

02

INTRODUCTION

IMAGINE
IDYLWYLD



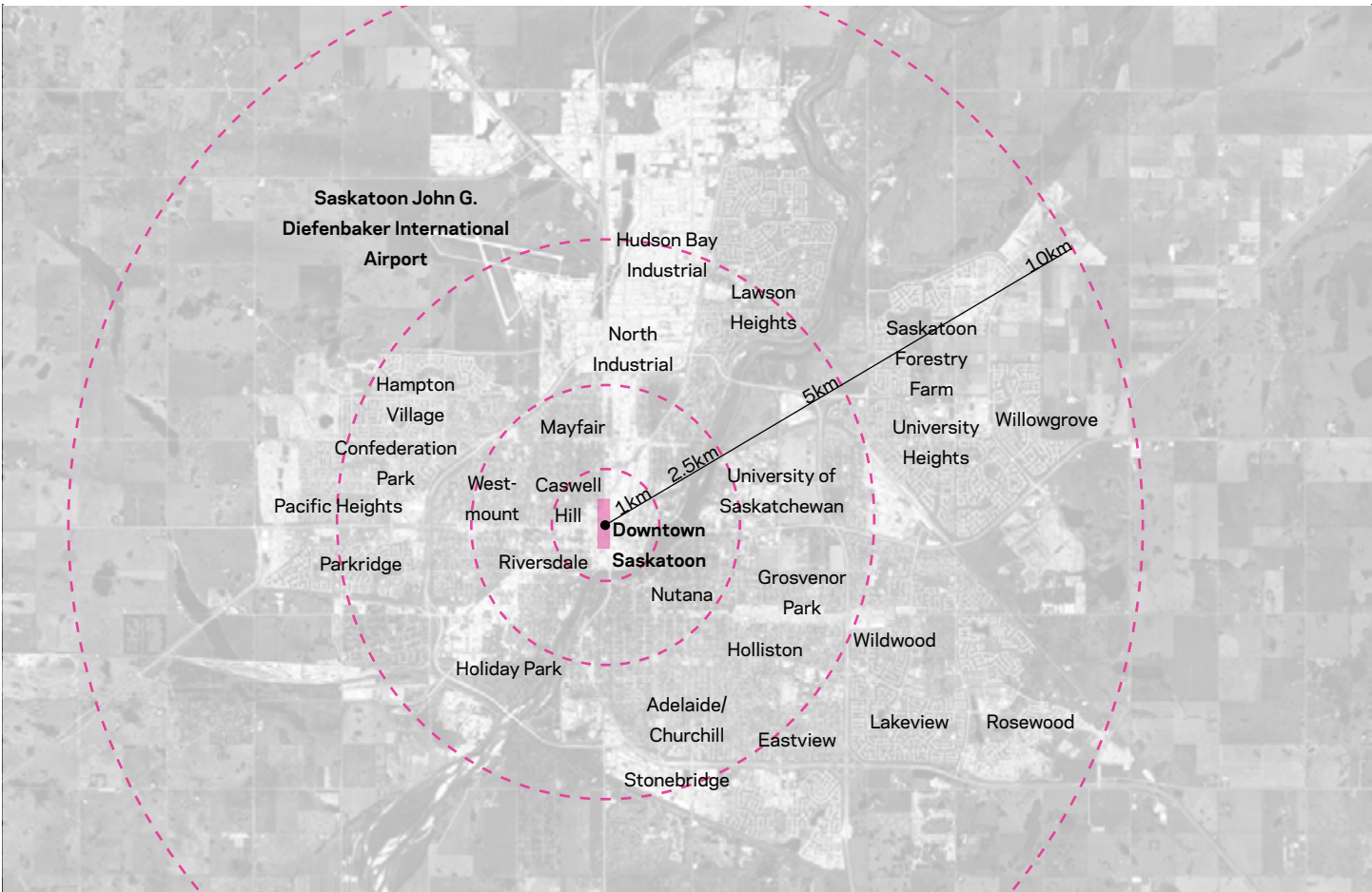


Figure 2.1: The Site in the City Context

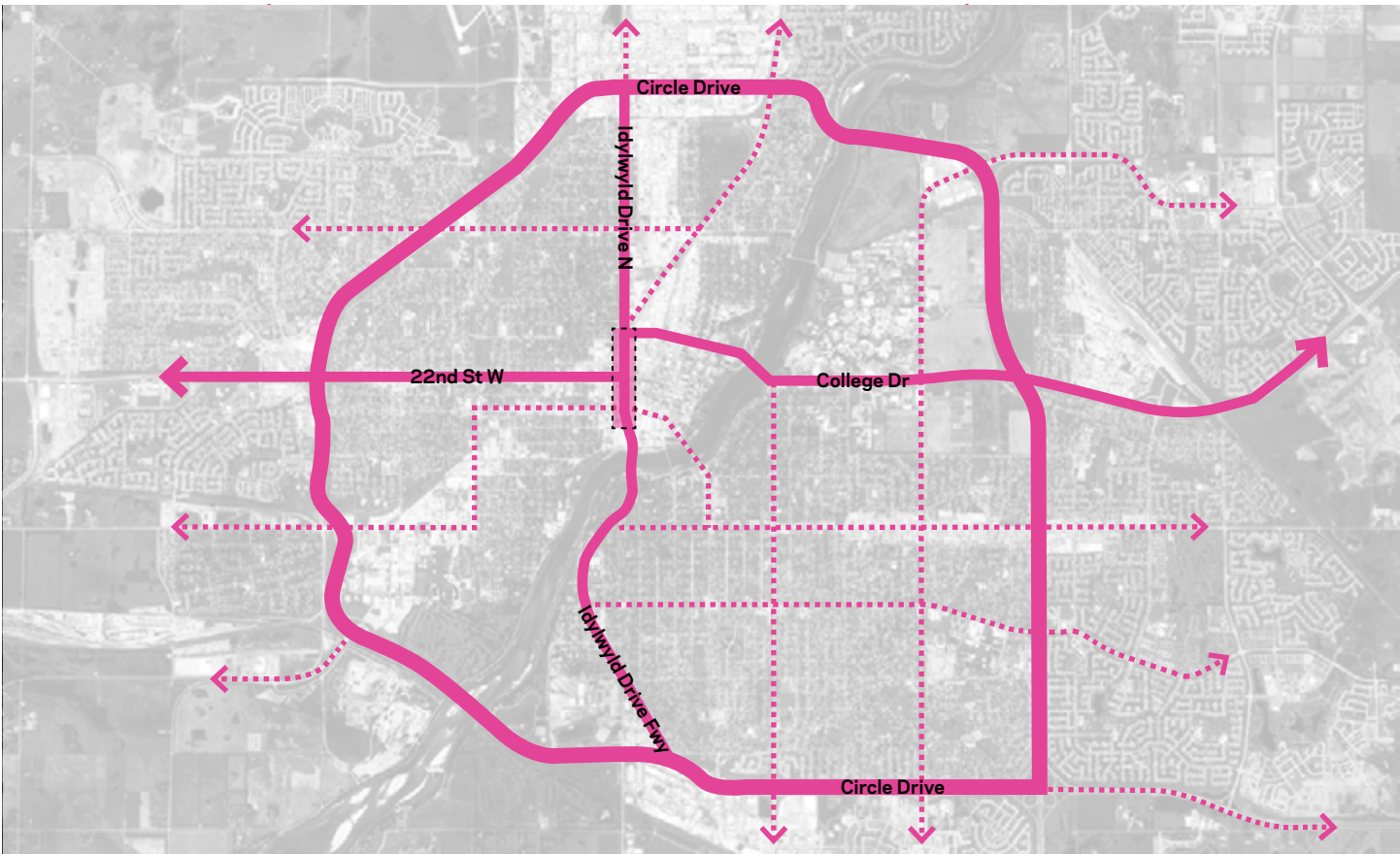


Figure 2.2: The Site in the City-Wide Circulation Context
 Imagine Idylwyld: Issues and Opportunities Report



INTRODUCTION

Imagine Idylwyld is a twelve month City of Saskatoon planning and design initiative for Idylwyld Drive. The purpose of the project is to develop a new vision and conceptual plan to improve the function, safety, connectivity and quality of the roadway and public realm along Idylwyld Drive, between 20th Street and 25th Street East.

Idylwyld Drive is, and will continue to be, a major north-south arterial corridor in Saskatoon and a key gateway into the City Centre for motorized vehicles. However, its current configuration poses a challenging environment for pedestrians to navigate, dividing surrounding neighbourhoods and districts. Improvements to Idylwyld Drive will help link the neighbourhoods and the business districts, making it easier for people to get around the City Centre and help define the street as a gateway by cultivating a sense of arrival.

PROJECT BACKGROUND AND CONTEXT

Idylwyld Drive serves as a key north-south travel corridor through Saskatoon and connection to the City Centre. Further, it connects with 22nd Street and 25th Street East, both east-west major arterial roadways. The project area represents a dynamic zone bordered by four neighbourhoods: Riversdale and Caswell Hill to the west, and Downtown and Central Industrial to the east.

The area also includes the Riversdale Business Improvement District (BID) and Downtown Saskatoon BID.

In the last four years, Idylwyld Drive has been affected by two major infrastructure projects:

The opening of Circle Drive South significantly changed traffic volumes, composition, and patterns. Idylwyld Drive experienced decreased traffic volumes as drivers moved their trips from 22nd Street and Senator Sid Buckwold Bridge to Circle Drive South. Specifically, the intersection of 22nd Street and Idylwyld Drive underwent decreases in the proportion of northbound left turns and eastbound right turns. Moreover, the City removed Idylwyld Drive and 22nd Street from its Truck Routes, dramatically decreasing the number of heavy trucks with trailers using Idylwyld Drive.

The extension of 25th Street East, between 1st Avenue and Idylwyld Drive, also contributed to traffic pattern changes. Previously, traffic to and from the University Bridge dispersed through the Downtown to connect with Idylwyld Drive. Now, that same east-west traffic is concentrated at the intersection of 25th Street East and Idylwyld Drive.




These changed traffic conditions above, along with the City's new policies to guide the growth and development of the city to 500,000 people, are driving the need to revisit the vision and character of the corridor. The *Imagine Idylwyld* project will examine existing and future transportation movement patterns, current and future zoning and land uses, and existing and proposed built forms to gain an understanding of Idylwyld Drive's role as a major urban arterial roadway - now and in the future.

