single way in which to make a street ‘complete’; it depends on many factors including the character, context and function of each unique street. WSP’s experience is that municipalities can take their Complete Streets approach to the next level by developing Complete Streets design guidelines. These guidelines can help ensure that all streets are planned, designed, built and operated with all users in mind. They facilitate important conversations amongst all stakeholders about how to best prioritize trade-offs for a given street’s limited space, helping to shape a City where people feel comfortable and connected. Ultimately, Complete Streets guidelines can inform updates to a municipality’s engineering standards, enshrining Complete Streets design principles into every street design project.

About WSP's Active Transportation and Complete Streets Practice

WSP has significant experience in developing Complete Streets Design Guidelines in Ontario. In 2019, we worked closely with the City of London to produce their award-winning Complete Streets Design Manual, and we have continued to iterate and improve upon the approach to that project with recent work in the City of Hamilton, the City of Greater Sudbury, Niagara Region, and currently the City of Guelph. In each community where WSP has led the development of Complete Streets Design Guidelines, the approaches identified in those manuals are already resulting in meaningful transformations in streets designs. Leveraging our past experience in Complete Streets Design, our team is able to incorporate lessons learned from past plans and other industry best practices to develop comprehensive, innovative, and well-supported plans for each unique community.



Figure 12: A collection of the Complete Streets guidelines to which WSP has contributed.

As a multi-disciplinary firm with specialists in complete streets design as well as active transportation, civil engineering, transportation planning, landscape architecture, and community engagement, we have the expertise and resources to develop industry-leading plans and projects that will meet the needs of the communities we work with. We bring a Future Ready, collaborative mindset to every assignment, working across departments within municipalities to identify the best path forward, and aligning our work with community objectives.

Get in touch with our team today



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