PLANNING FOR INDUSTRIAL URBANISM IN WINNIPEG, MANITOBA:

A CASE STUDY OF ROSSER CENTREPORT

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ABSTRACT

Industrial uses are often forced to the urban fringe by land use conflicts, real estate pressures and the strict separation of uses under conventional zoning practices. However, green technologies, smaller scale operations and rising costs of transportation have prompted different approaches to industrial land use planning. This research explores the concept of industrial urbanism and the application of form-based zoning to the Rosser CentrePort Special Planning Area to better understand the role of industry and the implications of CentrePort's planning model. Findings show public perception, lack of serviced land, and varying levels of incompatibility negatively affect industrial development. Seven recommendations are provided for the City of Winnipeg including the provision of serviced industrial lands, the redefinition of industrial uses, and the development of an industrial transect based on the CentrePort model. The research concludes industrial development requires additional attention from planners and municipal decision makers to better address its specific land use planning challenges.

Keywords: Industrial Land Use, Autonomous Industrial Park, Industrial Urbanism, Form-based Code, Zoning

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1 Introduction

Since the time before the Industrial Revolution, cities and industry have shared a common history. In their earliest form, industrial uses were created from the trade and manufacture of consumer-based goods and were largely dispersed throughout the urban fabric. New technologies established during the First and Second Industrial Revolution such as the steam engine and later the combustion engine drastically changed the means of production and subsequently the pattern of industrial development. This rapid expansion of industrial activity became a driving force for population growth and urban intensification. But rapidly expanding industrial development was not always a good thing; industrial areas were heavy polluters and newly urbanized workers were subject to poor living conditions, outbreaks of disease and even worse working conditions.

In many cases, industrial activity provided the impetus for modern efforts in urban planning and zoning, the first formulation of which was suggested by German civil engineer and professor Reinhard Baumeister in his book *Town Extensions: their links with technical and economic concerns and with building regulations* (1876). Baumeister recognized that industrial development posed hazards to human health and suggested a greater separation between the dwelling quarters of the city and more economic-based congregations (S. A. Hirt, 2018). In 1926, the watershed Supreme Court case *Euclid v Ambler* constitutionalized zoning in the United States as a means of municipal land use control, effectively enabling the practice of separating land uses to become a regulatory standard in western society.

The Euclidean model of land use control, whereby the control and division of private property is based on land use, would fundamentally reshape the geography of industrial

production and urban settlement, concentrating industrial land uses and elevating the value of residential and commercial development within city limits that were free from industrial nuisance (Hatuka & Ben-joseph, 2017). By the 1950s, the creation of vast highway networks allowed industrial development to boom in Canada and the United States. Inexpensive transportation and the low value of exurban land gave way to the suburbanization of industry where large lot, single-use industrial parks became the standard typology.

But the relationship between industry and the city would undergo significant upheaval over the next 60 years as several processes including the environmental movement, globalization, and technological advancement would contribute to widespread deindustrialization in North America (Hatuka, 2017; Leigh & Hoelzel, 2012). The shift toward a service-based economy and the off-shoring of manufacturing during this period has had a profound effect on the geography of land use in North American cities. Many workers and residents of cities did not find the displacement of industry to be a bad thing, however, once they were gone, communities began to realize the integral nature of industrial uses to daily life. In some jurisdictions, the positive relationship between cities and industry meant jobs, but in others, it meant foundational support for commercial enterprises, i.e. goods and services that people rely on.

As cities moved into a 'post-industrial' era, the patterns expressed through planning and development began to change. Where once the Euclidean norm of sprawling, homogenous, vehicle-oriented developments was the goal, density, mixed-use, and human-oriented cities became the new, ultimate goal (S. A. Hirt, 2016). This shift was driven by a desire to curtail sprawl, foster more sustainable cities and revitalize former industrial cities and downtown cores. Movements like New Urbanism and Smart Growth were developed to codify these principles and have included

such innovations as form-based codes, expanded design standards and broad policy changes encouraging everything from active transportation to density targets. Many new and exciting models and frameworks are now being adopted across North America.

But the lessons learned from more progressive planning models, frameworks and codes have not transferred over to the industrial sector. Why then is industry treated differently? The literature would suggest industrial land plays a significant economic role in cities but fails to garner the same attention that residential or commercial land receives. In addition, popular notions of industry emphasize its negative aspects; pollution, blight, and exploitation are typically the first things that come to mind. It's hard to think of anything other than smoke stacks, semi-trucks and pollution when one utters the phrase *industrial development.*

For these reasons, contemporary planning practice often regards industry and manufacturing as a detriment to attractive, vibrant and desirable urban living (Kim & Ben-Joseph, 2013), when in reality, industry provides a much needed component of a competitive and economically productive city. As such, industry is often pitted against other urban land uses where high density, walkable, transit-oriented developments are permitted and encouraged (Leigh & Hoelzel, 2013) while new industrial developments are pushed to the fringe of urban settlements where lower costs, access to transportation, and minimal land use conflict allow for uninterrupted activities (Grant, 2001; Howland, 2010).

The outcome has been a significant loss of industrial land in urban areas and North America as a whole, weakening economic opportunity for many and deepening the divide between communities. This poses a significant issue for many North American cities that depend on industry as a source of local employment.

1.1 Research Problem

This research practicum explores the concept of industrial land use and its relationship to urbanism and the city of Winnipeg, Manitoba by analyzing the use of form-based zoning in the CentrePort Special Planning Area in Rosser, Manitoba.

Industry is often found at the edges of urban areas, typically separated from other land uses. This is due to a combination of factors that both push and pull industry to edge of cities. Push factors include land use conflicts and real estate pressures, while pull factors include improved access to transportation and inexpensive land. In some cases, these factors have led to a decline in the amount and/or intensity of industrial land within the city and an increase suburban sprawl. In recognition of this decline and to halt industrial sprawl, some jurisdictions have adopted specific policies to protect or intensify already existing industrial land. However, few jurisdictions have sought solutions to these problems using zoning or transect-based regulating plans. CentrePort involves a distinctly different approach to industrial land use planning by utilizing a hybrid zoning by-law to plan for both industry and other land uses which are typically separated in traditional Euclidean zoning ordinances.

CentrePort is a tri-modal inland port created in 2008 comprising 20,000 acres of land shared between the City of Winnipeg and the Rural Municipality (RM) of Rosser. In 2016, Bill 13, *The Planning Amendment Act (Special Planning Areas)* (Manitoba, 2014) established the CentrePort Special Planning Area for the portion of CentrePort within the RM of Rosser and adopted an area-specific development plan and zoning by-law. CentrePort's planning framework utilizes a hybrid form-based approach that places additional emphasis on the form, structure and implementation of its development and has become the first of its kind in Manitoba, and the first applied to an industrial area in Canada.

While not under the City of Winnipeg's jurisdiction, CentrePort is a part of Winnipeg's industrial market and its urban fabric. It also presents a novel case of industrial land use planning that warrants further exploration to understand its intent and potential. By utilizing a hybrid approach that includes aspects of both Euclidean and form-based zoning, CentrePort provides a balance between traditional industrial uses and walkable, retail oriented commercial uses, with a recognition of the relationship between the two. Form-based zoning has typically been applied to residential and commercial areas where people live, work and play in a complete community. The non-residential production, transportation and logistics typically associated with industrial development do not fit the form-based mold and thus rarely see form-based zoning.

This practicum sets out to examine urban industrial land use and the uncommon application of hybrid form-based zoning to CentrePort. Through the findings, a set of recommendations are proposed to better address urban industrial land use and development in Winnipeg.

1.2 Objectives and Key Research Questions

The objectives of this practicum include the following:

- To addresses the lack of attention that industrial land use receives in both planning theory and practice.
- To develop an understanding of how and why form-based zoning is being utilized in CentrePort and its potential application to current and/or future industrial development in Winnipeg.
- To contribute to the understanding of form-based zoning and its uncommon application to urban industrial park areas.
- To propose a set of recommendations to better address the challenges that urban industrial land use and development poses in Winnipeg.

The following four research questions guide the proposed research project's inquiry:

1. ***What lessons can planners learn from CentrePort's chosen model of planning and zoning?***
2. ***What is the current role of industry in the land use planning framework of Winnipeg?***
3. ***How and in what ways can a conceptual zoning framework for industry better address the needs and current challenges facing urban industrial development?***
4. ***What physical and policy-based planning and/or zoning strategies should Winnipeg pursue to apply the principles of industrial urbanism?***

1.3 Significance of Research

This research contributes to the understanding of industrial land use planning and form-based zoning as it relates to the planning of industrial parks in North America. Urban industry serves as an integral piece of the economic health of metropolitan areas but has traditionally been ignored in contemporary planning practice. Form-based zoning has been studied at length since its inception, however, little research has been conducted regarding its use for industrial lands. The planning framework adopted in CentrePort is a first for Canadian cities and represents an opportunity for other planners, designers and professionals to learn from its example. As well, this practicum provides an opportunity to learn about the perceptions, experiences and attitudes that professional planners and developers have toward industrial development.

In planning practice, the use of form-based zoning in industrial parks is a relatively novel concept and thus has not been studied in any kind of detail. This research practicum contributes to both the theory and practice of zoning for new and existing urban industrial parks and identifies the obstacles that may hinder the creation and application of form-based zoning for industry.

The findings of this practicum can add to scholarly planning knowledge. The recommendations presented in this practicum can further the industrial land use planning goals and policies of Winnipeg, Manitoba. Information is available on the implementation of form-

based codes and complete community design, however, this study contributes new knowledge on how form-based codes and alternative planning methods can influence the planning and zoning of urban industrial lands. The recommendations of this study may be applied to other industrial districts, contributing to a wider application of form-based zoning practices for industrial lands.

1.4 Research Methods

To address the key research questions, this practicum follows a qualitative case study of industrial planning practice in the CentrePort Special Planning Area in Rosser, Manitoba. The research methods followed a linear path and included a literature review, a case study investigation, key informant interviews, the development of an illustrative conceptual model, analysis and recommendations. These methods allowed for the creation of original empirical research that builds upon and expands planning theory and practice.

Data collected throughout the practicum process was coded, analyzed and grouped into common themes, whereby comparisons, insights and findings were learned. A set of recommendations and a conceptual model were created based on the findings. **Figure 1** illustrates the research methodology for this research practicum.

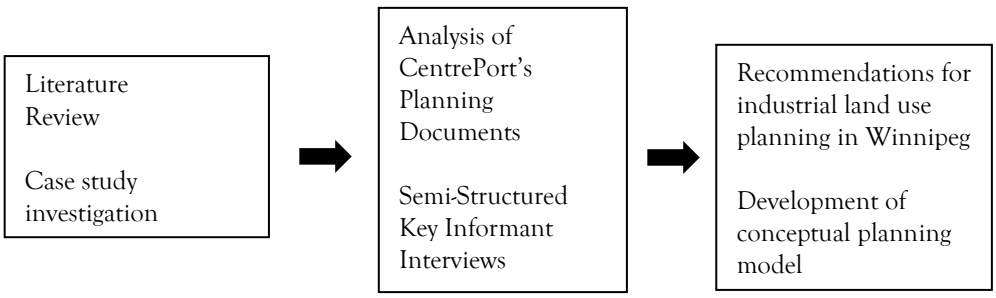


Figure 1: Research Methodology (Evan Allan, 2018)

1.4.1 Literature Review

The literature review served as the starting point for this research. A review of existing literature sought to understand a variety of concepts related to industrial development, zoning, form-based code, industrial urbanism, and illustrative planning diagrams. These topics provided a foundation for the research and largely informed the interview questions and subsequent analysis. The intent of the literature review was to identify trends, core themes and common practices currently available in this area of planning theory and practice.

1.4.2 Case Study and Document Analysis

Yin defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2014, p.13). Case studies are a commonly used research method within the planning discourse that allow an exploration between phenomena and the context within it arises.

The case study analysis provided essential background information for applying concepts and ideas uncovered through the literature review to a specific site; CentrePort. This stage of research involved an exploration of the characteristics of the CentrePort area and an investigation of its relevant planning policy documents. This was conducted using a latent content analysis. Latent content analysis involves the establishment of a specific criterion of selection or "concept dictionary" which is used to count textual elements which characterize and describe specific words, themes or concepts (Berg, 2001). From this latent content analysis, inferences were made about the novel characteristics being used and the extent of their purpose in CentrePort's planning.

A case study investigation of CentrePort and its planning policy was conducted using publicly available information and a latent content analysis of CentrePort's planning documents; the *CentrePort Secondary Plan* and *Zoning By-law*. The case study was used to determine CentrePort's history, its regulatory origin, and its current implementation while the content analysis was used to determine the structure, intent and potential of its planning framework. The content analysis was conducted by extracting key terms and phrases from textual data and drawing common themes, patterns and ideas from the policy. In addition, the analysis was used to determine the ways in which policies and provisions support the concepts of industrial urbanism.

Content analysis was identified as an appropriate research method for identifying the existing and potential role of form-based zoning in CentrePort's planning policy as well as providing the general context of the specific case presented. A content analysis can be easily repeated by further analysis but must be accompanied by further research methods to provide explanations to the results collected using the latent coding and deciphering of patterns (Berg, 2001).

1.4.3 Semi-structured Interviews

A key objective of this research is determining a set of recommendations that can inform the planning of new and/or existing industrial districts. To address the key research questions, a series of semi-structured interviews with professional planners (those in the public and private sector), developers and real estate professionals working in and around Winnipeg were conducted. The intent of the semi-structured interviews was to provide various perspectives on industrial planning and development and to provide an opportunity to comment on industrial planning policy currently employed in CentrePort.

Gray (2004) defines interviews as a conversation between two people in which a researcher with a defined set of questions poses them in a methodical fashion. This practicum followed a semi-structured interview format which allowed a non-standardized qualitative analysis. In a semi-structured interview process, the researcher has a set of topic areas or questions they wish to cover which are listed in an interview schedule. The semi-structured interview format allowed for probing questions where it was desirable for respondents to expand on their answers.

Interview participants were identified based on their experience and knowledge of industrial development and their experiences with CentrePort, both in theory and practice. Interviews provided access to relevant information from professionals dealing directly with the planning and design of industrial zoning and development, and the development of CentrePort directly. Respondents were asked about their experiences in the practice, their knowledge and perception of current practices happening in CentrePort, and their views on industrial development and its inclusion in form-based styles of zoning.

Key informant interviews were an appropriate method to address the research questions of this practicum as they can include perceptions, attitudes, meanings and opinions (Gray, 2004). For the purposes of these interviews, consistent topics and themes were maintained throughout all interviews, however, some deviation was experienced due to the extent of each participant's specific knowledge and experience.

1.5 Practicum Limitations

Three central limitations were identified as part of this practicum in relation to the subject matter and the collection of data.

Firstly, CentrePort represents a significant endeavour that has held the attention of Manitobans for the better part of the last 20 years. Throughout the creation of this practicum, several issues (unrelated to the research) have been presented to the researcher as being controversial in nature. The focus of this research is, however, centred on the planning and zoning of CentrePort and its future development potential, and not the financial, business development or Provincial-Municipal relations inherent. As with any project of CentrePort's size and complexity, difficulty rests in the accuracy of data collected from any one specific aspect. CentrePort's land use planning framework and development planning do not exist in a vacuum, but for the purposes of this practicum, limits were set on the scope and direction on the line of inquiry.

Secondly, CentrePort's planning framework can be considered relatively new. As such, little development has taken place under the set of regulatory standards and requirements. Thus, the research is limited in its ability to evaluate such a framework. It is argued there is sufficient opportunity to learn from the recent process and the underlying theoretical framework being presented through CentrePort's planning, as well as the perception and current implementation of industrial land use planning in Winnipeg. Considering this, it will be recommended that a comprehensive evaluation of CentrePort's planning framework be completed as part of future research endeavours, but such matters will not be discussed in this practicum.

Lastly, the creation of CentrePort's planning policy was conducted by several specific individuals from two private consulting firms. The intention of this practicum was to speak with and learn from as many of these individuals as possible to build the most accurate account of the development and intent of CentrePort's planning. However, during the data collection phase of

the research, several individuals that were originally scheduled were not ultimately interviewed due to scheduling conflicts and research timelines. This component was not left out entirely as several interview participants were able to provide some of the sought information.

1.6 Researcher Bias

The researcher is currently an employee of WSP Canada Inc. (formerly MMM Group Ltd.) which was one of the two contributing planning firms responsible for the creation of the Rosser CentrePort Secondary Plan and Zoning By-law, created in 2014. However, the employment period with WSP began in March of 2017, so there was no personal involvement in the creation of these documents.

Several senior level planners at WSP were interviewed as part of the research, however, their experience and expertise in both industrial development and the development of CentrePort's planning were seen to be of great importance to this practicum.

1.7 Document Organization

This document is organized into seven chapters. Chapter One introduces the research topic including the research problem, objectives and key research questions, significance, research and any limitations and bias. Chapter Two explores the literature relating to the main line of inquiry. Specific topics covered in this review include industrial land use, the industrial zoning crisis, zoning reform, form-based code, industrial urbanism and illustrative or conceptual planning models. Chapter Three provides an overview of CentrePort's planning context, both as a geographic area and as a socio-political entity. This chapter includes a review of the core policy directives and provincial legislation that established CentrePort as an inland port and an industrial centre in Winnipeg and the Winnipeg Metropolitan Region. Chapter Four details the review and

analysis of CentrePort's planning policy and provisions. Key policies, provisions and clauses from the *CentrePort Secondary Plan* and the *CentrePort Zoning By-law* are identified and used to establish themes and inferences that address the research questions. Findings and analysis are discussed as well. Chapter Five explores the perception of industrial land use planning in Winnipeg and CentrePort. A series of questions were posed to key informants to gain their perspectives on industrial development and policy considerations for an integrated and form-based approach to zoning for industry. Responses from informants are presented and discussed. Chapter Six provides a synthesis of the research findings in the form of seven distinct recommendations. Lastly, Chapter Seven concludes the practicum and provides the theoretical and practical implications of the results of this study, CentrePort's current status, directions for future study and concluding remarks.

2 Literature Review

2.1 Introduction

Industrial land use and industrial location are common topics of academic research that form the basis of this literature review. Theories of industrial land use typically fall into one of two groups: descriptive studies which mainly address the form of urban landscapes and the place of industry within them and structural theories which tend to look at industrial land use from an economic or supply/demand lens with urban form as the equilibrium result of market forces (Dempwolf, 2010). While not explicitly a descriptive study, this practicum seeks to better understand industrial land use and the concepts that can influence its creation and persistence in contemporary North American cities.

In the face of deindustrialization, academics and practitioners are now realizing the importance of a robust industrial sector to both local economic development and global competitiveness. The literature reveals a reinvigorated approach to industrial land use planning and a growing body of research regarding its implementation and study. While many tools and resources are presented, there are several complex problems – many of which are context specific – that affect industry's role in the traditional mix of urban land uses.

This practicum addresses aspects as they relate to industrial land use, including industrial land use history, zoning, industrial urbanism and the use of planning models to inform and alter land use planning practice. The literature review encompasses four topic areas: First, it seeks to provide an overview of industrial land use and its complex relationship to urban settlements in the North American context. Second, it forms an understanding of the history and styles of land use zoning in both theory and practice with specific regard to industrial zoning and form-based zoning.

Third, it examines the resurgence of urban industrial development and explores the concept of industrial urbanism and seeks to addresses gaps in the literature with respect to strategies and methods for implementing industrial land use planning concepts. The fourth and final section of the literature review briefly discusses the use of models and illustrative diagrams to support the development of a conceptual diagram to support the inclusion of industrial land use into the urban transect, which will directly inform the creation of the conceptual diagram proposed in this practicum.

2.2 The Industrial Zoning Crisis

This introductory section provides a general overview of the historical aspects of industrial land use and the current crisis facing industrial land. Topics to be covered in this section include the history of industry and the city, the movement toward de-industrialization, the rise of the single-use industrial park typology and the current crisis for urban industrial land as seen through the lens of land regulation.

2.2.1 Industry and the City – A Brief History

Industry has always shared a close relationship with the city. Industrial location, its effect on urban form and its relationship with other land uses has been closely studied since the Industrial Revolution. Since that time, industry as experienced vast amounts of change in both a physical and economic sense. Typically, theories of industrial development fall into two different camps: those that describe the spatial and physical qualities of industry (concentric rings, sectors and multi-nucleated zones) and those that describe the economic or market based forces affecting firm location (Dempwolf, 2010).

Regardless of the spatial or economic model, industrial districts were created in response to business needs and opportunities. The new technologies that spurred the Industrial Revolution allowed the means of industrial production to grow and locate in new places typically near transportation corridors allowing for ease of trade. But rapid urbanization and disregard for the new labour force created poor living and working conditions, initiating the notion that industry should be separated from the places that people live and recreate. The binary between *city* and *industry* can be seen today in the evident separation between industrial areas and the rest of the urban landscape and the stark contrast in both popular and academic experience. Speaking on industry and its current relationship with cities, Short et al. (1993) writes,

> To call a city "industrial" in the present period in the U.S. is to associate it with a set of negative images: declining economic base, pollution, a city on the downward slide. Cities with more positive imagery are associated with the post-industrial era, the future, the new, the clean, the high-tech, the economically upbeat and the socially progressive. (p. 208)

The negative aspects of industry have been observed since the industrial revolution, however, the effect of this negativity, warranted or otherwise, is still being felt today.

Following industry's rapid expansion in the early 19th century, the desire for suburbanization and clustering were popularized and can be described as industrial decentralization (Lewis & Walker, 2001). The causes of industrial decentralization differ drastically depending on your viewpoint. Lewis and Walker (2001) argue that while cities were continually growing and expanding, particularly at the edge, the choice of industrial developers to locate at the periphery occurred with respect to potential profits of land investment and subsequently paved the way for much needed infrastructure, housing, and commercial development in the lands between. In this way, industry can be seen as one of several land uses vying for geographic space and infrastructure and is subject to the same socio-political pressures and competition as other land

uses. To put it another way, the decentralization of industry was a natural progression and one that benefited urban settlements greatly by creating opportunities for growth.

Others posit that industrial land has been subject to conflict, global economic production changes and unsteady land availability. Dempwolf (2010) notes that industry's move to the periphery was due in part to changes and access to transportation, falling transportation costs, availability of natural resources, specialization and labour unrest. While not a natural progression, industry operated outside other land use systems and was at the mercy of both local and global changes. Alternatively, Howland (2010) indicates that rising land values, traffic congestion, and conflict with neighbouring land uses have contributed to industry's decentralization, driving firms outward to the periphery. It's clear that the path industry has taken from a common feature embedded within every urban settlement to concentrations at the city's edge is a complex one, often involving many different push and pull factors, both economic and spatial.

The ever-evolving dynamic between the city and industry has been described in several ways. Kim and Ben-joseph (2013) chart the historical rise of industrialization in four main phases: (1) the mercantile city, where industry was commonly seen at the local scale; (2) industrial cities, where assembly lines and large industrial districts were the norm; (3) the garden city, a response to the pollution and crowded industrial city built on ideals of marrying town and country; and finally (4) the composite city, where technological advancement and economic slowdowns promoted more flexibility. These different phases of industrial development are accompanied by varying spatial models that have had profound effects on way cities form and continue to do so today.

As an extension of this analysis, a fifth phase of the city-industry dynamic, the post-industrial city, is the result of deindustrialization, where globalization and increasing land use conflict has driven industry out of urban cores.

This historical context lays the foundation to better understand industry's role in the contemporary city, not just as a driver of economic development, but as a complex socio-political project with multiple dimensions (Hatuka, 2017).

2.2.2 The Industry-City Dynamic

Industry's role in the contemporary city is often cast in shadow, but its role is integral to the creation, development and functioning of contemporary cities. To better understand the evolving spatial relationship between cities and industrial environments, Hatuka (Hatuka et al., 2014) classified three spatial prototypes of city-industry relationships that are commonly seen today: the adjacent district, the autonomous and the integrated. The adjacent prototype is characterized by planned segregation between the industrial and residential areas of the city through zoning, the autonomous prototype is characterized by large-scale zones occupied by uniform industrial buildings and surrounded by various physical boundaries, and the integrated prototype is characterized by a symbiosis between living and working where industrial land use has become enmeshed in the urban fabric. Hatuka echoes other academics and practitioners in a call to re-evaluate industry as a primary goal of planners, urban designers and architects. Industry will continue to affect the production, growth and liveability of cities.

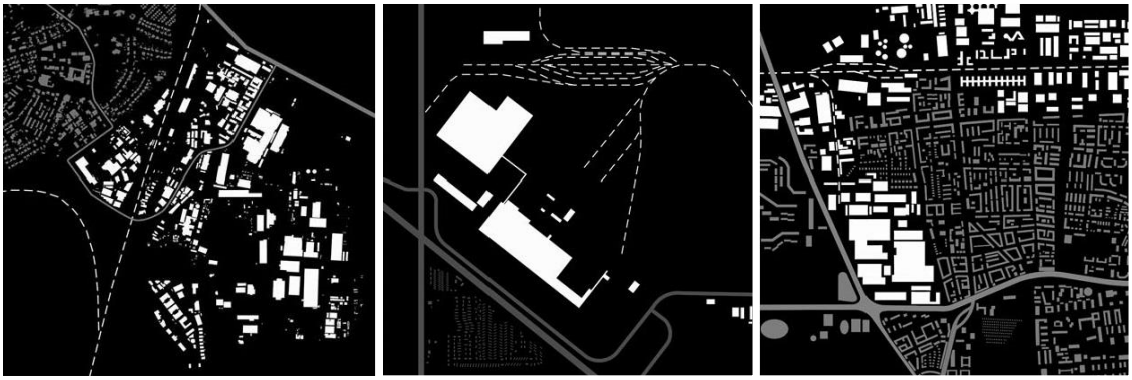


Figure 2: Industrial spatial prototypes (Hatuka et al., 2014)

Of the three spatial prototypes of city-industry relationships, as described by Hatuka, inland ports most closely resemble an *autonomous industrial space* prototype and are typically separated from urban localities to capitalize on various transportation networks. Many other North American jurisdictions have developed similarly styled inland ports in response to rising demand for freight transportation, the need for fluid multimodal freight transportation networks and their accompanying administrative systems (Maranchuk & Regehr, 2015).