PROJECT TIMELINE

<p>PHASE 01 Background Review 6 weeks</p>	<p>PHASE 02 Corridor Assessment 12 weeks</p>	<p>PHASE 03 Development of Alternatives 18 weeks</p>	<p>PHASE 04 Concept Streetscape Design 20 weeks</p>
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LEGEND

-  Study Area
-  Area of Impact
-  Block

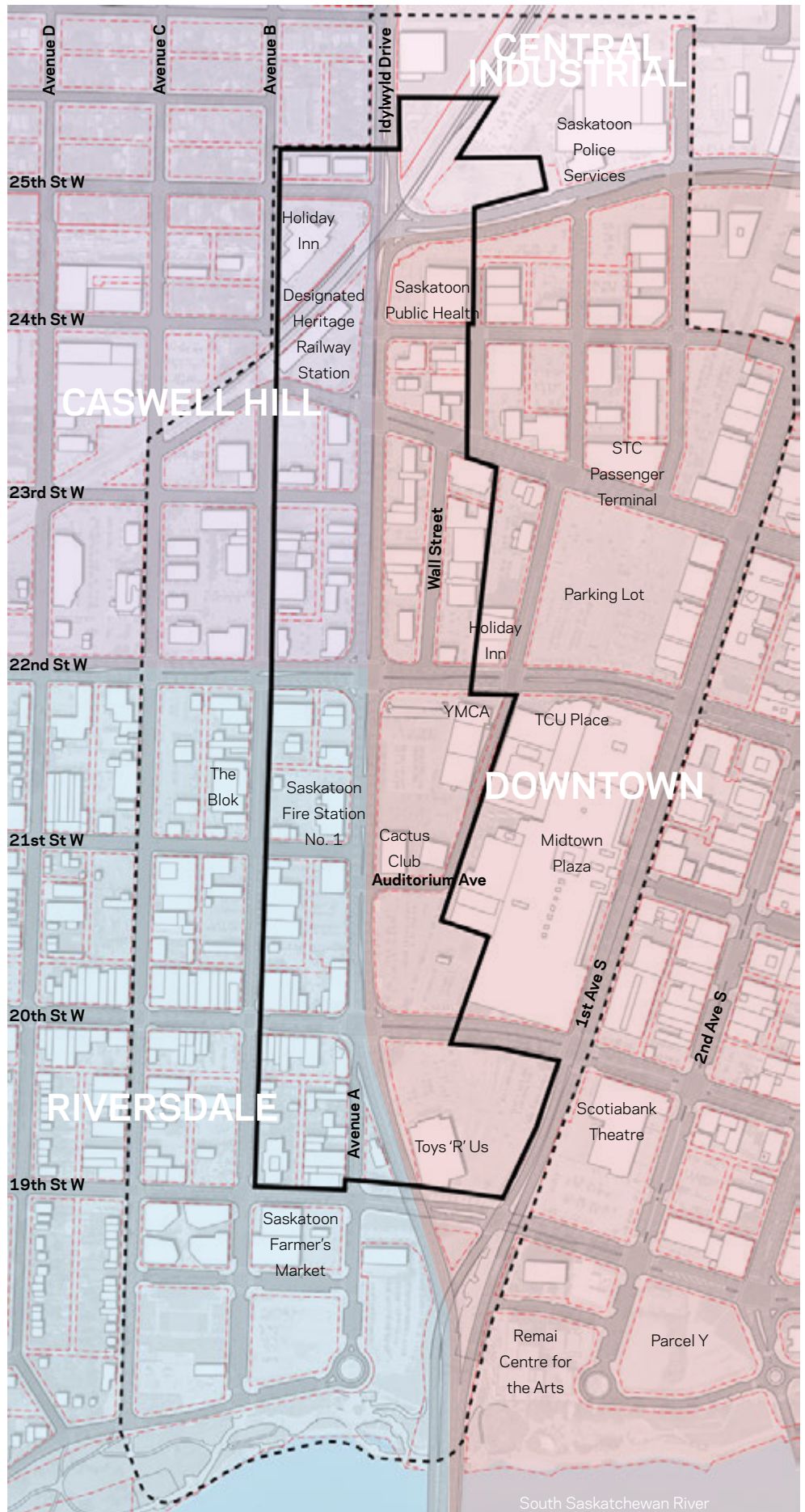


Figure 2.3: Imagine Idylwyld Study Area and Area of Impact



Figure 2.4: Idylwyld Drive - An Auto-Oriented Corridor

INTRODUCTION

STUDY AREA

The “Study Area” for *Imagine Idylwyld* was determined and refined with the feedback from a series of engagement efforts with the Steering Committee, Stakeholders, and the Public. Generally, the boundary includes a one block perimeter surrounding Idylwyld Drive between 20th Street and 25th Street. Additional areas beyond the one block perimeter, including Wall Street and the Toys “R” Us block, were included to ensure that future designs can make provisions for access and servicing, and that suitable lands are available for ‘gateway’ areas into the City Centre as defined by the City Centre Plan Study.

The “Area of Impact” includes lands and developments that might affect *Imagine Idylwyld* - or vice versa. This area was established based on the site analysis in this report and by mapping the extent of feedback and comments received during engagement events. Policies established throughout the *Imagine Idylwyld* project may make policy recommendations throughout this area.

Idylwyld Drive is a major connector between 4 core neighbourhoods of Saskatoon: Downtown, Riversdale, Caswell Hill, and Central Industrial. As a key north-south corridor Idylwyld Drive is also an integral connection point to the City Centre and the Saskatchewan River. However, due to the legacy of the former railway and shunting yards which formed a north-south barrier between the Downtown Core to the East and expanding City to the West, there continues to be a lack of connectivity between these neighbourhoods today. In effect, the study area is a distinct dividing line through the centre of the city.

The closing of the original railway station and construction of the Idylwyld Drive freeway in the 1960s made way for modern developments including Midtown Plaza and TCU Place. However with the removal of the railway station, the new Idylwyld Drive no longer served the market function of the former Avenue A. Today the urban fabric of the study area is dominated by transit oriented businesses .

A large contributor to its perception as a dividing line is the fact that Idylwyld Drive is an auto-oriented corridor, as defined and characterized in the City of Saskatoon’s Growth Plan. This condition is illustrated, in its context, in Figure 2.4. It is defined by low density and modestly scaled single-use developments, large expanses of surface parking lots, auto-oriented road and site design, no transit facilities or services, a 6 lane roadway with wide pedestrian crossings, narrow sidewalks and no cycling facilities.

The corridor’s current configuration is increasingly in conflict with the growing urban context in which it is located, creating numerous safety issues for vehicles, cyclists and pedestrians.

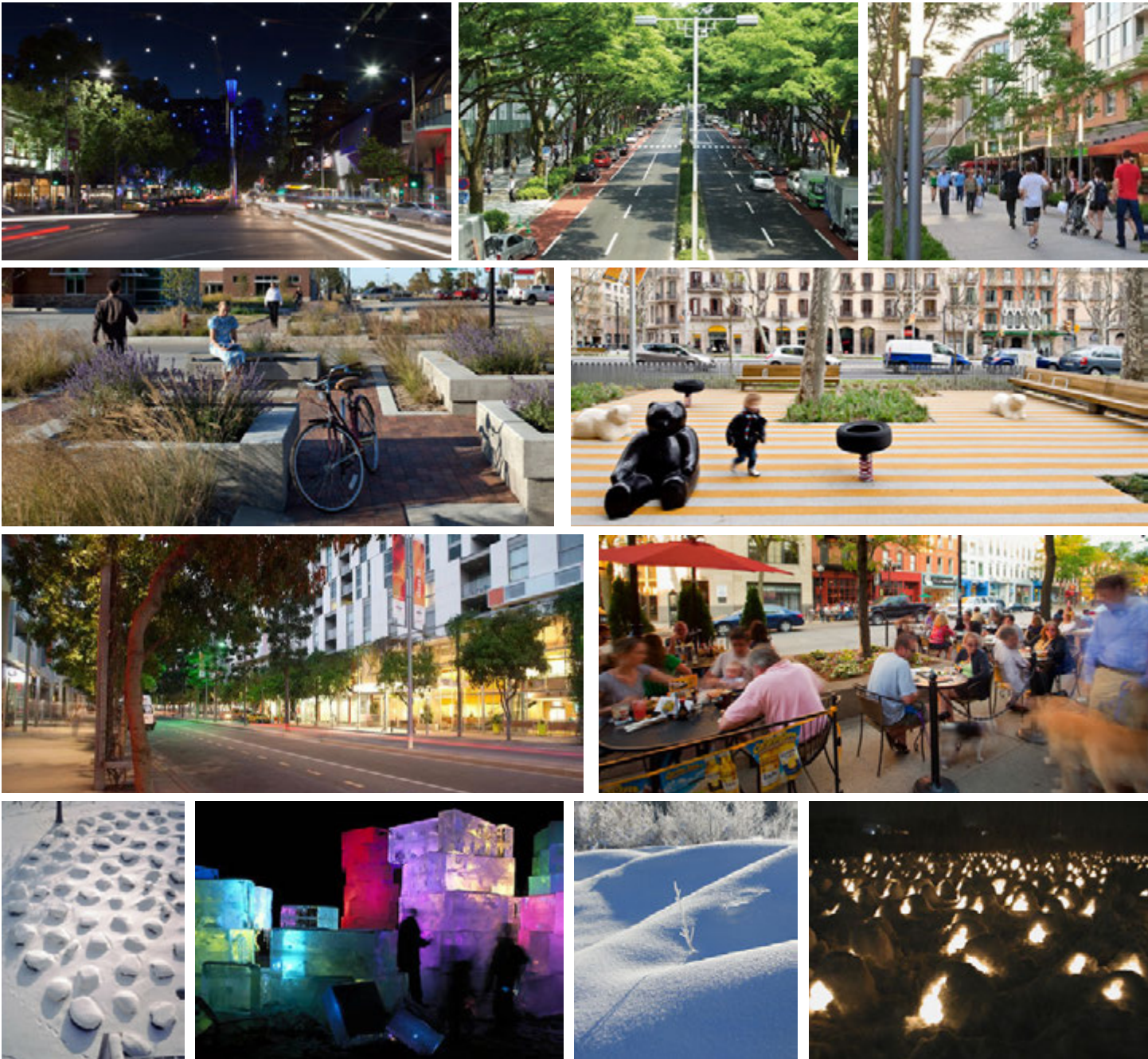


Figure 2.5: Integrated design solutions
 Imagine Idylwyld: Issues and Opportunities Report

INTRODUCTION

STANDARDS OF CARE

The Project Team established the following Standards of Care for *Imagine Idylwyld* to clearly communicate the project scope to stakeholders and the public, as well as establish a framework to help guide the project:

Idylwyld will be designed as an urban street.

Vehicular grade separations will not be considered. The street will be designed to be safe and to encourage driving speeds around a speed limit of 50 km/h. A well-designed and engaging landscape / streetscape will help to achieve this.

Idylwyld will remain an arterial street.

It will be designed for the safe and efficient movement of large volumes of cars and trucks as a key link in the City's motor vehicle transportation network.

All modes of travel will be considered and accommodated.

This includes Walking, Cycling, Driving, Transit, and Freight.

All types of people will be considered and accommodated.

This includes children, able-bodied adults, seniors, wheelchair users, visually impaired, hearing impaired.

Land use and transportation planning are integrated.

The street design will be compatible with the intended land use, not the other way around. The intended land use will be determined through this study process.

Existing businesses and driveways will be accommodated.

There is no intent to force anyone out – over the long term the access to adjacent properties may evolve along with the land use.

Saskatoon is a winter city.

Winter weather and snow management will be considered in the street design.

The most up-to-date engineering design standards, guidelines, and best practices will be used.

