FEBRUARY 2019
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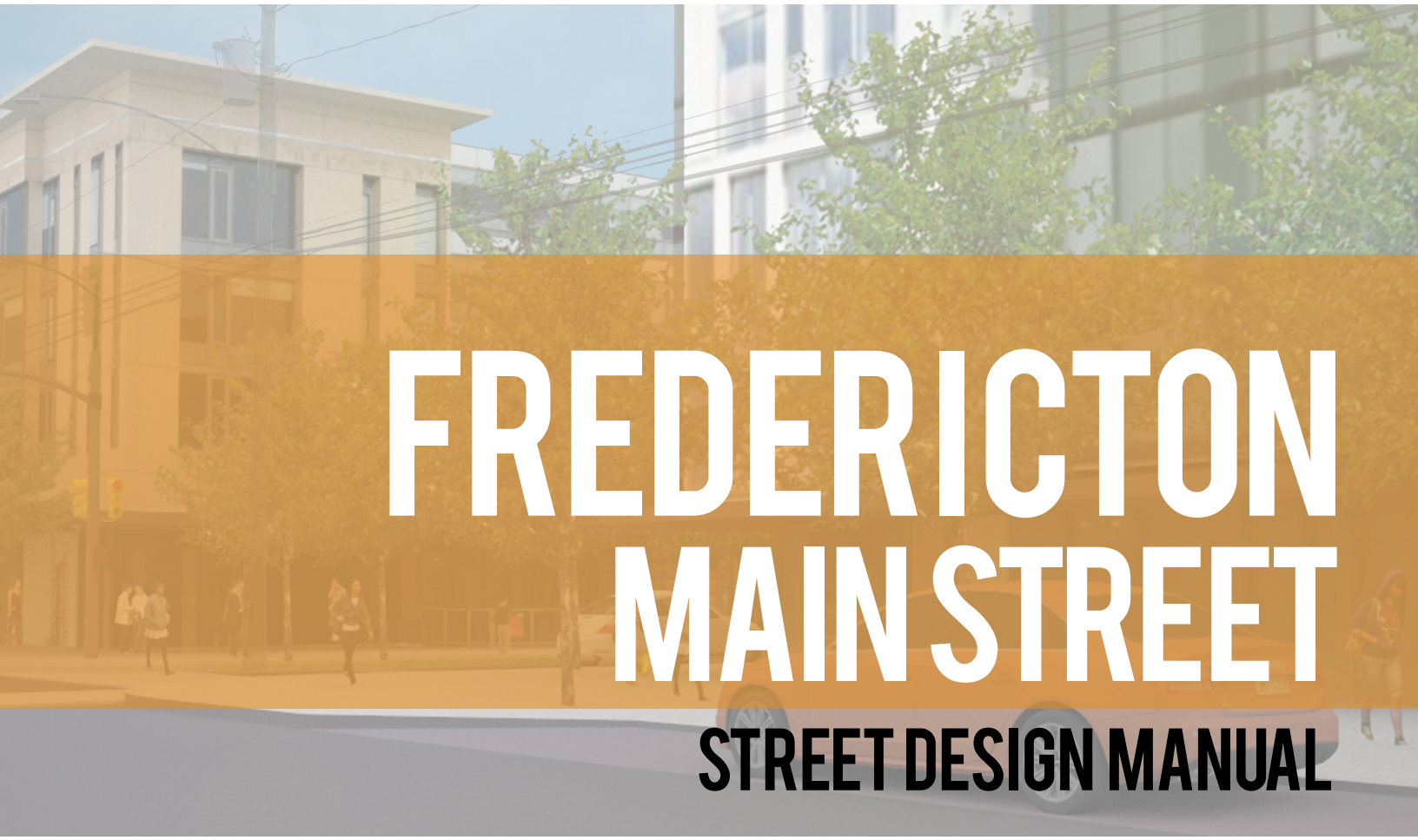


FREDERICTON MAIN STREET

STREET DESIGN MANUAL

Fredericton

The Planning Partnership

Contents

1.0 Introduction

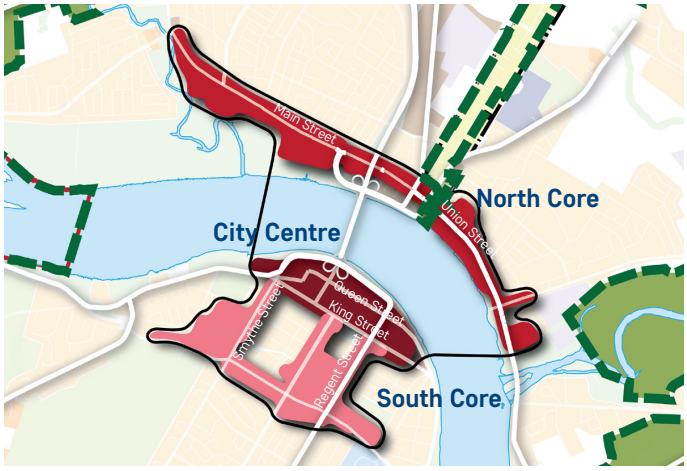
1.1 Vision

"The re-imagining of Main Street offers an unparalleled opportunity to strengthen and link Fredericton North through the integration of local neighbourhoods, trails, parks, waterfront, and open spaces. Main Street seeks to become a successful, attractive and vibrant place – a major attraction in this part of the City, offering a variety of living and shopping choices within a livable mixed use environment. The success of Main Street will be in developing it as a desirable place to invest and grow, where people of all ages want to live and play, and where an adaptable and skilled workforce can be found."

(*Main Street Urban Design Plan*)

Main Street has a narrow road feeling, a single lane of traffic in each direction with a centre turn lane. The right of way has not been widened significantly over time. However, the street lacks definition, in part due to the suburban development along it, but also because of an underdeveloped public realm. Street trees and pedestrian amenities are sparse.

Main Street will renew itself as a vibrant spine, joining Union Street, to become the focal point of the North Core growth area envisioned by the Fredericton Growth Strategy.

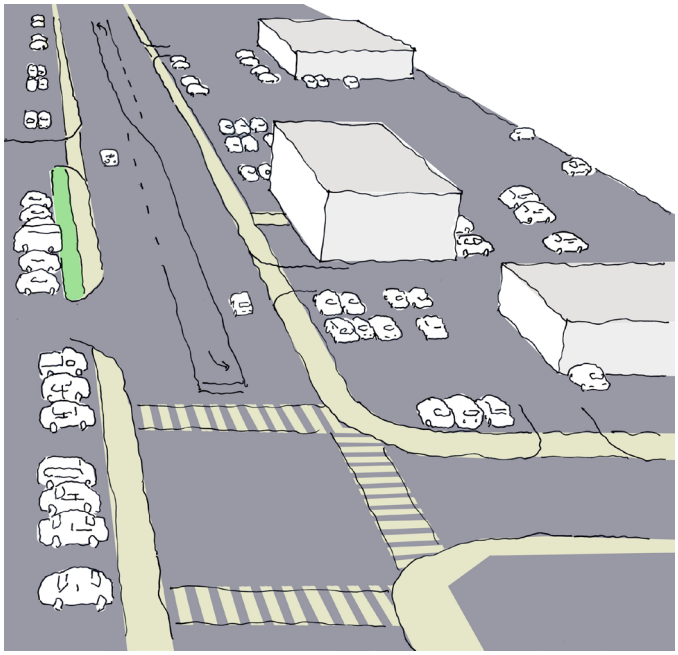


The Fredericton Growth Strategy designates Main Street as a key part of Urban Core growth to the year 2041.

This will be accomplished by a fundamental shift in mindset: from a place that caters first to vehicles, to a place that caters first to pedestrians. Main Street will prioritize infrastructure for pedestrians, including:

- maintaining the street's narrow character;
- providing broad tree-lined sidewalks;
- adding frequent crosswalks;
- providing seating, shelter and other pedestrian amenities along the street;
- ensuring vehicular design characteristics support the vision (slower design speeds, fewer and narrower driveways, rear access);
- orienting new buildings to the sidewalk, not to parking lots;
- establishing a continuous street wall as new buildings fill in, side-by-side, over time; and
- increasing the mix of uses along the street.

Transformation of Main Street

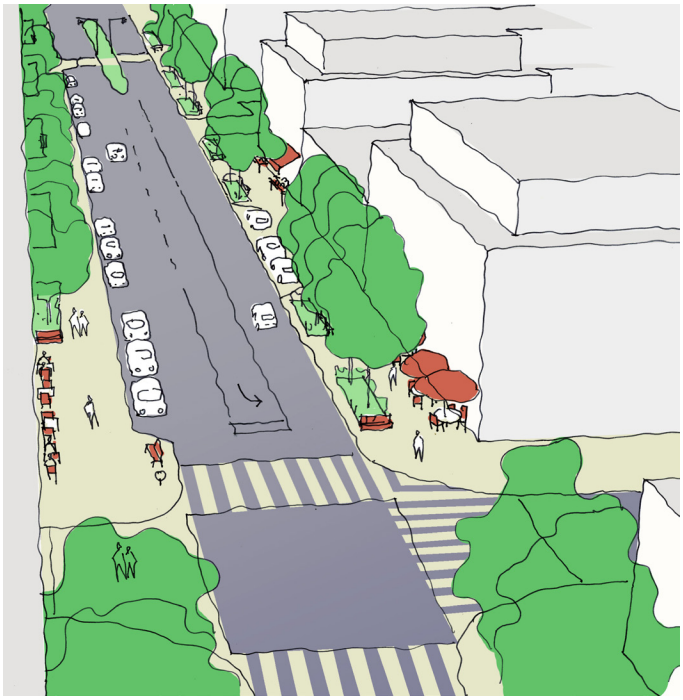


1 Existing Conditions

In many places along Main Street, commercial buildings are set back from the street edge, with large surface parking areas in front of them and between other buildings. Sidewalks are narrow, and there is little landscaping within the right of way.

2 Streetscape Improvements

The allocation of space within the right of way will be reassigned to support a pedestrian transformation. Boulevards will be reconfigured to include generous sidewalk zones and new planting zones. New street trees will have an immediate impact in transforming the street's visual character, creating a well-defined green corridor. A dedicated on-street parallel parking lane will be provided to serve as convenience parking for businesses and buffer the sidewalk. Pedestrian crosswalk locations will include street furniture and planting that help to define a safe crossing and contribute to the street's unique visual character.



3 New Buildings

When new construction occurs on vacant lots or through the redevelopment of existing sites, buildings will be located to define the street edge. They will be taller in scale, generally four storeys in height. Commercial uses will be encouraged at ground level with office and residential uses above. Parking and servicing will be located behind the buildings. Development driveways will be consolidated and located off side streets where feasible.

4 Long Term

Over time, as new construction continues to fill in gaps, a continuous street wall will be created, defining the edge of the street and creating an intimate street feeling. Cafes, restaurants, and retail uses at the ground level will be able to spill out onto the sidewalk. The streetscape along Main Street will be oriented to pedestrians. It will feel comfortable to move along the street and the environment will have a human scale.

1.2 Purpose and Use of the Design Manual

The Main Street Design Manual provides specific best practice and guidance on how the public right of way along Main Street should change into the future. It is not a stand alone document. The **Main Street Urban Design Plan** provides the big picture vision and guiding principles for the transformation of the corridor. The Urban Design Plan is wholistic, in the sense that it combines land use, urban design, public realm and built form strategies that work together to define a new character and use of the street. It contains a Public Realm Framework which sets out gateways, trail connections, and potential public art and parkette locations. This Street Design Manual is a key deliverable of the Urban Design Plan, an evolution and refinement of it.

The Main Street Design Manual sets out design performance standards for Main Street between Sunset Drive and the Westmorland Street Overpass. It is primarily intended to guide surface improvements located between the curb and the edge of the right of way, for sidewalks, furniture and trees. It does not make specific technical recommendations for the design of the driving surface from a traffic engineering perspective, but does establish a vision for the design of the roadway and its interface with the pedestrian realm. There are two primary goals of this Street Design Manual.

1. To provide a long-term coordinated vision informing all work within the right of way, from major reconstruction to utilities work and minor repairs, to ensure they are carried out consistently with the vision. It establishes a single, unified character for Main Street to guide decision making and construction to be carried out by different people at different times. A coordinated, predictable approach will establish a legible, harmonious image for the street.

2. To define measurable performance standards for pedestrian and street tree infrastructure. In order to create a comfortable walking street, pedestrian clearways must be adequate, and link to create a continuous system. Street furniture must include seating, waste receptacles, and bicycle lock up. These elements should be frequently located along the street and easily accessible. Street trees must have adequate growing conditions both above and especially below grade.

The Design Manual establishes a series of "typologies" for Main Street: a design rulebook that applies to typical conditions found along the street, including:

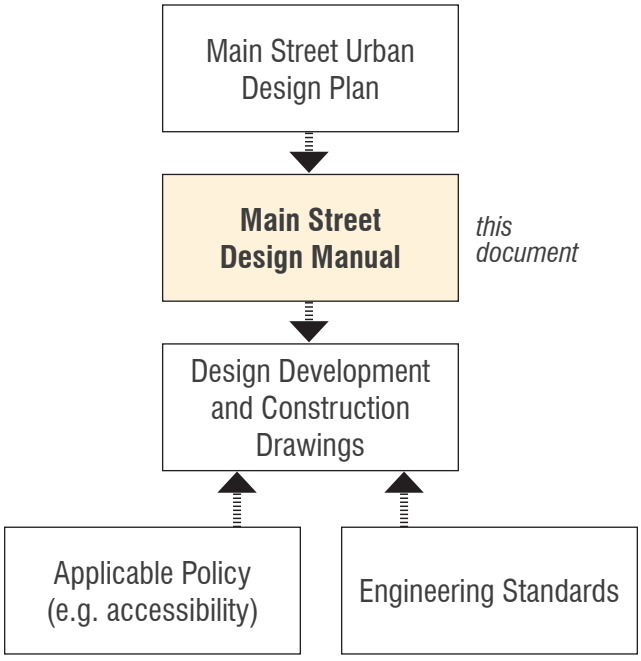
- design configurations for mid-block locations and intersections
- accommodating the varying location of hydro poles
- what to do where the width of the right of way varies
- how crosswalks are treated
- how driveways are treated.

Successful implementation of the Street Design Manual requires collaboration and cooperation among a number of City departments and divisions, other utility providers, and private landowners. As a rule, the Development Services Department will assume the lead role in the collaborative process to conceptually design changes to Main Street and interpret this Manual. The Engineering and Operations Department will assume the leadership role while still collaborating with other City departments in the preparation of construction drawings and facilitating the construction process.

Applying the standards in this Design Manual requires careful consideration. Since privately owned sites adjacent to Main Street are anticipated to transform slowly over time, with a focus on creating sidewalk-related development, it will be important to interpret this Design Manual with flexibility, working with the private sector to create a cohesive environment. This will mean coordination of driveways, building placement, and entrance locations with street trees, sidewalks, crosswalks and furniture. What are today vacant sites, parking lots or single storey commercial buildings will be vibrant mixed use buildings in the future. The Manual should be applied in a context sensitive way as Main Street continues to evolve and change.

