# CSDM

LONDON COMPLETE STREETS DESIGN MANUAL
EXECUTIVE SUMMARY

Streets are vital components of all cities. They allow us to get to work and school, run errands, participate in cultural and recreational activities, and live our daily lives. They are the connective tissue of our city and facilitate commercial and social activity. They also contribute to a beautiful cityscape and provide the pathway for an evening stroll or a morning bike ride. They must allow trucks to deliver goods to our stores, enable our fire, police and paramedic services to respond to emergencies and save lives, provide the network for London Transit Commission (LTC) buses to serve Londoners, and provide critical corridors for electricity, telecommunications, water, and natural gas utilities.

The complete streets approach is about considering the needs of pedestrians, cyclists, transit riders, and motorists and building streets that balance these needs and prioritize road safety. Beyond these mobility functions, the complete streets approach prioritizes "placemaking", the creation of places in our streets that contribute to healthy ecosystems, social inclusion, and vibrant business activity. These priorities need to be balanced with the need to accommodate critical utilities and allow for efficient maintenance and operations.
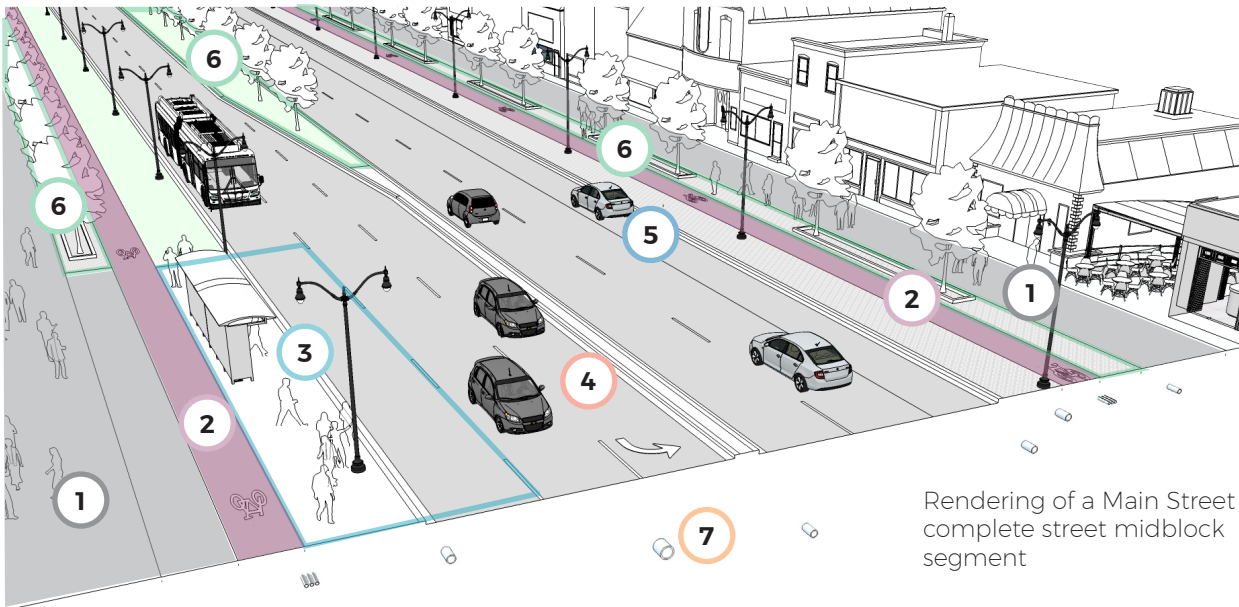
Rendering of a Main Street complete street midblock segment

1 Walking

Greater sidewalk width where higher volumes of pedestrians are expected, higher quality design elements in the public realm, lighting and universal accessibility features to ensure ease of use

2 Cycling

Consideration of on-street cycling facilities and increased cyclist priority if on the cycling network

3 Transit

Comfort and amenities for waiting passengers as well as design elements to speed up transit service

4 Through-Movement (Vehicles and Freight)

Ensure efficient through-movement of vehicles while balancing priorities such as building a sense of place and support for all street users

5 Parking

Provision of adequate on-street parking where appropriate

6 Green Infrastructure

Design features that promote environmental sustainability

7 Utilities

Accommodation of utilities above and below ground

The role of the Complete Streets Design Manual (CSDM)

This manual is a transformative tool that will guide the way streets are designed in London. It serves as a valuable resource for integrating the various functions of our streets and has been written for all practitioners, advocates and citizens involved in the street design process.