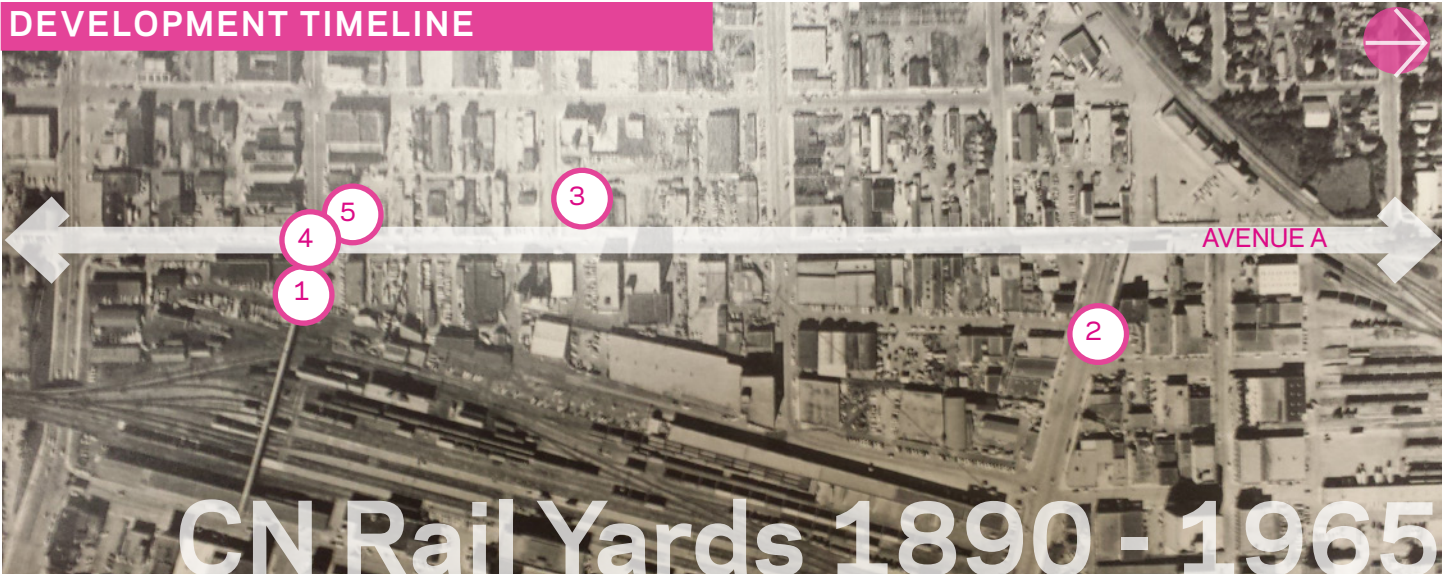
Modern guidelines allow a great deal of context-sensitive approaches. *Idylwyld* is not a suitable context for pioneering street design elements never before used or researched for use in Canada.

OUT OF SCOPE ITEMS

The following projects are running parallel to the *Imagine Idylwyld* process. These are projects that, while not a part of the *Imagine Idylwyld* scope, will be influential in its outcomes:

- Second phase of *Idylwyld Drive* Redevelopment : 25th Street and North
- Improvement, Redevelopment or Relocation of Fire Station No. 1
- Downtown Arena
- Railway Working Group

DEVELOPMENT TIMELINE



1. CN PEDESTRIAN BRIDGE



2. FAIRBANKS-MORSE WAREHOUSE



3. MARKET SQUARE



5. AVENUE A STOREFRONTS

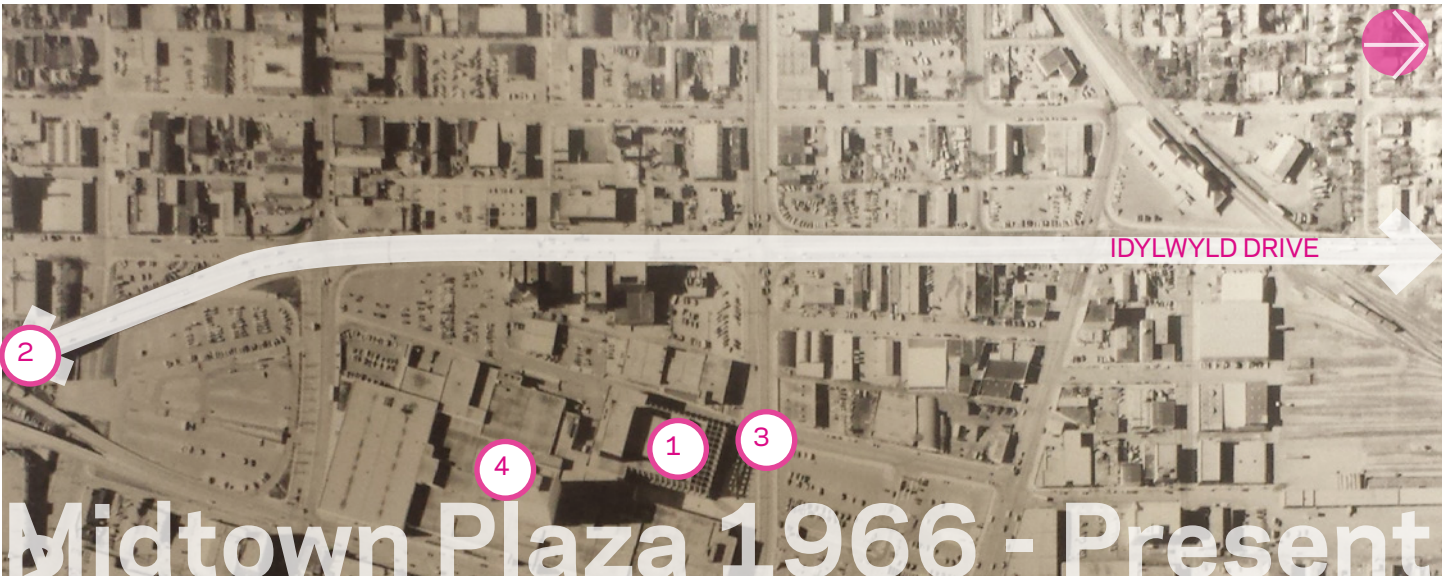


4. 20th STREET



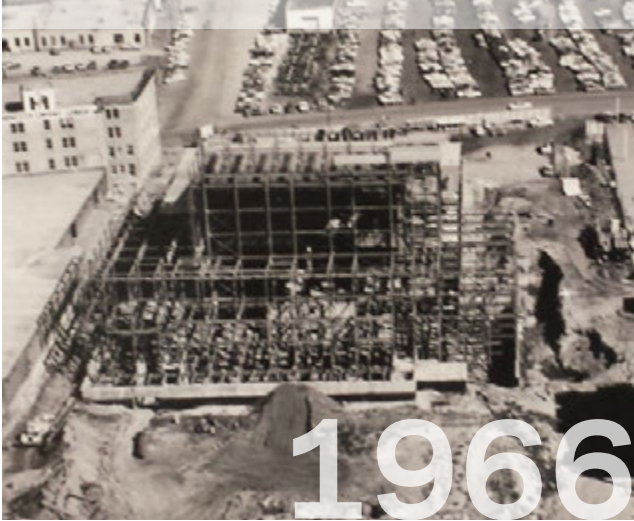
Photo credit for all images: Local History Room - Saskatoon Public Library

Figure 2.6: Development Era I - Hub City



Midtown Plaza 1966 - Present

1. TCU PLACE AND MIDTOWN PLAZA CONSTRUCTION



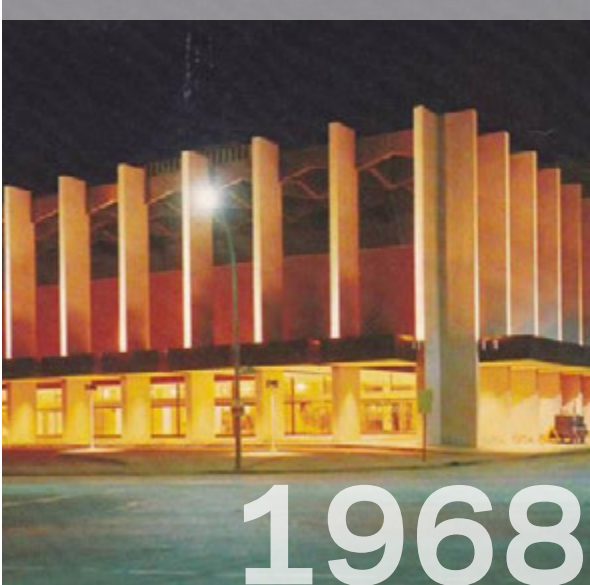
1966

2. IDYLWYLD DRIVE BRIDGE



1968

3. CENTENNIAL AUDITORIUM/TCU PLACE



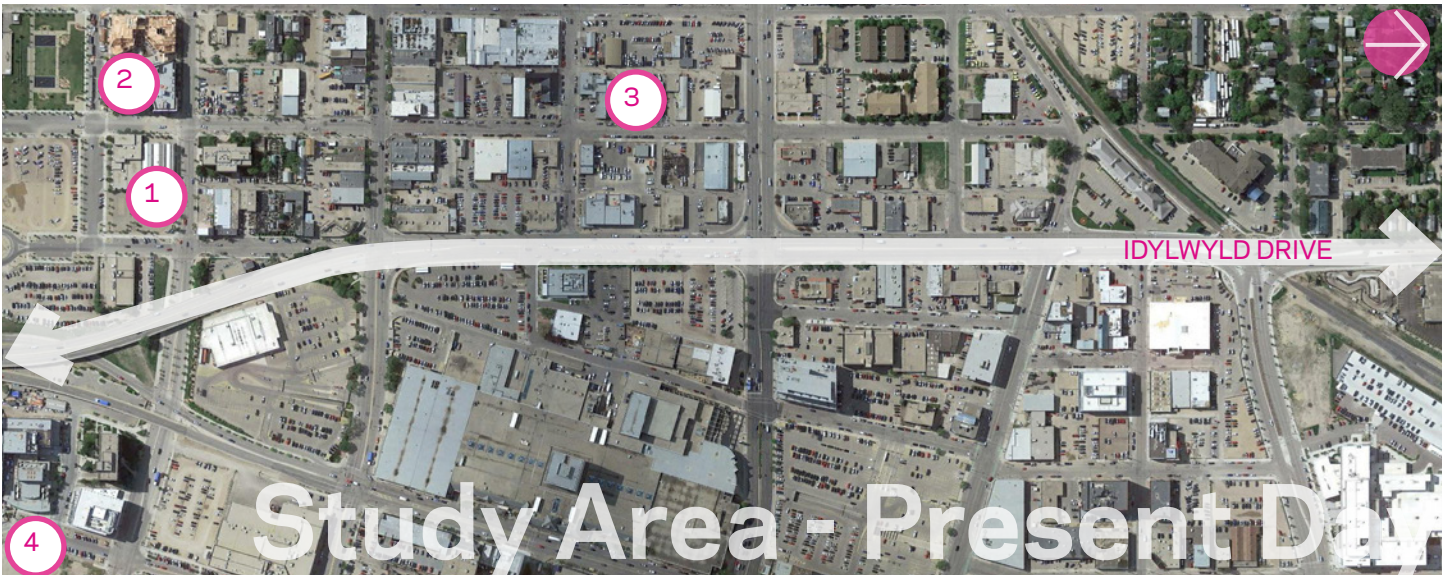
1968

4. MIDTOWN PLAZA



1970

Photo credit for all images: Local History Room - Saskatoon Public Library
 Figure 2.7: Development Era II - Post-War Revitalization
 Imagine Idylwyld: Issues and Opportunities Report



1. MARKET SQUARE



2. RIVER LANDING



3. THE BLOK



4. PARCELY



Photo credits: 1. Tourism Saskatchewan, 2. Colliers Canada, 3. KSA Group Architecture, 4. Jason Lowe Visuals

Figure 2.8: Development Era III

INTRODUCTION

DEVELOPMENT TIMELINE

The City of Saskatoon, including the *Imagine Idylwyld* study area, has seen three major periods of growth and development which have significantly defined our city.

