



Main Streets Program:

17th Avenue SW Streetscape Master Plan

Crowchild Trail SW to 37 Street SW

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Web: www.calgary.ca/mainstreets

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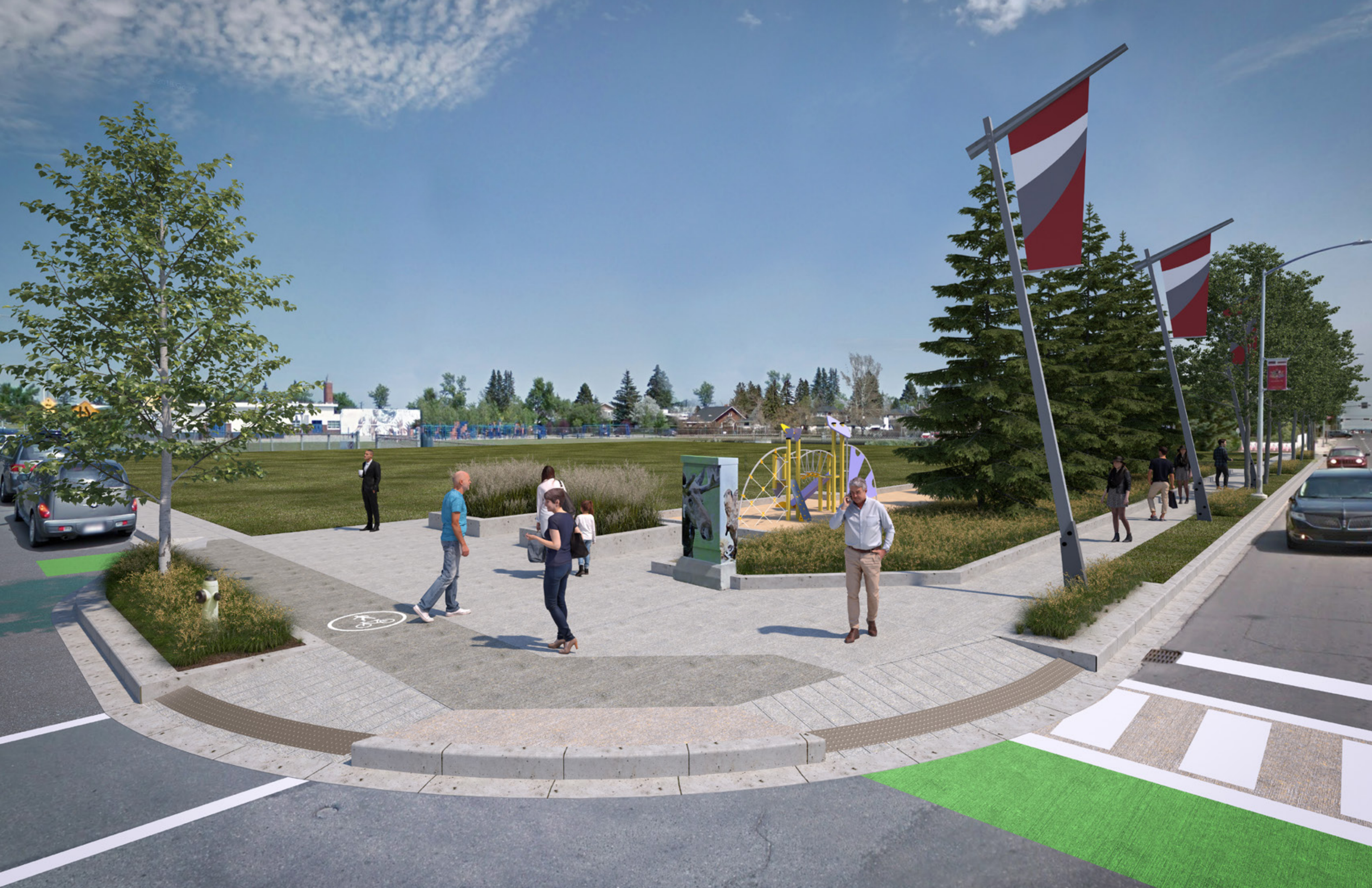


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EXECUTIVE SUMMARY

“The Main Streets Program focuses on implementation approaches and programs to enable the policies, goals and targets contained in the MDP for selected main streets areas. This includes development and implementation of designs for streetscape master plans. Main Streets is similar to the Centre City Implementation program which has successfully implemented public realm and corridor improvements since approval of the Centre City Plan in 2007.”

17th Avenue SW, between Crowchild Trail Bridge and 37th Street SW is a busy vehicle-oriented street corridor that links to and from Calgary’s downtown. As a high priority project within the City Main Streets Programme, 17th Ave SW requires a significant transformation; Pedestrians need to feel safer, cyclists require better connectivity to the greater City bike network and the eclectic social make-up of the surrounding communities and local businesses should be represented throughout the streets public spaces. There are very few public trees along the corridor and increasing the urban tree canopy will improve aesthetics and socio-economic, environmental benefits.

The 17th Avenue SW Streetscape Master Plan Study included a large number of stakeholders who were engaged over a two year period. The work was collaborative, involving citizens representing regular corridor users, area residents, businesses, and representatives from City of Calgary departments. Group and one-on-one sessions were conducted with these stakeholders to better understand the unique aspects of the street resulting in a collective vision and key design principles to be followed throughout the redevelopment.



Existing View at Northwest Corner (17th Ave. and 35th St.)

The Project Team analyzed the feedback and created the DNA and building blocks for the street’s development. A Project Toolkit has been included in the Master Plan. This will inform the design and provide an enhanced public realm that is multi modal and less vehicle focused while maintaining the traffic flows.

In summary, the Master Plan includes the following key design elements:

- **Environmental improvements including more street trees and vegetation;**
- **Curb extensions at the entry points to the adjoining residential streets providing opportunities for storm water infiltration and traffic calming without interrupting the flow of traffic along 17th Avenue;**
- **Bury all of overhead power lines that detract from the public realm;**
- **Potential locations for off-peak parking if traffic volume analysis supports this;**
- **Better connectivity for cyclists over Crowchild Bridge and through the 26th Street and 29th Street bike routes with the introduction of multi-use pathways and protected intersections;**
- **Improved pedestrian connectivity and accessibility with wider sidewalks (where setbacks allow), directional crosswalks, and more pedestrian crossings;**
- **Enhanced street and pedestrian scale lighting for better public safety and winter interest**
- **Maximize setback at intersections allowing for larger public spaces and more circulation space and seating as well as animation of adjacent restaurant patio’s; and**
- **Opportunities and space for public art and community signage/identity.**



Potential Improvements at Northwest Corner (17th Ave. and 35th St.)

A traffic study was carried out to investigate the feasibility of reducing the number of lanes and providing a wider public realm and sidewalk area. Due to future and existing volume and capacity, the study did not support lane reductions and was removed as a design option early on in order that the Project Team could focus on public realm improvements, based on the existing lane widths, by-law setbacks and the approved design and traffic study for the Crowchild Interchange.

The corridor redevelopment has been divided into 4 distinct zones:

- 1) Commercial Gateway Zone
- 2) Mixed Use Recreation Zone
- 3) Mixed Use School Zone
- 4) Residential and Mixed Use Crowchild Bridge Gateway Zone

A consistent design approach and uniform material palette will connect all of these zones and create a cohesive design along the entire 2km stretch of this project.

The Master Plan achieves the following design outcomes for streetscape improvements:

- 1) **300-400 new trees.**
- 2) **Public realm space within the road right of way expanded to 4,500m².**
- 3) **450m² of storm water infiltration/rain area added by curb extensions.**
- 4) **5 – 8 new crosswalks added over 17th Ave SW.**
- 5) **32 enhanced crosswalks added along the entire stretch of the street corridor.**
- 6) **500 linear metres of multi-use pathway added for pedestrians and cyclists.**
- 7) **1000 linear metres (1.0km) of new sidewalks added.**

The Master Plan is the result of a collaboration between The City and a team of multi-disciplinary professionals including urban designers, planners, landscape architects and engineers. It lays the groundwork for successful implementation and construction. This document also captures the vision and details necessary to guide the next important steps of detail design, approvals and construction.

After implementation, 17th Ave SW will become a destination that attracts a wide variety of users with the resulting economic benefits to local businesses, residents, as well as Calgarians and visitors from further afield.



1.0 INTRODUCTION

1.1 Main Streets Program

The Main Streets Program is one of the ways that the City of Calgary is making our city *“a great place to make a living, and a great place to make a life.”* This program shares The City’s common purpose of *“making life better every day”* by implementing a comprehensive process to transform our main streets into places where people want to live, work and play. The portion of 17th Ave SW between Crowchild Trail and 37th St SW is identified as one of the high priority streets in the City of Calgary’s Main Streets Program. Construction is scheduled to commence in 2020.

The 17 Avenue S.W. Streetscape Masterplan is home to several well-established local businesses and is also bordered by the communities of Killarney/ Glengarry, Richmond, Rosscarrock, Scarboro Sunalta West, and Shaganappi. In the early 1900s, the street served as a boundary to the city, and has always been an important east-west transportation route (Refer to Figure 1.2). The project boundary is along 17th Ave SW, bounded by 37th St to the east and Richmond Rd to the west (Refer to Figure 1.3).

The successful transformation of 17th Ave SW requires a multi-disciplinary approach across numerous areas of focus, including: market analysis, demographics, land use planning, transportation planning, streetscape design, placemaking, and construction. To execute the transformation process, the 17th Ave SW Project is following a 4-step transformation plan (Refer to Figure 1.1).

STEP	ACTIONS	OUTCOMES
Phase 1 - Strategize	<ul style="list-style-type: none"> 2 years of engagement Market analysis 	A plan for implementation
Phase 2 - Plan	<ul style="list-style-type: none"> Land-use redesignations Local plan amendments 	A plan for people, jobs and infrastructure
Phase 3 - Design	<ul style="list-style-type: none"> Streetscape Master Plan Design Development and Detail Design Contract Documents 	A plan for placemaking
Phase 4 - Build	<ul style="list-style-type: none"> Short and long term investments by public + private enterprise Ongoing maintenance and operation by asset owners 	Community transformation

Figure 1.1 Main St. Program Phases

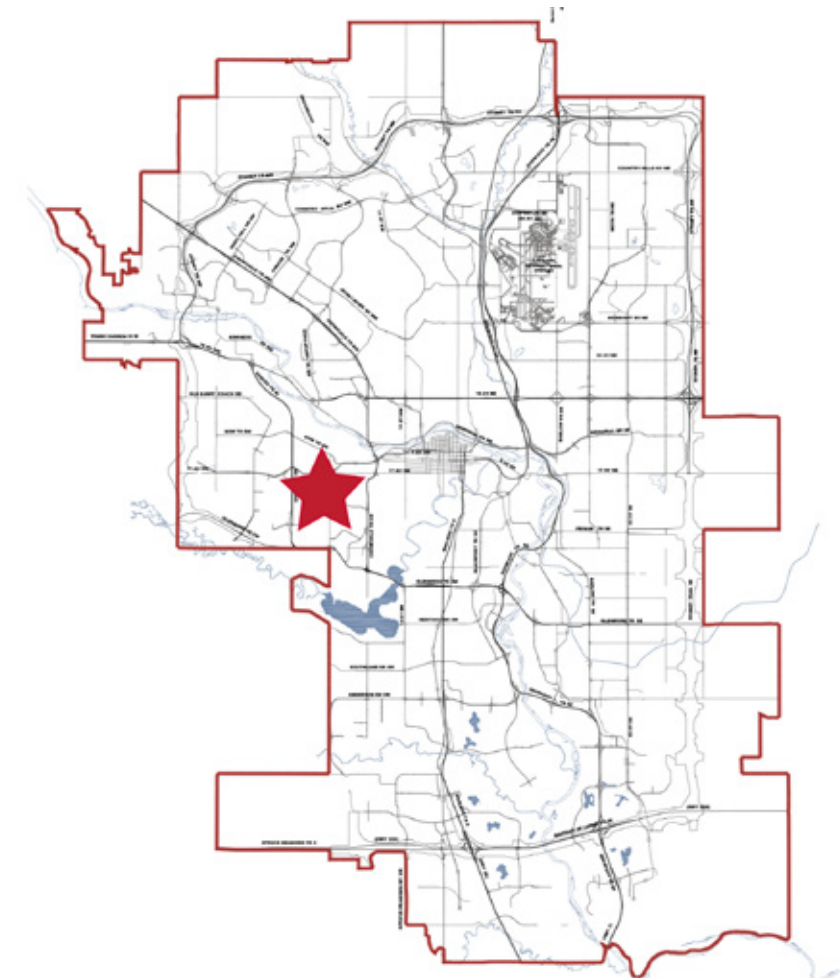


Figure 1.2 Location Map



Figure 1.3 Aerial View of Study Area

1.2 Purpose of The Master Plan

The purpose of the Master Plan is to create a high-level design concept that clearly communicates the “big moves”. The key design elements include all visual and functional components of the street and will become a collaboration tool and blueprint to rebuild 17 Avenue S.W within the road right of way and public / private spaces leading up to the building face. The Master Plan focuses on place-making, creating vibrant public spaces with priority on sociability, accessibility, connectivity, comfort, identity, programmable use and activity.

The Master Plan will provide direction and the foundation for detail design and development permit applications to the City of Calgary within the project boundary.

1.3 Master Planning Process and Engagement

This Master Plan document is the result of a collaborative and integrated process and public engagement which commenced in 2014 . The Master Plan draws upon numerous policy initiatives and documents, both statutory and non-statutory, that have been developed and adopted by the City of Calgary. These inform the vision and goals for this project along with the extensive engagement process that occurred. Feedback was reflected in many aspects of the Master Plan which will serve as an active guide for both immediate and future improvements along the road corridor.

Throughout the engagement process, the Project Team engaged the Steering Committee, Calgary’s City Council, key stakeholders and the general public through a carefully structured series of engagement events. The successful delivery of the 17 Avenue SW Streetscape Master Plan required reliable and consistent communication supported by meaningful engagement opportunities for the community to provide input (Refer to figure 1.4).

As part of the Master Plan process we engaged the public in three phases; **Discover, Explore and Reveal** to better understand the community’s values and aspirations for their street.

In the **Discover** phase we Listened & Learned; stakeholders and The City listened to and learned about public views, plans, concerns, and expectations. A number of engagement events were hosted in March 2018 and the purpose of these events was to inform stakeholders of the project, to collect feedback on the plan vision and to explore opportunities and constraints.

In the **Explore** phase, public feedback was obtained at an Open House to review preliminary design ideas and options developed from input at the Discover phase. The Explore Open House was held on December 3, 2018 at the Glamorgan Community Association to collect feedback on the various design options and the open house materials and a survey were available online from December 3, 2018 to Jan 10, 2019. The project team ensured issues and concerns were understood and considered prior to design revisions to the Master Plan at the Reveal stage. The Project Team determined design drivers that would shape the character of the public realm along the 17th Ave. SW corridor. These design drivers were represented with carefully selected images and descriptions that were uploaded and tested on the City of Calgary Engagement website and visually displayed at the Explore Public Engagement session.

The **Reveal** phase focused on communicating the short and long term strategies that will inform the detail design of the project. The Reveal Open House was held on May 30, 2019 at the Salvation Army Facility (17th Ave SW and 29th St SW) to present the final design and collect feedback. The Open House materials and a survey were available online from May 30, 2019 to June 17, 2019. The information included: (a) the proposed design and a toolkit of the key design elements;(b) what is different from existing; (c) why it is different, and; (d) how engagement input influenced the design, and; if not, explaining how the input was considered and why it could not be incorporated into the design.

Business Engagement: Project team representatives visited businesses along the south side of 17th Ave SW on March 16, 2018. In addition, two business engagement sessions were held on March 25 & 26, 2018 at the Military Museum off Crowchild Trail and Flanders Avenue SW. Only a couple businesses attended these sessions, however the 17th Ave team also visited businesses along 17th Ave in March to inform businesses of the project as well as to receive feedback. Furthermore, individual meetings were set-up with those who requested it. Overall, businesses were excited for the opportunity to improve 17th Ave and attract more people to their business. However, there were a few concerns pertaining to safety, parking availability, snow removal and visibility of business signs.

Police Input: On April 4, 2018 the City of Calgary and IBI Group met with the Calgary Police Service District 2. Councillor’s office representatives were in attendance. These meetings intended to bring agencies to the table to look for a comprehensive social-service solution. The main concerns expressed by the Police at this meeting included safety and security around the Westbrook LRT station, with more homeless individuals having access to the LRT coming into the community. The police calls have increased from 300 to 2000 in the last

twelve months and are related to diverse social disorder matters and crimes. Safety and security was seen as a larger issue closer to the LRT/McDonalds/ Tim Hortons. Police emphasized the importance of Crime Prevention through Environmental Design (CPTED) for public spaces along 17th Ave SW.

A **City of Calgary Internal Stakeholder** workshop was held on March 18, 2018 where opportunity was given for internal business units and departments to provide input and discussion. The project team logged and noted the comments and suggestions and incorporated them into the Master Plan.

A detailed Stakeholder Engagement Final Report, describing all 3 phases, can be found in **Appendix A**. This includes a detailed analysis and outcomes. It also includes a comprehensive list of all the stakeholders who were engaged in each phase of the project and throughout the engagement process.

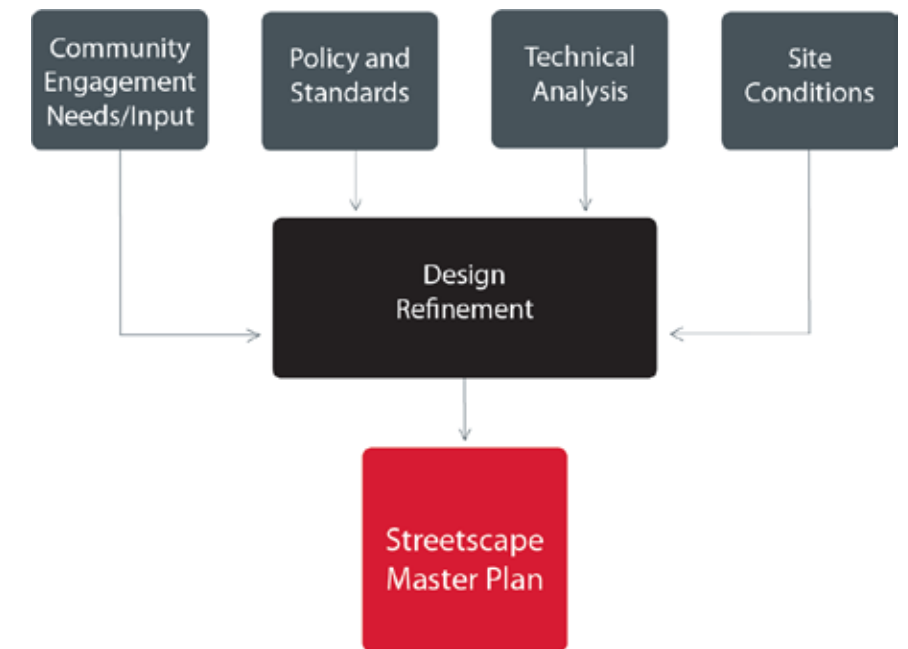


Figure 1.4 Integrated Design Process Diagram

2.0 SITE CONTEXT: Understanding 17th Avenue SW

2.1 Community Historical Context

17 Avenue SW has been a commercial and social focal point of the communities of Richmond, Killarney/Glengarry, Shaganappi and Rosscarrock and Glendale for almost one hundred years. These communities are located on land that was annexed into Calgary between 1906 and 1911, in areas that were once known as Calgary's outer suburbs.

Subdivisions have occurred from the time of those annexations to the end of the 1950's, dividing the communities into 25' and 50' lots. A small number of houses were developed following the annexation, mostly consisting of one-storey, cottage style and two-storey, clapboard houses on 25' lots. However, there was little development in the area until the post-World War II boom with the overwhelming majority of residential development occurring during the 1950's.

Houses from this period are generally one-storey, stucco bungalows on 15 metre (50 foot) lots. The majority of these homes were intended for single family use. In the 1950's, portions of the community were rezoned for three-storey apartments. Some apartment and fourplex development has occurred since that time. Some conversion to two-family dwellings has occurred since the 1950's. Additionally, a small number of 15 metre lots have been redeveloped to create two 7.5 metre (25 foot) lots for single-family infill dwellings. Apartment redevelopment has been limited to a few areas adjacent to 17 Avenue, 33 Avenue and Richmond Road S.W.

The majority of commercial development is located along 17 and 33 Avenues S.W. and serves a local function, while smaller pockets of commercial development are scattered throughout the communities or along corridors intersecting 17 Ave SW. The overall ambience of the 17 Ave SW corridor was functional in nature, with surface and aerial utilities and an automobile-oriented design (Refer to Figure 2.1&2.2).



Figure 2.1 An Undated Photo Showing A CTS Trolleybus on 17th Ave SW
Source: <https://www.bigdoer.com/16387/then-and-now/calgary-transit-then-and-now-17th-ave-sw/>



Figure 2.2 17th Ave SW Calgary in 1974
Source: <https://www.bigdoer.com/23283/then-and-now/calgary-transit-then-and-now-17th-ave-sw-2/>

2.2 Land Use and Community Transformation

Related Plans and Policy

This section provides a summary of background plans, policies and previous studies and demonstrates that the project is aligned with relevant City policies, studies and plans specific to the project boundary (Section A, Figure 2.3). As part of the City's preliminary analysis of local input, economic information and infrastructure investments, it was decided that 17 Avenue SW include 3 Main Street Projects: Crowchild Trail-37 Street, 14 Street-Crowchild Trail and MacLeod Trail-14 Street (Refer to Figure 2.3). It was identified that 17 Avenue SW (from Crowchild Trail to 37 Street SW) is ready for growth and development in the near future. This Master Plan considers various policies, plans and previous studies pertaining to the study area. They included:

- **Municipal Development Plan;**
- **Calgary Transportation Plan;**

- **Killarney-Glengarry Area Redevelopment Plan (provides land use policy that support MDP goals and includes a Main Street Area Development Guidebook);**
- **Shaganappi Point Area Redevelopment Plan;**
- **Developed Areas Guidebook;**
- **Crowchild Trail Functional Planning Study;**
- **Westbrook Village Area Redevelopment Plan (current draft, directed by the goals of the MDP);**
- **TOD Guidelines;**
- **Complete Streets Guide;**
- **Cycling Strategy;**
- **Pedestrian Strategy;**
- **Goods Movement Strategy;**
- **Accessibility Policy;**
- **Pedestrian Policy and Needs Report**
- **Transportation safety and traffic volume reports;**

- **2020 Sustainability Direction;**
- **A Parking Policy Framework for Calgary;**
- **Main Streets Economic Context Background Reports;**
- **Public Art Policy;**
- **Urban Forestry and Parks Guidelines.**

In addition to the overarching policy framework given by the City of Calgary's Municipal Development Plan and the Calgary Transportation Plan, the local policy framework relevant to the Upper 17 Avenue SW Main Street is provided by the following (Refer to Figure 2.5):

- **Richmond ARP includes a Main Street Area Development Guidebook;**
- **The 17 Ave SW Urban Design Guidelines**

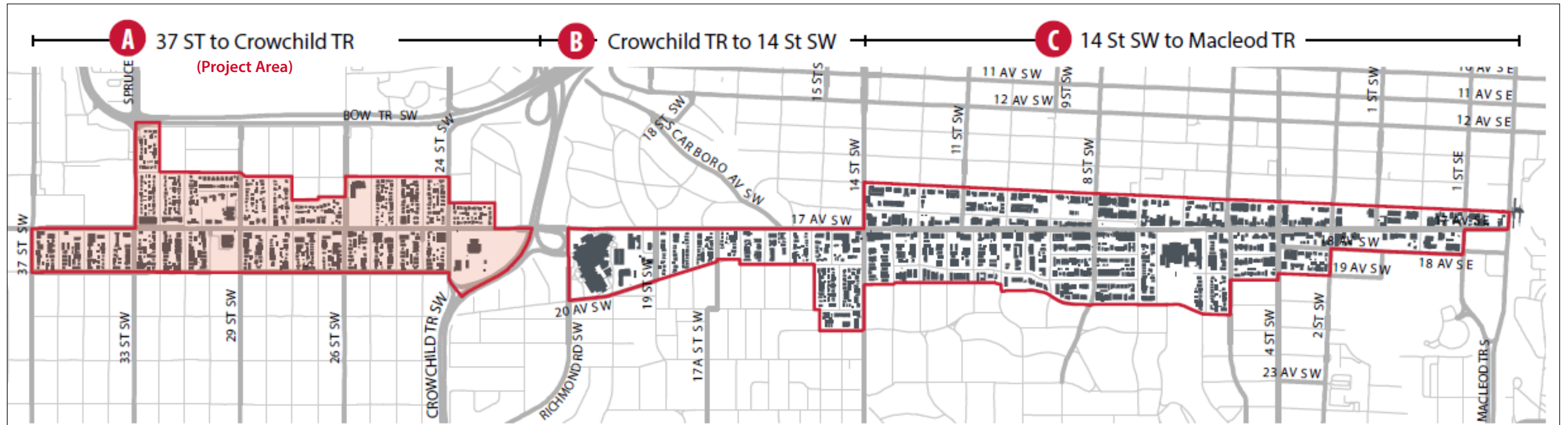


Figure 2.3 3 Separate Main Streets Program Projects along 17th Ave

Land Use Planning

The updated Killarney-Glengarry Area Redevelopment Plan (which includes the areas around the 17 Avenue SW (west of Crowchild Trail) and 37 Street SW main streets) provides support for mixed-use development, low-rise apartments, row houses, as well as single- and semi-detached homes in the blocks nearby.