These spatial relationships become important when considering the principles which ultimately determine the location and association of differing land uses within the city. Grant (2005) notes that "the desire to live in areas free from the risk associated with industry, and the easy availability of private automobiles, has left living near the factory a choice essentially for marginalized groups" (p.58). The idea of a dangerous, polluted and decidedly unlivable industrial area has become ingrained into the mindset of North American city building, so much so that barriers are not only regulatory but financial, structural and cultural (Grant, 2005).

2.2.3 The Autonomous Industrial Park

Planned industrial estates are not a recent phenomenon and can be found all over the world. These are spatially and administratively detached from surrounding urban areas and can be

defined as "...large tract[s] of land, subdivided and developed for the use of several firms simultaneously, distinguished by its sharable infrastructure and close proximity of firms" (Peddle, 1993). Their separation is reflective of two economic-spatial forces that have been shaping the geography of industry and employment for several decades: the decentralization of firms from urban cores, and the spatial agglomeration of firms and factories (Bar, 2017).

The first autonomous industrial parks were heavily dependent on rail integration including the spur lines and rail yards required to move raw materials and ship product. Following WWII and the expansion of automobile infrastructure and the trucking industry, modern industrial parks arose. Additionally the building type most associated with autonomous industrial parks, massive single-story structures which housed continuous horizontal assembly lines, were not readily available within urban centres.

Autonomous industrial parks changed again in the 1970s, corresponding to the rise of globalization and the shift from light or heavy manufacturing to logistics, information and technology based industries and economies (Urban Land Institute, 2001). As the world's economy has become more globalized, manufacturing and industrial production have followed suit in similar ways. For those firms seeking a 'global' presence, the autonomous industrial park model has become the preferred typology (Hatuka & Ben-joseph, 2017). The global proliferation of industry has helped redefine urban landscapes and labour markets, the world over.

As land-hungry, auto-dependent and infrastructure intensive developments, industrial parks are sprawling by definition (Bar, 2017), which profoundly affects their location in the urban landscape. In a working paper concerning industrial land use studies (in the United States),

Dempwolf observed five characteristics that are common to most industrial districts representing what industrial users value and require:

> **Accessibility** to customers, suppliers, workers and road networks were primary concerns. Access to ports, rail and transit were secondary and highly dependent on location and industry.
>
> **Affordability** was consistently among the top criteria. Traditional industrial users are highly sensitive to rent levels and are therefore vulnerable to displacements if not protected.
>
> **Clustering** of similar industries and their supplier networks is a common occurrence in industrial districts.
>
> **Compatibility (or the lack of it)** with non-industrial users was often cited as an issue and a reason why industrial users preferred exclusive industrial districts.
>
> **Site and building characteristics** were also important. Industrial users often need open yards for storage and material handling. Buildings with large bays and high ceilings were also desirable.
>
> (Dempwolf, 2010, p.18)

Given the prevalent discourse of density and mixed-use planning in today's theory and practice, industrial districts, and the features they require or value, present significant incompatibility with modern urban settlements. This has further contributed to the lack of consideration industrial land sees in planning theory or practice.

Inland ports are just one of several new industrial park typologies that have begun reshaping industrial developments and their geographic location in relation to localities in North America. Inland ports are locations where the process of trade is shifted from national borders and where multiple modes of transportation and services are provided. Inland ports are a type of autonomous industrial park that serves to enhance trade corridors within countries and provide the efficiencies and cost reduction that international firms require to stay competitive.

The Texas University Center for Transportation defines an inland port as "… a site located away from traditional land, air and coastal borders containing a set of transportation assets

(normally multimodal) and with the ability to allow international trade to be processed and altered by value added services at the site as goods move through the supply chain" (Leitner & Harrison, 2001). Inland ports can also be referred to as 'dry ports' or 'hinterland ports'.

Inland ports represent changes and increases to transportation networks following the globalization of local economies. Economic and trade policies like the North America Free Trade Agreement (NAFTA) have contributed to the increase in transportation needs as international supply chains increase in complexity and size (Leitner & Harrison, 2001). Because of these changes and the continued proliferation of the global marketplace, inland ports have become a new and popular typology of the autonomous industrial park able to meet the needs of growing nations.

2.2.4 The Current Crisis Facing Industrial Lands

As a core component of urban land use, industry is facing opposition and difficulty in contemporary cities from a land use viewpoint. Increasingly, there is pressure on planners to find and maintain industrial land that is suitable for industrial purposes. These pressures can be summarized into three primary causes and represent the main incompatibility that industrial land shares with other urban land uses: (1) industrial land use typically requires large tracts of land to house industrial operations and ensure the products or goods can be moved to and from site (2) industrial proponents desire to be as close as possible to major transportation infrastructure, and (3) there are expectations that new industry be environmentally friendly and share no residual conflict with neighbouring land uses (Kotval & Mullin, 1994).

Additionally, market factors can have a greater effect on industrial land use than other urban land uses. These factors can be seen in the real estate market, where industrial land is pressured from residential and commercial uses resulting in formerly suburban industrial districts

being subsumed by the larger city. These industrial districts (with many becoming brownfields) represent high value land within urban settlements. As rents increase, industrial users can't afford to stay and are often forced to sell their operations and relocate. The supply and demand shifts can drastically affect industrial land development, especially in the age of de-industrialization (Dempwolf, 2010). Secondly, the labour market has a great effect on industrial land use. Wolf-Powers (2005) found that planners actively engage in "passive de-industrialization", where visions of global cities did not have room or need for industrial users or workers. This highlights the binary between "blue-collar" and "white-collar" labour within cities and the land use decisions that are made from personal and institutional biases.

The challenges affecting industrial land use can most readily be explored within the concept of zoning, as it is the one planning tool that clearly identifies and regulates the use and development of land and buildings. As this literature review has shown, zoning was originally developed as a response to the pollution and nuisance created by industrial land use.

Traditionally, communities adopted three basic zones: residential, commercial, and industrial. These three zones were commonly thought of as having a hierarchy or pyramid structure, with residential zones at the top, and industry at the bottom. Under this structure, uses higher up in the pyramid were permitted in any zones lower in the pyramid. Therefore, residential uses could be built anywhere in the city. This was problematic for industrial land uses as they could only be built in industrial zoned areas. Once housing was constructed near industrially zoned lands, the potential for attracting further industrial growth declined dramatically (Mullin & Kotval, 2000). And much like agricultural lands in rural areas, once industrially zoned land in urban areas is lost, it is typically lost forever. This land use hierarchy still exists to some extent in

today's cities. A 2012 study of several major U.S. metropolitan areas discovered a sharp reduction in industrially zoned land (Leigh & Hoelzel, 2012) predominantly caused by speculative real estate pressure for residential development as well as increased conversion pressures. A 2013 survey of 74 cities in the United States revealed that cities and planning officials recognized the importance of urban manufacturing but that zoning regulations often discouraged this type of activity within core areas, instead relying on edges or suburban locations for future industrial development. This presents a growing conflict between planning policy and local ideals (Kim & Ben-Joseph, 2013). A recent study of London's employment lands suggests the move from single to mixed land use policy designations, in the absence of a broader strategy for protecting and encouraging manufacturing and industry, is undermining viable business opportunity and currently remaining industrial developments (Ferm & Jones, 2016).

Under-utilized industrial lands, or *brownfields*, present an economic drag on both city coffers and developers in that they do not generate immediate revenue like residential or commercial properties and they generally incur costly remediation efforts due to soil or water contamination. On the other hand, a lack of attention to industrial land planning can prevent large firms from entering the local market or smaller firms attempts at re-shoring. Lester et. al. (2014) suggest that a more nuanced approach is needed in regard to industrial land; cities need to be aware of their economic goals and the policies they create to accommodate them while being more specific about what industries can be preserved at what locations.

Given the many challenges presented here, why should planners care about the industrial land crisis? For one, industry and manufacturing are now considered to be an essential component of a city's sustainable economic viability, providing living wage jobs for medium to low income

families, direct support for ancillary businesses including the core production, distribution and repair (PDR) services, and stability during uncertain economic situations. There have been concentrations on employment in the "post-industrial" sectors like information and service-based industries, but for every core industrial/manufacturing job gained or lost, two to three supporting jobs are similarly affected, making the economic impact much greater for the broader industrial sector (National Council for Urban Economic Development, 1993). Industry is an unavoidable requirement for the mixed-use developments that make up compact, urban neighbourhoods, by supplying logistics, goods movement, raw materials and utilities. Furthermore, when industries move out of cities to reduce costs, they physically separate from the workforce requiring unsustainable forms of transportation and perpetuating forms of urban sprawl. Urban planning and design have largely been focused on the sprawl debate and ways to mitigate it, but interestingly, there has been little focus preventing sprawl caused by industrial development.

To encourage smart, sustainable growth across entire cities, there needs to be an understanding of industry's role in that sustainability and the tools available to accommodate and promote it. Research has shown that industry is likely to be an important part of sustainable urban development, but current zoning regulations and popular attitude is insufficient to accommodate it (Kim & Ben-Joseph, 2013).

2.3 Zoning Reform and Form-based Codes

This section provides a basic understanding of zoning and land use control including its history, efforts to reform it including recent innovations and trends, and its relationship with industrial land development.

2.3.1 A Brief History of Zoning

For the last hundred years, land use control has largely been exercised through functional or use zoning which divides the territory of a jurisdiction into relatively large blocks of land and assigns a functional class to each such as residential, commercial, or industrial (S. Hirt, 2013). Zoning grew out of the observation that similar land uses tended to congregate in areas separate from other uses in order to capitalize on spatial efficiencies (Hodge, 2003) and an effort to minimize land use conflicts between incompatible uses. While zoning is used throughout the world, there is perhaps no other place where its application is as ubiquitous as North America.

Zoning was first conceived by a German engineer Reinhard Baumeister in his book entitled, "*Stadterweiterungen in technischer, baupolizeilicher und Wirtschaftlicher Beziehung* (Town extensions: their links with technical and economic concerns and with building regulations)" in 1876. This eventually grew into the 1912 zoning of Frankfurt Germany which recognized the nuisance presented by local factories and thus increased bulk restrictions in residential areas, but loosened them along railroads where prevailing winds could blow smoke and pollution away from the city (Williams, 1922).

New York City saw the first formal zoning ordinance in North America where rules were implemented to solve four physical conditions that were threatening the health and quality of life for residents of the city: pollution from factories, overcrowding of residential neighbourhoods due to a massive influx of urban labourers, skyscrapers blocking light, and congested streets and sidewalks (Wolf, 2008). Several other major metropolitan jurisdictions followed suit by establishing their own zoning ordinances, but it wasn't until the watershed U.S. Supreme Court case *Euclid v Ambler* in 1926 where the concept of zoning was constitutionalized as a means of land use control. In the case, the Village of Euclid was sued by Ambler Realty Co. who argued that

Euclid's recently adopted zoning ordinance had substantially reduced Ambler's property value and limited its industrial land use capability. The court, citing the doctrine of nuisance, ultimately ruled the zoning ordinance must find its justification in some aspect of police power which is asserted for the public welfare and found in favour of the Village of Euclid.

Euclidean zoning can be described as '*proscriptive*' in that any deviation from what is contained within the code is prohibited. These codes take the form of various zoning districts, lists of allowable uses and broad dimensional standards (bulk) for sites. Most zoning codes, including Winnipeg's, are based on Euclidean principles.

The primary benefit of Euclidean zoning is its logical and systematic presentation, and its familiarity to administrators, public officials and the public. Euclidean zoning also provided invaluable in the early 20th century by preventing incompatible land uses and providing a mechanism for resolving land use conflict. Some of the disadvantages of Euclidean zoning include its lack of flexibility to respond to different kinds of development, its inability to provide direction on specific development issues including design and the public realm, and its strict separation of land uses that enabled sprawl and exclusionary practices.

As Euclidean zoning became the norm in many cities in North America, industrial land uses would continually be separated and pushed out of urban areas, often to their detriment. As time progressed, the practice and theory of planning began to evolve and change. The importance of health, environmental stewardship and the civil rights movement changed how cities look and function. Despite several attempts to innovate, Euclidean zoning remained relatively constant. Zoning is one of several factors that have contributed to the process of deindustrialization in North American cities. Given its negative perception, troublesome past and a system designed to

separate and plan around it, industrial land has received a lack of attention in both planning theory and practice.

2.3.2 Zoning Reform – From Euclid to Form-based Code

Euclidean zoning has largely been under attack since the 1960s with many authors, scholars and analysts providing various critiques. The most common argument posits that Euclidean styles of zoning favour low density patterns which in turn has contributed to patterns of sprawl (Batchis, 2010; Hall, 2007; Talen, 2002). In her comparative critique of Euclidean zoning Hall (2007) describes how this style of zoning perpetuates five major problems: urban sprawl, racial and socioeconomic segregation, environmental degradation and energy waste, adverse economic impacts, and diminished quality of life. Other studies concerning the issues of suburban sprawl have shown that most municipalities lack the ability to shift infrastructure costs to new suburban growth, requiring municipalities to increase property taxes. In response, residents lobby their local government to implement low growth land use controls (permitted via Euclidean zoning) that increase sprawl and promote further exclusion of low-income housing and racial minorities (Pendall, 1999). Drawing from the work of Jane Jacobs and her seminal tome *The Death and Life of Great American Cities*, Wickersham (2001) writes that "the fundamental problem with Euclidean zoning is that it incorporates an overly simplistic notion of what constitutes an ordered environment – a notion that ignores how cities really work" (p.563). Despite its good intentions, the rigidity of Euclidean zoning has had profound and far-reaching effects on the form and function of cities.

Dissatisfaction grew throughout the 20th century with many scholars agreeing that conventional zoning has had a significant detrimental impact on the pattern and form of cities at

the local scale (Talen, 2013) leading to a continued effort to reform the practice. The question was then, what can planners do to overcome the many issues that seem to plague urban planning's core implementation tool? Several movements and proposals over the years were proposed.

The first zoning reforms were additions or slight changes to existing Euclidean zoning methods to increase flexibility. These included overlay districts, performance zoning, incentive zoning and planned unit developments. Overlay districts impose additional or specific criteria and standards to a specific geographic area, usually in addition to existing zoning. Overlay districts provide site or area specific flexibility to better address the needs and requirements of specific developments. Because overlay districts are placed in addition to existing zones, they can become overly complicated. Overlay districts are common features in most North American cities today.

Performance zoning sought to regulate the associated impacts of land uses, rather than regulating on face value alone. Performance standards were originally developed for commercial and industrial areas and regulated levels of noise, pollution, odour and nuisance but were later expanded to other land uses and included standards for building coverage, landscape surface ratios, trip generation and infrastructure impacts. Performance zoning provides flexibility for density and floor areas, allowing specific developments to reach higher standards of development. Unfortunately, impacts are largely site specific and involved complex calculations based on many variables that were difficult to implement. Today, performance zoning has largely been incorporated into existing Euclidean ordinances and takes the form of limited standards for specific land uses to minimize discretion in review processes.

Incentive zoning was conceived in the 1950's and 1960's to encourage desirable forms of development through incentives. Incentives often included height and density increases, expedited

reviews and reduced parking for various reasons including the provision of affordable housing, environmental protection, historic preservation or infill purposes. Like performance standards, incentive zoning has become a standard feature in the zoning of many cities adopting bonusing or benefits to desirable forms of development.

Planned unit developments are typically applied to large parcels, typically mixed-use projects, that present significant challenges adhering to existing zoning regulations. These site-specific zones were implemented to increase flexibility and the discretion of approving authorities. There is no standard format for planned unit developments, but they typically include a special set of permitted uses, site specific dimensional standards, an extensive review and approval process and a regulatory amendment. Planned unit developments provide the highest level of flexibility, however, the process is often complex, expensive and uncertain for neighbouring uses which can lead to land use conflict.

Despite improving the flexibility of Euclidean zoning, these innovations ultimately maintained their proscriptive nature and failed to address the *form* of development. But several movements began to shift the focus of zoning onto prescriptive, design-based methods with the goal of establishing new typologies.

The New Urbanism movement found its origins in the early 1980s with advocates promoting neo-traditional development patterns with a focus on mixed-uses, connected street patterns, walkability and pedestrian-oriented design. Smart Growth was a similar movement found predominantly in the U.S. in response to anti-growth coalitions which promoted planning at a neighbourhood and regional scale to manage land use and transportation systems to achieve more efficient use of public infrastructure and a better balance between housing and jobs (Grant, 2009).

Lastly, while not specifically planning related, interest in the concept of sustainable development grew significantly since the publication of the Bruntland Commission report (WCED, 1987) as a means of promoting compact forms, increasing transportation options, ensuring healthy living environments, advocating for affordable housing and environmental responsibility.

Grant (2009) explains that "new urbanism tried to develop an environmental and social conscience, smart growth manuals often illustrated the traditional urban forms popularised by new urbanism and, in the wake of environmental concerns about global warming, sustainability became the *mot du jour* of discourse about cities" (p. 13). As these three movements began to inform and influence planning practices across North America, planning tools began to change and shift in response.

Euclidean zoning has a strong regulatory background and its innovations over the last 100 years have moulded it into a common tool used by planners, designers, municipalities and developers daily. The move to design-based zoning has yielded few instruments to effectively carry out the goals of New Urbanism. Form-based zoning has emerged as the most prominent tool to combat the woes of conventional zoning. The Form-based Codes Institute (FBCI) defines a form-based code as:

> "A land development regulation that fosters predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. A form-based code is a regulation, not a mere guideline, adopted into city, town, or county law. A form-based code offers a powerful alternative to conventional zoning regulation." (Form-Based Codes Institute, 2016)

Form-based zoning places its focus on form as opposed to use, establishing a regulatory framework that addresses the relationship between buildings and the public realm, requiring a high-quality and dense public realm and the mitigation of sprawl (Katz, 2004). Much of the form-based

methodology can be traced back to the concept of an urban-to-rural transect. In a transect-based code, buildings, uses, and their associated urban forms are arranged on a scale based on the intensity of urban character as opposed to their use. In this way, all categories found within the transect allow for some mix of uses, to an appropriate level of integration. In the context of a city, the scale begins from the most rural character (i.e., natural areas and agricultural lands) to the most urban (i.e., the city centre) (Duany & Talen, 2002). In its most literal translation into a zoning framework, the transect is represented by seven different zones (T1 to T6) and a special district zone (SD) for uses that do not readily fit into the core transect framework.

The urban-to-rural transect is not necessarily a new idea and mirrors transects that appear in nature (from mountains to the ocean for example). The direct mirroring of human made landscapes to natural landscapes through the transect is an observation of traditional settlements that were more in tune with nature and provides a foundational ordering schema from which to plan communities.

Figure 3: The rural to urban transect (Duany Plater-Zyberk, 2014).

Not everyone is convinced that form-based zoning is the panacea North American cities need to reinvigorate their urban forms. Garnett (2013) indicates that much of the North American urban landscape does not reflect the urban transect and that there are several fundamental problems associated with form-based zoning including the reluctance of local governments to relinquish development control to a coding document, and reluctance from home owners to

reembrace deregulation which is viewed as a threat to housing values. Echoing these sentiments, Woodward (2013) notes that applying form-based zoning to an area that has already been shaped by single-use, low-density conventional zoning would cause a political and legal fight that would lead to a code unable to live up its full potential. Granted, these interventions are coming almost 100 years following the implementation of Euclidean zoning, representing several generations of land use control and attribute much of the difficulty to political will rather than functional or structural issues.

In their guide for the creation and implementation of form-based codes, Parolek, Parolek and Crawford (2008) describe three macro elements that inform the character of a municipality and establish the existing urban framework where a form-based code might be applied: neighbourhoods, districts and corridors. While identified for their necessity, industrial areas including manufacturing, airports and other heavy industrial uses, are classified as incompatible-use districts that have "little need for a pure form-based code approach, except perhaps at their edges" (p.120). A fundamental tenet of New Urbanism is the integration of land uses to create walkable and vibrant communities. Industrial districts present a core challenge to this ideal and have yet to be recognized in form-based coding like residential and commercial uses. Leigh and Hoelzel (2012) note that organizations like the American Planning Association emphasize the benefits of form-based codes have for housing, pedestrian activity and the preservation of open space, but they "do not discuss potential benefits for industrial productivity or revitalizing industrial areas" (p.95).

Unfortunately, it is still too early to determine the true impact of this new style of zoning, as new applications have been slow, and the results have been mixed. Implementation is also

typically done in a spot manner (i.e., for specific neighbourhoods, or city sectors and not across entire municipalities) which may also skew their effectiveness. However, in their review of *Miami 21*, the city-wide form-based zoning ordinance in Miami, Florida, Garde et al. (2015) found that it performed better than its previous conventional zoning code in several categories (based on LEED-ND criteria), but it does not go far enough to address affordable housing needs.

Both Euclidean and form-based zoning have shown great progress in their abilities to address both the function and form of cities. However, the place of industry is still largely on the outside looking in.

2.4 Industrial Urbanism

This section explores the recently termed concept of industrial urbanism. Topics include industrial gentrification, the changing nature of industry, efforts to protect and intensify industrial development, and the current literature gap.

Industrial urbanism is a relatively new term used to describe and explore the relationship between current urban planning practices and industrial land use. More broadly, industrial urbanism suggests an extension of accepted paradigms to address future possible relationships between cities and industry and between urban planning practices and the places that are being designed for and dedicated to the production, distribution and repair of goods (Hatuka et al., 2014). As cities in North America are continually presented with opportunities for revitalization, increased livability and economic development, the planning of industrial land must be addressed in a similar manner.

2.4.1 Industrial Gentrification

Marcuse defines gentrification as

> "The movement into a previously working-class area by upper-income households, generally professionals, managers, technicians, and new gentry, resulting in the displacement of the former low-income residents." (Marcuse, 1999, p.790-791)

Work on displacement has often focused on residential neighbourhoods and gentrification's effects on marginalized populations in urban areas. However, the idea of gentrification can be applied to other types of displacement, including specific land uses.

As urban municipalities are faced with dying inner cities and vacant former industrial districts, the conversion to high profile lofts and condominiums can seem like a win-win situation: increasing property values and converting a previously uninhabitable industrial district into a thriving neighbourhood. In this instance, the concept of industrial gentrification becomes the reality, where currently active industrial firms are often forced out by rampant land speculation. In these situations, former industrial districts are fundamentally changed by encroaching residential development, effectively being pushed out by high rents and the risk of land use conflict.

Curran writes that "the changes wrought by gentrification-induced industrial displacement affect not just one neighbourhood, but the entire economic and social structure of the city" (2007, p.1439). Granted that many cities are also facing housing shortages, the land use decisions are not easy ones to make. However, the synergy between industry and residential uses in North American cities is perhaps further away than some case studies and prototypes would imagine.

In a study based in the Halifax region of Nova Scotia, Grant et. al. (Grant, 1994) analyzed the potential of adding residential uses into a large industrial park. Interviews with business owners, park managers, planners and councillors revealed considerable reluctance to introduce a mix of uses citing the possible destabilization of the business environment, and the unpredictability and uncertainty of mixed-use zoning.

Once again, the principles of mixed-use and increased density are popular with planners, but industrial land uses rarely enter the conversation for a variety of reasons not immediately apparent. As much as people do not want to live next to a factory, factories don't want to operate next to housing. This is especially true in low growth cities where green field sites are cheap and powerful interests promote suburban development (Grant, 2002) making industry's exodus that much easier. The idea of establishing a true mixed-use neighbourhood where people live in harmony with industry is much more nuanced process that cannot be solved by adapting a few old buildings with lofts and allowing the light industrial print shop below to continue operating.

2.4.2 Changing Cities, Changing Industries

As much as the negative view of industry dominates popular opinion, several key changes are now being observed within the industrial sector across North America. Changing dynamics of globalization, rising costs of labour and transportation, and the reintroduction of domestic production are changing industry in what were known as 'post-industrial' cities (Hatuka & Ben-joseph, 2014). Indeed, urban industry is currently undergoing a renaissance in which the antiquated methods of large-scale production have given way to advanced manufacturing that is cleaner, greener, and often smaller (Reynolds, 2017). These new industries have the potential to not only change popular opinion but perhaps the location of these businesses. As well there are many new avenues being pursued by academics that explore the implementation of industrial urbanism including hybrid building typologies calls to redevelop old industrial sites or brownfield sites for new industrial purposes (Love, 2017; Campagnol, 2017).

At the site level, Love (2017) makes a strong case for the hybridization of industrial developments using higher design standards to preserve a city industrial portfolio, increase

densities and reduce regional transportation demands. Such measures are required to transform single-use industrial districts into productive neighbourhoods that can support the goals of post-industrial cities. Love writes that "rather than starting with district-wide infrastructure layouts as the driver of a plan, planning needs to start at the molecular level of building prototypes" (p. 55) which reflects the level of attention paid to other land use types but is not often thought of when considering industrial developments. Love, however, fails to provide a means to accommodate the heavier industrial uses and instead focuses on the lighter and more commercially related types of industry, addressing only part of the problems discussed in this literature review.

Despite calls to reintegrate industry into the urban fabric, autonomous industrial parks are the industrial typology that is most widely accepted in North America. Further removing industry from urban landscapes, inland ports are rising to meet increased demands across North America, including those in Western Canada (Edmonton's Port Alberta, the Calgary Regional Inland Port, the Global Transportation Hub in Regina and Winnipeg's CentrePort Canada). Given these changes, Bar (2017) indicates that different forms of industrial clusters (both urban and suburban) are expected to co-exist into the future, leaving the question of how best to tackle the spatial fragmentations that they present.

2.4.3 Protect, Intensify or Integrate?

With renewed interest in industrial park lands and urban manufacturing, various competing theories as to what actions are required are being suggested by academics and practitioners alike. Several papers mentioned in this proposal have identified the need to protect the available supply of industrially productive land to maximize industry's potential where land shortages are common, and competition is growing.