Hub City: 1890-1914

The catalyst for the growth of the City of Saskatoon was the development of the railway in 1890, crossing the river where the Senator Sid Buckwold Bridge is today on its way from Regina to Prince Albert. The decision was made to build the railway station, not in the original Temperance Colony settlement where Nutana is now, but across the river in what is now Downtown, on First Avenue at 20th Street. As a result, this area quickly eclipsed the original settlement in both size and importance, incorporating as the Village of Saskatoon in 1901, then as a town on July 1, 1903. By 1905, there were three separate settlements here: the Town of Saskatoon, the Village of Nutana, and the newly-incorporated Village of Riversdale, west of the tracks. In 1906 they amalgamated to become the City of Saskatoon.

The building of new railway lines through Saskatoon in the years that followed, and the City's immense growth in population - from 2,500 in 1905 to an estimated 28,000 by 1913 - gained Saskatoon the nickname "the Hub City", and helped make it the economic heart of a vast rural hinterland. As the city grew, so did the downtown railway yards until they formed a nearly-impenetrable barrier between First Avenue and Avenue A, all the way from the river to 23rd Street, effectively blocking access between the downtown core and the rapidly growing west-side. Construction of an underpass beneath the tracks at 19th Street, and a footbridge over top of them at 20th Street, did little to ameliorate the situation, the legacy of which remains even today.

Nevertheless, the *Imagine Idylwyld* study area was a thriving commercial, warehouse and industrial district, including establishments like the Cockshut Plow Co. and the S.A. Early Feed and Seed Co. - with its grain elevators a west-side landmark for decades. On the Riversdale side of what became Idylwyld Drive, then Avenue A - like 20th Street itself - was primarily made up of small shops and businesses, most of which were family-run and reflected the area's ethnic diversity. The old City Market, built in 1911 on Market Square, north of 21st Street where Fire Hall No. 1 now stands, was Saskatoon's first farmers market. On 20th Street, King Edward Hotel and Theatre was one of several substantial Riversdale hotels. Farther north, was the Canadian Pacific Railway station - still standing at Idylwyld Drive and 23rd Street - and Cairns field, Saskatoon's first professional baseball stadium, which was built in 1914 on the east side of Avenue A just south of 26th Street.

Post-War Growth and Recovery: 1950 - 1970

By 1950, Saskatoon had survived two World Wars and the Great Depression. The next 20 years however, would see changes that would leave a lasting mark on the *Imagine Idylwyld* study area. The population exploded, almost doubling from 1951-1961 and the city began sprawling outwards, adding new neighbourhoods and overflowing historical city limits. The number of motor vehicles on the roads tripled during the same time, which meant that the downtown railway yards were no longer just a barrier to people crossing from east to west, but a major cause of congestion all over the city. This was exacerbated by the fact that the only way to get from one side of Saskatoon to the other was by passing through the heart of Downtown.

The proposed solution was twofold: move the railway yards and build a freeway that would allow east-west traffic to skirt the downtown altogether. On November 14, 1964, the last train crossed the CNR Bridge and soon after that, construction began on the Idylwyld Freeway and bridge connecting Highway 11 to Avenue A, which - except for a small piece south of 20th Street - was widened and re-named Idylwyld Drive.

The Idylwyld freeway officially opened on October 26, 1966. Meanwhile, 20th and 22nd Streets had been extended through to link Downtown with Riversdale, and where the railway yards had been, a grand shopping plaza and Saskatoon's long-awaited civic auditorium (the present-day TCU Place) were being built.

Sask-a-Boom: 2005 and beyond:

Prices of natural resources and commodities such as oil, potash, gold, diamonds, coal, uranium and agriculture increased significantly in the opening years of the 21st century, making Saskatchewan an important economic driver for Canada, and Saskatoon the engine that drove the provincial economy. Saskatoon was the fastest growing city in Canada in the late 2000's, including a substantial physical expansion that has necessitated a number of large infrastructure projects, notably the completion of the Circle Drive bypass, among others. Nevertheless, the overall pattern of growth and development in recent years has largely been defined by a return to mixed-use, human scaled spaces.

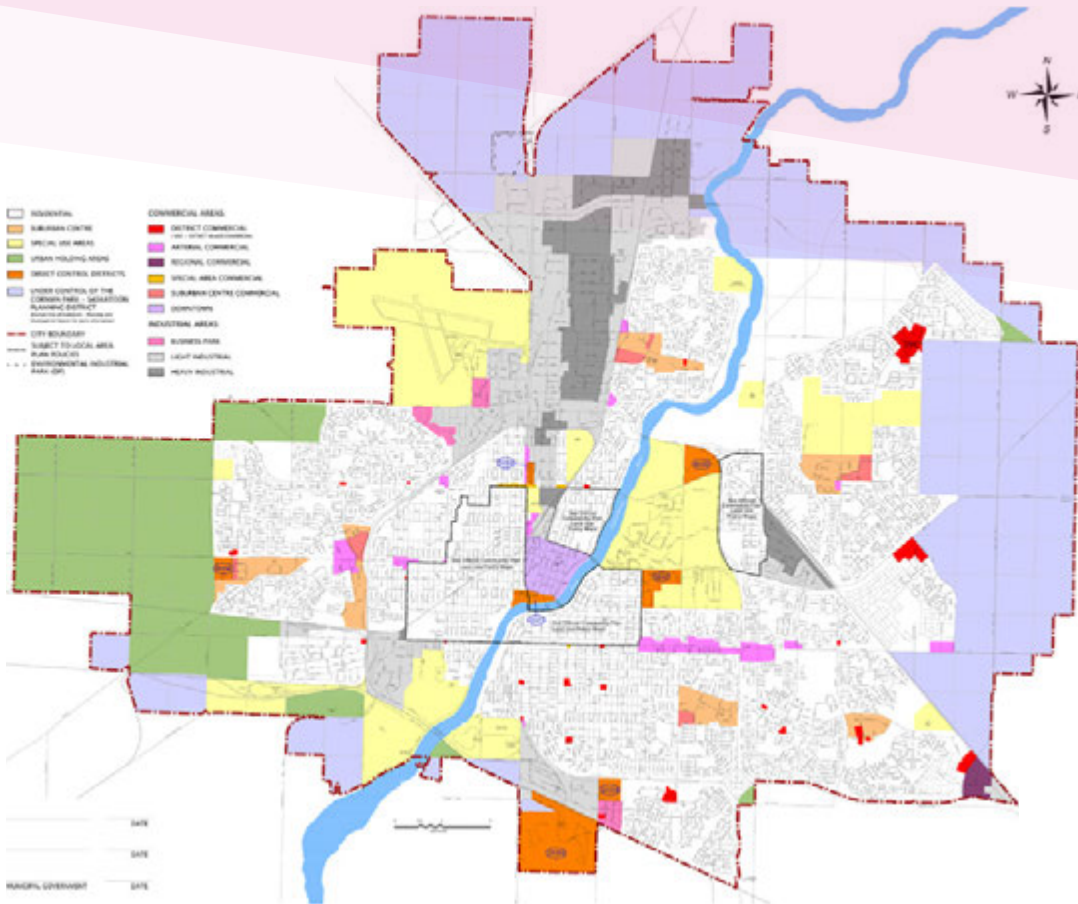


Figure 2.9: City-Wide Land Use Strategy, City of Saskatoon Official Community Plan, 2014

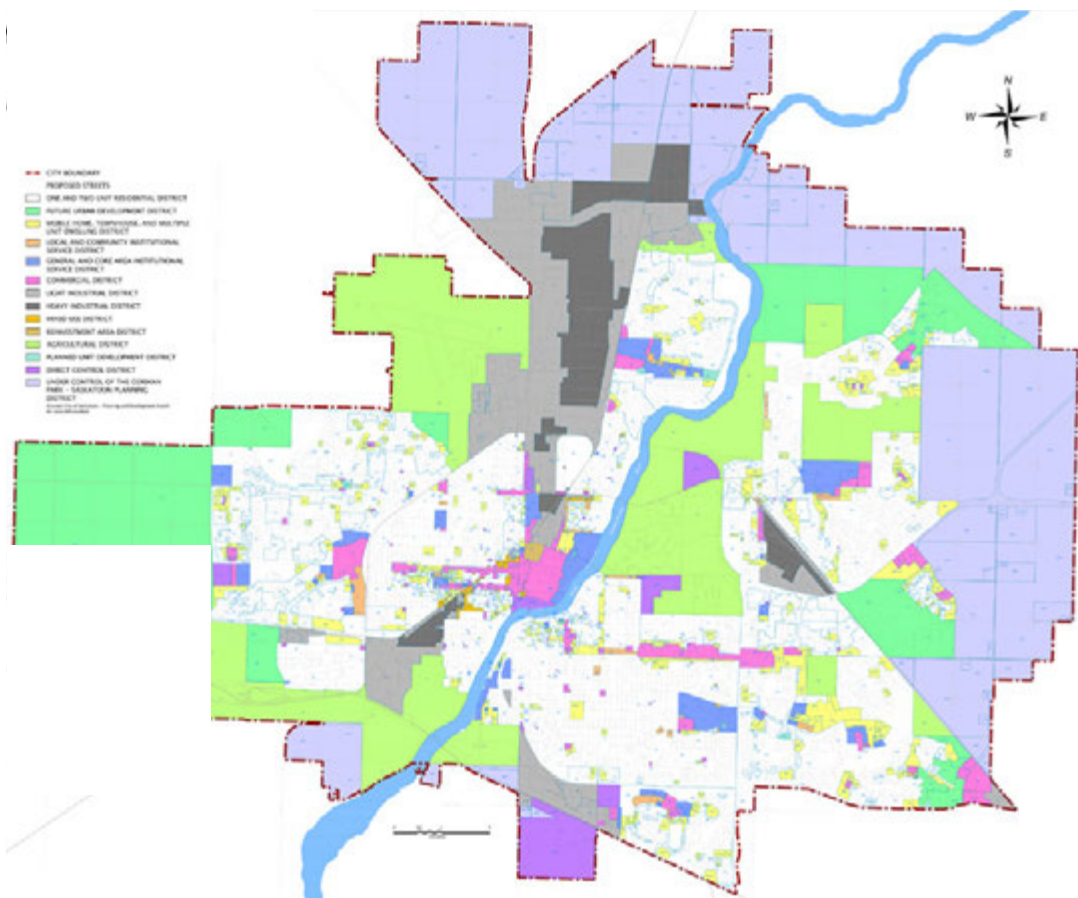


Figure 2.10: City-Wide Zoning Strategy, City of Saskatoon Zoning Bylaw No. 8770

INTRODUCTION

POLICY CONTEXT

There are many Provincial and City policies that will contribute to the reshaping of the Idylwyld Drive corridor. This section provides a high level overview of the key policy documents, planning initiatives and development projects which will influence the corridor, or to which *Imagine Idylwyld* will respond.