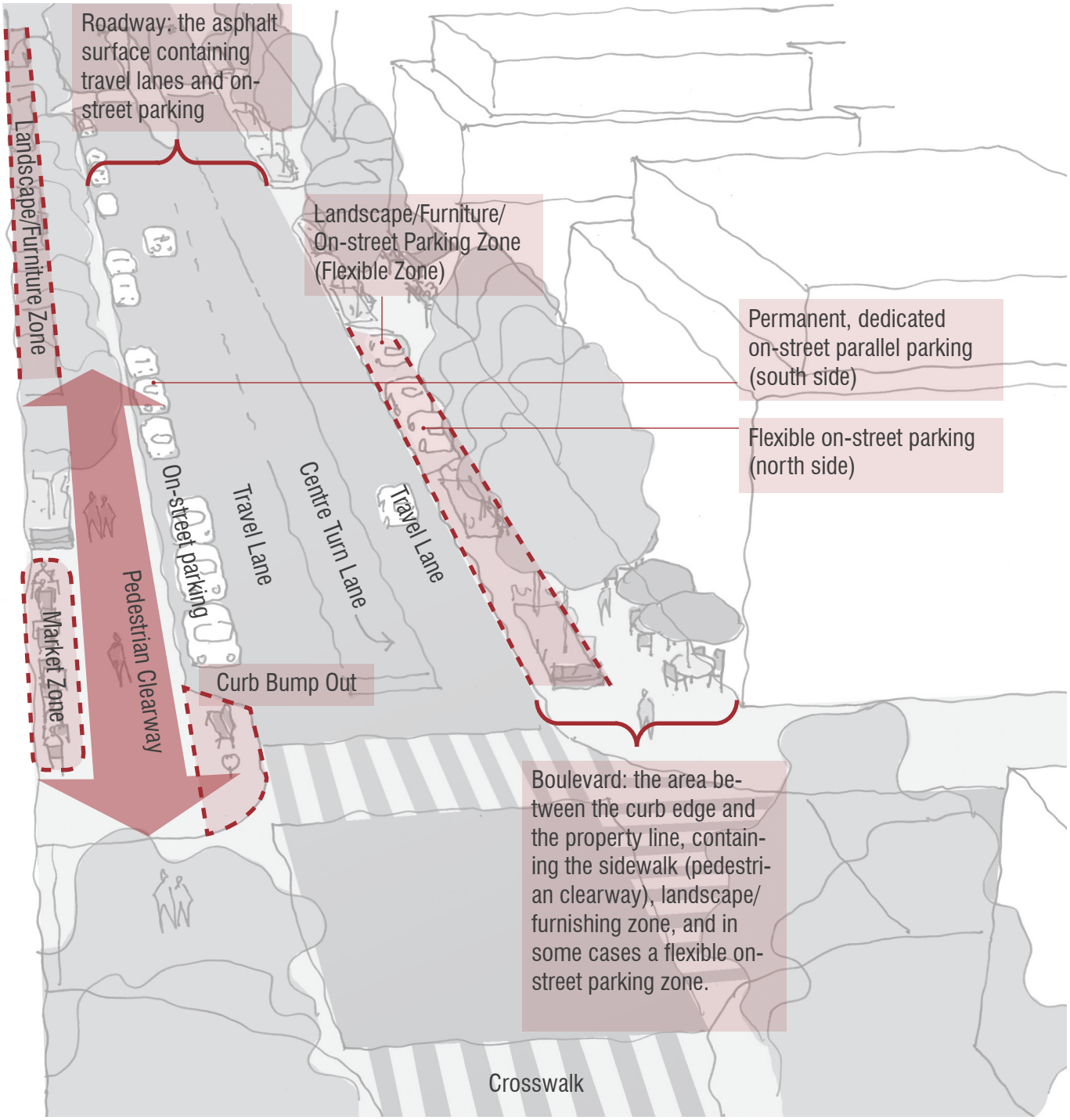
This Public Realm Design Manual acts in much the same way as the Built Form Design Guidelines to specify design objectives and performance standards for detailed design at the implementation (construction) stage. In the case of the Built Form Design Guidelines, the applicant does the design development, with the City acting as the review and approval agency. Here, the City itself undertakes the design development and the Public Realm Design Manual defines the criteria that guide the design.

Further design development work is required to implement this Design Manual, taking into account current and projected conditions including land use, buildings, building entrances, driveways, parking lots, connecting trails and sidewalks, lighting, utility locations, and existing trees, among others. Any planned work within the right of way should be done within the context of a minimum 1 block long streetscape master plan, or longer as appropriate.



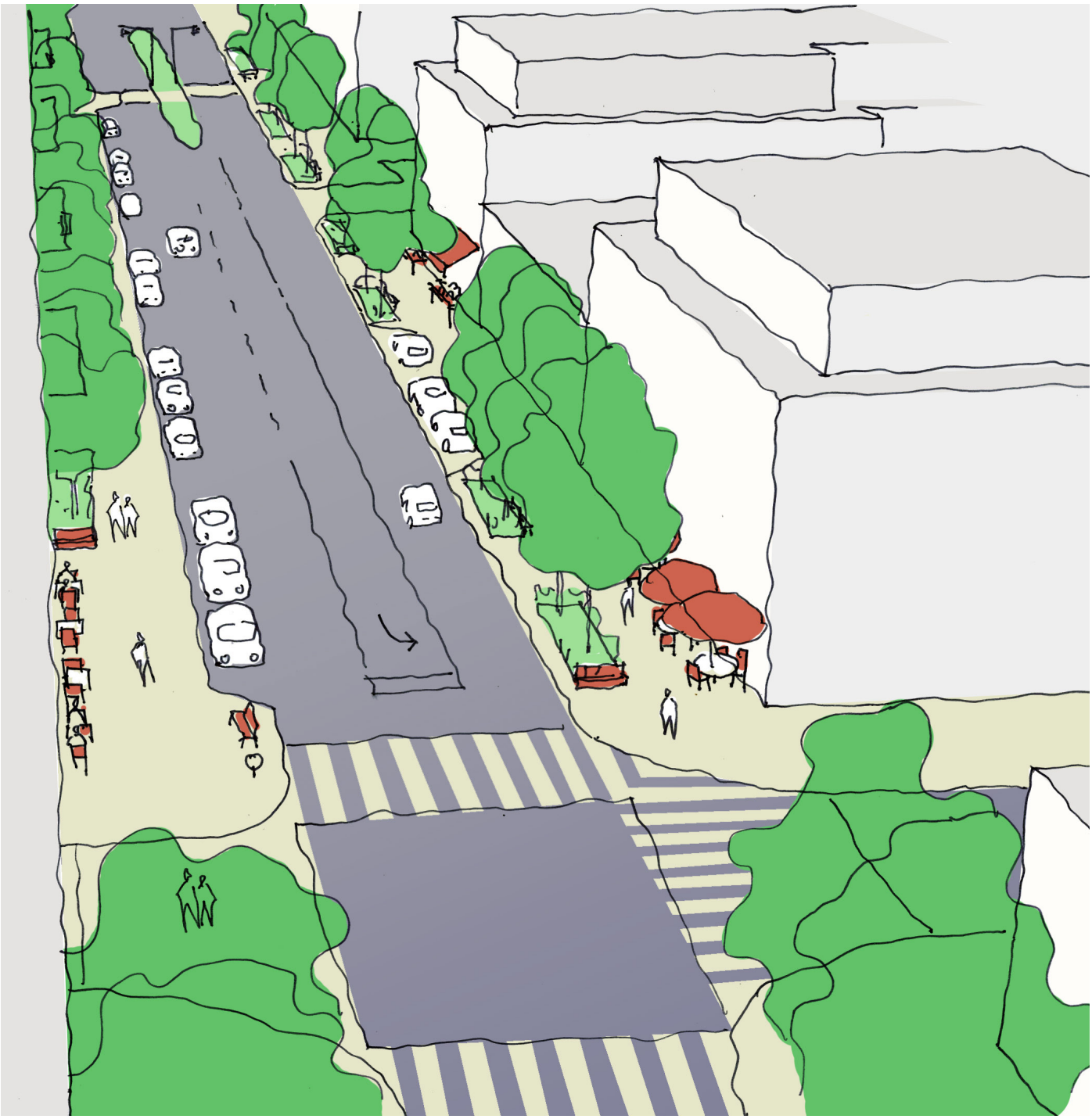
1.3 Anatomy of Main Street

The illustration below provides an orientation to the intended configuration of Main Street and the terminology used in this Design Manual.

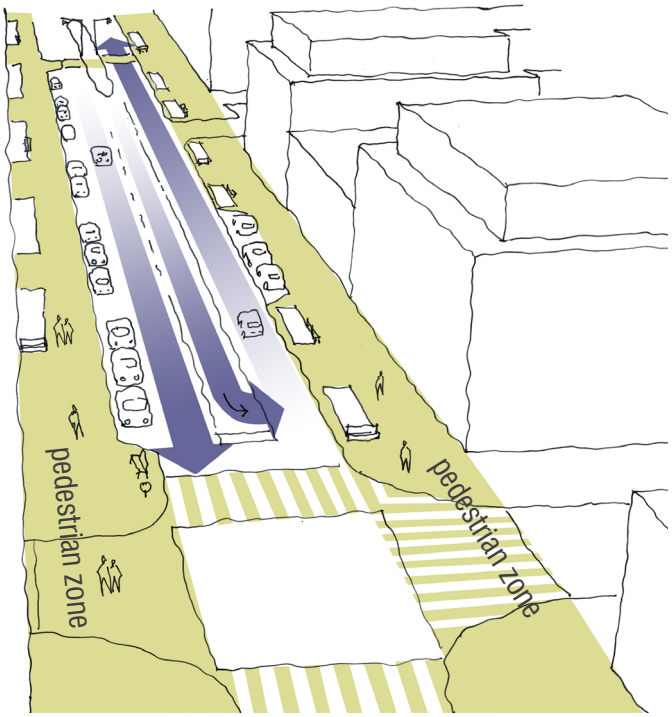


The transformation of Main Street over time will be the sum of many small changes. Both the buildings on private property and the landscape on public property will undergo change. Key goals of the public realm are:

- maintaining a narrow road profile but with pedestrian priority;
- greening the street with new trees and plantings;
- adding on-street parking;
- creating Market Zones for retail display;
- adding new pedestrian amenities; and
- ensuring the principles of accessibility are enshrined in all design decisions.



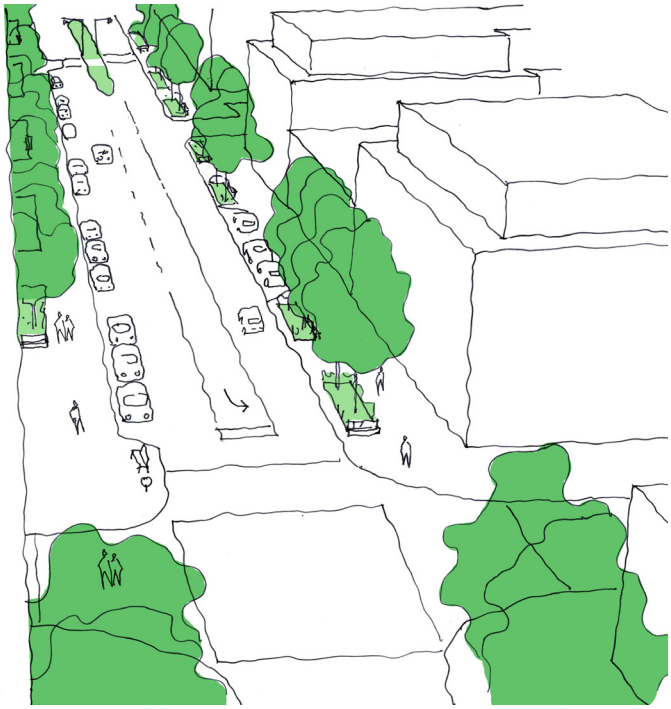
Narrow Profile, Pedestrian Priority



Main Street will remain a three lane road. A single driving lane in each direction, with a flexible central left-turn lane, is an appropriate scale for a pedestrian focused community spine.

- keeps pedestrian crossing distances short
- maintains intimacy in the street, a close relationship between one side of the street and the other
- building edges are close to the right of way which defines the outdoor room of the streetscape
- vehicular design standards will favour pedestrians: narrow lane widths, appropriate right turn channel design; minimum curb and turn radii
- allocating more space to pedestrians (not to cars) is a clear signal to slow traffic and create a safer walking environment, an important mind set to apply to the street as it transforms to a pedestrian main street

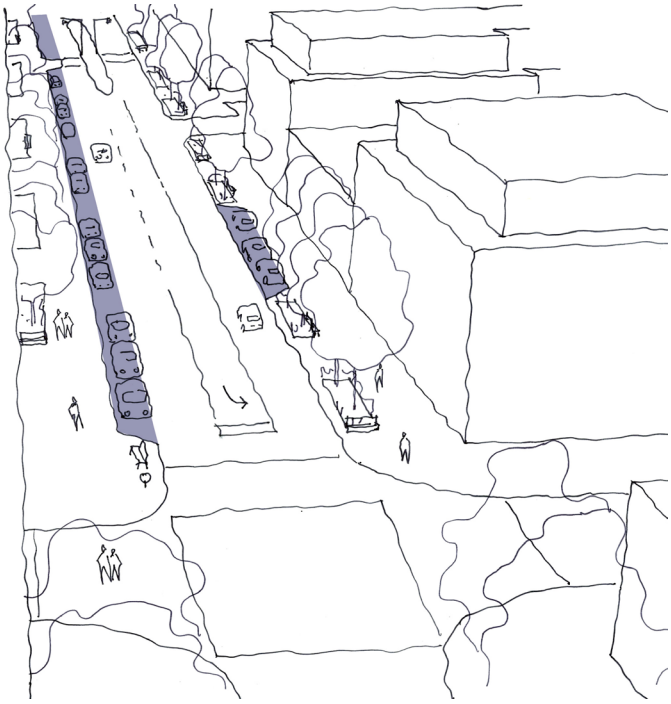
Greening



Introducing a rhythm of street trees, supported by lush ground level planting, is a key strategy that will have an immediate impact in visually transforming the character of the street.

- helps create spatial definition until built form evolves
- creates a lush green corridor
- includes vegetation in open planters and other public lands adjacent to the street (e.g. stream corridors, amphitheater)
- riparian-inspired planting helps create a connection with Nashwaaksis Creek and the Saint John River and promotes trail connections with the Saint John River system
- provides stormwater management benefits
- creates a resilient landscape with a wide variety of species
- will result in a unique street that is not currently found in Fredericton

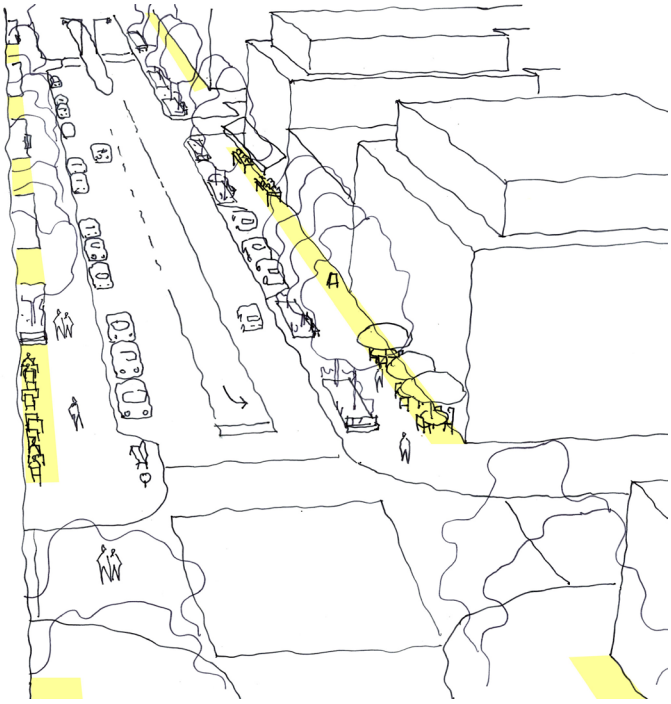
On-street Parking



The introduction of permanent, curbside, on-street parking into the right of way is a clear signal that Main Street will become a more urban environment supporting businesses oriented to the street corridor. Consolidation and relocation of driveways to side streets enables the repurposing of the left turn lane mid-block into more on-street parking.