Rappaport (Rappaport, 2017) goes one step further and describes several cases of hybridization at increasing scales, from neo-manufacturing to vertical factories to the hybrid city, drawing attention to the limiting factors of single-use urban districts. To achieve such interventions at a wider scale, Rappaport suggests that zoning regulations may be re-assessed to include flexibility and better acknowledge the clean, green, light and small industrial uses and their mixed-use potential. However, in many of the cases provided by Rappaport, the interventions are being conducted at a slow pace, often at the application phase. Most of the cases provided take place in older cities with already established industrial districts that provide ample opportunity to re-inject industrial uses into former warehouse districts, combining residential, commercial and light industrial uses into one. But little is said of newer cities that lack these pre-existing industrial bones with which to reinvigorate.

In other urban areas where industrial land availability is limited, such as Metro Vancouver, intensification policies have been adopted to combat the loss of industrial land and support a growing economy and employment base. In the Metro Vancouver context, intensification seeks to:

- Optimize available land potential by achieving high forms of industrial development;
- Facilitate new growth through the development of under-utilized industrial land;
- Reduce pressure on the conversion of agricultural lands; and
- Promote the efficient use of land, resources and infrastructure.

(Vancouver, 2013)

Most academic literature on the topic of industrial land intensification concerns spatial productivity and business location decision making. However, Gilmore (2015) shows that the

actions and goals of Metro Vancouver will require further distillation of appropriate definitions of intensification and measures to effectively implement intensification equitably.

But other jurisdictions have seen different results. In a case study of the Kfar Saba Industrial Park in Israel, Price (2017) showed the potential of specific interventions available to policy makers seeking urban industrial renewal. As part of a new industrial master plan, an 11-tier planning strategy was employed to better integrate the industrial district back into the city, upgrade the environmental standards of all businesses, promote cycling and public transportation, and ensure a dense pedestrian experience.

In their PAS Report 577, *Sustainable Urban Industrial Development*, which conceptualizes industrial development under the umbrella of sustainability, Leigh et. al. (2014) recognize the complex issues that have lead to industrial land use's lack of attention within planning practice. No simple solution is given, but rather a host of tools and resources for planners to consider when developing and implementing a local industrial land use strategy. The tools provided include financing for industrial economic development, sound infrastructure and transportation planning, and improvements to design and siting strategies. The authors recognize that not all industrial uses are a perfect fit for infill development, however, given the changing face of industrial development, many industrial activities can "enhance – rather than disrupt – a neighbourhood" (Leigh et al., 2014).

Amid the complex decision making that goes into industrial development, little attention has been paid to how planners and policy makers plan for industry, and even less to the consequences of industrial zoning. Given recent developments in planning theory and practice in the last several decades, a substantial gap exists in the literature about contemporary zoning and its

application to industrial land uses. Even more so is the potential application of form-based zoning to industrial parks of various spatial qualities.

2.5 Industrial Development and Models of Planning

This section examines the use of diagrams and illustrative art to distill complex ideas which have a rich history regarding industrial land use planning. The section will explore notable planning models, their associated diagrams, and their relation to industrial development.

2.5.1 Notable Models

Speaking on the use of art and analytical diagrams in city planning, professor of architecture and urbanism at UC Berkeley Andrew Shanken writes that, "planning indulges the same world of image making that artists and advertisers do. Every plan is an act of persuasion, an argument for an alternative way of life that attempts to posit or convince an audience of that alternative." Diagrams distill a complex idea into a simple and powerful visual statement and are often touchstones in the visual lexicon of urban planning and design (Grant, 2012).

Over the course of several centuries and the growth of city planning, many now iconic diagrams have influenced the design, policy and ideology of planning for urban settlements (Grant, 2012). One of the most influential texts of modern city planning practice was written in 1902 by Ebenezer Howard titled *Garden Cities of To-Morrow*. Howard's garden city concept attempted to marry town and country into one unifying concept as an answer to the pollution and overcrowding of the industrial city. He intended industrial uses to exist within city limits as they were a necessary part of the garden city economy, but they were sited at the periphery to avoid conflict. Howard's concept was accompanied by several diagrams that encapsulated his ideal.

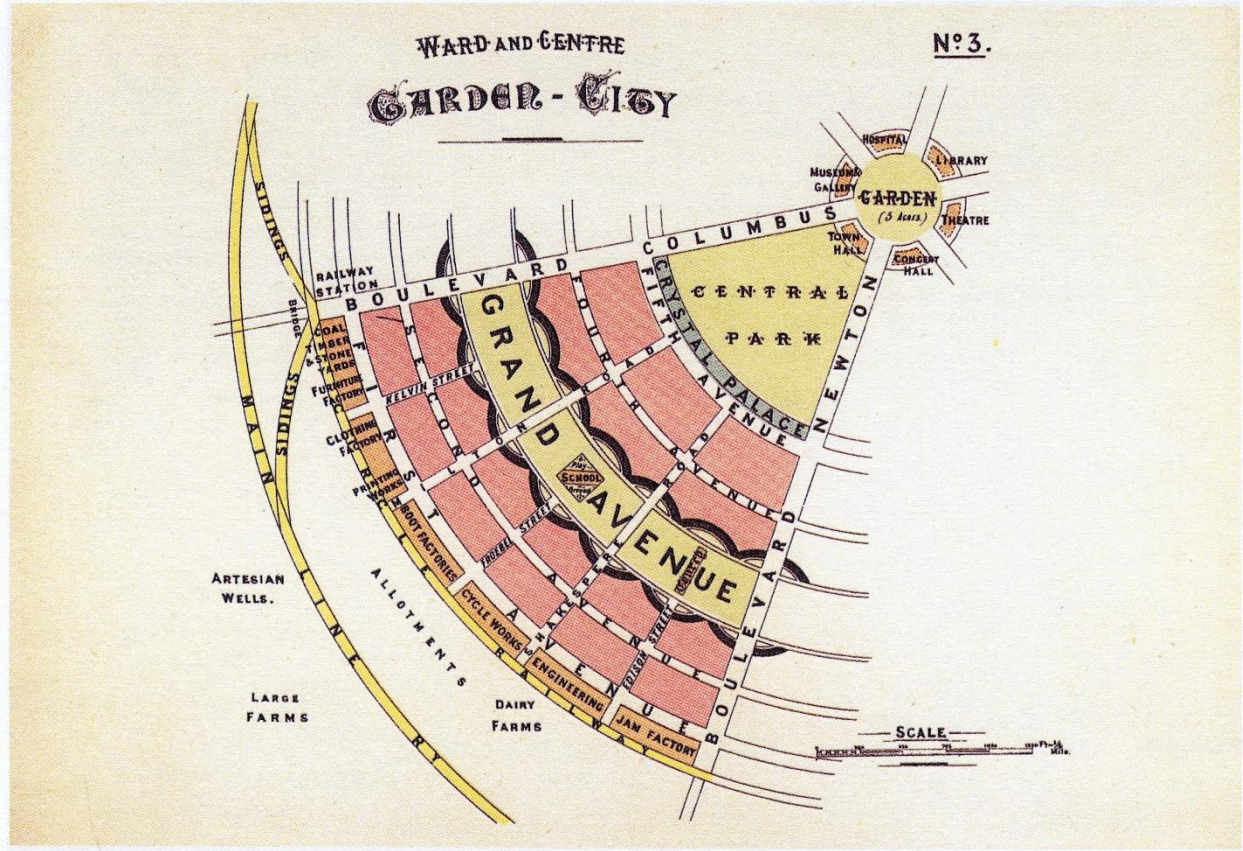


Figure 4: Ebenezer Howard's Garden City (Howard, 1898)

Following Howard's ambition for an urban master plan, Le Corbusier designed the Ville Radieuse, or *Radiant City,* in 1933 that conceptualized the city as a means of social order, symmetry and vibrancy. In accordance with modernist ideals of progress the Radiant City design utilized a strict separation of land uses whereby businesses, housing and industry were separated by expansive parks and connected by a series of wide transportation networks. The Radiant City fundamentally shifted modern urban planning and spawned the creation of new housing typologies ('Super Blocks') but would ultimately face heavy criticism for its lack of human scale and

density of interaction. Few examples of Le Corbusier's original intent have survived today as many were demolished following the end of modernist architecture.

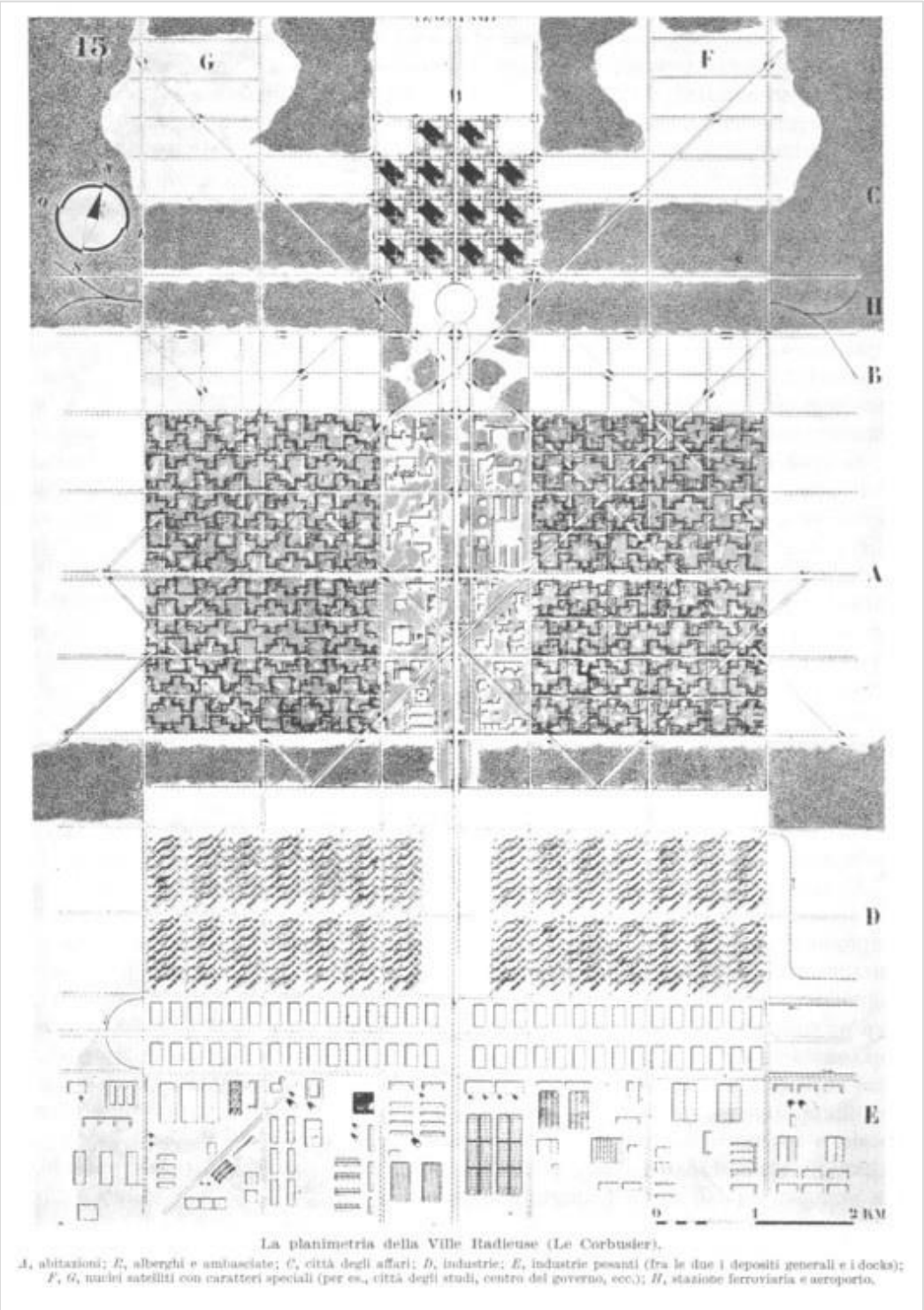


Figure 5: Le Corbusier's Radiant City (Arch Daily, 2018)

Around the same time in 1932, the famous American architect Frank Lloyd Wright had a master planned city of his own creation, called Broadacre City. Wright set out to provide a city based on his ideals of democratic process and capitalism, where the individual could grow. Whereas the old city was the result of impersonal forces that diminished the growth of individuals, the new democratic city would take a decentralized approach by taking advantage of modern technology and communication. In Wright's vision, each family lived on one acre of land and had some level of agricultural land associated with it. While Broadacre City was never realized, it deepened the relationship between the goals of society and the built environment.

Figure 6: Frank Lloyd Wright's Broadacre City (Frank Lloyd Wright Foundation, 2018)

Not all planning diagrams were utopian visions of entire cities. In 1961, Kevin Lynch released his seminal book *The Image of the City* (1960) which catalogued how observers imagine the city they live in. The study took place over a five-year in the cities of Boston, Jersey City and Los Angeles. Lynch showed that individuals created mental maps when conceiving of their cities, presented as five basic elements: paths, edges, districts, nodes and landmarks. Lynch is highly regarded as a pioneer in the creation of urban design principles and his work re-imagined the role of people in the creation of urban spaces.

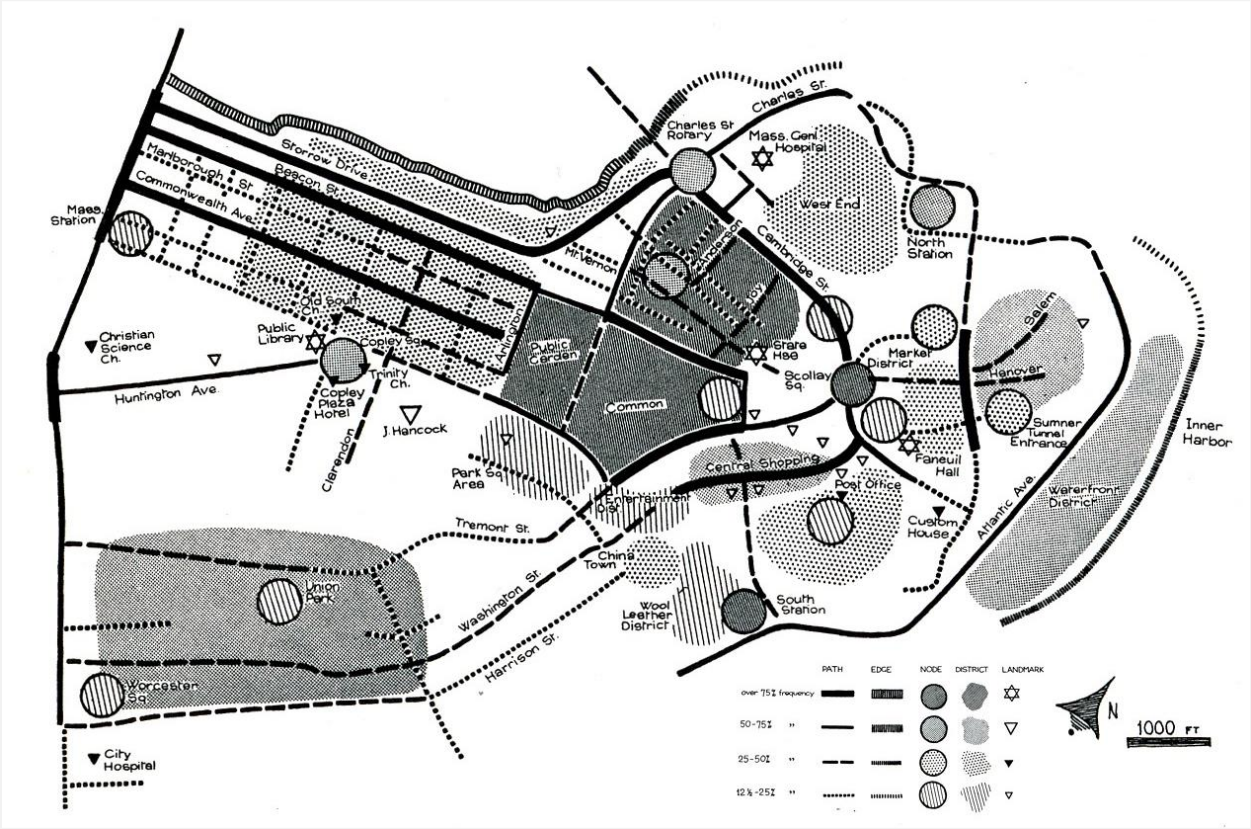


Figure 7: A mental map of Boston from Kevin Lynch's Image of the City (Lynch, 1960)

The *urban to rural transect* diagram (Fig 2) is one such diagram that has been developed for form-based zoning practices. The diagram identifies a series of environments and conditions from wild nature to the urban core and proposes that planning policies and human habitats change

based on their level and intensity of urban character (Duany & Talen, 2002). The urban to rural transect has been a key theory for those creating and implementing form-based zoning ordinances and can be seen in many planning policies in various jurisdictions. Notably absent from the many expressions of the urban-to-rural transect is industrial development or industrial typologies. In some versions of the diagram, a seventh *special district* is included to cover uses that do not fit within the transect, but it exists outside the transect gradient and does not share the same properties as the other zones.

As such, form-based zoning policies and ordinances have predominantly been applied to residential or commercial neighbourhoods or those that can readily accept a form-based typology but rarely are they found in other types of development.

2.6 Chapter Summary

This literature review sought to encompass four topics to better understand industrial land use and the concepts that influence it. In seeking this understanding, the literature review showed the complex relationship between industry and cities, going back centuries. This tumultuous relationship has significantly influenced urban settlements and continues to impact the makeup of cities to this day. From its beginnings in the Industrial Revolution, rapid postwar expansion and subsequent deindustrialization, no other land use has had similar implications on the makeup of cities. In terms of land use planning, industry is credited with providing the impetus for the first land use controls. From its beginnings, zoning was implemented to maintain the separation of land uses in response to nuisance and public harm. The desire for more livable urban environments pushed zoning to change and several movements, including New Urbanism, Smart Growth and efforts in sustainability, fostered the creation of new zoning frameworks like form-

based codes. However, where zoning adapted and changed how we plan for housing and commercial land uses, the same cannot be said for industrial land use. Recently, planners have begun to question the absence of industry and the important role that it plays in both the local and global economy. Several cases have shown a desire to recognize the concept of industrial urbanism as a positive factor in the continued revitalization of urban settlements, specifically in North America. And lastly, the use of illustrative models, often used to communicate the ideals of complex land use planning goals, have held a unique role in both planning academia and practice.

At the implementation level, there is little evidence of well documented zoning tools for supporting and sustaining urban industrial development. To further this area of study, an analysis of CentrePort Canada's planning documents was conducted, and interviews with currently practicing planners, developers and real estate professionals were undertaken to gain a deeper understanding of CentrePort and the planning practices currently being undertaken which will further acknowledge the role of industry in the urban landscape.

3 CentrePort in Context

3.1 Introduction

This chapter provides further understanding of CentrePort from a spatial, logistical, planning, and governance perspective. This section also outlines the regional context of Winnipeg as the urban centre most closely associated with CentrePort and the Winnipeg Metropolitan Region. While CentrePort is not located within an urban setting or an urban jurisdiction, its intended use and proximity to the City of Winnipeg allow an exploration of similar themes.

CentrePort is best described as an inland port industrial district specializing in freight, transportation and logistics operating as a special planning area under Manitoba's Planning Act. More broadly, CentrePort can be described as a regional industrial district situated on rural land at the edge of the City of Winnipeg. It lies within the Winnipeg Metropolitan Region straddling two municipalities, the City of Winnipeg and the Rural Municipality of Rosser. CentrePort's development plan indicates a wide variety of potential development within the Inland Port Special Planning Area designation, including heavy industrial, manufacturing, rail services, commercial, retail and service based industrial uses. Upon the realization of a full build out, CentrePort will largely become an extension of currently existing industrial, commercial and residential districts of Winnipeg.

Directly important to this research practicum is the specific legislation and jurisdictional qualities that are specific to the Inland Port Special Planning Area, which have allowed for the novel concepts and planning policy that are the subject of this study.

3.2 Rosser CentrePort Context

CentrePort is the largest inland port in North America (by area) and Canada's first and only tri-modal (air, rail, truck) inland port and foreign trade zone (FTZ). Centrally located at the crossroads of east-west and north-south transportation and trade corridors, CentrePort sits at the centre of both Canada and North America and is intended to capitalize on Winnipeg's geographic location and leverage Manitoba's role as a hub for international trade.

CentrePort Canada has also positioned itself as a driver of regional interest and economic development with a partnership in the Winnipeg Metropolitan Region and various cross-jurisdictional boards and interest groups. Using its geographic location, FTZ status, and single window planning and land use approving authority, CentrePort positions itself as a strong economic development opportunity for the Province of Manitoba, the City of Winnipeg and the Rural Municipality of Rosser, as well as providing additional investment opportunities for private businesses and corporations that choose to locate within the area.

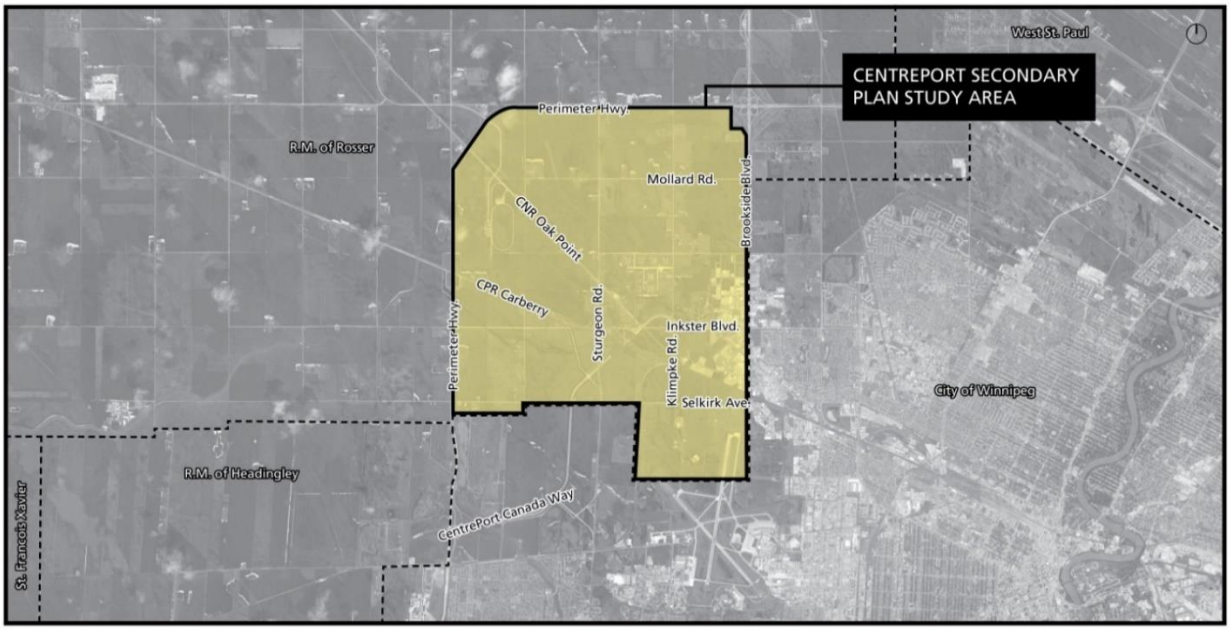


Figure 8: CentrePort regional setting map (Rosser, 2014, p.9)

The entire CentrePort area is shared between the Rural Municipality of Rosser and the City of Winnipeg. The area known as the Inland Port Special Planning area is roughly 11,000 acres (4,450 ha) and located in the south east corner of the RM of Rosser. The area is bounded by the Perimetre Highway (PTH #101) to the north and west, Brookside Boulevard (PTH #7) to the east and the City of Winnipeg and James Armstrong Richardson International Airport to the south. Previously, the lands known as CentrePort were identified as rural agricultural, airport industrial and highway commercial (SIPD, 2002). As such, there are many non-industrial land uses including single-family dwellings and recreational uses. As of the writing of this practicum, only the north half of CentrePort (in Rosser) is actively being planned. The southern half (Winnipeg) is slated for development and is currently undergoing a planning process.

CentrePort is marketed as the only inland port in Canada to feature direct access to the provincial/national highway system, three Class-I rail carriers (Canadian National, Canada Pacific and Burlington-North Sante Fe), and 24-hour access to an airport that supports 24-hour freight service. In anticipation of increased truck traffic and goods movement, CentrePort Canada Way (PTH 190) was officially completed in November of 2013 and establishes a 9.1 km, four-lane divided roadway through CentrePort improving access to the TransCanada HWY.

As of 2017, the first phase of water, wastewater and utility servicing was installed for the portion of CentrePort found in Rosser. This was accomplished in part through a multi-partner servicing agreement with surrounding municipalities and the City of Winnipeg. Servicing continues to be a major stepping stone for current and potential development within the area (CentrePort Canada, 2017). As of the writing of this practicum, CentrePort has attracted 44

private companies totaling over 250 acres of new development, representing more than $220 million in private investment into the provincial economy (CentrePort Canada, 2017).

3.2.1 History

The history of CentrePort is closely tied to that of Manitoba's capital city, Winnipeg. As an early gateway to Canada's west, Winnipeg was one of the fastest growing cities in the early 20th century (Siliscz, 2010). By 1921, Winnipeg was the centre of Canadian commerce with important commodity exchanges operating out of the downtown Exchange District (now a National Historic site) and a population of 179,000, making it Canada's third largest city (Siliscz, 2010). With a central geographic location and access to major railroad networks, Winnipeg was strategically located for trade and was projected to rival the population and size of Canada's other large cities. However, the completion of the Panama Canal in 1914 drastically shifted the economic landscape of North America. By allowing ocean-faring vessels to cross from the Atlantic to the Pacific, the need for land transportation was significantly reduced. Winnipeg was no longer a major stop for east-west travel in North America, and as such, growth slowed.