A Citizen's Guide has been included in the CSDM. It provides an overview of what complete streets are, why London is taking this approach, supporting policies, and ways of getting involved.

Why Complete Streets?

Preparations are underway to support a new era of rapid transit and city-building and the City of London is encouraging the design and development of streets that more effectively meet the needs of a wider variety of users. Cycling, walking, and public transit are key components of this strategy, as is improving health and activity levels, reducing traffic congestion and supporting the character and legacy of London's neighbourhoods.

The City's official plan, The London Plan, as well as the transportation master plan (TMP), Smart Moves, provide clear policy direction that the planning and design of future streets, as well as the renewal of existing streets should be supportive of all road users, and be "complete." Furthermore, in 2017 the City of London adopted the Vision Zero principles, which are based on the notion that no loss of life as a result of traffic-related collisions is acceptable.

The following are key policy priority areas for complete streets:

Strive for Vision Zero

The City will use an evidence-based decision-making framework to assess, guide, and improve traffic safety. The framework will take into account the interaction of all aspects of the transportation system.

Create pedestrian-friendly environments

The City will work to create neighbourhoods where residents are readily able to reach essential destinations such as grocery stores, parks, and transit stops by foot. Streets will be designed such that there is a sufficiently wide pedestrian clearway, frequent crossing opportunities, accessibility features such as audible signals and tactile walking surface indicators, and various public realm amenities such as seating, street trees, and waste receptacles.

Consider all users and functions of a street

In addition to accommodating pedestrians, cyclists, transit riders, and motorists, streets must also be designed for maintenance and snow clearing operations, curbside waste collection, and to accommodate various above and below ground utilities.

Integrate complete streets design principles into the decision-making process

Several tools were developed to ensure that all users and functions of a street are considered whenever a street is constructed, reconstructed, or rehabilitated.

Coordinate built form decisions with transportation decisions

Planning and design of streets will incorporate and be responsive to the appropriate use, intensity, and form along each street classification, as set out in The London Plan.

Engage residents and stakeholders in the Complete Streets process.

Guided by the CSDM, the City will inform and engage residents of the multi-faceted nature of street design, as well as engage stakeholders and provide practitioners and decision makers with appropriate information such that design efforts are coordinated and the City's complete streets vision can be achieved.

THE VISION FOR COMPLETE STREETS IN LONDON

London's vision for complete streets is informed by policies 211-218 of The London Plan as well as best practices in the field of complete streets planning and design. The following statement captures the overarching vision for the London Complete Streets Design Manual:

1 London's streets will be designed and upgraded to be more complete.

2 This means that streets in London will meet the needs of a wide range of users as defined by the place type, feature high-quality pedestrian environments, and integrate seamlessly with transit services, cycling networks, and automobile users.

3 London's streets will be designed for connectivity and support the use of active and sustainable modes of transportation, and also strongly consider the needs of utility and maintenance providers within the right-of-way.

4 With this balance of modes, users, and places in mind, all future construction, reconstruction, and rehabilitation projects for streets – both large and small – in London will be influenced by principles of "completeness" in both planning and design.

This vision is the foundation for the design guidance and process tools contained in this Manual. The City's core principles for complete streets build directly upon this vision.

COMPLETE STREETS DESIGN PRINCIPLES

Design principles help establish consistent decision-making parameters when undertaking complete street design activities. The City's design principles for complete streets include:

- **Prioritize safe and accessible options for people** such that on any street, regardless of the priority mode, all users should feel safe. This reflects the reality that pedestrians and cyclists are more vulnerable than vehicular road users, and that supporting active modes of transportation often results in health benefits, to both individuals and the community. Streets should be designed to be inclusive and accessible and that the various needs of users of all ages and abilities are accommodated to the maximum degree possible.

- **Ensure context sensitivity** such that land use and the adjacent transportation infrastructure are integrated where appropriate and supportive of each other. The design recommendations for each street type recognize important neighbourhood characteristics (including established land uses and functions). This includes the consideration of the civic functions performed by different streets in London such as Gateway Streets, Rapid Transit Boulevards, and designated Heritage Conservation Districts.