Current land use, approved in May 2017 allows for a range of mixed use and residential development to the south, but restricts commercial uses on the sunny north side of the street. The Study area has started to see some redevelopment activity as indicated by development permit applications received by the City to date (Refer to Figure 2.4).

The land use boundaries for mixed use and apartment development on both sides poses challenges for site design and building interface. In both cases there is limited opportunity for street level-access forms of multi-residential development such as row or townhouses. Rezoning provides more options for residences and businesses to develop along 17th Ave within the study area.

As part of the initial Main Streets work on 17 Ave SW, a revised land use framework for the study area was approved by Council in May 2017. The new land use provides more options for residential and commercial development along this main street with direct street access, thus encouraging an enhanced pedestrian streetscape and activated frontage.

The proposed enhancements along 17th Avenue will augment the revised land use policy. The increased density and mixed use development will provide tremendous opportunities for animating the frontage of new businesses and mixed use developments and allow better access and interaction with the public realm.

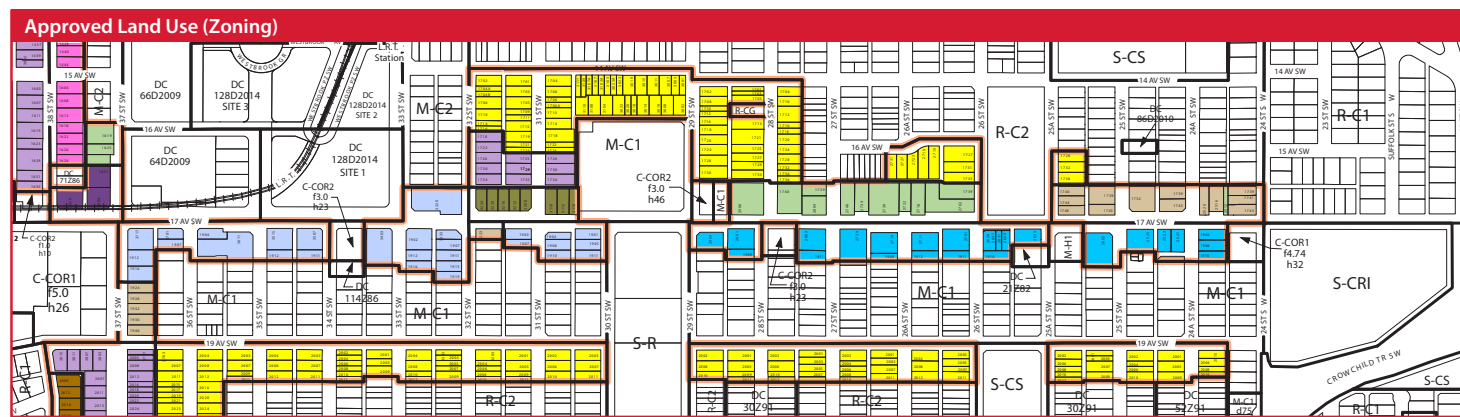
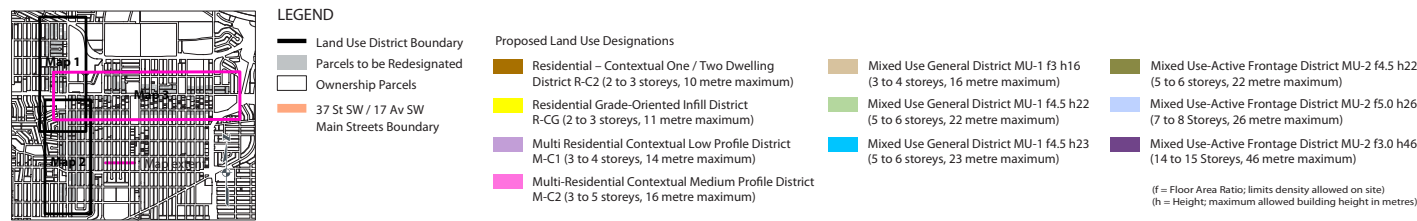


Figure 2.4 Approved Land Use for Study Area at The Time of Master Plan

Context Within the Greater 17th Ave Corridor

South of 17 Avenue SW the Killarney/Glengarry Area Redevelopment Plan provides land use policies that support Municipal Development Plan goals of a mixed use street along 17 Avenue SW. The northern half of the western section of this main street is guided by the recent Westbrook Village Station Area Redevelopment Plan. Public engagement, policy creation and internal City of Calgary review was directed by the goals and objectives of the Municipal Development Plan. Much of the northern half of this main street had City-initiated land use districts (zoning) put into place soon after the Area Redevelopment Plan.

The communities of Shaganappi and Scarboro/Sunalta West have land use policy within the non-statutory West LRT Land Use Study that support the Municipal Development Plan goals of a mixed use street along 17 Avenue SW. The community of Richmond, guided by the Richmond Area Redevelopment Plan, also have land use policies that support this Municipal Development Plan goal (Refer to Figure 2.5).

37 Street SW Project

Throughout the Engagement and Preliminary Design phases of this project, the Project Team collaborated closely with the 37 Street SW Main Street Project Team. The intersection at 17 Avenue SW and 37 Street SW is an important node for both projects and creates a gateway at the West end of this section of 17 Avenue SW. The three stakeholder engagement Open Houses included both projects and their Teams.

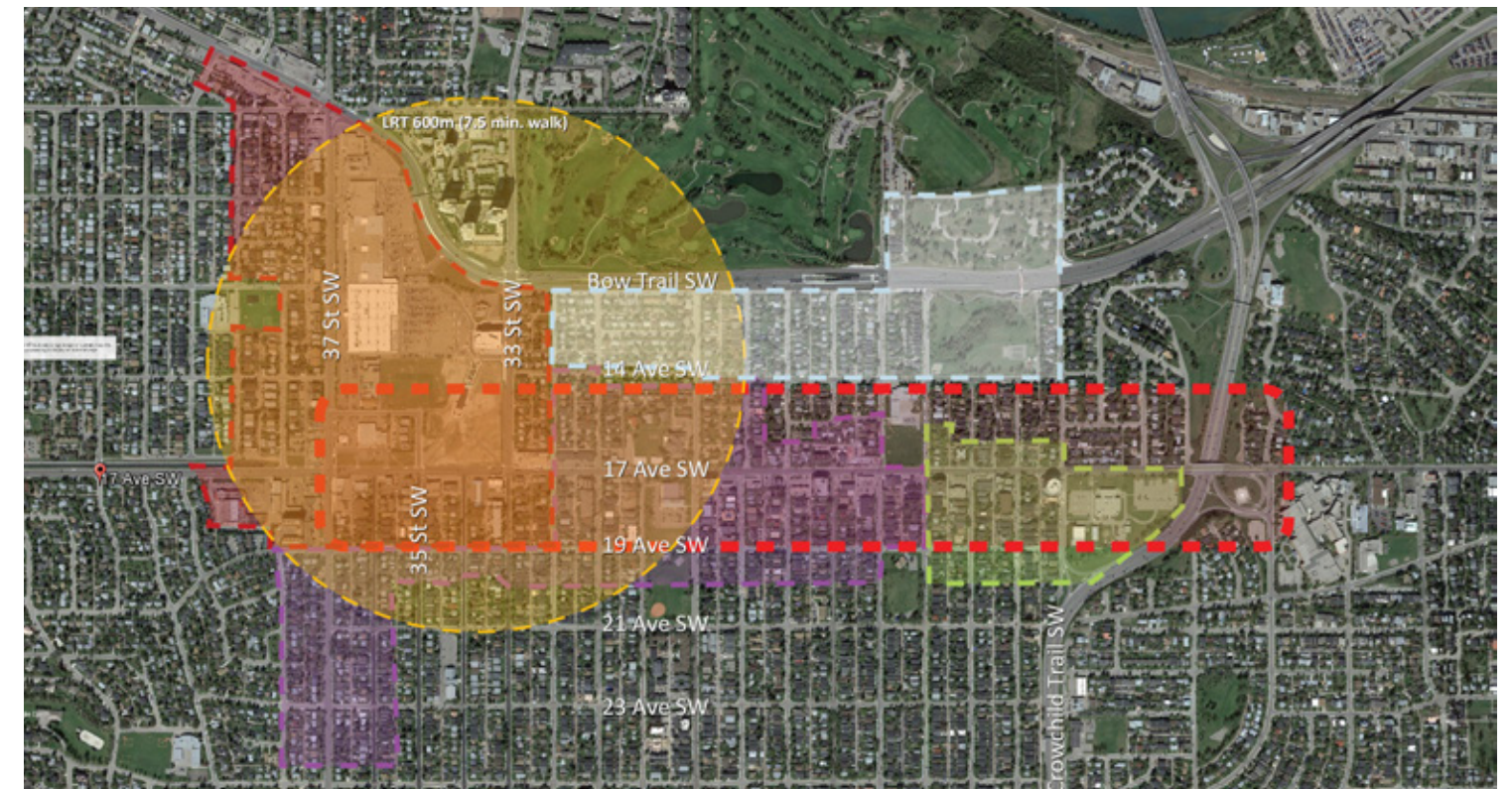


Figure 2.5 Local Planning Policy Context Map

Market Outlook & Socio-Economic Transformation

Along the east-west portion, various neighborhoods have experienced considerable development in the past decade and there is now established commercial development along this road corridor (Refer to Figure 2.6). Based on this success and popular marketing demand, 17 Avenue SW continues to show short-term potential for new development and growth. Three other Main Street Project areas intersect or feed into 17 Avenue SW (37 Street SW, 14 Street SW and 4 Street SW). Approximately 3,340 homes are expected to be built over the next 25 years and there is potential for further retail and commercial development opportunities and population growth. Growth is significantly less than the Municipal Development Plan target with the most relevant factors being market desire and consumer preference, which haven't driven redevelopment. The approved land use districts will enable redevelopment potential, increased population density and employment levels. Strong market interest is a key for fueling new construction. Support from City services and infrastructure will have a positive impact on market demand and will contribute to the evolution of 17th Ave SW, along with activation of the public realm.

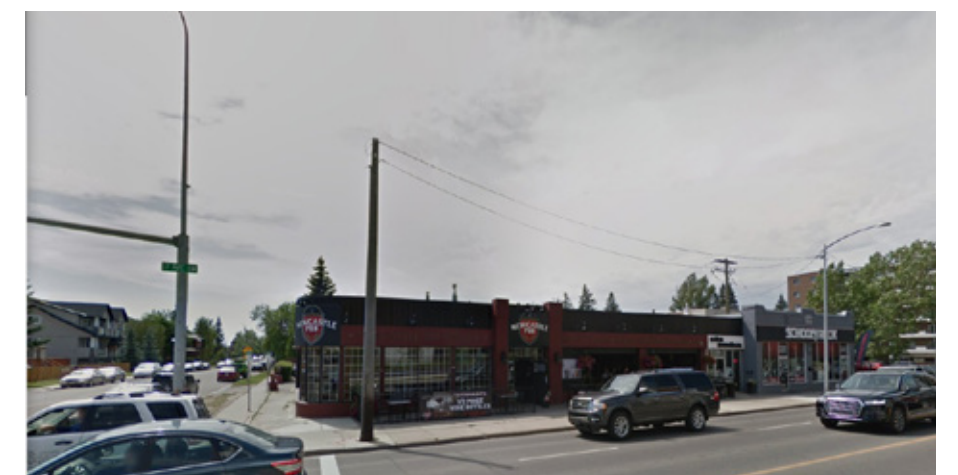


Figure 2.6 Existing Businesses along 17 Ave SW

2.3 Existing Conditions and Site Analysis

Today, 17 Ave SW remains an important transportation corridor connecting western communities with the downtown area, through the inner suburbs of the communities located along the corridor. The Master Plan area has a functional role heavily focused on facilitating vehicle traffic flow (public and private) and much of the corridor's character and businesses are auto-oriented with multiple driveways and surface parking (Refer to Figure 2.7).

Although the 17 Ave SW corridor accommodates pedestrian mobility (sidewalks on the north and south sides of the road for most of the corridor, with supporting pedestrian crossings at spaced intersections), the overall feel of the streetscape is vehicle focused and lacking in character.

Due to the flow and volume of traffic, there are very few safe opportunities for pedestrians to cross over 17 Ave SW. The result, is that the north and south sides of the road are detached from each other and there is a disconnect between neighbourhoods and businesses. There is a lack of connectivity for cyclists, especially between the Richmond Road bike route and the east end of 17 Ave SW, due to the lack of formal pathway over Crowchild Bridge (Refer to Figure 2.8).

Existing Traffic Flow and Volumes

Traffic volume and future capacity along 17th Ave SW was analyzed as part of the Master Plan study. Up to 23,000 vehicles use 17 Ave SW per day. The Full Report can be found in [Appendix B](#). From this Report, it was concluded that overall volumes and flow of traffic along this section of 17th Ave SW will not

support lane reductions, separate bicycle lanes and interruptions to traffic flow. The initial design intent included lane reductions and more traffic calming features in order to enhance the public realm and create public space and flex zones with wider sidewalks as well as more space for tree planting.

17 Ave SW is a key link to the overall transit and transportation network, and a balance between pedestrian/cyclist mobility versus the need to maintain traffic flow was an important consideration in the design development of this Master Plan.

The existing narrow lane widths makes the widening of boulevards and sidewalks challenging. As a result it was decided early on that the only way to maximize the area of public realm and maintain traffic flow was to maintain existing lane widths rather than reduce lanes.

The Master Plan maintains traffic flows and volumes while still providing improved connectivity to the communities on either side of 17th with more pedestrian crossings and a new multi use path over the Crowchild Bridge. Proposed curb extensions and bump outs at residential street entries results in more public realm space, opportunities for storm water infiltration as well as improved community identity and character with small nodes for planting, seating and shorter crossing distances for wheelchairs and those with hearing and visual impairments.

Public Realm

With the exception of a couple of blocks that have experienced recent redevelopment through construction of mid-rise buildings (commercial at the corner of 32 St SW and residential at the corner of 26 St SW), the public realm lacks distinct character and community identity.

Treatment of the public space between the road and private property lines varies, even in recent redevelopment projects. There is a lack of uniformity in design materials and limited space for seating and quiet resting places along the corridor. The residential mid-rise located at the corner of 17 Ave SW and 26 St SW offers a continued landscaped treed boulevard edge and the commercial development at the corner with 33 St SW offers a hard-surfaced edge with tree planters and a lay bay. The remainder of the corridor has sporadic and narrow worn grass edges adjacent to the road surface on both sides of the road without street trees (Refer to Figure 2.9). There is minimal space for good circulation and vibrant public space. Interaction with businesses is vehicle focused.

The Master Plan improves the vibrancy and quantity of public space with new tree planting, site furnishings and large open plazas for increased pedestrian mobility and cyclist circulation at primary intersections.



Figure 2.7 Auto Oriented Business Layout

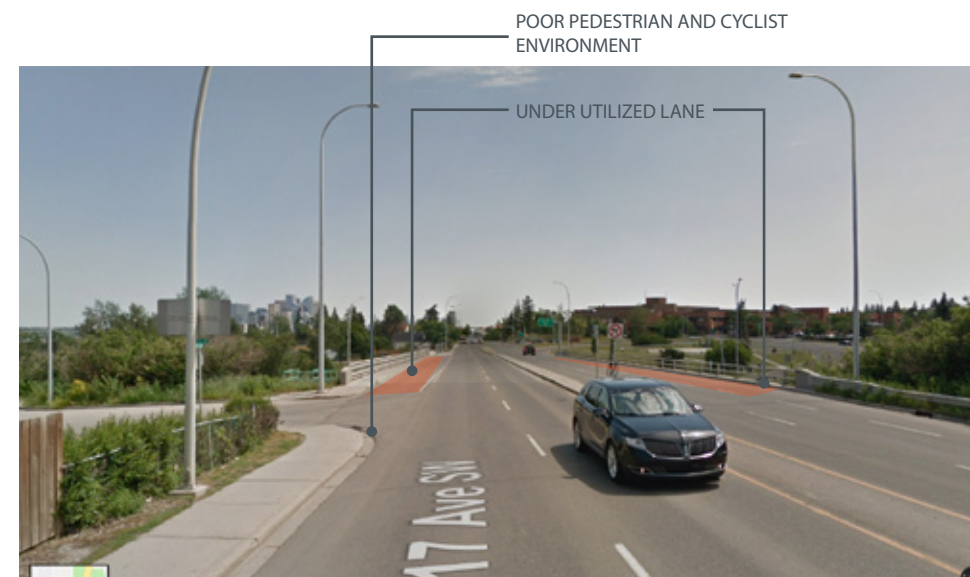


Figure 2.8 Intersection at 22 St SW and 17 Ave SW



Figure 2.9 Potential Tree Planting in Existing Boulevard

Sidewalks and Accessibility

The project area contains narrow, uninviting sidewalks that are generally too close to the road way and vehicles travelling at high speed. The result is little room for snow deposition and an unpleasant experience for pedestrians, especially in the winter months where sidewalks are covered in snow and ice from the street and ploughing operations. The existing condition offers little or no protection for pedestrians, and there is a lack of green space and tree planting to provide a buffer between traffic and pedestrians. Existing sidewalks are generally in good condition and clear of obstacles for pedestrian movement, although the width varies along the corridor. Most of the sidewalks are 1.5m wide adjacent to residential areas. (Refer to Figure 2.10) Aside from street signs at major intersections, way finding is limited. No pedestrian counts were carried out for existing movement and volume. It is proposed that counts be analyzed prior to construction and then measured post construction as a comparison.

Most intersections have wheel chair ramps that are non-directional (Refer to Figure 2.11). The orientation is towards the middle of the intersection with flares (City Standard) and not truly perpendicular and directional as preferred by Accessibility Groups and wheel chair users.

The Master Plan provides wider, more accessible sidewalks and directional crossings. Despite the challenges, better permeability and connectivity can be achieved for a variety of users passing through and connecting to adjacent residential neighborhoods (Refer to Figure 2.12). Reallocating space and increasing the number of crossings to better accommodate pedestrians will be a major functional shift while maintaining vehicular lanes and emergency vehicles requirements.

LEGEND

- NEW 2.0m WIDE WALKWAY
- APPROXIMATELY 1002 LM
- NEW 2.0m WIDE WALKWAY W/ TREE GRATES AS PART OF WALKWAY
- WALKWAYS IN CURRENT DESIGN THAT COULD BE WIDENED TO 2.0m (WITHOUT ENCROACHMENT)
- APPROXIMATELY 378 LM
- WALKWAYS THAT COULD POTENTIALLY BE WIDENED WITH NEGOTIATIONS WITH OWNERS (ENCROACHMENT ON PRIVATE PROPERTY)



Figure 2.12 New Sidewalk Width Analysis



Figure 2.10 Existing Boulevards and Bare Landscape Condition



Figure 2.11 Intersection at 31 St SW and 17 Ave SW

Existing Bicycle Routes and Connectivity

The existing bicycle network is defined in Figure 2.13. There is a bike route to the north along 14th Avenue SW that runs parallel to 17th Ave as well as to the south along 19th Ave SW. The regional pathway that runs along 17th Ave SW between 37th and 33rd Street connects to the 19th Ave route via 33rd Street. There are two important north south connections to the network via 26th and 29th Streets. Both of these cross over 17th Ave SW. The traffic studies and analysis of current and future transportation infrastructure confirmed that lane reductions and introducing dedicated bike lanes along 17th Avenue was not feasible. The biggest gap in the network within our study area is the lack of connectivity for cyclists over Crowchild Trail.

To enhance the bike connection on 17th Avenue, the key gaps addressed in the Master Plan include creating connections over Crowchild Bridge and protected/ safer bicycle crossings at 26th St, 29th St and Richmond Rd. Adopting protected intersection design principles at main intersections (refer to Figure 2.10) similar to Vancouver and other North American cities, is a key element within the Master Plan. We also propose to provide multi-use path to expand and connect to adjacent communities and the greater bike network wherever feasible. At the east end of the Crowchild Bridge, we propose to introduce 3.0m wide multi-use pathways that enhance connectivity further west over Crowchild Trail from Richmond Road.

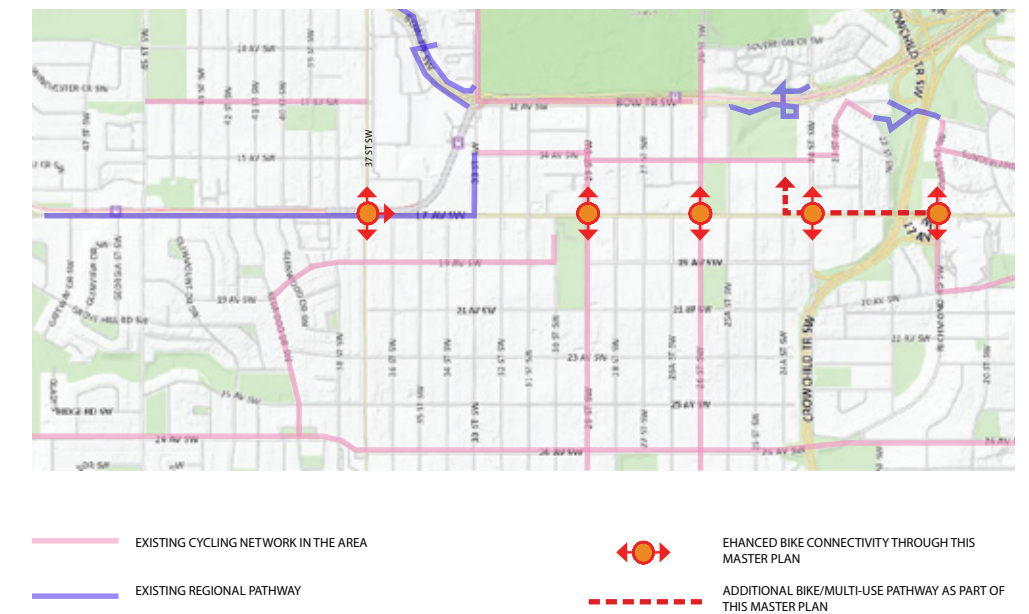


Figure 2.13 Cycling Network along 17 Ave SW Corridor

Parking

17 Ave SW is auto-oriented with high traffic volumes with very limited on street parking. Currently there is short-term lay-by parking in front of the Corus building at 33 St and 17 Ave but most the businesses along 17 Ave have surface parking at business frontage with multiple driveways connected to the street. The extensive parking and driveways impact the area of soft landscaping and sidewalk continuity.

The Master Plan provides opportunities for on-street parking and consolidation of some driveways to improve pedestrian comfort, safety and access to businesses.

Street Lighting, Utilities & Electrical Services

Existing utility locations are a major constraint for the regeneration of 17th Ave SW.