- permanent parallel parking on one side of the street at minimum
    - slows traffic
    - buffers pedestrians from traffic
    - convenience parking supports businesses
- where right of way width permits, a flexible zone on the other side can also be used for curbside parking
    - the flexible parking zone will be set at the same level as the sidewalk and have a roll curb detail along the edge of the travel lane
    - parking stalls will be demarcated with bollards, pavement markings or other street furniture
    - parking can be closed for special events or for sidewalk patios in summer and the parking area used as the pedestrian clearway

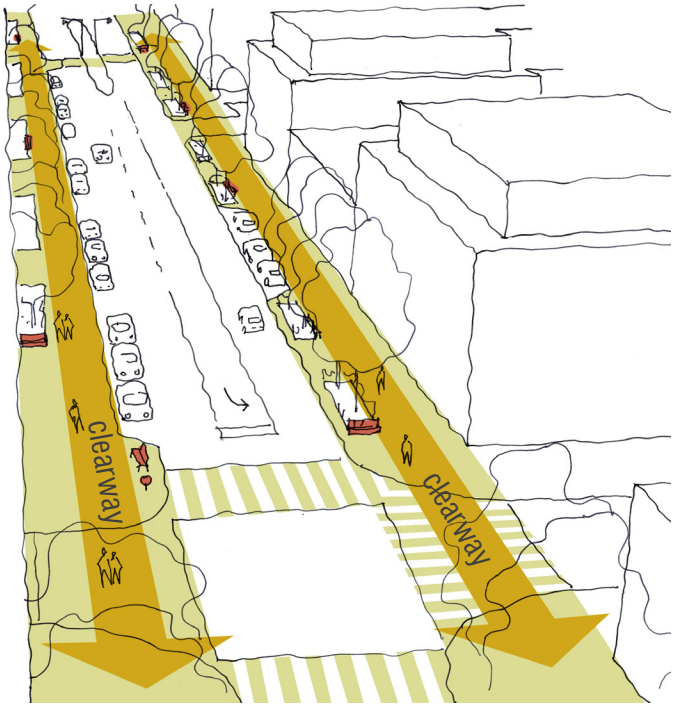
Market Zones



Market Zones are extensions of the sidewalk in front of the building, where businesses can spill out into the street. This creates animation and interest.

- ability for retail/restaurant to spill out into the sidewalk areas with patios, cafes, display areas, sidewalk sales, signs
- at other times the market zone functions as a wider sidewalk
- create the market zone over time with modest setbacks to new development

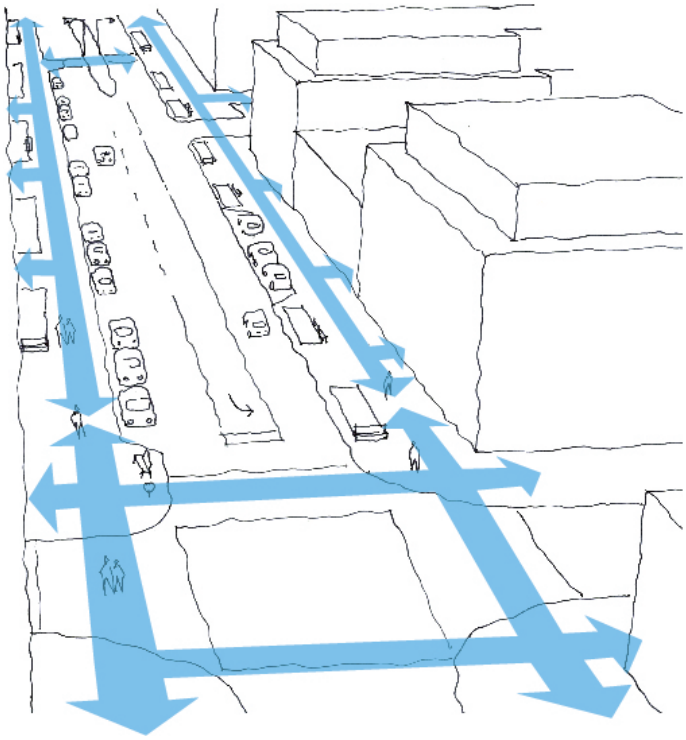
Pedestrian Amenity



A variety of improvements will encourage pedestrian use of the street, including wide sidewalks and street furniture. These work hand in hand with the built form, traffic and parking strategies to create a walkable street.

- create pedestrian clearways: a minimum width of sidewalk that is flat and free of obstruction, comfortable for strolling, allowing people to pass, and accommodating strollers and mobility aids
- pedestrian clearways are ideally 2.1m in width, as a minimum, increasing to 2.5m minimum where the sidewalk is directly adjacent to the roadway (not separated by a landscape/furniture zone) to provide additional separation to traffic
- pedestrian amenities will be provided along the street: benches, bike rings, garbage cans, shade from trees, and bollards
- dedicated mid-block crosswalks will provide frequent opportunities to cross
- all intersections will have demarcated crosswalks
- a continuous sidewalk surface will be provided across all driveways indicating pedestrian priority
- new signs and wayfinding will help direct people to destinations
- over time, small parkettes along the street will provide places of refuge and enjoyment, and additional linkages provided to the Northside trail

Accessibility

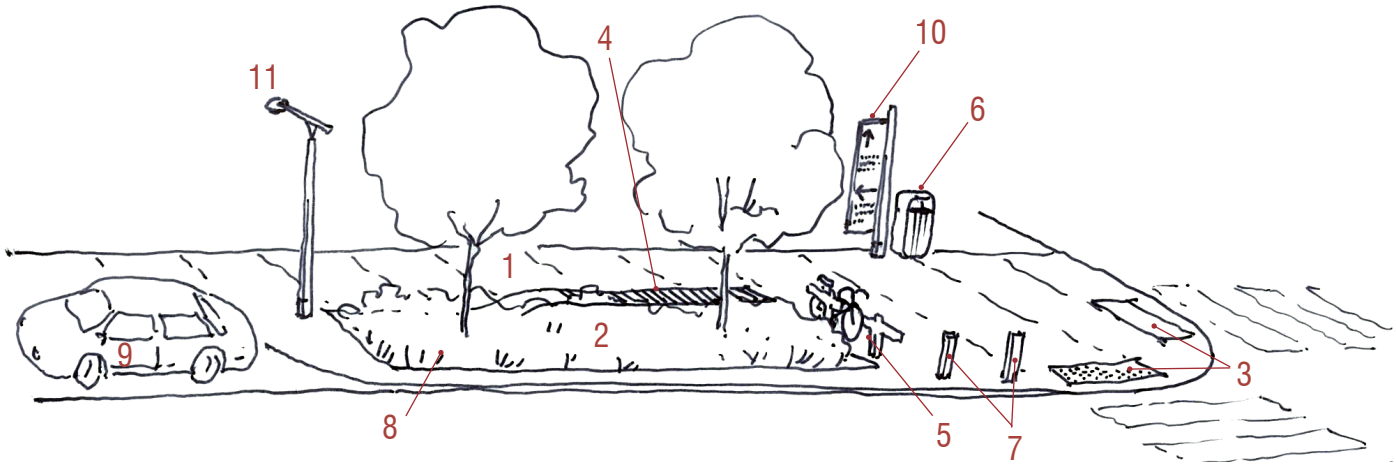


Designing the public realm along Main Street using the principles of accessible design benefits all people who use the space. Accessible design considers the full spectrum of human abilities and use and makes very simple improvements that make it easier to understand and navigate the street corridor. Principles of accessible design for Main Street include:

- ensuring all walking surfaces are hard surfaces, durable, and smoothly graded
- ensuring there is an uninterrupted, barrier-free path of travel between all walking surfaces, including sidewalks, crosswalks, and adjacent walkways and building entrances
- providing smooth transitions or ramps between surfaces at different levels, for example providing curb cuts and ramps at intersections
- providing tactile plates in the sidewalk at all street intersections
- providing audible call signals at all signalized intersections
- providing visual countdown signals for pedestrians at all intersections
- providing accessible on-street parallel parking spots at intervals along the street, that are at the same level as the sidewalk or provide a ramped transition to the sidewalk

2.0 Design Manual

2.1 Kit of Parts



1. Concrete Sidewalk

Poured in place concrete, broom finish, with regular rhythm of expansion joints/cuts approximately 2 metres on centre perpendicular to path of travel. Concrete will be used for all pedestrian surfaces within the right of way, including continuous concrete surface across driveways.

2. Planters

Open planters with poured in place raised concrete edges, perforated to collect rainwater. Length determined by number of trees and required soil volume. Trees spaced 6 metres on centre, centred in the planter, minimum 1 metre from ends. Spacing between planters approximately equal to length of planter. Located in regular rhythm along both sides of Main Street.

3. Tactile Plates

Detectable warning plates located on the sidewalk at all street intersections and major driveways. Located in the path of the pedestrian clearway. Steel material with raised textural bumps.

4. Benches

Wood seating with metal details. Freestanding benches will be located where there is no planter. Integrated benches will be located in conjunction with planters on a poured in place concrete base. Integrated benches may be placed at the end of planters or along their sides. Their length will vary with the length of the planter. Benches will be provided near crosswalks, transit stops and significant redevelopment sites.

5. Bike Posts

Metal bicycle lock-up posts with wood accents. Bike posts will be located in Landscape/Furniture Zone or Curb Bump-outs near major destinations and street-related uses.

6. Waste Bins

Metal garbage and recycling bins with wood accents. Waste bins will be located at street corners (maximum 2 per intersection) or near transit stops.

7. Bollards

Metal and wood posts, typically used to separate pedestrian and vehicular zones. Used at crosswalks and to define the edge of Flex Zone parking.

8. Planting

A major goal of this manual is to create a green, tree-lined street, with connected canopies, and a shaded public realm. Frequent planters will create significant space within the right of way for tree planting and understory planting. Trees will be selected to:

- act as natural infrastructure, enhance the urban ecosystem, and promote biodiversity, resiliency, and stormwater management
- provide visual beauty through form, colour, and seasonal variation.
- minimize conflicts with hydro wires, pedestrians and vehicular function.

Planters will also contain lower shrubs, grasses and groundcovers. Together, trees and understory planting will help connect Main Street visually to the Nashwaaksis Stream and the Saint John River corridor.

9. Flex Zone Parking

Where space within the right of way permits, a flexible sidewalk/parking zone can be created. A roll curb (or other sloped transition) between roadway and concrete sidewalk can allow on-street parallel parking on the north side of the street. Bollards will separate parking from the pedestrian clearway. This zone can be closed to parking and used as an extension of the sidewalk for patios or retail spill out.

10. Vertical Elements

Trellises, wayfinding/gateway signs, crosswalk standards and other vertical elements within the pedestrian realm help to define the visual character of the street. Wood used as the primary material with metal and concrete accents. It is envisioned that these elements will be custom designed and locally produced for Main Street.

11. Pedestrian Lighting

In addition to the primary traffic lighting, supplemental, pedestrian-scaled lighting is anticipated to be added to the north side of the street over time, as the street urbanizes in conjunction with development projects. Pedestrian lighting will be at an appropriate scale and height for its location, and complement the larger identity and wayfinding strategy.

Transit Shelters

Transit shelters should provide a large, comfortable place to wait for transit, and include seating and protection from wind and precipitation. They should incorporate substantial transparency for safety and so that transit operators and patrons have clear views of each other. Materials should include wood, steel and glass. Transit shelters may present another opportunity for custom design and local production.

2.2 Variety of Conditions

Main Street varies along its length, including the width of the public right of way, the location of hydro poles, and the location of existing buildings, driveways and intersections.

The hydro poles along the south side of the street will be generally maintained in their existing locations through the transformation of Main Street. This results in an assymetrical cross section, where the planned roadway is shifted to the north within the right of way. The boulevard on the south side (between curb and property line) will generally be wider than the north side.

The following pages illustrate the configuration of the pedestrian realm as conditions along Main Street vary. They set out the locations of sidewalks, street trees, street furniture, crosswalks and other pedestrian amenities.

Basic Cross Section
This is the most typical condition of Main Street through its central area. The right of way is 21.3 metres in width, on average. Hydro poles are located near the edge of the planned curb of the roadway.

Narrow Cross Section
Outside of the central area of Main Street, towards Brookside Drive in the west and the Westmorland Street Bridge in the east, the right of way width is narrower, at 20.1m. There is not room for a dedicated on-street parking lane. Hydro poles are located towards the middle of the boulevard or near the property line, not near the curb.

Wider Boulevard North Side
There are a number of irregularities in the right of way of Main Street on the north side that result in a wider right of way width, typically 22.6m. These occur in “jogs” and short stretches. In these cases more space is available for the north boulevard.

Wider Boulevard South Side
In a few cases a wider right of way width, or adjacent publicly owned land, results in additional space on the south side of the street that can be used for pedestrian space and/or planting.

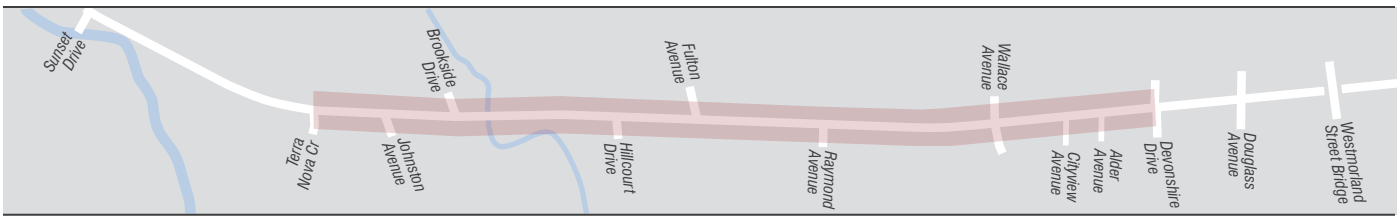
Mid-block Crosswalks
Mid-block crosswalks are planned for several locations along Main Street. They will have a centre island that narrows the roadway to a single lane in each direction. The islands provide a central refuge for pedestrians.

Curb Bump Outs
In areas where the on-street parallel parking lane terminates it is generally appropriate to widen the sidewalk to provide additional pedestrian amenity. This occurs at intersections, mid-block crosswalks and some driveways.

Planning for Buildings and Driveways
The conditions listed above provide a template for pedestrian realm improvements that cover most of Main Street. However, the pattern of buildings, driveways, and street intersections will mean there is no single formula that can be applied uniformly along the street. This section of the Street Design Manual provides an illustration of how to apply the templates, above, to a potential real-world scenario.

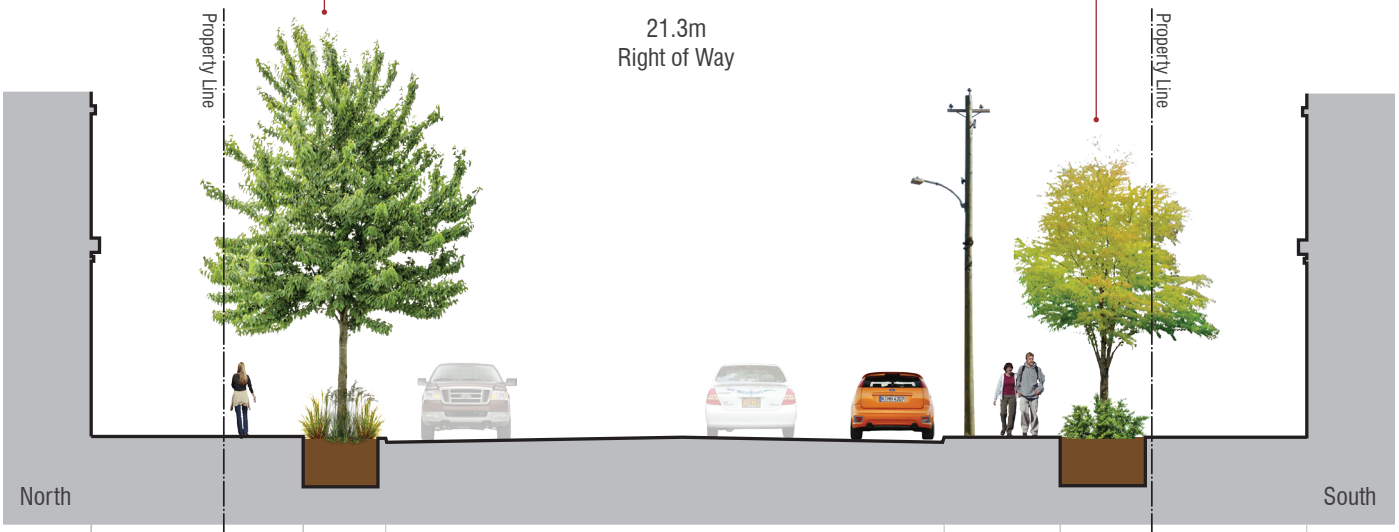
2.3 Basic Cross Section

This cross section represents a typical condition for Main Street in the central area of this Manual. The right of way is 21.3m in width on average.