- **Embed sustainability** into the design of streets through minimizing environmental impacts and emissions and supporting energy efficiency. This primarily includes prioritizing active modes of transportation such as walking and cycling. Ecological and urban resilience features such as trees, planters, vegetation, and low impact development elements that facilitate groundwater recharge should also be considered. Decisions should consider the lifespan of the street, and be cost-effective, avoiding

undue short- or long-term financial burden on the City for construction, operations, and maintenance.
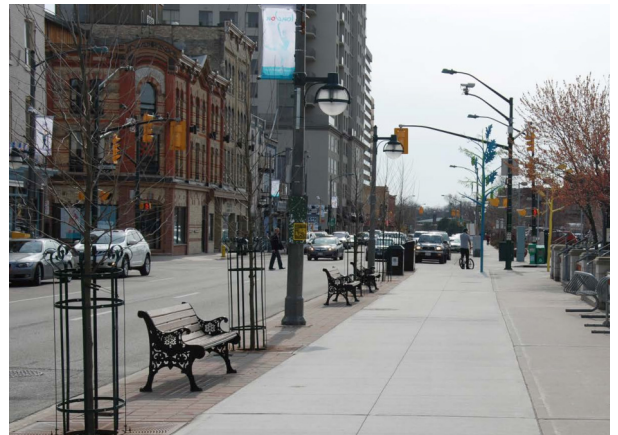
- **Prioritize connectivity** by designing complete streets and communities with block sizes, building orientations, neighbourhood configurations, and street patterns that maximize connectivity for pedestrians, cyclists, and transit users. This includes consideration of new connections and greenways that allow more residents to be within a ten minute walk of major civic and community facilities.

- **Emphasize vitality** such that new and renewed streets attract pedestrians with an enhanced sense of place, benefiting local commuters, businesses, and property owners. Whether out for a relaxing stroll, running errands, or meeting with friends, pedestrians bring economic and social activity to London's streets.

DESIGN GUIDANCE

Complete streets design features enhance the safety, comfort, and convenience of travel for each user group and support design for place-making, green infrastructure, and utilities. Readers who are less familiar with a specific aspect of street design, such as the design of pedestrian facilities for example, may find the relevant section of Chapter 2 to be a helpful introduction. For readers with more expertise in a specific area, the associated section may serve to highlight how street design is evolving to become more complete.

Pedestrian realm and place design considerations

- Accessibility, comfort, connectivity, and safety;
- Sufficient clearway widths to meet demand, provide pedestrian comfort, and enhance the public realm;
- Intersection and midblock crossing design treatments including geometric design guidance, pavement markings, signage, and lighting systems; and
- Public realm amenities such as lighting, urban tree canopy, and seating.

Cycling facility design considerations

- Context- and user-sensitive facility types that are appropriate for adjacent motor vehicle speeds and volumes, land use, and parking, among other factors;
- Continuity and wayfinding to establish a cohesive network of cycling routes; and
- Supportive facilities such as bicycle parking, left turn queue boxes, and property access crossing treatments.

A variety of **pedestrian amenities** including seating, pedestrian-scale lighting, waste receptacles, and trees positioioned adjacent to the pedestrian clearway in London.

Conventional bicycle lane in London.

Transit facility design

- Prioritization of transit vehicles on all transit routes within the Primary Transit Area (PTA) through dedicated lanes, queue jump lanes, and transit signal priority; and

- A comfortable user experience at stops through the integration of seating, lighting, shelter, and information.

Motor vehicle and freight facility design

- Selection of an appropriate design vehicle and design speed based on context and consideration for vulnerable road users; and

- Appropriate design parameters such as lane width, curb radii, intersection control, curbside parking and loading, and traffic calming.

Green infrastructure considerations

- Treatments to reduce, delay, and treat stormwater runoff, mitigate the urban heat island effect, and support sustainable transportation choices; and

- Appropriate integration of street trees and other plantings.

Utilities and municipal services considerations

- Integrating surface-level priorities and uses with below- and above-grade utility requirement; and

- Facilitating access to below-grade utilities.

Design guidance for pedestrian, cycling, transit, and motor vehicle facilities is provided in Chapter 2 of the CSDM. Chapter 2 also contains a review of green infrastructure design and utility integration.

An LTC bus crossing a **raised intersection**.