Overhead power lines are located along the south side of the road at 29th St. SW and 37th Street SW, with setbacks constantly changing the interface of the public-private spaces. The overhead cable and poles detract from the aesthetics of the public realm and are obstacles to efficient circulation and tree planting.

Existing street lighting fixtures are inconsistent throughout the corridor, with some having metal poles with different pole shapes (some curved, some at an angle), and a few made from wood. There is a lack of pedestrian scale lighting

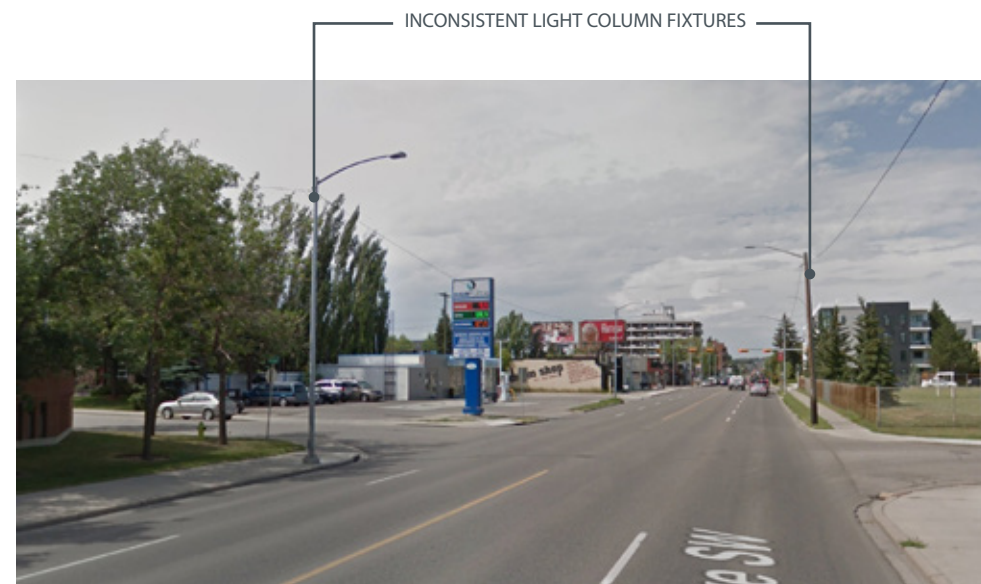


Figure 2.14 Existing Street Lighting along 17 Ave SW

(Refer to Figure 2.14). This is an important shortfall, with increased concerns over public safety and criminal activity since the opening of Westbrook Station.

As a result of existing utilities and infrastructure, providing new trees will be challenging. The relocation of utilities and services is generally cost prohibitive and achieving City standard setbacks between trees and services will limit tree planting opportunities in some locations. The Master Plan provides solutions to mitigate these constraints by providing a design toolkit that proposes the installation of soil cells and relaxations to setbacks where feasible.

Setbacks

The private property setbacks vary along this stretch of 17 Ave SW. The design maximizes the allowable by-law setback, in particular at intersections and on City-owned property. Some initial discussions were held with private business owners and residents that interface with the street, and strong collaboration and partnership with private land owners will be a key consideration in the success of this Master Plan.

Ongoing dialogue and engagement with adjacent landowners will be ongoing during detail design and implementation. The success of the design is very dependent on creating unique and site specific design interventions that compliment and animate adjacent private and public property along the corridor.

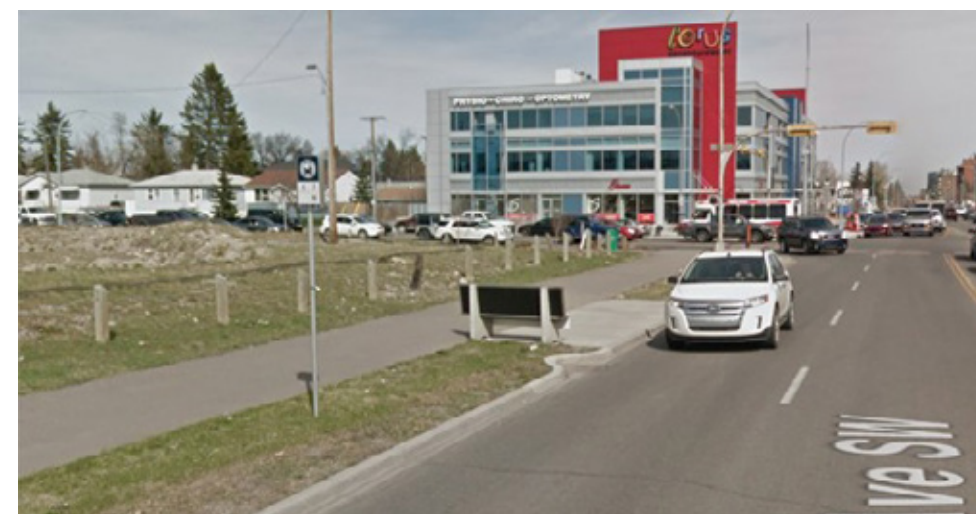


Figure 2.15 Uncovered Transit Bus Stop, North Side Intersection with 33 St SW

Transit Service

17 Ave SW is primarily well serviced by one primary bus route that connects the neighbourhood to downtown and the north side of the city. There are three additional routes servicing the western end of the study corridor through the intersection at 37 St SW. The style and treatment of bus stops along the corridor is varied, with only four bus stops offering a protected booth (south side at 29 St SW, 24 St SW and Richmond Road; north side at 17 Ave SW and Crowchild Trail). Most of the other bus stops are simply marked by a bus stop sign, a concrete pad and a standard open concrete bench (Refer to Figure 2.15). Some of the bus stops lack a bench (Refer to Figure 2.16).

The Master Plan proposes more shelters and enhanced pads with increased circulation space for transit users. Bus zones conform to the latest standards in accessibility and space for the type of bus that will use the route along 17th Ave SW.

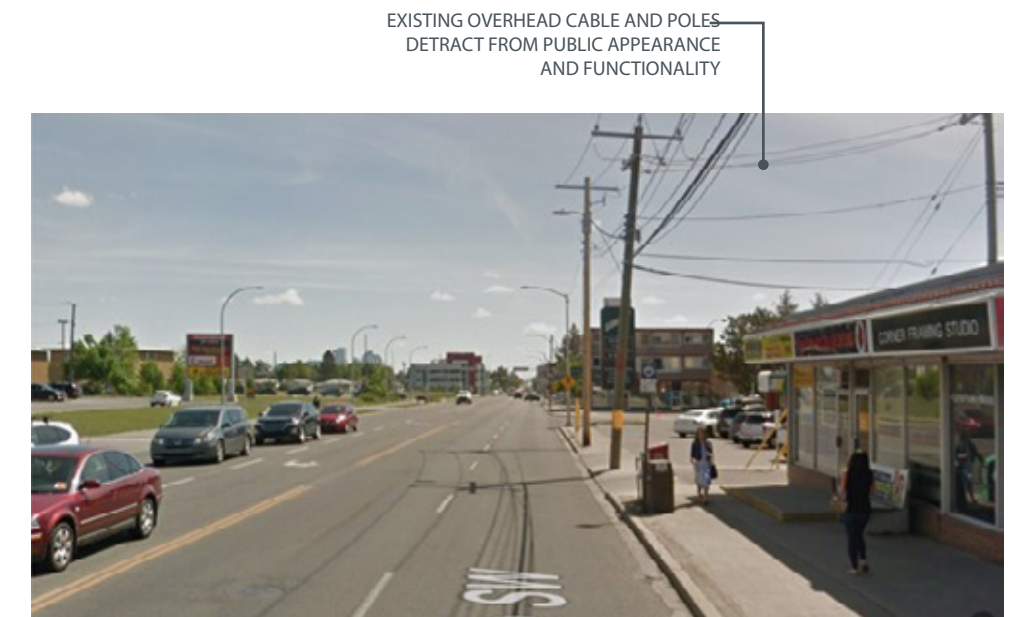


Figure 2.16 Marked Bus Stop, South Side Intersection with 37 St SW and Overhead Cables

2.4 Opportunities and Constraints

The Projects opportunities and constraints can be summarized as follows:

Opportunities:

- Land Use allows for higher density and mixed use development which will inevitably attract more people over the coming years and decades;
- Generous setbacks in some locations allows for wider sidewalks, multi-use pathways and tree planting;
- Influence new Development Permits that interface with the public realm -ensure that the new developments are street oriented and animate the adjacent streetscape;
- Introduce innovative storm water management techniques and infiltration areas in lieu of adding new underground piping; and
- The emerging eclectic character of businesses and adjacent neighbourhoods provides diversity within the design elements and public art.

Constraints:

- The street is characterized in part by stark, narrow sidewalks, devoid of any landscaping resulting in a harsh pedestrian environment. In some locations, the setbacks are narrow with utilities and traffic signals and signs that inhibit the widening of sidewalks (Refer to Figure 2.17-4 to 7) ;
- High traffic volumes negate the opportunity to reduce lanes and create bicycle lanes, more on- street parking and wider sidewalks and boulevards (Refer to Figure 2.17-2);
- Existing utilities and services restrict tree planting opportunities;
- Extensive surface vehicle parking at business frontage (on private lands) , impacts the area of soft landscaping – consolidation of some driveways will be explored during the detail design stages but will need to be confirmed on a case by case basis. This could prove challenging (Refer to Figure 2.17-1); and
- Existing City operating and maintenance budgets and design standards that are functional rather than aesthetically pleasing.

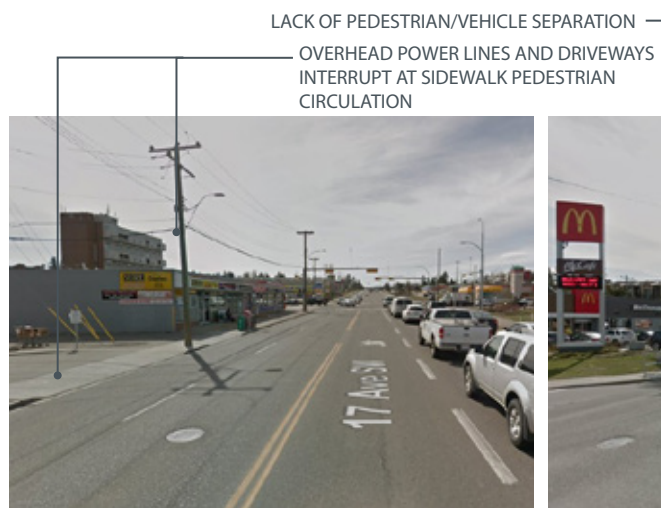


Figure 2.17-1 Overhead Power Lines and Multiple Driveways



Figure 2.17-2 Vehicle Focused 17th Ave SW Corridor



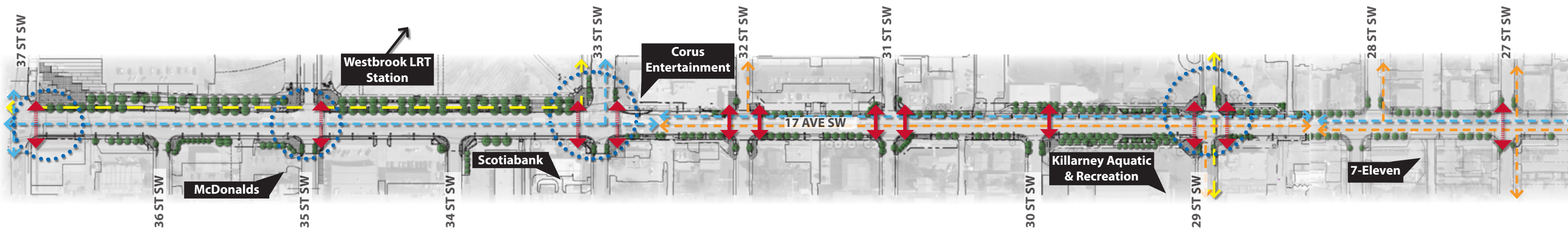
Figure 2.17-3 Covered Transit Bus Stop at The Corner of 29 St SW, South Side



Figure 2.17-4 Intersection of 17 Ave SW and 29 St SW













Figure 2.17-5 Intersection of 17 Ave SW and 26 St SW, North Side



Based on the opportunities and constraints, a design analysis diagram (refer to figure 2.18) was developed, showing potential improvement in planting, transit, bicycle/pedestrian paths, parking and public realm development. Enhanced mobility, connectivity and more pedestrian/bike crossings over 17 Avenue SW maximize the opportunities created in the Master Plan. Other improvements were explored, including more public realm space at major intersection, and new street tree planting where setbacks and space allows. (refer to figure 2.17-8 to10).

Legend

-  TREE PLANTING (NEW)
-  MAJOR NODE - OPPORTUNITY FOR PUBLIC REALM IMPROVEMENTS (POP-UP PARK, PUBLIC ART, FURNISHINGS, GATHERING PLACES, FLEX ZONES)
-  17 AVENUE PEDESTRIAN CROSSING (EXISTING)
-  17 AVENUE PEDESTRIAN CROSSING (NEW)
-  POTENTIAL OFF-PEAK PARKING (NEW)
-  TRANSIT (EXISTING)
-  TRANSIT (POTENTIAL FUTURE ROUTE)
-  BICYCLE ROUTE (EXISTING)
-  BICYCLE ROUTE (FUTURE)
-  NEW MULTI-USE PATH (BICYCLES AND PEDESTRIANS)

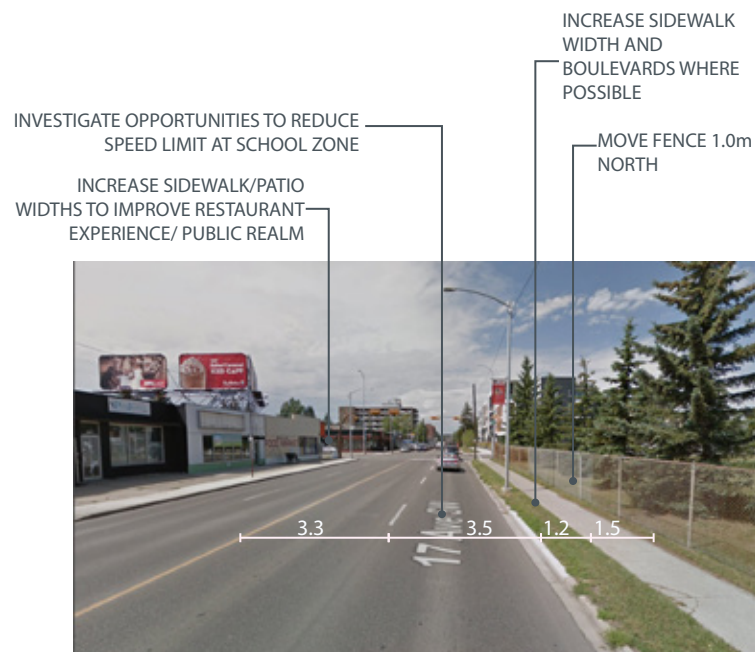


Figure 2.17-6 17 Ave SW at Alexander Ferguson School

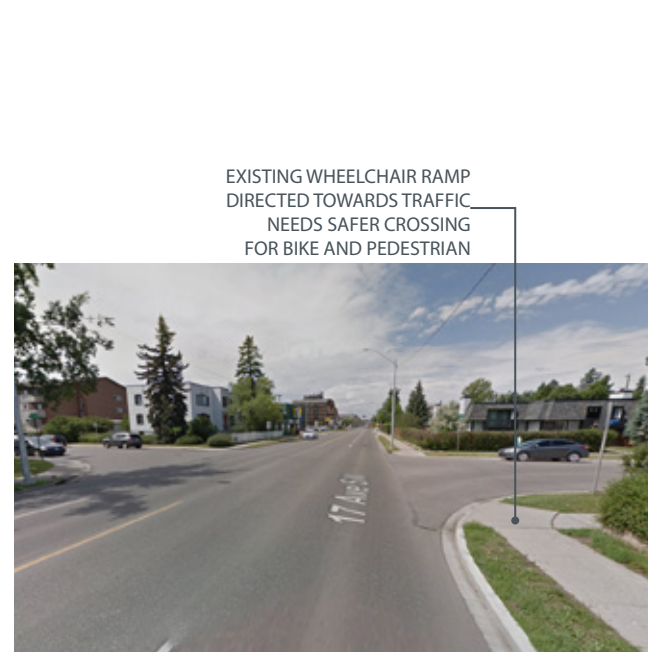


Figure 2.17-7 17 Ave SW at 24a St SW



Figure 2.17-8 17 Ave SW at 24 St SW

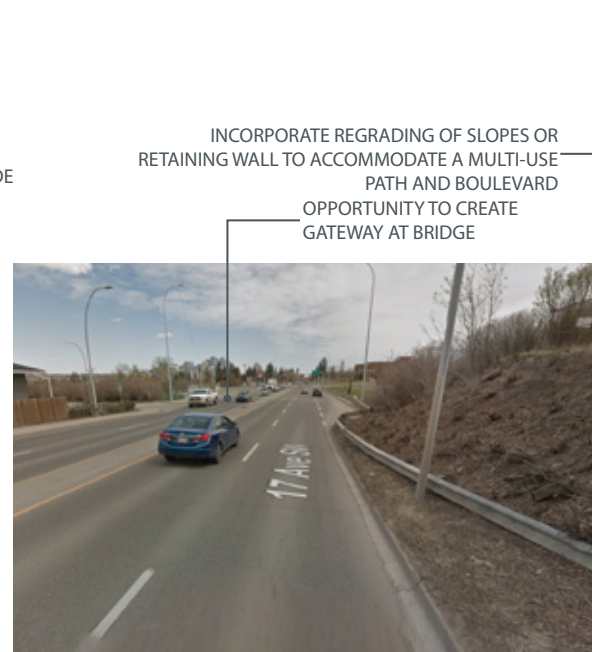


Figure 2.17-9 17 Ave SW at 22 St SW

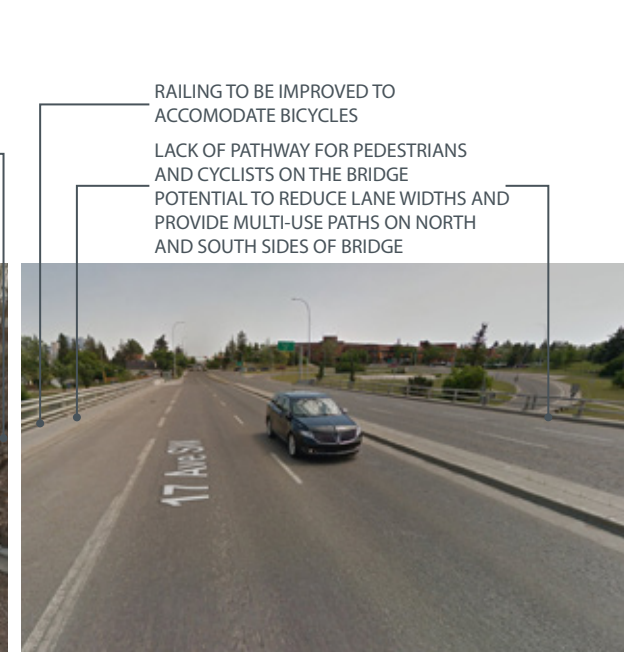


Figure 2.17-10 Crowchild Bridge

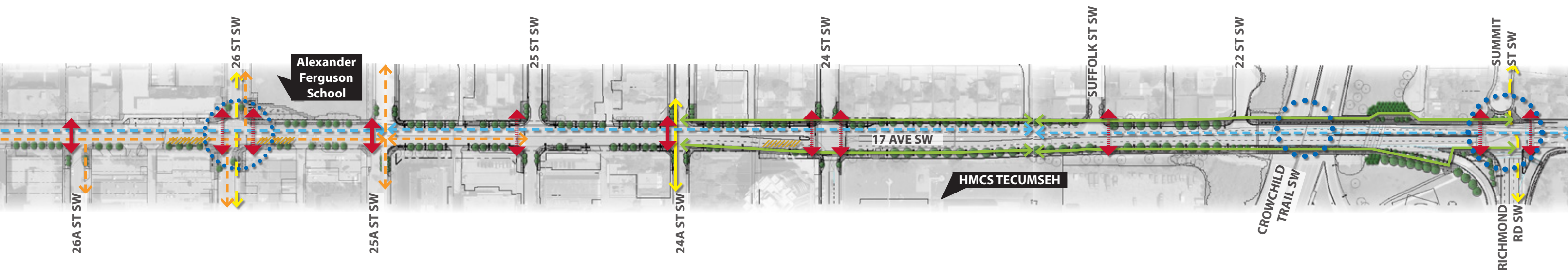


Figure 2.18 Opportunities and Constraints Design Analysis Diagram



3.0 DESIGN CONCEPT - THE MASTER PLAN

3.1 Vision, Goals and Objectives

The Vision, Goals, Objectives and Design Strategies for 17th Ave SW were informed by the rigorous engagement process described in *Appendix A*.

3.1.1 Vision

The project vision for 17th Ave SW is:

Celebrate the diversity and eclectic nature of the street while creating a pedestrian and cycling friendly, accessible, sustainable, and well connected street corridor with more trees and vegetation. The public realm area will be increased while preserving mobility function and traffic flow for cars and cyclists. The resulting economic benefits will bring vibrancy to the community.

This vision responds directly to challenges and opportunities presented by the current vehicle-focused environment. The proposed enhancements create vibrant public spaces and will attract more high density development with all the expected economic benefits to local business and property owners.

The 17 Ave Master Plan builds upon the projects vision by proposing:

- Demonstrable improvements to the quality and area of public realm.
- Improved livability of the adjacent neighborhoods and other users.
- A safer, more functional, pedestrian-oriented, well-integrated multi-modal network.
- Opportunities for the expression of the diverse and eclectic nature of the street's character.
- A more accessible, sustainable, and well connected street corridor.
- New trees and vegetation.

The Master Plan is a visionary document and specific information is provided that will guide design development in ways that complement the overall vision for the Main Streets program. The enhanced experience of the corridor will be the result of the quality of materials, improved accessibility and safety, sustainability, and character of the elements that have been proposed.

3.1.2 Goals and Objectives

Based on community input obtained through consultation, stakeholder and public engagement, the principles, goals and objectives described below have guided the streetscape design and vision for 17th Avenue SW. They are all measurable and can be characterized into three overarching themes:

A. Social + Economic Goals

Objective 1 - Focus on public realm enhancements

- Where there is generous setbacks at major nodes, seek opportunities for landscaping, pop-up parks, flex-zones, seating and public art.

Objective 2 - Enhance greenery and healthy living

- Significantly increase the number of street trees, tree canopy and overall vegetation to create a more inviting streetscape.
- Introduce sustainability elements that contribute to a healthy environment and create storm water infiltration areas.

B. Mobility + Functionality Goals

Objective 3 - Improve pedestrian comfort, connectivity, safety and accessibility

- Introduce safer and more accessible pedestrian crossings and multi-use paths that provide more connectivity options for cyclist and pedestrians.
- Maximize generous setbacks to allow for soft landscaping and snow storage locations where feasible.
- Protect pedestrian areas with elements that create a consistent and uniform design along the entire corridor.
- Provide enhanced pedestrian scale lighting.
- Create sustainable landscapes with storm water management functionality
- Review opportunities for on-street parking as a means of traffic calming, increasing pedestrian comfort, and improving access to businesses.

Objective 4 - Maintain the transportation functionality of 17th Avenue SW

- Maintain existing traffic flow and convenient transit service.
- Introduce traffic calming measures on residential "feeder" streets with extended curbs and bump outs.
- Create a consistent design language for bus stops – improved paving and accessibility for bus shelters and major intersections.

C. Character + Identity Goals

Objective 5 - Create a sense of entry/gateway at main corridor intersections

- Provide space and opportunity to celebrate and display the diversity and eclectic nature of the surrounding neighbourhoods and businesses. This can be achieved through sculptures, banners on poles, or other landscape features.