Street trees on north side are high crown, spreading species (no hydro wires).

Landscape zone located adjacent to property line where hydro poles are curbside so street trees are not directly under hydro wires. Street tree species selected for lower, compact growth.

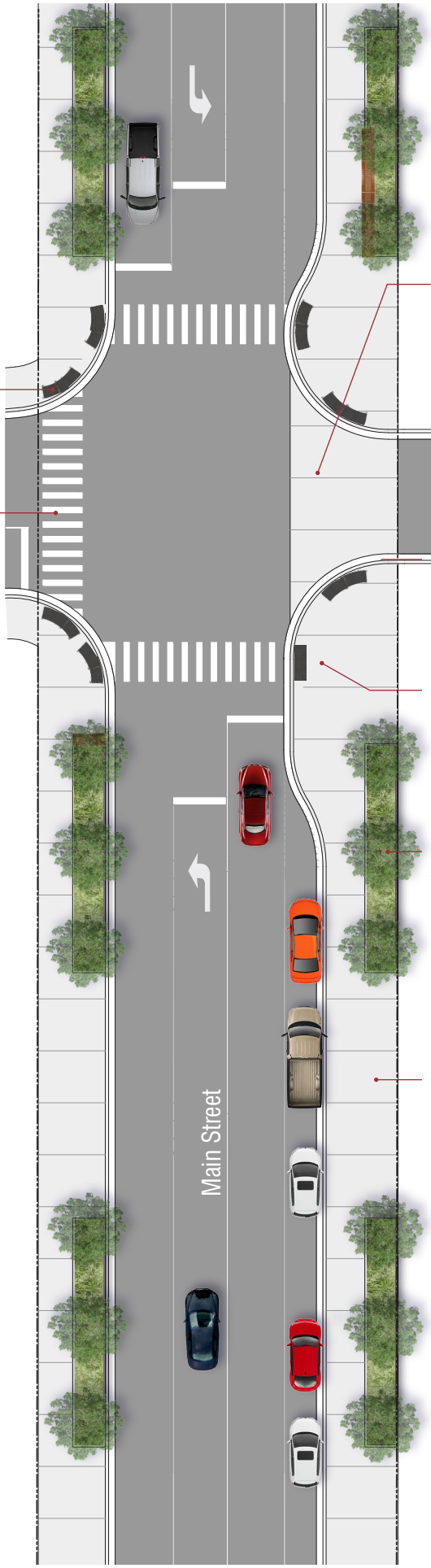


In the short term, pedestrian clearway minimum is 1.8m. On redevelopment, pedestrian clearway increases to 2.1m minimum.

Minimum landscape zone *with tree* is 1.6m on north side, increasing to 2.4m where space permits. In Wider ROW North Side conditions, a flexible on-street parking zone is located here (Flex Zone).

Pedestrian clearway minimum 2.5m adjacent to roadway.

Market Zone is integrated seamlessly with public right of way.



Tactile plates located at all intersections and major driveways.

Painted 'zebra stripe' cross-walks at intersections.

Planters typically 5m from pavement surface of intersecting streets and driveways

Concrete sidewalk continuous across driveways.

At intersections, crosswalks and some driveways, a curb bump out replaces the dedicated on-street parking lane.

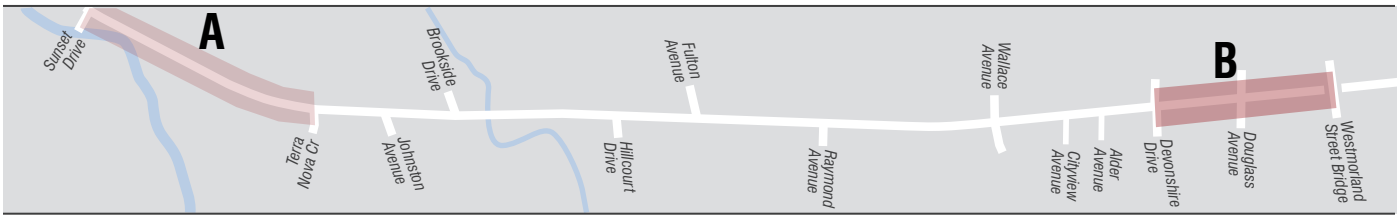
Planters 5-14m typical length. Street trees spaced 6m on centre. Shortest planter accommodates 1 tree, longest planter 3 trees.

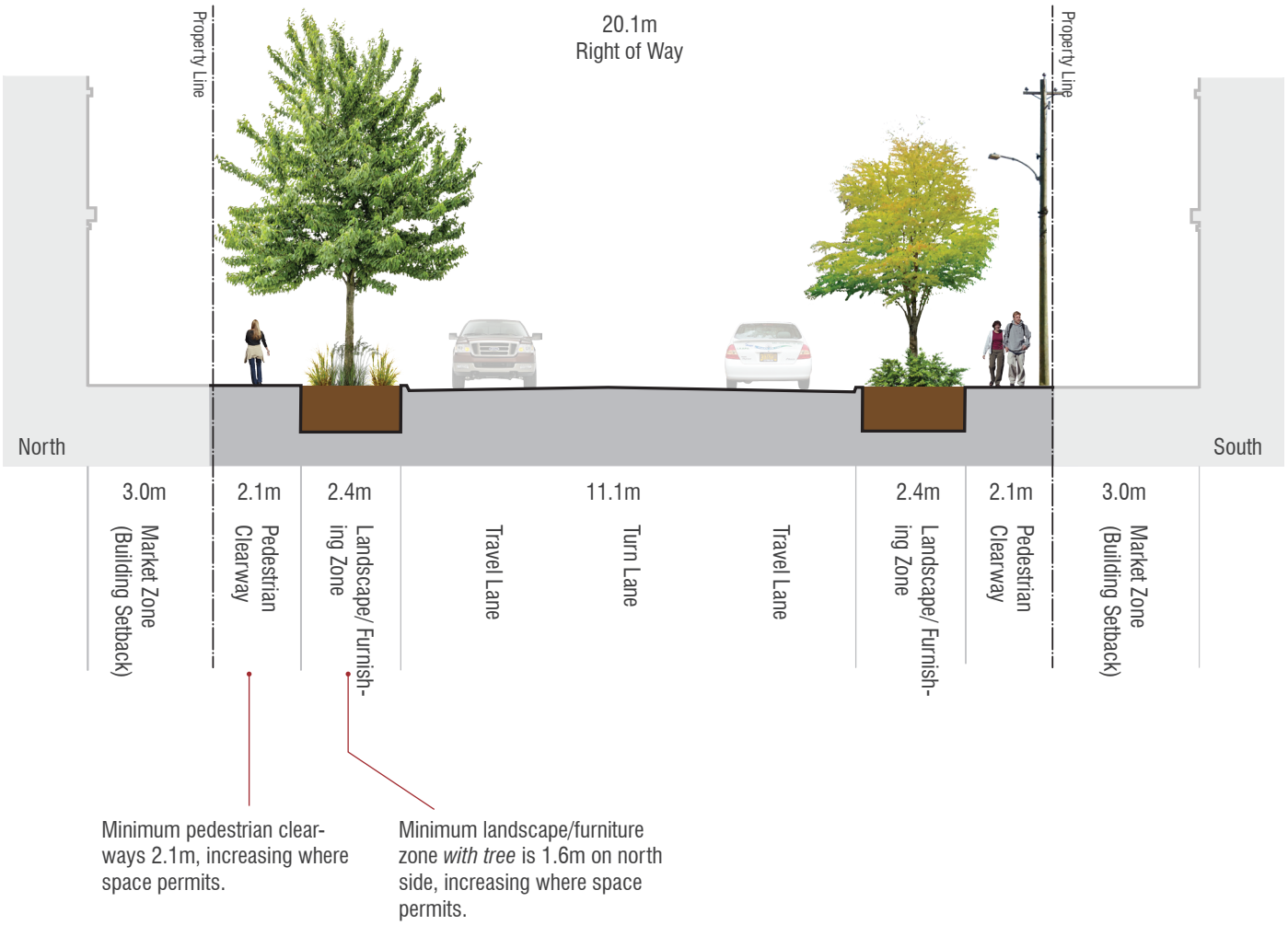
Spacing between planters approximately equal to length of planters, provides Market Zone

Location of planters, poles and street furniture coordinated to maintain mini-mum required pedestrian clearways and appropriate interface with adjacent buildings.

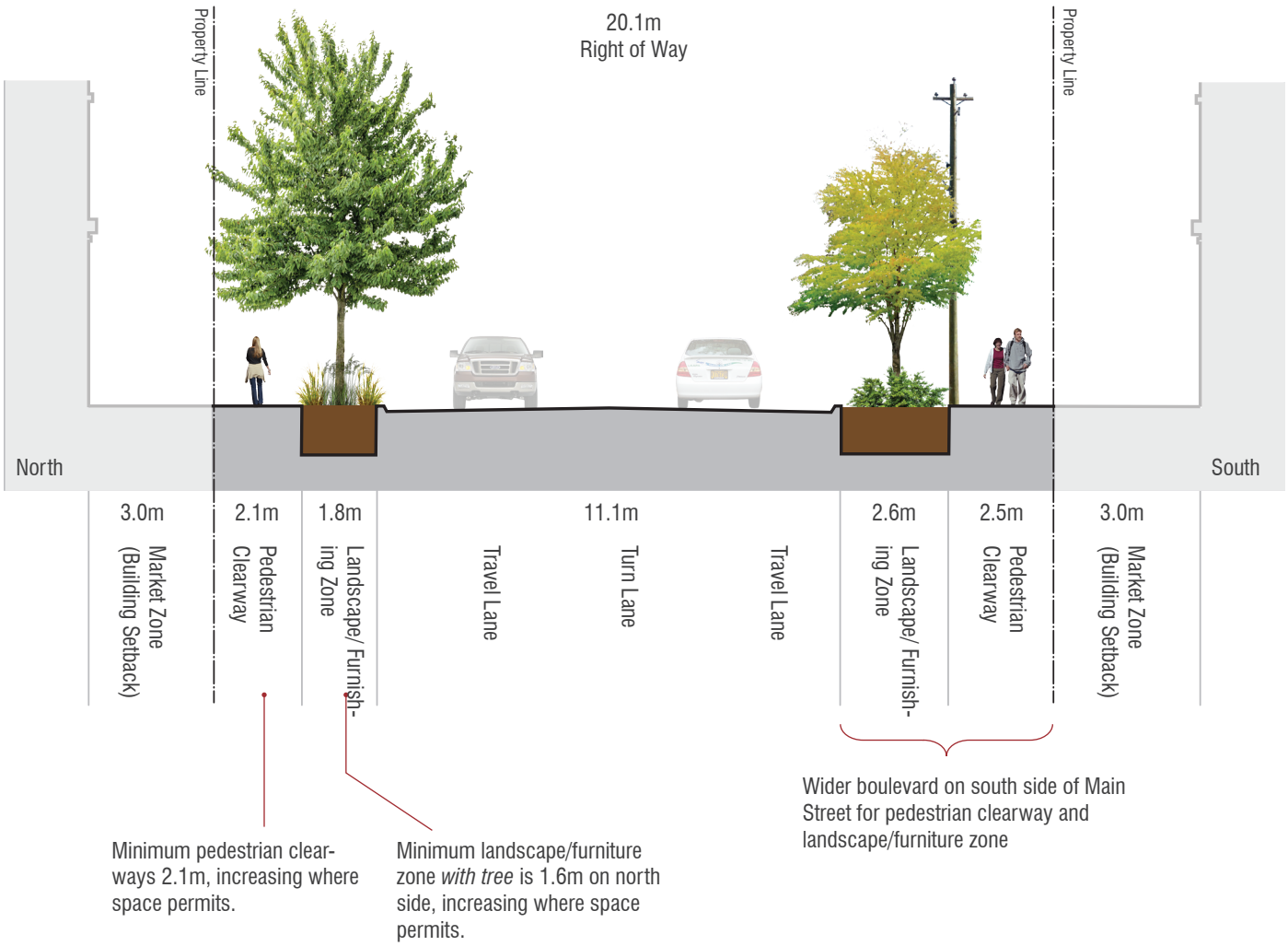
2.4 Narrow Cross Section

Outside of the central area of Main Street, towards Brookside Drive and the Westmorland Street Bridge, the right of way width is 20.1m. Within this narrower corridor it is still important to allocate space to maintain minimum pedestrian clearways. There will be no on-street parking lane, and in some locations the landscape zone reduced in width. At the detailed design phase, there is flexibility to reallocate space between the sidewalk and landscape/furniture zone based on adjacent land uses and the location of hydro infrastructure, as long as minimum clearways are maintained.





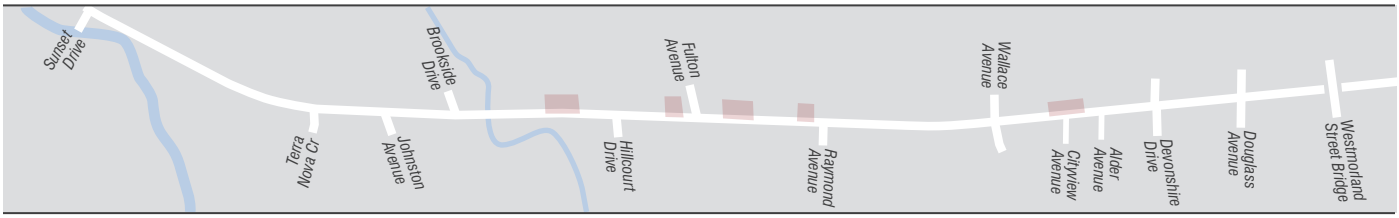
A: Narrow Cross Section Near Sunset Drive



B: Narrow Cross Section Near Westmorland Street Bridge

2.5 Wider Boulevard North Side

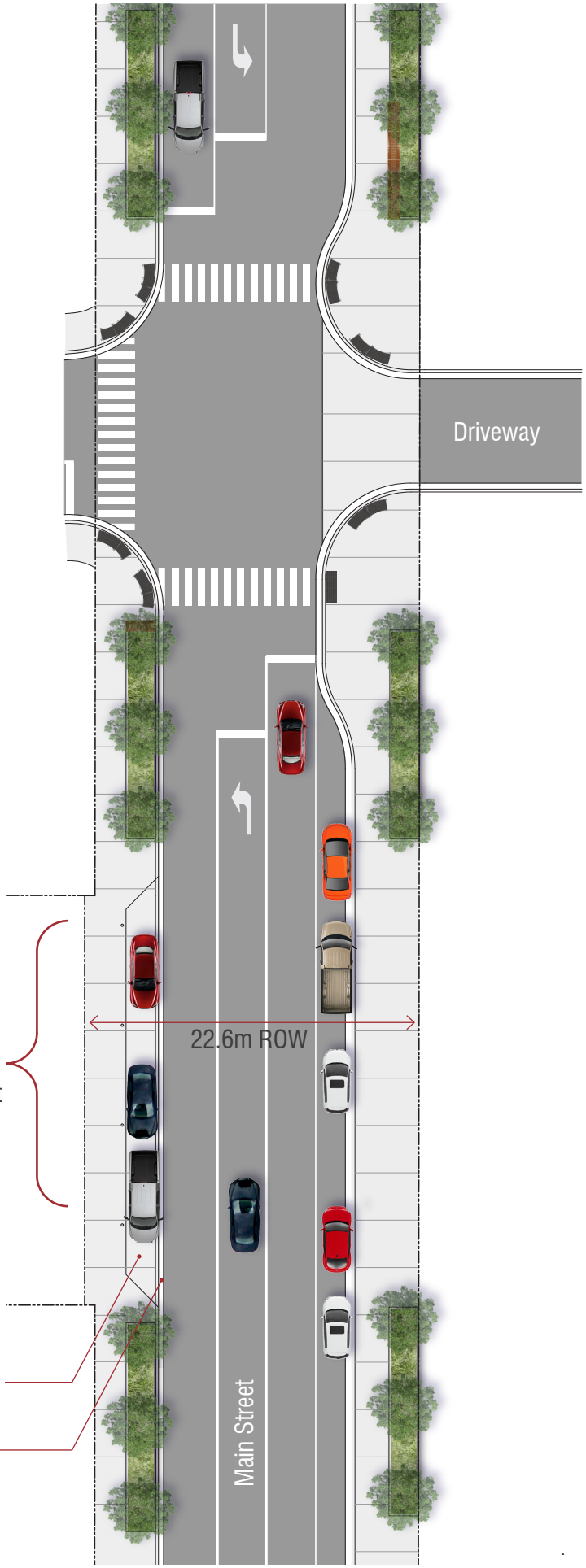
There are many irregularities in the right of way of Main Street. Many of these are located on the north side and result in a wider right of way width, typically 22.6m, and occur in “jogs” and short stretches. In these cases more space is available for the north boulevard, the space between the curb and property line, which can be utilized for increased pedestrian amenity, and/or the flexibility to provide on-street parallel parking.