A **planted median** provides aesthetic and stormwater management benefits (London).
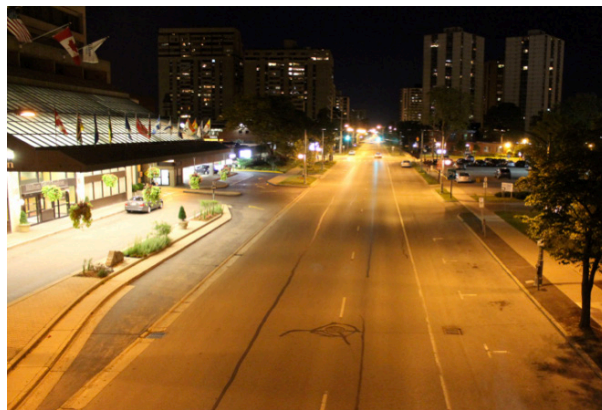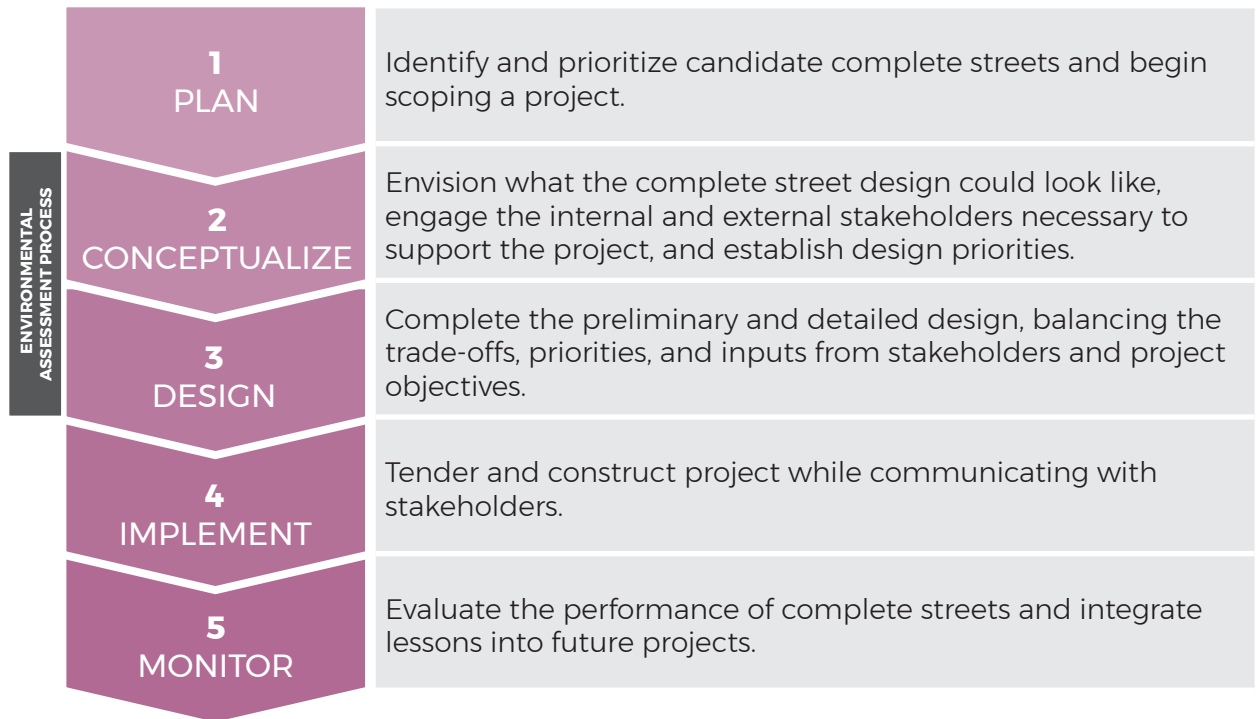

Before/After LED lighting upgrade shown (King St in London). LEDs are more energy efficient and provide better quality lighting.

THE DESIGN PROCESS

Achieving the City's complete streets vision requires a comprehensive process that spans from the initial planning and prioritization stage to project implementation and monitoring. City staff and engineering consultants will be incorporating complete streets elements into capital projects for new construction, reconstruction or rehabilitation.

The following workflow summarizes how staff and consultants will integrate complete streets into each stage of the planning, design and implementation process. This workflow draws on existing processes such as the Capital Coordinating Committee (C3) Process and the Environmental Assessment process and indicates how a complete streets lens can be applied at each stage.

ENVIRONMENTAL ASSESSMENT PROCESS	Stage	Description
	1 PLAN	Identify and prioritize candidate complete streets and begin scoping a project.
	2 CONCEPTUALIZE	Envision what the complete street design could look like, engage the internal and external stakeholders necessary to support the project, and establish design priorities.
	3 DESIGN	Complete the preliminary and detailed design, balancing the trade-offs, priorities, and inputs from stakeholders and project objectives.
	4 IMPLEMENT	Tender and construct project while communicating with stakeholders.
	5 MONITOR	Evaluate the performance of complete streets and integrate lessons into future projects.