Objective 6 - Use of high quality, consistent, and durable materials

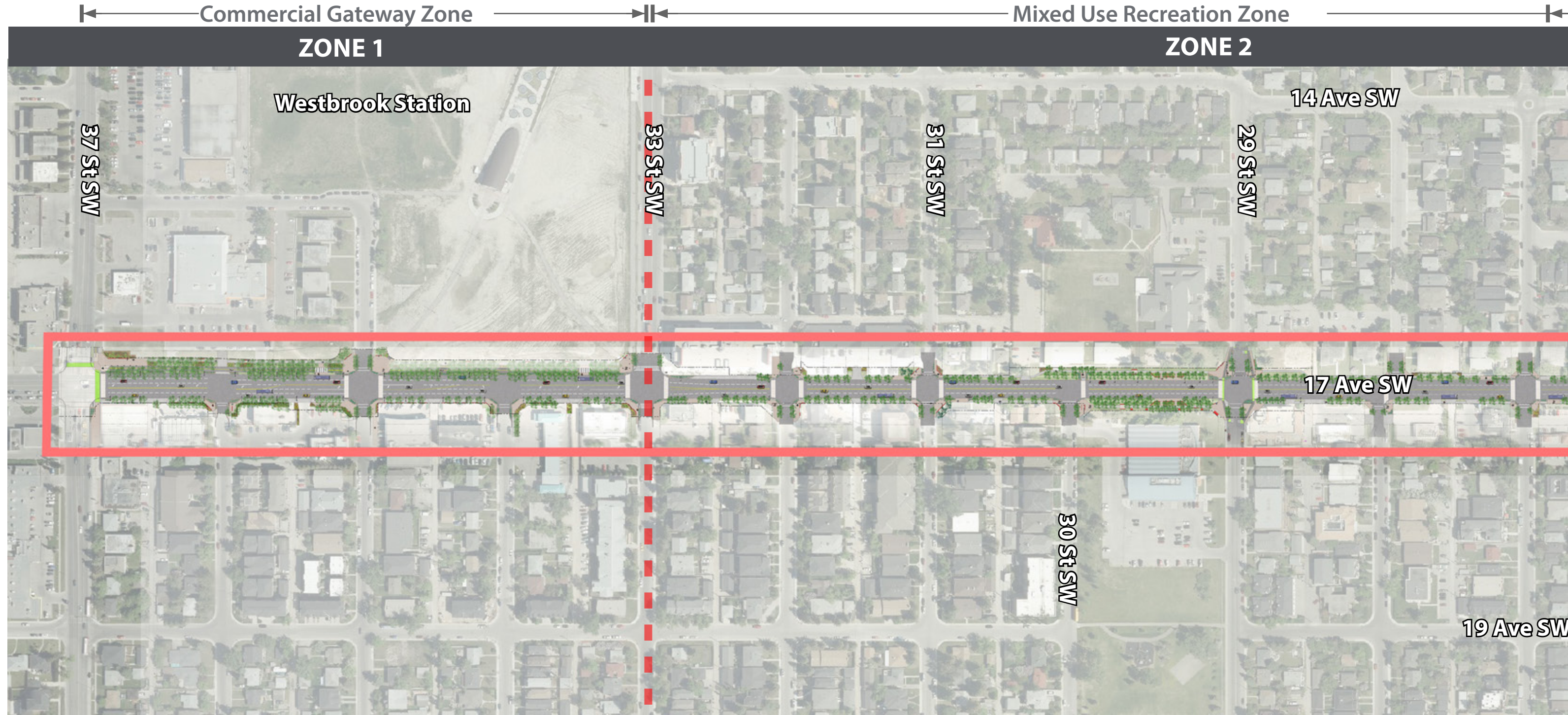
- Sustainable, attractive and low maintenance materials.

MASTER PLAN ZONES

Due to the length of this section of 17th Ave SW, the Project Team categorized the master plan into zones along the 2km stretch from west to east (Refer to Figure 3.1):

- Zone 1: Commercial Gateway Zone (37th St – 33rd St)
- Zone 2: Mixed Use Recreation Zone (33rd St to 27th St)
- Zone 3: Mixed Use School Zone (27th St – 25a St)
- Zone 4: Residential and Mixed Use Gateway Zone (25a St- Crowchild Bridge)

These zones create a series of destinations that people want to arrive at, stay and ponder rather than pass through. They are well connected by adaptable, contextual and seasonal elements that are inclusive and provide a sense of place. The Master Plan is a reflection of the collective needs and aspirations of those who live, work and play along this stretch of 17th Ave SW.



Mixed Use School Zone Residential and Mixed Use Gateway Zone

ZONE 3

ZONE 4



Figure 3.1 The Master Plan

3.2 Zone 1- Commercial Gateway Zone (37th St – 33rd St SW)

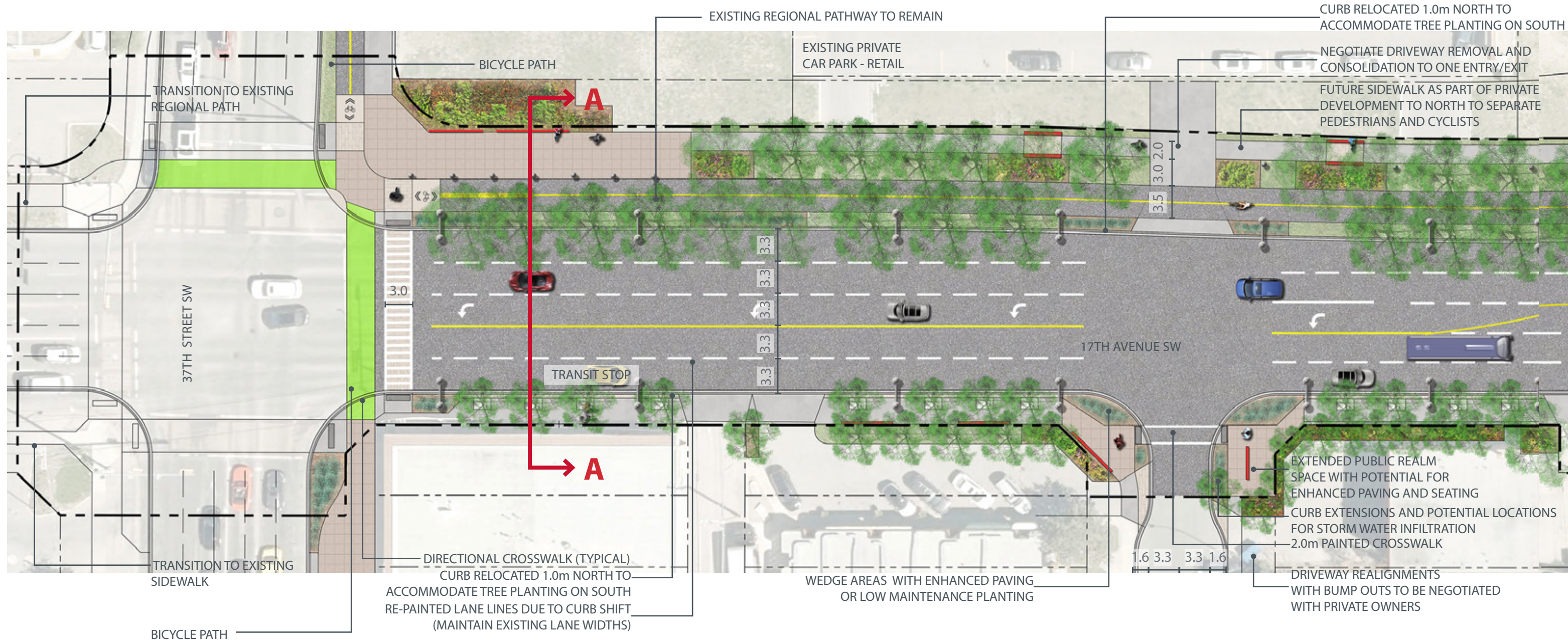
Design Strategies

One of the key strategies is to create more green space and a safer pedestrian-oriented environment with wider boulevards, sidewalks and increased tree canopy, while maintaining the regional path connection on the north side. The street curbs are to be relocated 1m to the north in order to accommodate tree planting and wider sidewalks on the south side. The newly added landscaped areas and street trees provide important assets to both the City and residents. The high traffic volume flow will be maintained by retaining existing lane widths, traffic signals and the current speed limit. Public safety is a concern in

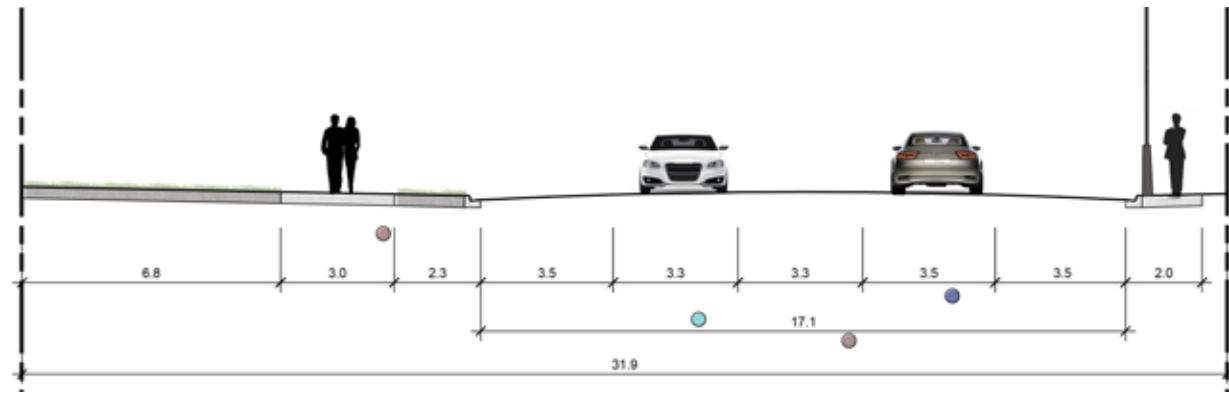
this location and CPTED principles have been applied with good sight lines, improved lighting, and open spaces that are not hidden.

Outcomes

Social and economic benefits include increased property values, potential for additional pedestrian traffic and parking space for local business. Street trees promote a healthy environment providing oxygen, shade, habitat for birds and rain water absorption. *Mobility and functionality* benefits include better connected sidewalks, more accessible wheel chair ramp crossings, public seating and more shade. Street trees and space for public art and landscape features also improve *character and local identity* with a more defined street edge (Refer to Figure 3.2-3.6).

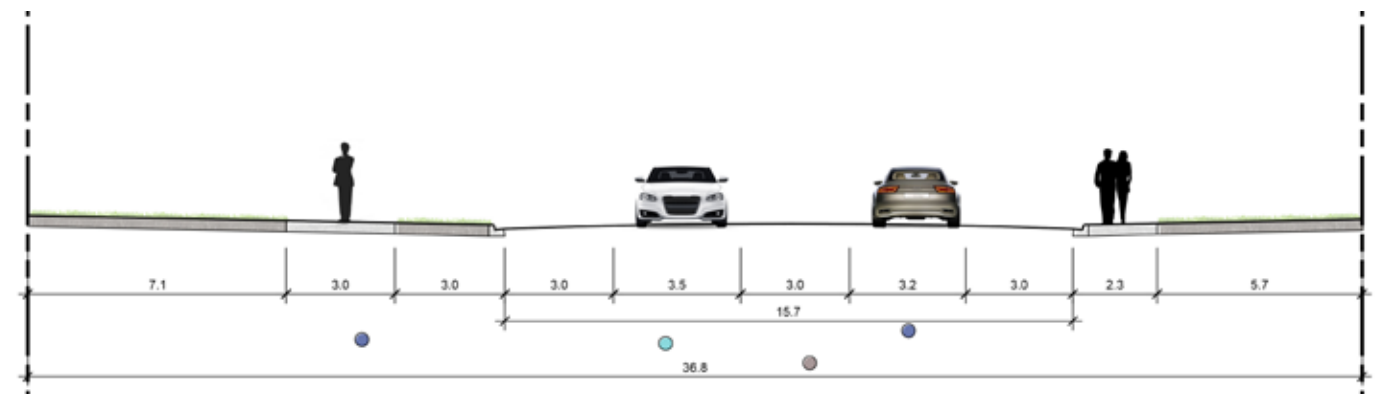


Sections



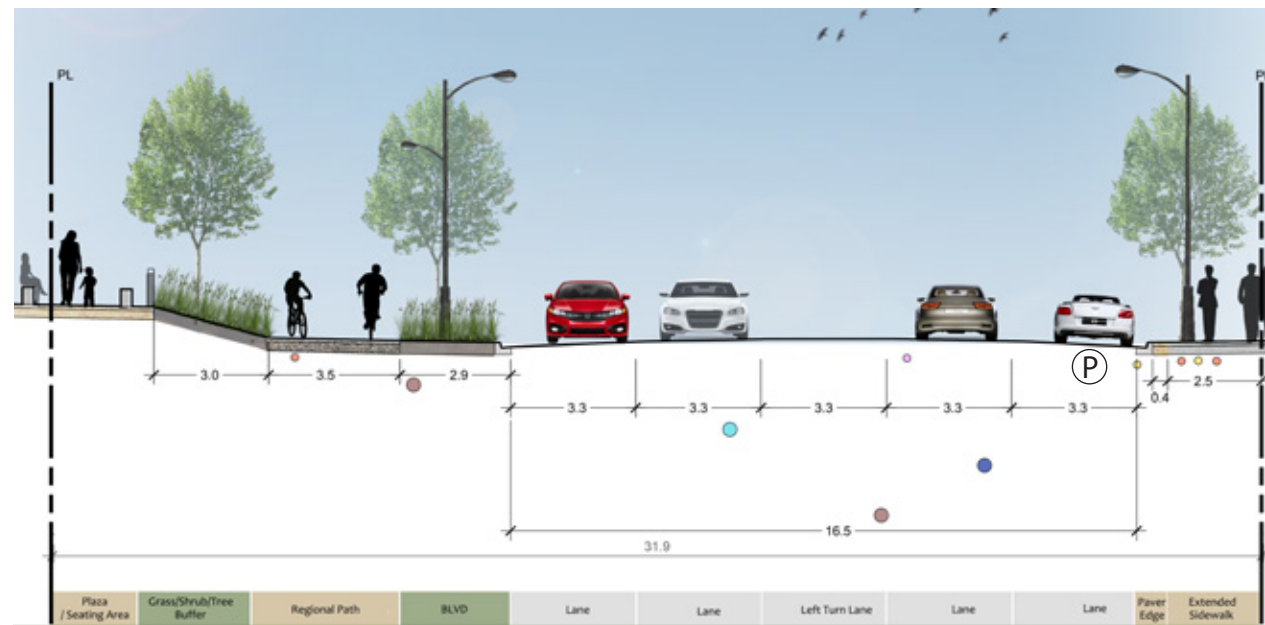
Section A - Existing

- Lack of tree planting
- Road alignment and lane widths vary narrow sidewalk on south side - no separation from traffic
- Existing 3.5m wide regional path connection



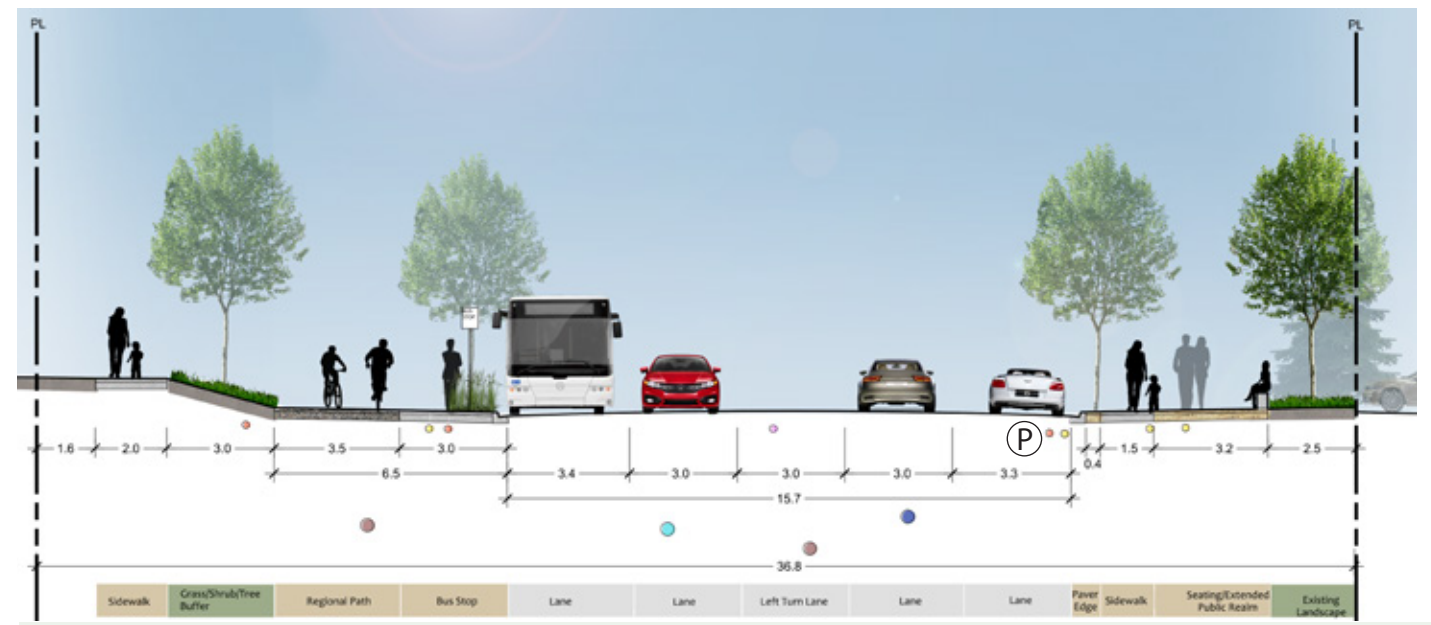
Section B - Existing

- Lack of tree planting
- Road Alignment and lane widths vary - narrow sidewalk on south side - no separation from traffic
- Existing 3.5m wide regional path connection



Section A - Proposed Design

- Potential opportunity to move the curb line 1.0m north to provide a wider and safer sidewalk on the south side where people can better connect with businesses and improve the constrained pedestrian environment (pending further technical review).
- Potential new off peak parking zones.
- Power line burial under sidewalk to increase space for trees that provide separation between pedestrians and vehicles.



Section B - Proposed Design

- Potential opportunity to move curb line 1.0m to the north and provide a wider and safer sidewalk on the south side where people can connect with businesses and improve the constrained pedestrian environment.
- Potential to introduce off peak parking zones.

Figure 3.3 Section A

Figure 3.4 Section B

3D View at 35th St. SW Intersection - Looking West



Figure 3.5 Existing Condition at Northwest Corner (17th Ave. and 35th St.)



Figure 3.6 Potential Improvements at Northwest Corner (17th Ave. and 35th St.)

Increased planting is proposed at the south side of 17th Ave due to the 1m curb shift north, providing a well-defined pedestrian walkway and street edge. Traffic calming and directional crosswalks on residential street entries provide potential for storm infiltration areas, space for seating and furnishings, improved lighting and landscape features/ public art. The curb extensions shorten crossing distances and increase safety for pedestrians.

3.3 Zone 2 - Mixed Use Recreation Zone (33rd St to 27th St SW)

Design Strategies

Killarney Aquatic and Recreation Centre is a major neighbourhood hub. The proposed design for this area includes increasing public plaza and circulation space for bicycles and pedestrians at the existing bicycle crossing at 29th St.. The crossings will include enhanced line markings, separation of pedestrians and bikes and provide opportunity for additional seating as well as more accessible crossings. We also propose increasing the path width to 2.0m and create a wider boulevard for large tree planting. The intersection also provides space for signage, public art, wayfinding or outdoor fitness opportunities that correspond to the healthy living theme of the Recreation Centre.

Outcomes

The design benefits the community socially and economically with the promotion of healthy living activity and better connectivity to private businesses in this zone. Trees and wider boulevards provide separation from traffic and better function and mobility is created by increasing circulation space for bicycles and directional wheel chair ramps for pedestrians. Potential storm water infiltration cells provide environmental benefits by filtering stormwater run-off and reduce silt deposits into the existing storm water system. These small spaces are functional components for City stormwater infrastructure and provide gateways into residential streets with low maintenance, low growing plant materials. Character and identity have been

reinforced with high quality materials and landscape features with potential for theming in this zone. (Refer to Figure 3.7-3.9)

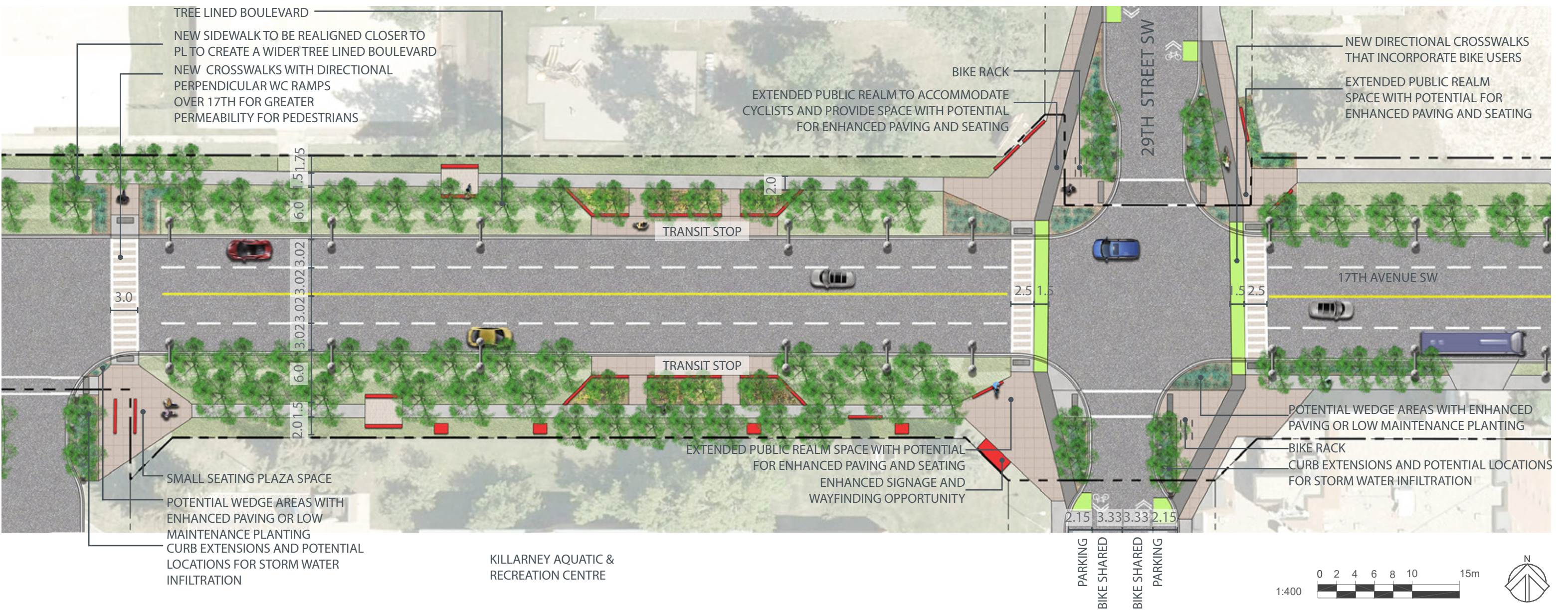


Figure 3.7 Zone 2 (Mixed Use Recreation & Residential Zone 33rd St to 27th St) Concept Design

3D View at Killarney Aquatic & Recreation Centre

Extended public plaza spaces with seating and ornamental planting is proposed at the intersection. New signage, public art and banners will help to define the community hub and provide way-finding opportunities. Clearly defined pedestrian/bike crossings are proposed for better circulation space and proposed curb extensions will provide space for stormwater infiltration. New planting and seating is proposed adjacent to the transit stops along 17th Ave.