The Planning and Development Act, 2007

The purpose of The Planning and Development Act, 2007 is to:

- Provide a community planning framework that promotes economic growth, environmental sustainability, social and cultural development, and sustainable communities;
- Provide the legislative authority to create and implement the Statements of Provincial Interest;
- Strengthen communities by providing municipalities with clear, consistent and effective tools for community planning;
- Foster cooperation and partnerships among municipalities, governments, First Nations and Métis communities, entrepreneurs and all citizens so that they can invest in and build communities;
- Respond to requests from municipalities for more local autonomy and authority, streamlined planning processes, and clearer and more flexible ways to administer planning bylaws; and
- Ensure that the public has meaningful input before planning decisions are made, and that decision-makers are accountable.

City of Saskatoon Strategic Plan, 2013

As a result of the feedback from, and vision established by, Saskatoon Speaks, the City of Saskatoon Strategic Plan sets specific objectives for the City to 2024.

These strategic goals include:

- Continuous Improvement;
- Asset and Financial Sustainability;
- Quality of Life;
- Environmental Leadership;
- Sustainable Growth;
- Moving Around; and
- Economic Diversity and Prosperity.

The purpose of the Strategic Goals is to emphasize the areas that the community and City Council have identified to realize the vision and accomplish the mission over the next ten years. Each goal has strategies and drivers for short and long-term execution and indicators for evaluation. *Imagine Idylwyld* will seek to implement these goals throughout the project and corridor wherever possible.

City of Saskatoon Official Community Plan Bylaw No. 8769, 2014

The City of Saskatoon Official Community Plan (OCP) provides the policy framework to define, direct and evaluate development in the City of Saskatoon to a population of 500,000. The plan ensures that development takes place in an orderly and rational manner, balancing the environmental, social and economic needs of the community. All other plans related to land use and development are secondary to the OCP and must be consistent with it.

Strategic directions of the plan include:

- Managing growth by directing it to the urban area where services already exist or where they can be provided efficiently; and
- Directing growth in the urban area to areas where it can be accommodated in compact mixed-use development, and served with quality transit, walking and cycling facilities.

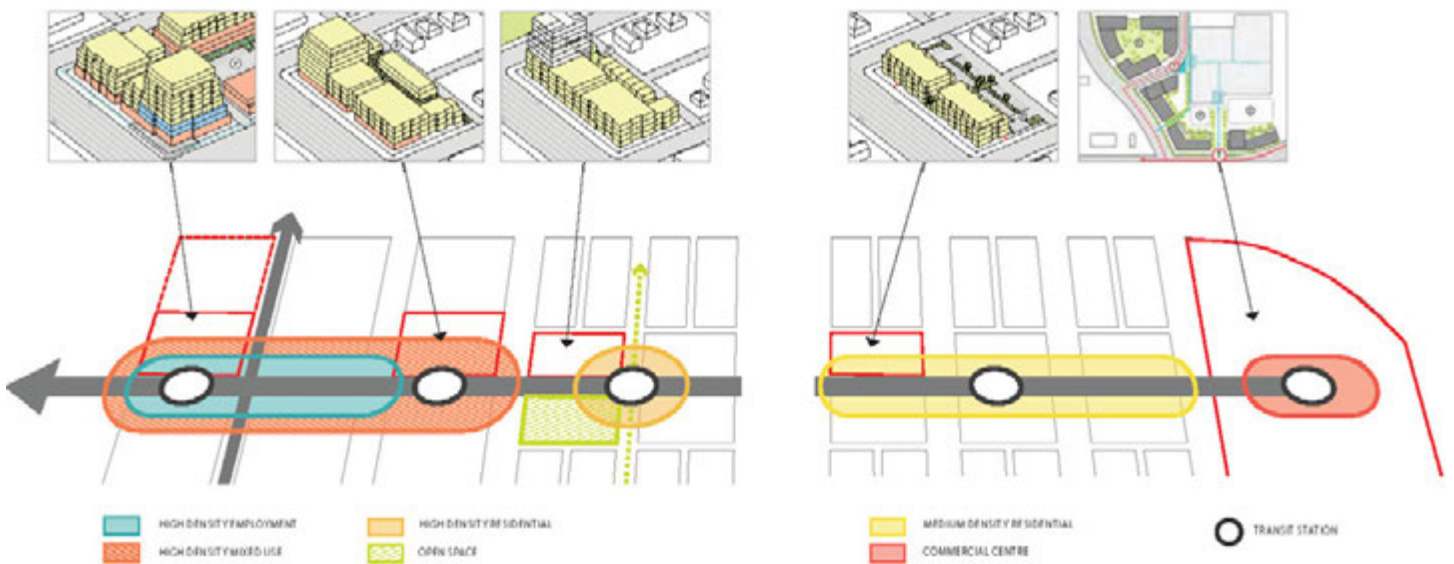
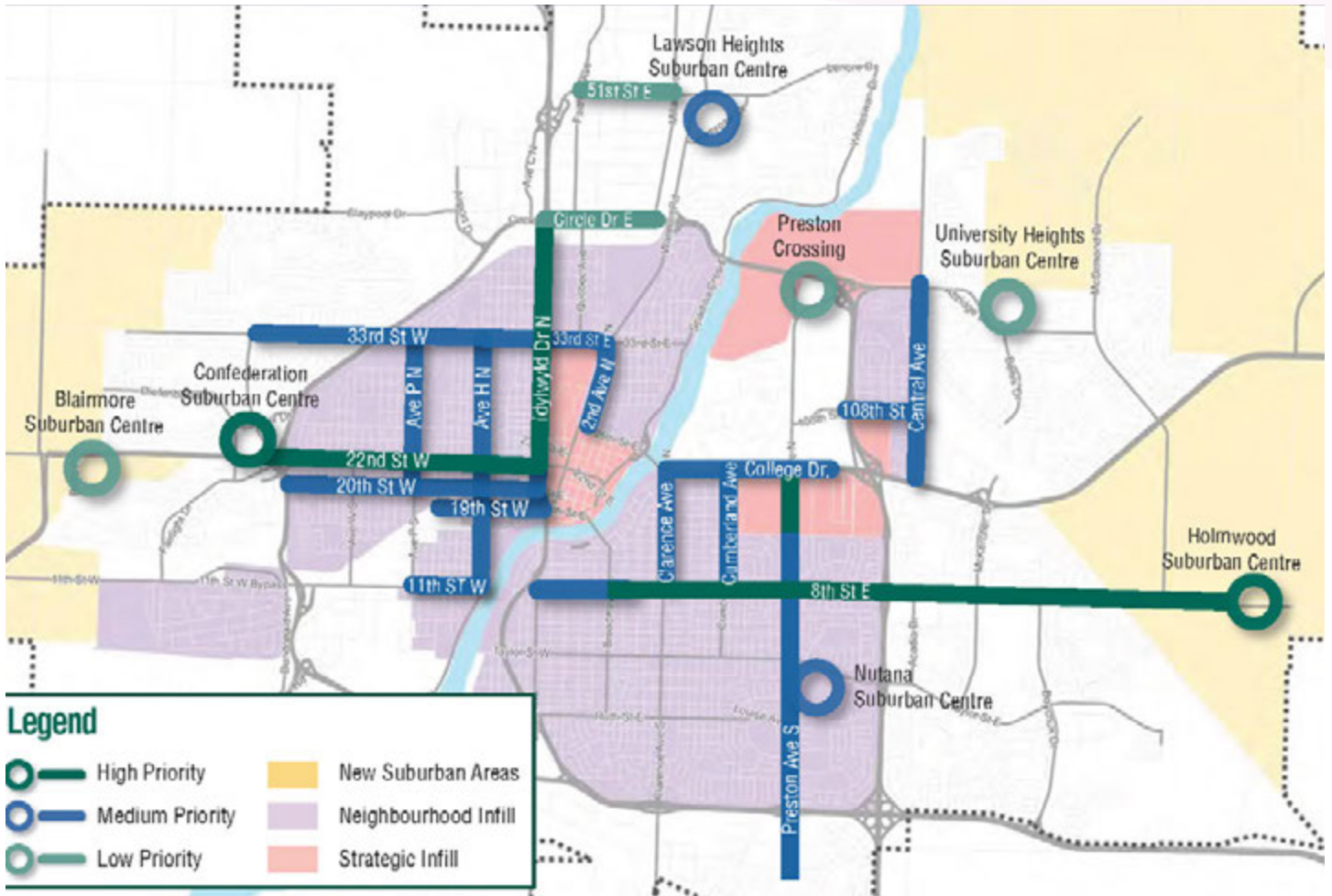


Figure 2.11: Corridor Redevelopment Strategy - City of Saskatoon Growth Plan, 2016
 Imagine Idylwyld: Issues and Opportunities Report

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Zoning Bylaw No. 8770 of the City of Saskatoon

The purpose of City's Zoning Bylaw is to regulate development in the City of Saskatoon to provide for the health, safety, and general welfare of the inhabitants of the municipality, in accordance with the provisions of the OCP.

The study area and area of impact of the *Imagine Idylwyld* project accommodates several different zoning districts and categories covering uses such as commercial, industrial, institutional, residential and mixed use areas.

City of Saskatoon Growth Plan

The City of Saskatoon's Growth Plan to Half a Million is about making choices to proactively manage the changes associated with growth, creating a city that is vibrant and attractive to future generations. A vibrant Saskatoon has a diverse mix of housing, commercial, social, cultural, and recreational opportunities that are universally accessible by all modes of transportation, including walking, cycling, transit, and driving. The Growth Plan is made up of several themes that, when pieced together, form a new growth model for Saskatoon:

Corridor Growth

The Growth Plan explores ways to encourage growth and redevelopment near Saskatoon's major corridors, - such as Idylwyld Drive - in order to reduce outward growth pressures, provide more housing options close to employment areas, and enhance transportation choices throughout the city. Residents have expressed a desire for sustainable growth options and a better balance of outward and upward growth. Corridor Growth is essential to transforming low-density, auto-centric land uses into vibrant communities that support attractive transit.

Transit

Public transit is a major focus of the Growth Plan, given the important role it plays in supporting and shaping growth. Residents have expressed a desire for a more accessible, efficient transit system with an attractive customer

experience. While people will still use cars, an efficient transit system with rapid transit will help to alleviate and even bypass congestion, ensuring that people can move around the city quickly and easily. Attractive transit will also reinforce opportunities for sustainable growth along major corridors. The Growth Plan includes enhancements to the way existing services are provided, increases to the amount and types of services available, and implementation of rapid transit lines over the next 30 years which will have significant impacts on the Idylwyld Drive corridor.

Employment Areas

The Growth Plan ensures the city has the right amount of employment in the right areas. The *Imagine Idylwyld* study area falls within the 'Core Neighbourhood Area' (CNA), Saskatoon's largest employment area. This employment area includes the Central Business District (CBD) and the neighbourhoods of Pleasant Hill, Caswell Hill, Westmount, King George, Riversdale, City Park, Nutana and Varsity View.

Active Transportation

Through a number of directions and actions for: connectivity, safety, convenience, land use, maintenance and accessibility, the Growth Plan's Active Transportation Plan (ATP), 2016, provides choices for how people move around the city, particularly by walking and cycling. Idylwyld Drive is identified as a "Multi-Modal Corridor", which are major streets that need further review to consider how they will accommodate active transportation given other competing priorities.