Where desired, on-street parallel parking can be provided. Parking surface is concrete and flush with sidewalk, with a roll curb or sloped transition to driving surface. Bollards separate the parking zone from the pedestrian clearway, minimum 1 bollard per parking spot.

Pedestrian clearway minimum 2.1m, increasing where there is more space within the right of way.

Pedestrian clearway minimum 2.5m adjacent to roadway.



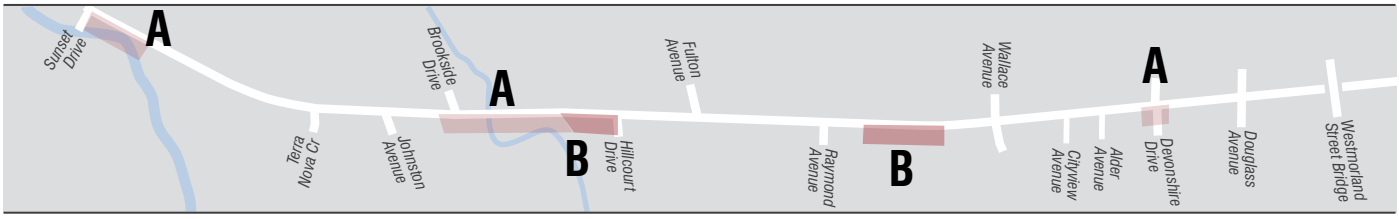
jog in property boundaries creates wider right of way width and the opportunity for on-street parallel parking

concrete surface flush with sidewalk

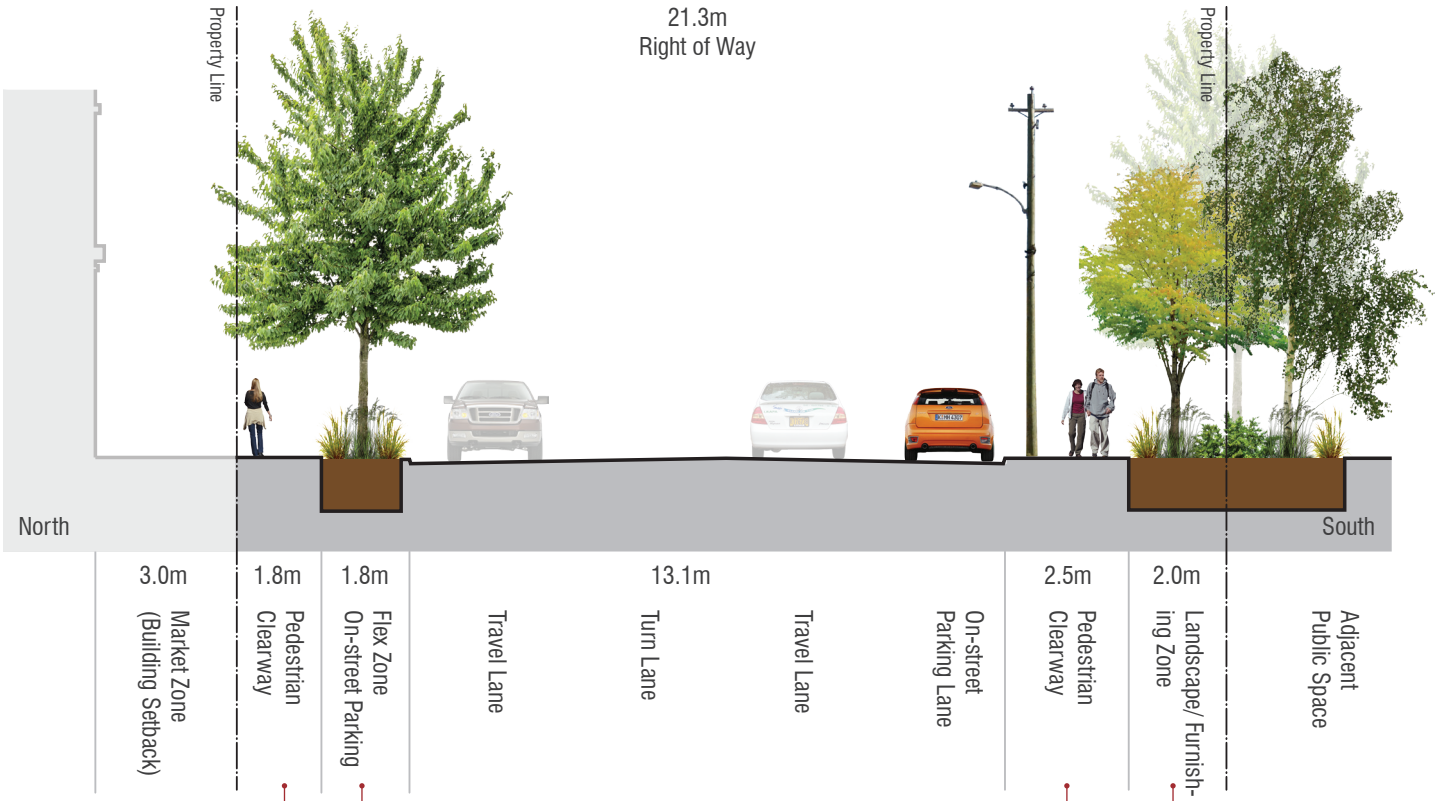
roll curb

2.6 Wider Boulevard South Side

In a few cases a wider right of way width, or adjacent publicly owned land, results in additional space on the south side of the street. In general, this side of the street already has adequate pedestrian clearways and landscape zones. But the space can be used to enhance the landscape zones with additional planting, and are opportunities to showcase riparian plantings. Where these wider boulevards border Nashwaaksis Stream, Killarney Brook, and Nashwaaksis Commons, it provides opportunity to enhance the edges of those public amenities with additional plantings and public amenity.



Where space permits, provide a double or triple row of trees. Trees may be in formal rows (spaced 6m on centre), for example in front of parks or trails, or located organically, for example adjacent to watercourses where the goal is to create an enahnced natural area.



In the short term, pedestrian clearway minimum is 1.8m. On redevelopment, pedestrian clearway increases to 2.1m minimum.

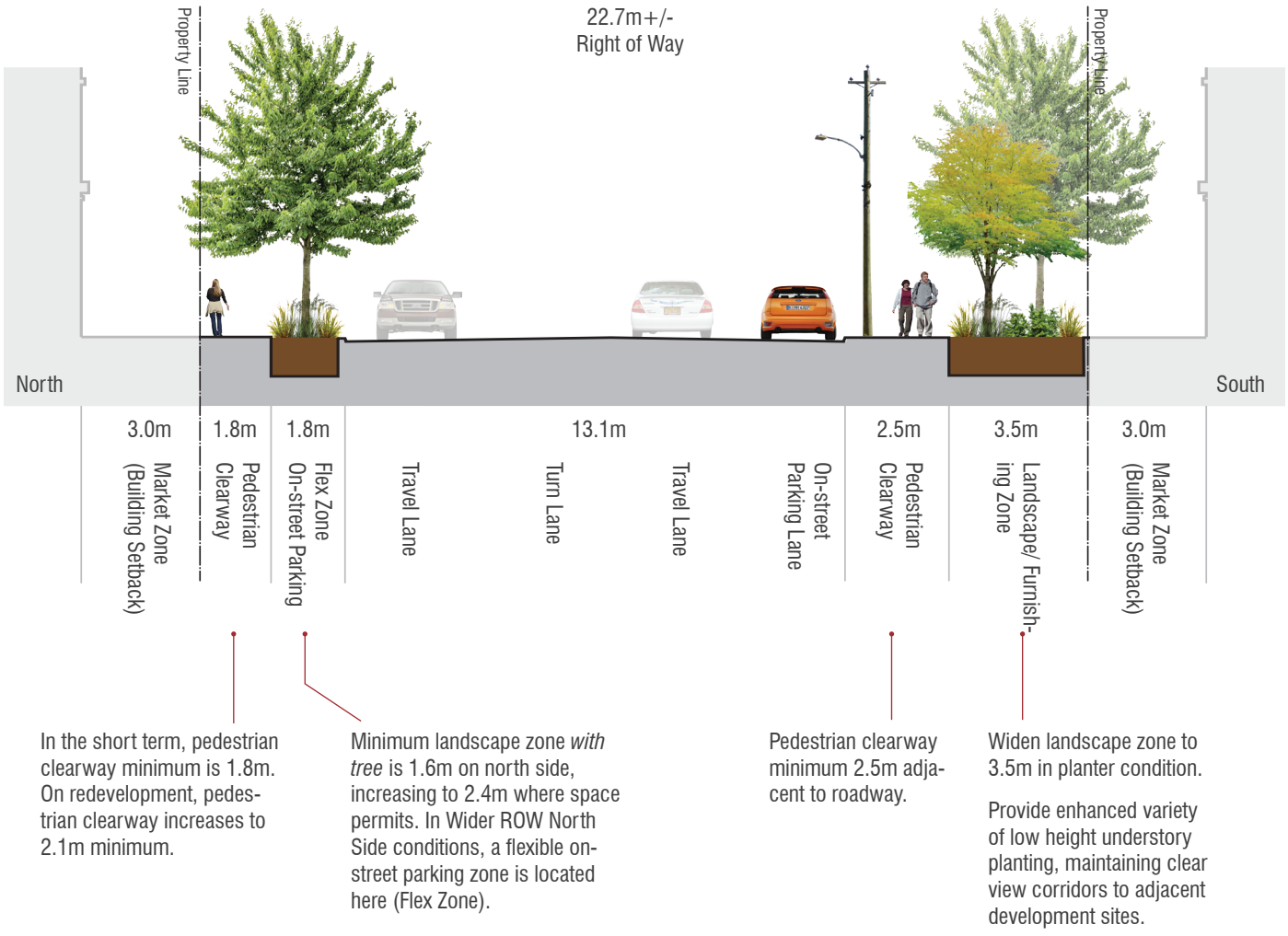
Minimum landscape zone *with tree* is 1.6m on north side, increasing to 2.4m where space permits. In Wider ROW North Side conditions, a flexible on-street parking zone is located here (Flex Zone).

Pedestrian clearway minimum 2.5m adjacent to roadway.

Landscape zone extends to property line with natural surface (not planter condition).

Provide enhanced variety of low to medium height understory planting, maintaining clear view corridors to adjacent trails, public spaces or development sites.

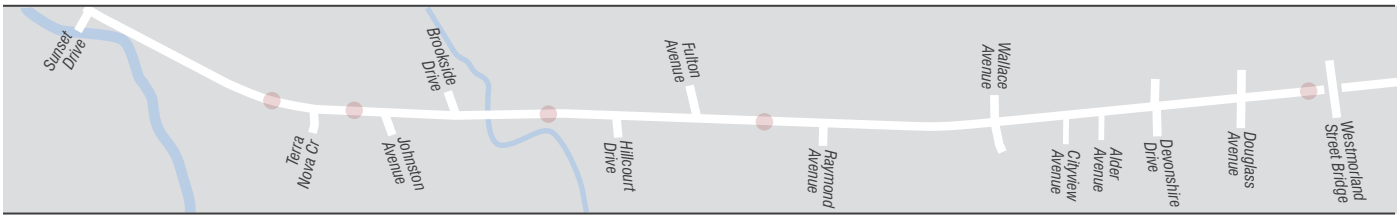
A: Wider Boulevard on South Side Adjacent to Public Space