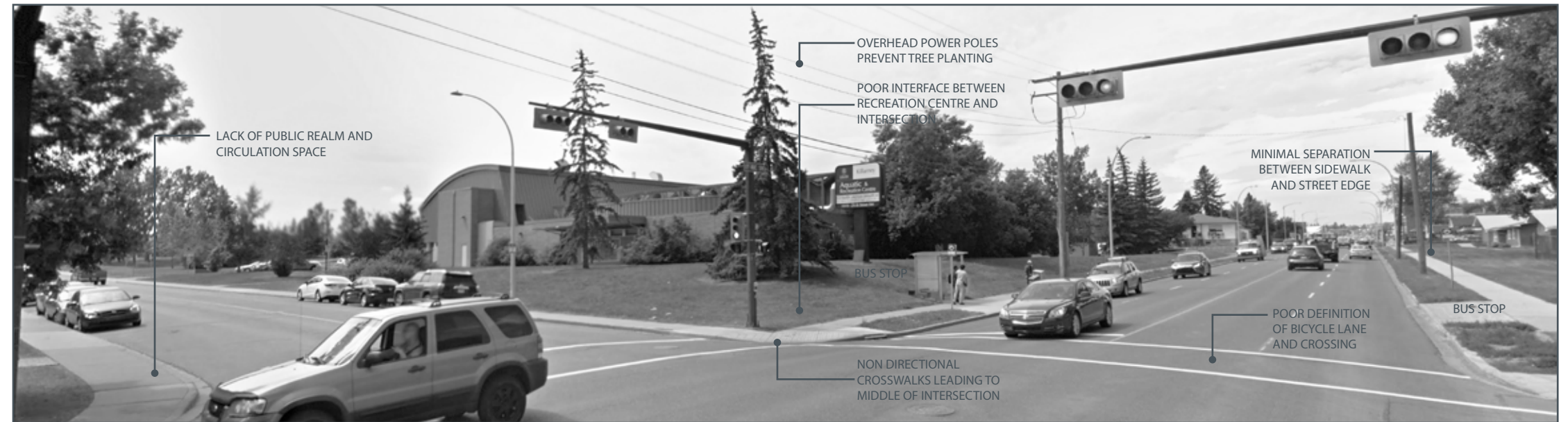


Figure 3.8 Existing Condition at Southwest Corner (17th Ave. and 29th St.)

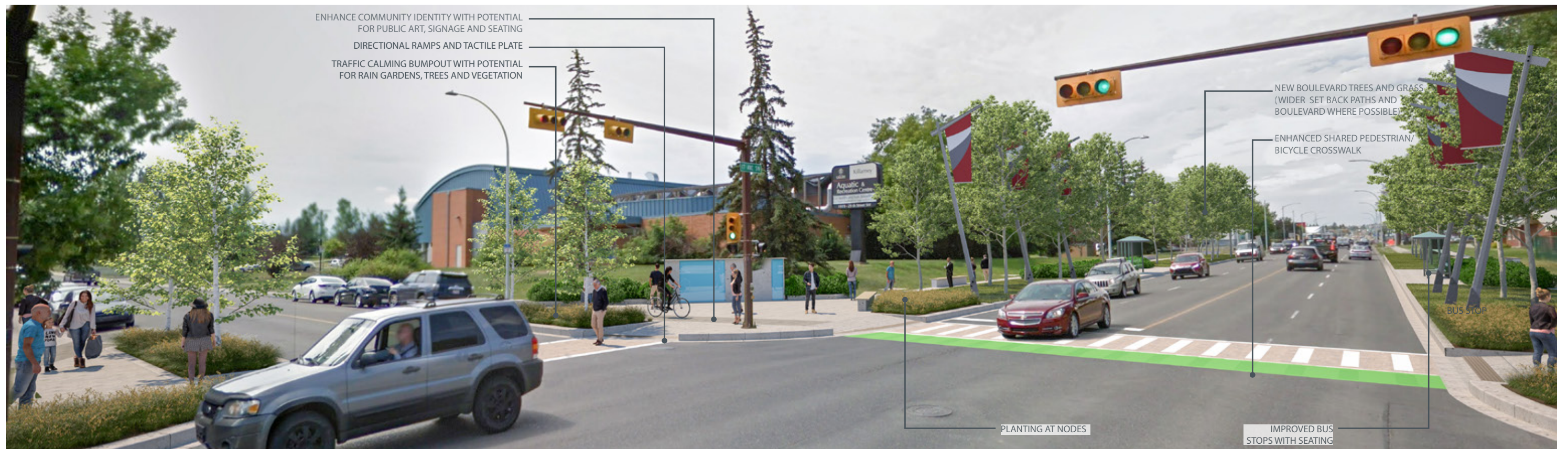


Figure 3.9 Potential Improvements at Southwest Corner (17th Ave. and 29th St.)

3.4 Zone 3 -Mixed Use School Zone (27th St – 25a St SW)

Design Strategies

The proposed enhancement of the streetscape for business owners, local residents and school users includes expanding and animating public space as well as creating a safer connection over 17th Ave to and from the school for children and parents. The Master Plan includes directional painted crosswalks, wider paved plaza space, better signage and improved delineation of connections for pedestrians, bicycles and vehicles. Space has been created for opportunities to activate the 17th Ave street edge. The school's interface with amenities such as new playgrounds or school art is an important strategy that includes the school as part of the 17th Ave street edge. Increased sidewalk/patio space is proposed at the south west corner of 17th Ave SW and 26th St SW

to improve the restaurant experience and animate the corner.

Outcomes

The *economic and social* benefits include the provision of additional space at the corner for restaurant patio extensions and pleasant resting places where people want to hang out and mingle. Better *function and mobility* are created by curb extensions that facilitate shorter crossing distances for pedestrians. Accessibility is improved for families, children and cyclists and new enhanced crosswalks provide visual cues to slow vehicles and give priority to pedestrians. *Character and identity* has been improved by providing space for site furniture, amenities, landscape features or public art (in partnership with the school). These design

elements will define the streets character with uniformity in style, themes, colour, finish and materials (Refer to Figure 3.10-3.14).

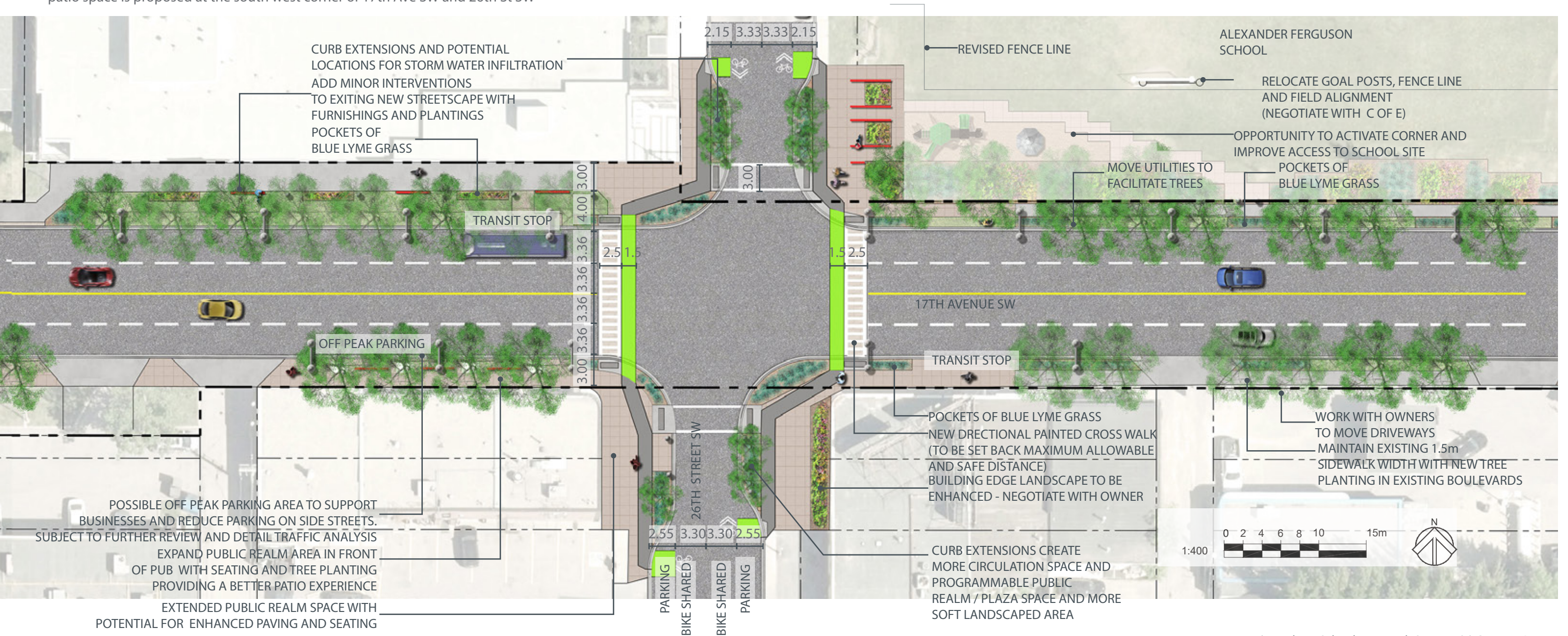


Figure 3.10 Zone 3 (Mixed Use School Zone 27th St – 25a St) Concept Design

3D View at Alexander Ferguson School



Figure 3.11 Existing Condition at Northeast Corner (17th Ave. and 26th St.)

Protected Intersections For Cyclists

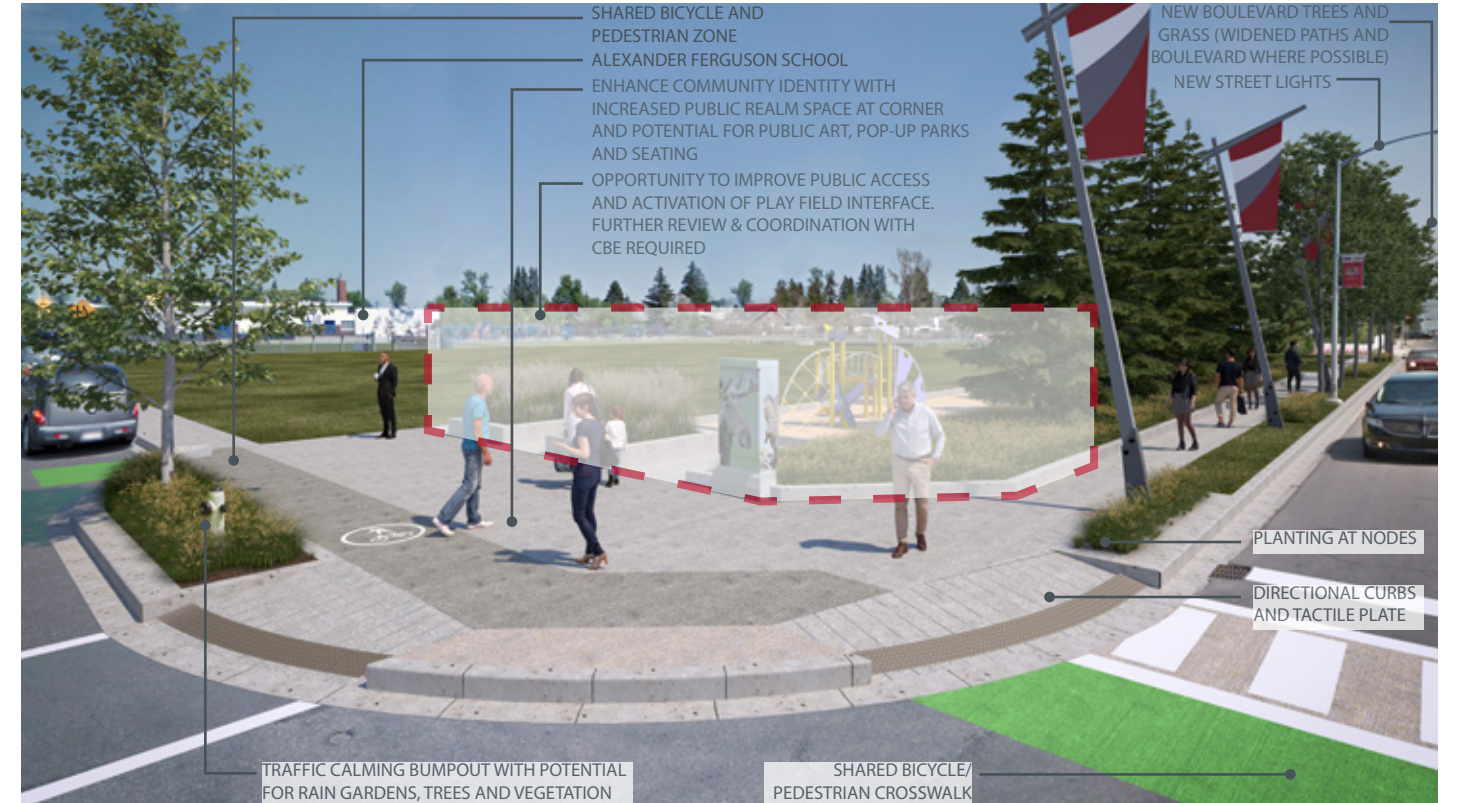


Figure 3.12 Potential Improvements at Northeast Corner (17th Ave. and 26th St.)

3D View at Newcastle Pub



Figure 3.13 Existing Condition at Southeast Corner (17th Ave. and 26th St.)



Figure 3.14 Potential Improvements at Southeast Corner (17th Ave. and 26th St.)

3.5 Zone 4 - Residential and Mixed Use Gateway Zone (25a St SW - Crowchild Bridge)

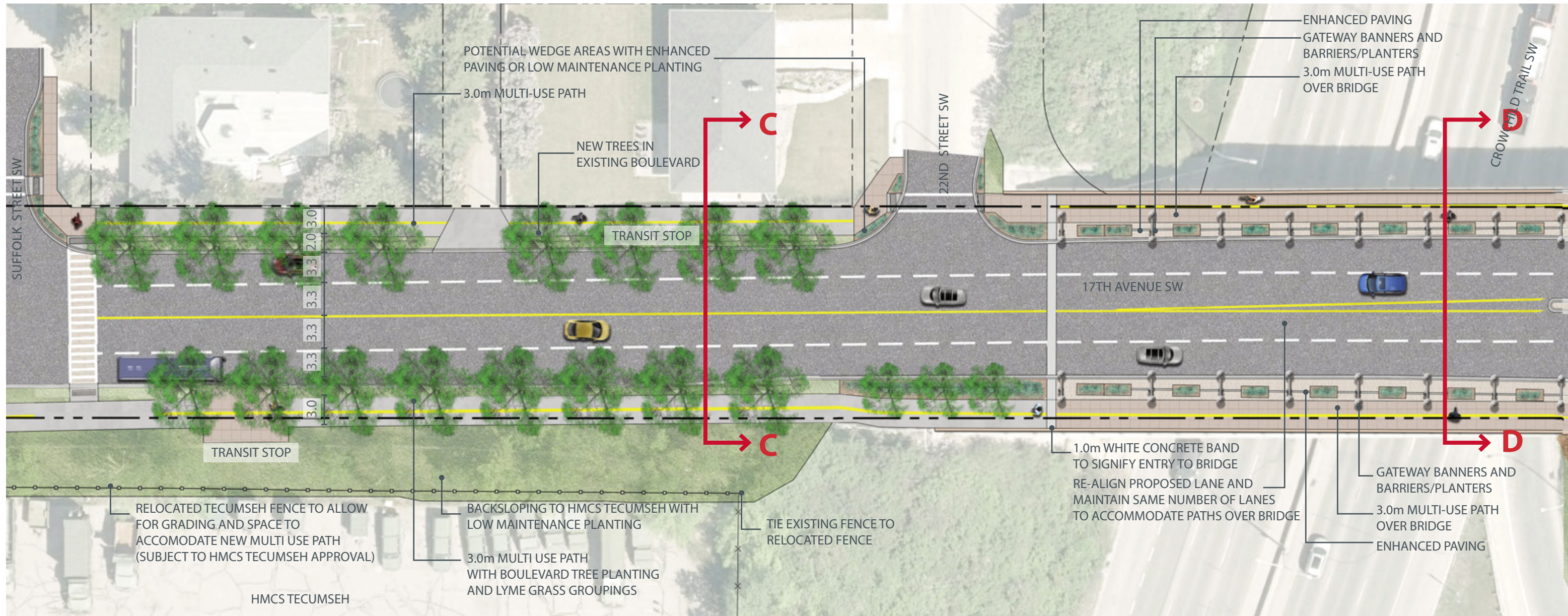
Design Strategies

The primary strategy for this zone is to create a gateway and sense of entry at the Crowchild bridge with improved railings, space for public art/banners and new protective barriers with planters. A safer connection for cyclists and pedestrians on the north and south sides of the bridge and further to west between 24A St. and Richmond Rd has been created. As a modification to the Crowchild traffic Study, minor changes to road geometry and lane widths provide space for streetscape design elements such as new trees in the boulevards as well as wider multi use paths with seating at the intersections. Discussions with HMCS Tecumseh have taken place, exploring opportunities for improved access and connectivity to their adjacent property.

Outcomes

Economic and social benefits include improved connectivity, accessibility and healthy living/fitness opportunities for pedestrians, cyclists and all users of 17th Ave. Bridge enhancements will benefit local businesses resulting in economic benefits. Better *function and mobility* are created by adjusting lane widths in order to gain more public realm space and new wider paths that provide a safe connection over the bridge while maintaining vehicular traffic flow. The Master Plan enhances existing crosswalks with priority given to pedestrians. The multi-use path connection over the bridge will encourage more visitors and residents, and the inclusion of a layby at 24th St also provides better vehicular access and parking for business owners. *Character and Identity* has been improved with

tree lined boulevards, seating, site furnishings, landscape features or public art that can be themed with input from local community groups and residents. Proposed design elements at the Crowchild Bridge create a sense of entry in this zone with opportunities for pageantry/public art integrated into the functional bridge structure such as the railings, lighting and protective barriers (Refer to Figure 3.15-3.19).



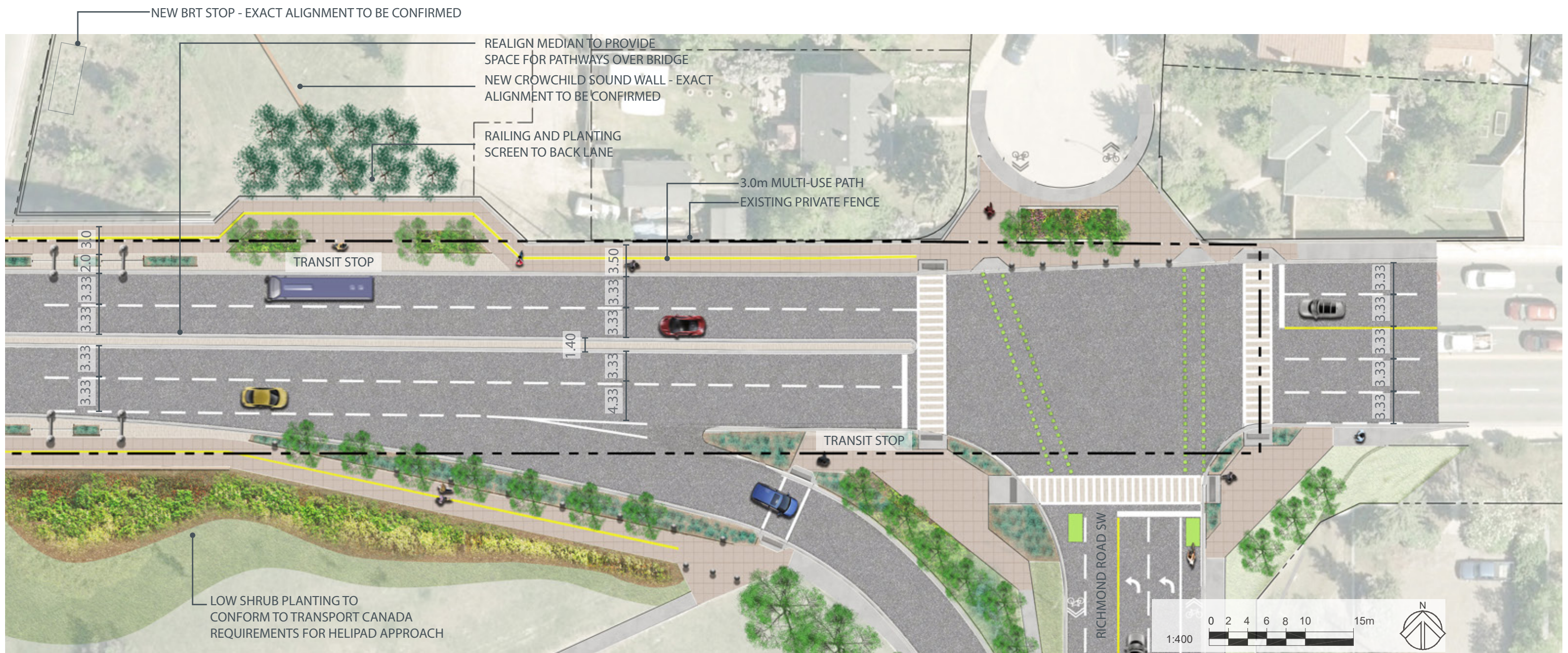
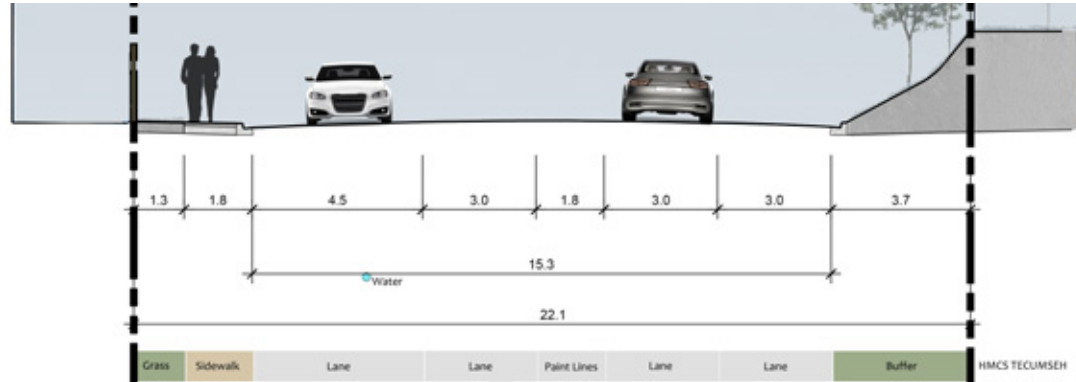


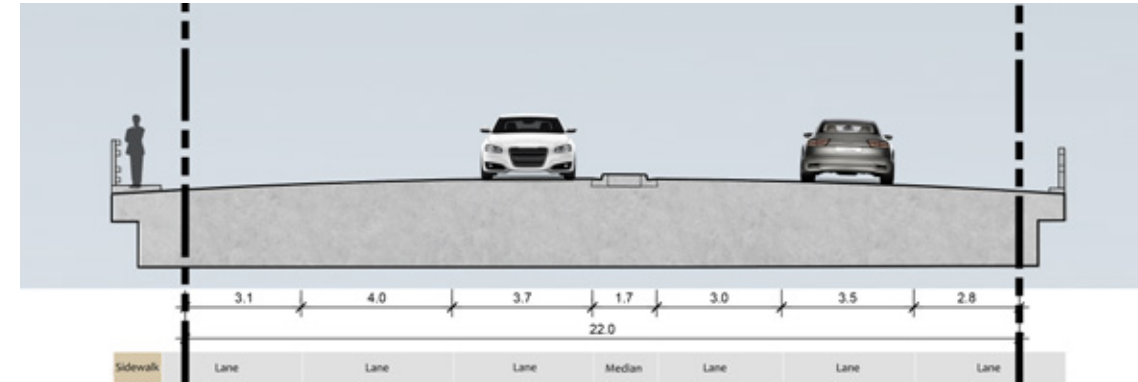
Figure 3.15 Zone 4 (Residential and Mixed Use Gateway Zone 25a St - Crowchild Bridge) Concept Design