Street design projects that are led by developers are subject to the City's File Manager review process for development applications. This process ensures that complete streets design principles are incorporated into new development sites and subdivisions. The five-stage complete streets design process (summarized above) and the File Manager review process for development applications (included in Chapter 3) have been integrated at key review milestones to ensure that new development plans embrace complete streets principles.

Chapter 3 includes several tools to assess the relative completeness of a street, scope street improvement projects, make design decisions in constrained corridors, review conceptual complete street designs, and engage stakeholders. Practitioners can use this chapter to ensure that complete streets considerations are integrated at the appropriate project stage and to understand expectations for the review process.

An example assessment using the Complete Street Audit tool is shown below. This tool allows staff and designers to assess existing or proposed conditions of a corridor based on the relative priority of each use for the particular street type.

STREET TYPE | Rapid Transit Boulevard

| |
|---|
| Rapid Transit Boulevard |
| Main Street |
| Urban Thoroughfare |
| Civic Boulevard |
| Neighbourhood Connector |
| Neighbourhood Street |
| Rural Thoroughfare |
| Rural Connector |

1 Select street type

2 Rate street elements

STREET TYPE | Neighbourhood Connector

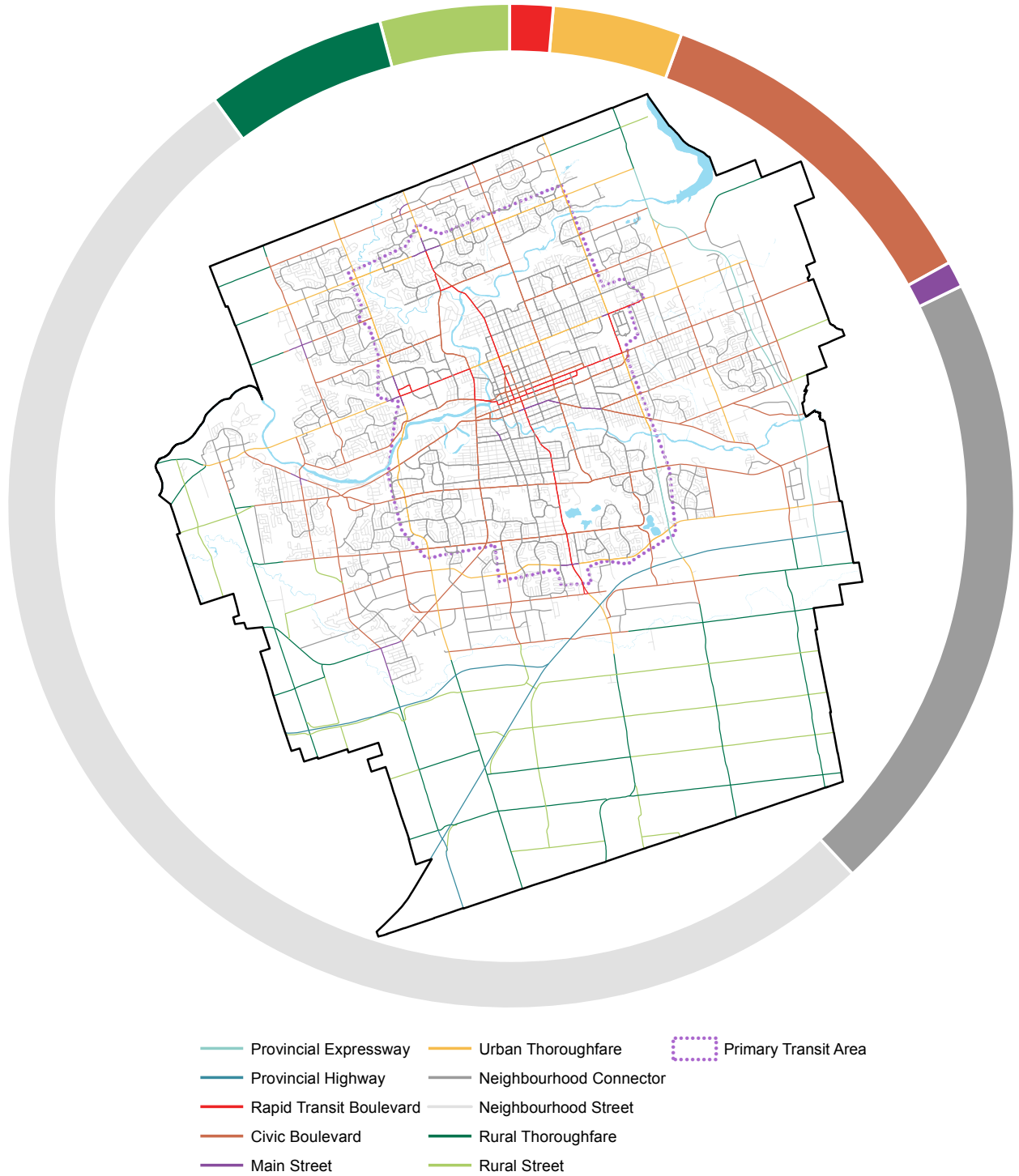|	Pedestrian Realm	Cycling Facilities	Cycling Facilities (if on Cycling Network)	Transit Service	Through Movement (Vehicles and Freight)	On-street Parking	Green Infrastructure
Priority Level	5	3	4	3	2	3	4
Current Conditions (user input)	2	1	1	3	3	2	2
Exceeds (+) / Fails (-) to Meet Priorities	-3	-2	-3	0	1	-1	-2