Financing Growth

Planning ahead for the costs of growth the City has an opportunity to define a future as a resilient city. Through this plan, the City aims to:

- Better utilize land and infrastructure assets;
- Provide opportunities for the public to use an efficient, convenient transit system;
- Have the types and forms of development where people can travel locally and choose to walk or bike;



Figure 2.12: North Downtown Master Plan streetscape and built form character (above) and aerial perspective (below)

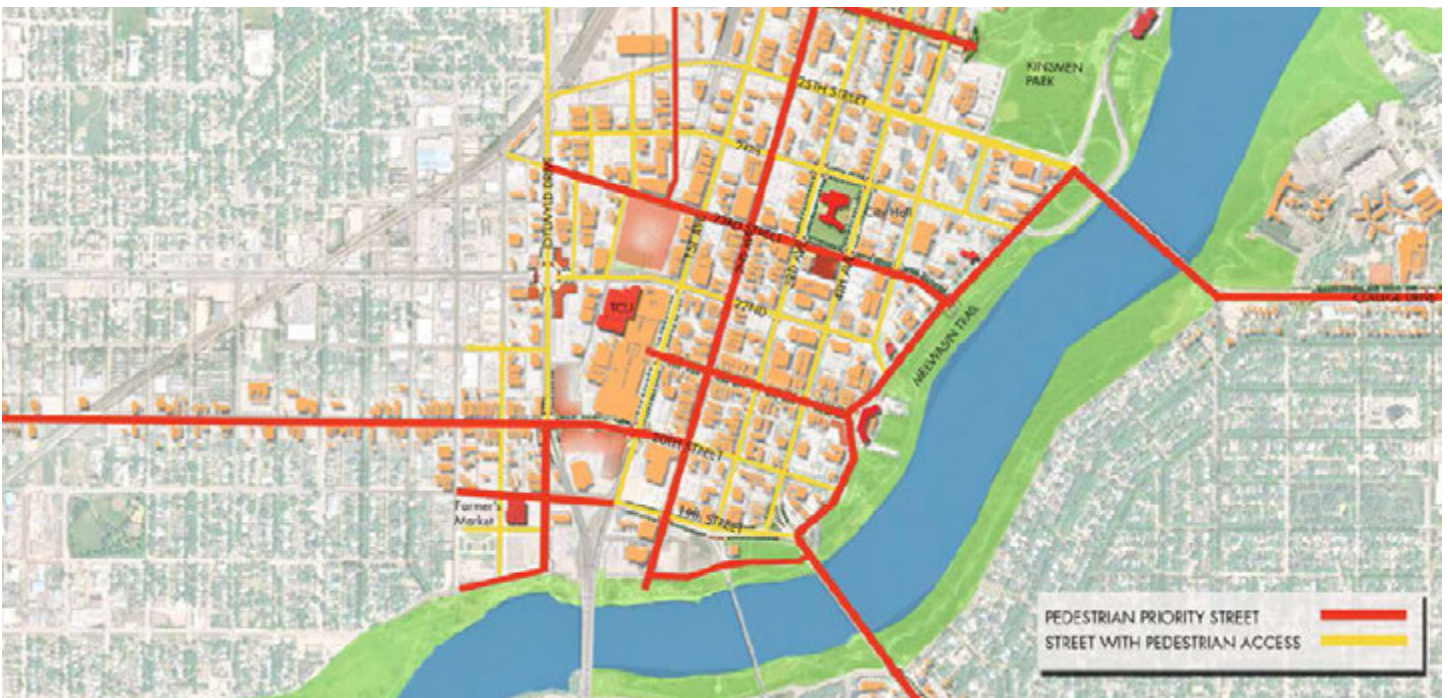


Figure 2.13: City Centre Vision Plan and Pedestrian Priority Streets

INTRODUCTION

- Provide a range of housing types to meet the needs of all people;
- Provide jobs close to homes;
- Provide health care and community facilities required to support families and other community needs;
- Protect the natural environment;
- Be more affordable to run in the long-term.

City Centre Plan, 2013

These plans are focused on the redevelopment and revitalization of Saskatoon's core areas, with a strong focus on encouraging more people to live and work in the City Centre area. The City Centre Plan, adopted by City Council in the fall of 2013, is a comprehensive plan for the downtown and the major corridors leading into the core. The plan is focused on improving the City Centre by creating market demand for residential, office and business uses so that the City Centre continues to be the cultural and entertainment hub for the region with employment, corporate offices, and store-front retail.

North Downtown Master Plan

When approved, the North Downtown Master Plan will create a vision for an integrated community which is compact, diverse and walkable on an underutilized site directly north of Saskatoon's City Centre. This plan also sets a framework for urban conditions at the corner of Idylwyld Drive and 25th Street East that will have an impact on the design of *Imagine Idylwyld*.

Downtown Parking Strategy, 2016

The Downtown Parking Strategy assesses existing parking supply, demand and utilization and identifies options for a series of growth scenarios. The Midtown and Warehouse districts fall within the *Imagine Idylwyld* study area and area of impact and provide an existing parking supply of 3,949 surface parking spots. The Downtown Parking Strategy suggests that future parking demand for *Imagine Idylwyld* will need to address a deficit of approximately 700 parking spots in addition to meeting the parking requirements for any new development, as per zoning requirements. The 700 spot deficit is based on TCU Place's inability to self-sufficiently provide parking.

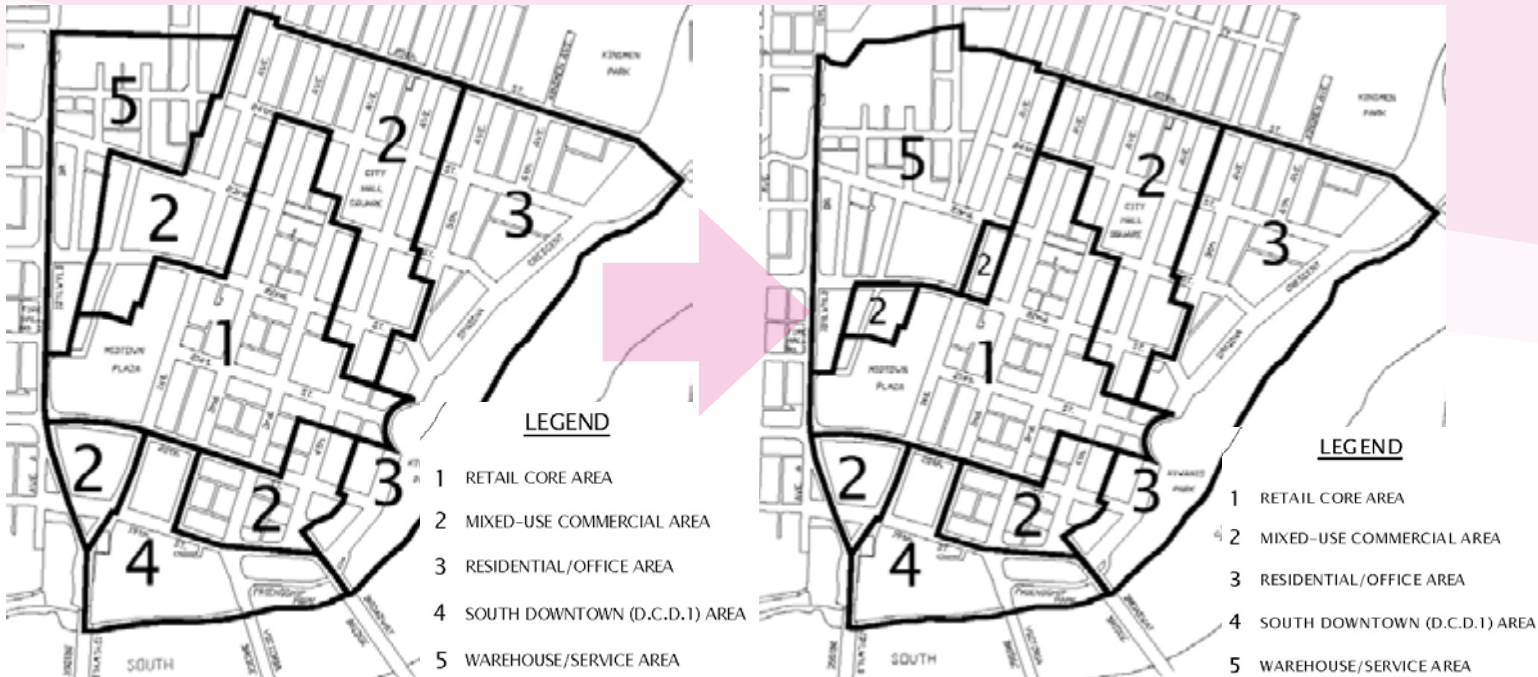


Figure 2.14: Figure 2.8: Downtown Land Use Changes Adopted through the Warehouse District LAP process

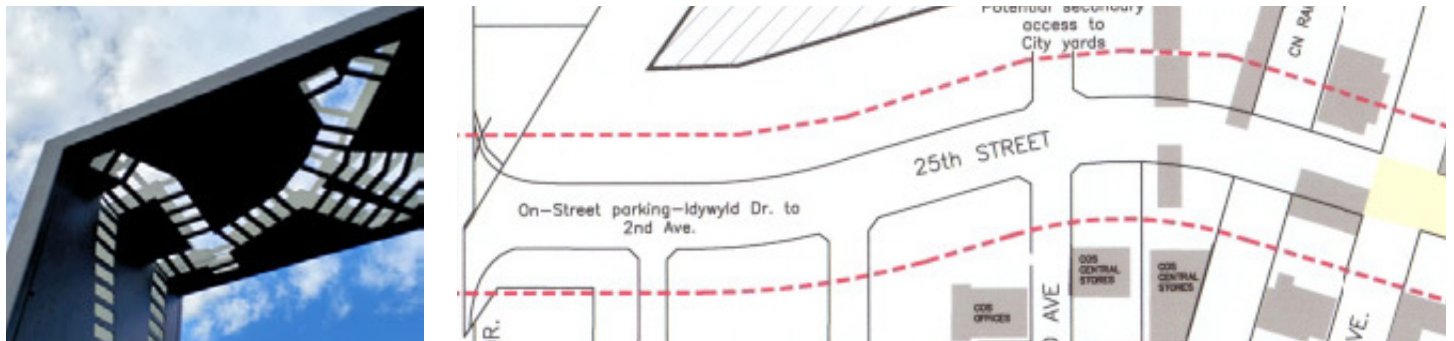


Figure 2.15: 25th Street Redignment and Streetscape Improvements



Figure 2.16: Riversdale Business Improvement District Focus Areas
Imagine Idylwyld: Issues and Opportunities Report

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Local Area Plans

Local Area Planning is a community-based approach to developing comprehensive neighbourhood plans. It enables residents, business owners, property owners, community groups and other stakeholders direct input into determining the future of their community. A Local Area Plan (LAP) sets out objectives and policies that guide the growth and development of a neighbourhood or selected area. The scope of a LAP depends on the issues and opportunities identified by the stakeholders involved.

Riversdale LAP, 2008

Riversdale is one of Saskatoon's original communities. Located near the heart of Saskatoon, the neighbourhood plays a very important role in providing housing, employment, and services to a diverse range of citizens. The neighbourhood has been experiencing unique pressures, such as land use conflicts, new development pressures, housing deterioration, socio-economic challenges, safety issues, traffic and circulation concerns, and perceptions issues.