Winnipeg's advantageous geographic location was not so easily forgotten, and several initiatives sought to capitalize on this. As a direct predecessor to CentrePort, WinnPort was the most recent venture seeking to entrench Winnipeg as an international hub of transportation and goods movement. With a consortium of companies from Winnipeg and exclusive freight movement rights between Canada and China, WinnPort was an ambitious plan to capitalize on Winnipeg's strategic trading location. Proponents also identified the vacant lands near Winnipeg's airport as a potential logistics centre. The project ultimately stalled when no additional third-party air cargo carriers signed on (Kirbyson, 2007) and was officially shelved shortly thereafter.

Like many other landlocked cities in North America, Winnipeg is acknowledging the potential that an inland port holds. Regina, Calgary and Edmonton are all pursuing inland ports, increasing competition and driving Winnipeg to develop and support its own transportation hub. Similarly, in the United States, intermodal and rail transportation has steadily become the fastest growing transportation mode and as a result, many inland ports have been established throughout the mid-west.

One of the most successful inland ports in the United States is AllianceTexas near Fort Worth, TX. AllianceTexas boasts a similar set of features to CentrePort as a master planned district featuring over 26,000 total acres of mixed-use development anchored by the world's first industrial airport. It also features access to BNSF's Intermodal Rail Facility, two Class I rail carriers (BNSF and UP), a foreign trade zone, and direct access to Interstate 35W which stretches from Mexico to Canada. Since 1990, AllianceTexas has generated over 48,000 jobs, built over 43 million square feet of developed industrial, commercial and residential space, and created an economic impact of over $69 billion for the North Texas economy (Alliance Texas, 2012).

3.2.2 Legislative Framework

There are two pieces of legislation that have enabled CentrePort, both as an inland port and as a separate planning entity. The first is Bill 47, *The CentrePort Canada Act,* which received royal assent in October of 2008. The bill designates approximately 20,000 acres of land as an 'inland port area' within the vicinity of the James Armstrong Richardson International Airport to serve as a transportation, trade, manufacturing, distribution, warehousing and logistics centre (Province of Manitoba, 2008). Bill 47 also established a not-for-profit non-share capital corporation charged with facilitating the long-term development and continual operations of the inland port. The

corporation is responsible for managing the land use planning and overall development of the inland port, providing business strategies and encouraging investment, and leading its marketing and promotion. Only one month was required between first reading and royal assent for Bill 47 to become law. While this piece of legislation is small in scope, it is indicative of the broad support from all partners in committing the CentrePort site to an inland port use.

As written, the bill doesn't initiate very much in terms of on-the-ground changes, with some describing it as essentially a "plan to make a plan" (Siliscz, 2010, p.126). A large body of work is still required to find the success that is being envisioned for the site.

Part of the additional work was requiring an amendment to the province's planning legislation that would enable the features that CentrePort now promotes. In the fall of 2016, *The Planning Act Amendment (Special Planning Areas)* or *Bill 13,* was officially adopted and rounds out the legislative requirements for CentrePort to operate. Bill 13 outlines several key powers: it creates the *Inland Port Special Planning Area* (IPSPA) for the portion of the land found within the RM of Rosser; it establishes the Inland Port Special Planning Authority to act as planning authority for the inland port; it allows for the creation of the *Inland Port Special Planning Area Regulation* which contains the CentrePort Development Plan and Zoning By-law; and it allows for the creation of other special planning areas in Manitoba by ministerial regulation.

Unique to Bill 13 is the role of a special planning area within the provincial and municipal planning framework. Under the new framework, a separate provincially appointed planning authority provides guidance and decision-making power for land use planning decisions respecting subdivision, conditional uses, variances, amendments, and appeals. Other administrative duties including development and building permits are still administered by the local planning district

authority (the South Interlake Planning District). The Inland Port Special Planning Authority is a unique cross-jurisdictional panel made up of representatives from the Rural Municipality of Rosser, The City of Winnipeg, representatives from CentrePort Canada Inc., the Winnipeg Airports Authority and the Province of Manitoba. The Planning Authority is tasked with holding public hearings on planning approvals and provides recommendations to the Minister on matters affecting land use planning within the IPSPA. The *Inland Port Special Planning Areas Regulation* establishes both the Development Plan and Zoning By-law (schedule A and B respectively), which are largely the subject texts of this research practicum.

These changes have created an environment that not only promotes a streamlined development process but a blank slate for which an alternative form of planning can be employed, despite being a large-scale industrial park. While there are many aspects that separate CentrePort as a unique planning entity in Manitoba, little is known about the implications of CentrePort's planning framework and the novel concepts that have been employed there.

3.3 Winnipeg Context

As a regional industrial centre, CentrePort's influence extends beyond the boundaries of the Inland Port Special Planning Area. While the policy documents and land area of CentrePort are not under the jurisdiction of the City of Winnipeg, it nevertheless resides within Winnipeg's central metropolitan area (CMA) and the Winnipeg Metropolitan Region. CentrePort's land use decision making body also contains at least one member from the City of Winnipeg, as well as a member from the Winnipeg Airports Authority, both of which are situated outside the jurisdictional boundaries of the inland port area. This relationship represents the unique multi-jurisdictional position that CentrePort holds within the Province of Manitoba.

For the purposes of this practicum, CentrePort can be considered a part of Winnipeg's industrial land use makeup and further provides an alternate planning and zoning framework with which to draw comparisons from. Additionally, the southern half of CentrePort is contained within the City of Winnipeg and will adhere to a completely different set of land use policies when established. The southern half of CentrePort is also slated to contain a large residential component, south of CentrePort Canada Way and adjacent to new industrial and commercial land uses. While this practicum is not a comparative case study, it is important to understand the geographic and planning context of Winnipeg, to determine the lessons that may be applied through this research. This context is also important for the practicing planners, developers and real estate agents who are deeply entrenched in the planning context of Winnipeg.

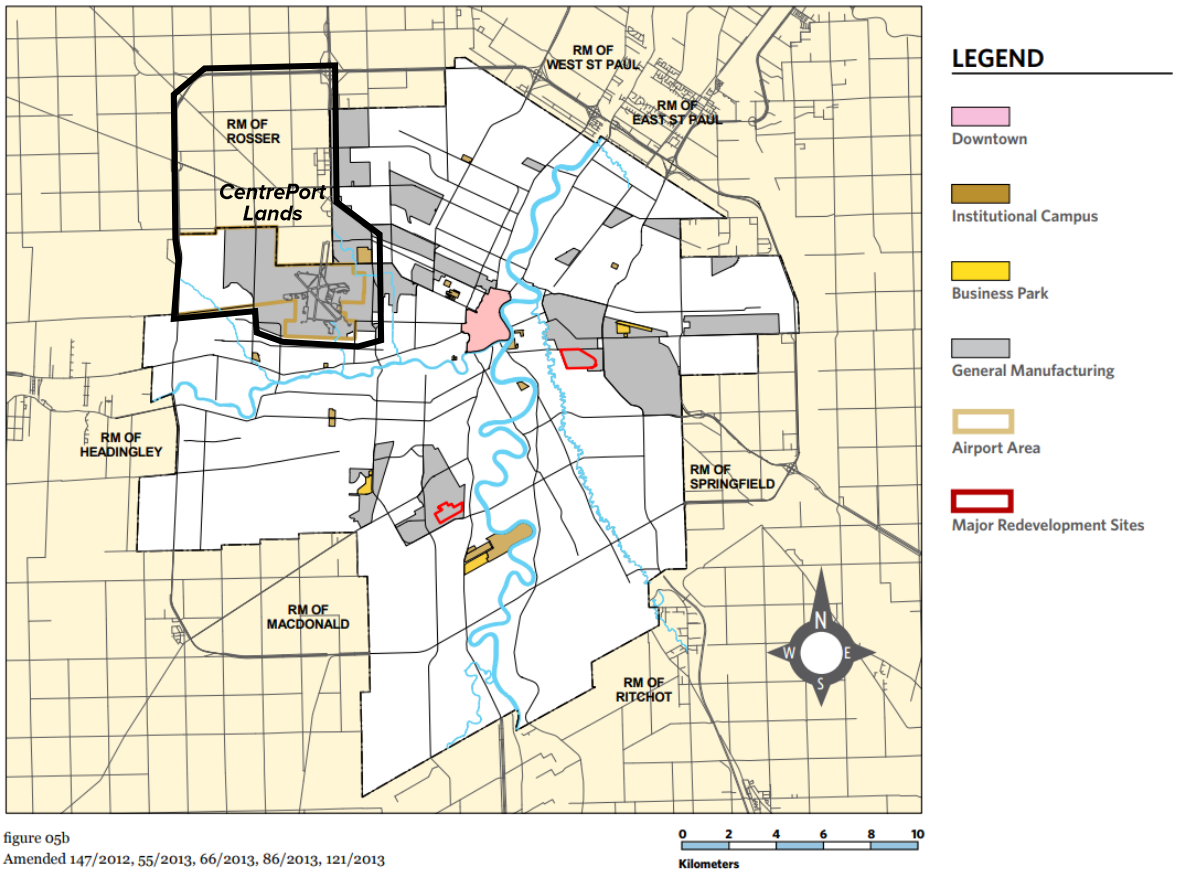


Figure 9: Winnipeg's Employment Lands (The City of Winnipeg, 2011) with CentrePort lands outlined.

Winnipeg's development plan, *Complete Communities,* identifies industrial lands as *Employment Lands* and sets a key direction of "providing a wide range of market opportunities by accommodating new investment and economic development" within the city. There are three types of industrial development including Business Parks, Institutional Campuses, and Manufacturing (General and Heavy) Areas. Winnipeg's employment lands are intended to accommodate an export-based economy as well as a wide range of industrial, specific commercial and institutional uses, which generally support the industrial/business function of its employment areas (Dillon Consulting, Watson and Associates, MDB Insight, Meridian Planning, & Tate Economic Research Ltd., 2017).

Employment lands in Winnipeg are deemed the "economic engine of the city" (The City of Winnipeg, 2011, p.90) and represent a vital component of the city's land-use structure. Employment lands also serve as core drivers of economic development, assessment, net fiscal base and growth potential. Winnipeg stands as the only large regional industrial centre between Toronto and Calgary, meaning it can operate as a centre of business operations for many large companies that also support some of the largest employment bases in the Province. *Complete Communities* sets out four broad directions for Employment Lands:

1. Facilitate the timely delivery of new employment lands to the market;
2. Accommodate new employment land development;
3. Maximize the economic development potential of existing and new employment lands; and
4. Ensure that employment areas are well-planned, sustainable over the long term and fit the community context.

(The City of Winnipeg, 2011)

From a regulatory standpoint, Winnipeg's industrial lands are governed by the *Winnipeg Zoning By-law No. 200/2006*. The zoning by-law establishes four zones for industrial uses, noted in the following table.

Table 1: City of Winnipeg Industrial Zones

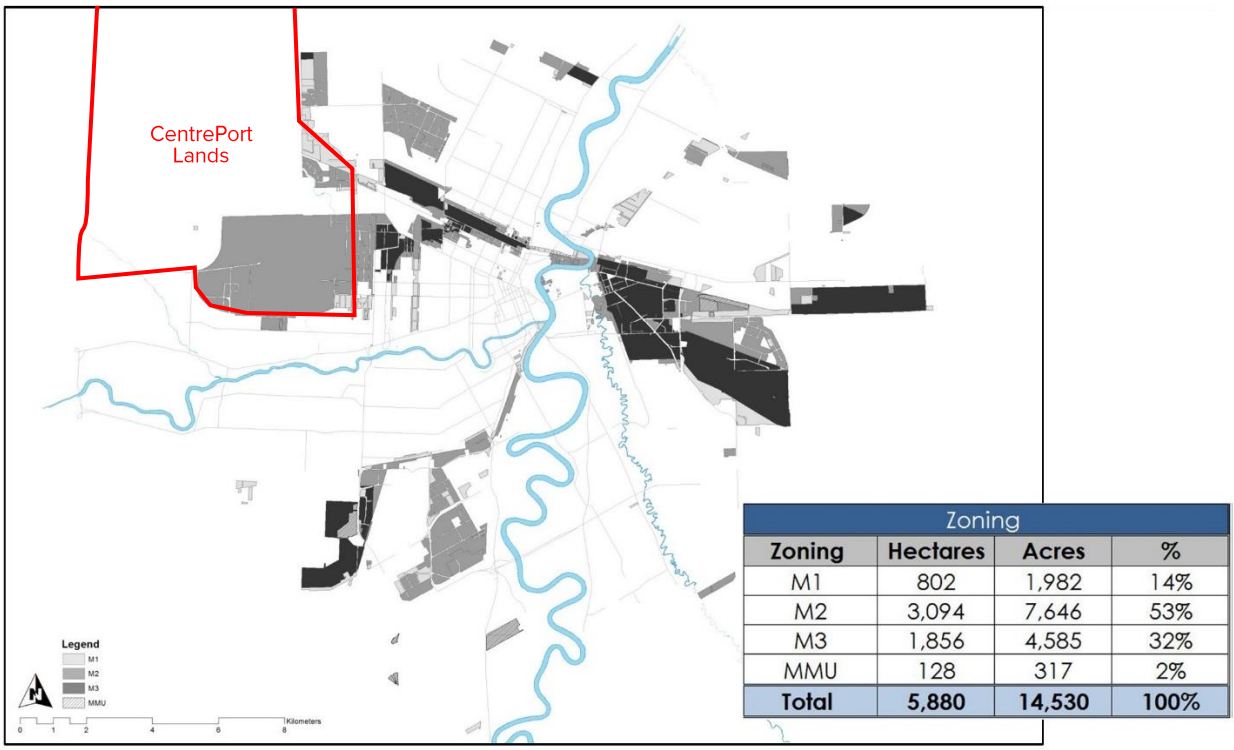
Zone	Description
Manufacturing Mixed-use (MMU)	Intended to provide linked commercial and industrial activities that are supportive of industrial functions and are compatible with surrounding industrial use areas, while allowing more flexibility of uses and requiring a higher standard of landscaping and design.
Manufacturing Light (M1)	Intended to provide for light manufacturing, processing, service, storage, wholesale, and distribution operations with all operations contained within an enclosed building with some limited outside storage.
Manufacturing General (M2)	Intended to provide for light manufacturing, processing, service, storage, wholesale, and distribution operations, with some limited outside operations and storage.
Manufacturing Heavy (M3)	Intended to provide for light or heavy industrial development, including heavy manufacturing, storage, major freight terminals, waste and salvage, resource extraction, processing, transportation, major utilities, and other related uses, particularly those that require very large buildings, frequent heavy truck traffic for supplies or shipments, or that may require substantial mitigation to avoid sound, noise, and odour impacts to neighbouring properties.

(The City of Winnipeg, 2006)

In 2016, the City of Winnipeg initiated an update to its *Employment Land Strategy* to assess the adequacy of the existing and long-term land supply. This study is being conducted in tandem with a review of the City's official development plan, *Our Winnipeg*, to guide growth and change in the city. The final versions of these documents were unavailable at the time of writing this practicum, however, several presentations from the conclusion of the First and Second Phases of

the Employment Lands Study have been made available and provide a snapshot of the most recent information on industrial land use for both Winnipeg and its capital region.

Between 2001 and 2016, the City of Winnipeg saw an annual growth rate of 0.9%, reaching a total population of 735,400 with its CMA reaching 810,900. This represents the eighth largest CMA in Canada. The city grew by roughly 89,500 people over the last 15 years with a population density of 1,566 people per square kilometre. Winnipeg's population is projected to grow to approximately 894,700 people by 2036, with an estimated growth of 1.2% annually between 2016 and 2036 (Dillon Consulting et al., 2017). This data indicates a steady but modest growth scenario for Manitoba's capital city.



Zoning			
Zoning	**Hectares**	**Acres**	**%**
M1	802	1,982	14%
M2	3,094	7,646	53%
M3	1,856	4,585	32%
MMU	128	317	2%
Total	**5,880**	**14,530**	**100%**

Figure 10: City of Winnipeg Industrial Lands (Dillon Consulting et al., 2017) with CentrePort lands added.

Winnipeg's industrial lands are spatially allocated in three concentrations that largely exist along existing rail corridors, in the east, the south west, and the northwest. Most of industrially

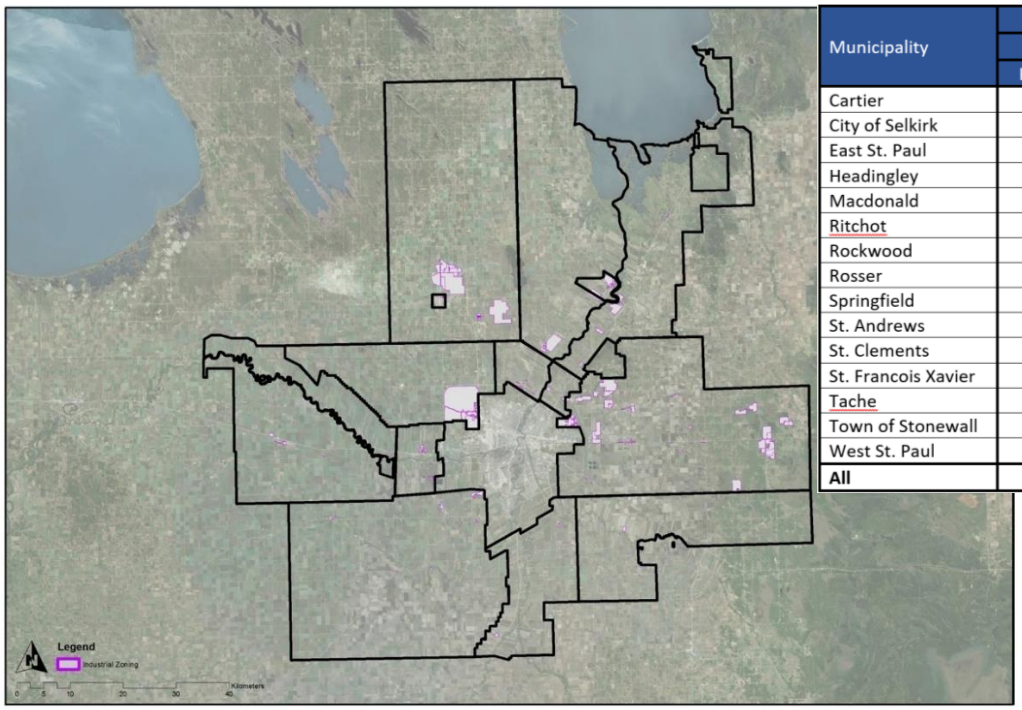
zoned lands fall in the northwest, bordering the Winnipeg James Armstrong Richardson International Airport and CentrePort. Some of the largest tracts of industrial land in Winnipeg are rail yards that do not factor into industrial land use calculations. Over half of Winnipeg's industrial lands are zoned Industrial General (M2), while only 2% are zoned Manufacturing Mixed-use (MMU). Manufacturing Heavy represents another 32% while Manufacturing Light represents 14% (Dillon Consulting et al., 2017). These land use zones represent over 14,500 acres (5,880 ha) of industrially zones lands within the City of Winnipeg.

A core finding of Phase 2 of the Employment Lands Study concluded that Winnipeg contains over 5,700 acres (2,318 ha) of vacant industrial land. Of these vacant employment lands, roughly 67% are un-serviced, leaving only 557 acres (237 ha) of serviced industrial land available. Winnipeg is forecast to add 83,000 jobs over the next 20 years, with 18% of those being in the industrial sector. This translates into roughly 11,260 jobs that will need to be accommodated on serviceable employment lands over the next 20 years. Using a calculation of 22 jobs per hectare, it is estimated that Winnipeg will require roughly 1,265 acres (512 ha) of serviced industrially zoned land over the next 20 years. Using our previous available employment lands total, this would indicate a shortfall of 1,102 acres (446 ha) of serviced industrial land that must be provided if Winnipeg is to remain competitive in the industrial market sector (Dillon Consulting et al., 2017).

Winnipeg's industrial market is the 7th largest in Canada with a current inventory of 77.6 million square feet of gross floor area. The vacancy rate for industrial property sites currently sits at 3.1% (Dillon Consulting et al., 2017).

3.4 Winnipeg Metropolitan Region Context

To promote cooperation and coordinated land use planning, the Winnipeg Metropolitan Region (formerly the Partnership of the Manitoba Capital Region) represents sixteen municipalities which account for more than two thirds of Manitoba's entire population. The municipalities have shown significant growth since the initiative was first established and work together to solve regional matters of importance. Land use is one such matter and efforts have been made to manage and provide guidance on strategic issues including transportation, servicing and utilities, environmental stewardship, economic development and good governance.



Municipality	Zoning		
	Industrial Lands		
	Hectares	Acres	%
Cartier	100	247	1
City of Selkirk	525	1,297	3%
East St. Paul	70	174	0%
Headingley	218	539	1%
Macdonald	246	608	2%
Ritchot	59	146	0%
Rockwood	3,772	9,320	24%
Rosser	4,386	10,839	28%
Springfield	4,739	11,711	30%
St. Andrews	771	1,906	5%
St. Clements	538	1,329	3%
St. Francois Xavier	3	7	0%
Tache	90	223	1%
Town of Stonewall	46	115	0%
West St. Paul	54	133	0%
All	**15,618**	**38,593**	**100%**

Figure 11: Winnipeg Metropolitan Region Industrially Zoned Land (Dillon Consulting et al., 2017).

At this time, a study of the Metropolitan Region's industrial land supply has not yet been conducted, however, as part of Winnipeg's Employment Lands Study, some information exists to help paint a regional picture of industrial land use. The Metropolitan Region contains roughly

38,593 ac (15,618 ha) of industrially zoned land arranged in different intensities and types. The majority (40%) of industrial land in the region is dedicated to aggregate mining or mine claims while a slightly smaller percentage (37%) represents general or heavy industrial land use types.

CentrePort alone represents 28% of all industrial land in the entire capital region and almost all industrially zoned lands in the RM of Rosser are found in CentrePort. This places specific importance on CentrePort as a regional industrial centre. Additionally, competition between the City of Winnipeg and other Capital Region municipalities places an added emphasis on its importance.

3.5 Chapter Summary

CentrePort represents the culmination of a complex set of socio-political, economic and geographic situations. As a regional industrial centre, CentrePort's influence extends well beyond its jurisdictional boundary and will have a profound effect on the City of Winnipeg as well as the surrounding municipalities of the Winnipeg Metropolitan Region. Looking beyond the regional, political and economic aspects of CentrePort, this practicum poses interesting questions that touch upon the theoretical planning implications of such policy. As such, this practicum deals with industrial land use and the implication of CentrePort's planning policy but also acknowledges the context within which it was created and currently operates.

Despite the complexity presented by CentrePort as an entity, this practicum focuses on a specific segment of planning policy and delves deeper into its meaning and potential.

4 CentrePort's Planning Policy

4.1 Introduction

The core purpose of this research is to identify and understand the uncommon application of a form-based zoning ordinance to an urban industrial district and consider the challenges and potential of this alternative style of industrial land use planning. This research seeks to develop an understanding of how and why form-based zoning is being utilized in CentrePort and its potential application to current and/or future industrial developments in Winnipeg. To identify the elements of CentrePort's planning and policy that will direct future development in the area as well as challenges that they may present, this practicum asks the following research questions:

1. ***What lessons can planners learn from CentrePort's planning and zoning?***
2. ***What is the current role of industry in the land use planning framework of Winnipeg?***
3. ***How and in what ways can a conceptual zoning framework better address the needs and current challenges facing urban industrial development?***
4. ***What physical and policy-based planning and/or zoning strategies can cities pursue to apply the principles of industrial urbanism?***

To seek answers to the research questions, the research methodology followed a case study of CentrePort's planning and policy environment. Following a review of the literature on industrial land use planning, an analysis of CentrePort's planning and policy documents was conducted to determine what aspects of form-based zoning have been applied to the CentrePort Special Planning Area, and to explore their purpose, function and impact on planning for the CentrePort case study planning area. Most importantly, the exploration of CentrePort's planning

and policy documents is intended to provide additional knowledge on the hybrid nature of CentrePort and to discover the intent and structure of its overall design.

4.2 CentrePort Document Analysis

As indicated in Chapter 2, CentrePort contains two core planning policy documents; the *Rural Municipality of Rosser CentrePort Secondary Plan By-law 17-14*, and the *Rural Municipality of Rosser CentrePort Zoning By-law 10-14*. These two documents regulate the planning and design of all development within CentrePort. Of these two documents, the CentrePort Secondary Plan serves as the official development planning document of the Inland Port Special Planning Area and provides a vision and direction for the development of the CentrePort Lands. Within the planning hierarchy in Manitoba, secondary plans must be generally consistent with development plans of the local municipality of the planning district. Zoning by-laws are tools used to implement the vision and direction of the development plan or secondary plan and must be generally consistent with any currently adopted policies. As the research reveals, both documents have a direct impact on the planning and zoning for CentrePort as an industrial district.

The lands that make up the Inland Port Special Planning Area fall under the jurisdiction of the South Interlake Planning District (SIPD) Development Plan. Normally, secondary plans are adopted by municipal council and must be generally consistent with their overarching development plan. However, *The Planning Act Amendment (Special Planning Areas)* allows special planning areas to adopt specific policies (development plans or secondary plans) which can be ministerially approved without needing to amend the overall planning district development plan. In this way, CentrePort stands largely independent from the SIPD Development Plan and receives only passing mention within its policy framework.

To conduct the research, both documents identified in this Section were read and scanned for key words, phrases and themes which were generally informed by the literature review. The scope of this research focuses on CentrePort's policy structure and the function of its form-based hybrid zoning model, its intent, and the specific policies or provisions that relate to urban form and aspects of industrial urbanism. The main function of researching these documents is exploratory in nature and effort has been made to analyze and understand these two documents in their entirety to determine the lessons that can be learned.

The following sections include descriptions of each document, information about the document structure, key policy sections and the specific policies and provisions relevant to urban industrial land use planning. This is followed by a summary and analysis of the major themes presented. This summarization begins at the highest level of CentrePort's planning framework with the *CentrePort Secondary Plan By-law 17-14* and then followed by the more detailed *CentrePort Zoning By-law 10-14*.