3 Results for Neighbourhood Collector
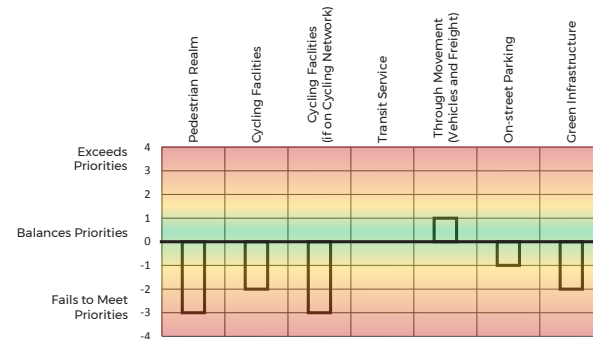
TYPES OF COMPLETE STREETS

Streets provide both a mobility function and a place function. The mobility function is about moving people whereas the place function is about attracting people. The relative importance of these two functions varies for each street.
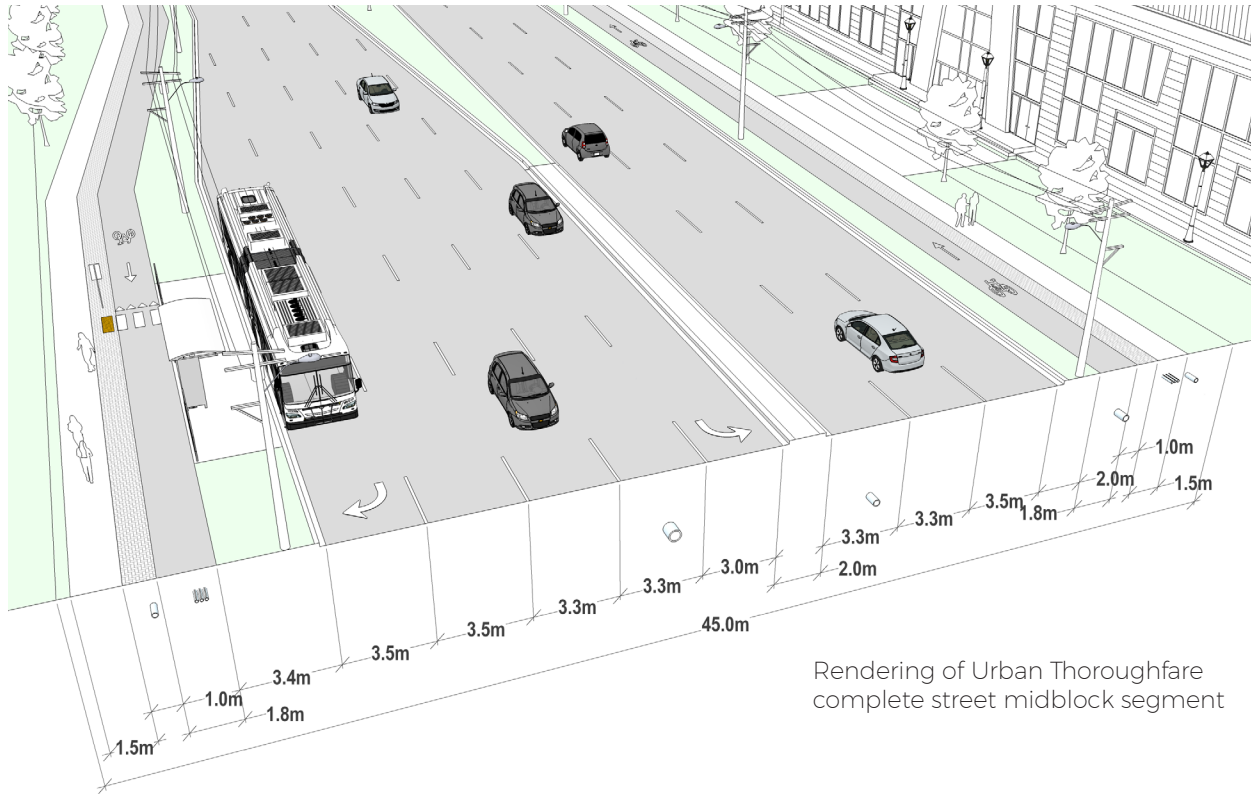
The London Plan designates the street type for each street in the city.