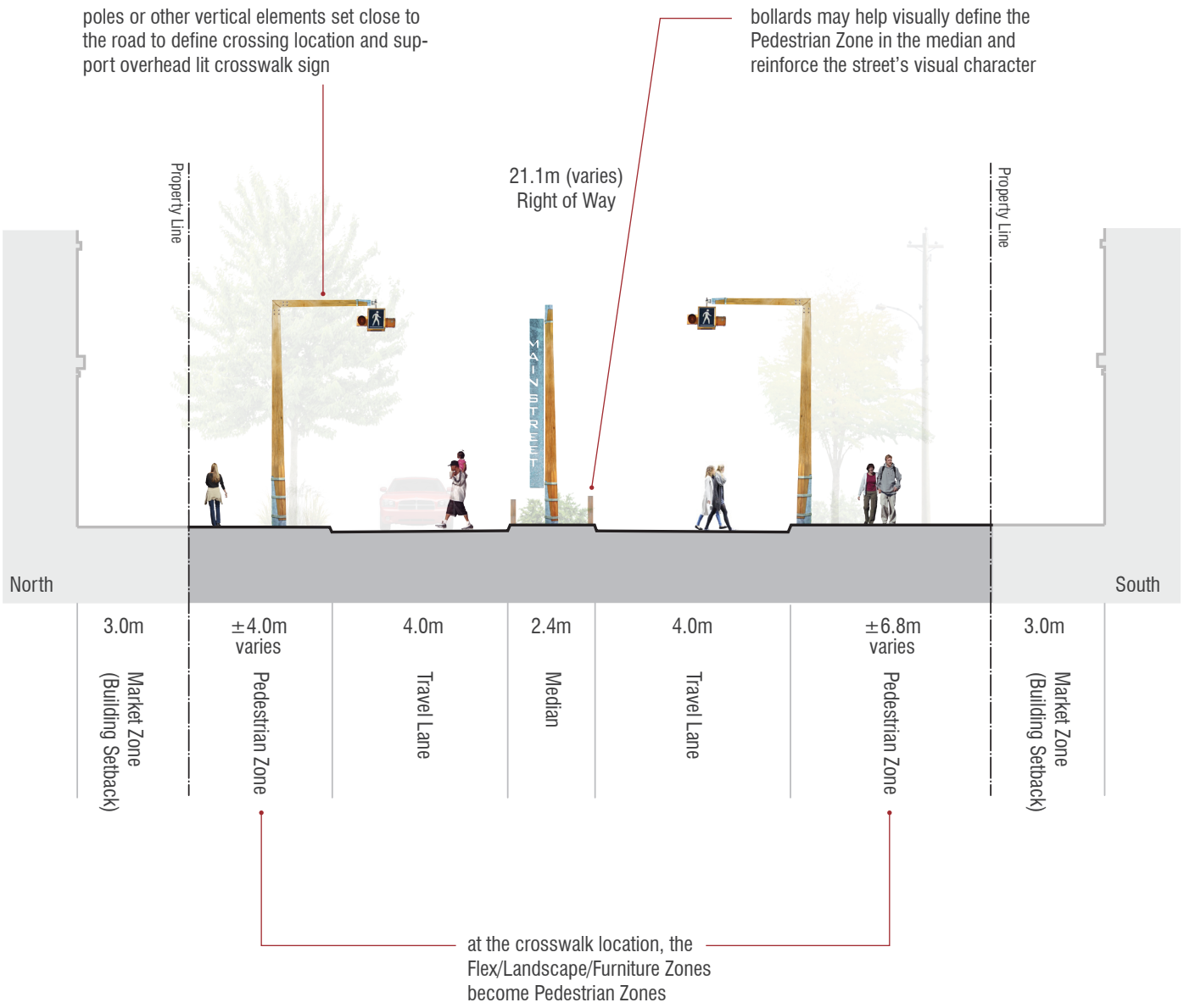


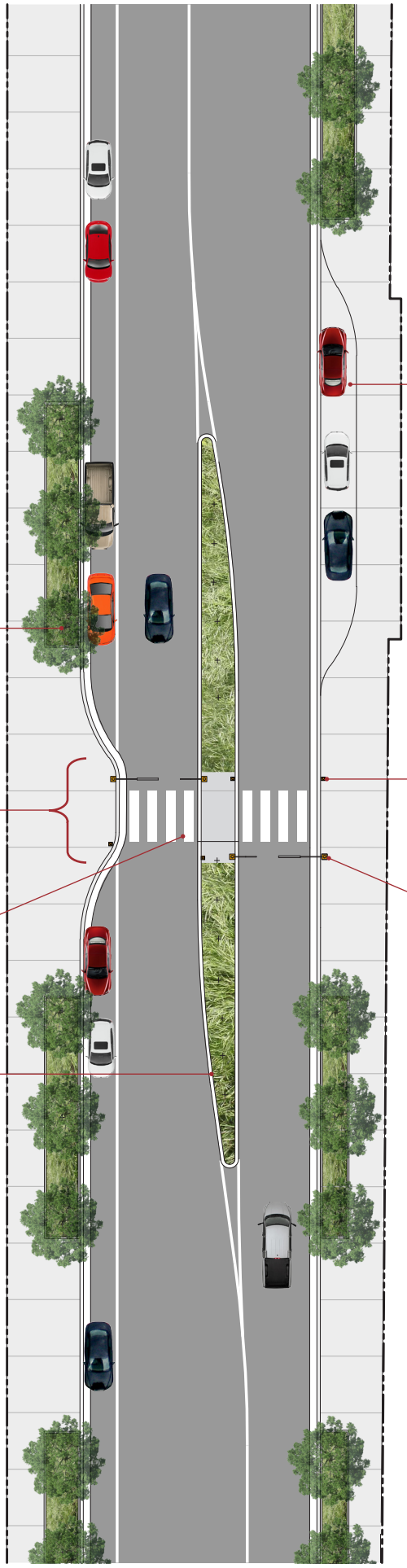
B: Wider Boulevard on South Side Adjacent to Development Sites

2.7 Mid-block Crosswalks

Mid-block crosswalks are planned for several locations along Main Street. They are intended to be unique visual moments along the street, breaking up its linearity, and enhancing pedestrian priority in the corridor. Crosswalks will be designed to include a centre island, narrowing the driving surface to a single lane in each direction, and providing refuge for pedestrians. The islands will contribute to showcasing riparian planting. Crosswalks will be defined visually with unique street furniture and crosswalk identity lighting.







Could be Flex Zone parking or landscape zone

curb side street trees set back minimum 5m from crosswalk zone

minimum 4m curb bump out interrupts on-street parking, provides shorter crossing distance

painted ‘zebra stripe’ crosswalk marking

bollards spaced 2.1-3m apart can visually define pedestrian zones

poles or other vertical elements set close to the road to define crossing location and support overhead lit crosswalk sign

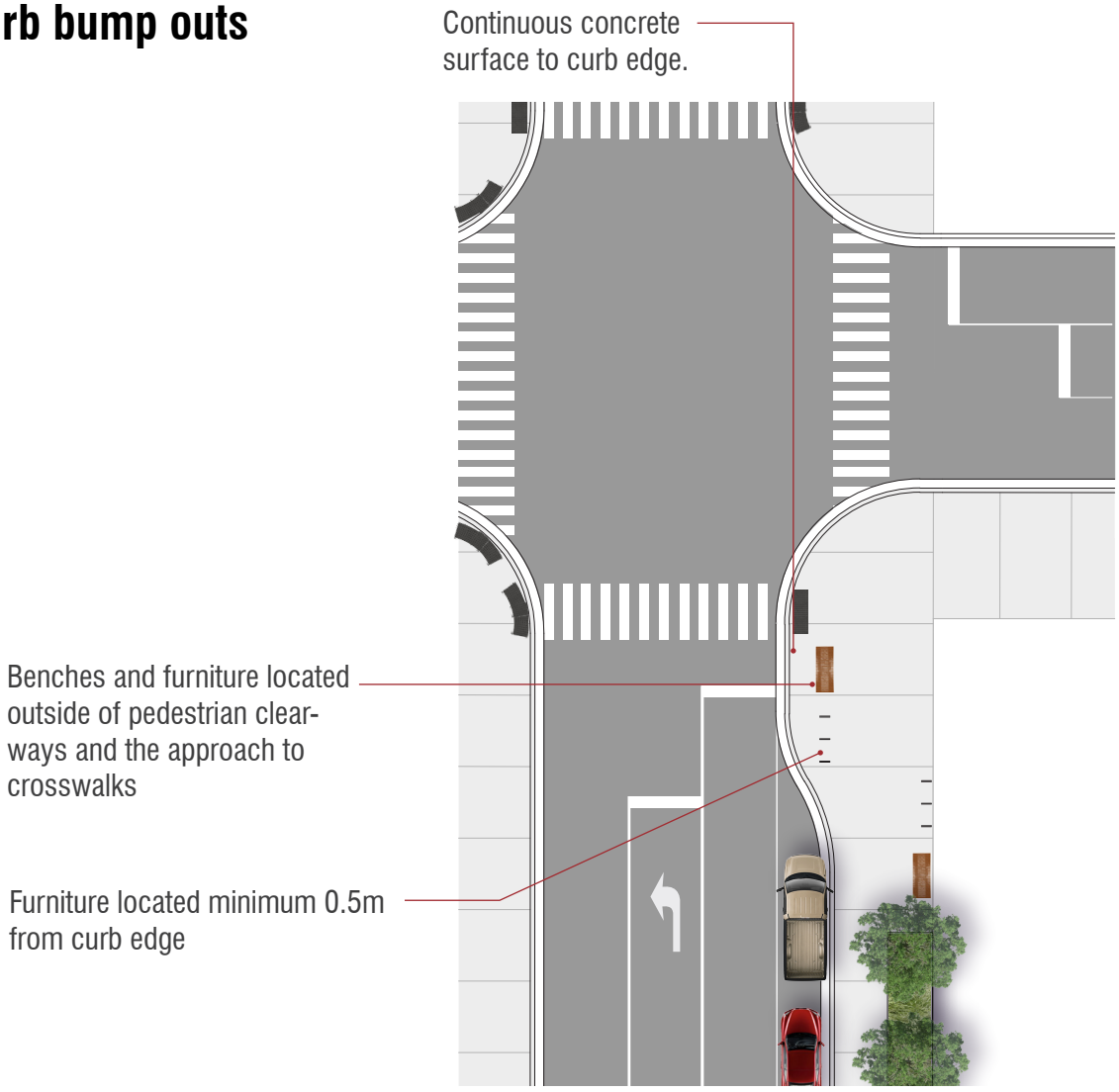
roll curb detail defines edge of island, height up to 0.4m to protect planting

curb depression in central island and adjacent sidewalks

2.8 Curb Bump Outs

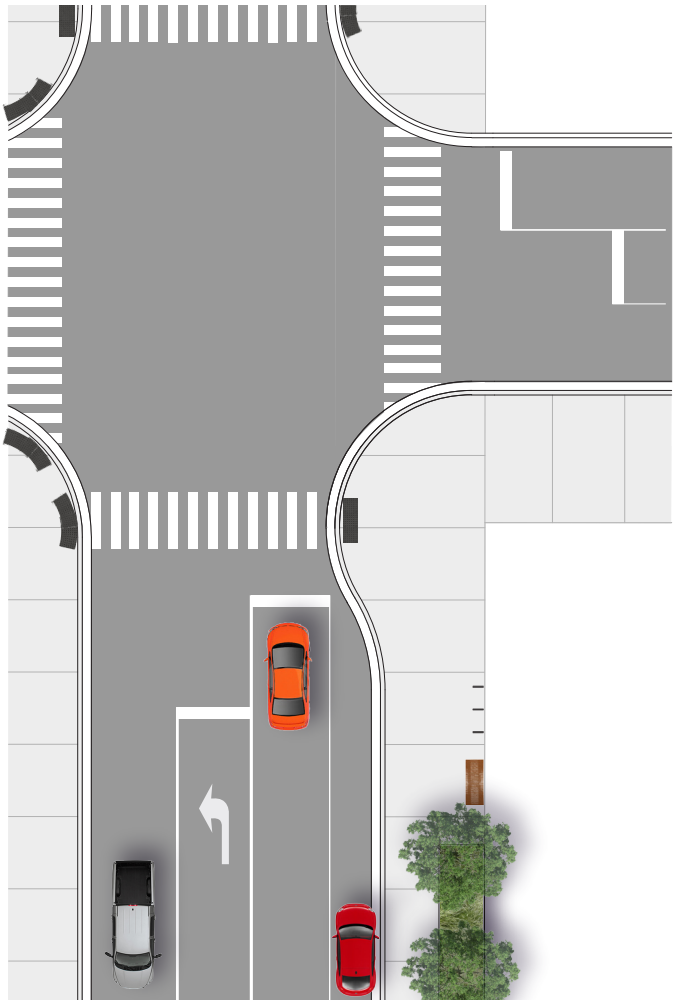
In areas where the on-street parallel parking lane terminates it is generally appropriate to widen the sidewalk to provide additional pedestrian realm amenity. This occurs at intersections, mid-block crosswalks and some driveways. The curb bump out shortens crossing distances for pedestrians and can provide small areas of refuge. Their length will vary based on their role — longer where they provide seating and furniture. Each bump out will be designed based on its context.

Options for curb bump outs



A: Long Curb Bump Out

Curb bump out lengthened to accomodate stand alone street furniture such as benches, bicycle rings, garbage receptacles or other amenities. The length of the bump out will vary with the furniture.



B: Short Curb Bump Out

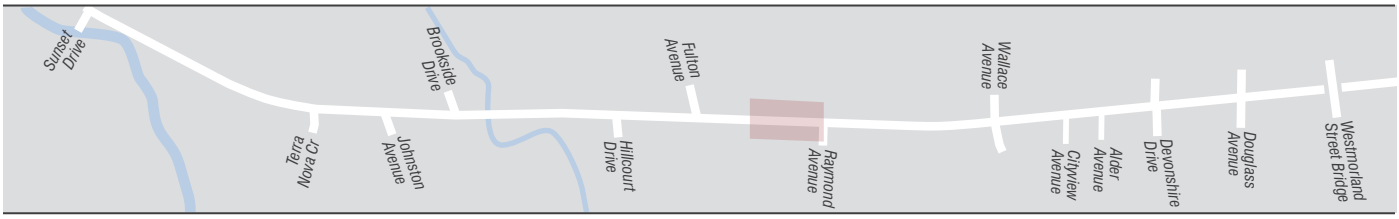
The primary purpose of the short bump out is to provide shorter intersection crossings for pedestrians.

C: Parklette

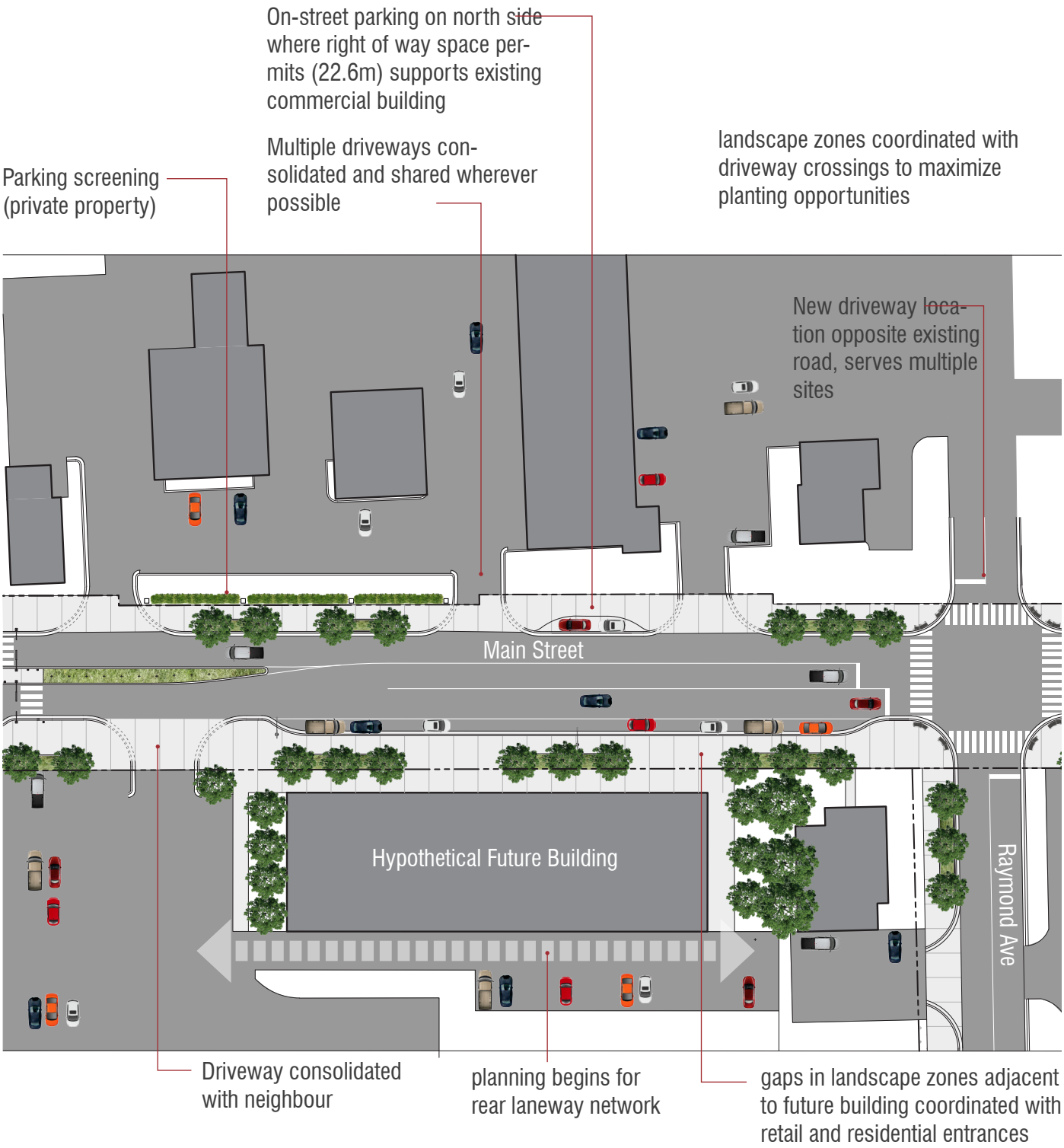
Curb bump out lengthened to accommodate custom Parklette or other street furniture that celebrates a special gateway or node along Main Street.

2.9 Planning for Buildings and Driveways

There are many existing driveways that cross the boulevard zones, and many buildings which are built at or near the property line. These will influence the location of planting zones, street furniture, on-street parallel parking and the need for a centre left turn lane. The goal is to provide a regular rhythm of street tree planting. However, driveways will necessitate gaps. The City will work with adjacent property owners to consolidate driveways wherever possible, and to minimize driveway widths crossing public property. Existing and planned buildings should be supported through the location of street furniture and on-street parking located close to entrances, particularly for commercial/retail uses.