4.2.1 CentrePort Secondary Plan By-law

The Rosser CentrePort Secondary Plan By-law was officially adopted by the Rural Municipality of Rosser in 2015. Whereas a development plan provides a broad policy framework for development, the function of a secondary plan is to provide a finer level of detail concerning land use policy and intent. According to Section 12(5) of *The Planning Act* of Manitoba, the minister may make regulations respecting the land use planning for special planning areas including the creation of secondary plans and/or zoning by-laws (Province of Manitoba, 2005). Section 63(1) of *The Act* details the matters which may be included in a secondary plan including:

a) Anything dealt with in the local development plan;

b) Policy concerning subdivision, design, road patterns, building standards or other land use and development matters; or
c) Respecting economic development or the enhancement or special protection of heritage resources or sensitive lands.

(Province of Manitoba, 2005)

The Secondary Plan (and Zoning By-law) was created by Placemakers LLC and MMM Group Ltd. in close collaboration with the Province of Manitoba and the Rural Municipality of Rosser and cost shared between the Province of Manitoba and the Rural Municipality of Rosser. The Plan was created in close consultation with current residents, local landowners, and business owners currently operating in the CentrePort area. The CentrePort Secondary Plan provides policies to guide future land use and development and sets out to achieve the following objectives. It:

- Provides a vision for the future of development of the plan area that is consistent with the overall objectives of CentrePort Canada to become an inland port (rail, trucking and air cargo connections).
- Maximizes the benefit of the plan area's close proximity to the airport and railway networks.
- Demonstrates connectivity between the plan area's close proximity to the airport and railway networks.
- Demonstrates connectivity between the plan area and other areas within CentrePort and the adjacent lands in the R.M. of Rosser and the City of Winnipeg.
- Identifies various industrial uses and intensities to guide the Rosser CentrePort Area Zoning By-law.
- Provides direction for establishing future commercial centres, where local services will be directed. Identifies the general location of future arterial and collector roads, Active Transportation Corridors, and facilities that connect well with the surrounding infrastructure needs.
- Identifies a road hierarchy that will facilitate the establishment of Walkable Streets, Active Transportation Corridors, and Industrial Corridors, which is consistent with the Rosser CentrePort Zoning By-law.
- Provides Policy direction for transitional uses in the plan area.
- Outlines the logical phasing of development consistent with future anticipated municipal services.

(Rosser, 2015, p.9)

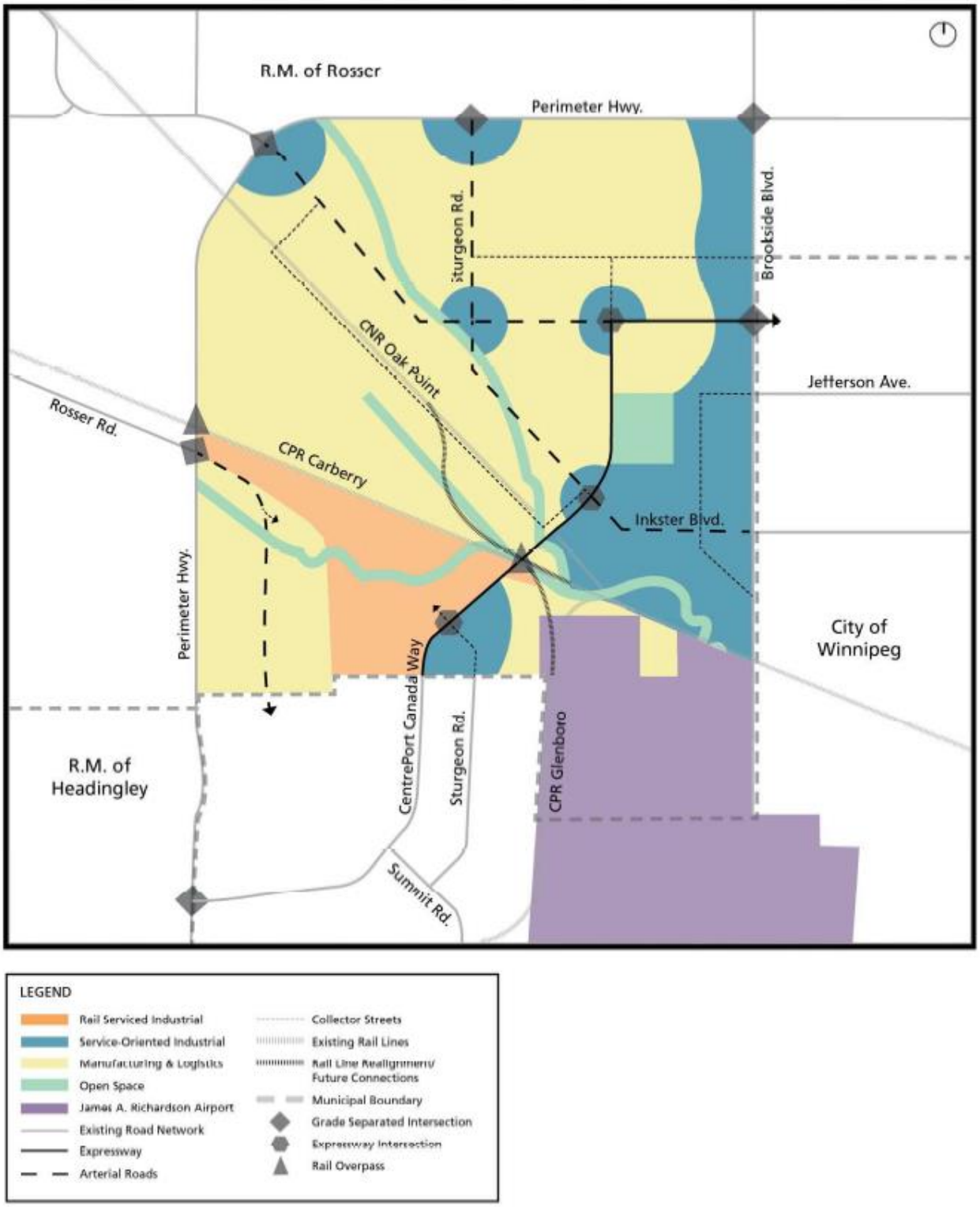


Figure 12: CentrePort Land Use & Transportation Map (Rosser, 2015, p.41)

The table in **Appendix A** outlines the Rosser CentrePort Secondary Plan policy structure and includes the major policy section headings, sub-headings, and descriptions of the various policy sections found within the document. Each section includes the broad intent of the policy section and notable policy implications present in each section.

There are four main land use designations within the Secondary Plan that relate directly to the intent and permitted uses anticipated to develop the site. Three maps are included and form part of the Secondary Plan. The maps provide further detail regarding specific land use and transportation networks, transportation overlays, and municipal servicing. In addition to the land use maps, the Secondary Plan also includes conceptual images and example site plans to support its urban design and landscaping policies, however, they do not form part of the by-law and are for illustrative purposes only.

As the scope of this research concerns CentrePort and its operation, this assessment includes all policy sections relevant to industrial land use planning. The following sections include examples of some of the relevant policy statements and strategies related to urban design and industrial urbanism that are unique to CentrePort and its function as an inland port. Important points have been <u>underlined</u> for emphasis.

2.0 Guiding Policies

Section 2.2 – General Principles

- To support businesses that are suited to a location that would benefit from tri-modal services including: Class 1 railroads, a 24/7 international airport and the majority of Winnipeg's trucking companies.
- To enable the establishment of Foreign Trade Zones (FTZs) on a parcel of land or within a building as warranted, subject to the federal requirements for establishing these zones.
- To protect and respect the natural environment and all it encompasses, by reinforcing the sustainable development measures outlined in this Secondary

Plan and the Sustainable Development Standards included in the R.M. of Rosser CentrePort Zoning By-law.

- To allow for the cost-effective installation or extension of municipal services and the provision of adequate drainage facilities within, into and throughout the plan area in a manner that is responsive to the rate of development and to market demand for serviced lands.

(Rural Municipality of Rosser, 2015, p.10-11)

Section 2.3.3 – Sustainability Policies

- The Zoning By-law outlines a minimum number of points (based on a points system) that each development application must attain in order for their application to be processed.

(Rural Municipality of Rosser, 2015, p.11)

Section 2.5.2 – Existing Development Policies

- Industrial development locating in the vicinity of existing uses shall be subject to a minimum setback distance to the building, as established in the Rosser CentrePort Zoning By-law. This will help ensure that some separation of uses occurs but does not negatively impact the amount of land that can be developed for industrial uses.
- Industrial site designs, for new industrial uses, should attempt to reduce the potential impact on nearby existing uses. This may include:
- Locating key access points onto the industrial site away from the existing property.
- Impacts on existing sensitive uses shall be mitigated by requiring that industrial uses conform to performance standards outlined in the Zoning By-law for noise, odour, dust and other nuisance effects.
- Incorporating fencing, a tree line or earthen berm on the industrial site, adjacent to the property line of the existing use, to screen or separate land uses.

(Rural Municipality of Rosser, 2015, p.13-14)

While not explicit in their industrial policy schema, the Guiding Policies broadly outline the intent of the CentrePort area as an inland port and contain several policies directed toward sustainability and compatibility between industrial and currently existing uses. Mutual buffer zones are present in Section 5.2.5 that both protect existing dwellings and future industrial developments in the area. As shown, the intent of the special planning district is self-evident. The

nature of CentrePort as a purely industrial and/or commercial district is also apparent wherein the provision for new residential dwellings is prohibited.

3.0 Land Use Policies

Section 3.1.2 – *Service-Oriented Industrial Policies*

- The lighter industrial uses should be directed to key transportation routes and intersections, with more moderate industrial uses generally directed to the internal areas.
- Industrial uses located in the vicinity of commercial notes must be compatible. If they are not, they shall incorporate the use of buffers or other mitigated solutions into their site design to reduce their impact.
- Heavy industrial uses are prohibited in and adjacent to commercial nodes.
- Vehicle oriented retail and services may be considered where their operation or site requirements do not align with the commercial node and retail policies of section 3.1.3.
- Commercial and retail development, other than vehicle-oriented retail and services or other specific exceptions identified in the R.M. of Rosser CentrePort Zoning By-law, must be located within a commercial node.

(Rural Municipality of Rosser, 2015, p.15)

Section 3.1.3 – *Commercial Nodes and Retail Policies*

- Commercial nodes will be directed to strategic locations within the Service-Oriented Industrial designations, subject to the appropriate zoning.
- Commercial nodes should be directed to areas easily accessible and visible from main transportation corridors. Commercial nodes should be predominantly located near major intersections that are well-connected to the active transportation network.
- Applications to establish commercial or retail development must be supported by a Commercial Node Concept plan which includes, at a minimum, a walkable street, the proposed public and private transportation network, proposed access, conceptual building location and parking.
- All land owners within the commercial node must be given the opportunity to participate in the development of and to comment on the proposed Commercial Node Concept plan.
- Commercial nodes will include a street that is flanked on both sides by on-street parking, sidewalks and commercial buildings that are oriented to the street. The minimum length of this street is approximately 500 feet. Buildings developed along the street should have minimal building setback distance, as established in the Zoning By-law.

- Mixed-use buildings may be permitted in commercial nodes. The retail side of a mixed-use building should front a public or walkable street.

(Rural Municipality of Rosser, 2015, p.15-16)

Section 3.2.2 – *Manufacturing and Logistics Industrial Policies*

- Industrial uses that may generate higher levels of nuisance in compliance with performance standards shall be directed to areas designated Manufacturing and Logistics Industrial.
- Heavy industrial uses within the Manufacturing and Logistics Industrial designation shall incorporate buffers and other mitigating measures into their site design when located adjacent to lighter industrial uses, natural waterways, public open spaces and existing residential dwellings.
- Un-serviced development should be clustered to allow for efficient provision of access to municipal services, such as fire protection.

(Rural Municipality of Rosser, 2015, p.18)

Figure 13: Sample Commercial Node (Rural Municipality of Rosser, 2015, p.17)

Section 3.4.2 – *Open Space Policies*

- Landowners are encouraged to incorporate private passive open space into development sites to support the needs of employees.

- Development built adjacent to public Open Space designations may be required to incorporate fencing, tree lines, earthen berms, or other features on the industrial site to reduce any potential noise impacts.

(Rural Municipality of Rosser, 2015, p.20)

CentrePort's Land Use policies further separate it from conventional industrial districts, both in its land use designations and design-based policies. Of specific note are the commercial node policies, where light industrial, commercial and retail uses will be clustered. Clear policies are provided to maintain the commercial nature of these nodes including specific requirements concerning the requirement of a node concept plan, minimal setbacks and a provision for mixed-use developments. The Land Use Policies are also clearly tied to the Transportation Policies found in Section 4– a significant difference between conventional industrial land use planning where public right-of-ways typically fall outside the bounds of a secondary plan or zoning by-law.

The Manufacturing and Logistics and Rail Serviced Industrial Policies contain few policies concerning design but do provide adequate measures of mutual separation and buffering that protect both the more intense industrial land uses and the uses that are being separated.

4.0 Transportation Policies

Section 4.1.2 – *General Transportation Policies*

- Roads throughout the plan area must provide access for long combination trucks. Turning radius will be considered in all road and private approach designs. Walkable Streets and approaches from Walkable Streets may be designed to a different standard, provided an alternative means of access is available that will accommodate long combination trucks.
- Individual development projects are required to accommodate future road connections at strategic locations to provide seamless connections to future development.
- Roads and sidewalks shall include wheelchair accessible curb cuts, visually accessible ground treatments and signage. City of Winnipeg roadway standards and Universal Design Guidelines provide information on accessibility needs.

(Rural Municipality of Rosser, 2015, p.21)

Section 4.4.1 to 4.4.3 – *Street Overlay Policies*

- Landscaping along Industrial Streets should be designed to assist in defining the street, but the primary consideration of their design should be the safe and efficient movement of large industrial trucks and service vehicles.
- Development fronting on an Active Transportation Corridor will be expected to provide additional landscaping or a site design that helps to create an appealing environment for the active transportation facility.
- Walkable Streets will be identified as part of the development application process to establish a commercial node.
- Sidewalks and on-street parking shall be included on both sides of the [Walkable] street.
- A minimum length of Walkable Street should be identified to ensure that it is sufficient to create the desired comfortable pedestrian environment. The desirable minimum length is approximately 500 feet (152.4 m), with a maximum length determined during road design.
- An urban streetscape should be encouraged with minimal building setbacks and parking directed beside, or preferably behind buildings [on a Walkable Street].
- Street trees and pedestrian amenities should be used to create and reinforce the human scale of the street and add to pedestrian comfort.

(Rural Municipality of Rosser, 2015, p.26-27)

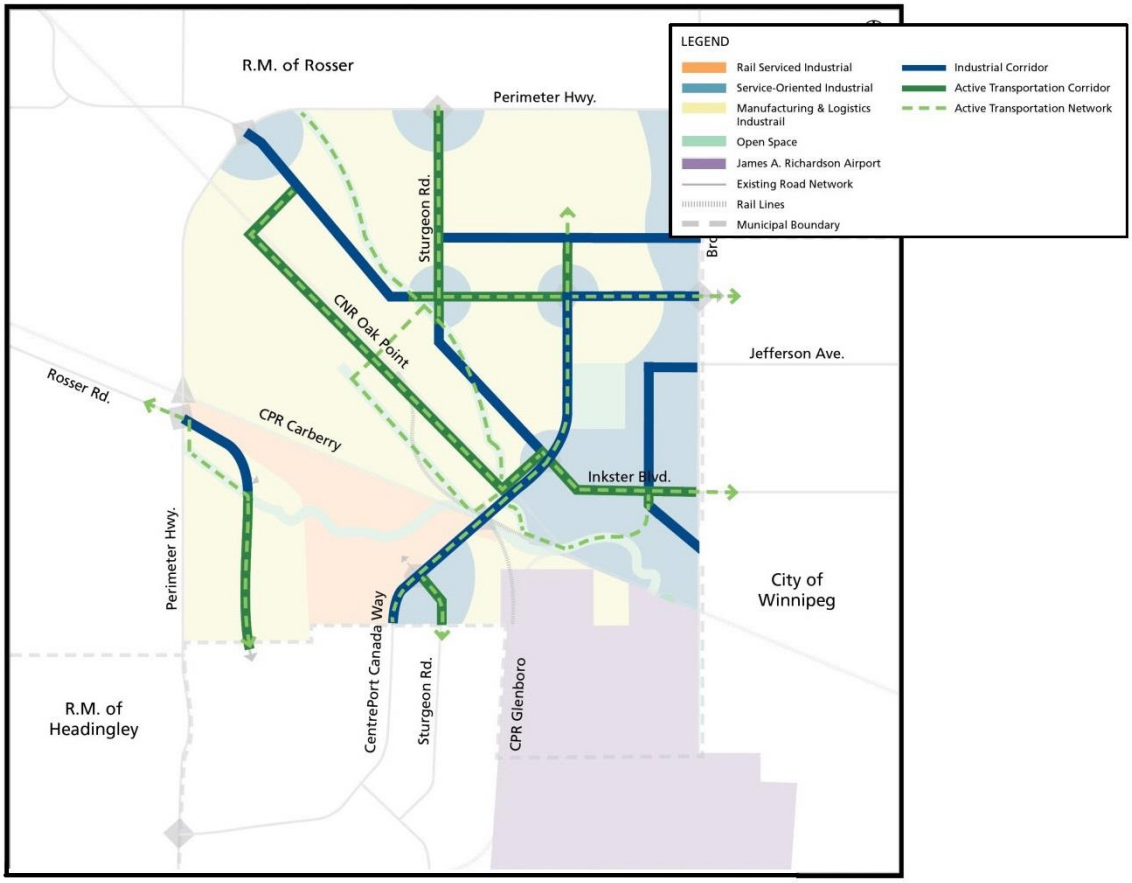


Figure 14: Transportation Overlay Map (Rural Municipality of Rosser, 2015, p.21)

Section 4.6.2 – *Active Transportation Policies*

- AT crossings between streets to reduce pedestrian trip length and provide alternatives to local streets should be considered as necessary to facilitate convenient and direct connections to destinations, open spaces and transit routes.
- AT facilities within a road right-of-way must be provided as a separate transportation facility. Where possible, a land drainage facility or open space must be provided between the vehicle lanes and the AT facility. Where this is not possible, a physical barrier should be provided to separate motorized vehicles from AT facilities.

(Rural Municipality of Rosser, 2015, p.27)

CentrePort's Transportation policies are closely tied to its Land Use policies and place significant design requirements on the public realm found in both Walkable Streets and Active

Transportation Corridors. Specifically, a Walkable Street is required as part of the concept plan for a commercial node application. There are also several policies that highlight and improve the pedestrian experience, including the use of curb cuts for accessibility. There is, however, a strong drop off in terms of policy requirements when going from a Walkable Street Overlay to an Industrial Corridor Overlay whose primary focus is the movement of goods and industrial traffic. The policies found in this section are reminiscent of conventional industrial district policies.

5.0 Urban Design and Landscaping

Section 5.2 – *Urban Design and Landscaping Policies*

- The commercial centre buildings, especially those that flank a Walkable Street, shall achieve a higher standard of urban design quality for the buildings.
- The R.M. of Rosser should develop streetscaping guidelines that guide the design of storefronts, signage and landscaping. Development agreements may require landowners to supply elevation drawings of proposed storefronts and building façade drawings to ensure they adhere to the streetscaping guidelines.

(Rural Municipality of Rosser, 2015, p.31)

Section 5.2.1 – *Urban Design and Landscaping Policies for Service-Oriented Industrial*

- Active storefronts will be required to enhance the pedestrian experience, if along a Walkable Street.
- Along Walkable Streets, buildings should be designed to contribute to the enclosure of the Walkable Street.
- Developments should incorporate inviting sidewalks, sitting areas, multi-use paths, bike lanes, and landscaping measures to support pedestrian and commercial activity.
- Buildings located within the Walkable Street overlay shall have a more urban form to accommodate commercial, retail, office or other mixed-use activity.

(Rural Municipality of Rosser, 2015, p.32)

Section 5.2.2 – *Urban Design and Landscaping Policies for Manufacturing and Logistics Industrial*

- Buildings may be up to three stories in height and located with a portion of their frontage at or near the sidewalk. Ground activity ranges from industrial to manufacturing uses.
- Ground floor industrial activities, including loading docks and front yards, may shape the streetscape.

(Rural Municipality of Rosser, 2015, p.33)

Section 5.2.3 – *Urban Design and Landscaping Policies for Rail Serviced Industrial*

- Buildings will have ground floor frontages, including loading docks, storefronts and front yards that will shape the utilitarian streetscape.

(Rural Municipality of Rosser, 2015, p.33)

Section 5.2.4 – *Urban Design and Landscaping Policies for Street Trees*

- Street trees will reinforce the human scale and will be planted to provide shade for pedestrians along Walkable Streets and Active Transportation Corridors.
- In the Rail Serviced Industrial designation, street trees may be present on the perimeter streets to spatially define and buffer those streets from other uses while accommodating the needs of large service and delivery vehicles.

(Rural Municipality of Rosser, 2015, p.33)

Lastly, the Urban Design and Landscaping policies provide further clarification of the specific design qualities that are required for the specific land use designations. As with the other major policy sections, the requirements are most intense within the Service-Oriented Industrial designation and include required enhancements to buildings if on Walkable Streets and suggest specific amenities like seating, street furnishing, bike lanes and landscaping to amplify the pedestrian experience. Provisions for street trees are also included along Walkable Streets and Active Transportation Corridors providing shade and comfort for pedestrian or those using active transportation.

4.2.2 CentrePort Zoning By-law

The Rosser CentrePort Zoning By-law No. 10-14 was officially adopted in 2015 and represents the first zoning by-law for a special planning area in Manitoba. The Zoning By-law was conceptualized and created by Placemakers LLC and MMM Group Ltd. prior to the creation of the Secondary Plan for the CentrePort area.

A zoning by-law is a tool used to implement the objective and policy statements found in development plans and secondary plans. They contain enforceable regulatory statements that govern the use of buildings as well as the location and form of buildings. CentrePort's zoning by-law is used to implement the objectives and policies of the Rosser CentrePort Secondary Plan and goes one step further in requiring additional attention be paid to the public realm.

Much of CentrePort's Zoning By-law contains standard features found in many zoning by-laws across Manitoba. There are, however, several key differences enabling the form-based aspects outlined by the objectives and policies of the Secondary Plan. The table in **Appendix B** outlines the Zoning By-law's general structure and provides descriptions of the major parts contained therein.

The Rosser CentrePort Zoning By-law covers a broad range of development regulations including the form-based regulations that dictate CentrePort's various land use zones. It also contains specific use provisions and standards that affect the implementation and typology of development within the inland port.

As mentioned in the previous section of this chapter, the analysis of CentrePort's planning documents intends to review all provisions relevant and specific to industrial land use planning. The following sections include examples of the provisions related to urban design and industrial urbanism that are unique to CentrePort and its function as an inland port. Because zoning by-laws are regulatory in nature, the provisions of this by-law are not explicit in their intent toward industrial urbanism and provide regulations for all forms of development.

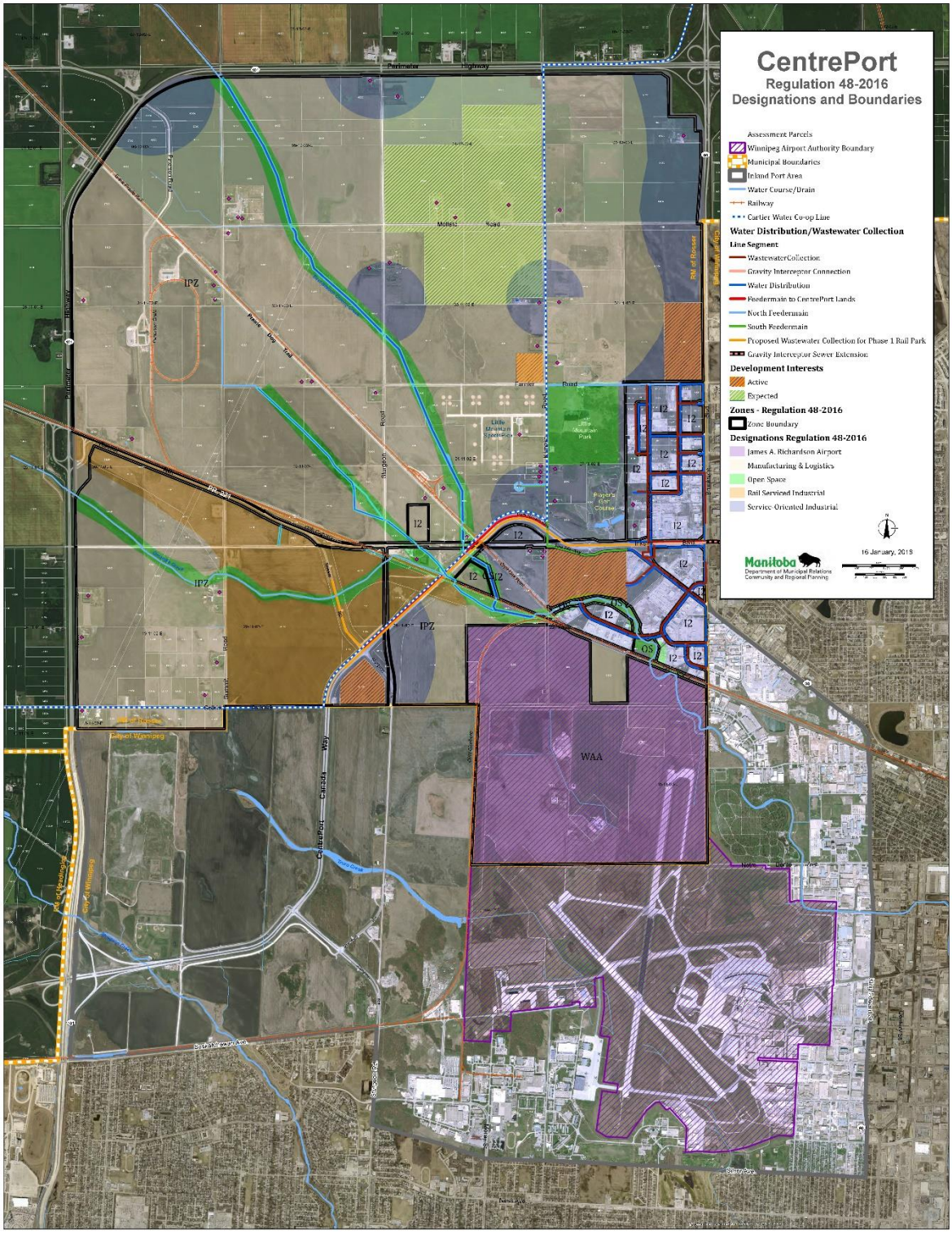


Figure 15: Rosser CentrePort Designations and Zone Boundaries Map (Province of Manitoba, 2018)

PARTS I and II of the CentrePort Zoning By-law contain the administrative, interpretive and definitional sections of the By-law. These parts are common pieces found in every zoning ordinance in Manitoba and contain no special requirements. Of note is the absence of any provisions regarding *conditional uses*. Conditional uses are permitted uses, subject to conditions set by the planning authority. Conditional uses require a public hearing be held by the planning authority to receive representations from the public prior to any approval being given.