— Provincial Expressway	— Urban Thoroughfare	⬚ Primary Transit Area
— Provincial Highway	— Neighbourhood Connector	
— Rapid Transit Boulevard	— Neighbourhood Street	
— Civic Boulevard	— Rural Thoroughfare	
— Main Street	— Rural Street	

Map of complete street typologies for the City of London

Note: This figure was draft at the time this manual was prepared and is subject to appeal and revision.

Some streets, such as Neighbourhood Streets, provide a quiet environment where neighbours get to know each other on the sidewalk and kids can play or learn to ride a bike. Other streets, such as Rapid Transit Boulevards or Main Streets, are bustling with activity, lined with shops and businesses, draw tourists, and offer a broad range of amenities. Still other streets, such as Urban or Rural Thoroughfares, connect different parts of the City and give priority to the mobility function. While each street is unique, many streets share common features, and a street typology is a useful way of thinking about streets with similar mobility and place functions.


Rendering of Urban Thoroughfare complete street midblock segment

Chapter 4 provides guidance for each specific street type, as defined in the London Plan. In each section of this chapter, typical configurations, design treatments and amenities are illustrated with a three-dimensional rendering, such as the Urban Thoroughfare above. This chapter incorporates the general guidance from Chapter 2 and indicates how it may be applied for a specific street type. This rendering acts as a starting point for complete street conceptualization and design, showing how the space in the right-of-way should be allocated and how individual street elements are integrated to form a complete street. These diagrams include both the above ground features of a street that Londoners are readily familiar with, and subsurface utilities which, while less visible, are an important consideration in the design of a complete street. The accompanying text provides design parameters and considerations for pedestrians, cyclists, transit, motorists and freight, green infrastructure and utilities. Context is provided on why specific design elements were selected and when it may be appropriate to consider an alternate configuration. Practitioners will find this to be a useful starting point in the early stages of a street design when typical cross sections are being developed.

COMPLETE INTERSECTIONS

Intersections connect streets and allow users to navigate through the street network. They can serve as hubs, gateways, and transfer points and allow adjacent land uses to benefit from the connectivity to multiple corridors. Due to the overlapping paths of the various movements and modes, intersections also have greater potential for conflict than mid-block locations. With eight different street types in London, and many more contextual factors that affect intersection design, each individual intersection is unique.

Chapter 5 provides guidance on the design of intersections. The first part of this chapter outlines several principles for improving safety and overall operation of intersections. Since there are many possible combinations of street types at intersections, five representative examples are illustrated in the subsequent sections of the chapter. The examples address different forms of intersection control including roundabouts, signalized intersections, and stop controlled intersections. Practitioners will find the principles and examples in this chapter to be a helpful resource when undertaking intersection design or assessing potential operational improvements for intersections.
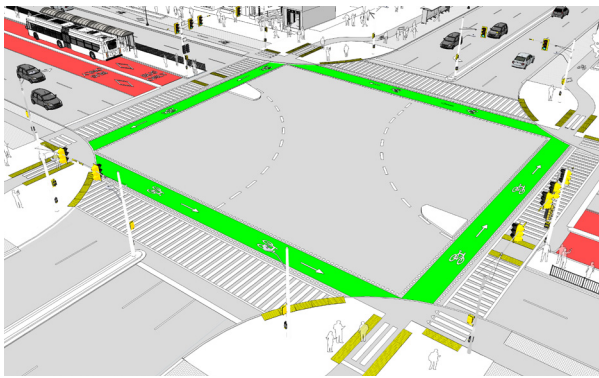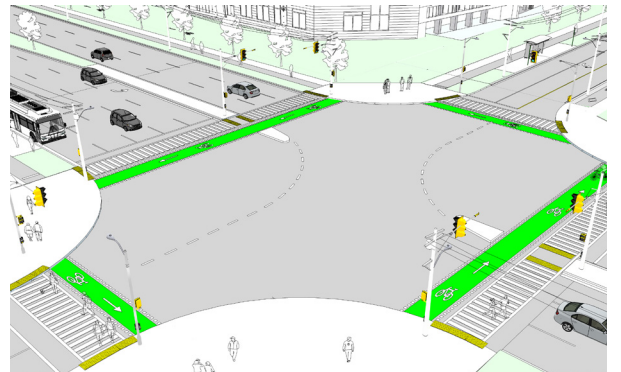