Existing Conditions Near Raymond Avenue



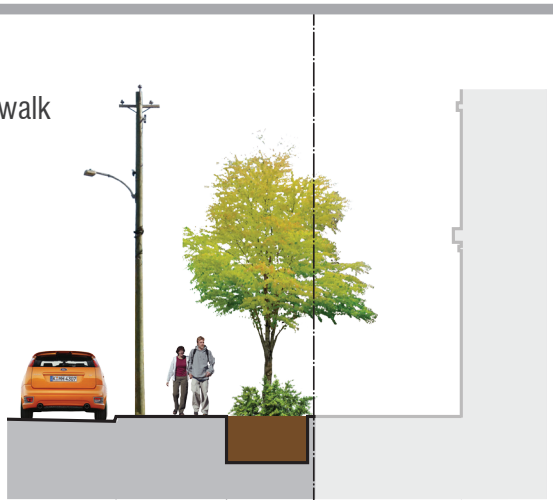
Demonstration Streetscape

3.0 Design Details

3.1 Tree Species Selection

Planting Typology A: Next to Roadway

Planting Typology B: Middle of Sidewalk



Planting Typology C: Large Soil Volume or Next to Open Space

LARGE TREES

Soil volume greater than 30 cubic metres is required, or greater than 20 cubic metres per tree when soil volume is shared with other trees.

SPECIES	PLANTING TYPOLOGY
Bur Oak (*Quercus macrocarpa*)	A, B, C
Red Oak (*Quercus rubra*)	A, B, C
Swamp White Oak (*Quercus bicolor*)	A, B, C
Sugar Maple (*Acer saccharum*)	C
American Basswood (*Tilia americana*)	A, B, C
Little Leaved Linden (*Tilia cordata*)	A, B, C
Eastern White Pine (*Pinus strobus*)	A

LARGE - MEDIUM TREES

Soil volume greater than 20 cubic metres is required, or greater than 15 cubic metres per tree when soil volume is shared with other trees.

SPECIES	PLANTING TYPOLOGY
D.E.D. Res. White Elm (*Ulmus americana D.E.D. Res.*)	A, B, C
Siberian Elm* (*Ulmus Pumula*)	A, B, C
Red Maple (*Acer rubrum*)	A, B, C
Silver Maple (*Acer saccharinum*)	A, B, C
Freeman Maple (*Acer x freemanii*)	A, B, C
Honey Locust (*Gleditsia triacanthos*)	A, B, C
Common Hackberry (*Celtis occidentalis*)	A, B, C

*Species prone to sudden branch drop

MEDIUM TREES

Soil volume greater than 10 cubic metres is required, or greater than 8 cubic metres per tree when soil volume is shared with other trees.

SPECIES	PLANTING TYPOLOGY
Hawthorn Species (*Crateagus* sp.)	B, C
Miyabe's Maple (*Acer miyabei*)	B, C
Hedge Maple (*Acer campestre*)	B, C
Amur Maple (*Acer ginnala*)	B, C
Paper Birch *(Betula papyrifera)*	C
Yellow Birch *(Betula alleghamensis)*	C

SMALL TREES/SHRUBS

Soil volume greater than 5 cubic metres is required, or greater than 3 cubic metres per tree when soil volume is shared with other trees.

SPECIES	PLANTING TYPOLOGY
Serviceberry Species (*Amelanchier* sp.)	B, C
Weigela Species (*Weigela* sp.)	C
Hazel Species (*Hamamelis* sp.)	C
Ninebark Species (*Physocarpus* sp.)	B, C
Lilac Species (*Syringa* sp.)	B, C
Viburnum Species (*Viburnum* sp.)	B, C
Dogwood Species (*Cornus* sp.)	B, C

Planting Standards

Trees perform infrastructural roles including stormwater management through root uptake and respiration, urban heat island mitigation through shading, pedestrian comfort, provision of habitat for avian and insect populations, and increase resiliency in the face of climate change. Trees beautify the environment, provide psychological benefits and promote physical health in people. We believe the economic value of a tree increases exponentially with age, with a potential cumulative value of $160,000+ per tree. Over 50 years one tree will produce $31,250 of oxygen, $37,500 of recycled water, and $31,500 worth of erosion control (US Forest Service, ISA, 2013). It is therefore a fundamental principle of this Street Design Manual to create a tree lined street.

Trees must be thought of and included in the allocation of above- and below-grade infrastructure within the right of way and allocated sufficient space to perform their function. Trees cannot be an afterthought.

There are many factors that contribute to successful trees, but foremost is their soil conditions: sufficient soil volume, appropriate texture, quality soils that are not compacted, and access to air and water. Under this Street Design Manual, every effort will be made to provide sufficient soil volumes and appropriate growing conditions for trees. This will mean careful consideration of every tree location and the application of new engineering practices that prioritize soil volumes, appropriate soils, and access to water and aeration. In some cases, consideration may be given to the provision of soil cells, specialized modular structures designed to bear the weight of paving and above ground infrastructure in order to provide large, non-compacted soil volumes under the sidewalk.

This approach to the growing requirements of trees is intended to ensure that tree life expectancy cycles are considered in increments of 50 to 100 years. Even the fastest growing and shortest lived trees will thrive for 50 years, and the slower growing and longer lived trees will have an opportunity to last a century.

An important goal for Main Street is to appropriately balance street trees with the other elements of public infrastructure in a fiscally responsible manner. This increased consideration of tree requirements will be a key component of the Design Development process. Design Development shall be guided by the following general targets.

Soil

The biomass of urban trees that we see above grade, which includes the trunk, branches and leaf volume, is approximately equal to the biomass below ground, which includes the root network. To achieve large street trees, soil volume for canopy trees should be 30 cubic metres per tree, or 20 cubic metres per tree if soil volumes are shared. Soil volume calculations shall consider only the soil available within the first 1.4m of soil depth. Below this, there are significant diminishing returns, as tree roots do not benefit from any additional soil depth. Volumes less than 14 cubic metres will not support a long-term functional tree (James Urban, Making Space for Roots: Tree Planting Options in Urban Areas, 2009. http://www.isa-arbor.com/myaccount/myeducation/resources/ceu-april10.pdf).

Tree roots are opportunistic, in that they will fill the available space that provides access to air exchange and water. This means that soil volumes can be provided in long, linear, connected trench beneath the sidewalk surface, which works well with the available Landscape/Furnishing Zone along Main Street (i.e. the soil volume shape can be different from the canopy shape).

It is recognized that 30 cubic metres of soil volume will not be achievable in all locations. 20 cubic metres of soil volume will still support a large tree, though at a lesser growth potential. At reduced soil volumes, different types of trees need to be considered. This section provides guidelines for appropriate tree species matched to planting typologies, including soil volumes. There will be very

few instances where trees are not possible. Consider enhanced lighting, furniture and paving treatments at these locations to compensate.

Irrigation systems are not generally recommended, however, it is critical to the long term health of trees to provide weekly watering during the first two years following transplant when feeder root establishment occurs. This should be accompanied by appropriate fertilization.

Soil pH levels are important for nutrient uptake and appropriate levels vary depending on species (Soil Management for Urban Trees - Best Management Practices, 2014). Soil Organic Matter content should be 3-10% (Soil Management for Urban Trees - Best Management Practices, 2014). Soil can be amended at time of planting with micorrhizal inoculant. Consider all pH altering influences on the soil. For example, an oak typically requires alkaline soil, so a softwood mulch with acidic properties is not an appropriate top dressing. Mulch should be shredded and non-pH altering.

Roots require air and therefore soil must be well drained. Soil should drain within 24 hours of rainfall events. A Draw Down test must be used to check drainage during construction, prior to tree installation, to confirm adequate drainage. Appropriate mitigation is required if soil does not drain. It is too late to do this after construction is complete.

Over an urban tree's life span, the quality of its soil depletes, as the tree uses up nutrients and minerals for its growth. A soil depletion strategy should be established with biennial soil testing and then fertilization and mulching based on test results.

Planting Details

Temporary tree guards can be used after tree transplant to protect trees from snow removal operations, bikes, and vandalism. Tree guards should be removed after approximately 5 years or when the tree reaches 30cm diameter at breast height. Tree guards should not touch the tree or constrain growth in any fashion. Tree grates and paving details must allow adequate space for future trunk flare. Trees should be planted with the trunk flare above finished grade (top of rootball should be planted 2 to 4 cm above grade to allow for settlement), and ensure the trunk is plumb. Specimens should be Balled in Burlap.

Existing trees that are well established, in good health and contribute to the streetscape should be preserved wherever possible.

The Urban Forest System

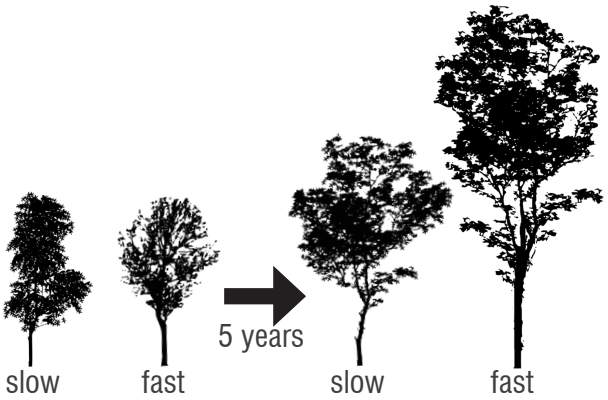
There are many considerations when selecting appropriate trees for specific streets or locations along Main Street. This Street Design Manual focuses on the urban forest as a system and promotes the principle of biodiversity and growth rate stratification when selecting tree species. Tree selection will be approved by the City Forester.

Biodiversity is founded on ecological principles with a host of benefits, but of particular importance is the establishment of resiliency. ISA best practices promote species selection based on the following guidelines:

- no more than 30% from the same family;
- no more than 20% from the same genus; and
- no more than 10% from the same species.

The purpose of this allocation is to prevent the same kind of monoculture that devastated the trees of urban streets including the American Chestnut, American Elm, and Ash trees. Many species today are under threat from pests and diseases (for example, Asian Long Horned Beetle), and diversity will help to ensure trees along Main Street are more resilient and remain green. While these percentages are a goal of the urban forest system, it will be difficult to achieve it along Main Street, where there are fewer trees to choose from of sufficient hardiness and adaptation to urban conditions.

Growth rate stratification is based on the fact that different species grow at different rates and have different life expectancies. Generally, fast growing species are shorter lived than slow growing species. By mixing both types along streets, it ensures that a green canopy is achieved as quickly as possible, and that it remains green, because when the fast growing species reach the end of their lives, the slower growing species will have reached their mature size.



Growing Conditions for Trees

The large street trees on Fredericton's many older streets are a result of historic circumstances. They were planted at a time, often a century ago, when engineering standards were not as well developed. This gave the trees decades in which to establish themselves, growing extensive root networks that take advantage of many permeable surfaces, cracks in the sidewalks, gaps in infrastructure, and less-compacted natural soils. In more recent times, the environment for new trees is not conducive to prolonged health. Contemporary engineering practices promote rigorous compaction of subsurface fills, primarily crushed rock, which roots cannot penetrate. The quantity of soil available for roots is constrained to the pit they are placed in, and roots cannot grow beyond their pits to find other sources of water and nutrients.

This problem is shared by many cities around the world: trees that don't grow, die young, and require constant replacement. It is environmentally irresponsible to plant trees that will only survive for a short time. Tree longevity must be planned for. For cities committed to re-greening their streets with large, thriving trees that live for decades, new thinking is emerging. Progressive engineering is finding ways to create large soil volumes under the sidewalk for the benefit of trees, and utilities are routed appropriately through or around these soil volumes.

TREE BAGS

Tree bags store water and release it slowly to the soil over a period of 4-24 hours (for example, Treegator Bag). They contribute to tree establishment and healthy growth following transplant, a critical time for new trees. During its first two years, a newly transplanted tree must re-establish the absorbing feeder roots from its root ball. Tree bags should be provided, at a minimum, for each new tree during the year of planting and the following growing season, but removed over winter. The tree bag must be filled at a minimum of once per week, and twice per week during periods of drought. Nitrogen, phosphorus, potassium, trace nutrients and minerals are also critical to trees during this time and can be delivered by the tree bags.

Box Litter Bin

The Box Litter Bin is manufactured from a robust 6mm thick sheet metal structure and two doors of which one is fixed and one which opens. The doors can be made with vertical 57x18mm section to hold timber slats which fit onto a tubular steel structure. The litter bin is equipped with a zinced steel ring to hold plastic waste sacks. The litter bin is available with an ashtray upon request. The litter bin is available in three sizes: 50L for wall fixing, 100L and 135L for ground fixing with M8 bolts (not included). All metal parts are hot dip galvanised (in accordance with the relevant UNI standards) and polyester powder coated. All fixings are stainless steel.

Specification:

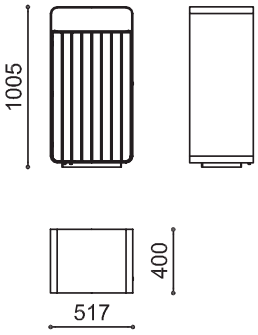
Materials:
Body - Powder Coated Steel; Timber.

Finish:
Galvanised. Powder Coated.

Fixings:
Pre-drilled for anchors.

Dimensions

H: 780mm / 1005mm
W: 393mm / 517mm
D: 255mm / 400mm



(Technical Drawings for variants available on request)

artform
urban furniture

Artform Urban Furniture Ltd | Adlington Business Park | Adlington | Cheshire | SK10 4NL | **t :** 0800 542 8118 | **w :** artformurban.co.uk

STREETLIFE®

Product Sheet Rough&Ready Bicycle Racks

Bicycle rack in the style of the Rough&Ready family. FSC® hardwood beam combined with a solid galvanized steel or weathering steel frame.

Product Code	**R&R-BP-CT**
Dimensions	ca. 70x75x7cm | 28x30x2.8" (wxhxd)
Weight	ca. 18kg | 40lbs
Material	Timber: Untreated FSC® Hardwood beams (Louro Gamela) Single beam (7x15cm | 2.8x5.9") Foundation: prefabricated concrete block Alternative: All Black recycled black plastic Steel: weathering steel (optionally powder coated in RAL color)
Mounting equipment	Wood bolts (M6)
Delivery	Frame and beam separate
Cleaning & Maintenance	Timber: with clear water and soft brush or cloth; do not use high pressure cleaner or similar (this can open up the wood grain and make the surface coarse) The timber can be gently sanded every 2-3 year (in the direction of the wood grain)

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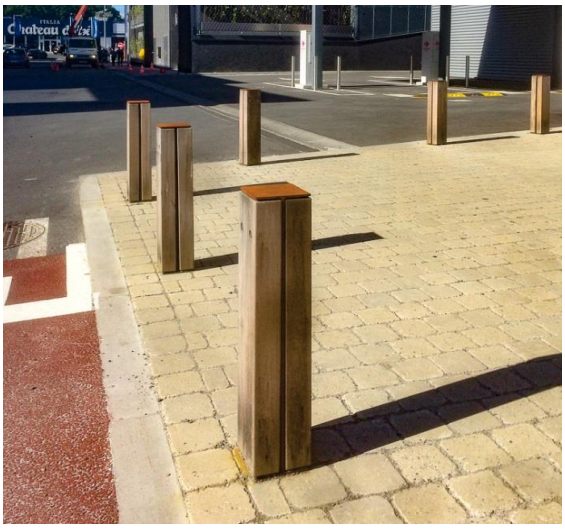
Chamber of Commerce: 28.073.827 Tax No. NL 806077049B01

STREETLIFE®

Product Sheet Rough&Ready Bollards

Bollard in the style of the Rough&Ready family. FSC hardwood or All Black beams combined with a solid galvanized steel or weathering steel frame.