The following sections include examples of some of the relevant regulatory statements related to urban design and industrial urbanism that are unique to CentrePort and its function as an inland port. Important points have been <u>underlined</u> for emphasis.

PART III – GENERAL PROVISIONS

5. *Buffering Existing Residences*

New industrial structures in the different industrial zones shall be separated from existing residential structure by the following distances: *Industrial Centre* Zone (I1) – 100 feet (30.5 m); *Industrial General* Zone (I2) – 200 feet (61 m); *Industrial Heavy* Zone (I3) – 500 feet (152.4 m).

14. *Parking and Loading*

(5) Location

b) Active Transportation Corridors shall have 30% of the Block length comprised of shopfronts, common entry frontages and common yards. On-site parking may be located on the side of the building for the remainder of the lot width.

c) Walkable streets shall have 80% of the block length comprised of shop fronts of common entry frontages.

(The Rural Municipality of Rosser, 2015, p.22, 29)

PART IV – ZONES

3. Uses

(2) Table 1 – Use and Parking

Of note in CentrePort's use table is the elimination of conditional uses and a sharp reduction in the total number of land uses.

Table 1 – USE AND PARKING

Emp = employee *n/a = not applicable* *1000 ft²(93 m²) of gross floor area*

LAND USE		Industrial Centre I1		Industrial General I2		Industrial Heavy I3		Open Space OS	
		P/X	Parking	P/X	Parking	P/X	Parking	P/X	Parking
Accessory Buildings, Structures and Uses		P	0	P	0	P	0	P	0
Accommodations		P	1/room	X	n/a	X	n/a	X	n/a
Agricultural Activities		P	0	P	0	P	0	X	0
Billboard		X	n/a	P*	n/a	P*	n/a	X	n/a
Emergency and Protection Services		P	1/3 emp	P	1/3 emp	P	n/a	X	n/a
Industry	*Aggregate Extraction*[1]	X	n/a	X	n/a	P*	1/3 emp	X	n/a
	Anhydrous Ammonia	X	n/a	X	n/a	P*	1/3 emp	X	n/a
	Animal Processing	X	n/a	X	n/a	P*	1/3 emp	X	n/a
	Light	P*	1/3 emp	P*	1/3 emp	P*	n/a	X	n/a
	General	X	n/a	P*	1/3 emp	P*	1/3 emp	X	n/a
	Heavy	X	n/a	X	n/a	P*	1/3 emp	X	n/a
Office		P	2/1000 ft²	X	3/1000 ft²	X	n/a	X	n/a
Open Space		X	0	P	0	X	0	P	0
Parking		P	n/a	P	n/a	P	n/a	X	n/a
Residential		X	n/a	X	n/a	X	n/a	X	n/a
Restaurant	*Full-service*	P	3/1000 ft²	x	n/a	X	n/a	X	n/a
	Fast-food	P	3/1000 ft²	P	5/1000 ft²	X	n/a	X	n/a
	Take-out	P	3/1000 ft²	P	5/1000 ft²	X	n/a	X	n/a
Retail	*Agriculture Related*	P	4/1000 ft²	P	4/1000 ft²	X	4/1000 ft²	X	n/a
	General	P	3/1000 ft²	X	n/a	X	n/a	X	n/a
	Vehicle-Oriented	P	4/1000 ft²	P	5/1000 ft²	X	n/a	X	n/a
Services	*Agriculture Related*	P	3/1000 ft²	P	3/1000 ft²	X	n/a	X	n/a
	General	P	2/1000 ft²	X	n/a	X	n/a	X	n/a
	Vehicle-Oriented	*P*	3/1000 ft²	P	3/1000 ft²	X	n/a	X	n/a
Transportation Related	*Container Transload*	X	n/a	P	1/3 emp	P	1/3 emp	X	n/a
	Distribution Centre	X	n/a	P	1/3 emp	P	1/3 emp	X	n/a
	Fulfillment Centre	X	n/a	P	1/3 emp	P	1/3 emp	X	n/a
	Intermodal Transfer	X	n/a	X	1/3 emp	P	1/3 emp	X	n/a
	Rail / Truck Terminal	X	n/a	X	1/3 emp	P	1/3 emp	X	n/a
Utilities – Private and Public		P	1/3 emp	P	1/3 emp	P	1/3 emp	P	1/3 emp
Warehouse and Distribution		X	n/a	P	1/3 emp	P	1/3 emp	X	n/a

Figure 16: CentrePort Use and Parking Table (The Rural Municipality of Rosser, 2015, p.34)

(4) Table 2 – Bulk Requirements

The Bulk Table includes several sections not typically included in conventional zoning by-laws including frontages for shopfronts and common entry points and the inclusion of street overlay zones.

TABLE 2 – BULK REQUIREMENTS

ZONE	REQUIREMENT		Walkable Street Overlay	Active Transportation Overlay	Industrial Corridor Overlay
INDUSTRIAL CENTRE ZONE (I1)	*Building Height*+		20 ft min (6.1 m) – 10 stories max	3 stories max	3 stories max
	Building Setback	Front	0 – 10 ft max (0 – 3.1m)	5 ft – 20 ft max (1.5 m – 6.1 m)	5 ft min (1.5 m)
		Side	Abutting I1: 0 – attached; 5 ft (1.5 m) detached	Abutting I2: 20 ft min (6.1 m) attached; n/a	Abutting I3: n/a; n/a
		Rear	20 ft min (6.1 m) 5 ft min (1.5 m) to rear access lane	20 ft min (6.1 m) 5 ft min (1.5 m) to rear access lane	n/a n/a
	Frontage ++	Shopfront	50 % min of total Building frontage with 60% min clear glass	50% min of total Building Frontage with 60% min clear glass	50 % min of total Building Frontage with 60% min clear glass
		Common Entry	70% min of total Building Frontage with 30% min clear glass	50 % min of total Building Frontage with 30% min clear glass	Unlimited % of total Building Frontage with 30% min clear glass
	Landscaping		1 tree/30 ft (9.1 m) plus 3 shrubs /20 ft (6.1 m) of Lot Frontage 1 foundation shrub/10 ft of Facade	Landscaped with connection to *Existing* or proposed sidewalk and bikeway	
	Parking	Access	60 ft min (18.3 m) from corner	60 ft min (18.3 m) from corner	60 ft min (18.3 m) from corner
		Landscape	5% gross parking area to be landscaped if over 20 parking spaces		
		Setback	30 ft min (9 m) *Front Yard*	20 ft min (6.1 m) *Front Yard*	n/a
	Loading	Setback	60 ft min (18.3 m) *Front Yard*	20 ft min (6.1 m) *Front Yard*	n/a
	Signs*		Band sign*: 1 sign/Facade (2 max); 3ft²/linear ft max area (0.28 m²/linear m); 7 ft min clearance (2.13 m) Projecting sign**: 1 sign/façade (2 max); 6 ft² max area (0.56 m²); 8 ft min clearance (2.44 m)		
	Site Coverage		90% max	90% max	90% max
INDUSTRIAL GENERAL ZONE (I2)	*Building Height*+		n/a	3 stories max	3 stories max
	Building Setback	Front	n/a	5 ft – 20 ft max (1.5 m – 6.1 m)	5 ft min (1.5 m)
		Side	Abutting I1: n/a	Abutting I2 – 20 ft min (6.1 m)	Abutting I3 – 29.8 ft min (9.1 m)
		Rear	n/a n/a	20 ft min (6.1 m) 5 ft min (1.5 m) to rear access lane	20 ft min (6.1 m) 5 ft min (1.5 m) to rear access lane
	Frontage ++	Shopfront	50% min of total Building Frontage with 60% min clear glass	50% min of total Building Frontage with 60% min clear glass	50% min of total Building Frontage with 60% min clear glass
		Common Entry	70% min of total Building Frontage with 60% min clear glass	50% min of total Building Frontage with 30% min clear glass	Unlimited % of total Building Frontage with 30% min clear glass
	Landscaping		Paved	Landscaped with connection to *existing* or proposed sidewalk and bike lane	
	Parking	Access	n/a	60 ft min (18.3 m) from corner	30 ft min (9.1 m) from corner
		Setback	n/a	20 ft min (6.1 m) Front Yard	n/a
	Loading	Setback	n/a	20 ft min (6.1 m) *Front Yard*	n/a
	Signs		Free standing sign: 200 ft² max area (18.5 m²); 30 ft max Height (9.14 m); 25 ft (7.6 m) Front Yard or as approved by the Manitoba Highway Traffic Board or Manitoba Infrastructure and Transportation		
	Site Coverage		70% max	70% max	70% max
INDUSTRIAL HEAVY ZONE (I3)	*Building Height* +		n/a	3 stories max	3 stories max
	Building Setback	Front	n/a	20 ft min (6.1 m)	5 ft min (1.5 m)
		Side	n/a	Abutting I2: 29.8 ft min (9.1 m)	Abutting I3: 20 ft min (6.1 m)
		Rear	n/a n/a	29.8 ft min (9.1 m) 5 ft min (1.5 m) to rear access lane	20 ft min (6.1 m) 5 ft min (1.5 m) to rear access lane
	Frontage ++	Shopfront	n/a	n/a	n/a
		Common Entry	n/a	n/a	n/a
	Landscaping		n/a	Landscaped with connection to existing or proposed sidewalk and bikeway	
	Parking	Access	n/a	60 ft min (18.3 m) from corner	60 ft min (18.3 m) from corner
		Setback	n/a	Landscaped with connection to *existing* or proposed sidewalk and bikeway	
	Loading	Setback	n/a	n/a	n/a
	Signs		Free standing sign: 200 ft² max area (18.5 m²); 30 ft max Height (9.14); 25 ft (7.6 m) Front Yard or as approved by the Manitoba Highway Traffic Board or Manitoba Infrastructure and Transportation		
	Site Coverage		n/a	70% max	70% max

+ Building *Height*s shall be in accordance with *Airport* restrictions.
++ Provided all energy-related code requirements are met.

Figure 17: CentrePort Bulk Requirements Table (The Rural Municipality of Rosser, 2015, p.35)

(5) Sustainable Development Standards (Table 3)

Development proposals shall achieve a minimum of 5 points in total, from any combination of the following sustainable development measures before a Development Permit will be issued. No partial points will be accepted. Applicants will be encouraged to incorporate as many sustainable development measures as their Construction plans will accommodate.

TABLE 3 - SUSTAINABLE DEVELOPMENT MEASURES		
Sustainable Measure	**Points**	**Required Documentation**
Active Transportation Corridor	5	Construction plans showing location of proposed construction along an Active Transportation Corridor at *Active Transportation Corridor Standards*
Benchmarking and Disclosure of Energy Performance	2	Copy of enrollment in Canadian ENERGY STAR Portfolio Manager
Bicycle Amenities	2	Construction plans showing bike storage, bike parking, employee shower
Bicycle Path	2	Construction plans showing new bike path adjacent to creek corridor
Energy Efficient Building	2	Proof that new construction is 10% improvement over MB Energy code standard / Proof that a *major renovation* is 5% improvement over ANSI/ASHRAE/ES Standard 90.1-2013
Green Building	2	Construction plans showing new construction or *major renovation* in compliance with the Green Building rating system Energy model demonstrating improvement and other proof of eligibility for certification by Green Building Council of Canada, Green Globes or Living Building Challenge
Green Industries	3	Specifications and quarterly reports for 48 months after start up as proof that qualifying *green product* sales and services comprise over 75% of gross revenue
	5	Specifications and quarterly reports for 48 months after start up as proof that qualifying *green product* sales and services comprise over 95% of gross revenue
Green Roof	3	Construction plans showing vegetated roof on 50% min of total roof area – with drainage and planting details
Heat Island Reduction	3	Construction plans showing 35% of all on-site, non-roof hardscape areas such as sidewalks, plazas, courtyards, *parking lots*, parking structures, and driveways to be covered by either: shade tree canopy (15 year maturity); or solar reflective paving and roofing with a solar reflectance index (SRI) of at least 29
Hydro Power Smart Commercial Incentives	1	Construction plans showing sustainable development measures and proof of qualification for current incentives
Hydro Power Smart Industrial Incentives	5	Construction plans showing sustainable development measures and proof of qualification for current incentives
Rail Use	3	Logistics plans and quarterly reports for 48 months after start up showing transport of raw and finished good to be 60% or greater by rail
	5	Logistics plans and quarterly reports for 48 months after start up showing transport of raw and finished good to be 95% or greater by rail
Renewable Energy Sources Incentive programs: Manitoba Green Energy equipment tax credit and Manitoba Geothermal Energy Incentive Program	3	Construction plans or an affirmative pre-feasibility study of the system showing on-site solar (thermal or *Photovoltaic*), wind energy generation or geothermal in compliance with CSA-448 Earth Energy Standard established through an accepted building energy performance simulation tool supplying 5% min of building's annual electric and thermal energy
Upgrade to *Industrial Corridor*	1	Construction plans showing shade tree planting and sidewalks along an *Industrial Corridor*, with connections to *existing* and proposed adjacent sidewalks
Walkable Street	5	Construction plans showing location of proposed construction along a *Walkable Street* at *Walkable Street* standards
Water Efficient Landscaping	2	Construction plans showing *Xeriscape* plant materials and water-re-use for irrigation

Figure 18: CentrePort Sustainable Development Standards (The Rural Municipality of Rosser, 2015, p.36)

(6) Performance Standards (Table 4)

Industrial Uses shall conform to the following Performance Standards. The Designated Officer shall require written confirmation of compliance by a qualified professional, to be attached to the permit application submission.

(The Rural Municipality of Rosser, 2015, p.31-37)

TABLE 4 – PERFORMANCE STANDARDS *I1 = Industrial Centre Zone I2 = Industrial General Zone I3 =-Industrial Heavy Zone*	
NUISANCE	**STANDARDS**
Air Pollution	No air pollution or smoke shall be produced which is in violation of the requirements of the *Canadian Ambient Air Quality Standards*.
Dust, Dirt or Particulate Matter	No discharge into the air of any dust, dirt or particulate matter shall occur from any activity or from any products stored on the *Zoning Site* that is discernible without instruments at: I1: A *Lot* line of the *Zoning Site*; I2: A *Lot* line of the *Zoning Site*; or I3: A *Lot* line *Abutting* a Residential Zone.
Electrical Disturbance	No activity shall cause electrical disturbance adversely affecting the operation of any equipment other than that of the creator of such disturbance.
Glare or Heat	No direct or sky-reflected glare or heat shall be produced in quantities which are discernible without instruments at: I1: A *Lot* line of the *Zoning Site*; I2: A *Lot* line of the *Zoning Site*; or I3: A *Lot* line *Abutting* a Residential Zone.
Inflammable or Explosive Materials	No inflammable or explosive materials shall be produced, used, stored or handled unless adequately safe-guarded, as approved by the Municipal Fire Department, against hazards of explosion.
Liquid Contaminants	No discharge of liquid contaminants or materials of such nature or temperature which contaminates any water supply, interferes with bacterial processes and sewage treatment or in any way causes the emission of dangerous or offensive materials shall occur into any public sewer, private sewage disposal system, stream or into the ground.
Noise or Vibration	No noise or vibration, other than related to transportation activities and temporary *Construction* work shall be produced in quantities which are discernible without instruments at: I1: A *Lot* line of the *Zoning Site*; I2: A *Lot* line *Abutting* a non-industrial land use; or I3: A *Lot* line *Abutting* a *Residential* Zone. Where noise attenuation is required within a Provincial Highway or Road Control Area, application shall be made by the *Owner* to Manitoba Highway Traffic Board or to Manitoba Infrastructure and Transportation respectively.
Odorous Gases	No emission of any odorous gases or matter shall be produced in quantities which are discernible without instruments at: I1: A *Lot* line of the *Zoning Site*; I2: A *Lot* line of the *Zoning Site*; or I3: A *Lot* line *Abutting* a Residential Zone.
Radioactivity	No activity, including storage or dumping, shall result in the emission of radioactivity in any amount.

Figure 19: CentrePort Performance Standards (The Rural Municipality of Rosser, 2015, p.37)

4.3 Findings and Analysis

To better understand the policy framework of CentrePort and determine if there are lessons to be learned regarding industrial land use planning, an assessment was conducted of its two main policy documents; the Rosser CentrePort Secondary Plan and the Rosser CentrePort Zoning By-law. A brief review of the documents confirms they are broadly centred around the concepts of design (form-based code) and industrial urbanism, as seen in the literature presented in this practicum. Common policies and recurring key words that emerged from an initial review of the selected

documents were used to establish five themes. Each of the themes presented below indicates a core principle of CentrePort's vision and objectives and further separates it from traditional industrial land use planning. Aside from its existence as a special planning area, the specific policies and themes presented in this section indicate a more specialized intent for CentrePort's development.

The intent of this assessment was to reveal how these documents function and interact together, to define their structure, and to speculate how they intend to shape land use in CentrePort. These themes, in accordance with insight from the key informant interviews, support the development of a series of recommendations that seek to address the planning, design and implementation of other industrial districts in similar jurisdictions.

The assessment revealed five broad themes (presented in no particular order):

1. Sustainability and Environmental Protection
2. Local and Regional Transportation and Connectivity
3. Design, Built Form and Enhancing the Pedestrian Experience
4. Nodal Development
5. The CentrePort Hybrid Transect

4.3.1 Sustainability and Environmental Protection

Both the policies of the Secondary Plan and the provisions of the Zoning By-law indicate a strong adherence to the principles of sustainable development and green design. Sustainability is largely a part of urban planning practice across North America and the world, however, it is not typically associated with industrial land use or industrial development (Cotter, 2012). There is, however, a change occurring wherein the retention of industry in cities is seen as fundamental to both economic and employment sustainability (Ferm & Jones, 2017).

Principles of sustainable development are reflected in the *CentrePort Secondary Plan* under the broad Guiding Principles section. Specifically, Section 2.2.5 encourages the protection of and

respect for natural areas by "reinforcing the sustainable development measures of this Secondary Plan and the standards of the Zoning By-law," (The Rural Municipality of Rosser, 2015, p.10). The *Secondary Plan* contains two objectives that further establish support for sustainable development, stating that CentrePort will encourage sustainability through "site and building design, and demonstrating leadership in innovation in energy conservation, ecological protection and sustainable transportation" and for CentrePort to be "a model for sustainability" (*ibid*, p.11). These policies are not uncommon for industrial districts but do show a substantial shift from conventional planning policies, suggesting a renewed focus on sustainable development principles within CentrePort for the betterment of the district as a whole.

The *Rosser CentrePort Zoning By-law* goes further in promoting sustainable development practices by requiring all development proposals to achieve a minimum number of sustainable practices using a points system (The Rural Municipality of Rosser, 2015, p.36). Some of these measures include energy efficiency and performance tracking, green building features, heat island reduction, sources of renewable energy, development along a walkable street or active transportation corridor, and amenities for bicycles. Each measure listed is assigned a point value and applicants must achieve a minimum of five points before a development permit will be issued.

While the sustainable development policies presented in the secondary plan are par for the course in broad policy visions in North America, the use of a mandatory point system to require additional sustainable development practices in industrial areas is novel and allows CentrePort's planning policy to stand apart from other industrial district policies. However, upon further inspection, many of the measures require little to no additional effort on the part of the applicant, suggesting the program may not be as impactful as it may appear. The requirement only states that

applicants must attain five points, but it does not indicate where these points must be scored, nor does it indicate a larger goal of the program aside from ensuring a general adherence to sustainable development practices, no matter how insignificant they may appear.

Several policy sections with the *Secondary Plan* promote principles of sustainable development including policies for walkability (p.24, 26 and 32) and active transportation (p.25), specifically within Commercial Nodes and along transportation corridors. Retail and service development concentrated at Commercial Nodes is also encouraged to develop light industrial-commercial mixed-uses (p.16). As indicated by the literature, mixed-use planning and design for industrial areas is centred on the symbiosis between living and working (Hatuka et al., 2014). Since residential development is prohibited within the CentrePort SPA, the provisions for sustainable development and an 'enhanced pedestrian experience' are somewhat limited. Without a dense residential population, the target for these pedestrian-friendly policies and regulations is directed toward those individuals using the spaces during the work day and work week, but not living there. Furthermore, the concept of density, which is often associated with sustainable planning practices and associated with residency, is lost. With no residential component in the CentrePort SPA, calculating and planning for density becomes irrelevant. This begs the question of who or what are these regulations for and why are they being implemented in a predominantly industrial development.

Further, many of these policies are attributed to specific land use designations and zones within the CentrePort area, yet no concrete structure for where they are to occur. This is largely done to allow the market to dictate the ultimate form of CentrePort (more on this in Section 4.3.5) however it places challenges of future planning efforts where there is no indication of where

these designations and zones will be located. This is particularly concerning for a potential active transportation infrastructure network that is based on development that doesn't exist.

Aside from these several challenges, the sustainable development provisions provided in the Secondary Plan and Zoning By-law provide a significant step in the right direction. As seen in the literature, many industrial areas are shifting their focus to more green and efficient practices. While the implementation is still in question, the potential is there to create lasting change and perhaps change public opinion on industrial development. Critique aside, the policy statements and requirements provided in CentrePort's documents set it apart from other industrial districts, specifically those in Winnipeg that do not share similar requirements.

4.3.2 Local and Regional Transportation and Connectivity

CentrePort, like other inland ports across North America, places a significant focus on both the internal and regional transportation network. One of CentrePort's core guiding principles is to facilitate "businesses that are suited to a location that would benefit from tri-modal services, including: Class 1 railroads, a 24/7 international airport and the majority of Winnipeg's trucking companies" (The Rural Municipality of Rosser, 2015, p.10). Specifically, the transportation network within CentrePort should be designed such that it "respects the operations of rail and air transportation facilities," (p.20) indicating a preference for the efficient movement of rail goods and the safe and unobstructed movement of air traffic. Various other policies affecting the turning radius, angle of intersections, wide parking and travel lanes and strategic road connections provide for the efficient movement of trucking vehicles throughout the plan area (p.21).

In terms of its ability to foster integrative land forms, the transportation policies of CentrePort are resoundingly geared towards the function and efficiency of an inland port.

Prevalence is given to goods movements and industrial corridors, whereas active transportation and pedestrian mobility are only attributed to specific designations and zones that are less represented across the planning area. This is a good example of the core difference evident in CentrePort when compared with other urban industrial districts. As an autonomous industrial district, CentrePort resides at the edge of Winnipeg and largely apart from other land uses and infrastructure. Because of this, policies here are geared toward the efficient movement of goods and movement into and outside of the plan area, rather than movement within the plan area.

However, the identification of active transportation corridors and pedestrian corridors implies a respect for alternative modes of transportation toward the future. As CentrePort continues to grow, so will the number of daily trips, emphasizing the need for multi-modal means of transportation.

While this theme favours the preferred transportation modes associated with inland ports, there is potential for improved transportation for workers and pedestrians. As mentioned in the previously identified theme, active transportation will play a role in future infrastructure developments along identified active transportation corridors and will contribute to the overall connectivity of the district and enhance existing and future designated natural areas.

4.3.3 Design, Built Form and Enhancing the Pedestrian Experience

Design is a core facet of CentrePort's planning framework, where form-based solutions are required to "ensure a high standard of development throughout the Secondary Plan area" and "enhance the identity of the CentrePort lands and promote it as an innovative inland port" (The Rural Municipality of Rosser, 2015, p.31). Leigh et. al. (2014) note that design can be an important strategy for the development of industrial sites and something that is often overlooked

in 21st century industrial land development but can help mitigate some of the effects rendering industrial development undesirable. While there is no universal strategy for industrial design and aesthetics, several strategies are provided and agreed upon, including:

- Provide or require landscaping or architectural buffers from surrounding neighbourhoods;
- Incorporate waterfront, green space and open space into industrial districts;
- Add retail space for firms that can sell directly to the public;
- Promote modernization and beautification of industrial sites or districts;
- Incorporate branding, signage or identification;
- Improve street connectivity and truck access;
- Establish 'gateways' into the district;
- Consolidate small and irregular vacant sites into larger, more versatile and marketable sites;
- Consolidate surface parking.

(Leigh et al., 2014, p.37)

The policies and provisions of CentrePort's planning framework reflect several of the suggested strategies presented by Leigh et. al. As an autonomous industrial park area, the need to buffer industrial uses from surrounding neighbourhoods is typically not needed, however, internal buffers are suggested for uses incompatible with neighbouring uses, including commercial nodes (The Rural Municipality of Rosser, 2015, p.15), lighter industrial uses, natural areas and lawfully existing dwellings (p.18). CentrePort's Zoning By-law also identifies the means to which you provide buffers, but only between industrial uses and existing dwellings or parking areas (The Rural Municipality of Rosser, 2015, p.22 and 23).