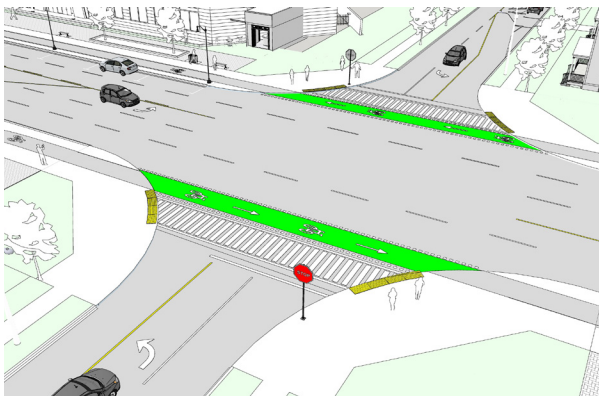Rapid Transit Boulevard Intersecting a Main Street
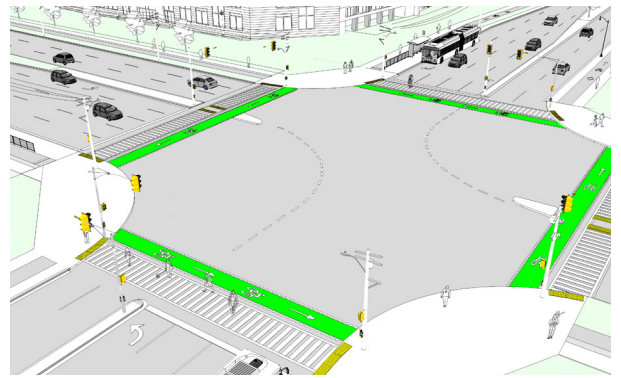
Urban Thoroughfare intersecting a Civic Boulevard (Signalized)
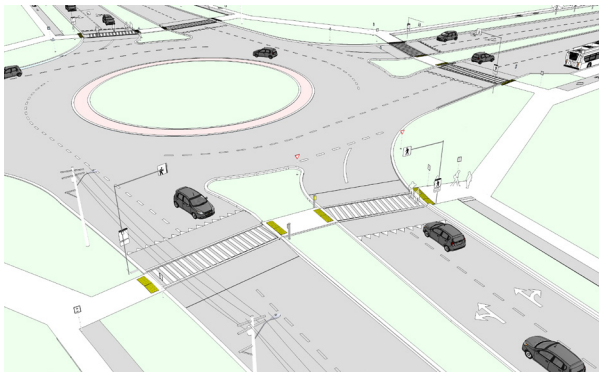
Urban Thoroughfare Intersecting a Civic Boulevard (Roundabout)

Urban Thoroughfare Intersecting a Neighbourhood Connector

Civic Boulevard intersecting a Neighbourhood Street

MONITORING

The complete streets process is informed by data and thorough review of existing and proposed conditions. Baselines can be established for existing streets to determine how they are performing and how they can be improved. The usage pattern of a street should be explored to inform existing, potential, and unmet demand. As the City moves forward with various completes streets projects, key lessons should be captured and integrated into future projects as appropriate. Metrics and monitoring activities are recommended along the key themes of mobility, connectivity, vitality, safety, accessibility, and sustainability. These monitoring activities include.

- Measuring performance through **multi-modal level of service (LOS)** analyses for intersections, street segments, and facility corridors;

- Measuring connectivity with **spatial analysis tools;**

- Measuring vitality by studying **public life** and tracking **retail sales;**

- Monitoring safety through **network screening** and **road safety assessments;**

- Reviewing accessibility and universal design elements of London's street network such as tracking **progress in implementing accessible curbs or transit stops; and**

- Tracking London's resilience and response to sustainability challenges through **emissions models**, tracking **non-auto modal share**, tracking **stormwater retention capacity and facilities**, and monitoring **tree canopy coverage**.

Chapter 6 in the CSDM focuses on monitoring. Practitioners should refer to this chapter during the preliminary planning phase of a project to determine appropriate baseline data collection strategies, and again after a project has been implemented to evaluate its performance.