Sections



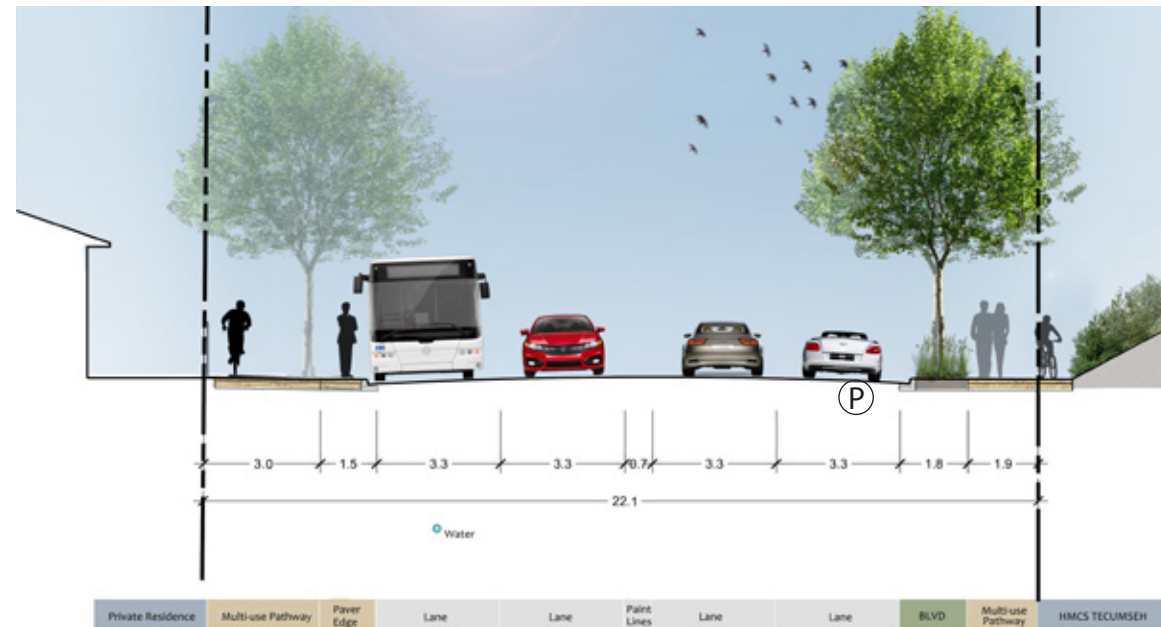
Section C - Existing

- No existing sidewalk/path on south side
- Severe backsloping from HMCS Tecumseh
- Dangerous pedestrian crossing condition
- Poor pedestrian connection to bus stop



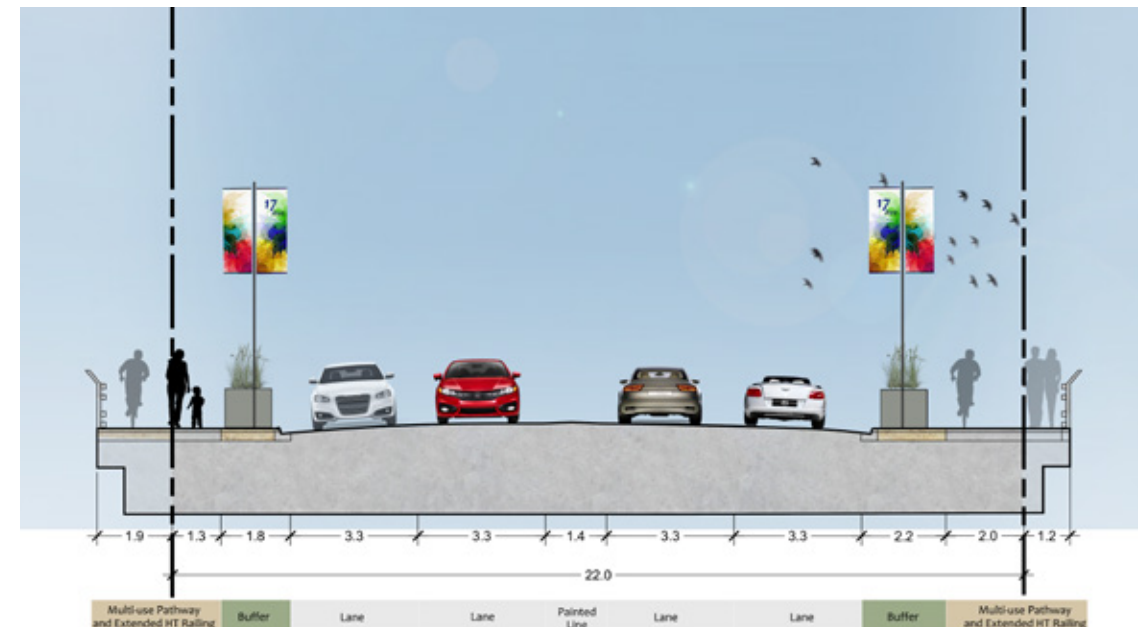
Section D - Existing

- No existing path connection over bridge
- Dangerous pedestrian and bicycle crossing condition with no formal pathway



Section C - Proposed Design

- Potential lane width reductions for increased public realm and new off peak parking zones.
- Option for slope and/or retaining wall at HMCS interface to provide space for sidewalk and tree planting pending further technical review and coordination. Significant improvement for pedestrian connectivity and vehicular separation with tree plantings.
- 3.0m wide multi use path with boulevard trees on north and south side



Section D - Proposed Design

- Adjust lane widths and alignment to create space for multi use pathways on north and south side of bridge
- Install a barrier to protect pathway users
- Use barrier as an opportunity to integrate a gateway experience into the 17th Ave corridor

Figure 3.16 Section C

Figure 3.17 Section D

3D View at Crowchild Trail Bridge



Figure 3.18 Existing Condition at Crowchild Bridge



Figure 3.19 Proposed View at Crowchild Bridge

Bridge lanes are re-aligned and narrowed, in order to accommodate multi-use paths for cyclists as well as planters and other design elements that create a community gateway at the east end.

3.6 Design Toolkit

The 17th Ave SW design toolkit includes feasible design options that improve: placemaking, economic vitality, mobility, infrastructure, and fosters private investment in the community. This aligns with Council policy and the Main Streets Program vision.

The design toolkit will include, but is not limited to:

- **Potential cross-sections that reflect the project objectives and strategies, and address divergent stakeholder priorities and values. These cross-sections will be used to consult with stakeholders and the public to collect feedback;**
- **Examples of potential design interventions that reflect the Project Vision, Objectives and Strategies and would address project concerns. The design interventions shall include a wide spectrum of costs, deviation from existing conditions, and level of effort required for implementation, and;**
- **Relevant illustrations, photographs, and other presentation matter**

3.6.1 Directional Crosswalks and Wheel Chair Ramps

A walkable and accessible public realm should provide safe and frequent crosswalks. Crosswalks benefit and guide pedestrians and cyclists. The proposed design of 17th Ave SW increases the frequency of crosswalks, providing much needed permeability and connectivity between the north and south sides of the street (Refer to figure 3.20 and 3.21).

Design Analysis (Key Map)



Concept Plan

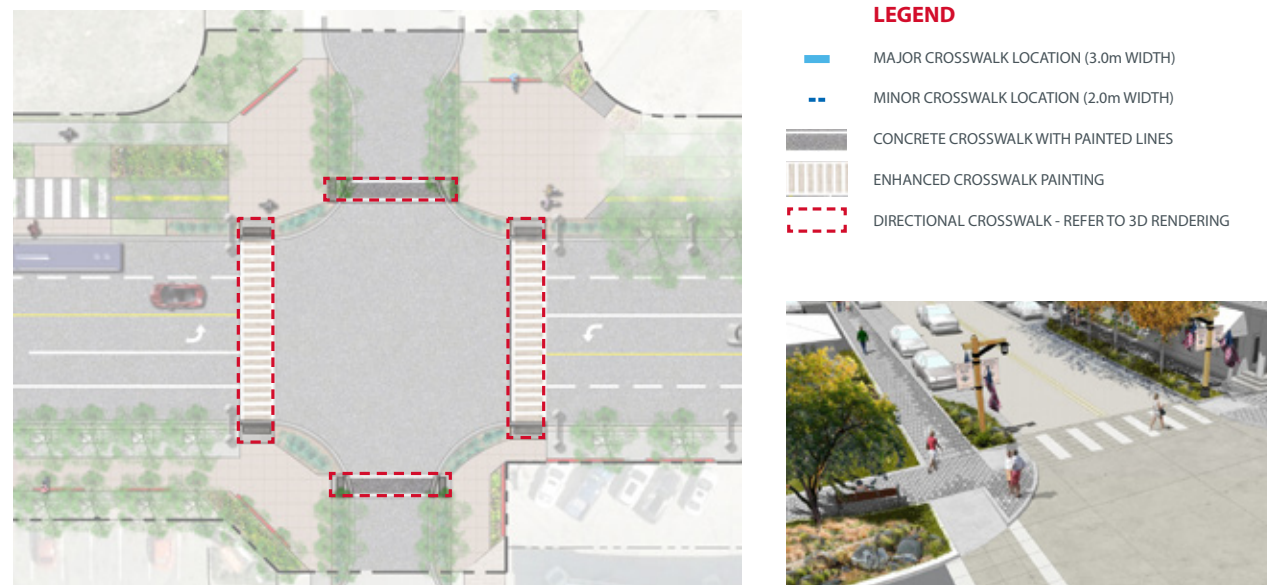


Figure 3.20 Directional Crosswalks and Wheel Chair Ramps Concept Plan

The design of the 17th Ave SW intersection crosswalks and wheel chair ramps will have the following characteristics:

- **Curb extensions and bump outs that create a larger public realm space for safer, more accessible circulation, shorter crossing distances as well as stormwater filtration and retention**
 - **Truly directional perpendicular wheel chair ramps with concrete curb returns that assist the visually impaired.**
 - **Tactile Pavers at consistent locations.**
- 8-10% maximum gradients on ramps with concrete grooves at uniform distance.
- **Consistency in design for this entire section and extents of this project.**
 - **Accommodation of SU9 vehicle turning movements.**
 - **Safe circulation of bicycle traffic through the two bicycle route street intersections (26th and 29th St)**

This design of the directional crosswalks and wheel chair ramps have been previously implemented in the new phases of Currie Barracks. They have been tested and endorsed by an Accessibility Consultant (Level Playing Field).

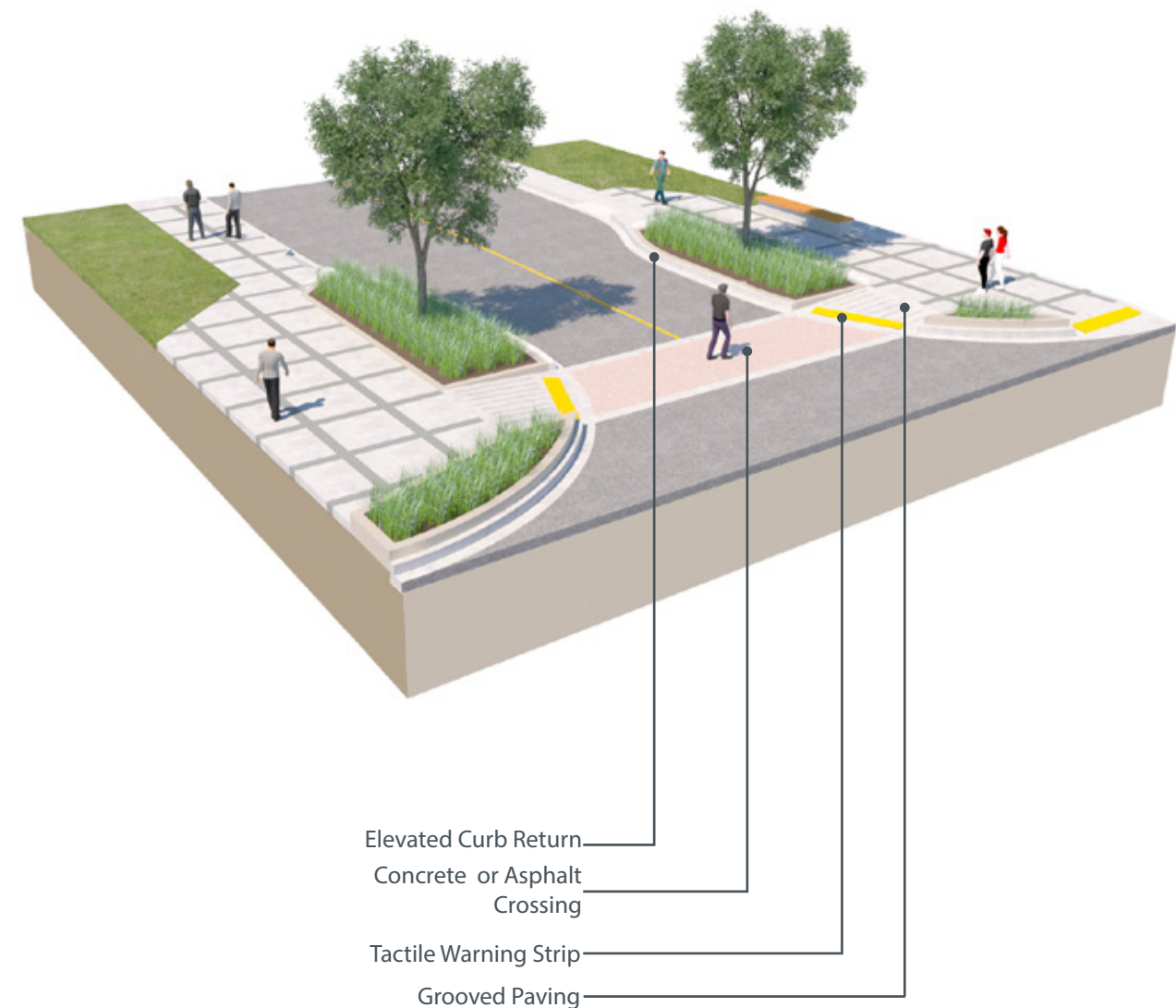


Figure 3.21 Directional Crosswalks and Wheel Chair Ramps Render

3.6.2 Storm Water Bio-retention Cells

Traffic calming measures and curb extensions at the intersections along 17th Ave provide space and opportunity to create small rain gardens and bio-retention and filtration areas. As part of the 17th Ave SW toolkit, they will become character defining elements that soften community entrances and exits while performing a storm water management function. Low Impact Development in Calgary has evolved in recent years and is a result of The City's Stormwater Management Strategy (Refer to figure 3.22 and 3.24).

Sustainability is a key design principle for the Main Streets Program and the 17th Ave. SW project aligns with The City of Calgary's greater policies and goals:

- **Protect watershed health by reducing rate/volume of stormwater runoff entering rivers.**
- **Maintain sediment going into the Bow River at 2005 levels.**
- **Control sediment by focusing on retrofits in existing developed areas.**
- **Develop sustainable stormwater management practices for new/redeveloped areas.**

The vision for long-term sustainable growth and development is a result of various plans captured in the council-directed Plan IT Calgary process.

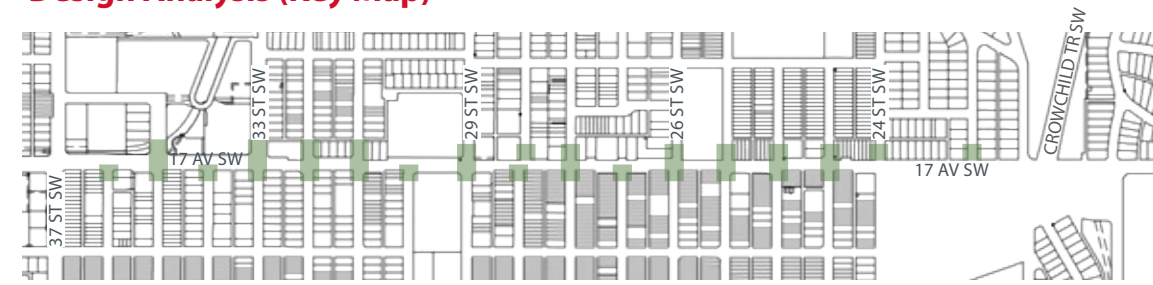
Rain gardens protect our rivers, ecosystems and drinking water by helping to manage the level of sediment going into rivers from Calgary's stormwater drainage system. Other benefits of rain gardens include the following:

- **Reduce the chances for local flooding, drainage problems and stream bank erosion.**
- **Reduce untreated pollutants that run from the roads into waterways.**
- **In addition to protecting our waterways, rain gardens:**
- **Can be planted with beautiful, hardy, low-maintenance, water-wise plants**
- **Attract birds, butterflies and beneficial insects, such as mosquito-eating dragonflies.**
- **Complement any landscape and enhance the beauty of the surrounding neighbourhood.**



Figure 3.22 Storm Water Bio-retention Cells Precedent Images

Design Analysis (Key Map)



Concept Plan

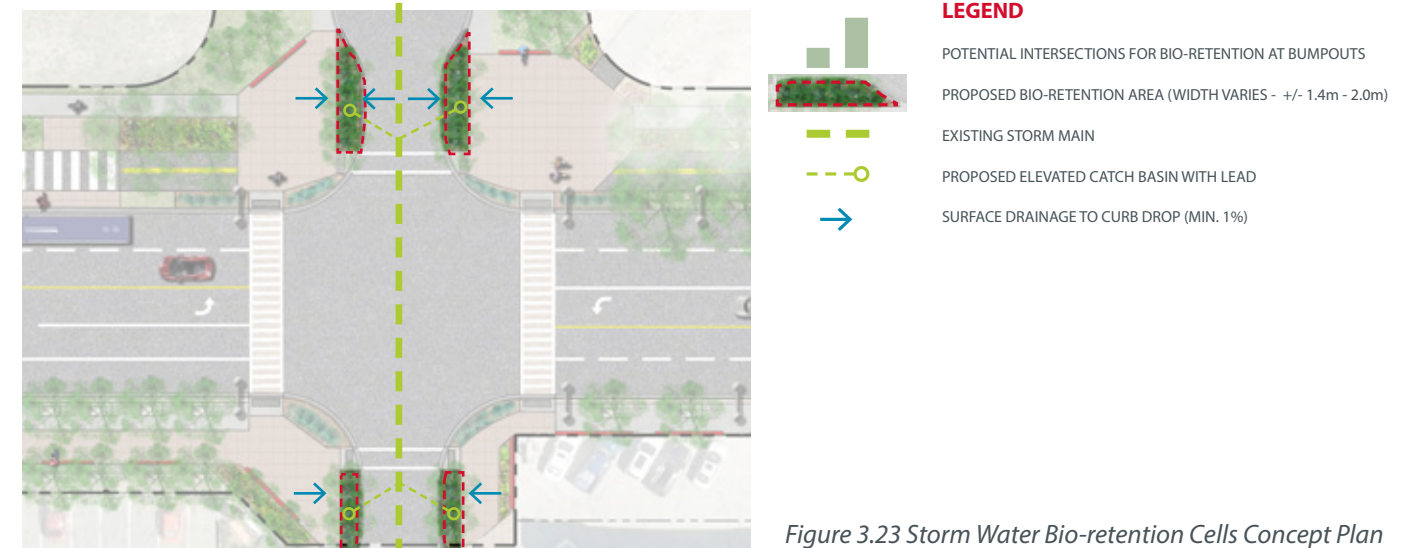


Figure 3.23 Storm Water Bio-retention Cells Concept Plan



Figure 3.24 Storm Water Bio-retention Cells Render

The bio-retention areas installed along 17th Ave SW will capture and filter stormwater before it enters the greater stormwater network. The existing and aging stormwater infrastructure along 17th Ave and the intersecting north-south streets was identified as deficient in terms of capacity and condition. Rain Gardens will be located at the existing low points at the intersections with existing catch basins and connecting leads being replaced and upgraded as part of the project.

The Rain Gardens will be designed to work as part of the drainage system and will be filled with hardy low maintenance plant materials that are low growing and retain the required sight lines at the intersections. The natural processes of plants and soils will also improve water quality by trapping and storing sediment, and by filtering contaminants and nutrients. The rain gardens also reduce runoff and allow for water to soak into the ground at these low points (Refer to figure 3.25 and 3.26).

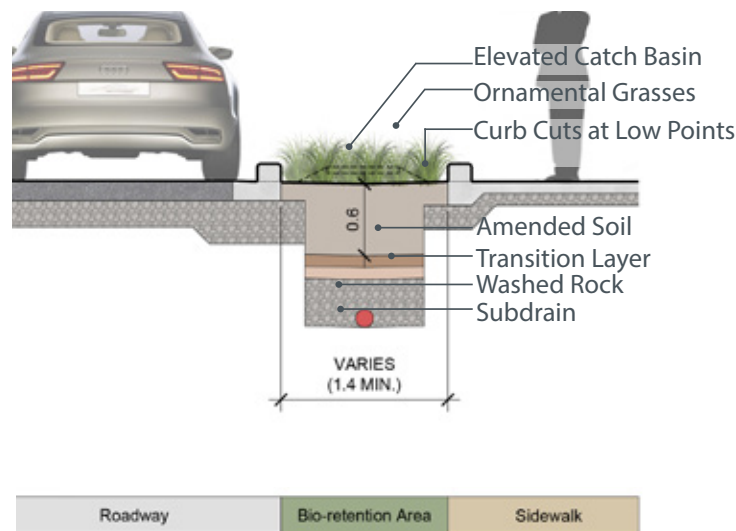


Figure 3.25 Type 1 Bio-Retention Area

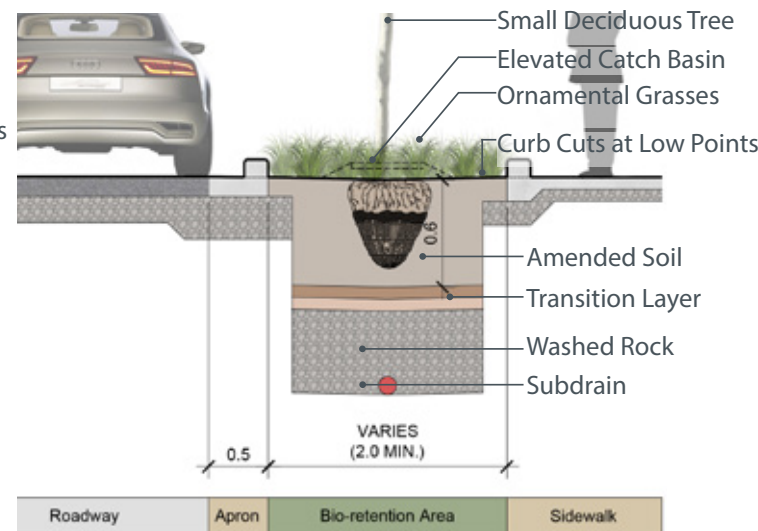


Figure 3.26 Type 2 Bio-Retention Area

3.6.3 Tree Planting and Soil Volume

Urban tree planting conditions along 17th Ave SW is not conducive to the growth of plants and trees. Narrow sidewalks and small setbacks have resulted in little or no existing tree cover along the entire stretch of this section of 17th Ave.

Increased tree planting was identified by all stakeholders as one of the main design drivers and priorities in the upgrades along 17th Ave SW. The advantages of large trees are numerous and range from aesthetic beauty and excess water management to reduction of high temperatures in urban areas. The 17th Ave SW project is an ideal location for soil cell installation due to the harsh urban conditions and proximity to high volumes of fast moving traffic.

As part of the 17th Ave. SW toolkit, soil cells are proposed as a means to accommodating street trees in areas where there is no boulevard and minimal space from back of curb to property line for a traditional soil trench and tree boulevard. This will enable the development of functional and beautiful trees in this tight urban corridor and public spaces (Refer to figure 3.27 - 3.32).

Limiting factors in the growth of urban trees are primarily small planting volumes and highly compacted poor-quality soil structure. A well-structured soil functions like a reservoir and enables a tree to accept, store and transmit water, nutrients, and energy, and provides ample room for roots to propagate. Trees are frequently planted in cramped planting pits and

poor subsoil, resulting in restricted growth and roots that colonize the area immediately underneath a paved surface often leading to damage to the paving structure which require solid, compacted ground to accommodate pedestrian movement and vehicular traffic. Soil cells provide an underground framework for containing lightly compacted, good quality soil that supports large trees and absorbs runoff from rain, increasing air and water quality, reducing energy loads, mitigating heat island effect and nurturing trees for a long life. Soil cells provide trees and plants in urban environments with the nourishment they need, without disturbing the structures above.

There are two main suppliers of soil cells in the market place; Deeproot (Silva Cells) and Citygreen (Stratavault /Stratacells). Both are reputable and have a proven track record in soil cell supply and installation.