Riversdale Business Development Revitalization Plan, 2013

The Riversdale Business Improvement District (RBID), in association with the City of Saskatoon prepared a plan to revitalize the district to improve neighbourhood health and safety, retain and attract businesses and organizations, renew the public image of the district, and develop an action plan. The action plan uses a multi-pronged approach; addressing surplus lands, creating community champions, addressing public perception through marketing campaigns, programming activities, addressing policy inadequacies, and providing improved development incentives. Spatial considerations of this plan are illustrated in Figure 2.16.

Caswell Hill LAP, 2001

The Caswell Hill LAP aims to create a vital, diverse residential community containing a strong group of businesses, community schools, churches, parks, and services. The LAP proposed several key recommendations to address land use conflicts between industrial/residential areas and

with existing conditions and heritage preservation. It also recommends that the Municipal Transit Facility site be considered for redevelopment upon relocation. Several traffic calming initiatives to mitigate potential impacts by the 25th Street extension were also proposed.

Warehouse District LAP, 2002

The Warehouse District LAP creates a framework to create a "teeming urban environment reinventing itself in the shell of its historic industrial character, the Warehouse District offers diverse alternatives of livability and enterprise unique to the center of the city. The District will be nurtured from a forgotten urban core to a vibrant people place that supports arts and culture, in harmony with a variety of mixed uses".

The vision statement was supported by a series of recommendations which have significantly changed this area of the Downtown. In addition to the 25th Street realignment and extension, OCP and Zoning amendments were made to facilitate Downtown land use changes and create an RA-Reinvestment Area District. This change fractured a large mixed use commercial land use zones, leaving only small pockets to buffer other major land use zones. Also proposed were the use of public lands to create a residential and/or multi-use catalyst development. The plan also created several design recommendations such as design guidelines and special streetscape consideration at the corner of Idylwyld Drive and 25th Street as a gateway - which has recently been completed. The LAP also proposes that historic character lighting standards be applied throughout the District, which a portion of Idylwyld Drive falls within. This could potential be in conflict with a modern vision for *Imagine Idylwyld*.

2 CLIMATE AND PLACE

ASHRAE Classification

ASHRAE Climate Zone 7

Very Cold

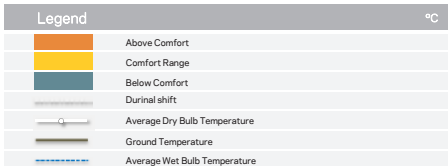
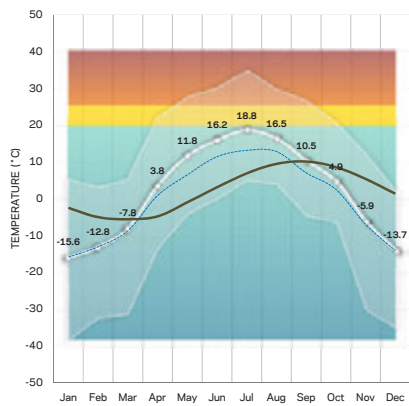
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KOPPEN Equivalent

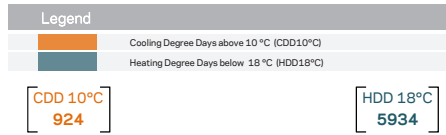
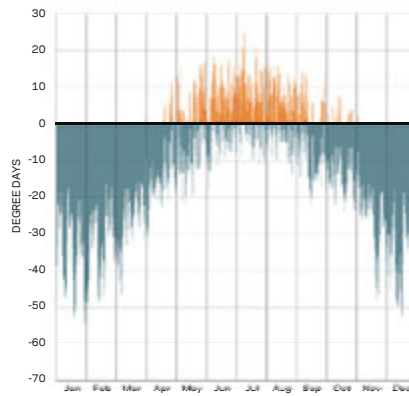
Dfb

Characterized by cold winters and warm summers. Exhibit little humidity.

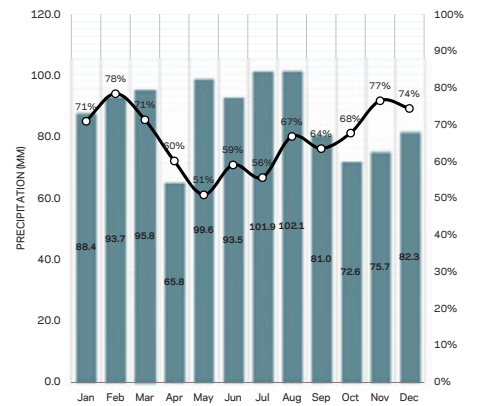
Dry Bulb Temperature



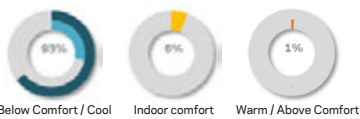
Degree Days



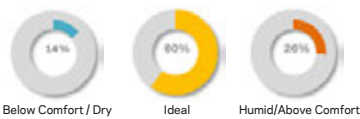
Precipitation and Relative Humidity



Dry Bulb Temperature



Humidity



Horizontal Solar Radiation

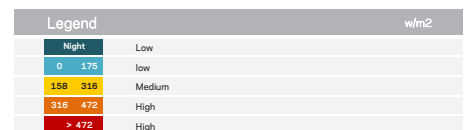
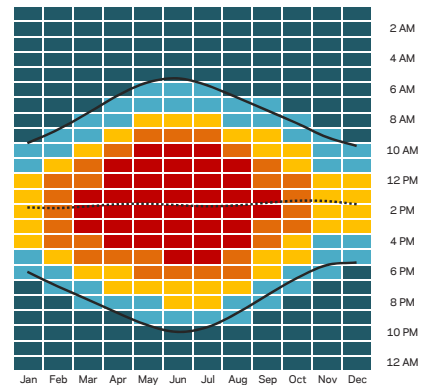
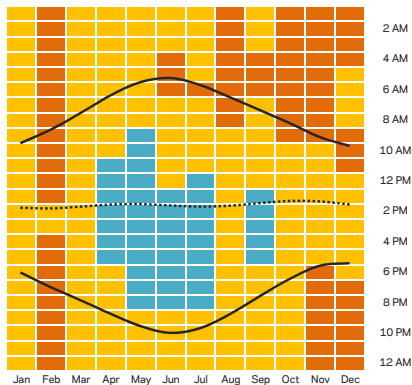
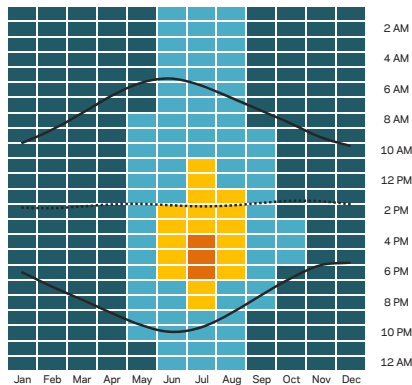
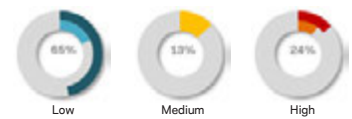


Figure 2.17: Climate and Place Analysis - Part 1
Imagine Idylwyld: Issues and Opportunities Report

INTRODUCTION

CLIMATE AND ENVIRONMENTAL ANALYSIS

A climate analysis was executed for the City of Saskatoon to understand local environmental conditions and their potential impacts on the design of the environment and built form in the concept master plan. The below analysis is based on historical weather data and averages. Climate change is increasingly affecting prairie cities and creating atypical conditions - from heavy rains and flooding in wet seasons to increased risk of wildfires in dry seasons. *Imagine Idylwyld* should seek to mitigate these risks wherever possible.

Saskatoon's climate is characterized by cold winters and warm summers with little humidity. This type of climate presents design challenges to address changing seasonal conditions to satisfy factors such as: user comfort including shade and shelter from inclement weather and winds, snow and slush and stormwater management, road conditions and driver safety, hardiness of landscape planting in urban conditions and robustness of streetscape materials where exposure to seasonal changes can speed wear and deterioration. As a consequence, solutions must be thoroughly tested to minimise compromise. A careful analysis of the length and relative severity of seasons is required to find a balanced design.

Temperature, Humidity and Precipitation

Saskatoon gathers on average 347.2mm of rain and snowfall per year. The driest months are early spring and late fall, while June and August tend to be the wettest.

Solar Analysis

The horizontal solar radiation chart in Figure 2.17 depicts the duration and intensity of sunlight throughout the year. This shows that during the summer months, June and July, medium to high solar radiation occurs between 8AM and 8PM, while in the winter months, November to January, medium solar radiation occurs only between 12PM and 3PM. A break down of periods of low, medium and high radiation reveals that sunlight in Saskatoon is indirect for $\pm 65\%$ of the year, somewhat direct for $\pm 12\%$ of the year, and direct for $\pm 23\%$ of the year.

Solar analysis should be a key design criteria while developing massing for the master plan, with particular consideration to solar access (exposure of building facades as well as public spaces to sunlight without obstruction from neighbouring buildings, trees, etc) and executing shadow analyses due to the long summer days in contrast to the shorter winter days with low sun angles.

2 CLIMATE AND PLACE

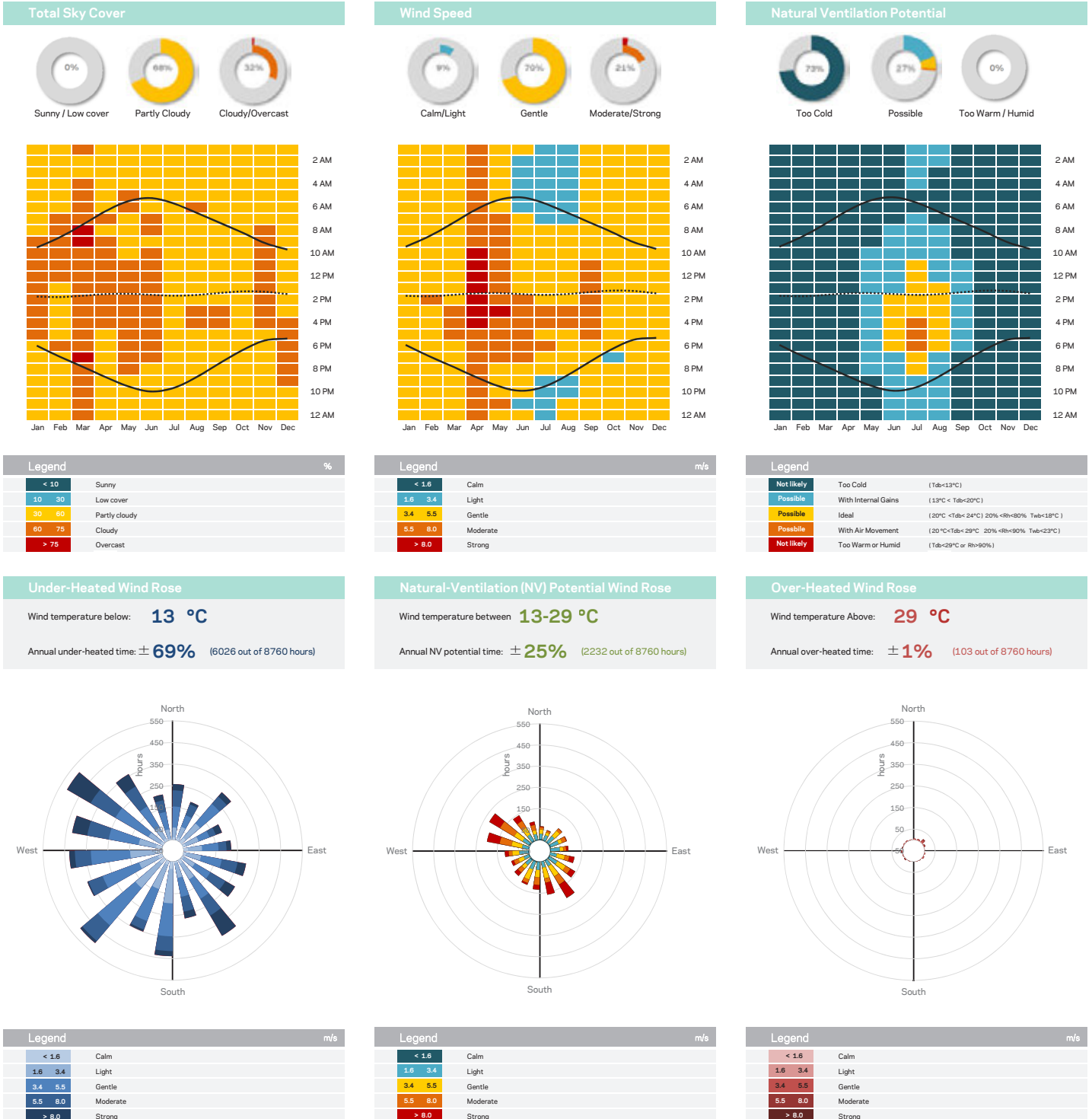


Figure 2.18: Climate and Place Analysis - Part 2
 Imagine Idylwyld: Issues and Opportunities Report