Product Code	**R&R-BOL-45 CT / R&R-BOL-75 CT**
Dimensions	ca. 45x15x15cm | 18x6x6" ca. 75x15x15cm | 30x6x6"
Weight	ca. 15kg | 33lbs ca. 25kg | 55lbs
Material	Timber: Untreated FSC Hardwood beams (Louro Gamela) Two beams (7x15cm | 2.8x5.9") mounted with Streetlock® system with stainless steel threaded rod and anti-theft flange nuts Steel: weathering steel Steel thickness: 6 mm (¼") Optional: Steel ground anchor Alternative: All Black recycled black plastic
Mounting equipment	Stainless steel anti-theft flange nuts and Pin-Torx key
Delivery	Frame, beams and mounting tools separate (knock down)

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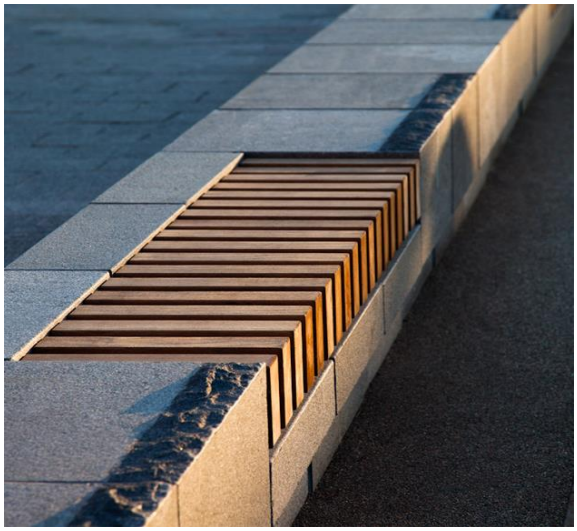
STREETLIFE®

Product Sheet Rough&Ready Crosswise Topseat

Timber seat including double support rail



Product Code	**R&R-CW-TOP-200-60**
Dimensions	ca. 200x60x17cm | 79x24x7” (lxwxh)
Weight	ca. 144 kg / 318 lbs (plain, no accessories)
Materials	Seat: timber, untreated FSC 100% Hardwood (Louro Gamela) Beams (7x15cm | 2.8x5.9”) fixed in Streetlock®comb system Seating depth ca. 60cm | 24” Support rails: hot dip galvanized steel (standard)
Accessories / extras	Single or Double beam backrest FSC 100% Hardwood Armrest in stainless steel with micro-peen finish Seat in black recycled plastic (All Black)
Mounting equipment	Not included
Delivery	Pre-assembled seat modules ready to install
Installation	Surface mounted on continuous brick or concrete wall using M8 bolts
Cleaning & Maintenance	Timber: with clear water and soft brush or cloth; do not use high pressure cleaner or similar as this can open up the wood grain and make the surface coarse. The timber can be gently sanded every 2-3 years, in the direction of the wood grain, using a fine grain sandpaper.

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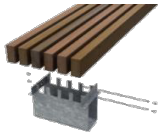
STREETLIFE®

Product Sheet Rough&Ready 6 Benches

Low bench with timber seat and steel supports, 5 - 8 seater, extendable with extension set

Product Code		**R&R-L6-300 / R&R-L6-300-Ext**
Dimensions		ca. 300x59x45cm | 118x24x18” (lxwxh)
Weight		ca. 205kg | 452lbs (plain, no accessories)
Materials		Seat: timber, untreated 100% FSC Hardwood (Louro Gamela) 6 beams (7x15cm | 2.8x5.9”) ca. 60cm | 24” depth Mounted in Streetlock® comb system with stainless steel threaded rod and anti-theft flange nuts
		Support: open laser-cut rectangular shape Hot dip galvanizing according to NEN-EN-ISO 1461: 2009NL Optionally: CorTen Steel (weathering steel) or double powder coat finish in RAL or DB colour
Mounting equipment		Stainless steel anti-theft flange nuts and Pin-Torx key
Optional		Single or double beam backrest 100% FSC hardwood convex planed on one side Armrest in stainless steel with micro-peen finish Anti-Skate-Knobs (ASK) in stainless steel
Delivery		Supports, beams and mounting tools separately (knock down)

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Handelsregister: 28.073.827 USt - IdNr.: NL 806077049B01

STREETLIFE®

Product Sheet Rough&Ready Curve Top Seats

Curved topseat with Rough & Ready seating including double support rail

Product Code	**R&R-C-TOP-200-60**
Dimensions	ca. 200x60x17cm | 79x24x7” (lxwxh)
Weight	ca. 138kg (plain, no accessories)
Material	Seat: timber, untreated 100% Hardwood (Louro Gamela) 20 beams (7x15cm | 2.8x5.9”) ca. 60cm | 24” depth Mounted in Streetlock® comb system Comb: set of two curved profiled combs of hot dip galvanized steel According to NEN-EN-ISO 1461: 2009NL
Mounting equipment	Pin-torx bolt mounting using supplied specialty tools
Available accessories	Double beam backrest 100% Hardwood convex planed on one side Armrest in stainless steel with micro-peen finish Seat in black recycled plastic (All Black)
Delivery	Pre-assembled

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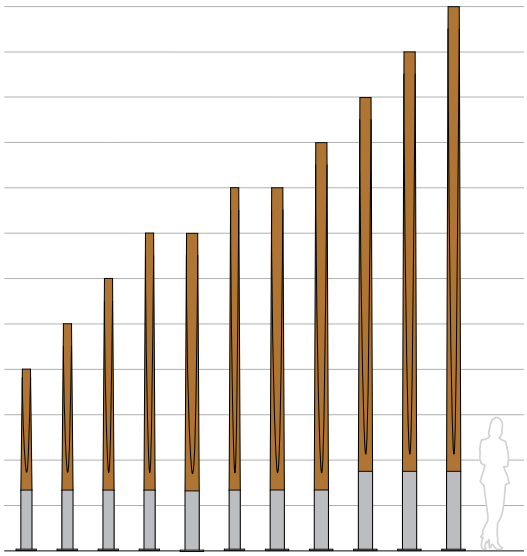
Bol – RSQ 8' – 24' Round Tapered to Square Pole

FIXTURE TYPE: _____

PROJECT NAME: _____



Round Tapered to Square

Glulam solid wood and aluminum pole available in 8' – 24' lengths. Tenon adapters, slip fitters and side bracket mounts are available for luminaire mounting.

FEATURES:

- Unique CNC machined, round cross section at the base tapering to square cross section at the pole's top.
- Solid glulam wood construction.
- Round extruded aluminum pole base with flush handhole cover held with countersunk stainless steel fasteners.

SPECIFICATIONS:

HOUSING: Solid wood pole is assembled through glulam construction and precision machined using CNC technology. The pole's cross section begins round at the base and tapers to a square cross section at the top. An electrical raceway is provided in the pole's center for wiring. Laminations measure no more than 2" in thickness. Adhesive complies with ASTM D-2559 glulam construction specifications for extreme exposed weather conditions, is waterproof and rated for wet or dry use exposure.

Glulam wood shaft is fastened to aluminum pole base welded to a 3/4" thick aluminum anchor bolt base. Anchor bolt kit includes (4) 3/4" hot dip galvanized anchor bolts and fasteners and ridged concrete pour template.

FIXTURE MOUNTING: Fixtures mount either by 2 3/8", 2 7/8", 3 1/2", or 4" diameter by 4" tall tenon or drill mount for arm brackets. Consult factory for other tenon sizes. Luminaires shall be provided by others.

ELECTRICAL: A 5/16" – 18 grounding point is provided on the aluminum pole base. Wireway access is provided through a NEC compliant handhole with a flush, gasketed cover plate.

FINISHES AND MATERIALS: Woods are finished with a low VOC waterborne matte exterior finish containing UV and mildew inhibitors. All aluminum parts are polyester powder coat painted.

HARDWARE: Fasteners are stainless steel. Anchor bolt kits are hot dip galvanized.

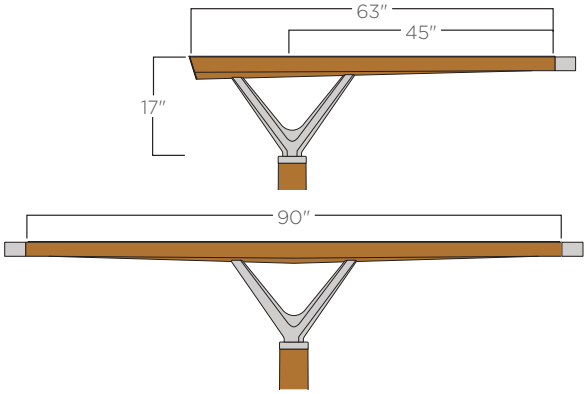
Vega/Omega Wood and Aluminum Mounting Arm

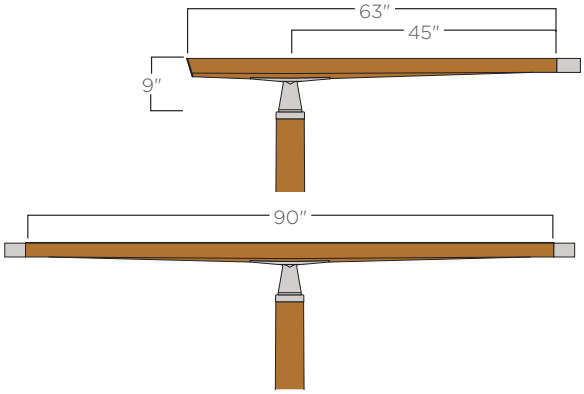
FIXTURE TYPE: _____

PROJECT NAME: _____


Vega


Omega





Wooden fixture mounting arm with aluminum accents to attach to wood poles.

FEATURES:

- Easy slip fit luminaire attachment
- Available for single or double fixture attachemnt
- Pole top connection with two different connection appearances and styles.

SPECIFICATIONS:

CONSTRUCTION: Solid glue laminated wood. Casted aluminum piece to connect arm to pole.

FINISHES AND MATERIALS: Woods are finished with a low VOC waterborne matte exterior finish containing UV and Mildew inhibitors. Woods can also be supplied without finish to naturally weather. All metal parts are polyester powder coat painted.

HARDWARE: All fasteners are stainless steel.

ELECTRICAL: Electrical raceway through center of arm connecting to pole.

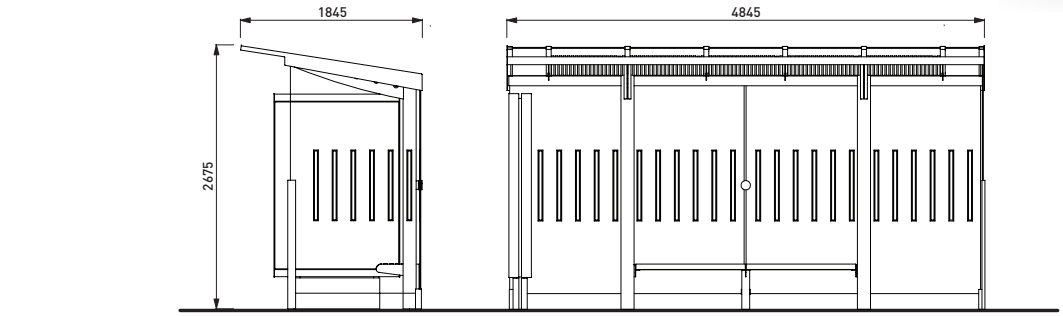
ORDERING GUIDE: EXAMPLE: VEGA-DBL

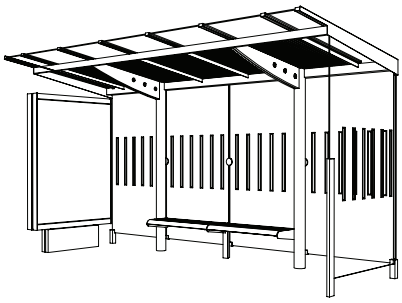
1	2

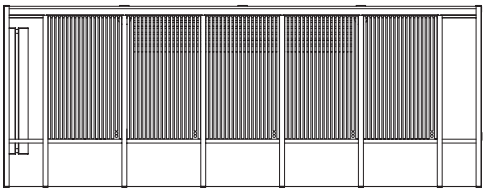
1	Series	2	Arm
VEGA	Vega	**SNGL**	Single
OMEGA	Omega	**DBL**	Double

Designed by Aubrilam

ILLUSTRATIVE PHOTO







DATE: 16. 10. 2016 V: 02

dimensions in mm

REG310b - REGIO

mm cité 1

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Rozměry výrobků mají informativní charakter. Výrobce si vyhrazuje právo na změnu technické specifikace bez předchozího upozornění. Rozměry spodní stavby a způsob osazení výrobku jsou závazné. Rozteče kotev rozměřovat dle rozměrů dodaného výrobku.
All product sizes have an informative character. The producer reserves the right to amend the technical specification at any time without previous warning. The size of foundantion baseplate and the method of mounting of the product are imperative. Anchor spacing measure out by measurements of supplied product.
Die Abmessungen der Produkte sind informativ. Der Hersteller behält sich das Recht an Änderungen der technischen Spezifikationen vor, ohne vorher darauf hinzuweisen. Abmessungen der Fundamentierung – Unterbau und Art des Produkteinbaus sind verbindlich. Ankerabstand gemäß der gelieferten Produktabmessungen dimensionieren.
Dimensions des produits sont à titre informatif seulement. Le fabricant se réserve le droit de modifier les spécifications techniques sans préavis. Dimensions des fondations et manière de l'implantation du produit sont obligatoire. Ancre écartement dimensions à partir des dimensions du produit livré.
Las dimensiones de los productos tienen carácter informativo. El fabricante se reserva el derecho de cambio de la especificación técnica sin aviso previo. Tanto las dimensiones de las bases de cimentación como el sistema de fijación son inalterables. Hay que medir el espaciamiento de anclajes según las dimensiones del producto suministrado.

Stop shelter with flat glass roof, covered space 9m^2 (9 sq yd) - 1.8 × 4.9m (71“×193“)

Variations:	REG310a	shelter with glass fillers
	REG310b	shelter with one backlit showcase
	REG310c	shelter with two backlit showcases
Construction type:	Steel construction with glass fillers on the side and back walls and the glass roof will be assembled at the installation place using stainless screw joints; total shelter height 2,500mm (98“).	
Coating:	The steel construction is equipped with a protective layer of zinc and powder coating.	
Support frame:	Supporting poles and lengthwise mangers are made of welded steel construction consisting of 133×8 (5.2“×0.3“) tubes and 4, 10 and 12mm (0.2“, 0.4“ and 0.5“) thick steel sheet; supporting consoles supplied with boards made of 30mm (1.2“) thick white-wood piedroit, equipped with outer coating; frame, used as a support frame for glass fillers and shelter roof; it also ensures roofing drainage.	
Fillers of back and side walls:	10mm (0.4“) thick hardened glass with safety printing; alternately - one or two backlit showcases CL 170 or CL 110 instead of side fillers.	
Roofing:	2×5mm (2×0.2“) thick laminated security glass with printing.	
Drainage:	Lead through the medium of PVC hose through supporting pole with an opening above the paving behind the back wall of the shelter.	
Other equipment:	Integrated bench with seat made of five 58×38.5×1,690mm (2.3“×1.5“×67“) lamellae and one 58×58×1,690mm (2.3“×2.3“×67“) end lamella made of massive tropical-wood, equipped with coating, in steel holders tightly attached to the shelter. Can be equipped with one or two C-light showcases (according to version).	
Colour scheme:	Shades of polyester powder coatings in the fine structure mat, standardly provided by mmcité. Other shades according to the RAL sampler are available on request.	
Anchoring:	Anchoring under the paving or in compacted terrain into concrete foundation using M20 (3/4“) AND M12 (1/2“) threaded rods. All supplies of street furniture must be fixed according to the manufacturer's technical instructions. If these indications are not met, you risk a damage of product and human consequences. The manufacturer declines any responsibility for possible damages caused, directly or indirectly, to people, animals or things caused by non-compliance with the instructions manuals and, in particular, with installing, use and service operating instruction.	
Weight:	1,180kg (2,601lb)	
Declared properties:	Execution class - EXC2 (CC2 / PC2 / SC1) according to ČSN EN 1090-2+A1:2011 Snow load - Surface load= 1,5kN/m^2 (150kg/m^2) according to ČSN EN 1991-1-3 Wind load – Guaranteed wind resistence up to speed of 25,1m/s (90km/h) according to ČSN EN 1991-1-4	
Option:	Different than standard colour. The time table carrier can be installed into the back wall filler.	

DATE: 14.4.2015 V:03
TECHNICAL SPECIFICATIONS
REGIO REG310

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