Design Analysis (Key Map)



Concept Plan

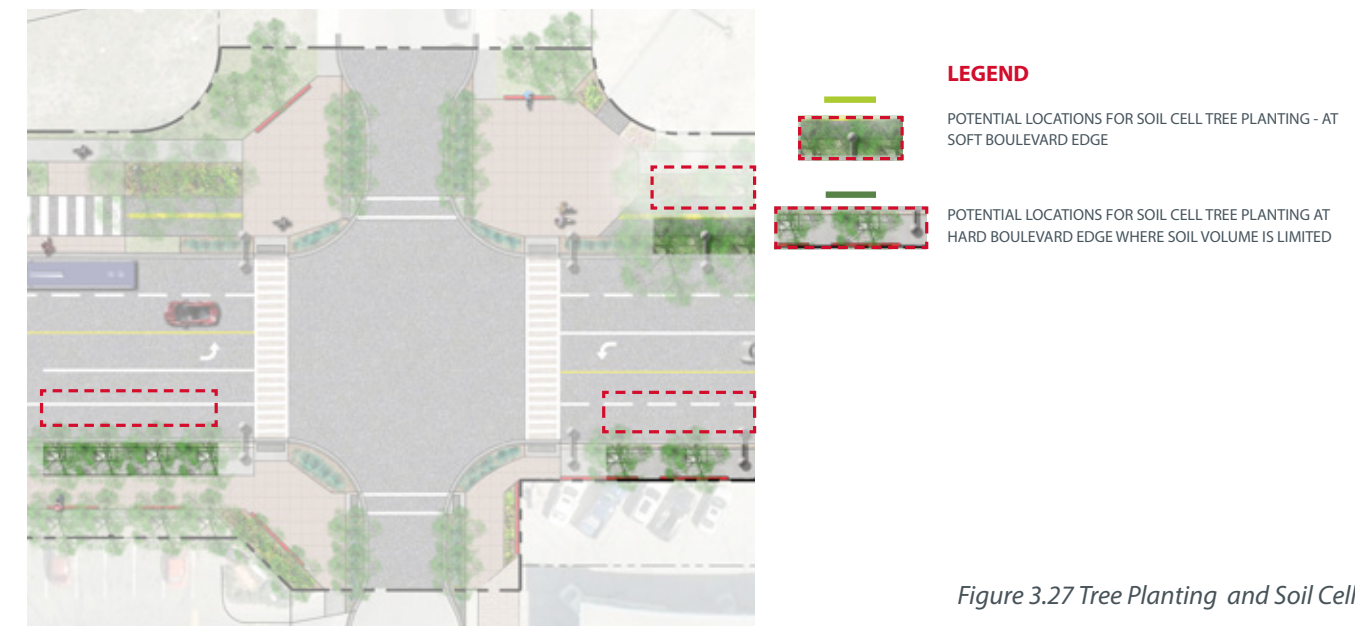


Figure 3.27 Tree Planting and Soil Cell Concept Plan



Figure 3.28 Tree Planting and Soil Cell Precedent Images

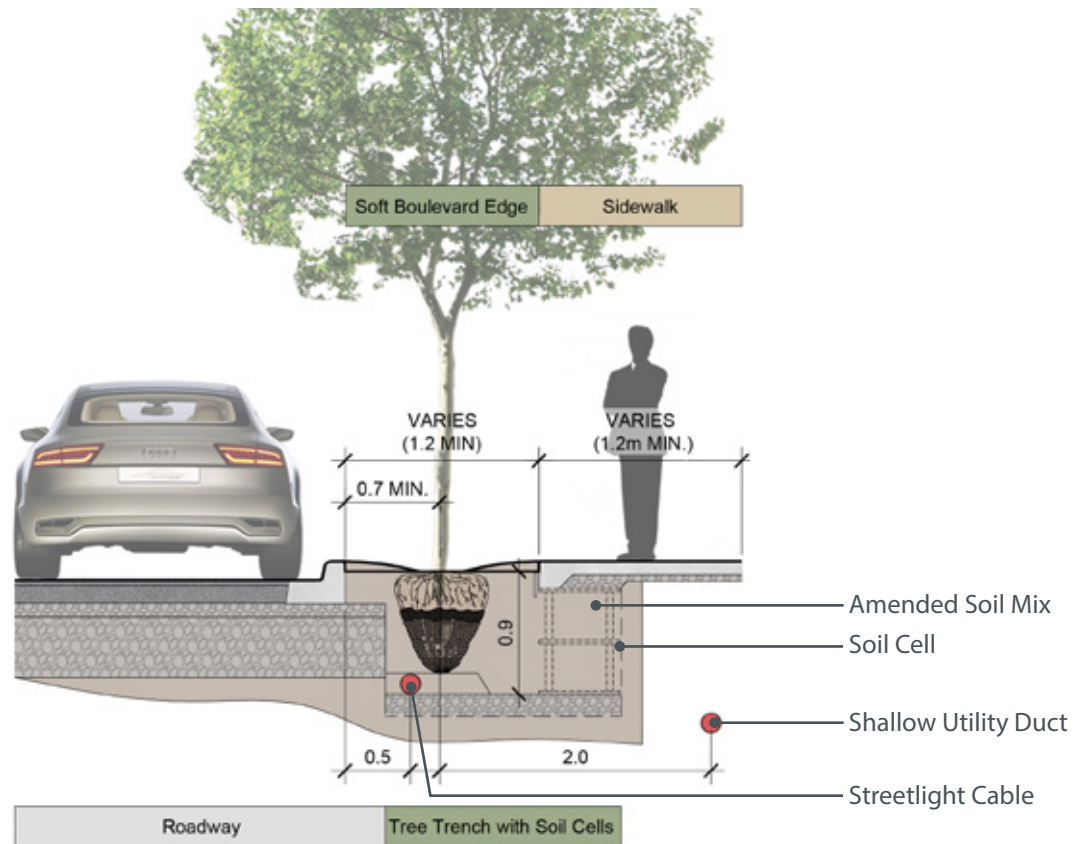


Figure 3.29 Potential Tree Planting Detail A

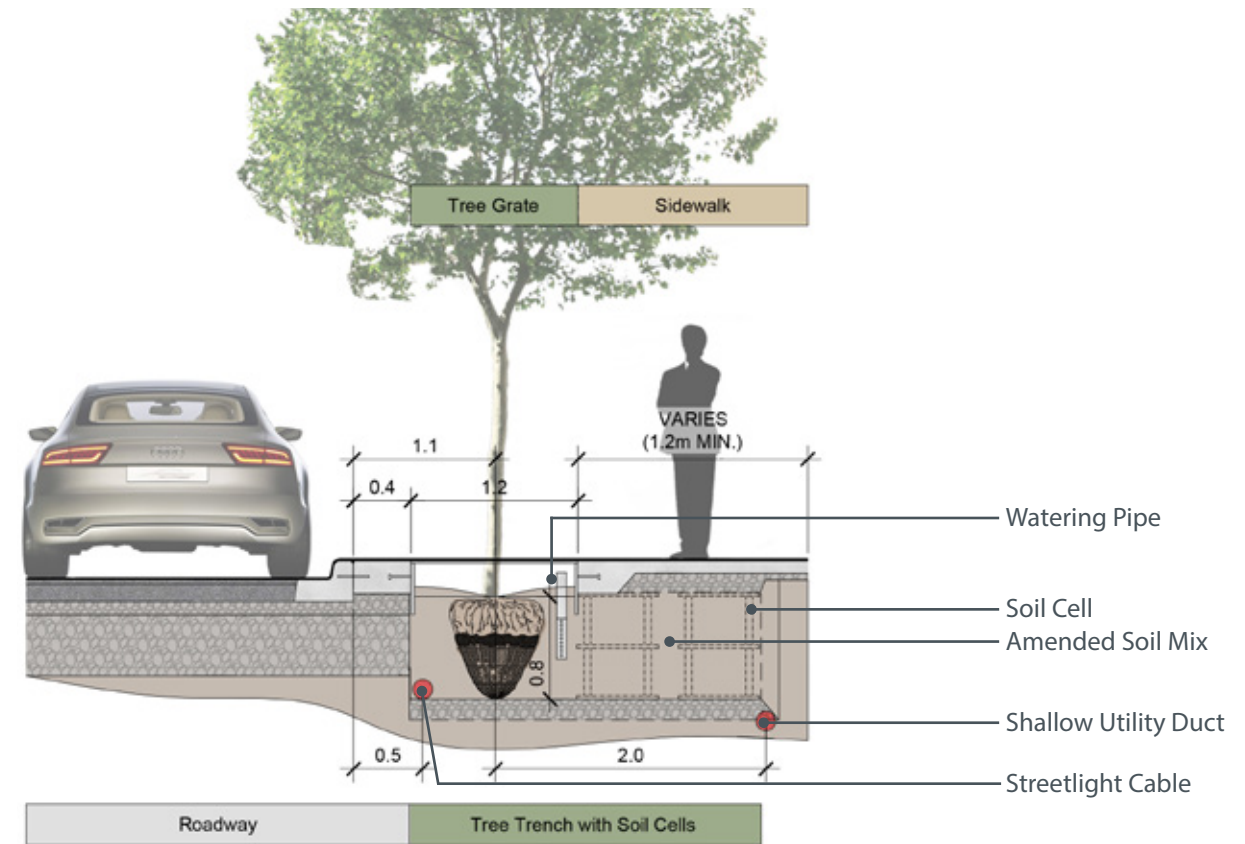


Figure 3.30 Potential Tree Planting Detail B

Note: Potential design solution where boulevard width is less than 2.0m.

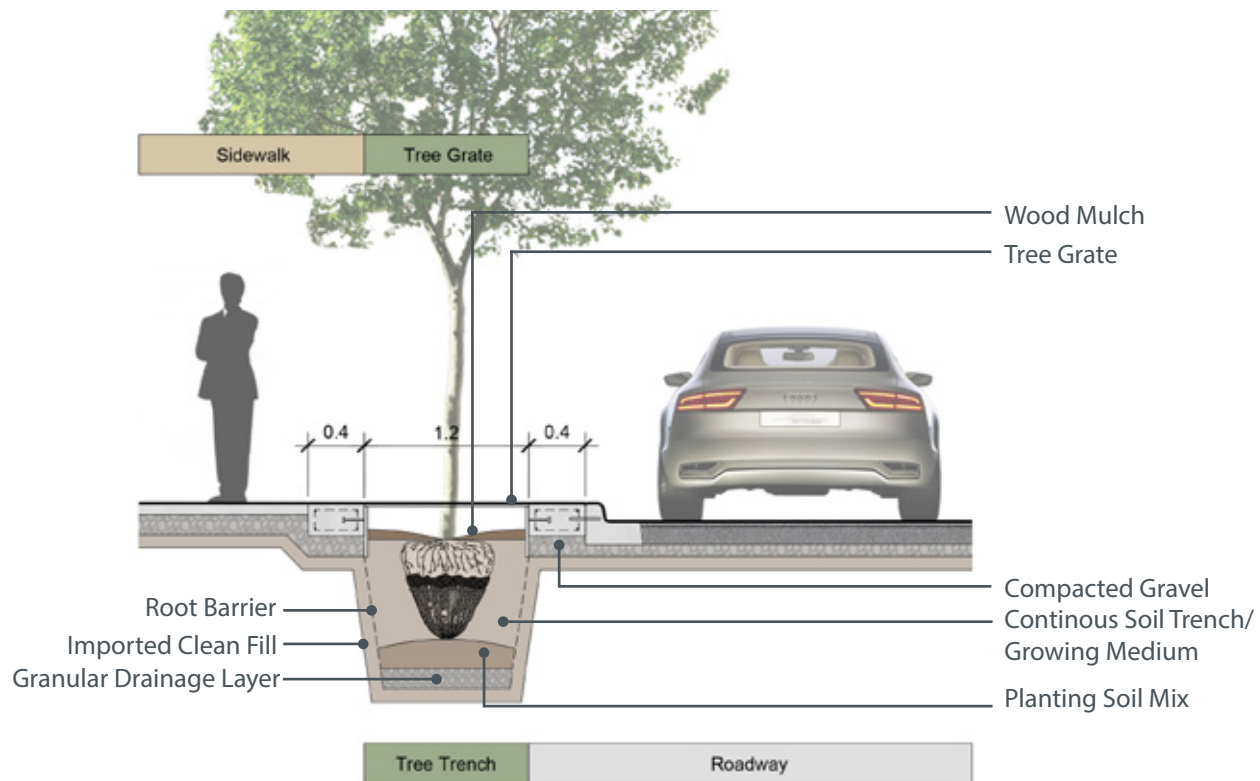


Figure 3.31 Potential Tree Planting Detail C

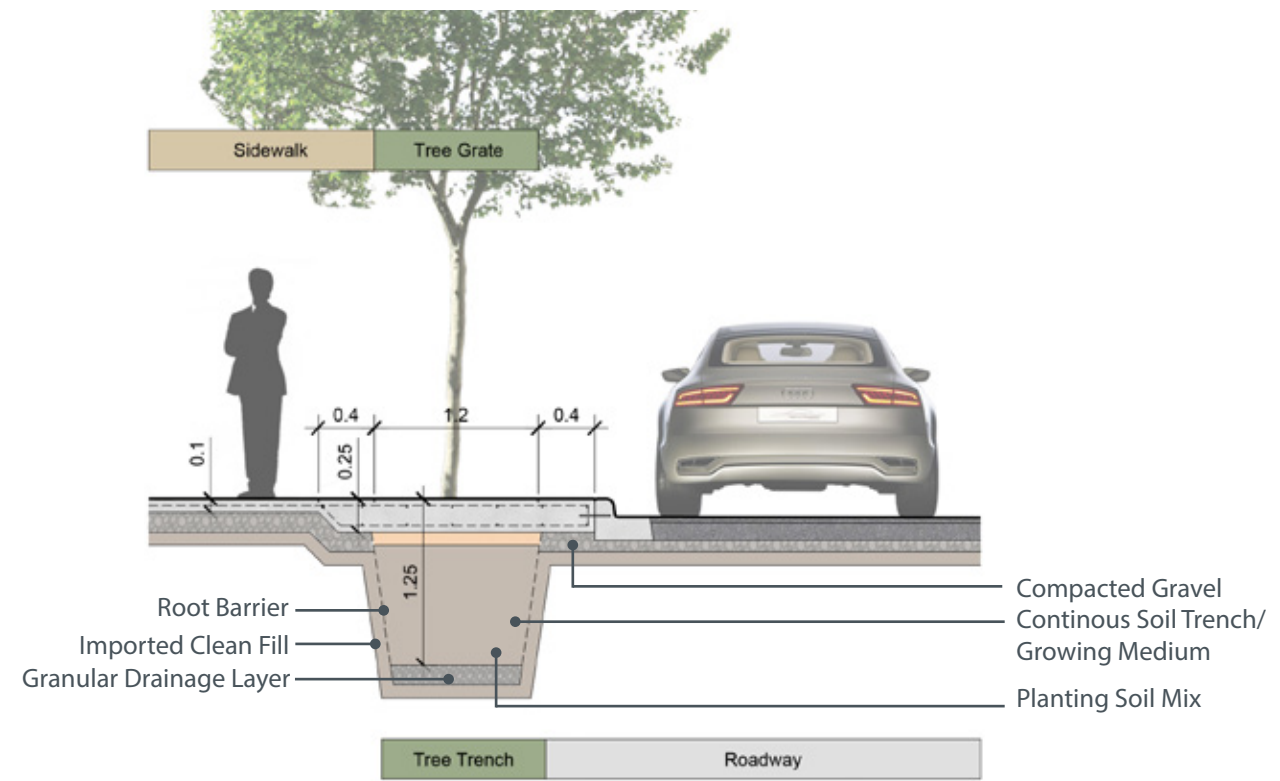


Figure 3.32 Potential Tree Planting Detail C - 2

3.6.4 Intersections for Cyclists (Richmond Rd, 26th and 29th)

With an increase in bike lanes, intersections need to accommodate motor vehicles, pedestrian and bike traffic. The mixed user group adds complexity to the intersection and new treatments shall be implemented to give cyclists more visibility and protect them from car traffic.

Option 1 Protected Intersection (Preferred Option)

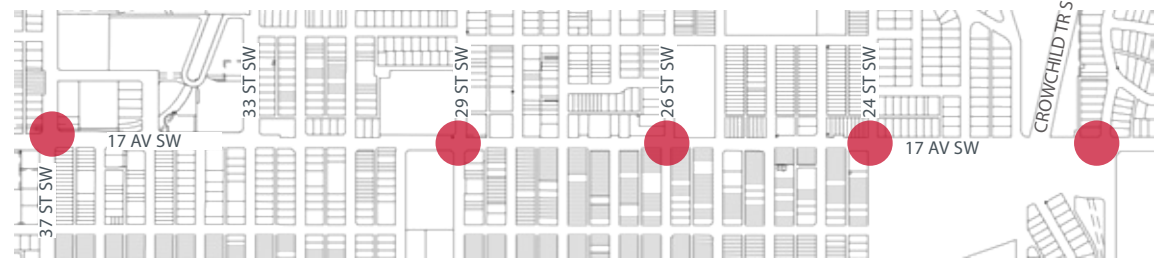
"Protected intersections" are already popular in European cities where cycling culture and design for multi modal transportation is strong. A study conducted in the Vancouver area in 2015 showed the majority of collisions involving

cyclists happen within intersections. The City of Vancouver have implemented protected intersections in a few key locations including the first "protected intersection" in North America at the intersection of Burrard Street and Cornwall Avenue, at the south end of the Burrard Bridge.

The protected intersection eliminates or minimizes conflicts between vehicles and people walking or cycling by separating movements in time and space. To be truly effective, a protected intersection must be clearly thought out and carefully designed using geometric layout, separated traffic signal phases, and well placed signs and pavement markings (Refer to figure 3.33 and 3.34).

Amid efforts to eliminate preventable fatalities, more thought and analysis has occurred in recent years and protected intersections are now being integrated into Canadian and American cities. While the design primarily provides safe passage for cyclists away from vehicles, this is also balanced with the requirement to avoid conflicts between cyclists and pedestrians.

Design Analysis (Key Map)



Option 1 Protected Intersection for Cyclist (Preferred Option)

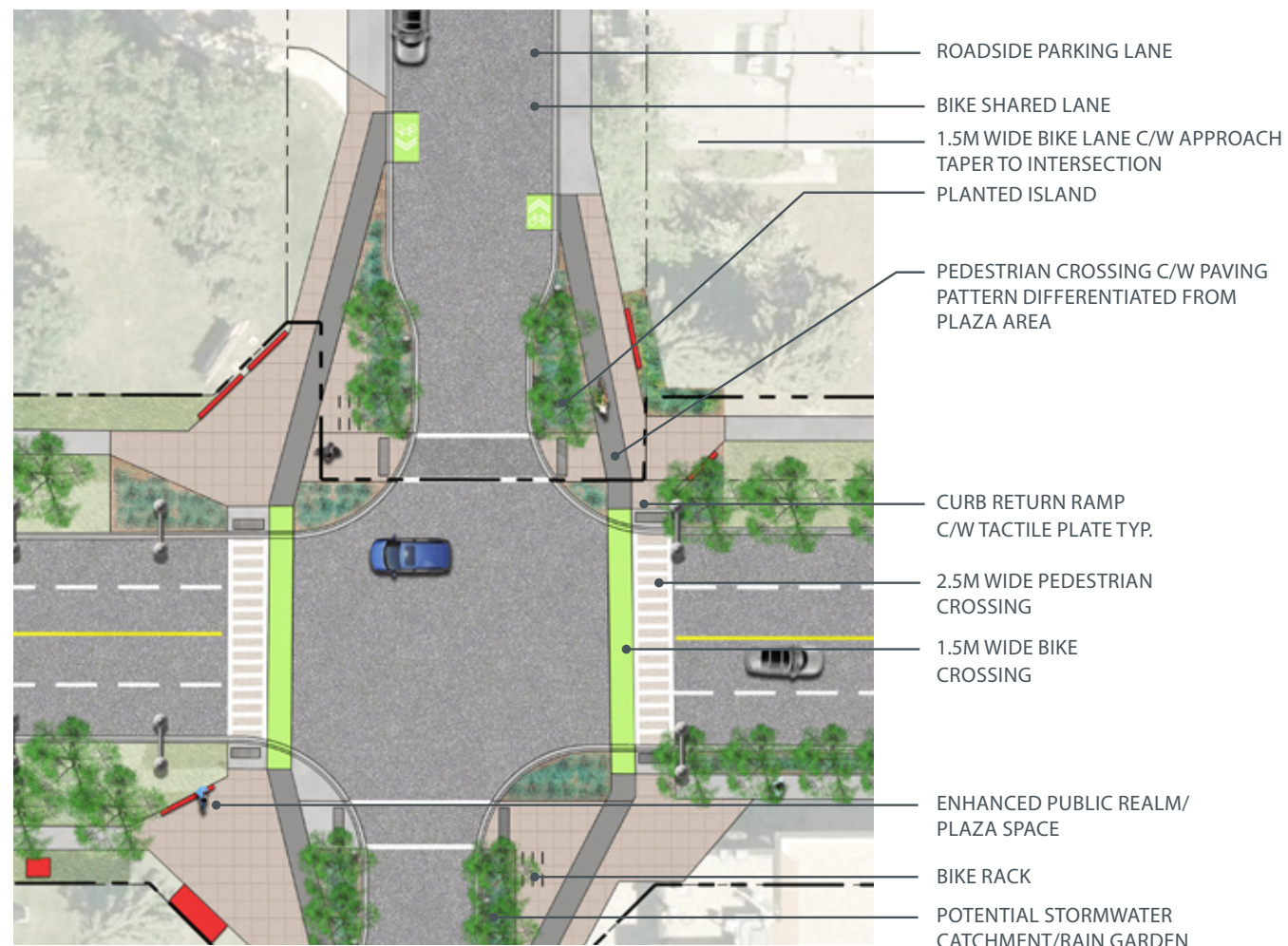


Figure 3.33 Protected Intersections for Cyclists Plan

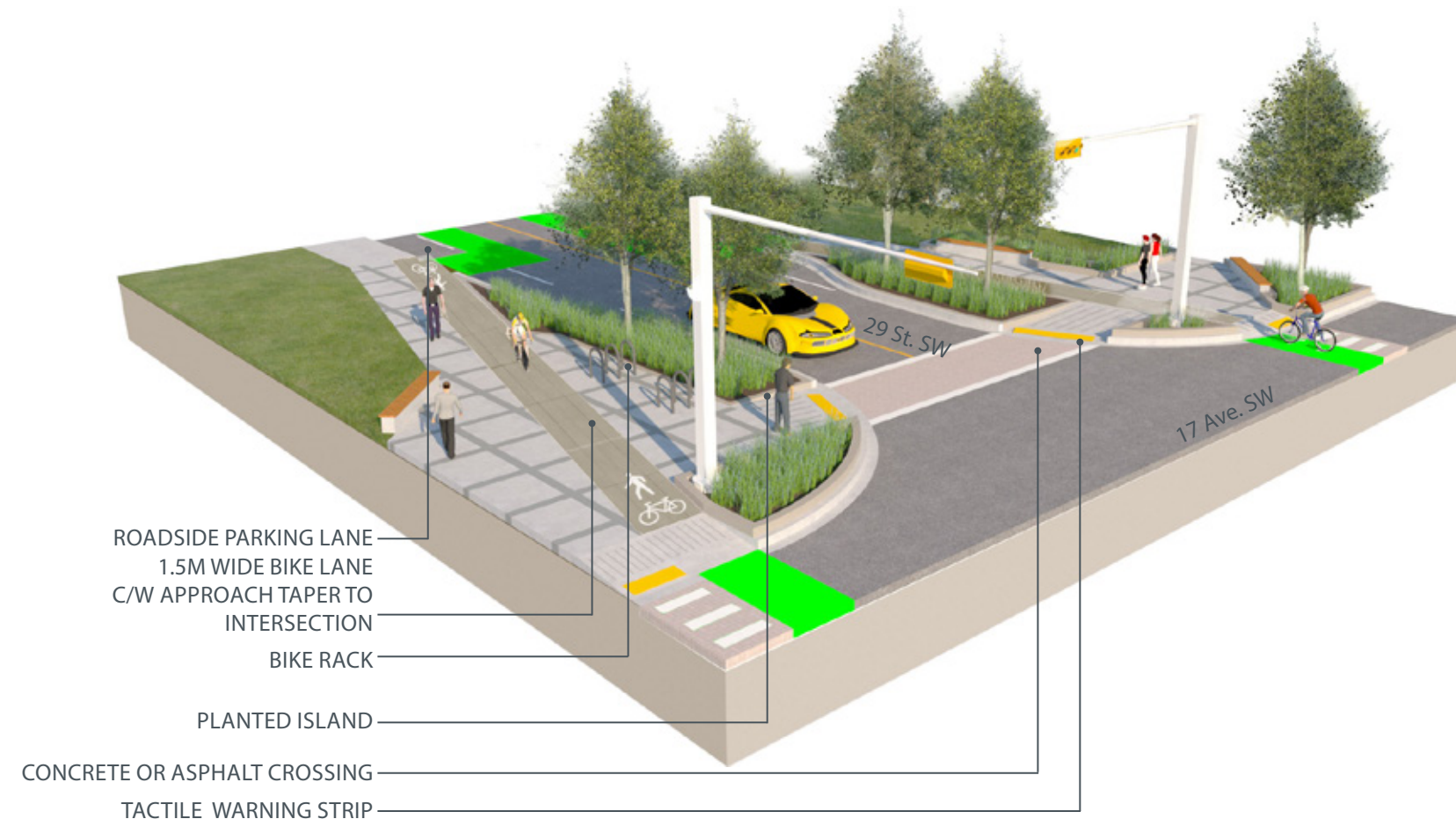


Figure 3.34 Protected Intersections for Cyclists Render

Option 2 On Street Crossing

The on street crossing option direct the bicycle traffic away from the pedestrian crossing and connect the bike route through the center of intersections. This option requires a slight reduction in the curb extension and less route marking for construction. The bicycle crossing sign may be used on the cross street to indicate the crossing (Refer to figure 3.35 and 3.36).