INTRODUCTION

Wind Analysis

The series of wind rose charts in Figure 2.18 depict the temperature, direction, strength, and frequency of wind conditions along Idylwyld Drive. Figure 2.18 illustrates that a wind temperature below 13°C occurs for ±69% of the year, a wind temperature between 13°C and 29°C occurs for ±25% of the year, and a wind temperature above 29°C occurs for only ±1% of the year. The charts also indicate that cooler winds are predominantly westerly, while warmer winds are often north-easterly or south-westerly. Saskatoon generally experiences gentle wind speeds throughout the year, typically between 3.4-5.5m/s. Moderate to stronger winds over 5.5m/s may occur in the springtime months of April and May

This wind analysis will impact the redevelopment concept by indicating orientation of built form and vegetation that would prevent wind tunnel conditions along the corridor.

Optimal Conditions

Optimal climatic conditions for *Imagine Idylwyld* are recommended based on regional climate and geographic location. Built form and landscaping should be massed and oriented appropriately to reduce the potential for wind tunnels and to avoid the creation of large shadows between the hours of 9:00AM and 3:00PM at all times of the year. Open spaces, sidewalks, and other public realm features should be designed and located to allow for maximum solar access during the winter, while receiving appropriate filtered shading during the summer. Impacts of solar access on street plantings should also be considered and optimized to ensure the health and growth of vegetation on site.

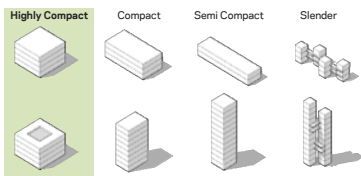
Green building and landscape design principles should be considered to reduce energy loads and waste creation by designing in harmony with the regional climate. Initiatives that take advantage of solar access, storm water, and prevailing winds for natural daylighting and passive ventilation are strongly recommended to increase energy efficiency and reduce negative environmental impacts of development.

3 LOAD REDUCTION (Massing & Programming Considerations)

Massing

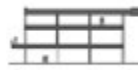
Ideal massing options try to find the right balance between exterior surface area that fits the climate zone and daylight requirements.

Highly Compact Geometry



Aspect ratio of roughly 1 to 1.5 (height:width).
 Limited surface to volume ratio minimizes conductive losses while still allowing daylight & solar heat gain for colder climates.

Earth sheltering: Not feasible



Limited or No benefit to in exposure of the external envelope with a thermally significant volume of soil or substrate.

Self-Shading & Solar Exposure

Excessively cold temperatures
 1- Minimum amount of self-shading (maximize exposure) suggested
 2- Minimize openings

Enclosed Central Atrium

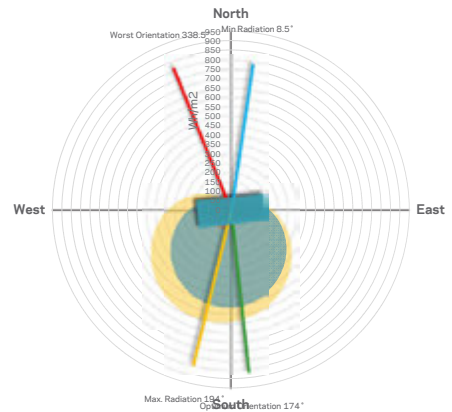


A central atrium allows for natural daylight to inner zones without increasing conductive losses through the envelope.

Orientation

The optimum orientation provides maximum winter solar collection as well as maximum summer solar protection.

Optimum Orientation: 174 °



Legend		Wh/m2
	Radiation during underheated period	
	Total Radiation	
	Radiation during overheated period	
	Overall Mass sample	
	Best orientation	
	Worst Orientation	
	Maximum Radiation	
	Minimum Radiation	

Program

Temperatures are below the comfort range
 1- Avoid orientation of any long dimensional facades in the direction of cold winds
 2- Passive solar heating during the winter to decrease heating loads

Buffer Zone (Cold Wind)



Place low-occupancy and / or high internal gain zones near exterior surfaces exposed to prevailing cold winds to minimize heating load and avoid thermal discomfort. (e.g. corridor, utility, core, labs, gyms, kitchens, etc.)

Vestibules



Vestibules at building entrances reduce air infiltration which result in reduction of heating and ventilation loads in very cold climates.

Solar Oriented Interior Zones



Maximize the placement of high occupancy space near exterior walls exposed to the maximum radiation angle to allow for passive space heating.

External Shading

Passive solar heating is available and needed most of year, use Internal shades rather than external shades to encourage internal heat gain
 Consider external shades only for very large scale glare issues.
 Consider internal shading devices for all medium and low scale glare issues

South Façade



Narrow horizontal shades for sun facing exposures provide enough shade in summer while allowing solar heat to enter the building during the winter (limited shading).

East and west façade



Consider external vertical fins for eastern and western exposures (partial shading).

Lightshelf



Consider light shelves to increase daylight penetration.

Internal Shading

Radiation intensity during operational hours (8Am- 6Pm)

Low 25%	Medium 21%	Intensive 54%

Blind Curtain System



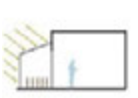
Open top internal shades may effectively block glare and daylight. Conduction, convection and radiation will usually convey a large portion of the heat to the interior of the space.

Horizontal louvers



Consider internal shading devices to control glare while taking the advantage of solar heat gain.

Solarium



Consider a solarium or atrium on sun facing exposures to collect solar heat and act as a thermal buffer between interior and exterior space.

Figure 2.19: Massing and programming considerations
 Imagine Idlywyld: Issues and Opportunities Report

INTRODUCTION

Climate-Related Design Considerations

The results of the climate analysis for *Imagine Idylwyld* yielded several design considerations that should be explored in conjunction with the master plan.

These design considerations are depicted in Figures 2.19 and 2.20, and address:

- Massing and building geometry;
- Building and open space orientation;
- Self-shading and solar exposure;
- External shading;
- Internal shading;
- Material selection;
- Insulation and solar absorption;
- Optimal opening and glazing conditions; and
- Window-to-wall ratios.

These climate-related design considerations should be referred to and applied during design and implementation of *Imagine Idylwyld*, and are summarized below.

Massing

Massing should find a balance between daylighting requirements and exterior surface area.

Surface to volume ratio of buildings should be limited to minimize energy losses while allowing daylight and solar heat gain in Saskatoon's colder climate.

Orientation

Buildings and open spaces should be oriented to allow for maximum solar access in the winter as well as appropriate protection from harsh sunlight in the summer.

Longer building facades should not be oriented in the direction of cold winds.

Passive solar heating should be used in the winter months to reduce energy loads.

Imagine Idylwyld: Issues and Opportunities Report

Self-Shading and Solar Exposure

Buildings should produce a minimum amount of self-shading to allow for maximum solar exposure in Saskatoon's colder climate.

Internal and External Shading

Internal shading should be used instead of external shading to allow for internal heat gain from passive solar heating.

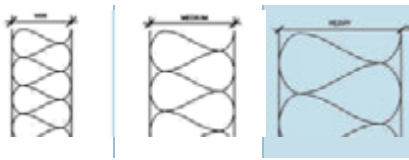
External shading should only be used for large scale glare issues.

4 INTEGRATED SOLUTIONS

Material Considerations

Strive for the levels recommended below, but verify feasibility with whole-building payback analysis that includes insulative effects on building systems.

Insulation Level: Heavy

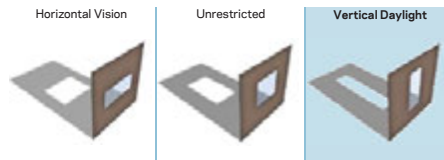


High Conductive losses are expected due to cold temperatures. Heavily insulated envelopes may prove to have a short payback period (energy modeling is required for verification).

Opening & Glazing Considerations

The recommendations below aim to optimize daylight infiltration while avoiding unwanted glare and solar heat gain.

Glazing aspect ratio: Vertical Daylight

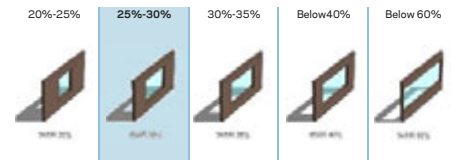


Consider a constant area for glazing. Vertical daylight glazing is recommended to promote the penetration of solar heat and light to the space more than horizontal vision glazing.

Window to Wall Ratio

The amount of glazing can have a large effect on building energy use depending on which climate zone and which building typology you are designing.

Overall WWR 25%-30%



Due to the large ΔT of outdoor and indoor temperature, huge conductive losses are expected. However, to maintain the minimum requirement for natural daylight, keep WWR around 25% - 30%.

Solar Absorptive Envelope



Consider dark colors for the exterior surfaces to maximize solar heat absorption.

Glazing properties



ASHRAE 90.1-2010 minimum requirement for U-factor is 0.4 and for SHGC is 0.45. Exceeding the code minimum U-Factor (efficient double or triple glazing) may have an acceptable payback (to be verified by an energy model).

Specific WWR



Percentage of WWR on the best orientation (174°) can be as high as 30%-40%. However, limit the WWR on the worst orientation (338.5° to north) and the direction of cold wind (300°) to around 10%-20%.

INTRODUCTION

Material Considerations

Dark colours should be used for exterior surfaces to maximize solar heat absorption in Saskatoon's colder climate.

Opening and Closing Considerations

Vertical daylight glazing is recommended instead of horizontal vision glazing to promote the penetration of solar heat and light to a space.

Window to Wall Ratio

Based on Saskatoon's climate, a window to wall ratio (WWR) of 25-30% is recommended.

Window to wall ratios should be increased to 30-40% on facades with optimal orientation, and should be reduced to 10-20% on facades with the worst orientation and facing the direction of colder winds.