Similar calls for a more architectural approach to industrial district design can be seen in the sentiments of Love (2016) who suggests that if industrial land use is to be fully integrated into the urban fabric, sites need to be re-imagined through the lens of design rather than district-wide transportation or civil engineering. The Commercial Nodes found within the *Secondary Plan* allow for retail uses and showrooms provide ample opportunity for industrial uses to operate and sell

goods to local traffic on a local scale. Additionally, uses within the *I1 – Industrial Centre Zone* feature modern urban design requirements including buildings situated near the front lot line abutting a sidewalk, high densities, ground floor retail uses, and pedestrian-friendly streetscapes (p.31). The Zoning By-law also contains several illustrative guides for the development of streets, intended to guide the development and construction of both public and private roadways within CentrePort. The standards are provided as guidelines and do not part of the By-law, but future developments should preserve the intent of the original guidelines (p.43).

While not part of the policy framework of the Plan itself, the illustrations and concept site plans serve to guide developers and property owners toward the inclusion of higher development standards. This appears to be an acknowledgement that such high design requirements are not common for industrial districts and an attempt to "show" rather than "tell" applicants that it is indeed possible.

The design requirements provided provide a key difference in the planning and zoning of CentrePort as opposed to other industrial districts and represent the form-based portion of the hybrid policy framework. The combination of design guidelines and requirements for public spaces, locational requirements for walkable streets and commercial nodes, and specific site requirements and guidelines all contribute to making CentrePort a novel case.

Figure 20: Commercial Node site plan and illustration (The Rural Municipality of Rosser, 2015, p. 32).

4.3.4 Nodal Development

Nodal development is another core feature of the Special Planning Area and allows for the responsible and managed development of services and amenities that are not typically provided for within autonomous industrial park areas. The commercial centre nodes will be developed at "strategic locations that are highly visible and easily accessible (by roads and pathways) and will be established based on market demand" (The Rural Municipality of Rosser, 2015, p.14). Leigh, et. al, (2014) recognizes the need to combine better local and regional land use policies in order to maintain and protect industrial uses while permitting them to flourish alongside other needed land uses.

The goal of commercial nodes is a bold one, however, CentrePort's policy is short on specifics. It does not identify the spatial location nor the specific requirements that must be met before a node is implemented. This can be seen in the relationship between the land use designations of the Secondary Plan and the zones of the Zoning By-law (Table 3). Whereas most planning documents in Manitoba are "generally consistent" the designations don't clearly translate into development ready zones. For example, the *Service Oriented Industrial* designation allows for both the *I1 – Industrial Centre Zone* and the *I2 – Industrial General Zone*. Therefore any "node"

supplied on the conceptual land use map could potentially also include general industrial uses, relaxed development and design standards and no active transportation or pedestrian corridors.

Filion (2009) notes that while nodal development is receiving increased attention within the planning community, specifically due to their promises of economic, quality-of-life and environmental rewards, their performance must rely on aspects of urban development that are not so easily attainable. While Filion was not looking at mixed-use commercial nodes within an industrial district, it shows the potential for planned nodes to fail, suggesting that nodes are perhaps not planned but organic in nature. This, combined with CentrePort's lack of structure, indicate nodal development will not be a core outcome of this plan.

If initiated, CentrePort's nodes feature some of the highest development standards and must include a walkable street, street trees and specific use requirements. Several uses within the *Zoning By-law* are only permitted in the *I1 – Industrial Centre Zone* including: Accommodations, Offices, Full-Service Restaurants, and Commercial Retail uses. By clustering these commercial uses together, CentrePort's planning documents seek to capitalize on nodes to ensure spatial efficiencies and avoid sprawl or urban dispersion (Filion, 2009).

Table 2: Land Use Designations and Corresponding Zones

Secondary Plan Land Use Designation	Zoning By-law Zones
Service-Oriented Industrial	**I1** – Industrial Centre Zone **I2** – Industrial General Zone
Manufacturing and Logistics Industrial	**I3** – Industrial Heavy Zone
Rail Serviced Industrial	
Open Space	Open Space Zone
-	CentrePort Rural Zone
Industrial Corridor Overlay	Industrial Corridor Overlay Zone
Active Transportation Overlay	Active Transportation Overlay Zone
Walkable Street Overlay	Walkable Street Overlay Zone

4.3.5 The CentrePort Hybrid Transect

Central to CentrePort's planning and design is its basis in transect planning. As seen in the literature, the urban-to-rural transect is a core tenet of New Urbanism and was developed as an alternative to single-use, Euclidean developments (Duany & Talen, 2002). The transect also serves as a basis for many form-based regulating plans, establishing the flow and transition of appropriate urban densities as they are found within cities. The literature review revealed that the transect typology doesn't explicitly provide for large-scale industrial developments like airports, heavy manufacturing or logistics and goods movement uses. What makes CentrePort novel is the reversal of this assumption and subsequent application of a transect-like framework that describes the intended industrial character of areas including site design and public realm additions.

The transect can be most easily seen in the naming convention of CentrePort's zones with the *I1, I2* and *I3* Zones roughly translating into an industrial transect that increases in industrial intensity from 1 to 3. Most form-based codes are based on their "level and intensity of urban character" (Duany & Talen, 2002) and are applied to neighbourhoods and districts which include residential, commercial and mixed-use areas. The transect provided in CentrePort is based on intensity of industrial character and is applied to an industrial district, separated from other areas of Winnipeg. Another way to view this hybrid transect is to look at expected land use conflicts and nuisance. The transect moves from more commercial and service type uses to heavier manufacturing and rail specific uses. The industrial transect seen here defines CentrePort's expected growth pattern and provides the basis for land use control within the inland port.

The land use policies that support this industrial transect can be found in Section 3.1.2 and 3.1.3. While both sets of policies fall under one land use designation (*Service Oriented Industrial*), they provide the means by which different intensities of industrial and commercial

development are arranged throughout CentrePort. These policy sections also outline the level and intensity of urban design that developments must employ throughout the planning area. These concepts represent the largest difference that CentrePort sees from more conventional industrial districts. The use of street overlays districts, commercial nodes and design standards enable the industrial transect to operate in a different way than a traditional zoning by-law.

However, as mentioned in the previous theme, the implementation of the overlays, nodes and design standards is not set in stone and largely depends on the industrial market. Because of CentrePort's suburban location at the edge of Winnipeg, and its lack of residential and urban commercial uses, the possibilities for future development are limited. This means the critical mass of development must come from industrial users and tenants. This can slow or even prevent a predictable build out period and places emphasis on the ability and success of inland port operations to see this development pattern come to fruition.

4.4 Chapter Summary

While this research is not intended to evaluate CentrePort's planning framework, a cursory review of its general standing can showcase the perceived intent of its plan policies. As evident in Table 3, there is a general inconsistency between the secondary plan and the zoning by-law in terms of its layout and structure, indicating the vision for nodal development and higher standards of design may be further out of reach than positioned in the secondary plan.

Apart from the structural challenges that lay ahead for CentrePort, the overall policy framework of sustainability, transportation and connectivity, as well as a high level of design present a progressive industrial district that meets several requirements of an industrial district poised to be both environmentally and economically sustainable.

The lack of conditional uses typically found within most zoning by-laws in Manitoba and the special planning authority greatly increases approval times and streamlines the by-law to accelerate development. Additionally, unlike other zoning by-laws in Manitoba, the CentrePort Zoning By-law contains no minimum lot size requirements for added flexibility.

This analysis has identified the unique qualities of CentrePort's planning framework and has painted a broad picture of its structure, intent and potential. As development continues and additional land is converted to these new land use designations, the framework will be challenged.

5 Perceptions of Industrial Land Use Planning and CentrePort

5.1 Introduction

To further explore industrial land use planning and the implications of CentrePort's industrial planning framework, key informant interviews were conducted with professional planners, developers and real estate professionals. The interviews were conducted to gain insight into industrial land use planning and to explore the impact and potential of CentrePort's industrial land use model. To further draw conclusions and supplement the findings of the literature review and case study analysis, a series of questions was developed and posed to informants to gain understanding from first hand experiences and explore concepts that are not often discussed at the planning practice level.

5.2 Semi-Structured Informant Interviews

Semi-Structure interviews with key informants provided information on several aspects of the research. The semi-structured interview format allowed for probative follow-up questions and a more substantive exploration of topics that may have been unanticipated by the interview process. This provided additional explanations to questions and deeper understandings of the subject material. Due to the nature of the interview process and the varied backgrounds of the interview participants, questions were adapted when necessary from the standard interview schedule to suit the individual interview. The literature review provided guidance on what type of questions to ask as well as on what information to seek out.

Informant interviews were an appropriate method to address the proposed research questions as informants can provide in-depth perceptions, meanings and explanations for situations and circumstances that appear both in practices and in theory. Interviews, however, rely on participants to provide accurate and truthful answers to questions. To engage this limitation directly, efforts were made to ensure participants were comfortable in providing responses by delivering questions in an unbiased and honest manner and interviews were held in familiar settings at the participant's discretion.

A total of six interviews were completed with informants in November and December of 2017. Informants were selected for their qualifications, professional designations, direct experiences and knowledge of industrial and use planning, development and implementation in Winnipeg and its surrounding municipalities. The informant group included four professional planners (three currently operating in the private sector and one from the public sector), one industrial real estate professional and one local developer specializing in residential development (who is also a professional planner). As is the case for many planners in Manitoba, several participants selected for interviews have additional work experience in various capacities within the planning profession in Manitoba including experience with the Province of Manitoba and the City of Winnipeg. Industrial land users were not included in this research as it would be near impossible to establish a representative who could accurately represent the multitude of industrial users operating in Winnipeg. Attempts were made to contact additional members of the consultant team who developed CentrePort's planning documents, but due to timing and schedules, interviews could not be achieved. Despite these limitations, it is believed that the data

generated by this practicum is representative of the views of the planning practice the Winnipeg area.

Table 3 lists the informants and the assigned acronym used throughout the following chapter for reporting on the data. For the purposes of this practicum, the identities of all participants have been kept confidential.

Table 3: Interview Participant Acronyms

Key Informant/Speaker	Acronym Used for Reporting
Developer	**D**
Private Sector Planner	**P1**
Private Sector Planner	**P2**
Private Sector Planner	**P3**
Public Sector Planner	**P4**
Industrial Real Estate Professional	**IR**
Student Researcher (self)	**R**

All interviews were conducted in person in Winnipeg and lasted approximately 45 minutes to an hour in length. A total of sixteen questions were asked, including an additional six questions for those identified to have worked toward the creation of CentrePort planning documents. A copy of the interview schedule and questions can be found in **Appendix C**. The interview questions, length of interviews, and number of interviews conducted received approval from the University of Manitoba Research Ethics and Compliance Board. A copy of the ethics approval certificate can be found in **Appendix D**.

Interviews were recorded digitally and subsequently transcribed. The analysis phase of the research followed grounded theory, which according to Gray (2004) is used to discover, develop, and provisionally verify information through systematic data collection and analysis of data pertaining to a phenomenon. As per Neuman (2000), three methods were employed to analyze the

data. First, *open coding* was used to analyze transcripts. Open coding is the act of naming and categorizing phenomena through close examination. This technique was used on initial reading of the interview transcripts. A list of over 50 separate codes was generated from the data. This was followed by *axial coding,* where the focus is shifted to the initial coded themes to look for linkages and relationships. Lastly, *selective coding* was used to highlight the major themes that may have been identified. The final stage of the analysis was to select specific examples and quotes from participants that could illustrate specific ideas or themes and provide direct evidence of the themes being presented.

The data generated from the interview process resulted in a significant amount of insight into subject matter that would have been difficult to achieve from other forms of qualitative research. The ability to discuss industrial planning in an open and frank manner provided informants the opportunity to discuss an area of planning that is not often considered and to question the methods of currently utilized frameworks and systems for industrial land use planning.

5.3 Findings and Analysis

The questions used in the research generally followed two lines of inquiry: the role, challenges, and perceptions of industrial land use planning (using Winnipeg as a reference point) and perceptions and implications of CentrePort, as interpreted by its land use planning model. Common subjects, issues and keywords were used to summarize the perspectives of participants and each theme area is further categorized into sub-themes providing a finer level of detail for the interview data. The themes include:

- *The State of Urban Industrial Land Use Planning*
- *The Nature of Planning for Industry in Winnipeg*

    - *The Extent of Incompatibility*
    - *New Definitions for New Typologies*
    - *The Industrial Market Effect*
    - *Industry's Place in Mixed-use and Complete Community Design*
    - *The Economics of Industrial Land Development*
    - *Industrial Design and Aesthetics*
- *Perceptions of CentrePort*
    - *Servicing*
    - *Transect and Nodal Development*
    - *Expanded Design and Sustainability Requirements*
    - *Fast-tracked Development*

Like the analysis section in Chapter 4, the order of the themes and sub-themes are not indicative of a hierarchy and many of the themes presented are interrelated. The remaining sections of this chapter present the findings from the interview process and are organized according to the above themes.

5.3.1 The State of Urban Industrial Land Use Planning

Each interview began with a discussion of the current state of urban industrial land use planning where participants were asked to articulate their views based on their professional experience. This question was intended to determine the professional's general outlook on industrial development within the geographic, economic and political environment they operate in. The majority of professional planners interviewed identified a generally negative outlook on the land use planning conducted for industrial development. This negative outlook primarily consisted of industry's troubled history, its negative perception and the difficulty of its implementation when compared with other land uses. The comments below from three informants encapsulate these sentiments and some of the underlying issues:

> **P3:** "You say the word industrial and people have that old fashioned, Euclidean sense. You've got the chimney spewing bad stuff, environmental degradation, noise. I think we do need to plan to accommodate [industry]. If we don't plan to accommodate industrial, it'll be very difficult for people to accept it when it's there. Acceptance is a big part of planning."

> **P1:** "I think there's certainly improvements to be made."

> **D:** "Industrial lands are a secondary thought, somewhat. It's usually an unpopular land use, even though sometimes the actual land uses that end up establishing there can be quite benign, really. People picture smokestacks and noise and dust and that's perhaps one of the issues with then finding appropriate areas for it to establish."

Five of the six interview participants expressed varying levels of concern or negativity when asked about the state of urban industrial land use planning. Comments indicated large challenges unique to industrial land use planning due to lack of attention. These statements echo the findings of the literature review.

When asked if there were manuals or resources available to aid in planning for industrial development, a Private Sector Planner indicated he was not aware of any such resource, but also that he had never felt the need to look:

> **P3:** "I haven't seen anything like that but, in fairness, I haven't gone looking. So, maybe something is out there, but I suspect there's a lack of guidance – external guidance or guidelines. Locally, I'm not aware of anything."

Comments from informants in professions other than planning suggest that industrial development is adequately addressed but that summation largely rests on the frame of reference. From the Industrial Real Estate professional, current industrial land use planning is adequate for development, but issues arise when considering other aspects of planning such as servicing, utilities and transportation.

> **IR:** "The current zoning by-laws and planning that I've seen and used, I think are adequate for us to get the inventory, it's just we don't have the infrastructure to get there."

Additionally, responses from the Developer indicate that, in its current form, industrial land use planning is performing adequately to its original Euclidean intent; to protect residential and commercial uses from land use conflict:

> **D:** "I think it's adequately addressed if you're looking at it from the perspective of other land uses. We talk about the need to do "mixed-use" communities. But mixed-use doesn't mean a factory. Those are land uses that are understood to be accommodated somewhere other than the community. So, is it adequately addressed? From that perspective, it is."

To summarize, informant responses indicate a generally negative view on the state of industrial land use planning but present a difference of opinion on how it is currently being implemented. From the view of planners, there is an understanding that more should be done for industrial planning and a suggestion that public perception on the matter is not always accurate. From a developer standpoint, planning for urban industrial development appears to operate as intended. And from real estate, land use planning is secondary to the provision of infrastructure.

Despite the differences in these perspectives, there is a common theme that industrial development typically exists outside the realm of 'normal' or 'desired' land uses. This is exemplified either by pollution or nuisance, lack of infrastructure, incompatibility, or a lack of attention by planners and decision makers. Industrial land can therefore be thought of and recognized as a marginalized land use. The following section provides additional detail on the nature of planning for industry and the many challenges posed by this core land use.

5.3.2 The Nature of Planning for Industry in Winnipeg

Part of this research practicum is to explore the complex challenges that affect industrial land use development and to seek recommendations for intervention. What exactly makes industry so different? While the answer to this question may seem obvious, the research conducted for this practicum has shown it to be a much more complex and far-reaching issue with many interrelated factors to consider. Informants suggested there are several key factors affecting industrial land use including the persistence of incompatibility, industry's potential in mixed-use planning, the importance of classification, and the unique economic drivers that direct industrial development.

5.3.2.1 The Extent of Incompatibility

While smokestacks spewing harmful pollution onto city streets may be a thing of the past, land use conflicts associated with industrial development undoubtedly persist. Industrial development invariably falls into the category of locally unwanted land uses, or LULUs (Schively, 2007) which can incite local communities and render widespread benefits to go unaccounted for (Wolsink, 1994). Several informants alluded to industry's troubled legacy and how public perception is still centred on pollution and public harm. The literature would suggest that urban industrial activities have largely transitioned into cleaner and greener industries, suitable for integration into the urban landscape. Similarly, comments from informants would suggest that the industrial development found in urban areas are predominantly benign, though both views contradict predominant public perception on the issue. In discussions with informants, this topic largely became the difference between *hazard* and *nuisance*. P4 provides the core difference between the two terms:

> **P4:** "… a nuisance is something that bothers you. It's dust, it's noise, it's not going to kill or harm you. Hazard is something that is volatile and could explode. Another type of hazard could be smokestacks spewing pollution and gases constantly – that's a hazard."

Whereas older industrial uses were typically noxious or hazardous in nature, presenting a serious concern for residents and the public, most contemporary industrial uses are benign and only contain nuisances such as noise from trucks, 24-hour operations, light pollution and derelict or unsightly properties. This is an important distinction because mitigation efforts will likely differ depending on whether an industrial use is a hazard or a nuisance. At present, most zoning provides differentiation in zoning type based on the level or intensity of nuisances, however, public

perception would indicate most industrial uses are perceived as hazards to human health. Other comments from informants would suggest there will always be industrial uses that invariably involve some form of hazard or nuisance, be it noise, vibration, odours, dust or particulates, etc. For this reason, most interview participants agreed that certain industrial land uses would not be deemed "compatible" with residential uses.

> **P4:** "I think most cities have created their industrial parks strategically in certain locations and I think that works fine. I don't see the point of trying to introduce industrial uses back into proximity of residential."

Several informants made clear that regardless of environmental standards or accepted buffer zones, many of the industrial uses that dominate industrial parks are, by their very nature, incompatible.

> **P1:** "I do really still think that those heavy industrial type uses are separated for a reason and need to be separated. Like I mentioned in my last answer, I think there can be some mixed there, moving towards generally or lighter industrial uses, or some more intensive commercial type uses."

Importantly, this assertion does not indicate all industrial activities exhibit a hazard or nuisance. This begs a larger exploration of the different kinds of industrial activities that do not produce any kind of hazard or nuisance or the strategies that one could employ to mitigate these constraints.

Industry is often viewed as a liability rather than an asset. Even after acknowledging the need for additional industrial land and the lack of effort that goes into planning for it, planners and developers continually returned to the idea that industry should be removed from the city. Speaking in reference to a large brownfield site within Winnipeg, one interviewer indicated that:

> **D:** "Realistically, over time, the City should probably try and move a lot of it out of there because it's maybe not the most appropriate location for it, but the simple fact is that it's there right now and it presents huge challenges…"

5.3.2.2 New Definitions for New Typologies

As mentioned in the previous section, how one chooses to define industry can have a great effect on its perception and how it is ultimately implemented within an urban area. In 2002, San Francisco replaced the term "industrial" in its planning documents with a more descriptive term: production, distribution and repair" or PDR (City and County of San Francisco, 2018). The change was in recognition that industry is more than just manufacturing – terms that are often thought of and used synonymously – and represents a full range of industrial-type uses. More importantly, this change signified a move away from traditional terms used to describe industrial development that carry a negative perception in North American culture.

Several informants spoke about the complications that arise when attempting to permit specific types of industrial activities and the limitations of current zoning by-laws in their ability to determine the differences between uses that fall under the same classification:

> **P4:** "There are certain uses we want and certain uses we don't want, but they all fall under the same umbrella of 'industrial'."

Conversations with informants revealed how there is great variation in the terms used to describe industrial development and the implications of such definitions. Most zoning by-laws use the terms *heavy* and *light* to describe relative intensities of industrial use, while others use the presence of outdoor activities versus indoor activities as a means of differentiation. As informants' comments would imply, the definition is up for debate and can have different meanings to different people, especially dependent upon the individual's role in the development process. In one instance, P1 describes a "spectrum" of different uses with those industrial uses featuring high potential for conflict or nuisance at one end and lighter, more commercial industrial uses at the other end. This

reinforces the complicated nature of industrial land uses, and the constraints presented in their implementation in zoning by-laws.

This means that the methods used in zoning to define specific uses can have a major impact on the implementation of the by-law and how it is viewed in the urban landscape. There is an opportunity to appropriately describe, classify and categorize industrial activities, providing additional clarity on the expected impacts and nuisances that may be present. As discussed in the previous section, there is a demonstrated difference between *hazards* and *nuisances* that may provide a basis for further classification schemes. This type of dialogue can help lead to a shared understanding of industrial uses and their place in the urban landscape.

5.3.2.3 Industry's Place in Mixed-use and Complete Community Design

Industry's place in mixed-use planning was a recurring theme in these discussions. With many municipalities across Canada and North America moving away from strictly single-use areas and recognizing the need to develop denser, mixed-use neighbourhoods, the question was posed as to where industry fits into this new method of community design. Conversations with informants alluded to the differences in intensity of industrial use and scale when discussing mixed-use design or complete communities.

Before delving into the data, we must first identify what is meant by *mixed-use* and *complete community design*. These terms are used frequently in planning practice and have come to represent several key principles in contemporary planning. Mixed-use is generally understood to mean the breaking down of Euclidean boundaries between land use sectors. Where once there was complete separation between residential, commercial and industrial districts, there are now buildings,

neighbourhoods and entire communities that mix these different uses, such that the boundaries between them are blurred.

The term '*complete communities*' is largely an extension of mixed-use principles and is often used in municipal development planning, though its definition varies from jurisdiction to jurisdiction. For Winnipeg, a complete community is "a place that offers and supports a variety of lifestyle choices, providing opportunities for people of all ages and abilities to live, work, shop, learn and play in close proximity to one another" (The City of Winnipeg, 2011). But how close is *'in close proximity'*? The scale of proximity to which the concept of complete communities refers is almost never discussed in planning documents, and Winnipeg is no exception. Another example would be CentrePort, which highlights "Championing a 'live, work, play, learn' approach to inland port development…" as one of its strategic priorities (CentrePort Canada, 2017). The Rosser portion of CentrePort explicitly prohibits residential uses throughout the planning area, however, the Winnipeg portion of CentrePort has designated a sizeable residential community toward the south. At what scale does CentrePort operate as a complete community and where does the industrially dominated Rosser section fall into that paradigm?

Several informants discussed how industrial land use can potentially fit into a complete community, but only at a large, city-wide scale. This is to ensure that land use conflict is mitigated through separation. In this instance, the mixing of uses happens at the community level instead of the neighbourhood or site level.

> **P1:** "Yes I think there's a place for it in complete community design because overall I feel like that is looking at a larger scale area and not necessarily a whole municipality."

In another instance, P4 describes industry as a patch within the urban landscape, not necessarily woven into the rest of the fabric, but still connected. This is to identify and maintain a separation

with residential uses in particular where land use conflict is to be expected, but also ensuring that access is still provided to workers and goods movement.

> **P4:** "I think it's making sure the industrial lands are accessible with the population not integrated with the residential uses.

However, the Developer indicates that the place of industry in complete communities is largely dependent on public perception. There is an indication that the more hazardous or nuisance uses should be fully separated, and not part of the urban fabric altogether, but given changes in design, and operation, they could find their way into the makeup of a complete community alongside other land uses.

> **D:** "It's almost in terms of people's biases or how they conceptualize what a complete community is. You're not going to have that factory in there. That's what people think about when they think industrial. So, if attitudes and perceptions about different types of industry change, people probably wouldn't mind seeing one of those buildings in the Tuxedo Industrial Park within the fabric of a complete community because they're attractive buildings, they house professional work places, they operate 9-5, Monday to Friday. So, they're not intrusive uses, right? But by definition they are industrial, and they have industrial zoning."

The literature review revealed several ideas on how to incorporate industrial activity (especially manufacturing) into hybrid building typologies, thereby increasing productivity and expanding the reach of industry into the urban landscape. Several informants noted the distinct barriers to incorporating industrial uses with other land uses on the same site. The decision on whether something is compatible with mixed-use design is largely made on a case-by-case basis and is informed by the potential for land use conflict.

> **D:** "Mixed-use doesn't mean a factory. It includes commercial, residential, recreation, social, and those sorts of elements of a community. But nobody is saying we also need somewhere for hogs to be slaughtered, or something like that. Those are land uses that are understood to be- and when I say marginalized, I mean pushed out, or to be accommodated somewhere other than the community."

> **P1:** "I do think there's a place some of those uses that are considered closer to commercial in nature. I think it's fine mixing those types of uses, but pure mixed-use where you're looking at all those land uses together, I just feel like the ones that are on the spectrum, with residential so far away from the industrial, that its too…"
> **R:** "It's too big of a gap to bridge?"
> **P1:** "Yeah exactly."

As seen in previous sections concerning incompatibility and how we choose to define industrial development, there are many different possibilities and outcomes when looking at site level compatibility. Informants refrained from discussing the option of industrial uses mixing with residential uses. This echoes the findings of the literature review and speaks to the prevalence of land use conflict associated with residential development. These findings further solidify this as a constraint of industrial land use within urban settings.