While this option still separate bicycle and pedestrian circulation at intersection, it does not provide additional safety for cyclist away from vehicles. With no defined road marking for bike crossing, there could be more conflicts between cyclists and pedestrians as well.

As part of the toolkit for this project, three streets with bicycle intersections are utilizing the options for intersections and design principles within the context of the existing lane widths, allowable turning radii and traffic movements.

Option 2 On Street Crossing Intersection for Cyclist

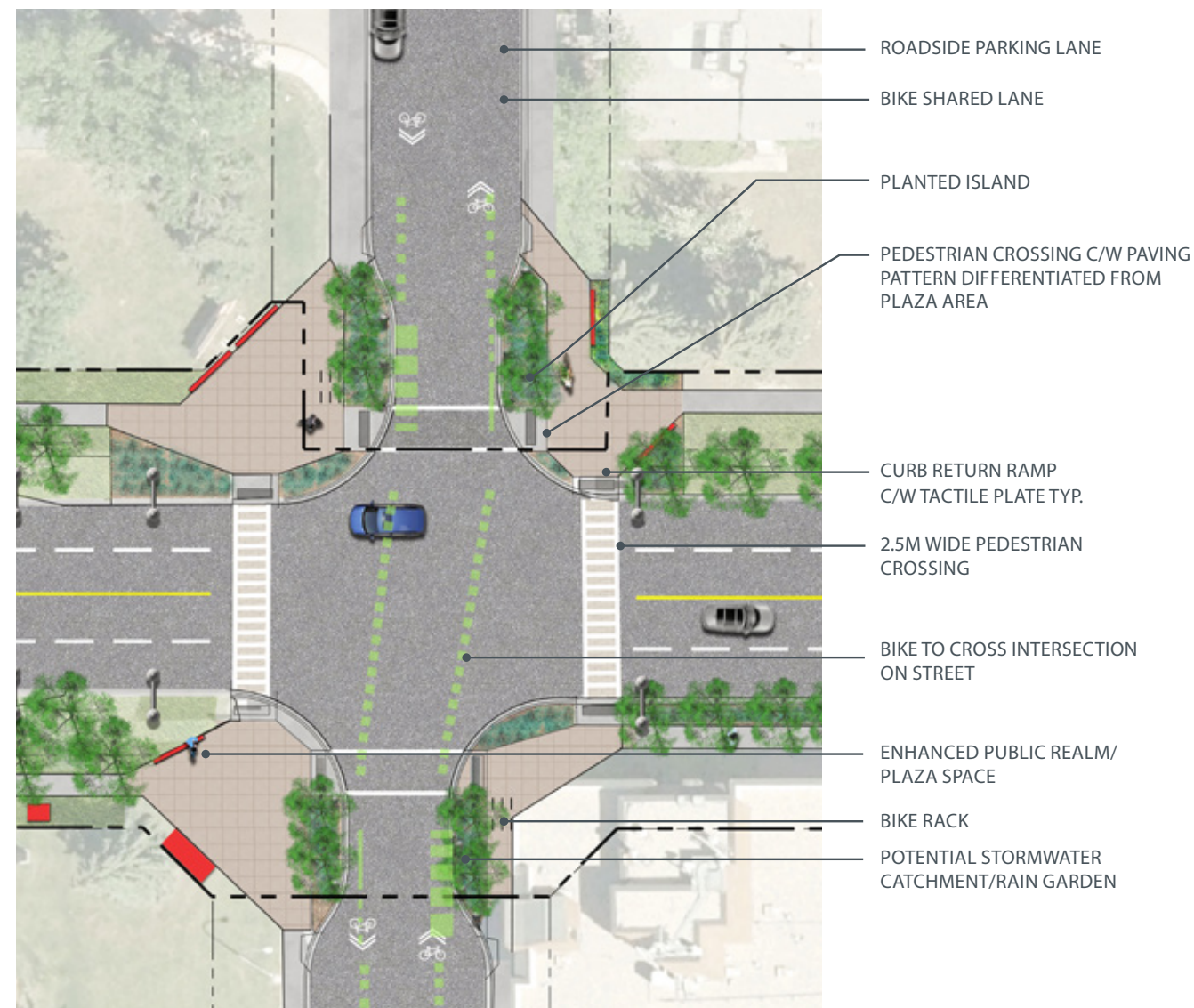


Figure 3.35 On Street Crossing Intersection for Cyclists Plan

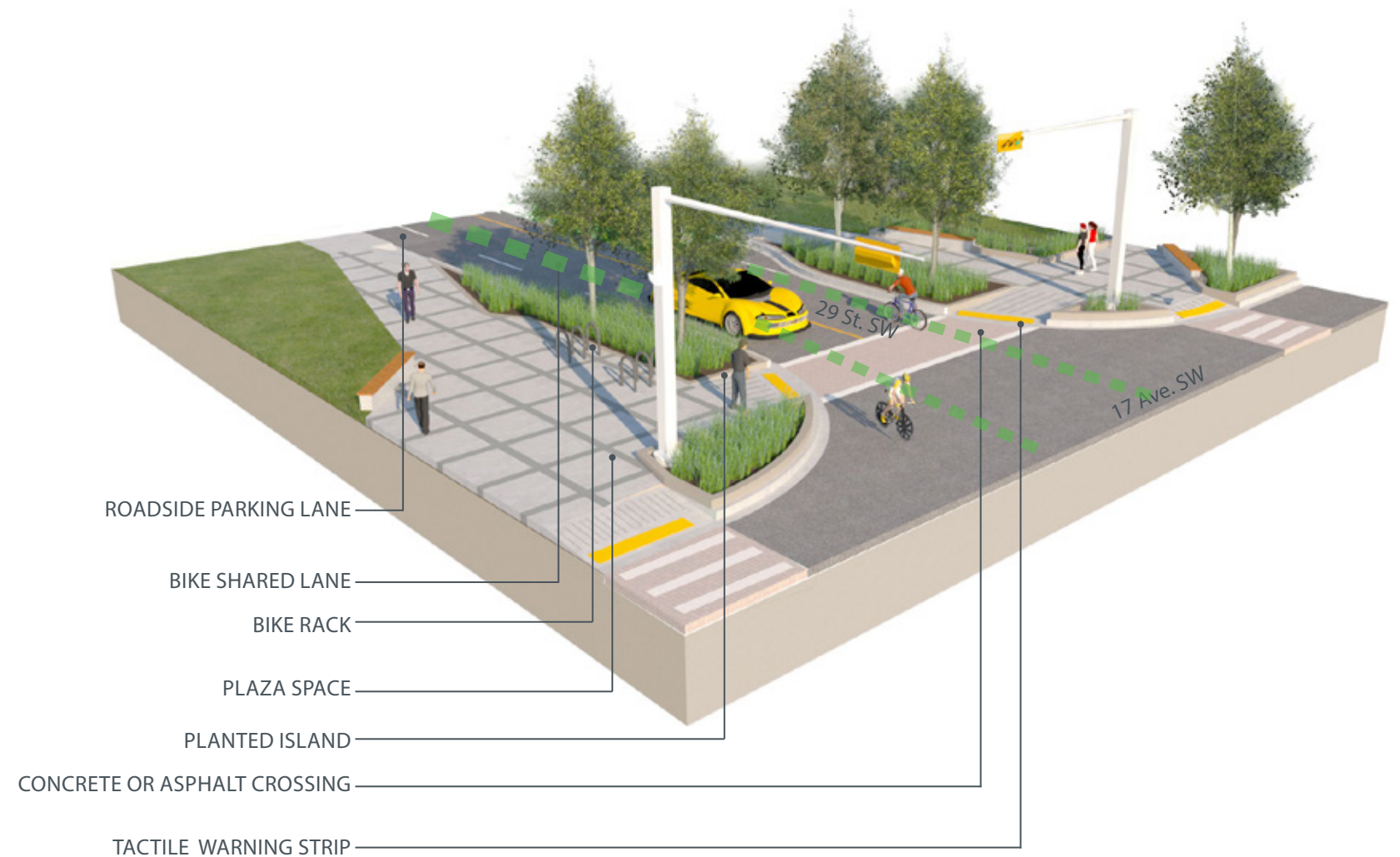


Figure 3.36 On Street Crossing Intersections for Cyclists Render

3.6.5 Paving Materials, Lighting, and Urban Design Elements

High quality, consistent and durable materials and elements will be used through out the street corridor. Various paving materials will be used in featured landscape nodes and new walkways to delineate different public spaces(Refer to Fig 3.39). Existing street lighting fixtures will be upgraded and new pedestrian scale bollards and feature lighting will be added to public plazas(Refer to Fig3.37 and 3.38). The enhanced street and pedestrian scale lighting will provide well lighted public realm for better public safety and winter interest.

Lighting Opportunities

Design Analysis (Key Map)



Concept Plan






- LEGEND**
-  TWO-TIER PEDESTRIAN SCALE ROADWAY LIGHT POSTS ALONG ENTIRE STRETCH OF PROJECT
 -  PEDESTRIAN LIGHT BOLLARDS
 -  POTENTIAL AREAS FOR FEATURE/ACCENT LIGHTING
 - 26th Street intersection at school
 - 29th Street fitness area and/or public art
 - 37th St Intersection
 - Crowchild Bridge gateway

Figure 3.37 Lighting Opportunity Concept Plan

Constructed Precedent Examples



TWO-TIER PEDESTRIAN SCALE ROADWAY LIGHT POSTS



ACCENT LIGHTING (I.E. FOR PUBLIC ART, SEATING OR OTHER URBAN FEATURES)



PEDESTRIAN SCALE LIGHT BOLLARDS AT MAJOR NODES

Figure 3.38 Lighting Precedent Images

Paving Palette



ACCENT PAVER

- Pedestrian nodes and increased public realm areas at key intersections - accent banding and texture



COLOURED CONCRETE

- Major pedestrian nodes
- Multi-use pathway - Crowchild Bridge
- Crosswalks



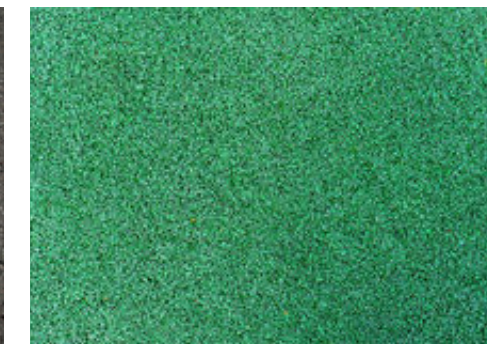
SAND BLAST FINISH CONCRETE

- Minor pedestrian nodes
- Multi-use pathway - Crowchild Bridge



ASPHALT

- Multi-use pathway - adjacent to 37th Street
- Crosswalks - on connecting residential streets



GREEN ASPHALT

- Bike Lanes on street at protected intersections



BROOM FINISH CONCRETE

- Pedestrian corridor - main thoroughfare
- Driveway aprons

Figure 3.39 Paving Precedent Images

3.6.6 Enhanced Amenity and Public Art Opportunities

Extended public realm spaces are proposed at the main street intersections and there are opportunities to enhance the spaces with site furniture and public art installation. Some of the unique neighbourhood nodes include 26th St play space, 29th Street fitness area/public art and Crowchild bridge gateway area. The enhancement will also provide opportunities to celebrate the diversity of the surrounding neighbourhoods and businesses.

Design Analysis (Key Map)

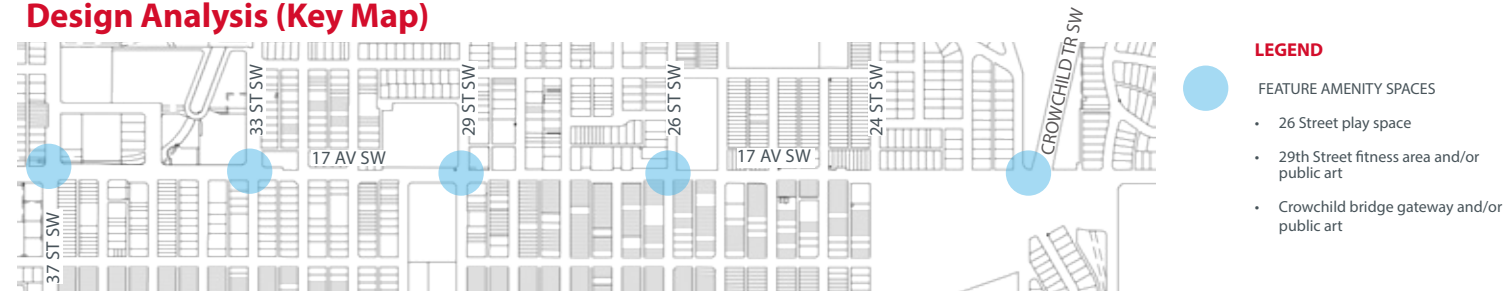


Figure 3.40 Enhanced Amenity and Public Art Opportunities Concept Plan

Constructed Precedent Examples



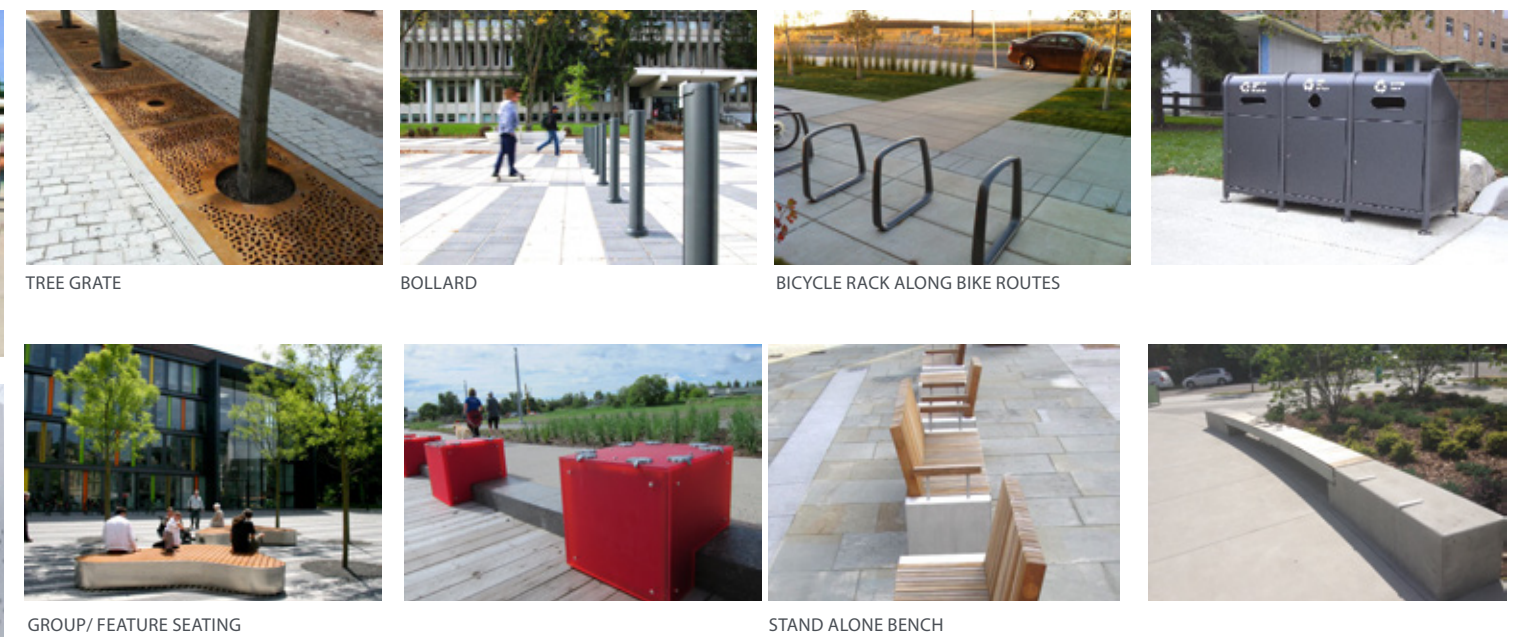
GATEWAY FEATURE

PUBLIC ART

PLAY OR FITNESS SPACE

Figure 3.41 Enhanced Amenity and Public Art Precedent Images

Site Furniture Palette



TREE GRATE

BOLLARD

BICYCLE RACK ALONG BIKE ROUTES

GROUP/ FEATURE SEATING

STAND ALONE BENCH

Figure 3.42 Site Furniture Precedent Images

4.0 STORM WATER MANAGEMENT AND UTILITIES

4.1 Stormwater Management

Introduction

17 Avenue Southwest consists of a dual drainage network comprised of the major system including streets, boulevards, walkways and the minor system including storm sewers, catch basins and grated-top manholes. During a rainfall or a snow-melt event, any stormwater (referred to as overland runoff) that is not infiltrated by a pervious surface located within the major system will continue to flow towards the nearest storm inlet, eventually entering the minor system. Due to the early development of Killarney/Glengarry, the existing underground storm infrastructure is mainly composed of concrete storm pipes and storm inlets such as catch basins or grated-top manholes. Captured stormwater is conveyed through a series of pipes to one of four wet ponds located at the Shaganappi Golf Course and ultimately discharges to the nearest Bow River outfall. The amount of pervious to impervious surfaces will be unique to each catchment area as Killarney/Glengarry is comprised of mostly residential and varying recreational/commercial uses bordering 17 Avenue Southwest.

Challenges

The overall age of the Killarney/Glengarry neighbourhood infrastructure will introduce a number of challenges for the design of stormwater management on 17 Avenue SW. Firstly, the existing stormwater management reports for the Killarney/Glengarry area are outdated and most of the content such as the storm design requirements, is no longer applicable. Therefore, the analysis of 17 Avenue Southwest will require an intensive investigation, exceeding the standard limits of the road right-of-way, in order to determine the total contributing flows. The results of this investigation will influence the available pipe capacity and the required storage volumes along this segment of roadway.

With the recent advancement of stormwater best management practices, it is suspected that many of the existing developments bordering 17 Avenue SW have not been designed according to the latest City standards, further reducing the available capacity within the minor system. There are existing segments of storm pipe that are significantly undersized for the upstream catchment. In order to ensure a consistent flow is maintained throughout the minor system, a low unit area release rate target is typically introduced for developments tying into the storm system. A low unit area release rate may introduce design and cost implications for retrofit developments since the re-development would need to abide by the current City of Calgary Standards.

To maintain an achievable unit area release rate for 17th Avenue Southwest, various storage options will be explored and implemented as part of the proposed streetscape of 17th Avenue SW. Storage in the form of surface depressions, referred to as traplows, is an alternative that is commonly used. Other alternatives such as Low Impact Developments (LIDs) will be explored.

Low Impact Development (LID)

Low Impact Developments serve a number of benefits for stormwater management such as temporary storage, improving water quality and reducing the total runoff directed to the river outfall. One of the LID practice(s) that will be explored is the use of soil cells which can provide underground bioretention that uses select soil volumes that support tree growth while storing, treating and reducing the overall runoff.

Integral to the Master Plan, are the curb extensions and bump outs designed into the entry points of the residential streets, all the way along 17th Avenue. These bump outs will be utilized for storm water infiltration and create permeable surfaces and landscaped areas. (See also Design Toolkit Section 3.6.2) During detail design, the installation of permeable and porous pavements will be explored – this allows storm water runoff to infiltrate the underlying soil (Refer to Figure 4.1).

Throughout detailed design, there will be ongoing correspondence between the design team and The City of Calgary Urban Strategy, Transportation Infrastructure/Roads and Water Resources departments to ensure that the desired vision for 17th Avenue SW is achieved.



Figure 4.1 Precedent Examples

4.2 Utility Conflicts

The 17th Ave. SW Corridor contains deep, shallow and surface utilities. This information was provided by the City of Calgary and is referenced on the base plans utilized for the project.

Surface and Overhead Enmax Lines and Power Poles

17 Avenue Southwest consists of areas where the overhead Enmax lines and power poles impede pedestrian circulation and opportunities for tree planting. Discussions with Enmax occurred during the Master Plan design process and most of the power poles and overhead lines will be placed underground prior to construction of the streetscape.

Power poles to be removed are located at the west end near 37th Street as well as further east between 26th and 23rd Street. The City are coordinating this enabling work directly with Enmax as part of the greater Main Streets program. Other surface utility improvements include:

- **Street light standards in various locations along the corridor. These have been included in the base information on the Master Plan.**
- **Traffic signal structures and controllers are installed at several intersections.**
- **Pedestrian crossing signals at 35th and 27th Street SW.**

Deep Utilities

- **Storm sewer lines are located in the length of 17th Ave SW within and under the existing roadway. These should not be affected by or conflict with the proposed boulevard and public realm enhancements other than locations where they connect through lanes and into private property. A full inventory and base plan indicating existing utilities can be found in Appendix 3.**
- **Sanitary sewer lines are located in the length of 17th Ave SW within and under the existing roadway. These should not be affected by or conflict with the proposed boulevard and public realm enhancements other than locations where they connect through lanes and into private property. A full inventory and base plan indicating existing utilities can be found in Appendix 3.**
- **Water lines are located in the length of 17th Ave SW within and under the existing roadway. These should not be affected by or conflict with**

the proposed boulevard and public realm enhancements other than locations where they connect through lanes and into private property

- **Service connections for these utilities are present at various locations along the corridor.**
- **Manhole structures are typically located within the roadway portion of the corridor.**

Shallow Utilities

- **Some of the shallow utility installations are likely to be in conflict with changes and additions made to the public realm area. This will result in modifications to both the layout of the new design elements, trees, and the relocation shallow utilities. These must be considered at the detailed design stage and be accounted for in project cost.**
- **The base plan in Appendix 3 indicates existing locations of ATCO Gas lines, Enmax, Telus and Shaw installations. Telus and Shaw have several line segments and service vaults located within the right-of-way, which must be verified at the time of the detailed design.**
- **The project Team will send the Master Plan to all the utility providers early in the design process in order to verify locations and what constraints will be, in particular with regards to new tree planting in boulevards.**
- **Acceptance and approval of soil cells for tree planting will be sought as an alternate to more expensive rerouting of ducts and cables.**
- **Service connections for these utilities are present at various locations along the corridor and must be maintained even if this requires relocation.**
- **Most of the shallow utilities are located under the current or projected area of the public realm.**