In all, informants indicated that industry should be a part of the overall urban fabric, connected and integrated at a regional, city or community scale, but not at the neighbourhood scale. Presently, the risk of land use conflict has largely kept industry out of discussions about mixed-use or hybrid typologies, as suggested in the literature review. At smaller scales like the neighbourhood or site level, the place of industry is contingent on several factors including the level of nuisance, and the site-specific interventions that can be employed to mitigate land use conflicts. More commercially geared industrial activities could fit within a mixed-use area, but the more hazardous, nuisance or intrusive industrial activities would not be expected to fit.

5.3.2.4 The Economics of Industrial Land Development

One of the biggest constraints for new industrial development in Winnipeg is the availability of serviced industrial lands. As indicated in Winnipeg's Industrial Land Use Study Report (Dillon Consulting et al., 2017), only 33% of Winnipeg's 5,700 acres of industrial land is serviced.

Because of this shortfall of serviced land, some industrial development has been forced to move outside city jurisdictions where the upfront cost of servicing was deemed to be more feasible. This can lead to residential or commercial development outpacing industrial.

> **D:** "Again, land. Availability of land. And finding an appropriate location where there is a land base. Infrastructure is a biggy with an industrial area."

> **P3:** "Yeah or where are the pipes? If they're off site, then you've got to get them *to* site before they're even onsite. Off-site costs can be significant. Perhaps so significant that you can't make it work."

Discussions with informants revealed that the development of industrial land operates in a different capacity from other land uses regarding market changes and development potential. Factors including absorption rates, build out times, phasing, financing, and servicing all operate at slower rates than predominantly residential or commercial development. In Winnipeg specifically, the demand is quite high for industrial lands, however, the city's challenged from the supply side.

> **IR:** "Well, in the last 12 months, the City of Winnipeg absorbed 25 acres of industrial land. In the same period of time, the surrounding Capitol Region was 225 acres. So, the City of Winnipeg is losing business because we don't have the inventory to supply the demand."

This constraint can also be seen in immediate versus long-term return on investments. Several informants noted the slow development period for industrial development leading to a market effectively chokes out industries and relegates them to less desirable areas.

> **P4:** Servicing is the issue and as far as the constraints in Winnipeg… it's to do with competing uses outside of the city. Rarely is the constraint to do with there's houses too close. It's more that the industry's existing or placing housing too close to the industries than the other way around."

This constraint can also extend to the industrial real estate market in terms of land value. These effects can be seen in the concept known as *highest and best use,* where the real estate market dictates what is viable for a specific location based on land value. Industrial land use is typically less

dense than other land uses, taking up large plots of land but employing few people, further lowering its value. Combined with high costs of development and servicing and the risk of land use conflict, predatory real estate practices that value the higher returns on denser residential or commercial properties create a situation where industrial land is devalued and pushed out. This also constrains the potential for industrial mixed-use.

5.3.2.5 Industrial Design and Aesthetics

Another major constraint listed by informants was the absence of design controls in industrial park areas. Industrial parks tend to look different for a number of reasons suggested by informants as part of this research. Because industrial parks are devoid of residents and traveling public, there is much less focus on how buildings look as well as the appearance of the public realm. This leads to a lack of design control, but also lack of public support. There are few manicured boulevards, street trees or park areas specifically design or cared for in Winnipeg industrial parks. Lot sizes also tend to be large, with vast spaces required for storage and loading areas. This can add to the sprawling style of industrial parks. It was noted by one planner that the use of inexpensive building materials is normal throughout industrial parks and also leads to its unaesthetic appeal.

> IR: "So, in terms of design control and architectural control, it's a dangerous subject, but there definitely has to be something in place. Not quite to the degree of residential, but you know. And from my perspective, that should be set out in a planning document."

> **P2:** "If all people see is junk and piles of cars with a chain link fence, people just see it as a big mess and they want nothing to do with it."

Several opportunities for industrial site design were suggested to better improve its public image including the placement and visibility of outdoor activities and storage, the addition of

landscaping, the importance of planning for access and the routing of goods movement along major truck routes or back lanes.

Moving away from aesthetics, industrial subdivisions present a different set of constraints that can hinder development. One aspect discussed at length is the size of lots in industrial parks. When users are seeking the appropriate lot size, many are unsure of the best configuration to seek the highest return. This also creates challenges for the design of road networks and access, especially with the assumption of freight and goods movement. Whereas residential and commercial subdivisions are largely uniform in their design (save for school sites or larger commercial properties) industrial sites tend to vary between 1 acre and 10 acres and tend to be rectangular or square in shape.

> **P3:** "So, it seems to be everyone is fishing for what would be a good lot size. Then when it comes to subdivision design, you have to create a design that can accommodate all those possibilities. Given your street layout, it can be challenging to create a 1-acre lot and a 10-acre lot in the same area. Yet you may need that."

At the site scale, industrial building designs also change depending on requirements for loading and parking areas. These largely exist in excess of setbacks and required yards in a zoning by-law. Not all industrial activities require the same land use requirements, which leads to many variations in the implementation of site sizes throughout an industrial district.

> **IR**: "… to get economy of scale, you need 8-10 acre sites and you need them to be specific dimensions. They need to be rectangular. And the smaller sites need to be more square. We deal with this all the time, in terms of how to figure out what lot sizes should be."

As indicated by informants, design can play an important role for industrial districts, not only in terms of public perception but for planners and decision makers as well. If more attention is paid to the design of industrial areas, a higher chance of integration and acceptance can be

maintained. In addition, paying close attention to the needs of industrial users and the specific site requirements of each facility can improve the layout and design of industrial subdivisions.

5.3.3 Perceptions on CentrePort

A stated goal of this research is to explore the novel planning framework being utilized in CentrePort, including a line of inquiry on the original inception of CentrePort's plan and zoning by-law and perceptions regarding their implementation. Due in part to CentrePort's relatively new status, many of the informants were unable to discuss the specifics of its planning model. However, most informants were able to provide general information on the area and specific insight into related issues. Informants were also asked if they perceived any challenges or barriers to the planning model's implementation and its potential influence on other industrial districts in Winnipeg.

This section of interviews usually began with a general discussion on the nature of CentrePort and provided informants an opportunity to comment on its progress thus far. A Private Sector Planner with direct experience in the creation of CentrePort's Secondary Plan and Zoning By-law noted the unconventional aspects of its creation, touching on the contradictions posed by the creation of a more 'walkable' and form-based industrial district.

> **P2:** "It was an odd request. Not on the fact that [the Province] wanted to do an industrial park, which I think is good, but they wanted to approach it in the manner that was form-based, and more walkable. But it was ironic because I found that heavy industrial for airports and goods movement, in essence, is not walkable. The communities that it creates are not necessarily walkable. So, we were conflicted with their original request and we said, we could do this in residential or commercial communities, but how can we do this in industrial communities? It didn't make sense to us."

Industrial areas are not typically thought of as places for people, but rather places for the movement of goods and the implements with which such movement is achieved (i.e. – trucks).

This tends to result in a decidedly unwalkable landscape. There are few examples of industrial districts that utilize such zoning provisions for this very reason. These sentiments were echoed by another Private Sector Planner (one who did not work on CentrePort) who found the use of form-based elements somewhat contradictory to the exurban location of CentrePort and its regional industrial uses and clientele.

> **P3:** "I think it's a stretch out there in CentrePort. I do like the vision and the philosophy. I think in the reality of that market, (…) it would be more of a rural, large lot industrial plan. There's the rail facility where it isn't in the city, so rail facilities attract the kinds of things that need large lots. So, the kinds of interventions you're talking about, to me, they don't come to mind when I'm thinking about the kind of products that Rosser is looking to attract."

It was implied that form-based zoning and its focus on walkability and design are traditionally geared towards denser, residential and/or commercial areas which can fully support and capitalize on the kinds of development produced through that style of zoning. There is a definitive contradiction between the needs and operation of an industrial use and those of a commercial or residential use.

As seen in Chapter Four, the use of form-based elements is only applied to a specific land area within CentrePort; the industrial service and commercial sectors falling within the I1 Zone. They are not applied to the entire CentrePort planning area. However, the implementation of these higher design standards must still be questioned as Inland Port Special Planning Area of CentrePort will not contain any residential uses. Will there be people to appreciate walkability and or an enhanced pedestrian experience? Several interview participants indicated there likely will not be.

Speaking on the merits of CentrePort's planning policy, P3 indicated the use of such design controls, and specifically the nodal aspects of CentrePort, would be much better suited to an

industrial office park (something seen in Winnipeg in special land use zones called Manufacturing Mixed-use or MMU), where heavy, or noxious industrial uses are tightly controlled, and light-industrial uses are considered appropriate. These areas also have much higher design standards that set them apart from traditional industrial zones.

> **P3:** "So, I think that CentrePort model, apart from my opinion on whether it will work or not work out there, I think there's application to that idea, it's just not out there. I would see the application in smaller scale industrial scale that are in context of other uses already. Basically, closer to the city."

Altogether, the general perception of CentrePort and its novel planning framework remains a contested subject amongst planners and professionals in Winnipeg. On one hand, those interviewed agree the plan is laudable in its design and structure and holds potential, but on the other, the plan presents contradictory elements; a multi-modal inland port with areas of walkability and high design standards.

While there may be merit to the planning model's intent, there is little evidence (so far) to indicate that it will work in its intended manner. Interview respondents showed uncertainty towards the final outcome of CentrePort, citing both theoretical challenges mentioned here and operational challenges (discussed further in this Section). There were also many comments that praised the planning theories behind the plan, as well as several elements presented throughout its implementation. Despite the promise of form-based code to create predictable and efficient development patterns, CentrePort's validity as an example of industrial urbanism remains elusive.

5.3.3.1 Servicing

The challenges associated with servicing industrial development became a recurring theme throughout almost all informant interviews and provided one of the main challenges for

development within CentrePort to date. While not explicitly related to the planning framework employed in CentrePort, it remained a significant issue, regardless of who was being interviewed.

> **P4:** Development is happening much slower. It's no secret. It's happening much slower than everyone thought. But I think that's largely because we don't have services fully developed. So, you're kind of limited as to what you can even approve up there. I think the plan has some elements to it that weren't well thought out."

> **P1:** Most of those large-scale industrial developments need water and wastewater, or at least one or the other, and that is a huge multi-million-dollar project that has to be done and the municipality cannot afford to pay for it on its own. I don't think they can expect – the cost is too large to expect individual developers to pay for it."

The prohibitive costs of servicing are a major constraint, especially in a metropolitan area that doesn't have many industrial development specialists. Because many industrial developments are single-users, the high costs of development, on top of land costs and capital levy charges, can be a barrier. In another interview, P1 indicates that the majority of development in CentrePort thus far has been individual businesses choosing to relocate or new builds into already serviced areas (of which there are few). Most of these industrial users cannot afford the exorbitant costs of bringing services to a greenfield site, and so they remain undeveloped.

The 'developer pays' model in Rosser is similar in Winnipeg and represents the standard for all other types of development in the city. Whereas a residential developer can recoup the costs of servicing in short order by passing on the costs to homeowners, the same cannot be said for individual industrial users or developers. To stay competitive, cities must provide market-ready industrial lands that can readily accept new developments when required.

Much of CentrePort's future development hinges on the ability of industrial users and firms to establish themselves there when opportunities become available or necessary. According to the informants, without the availability of servicing, the costs associated with development become

too much for most industrial users. This is another instance where industrial development seems to suffer a different set of grievances to other land uses. Much of CentrePort's future growth is slated for agricultural lands, allowing firms to establish without the threat of neighbouring land use conflict but with additional servicing costs. Certain benefits do arise from greenfield development including new transportation infrastructure, a seemingly unlimited opportunity to grow, and the ability to accommodate many different types of development. The main drawback being that key services and utilities don't exist, and since individual users are often left to foot the bill, development slows drastically.

> **P4:** "The idea is that you want to develop from your services out. Start from a centralized location and not leapfrog but grow slowly outward. If the people who own that land aren't ready to sell, then you're kind of stymied until you can provide roads somewhere else. So, it's mainly been who's ready to develop when and servicing, unfortunately, is the key issue. I wouldn't say it's stalled, but it needs a bit more infrastructure than a road."

In other instances, because industry is often planned as an after thought, much of servicing required is also provided as an afterthought. In Winnipeg, Precinct Plans identify the next logical area for servicing and typically follow commercial and residential plans, however, industrial planning rarely receives the same attention.

> **P2:** "The challenge is the space and incorporating it into an existing urban area might be difficult. But when you're planning a place like CentrePort and you have vacant land, it's a little easier."

5.3.3.2 Transect and Nodal Development

CentrePort's specific land use model follows a hybrid transect where pockets of commercial and serviced based uses are planned amongst a predominantly industrial area in a gradient pattern where more intensive industrial uses give way to lighter industrial and finally to commercial type

uses. In accordance with the transect, design standards also increase and intensify along the gradient. Regarding the planning framework, P2 notes the decision to cluster non-industrial uses was a deliberate choice to lessen their ability to impact industrial development. By clustering non-industrial uses, there is less risk of land use conflict throughout the remaining plan area.

> **P2:** "If you scatter your retail and commercial and other types of uses within those particular areas, you create a lot more opportunity for conflict."

The use of nodes to cluster non-industrial developments also allows industrial uses to dominate the remaining plan area. As there are no conditional uses in the CentrePort Zoning By-law, there is little opportunity for additional complications in the development process. A lack of additional zoning considerations, buffers, conditional uses, hearings and special requirements are all lessened, as a function of the transect model.

The nodes also offer centralized locations for amenities. It is intended that these nodes will house restaurants and hotels, showrooms and shopping centres, to allow employees of CentrePort access to needed services without travelling outside the plan area. Because nodes require frontage on a walkable street, different options for development present themselves.

> **P2:** "And we had some innovative thinking that we could have the storefronts all on a walkable street with the big heavy stuff behind it. This would create a bit of a node for different kinds of shopping, or it could even be whatever industry with the retail component on the front and the warehousing and logistics facility in the back."

However, several informants were hesitant to support their use in CentrePort for several reasons.

> **P4:** "Well, developing commercial at nodes is actually quite difficult because, if you're going to have private access, you need to be set back from an intersection. But then they have the intersection where the commercial is going to happen. How do you do that?"

While the issues provided by P4 may present challenges, efforts have been made to include sample site plans and design concepts directly within the CentrePort Secondary Plan to assist in the

implementation of these nodes. Granted, with more complex forms of development comes more complex development processes. In terms of sophistication, it can be difficult for developers who are used to just doing either commercial or industrial uses. Without a significant population of residents or transient patrons, the options for commercial development become thin.

> **D:** "You have this plan that sets out these nice concepts, and again, the very little that I know about how it's set out, you have these mixed-use industrial areas, who's going to pull that off from a private perspective? Who's going to do that? I just don't know. I know of land owners on the City side of the boundary who would certainly be sophisticated enough to do it, but they're waiting for the pipe to come down to the city side where there's also planning work being done."

5.3.3.3 Expanded Design and Sustainability Requirements

Informants suggested that CentrePort's specific design and sustainability requirements are playing a larger role for new developments regardless of any special nodes being implemented yet. One Private Sector Planner discussed how many of these requirements have already been expressed through the Winnipeg Zoning By-law and that most industrial developments already adhere to these requirements. But there are slight variations that have sought to improve the aesthetics and outward appearance of the standard industrial uses permitted in the area.

> **P1:** "The form-based zoning piece is sort of the more aesthetically pleasing part that requires landscaping, active transportation pathways in appropriate locations. One of the most interesting zoning requirements for me which makes a huge difference is the glass frontage on a building."

These extra requirements, including the design standards and sustainability point system, are relatively new for many developers in the area, especially for industrial developers. This means there is a steep learning curve. Speaking from personal experience, a Private Sector Planner explained that many of the "greener" requirements of the Zoning By-law, especially the active

transportation corridor requirements, were often met with confusion and disapproval. Whereas industrial development often lacks the attention of other land uses, CentrePort was bringing these to the forefront – often at the expense of the developer.

> **P1:** "People aren't used to having to do the extra things that the CentrePort Zoning By-law requires them to do. I mentioned before, the aesthetic improvements, things like glass frontage, additional landscaping that might be required. I think that, particularly for an industrial development, it seems to be perceived as a barrier."

This isn't to say that something like active transportation would never suit an industrial park area, but the location of CentrePort at the edge of Winnipeg certainly influences what is imagined for its development. Most developers are moving out there to capitalize on lower taxes, ease of goods movement, lower shipping costs and the free trade zone, not necessarily the ability of workers to bike to work.

While the higher standards present in CentrePort's planning documents may be common elements for other commercial or mixed-use developments, the perception from developers and real estate agents is the requirements are restrictive and prohibitive. Regardless of the actual outcome of such design requirements, the fact that any requirements are placed on industrial land can be considered an impediment to development.

> **P1: "**The perceived benefit of that infrastructure is not as strong for an industrial area as it is for a residential area. They're essentially trying to take what would be requirements for a typical residential requirement and put them in an industrial development."

5.3.3.4 Fast-tracked Development

Part of CentrePort's plan moving forward was to supply market-ready land that could be moved through the development process faster than other jurisdictions. Several comments from

informants alluded to the desire of the CentrePort authority to make development as easy as possible.

> **P2:** "I think a lot of it was around the approval process. I think the province really wanted to say, "Okay, we want an industrial area and we don't want to create a situation where there's going to be a lot of issues with conditional uses," they wanted an opportunity to say, "we have a spot ready for you to go."

As previously covered in this chapter, development has been hindered by a lack of servicing, but the intent of the Secondary Plan and changes to the Zoning By-law have ensured a faster process. Specifically, the Zoning By-law does not permit any conditional uses. Aside from re-zonings, no public hearings will take place and faster movement from proposal to ground breaking. The "one-stop-shop" approach can be an attractive marketing tool.

5.4 Chapter Summary

This chapter sought to further explore industrial land use planning and the implications of CentrePort's industrial planning framework through key informant interviews and gaining insight through their personal experiences. The impact and potential of CentrePort's industrial land use model was also explored. As mentioned in previous chapters, the purpose of this research is not to evaluate CentrePort, but to explore its theoretical underpinnings and gauge its potential application to other industrial areas.

In keeping with the findings of the literature review, Winnipeg professionals identified a generally negative perception for industrial development on the part of members of the public and developers alike. There was also broad recognition of industry's place outside of the normal or desired land uses.

These sentiments were further expanded upon by examining informant responses regarding the specific challenges and constraints associated with urban industrial land

development. Industrial development experiences several forms of incompatibility beyond standard land use conflict. These incompatibilities also extend to economic valuations of highest and best use and the availability and extent of adequate servicing. Industrial development also experiences a tenuous relationship within complete community planning, often dependent on the scale of the term "community". Lastly, design is a significant driver of urban industrial development including access to transportation and lot configuration/size.

Informants were also questioned on the nature and future of CentrePort in relation to its recently adopted planning framework. Informants noted the significant challenges associated with providing adequate servicing and utilities, often citing a tenuous dance between private developers and both the RM of Rosser and the City of Winnipeg. Servicing represents a large cost to developers and is key to future development. Additionally, informants shared differing opinions on the specific features of CentrePort's planning including its transect style development, its nodal development, and the sustainability and form-based requirements of the zoning by-law. While opinions may differ, there was broad recognition that industrial development requires additional attention, especially in Winnipeg, to plan for the future.

The following chapter uses the findings and analysis of Chapter Four and Chapter Five to formulate a series of recommendations for industrial development in Winnipeg.

6 Recommendations for Industrial Development in Winnipeg

6.1 Introduction

The seven following recommendations have been distilled from the literature review, case study analysis and perspectives from the planning community regarding industrial land use planning in Winnipeg. The recommendations have been developed to address specific planning processes and policies concerning industrial development.

1. *Develop and Adopt an Industrial Land Use Master Plan:*
   - *Identify and Employ an Industrial Transect*
   - *Re-define or Re-classify Industrial Developments*
   - *Develop and Apply Appropriate Industrial Design Standards*
2. *Provide for Industry in Secondary/Concept Plans*
3. *Make Serviced Industrial Land a Priority*
4. *Seek a Supportive Political Climate for Industrial Land Use Planning*

If applied, these recommendations can contribute to the planning and design of industrial land use in Winnipeg and abroad using the principles of industrial urbanism and lessons learned through the analysis presented in this practicum.

6.2 Develop and Adopt an Industrial Land Use Master Plan

This research has revealed a set of specific challenges experienced in the development of industrial land use within urban settings. These challenges are complex and often interrelated and include challenges surrounding public perception, varying levels of incompatibility, a lack of available industrial land, outdated systems used to classify and define industrial activities, and an assumed difficulty in the mixing of industrial land uses. The literature review has also shown that industrial

land use receives a lack of attention from progressive planning initiatives like New Urbanism or Smart Growth, despite an acknowledgement from academics and practitioners that industry provides a key role in North American cities as a driver of economic development and employment.

Many of these challenges are present in Winnipeg in varying degrees. As a first step in addressing these challenges, it is recommended that the City of Winnipeg develop and adopt an industrial land use master plan. Such a master plan could better address these specific challenges by translating the broad goals and policies of *OurWinnipeg* and *Complete Communities* into a specific framework for industrial land uses. The policies currently employed in Winnipeg, while promoting a progressive vision for employment lands in the city, fail to address the issues brought to light by this research. Positive steps are being taken by the City, including the review of the *Employment Lands Strategy* expected to be released in late 2018. Unfortunately, such strategic documents lack the regulatory tools to change how and in what ways industrial land uses are provided for in the city. Without an effective and enforceable industrial land use plan, it can be difficult to achieve the vision outlined in *OurWinnipeg,* one that promotes the continued acceptance and flourishing of employment uses.

The means of planning for industrial land use is different than planning for other urban land uses. In the same way that Winnipeg utilizes a transportation master plan, it can adopt an industrial land use plan to protect, intensify and integrate industrial land uses across all sectors of development and at a city-wide scale that goes beyond site-specific interventions.

An Industrial Land Use Master Plan can support the implementation of regulatory standards and requirements that can effectively promote sustainable industrial land use within the

city of Winnipeg. These regulatory standards and requirements include the identification and implementation of an industrial transect zoning ordinance, re-defining and re-classifying industrial land uses to a new standard, and establishing industrial design standards that embody the principles of industrial urbanism. The following sections outline integral components of an appropriate Industrial Land Use Master Plan.

6.2.1 Identify and Employ an Industrial Transect

Many form-based codes are based on an urban-to-rural transect that uses the level and intensity of *urban character* to establish a linear model of development. As discussed in the literature review of this practicum, industrial uses are often left out of form-based regulating plans because their urban form doesn't fit into the transect model. This is because a traditional transect plan allows for a mix of uses in all categories governed largely by form, which implies all uses are expected to be compatible. While this practicum has shown that industrial uses are actively lessening their negative impact, many are still fundamentally incompatible with other uses, especially with residential.

Nonetheless, the regulating principles used in the transect model that focus on place and the relationship of different uses within a continuum can still be applied to industrial lands, albeit in a different way. Therefore it is suggested that an industrial transect, based on *industrial character* rather than *urban character*, be identified and employed in Winnipeg to better protect and integrate industrial development.

CentrePort's planning framework is not a true transect plan but utilizes a hybrid model that operates in a similar manner. Commercial and service-based industrial uses and nodes in the

I1 – Industrial Centre Zone transition into the light industrial uses in the *I2 – Industrial General Zone* and then to the heavier industrial and rail uses in the *I3 – Industrial Heavy Zone*. As discussed in Section Four of this practicum, there is some variation in the implementation of the I1 and I2 zones as they are found in the same land use designation (*Service-Oriented Industrial*).

To illustrate the industrial transect under the CentrePort's current framework, the land use zones can be arranged in a linear fashion to highlight the transitional relationships and the types of commercial/industrial development expected for each zone. If a radial pattern is used, CentrePort's use of nodal development becomes highlighted. The nodal pattern is an important factor when considering other land use zones and how they could interact with industrial development.

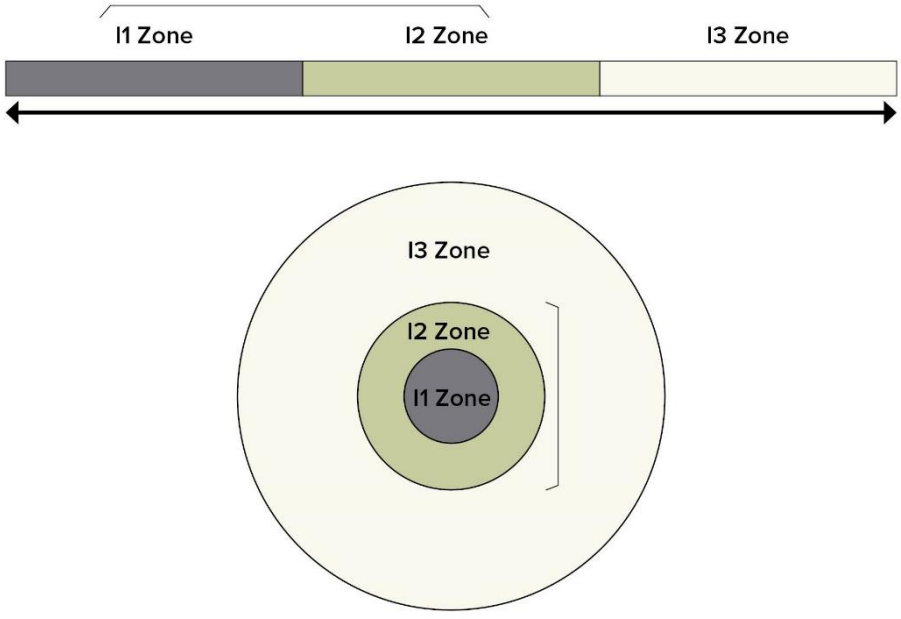


Figure 21: CentrePort's Transect (Evan Allan, 2018)

To illustrate how the industrial transect might appear in an urban context, industrial uses with high levels of compatibility are found alongside other land uses like commercial blocks, in a similar way that residential areas can be located adjacent to commercial activities. This represents a larger successional transect that includes all land uses from residential to heavy industrial, bridging the gaps between incompatible uses while maintaining the urban fabric.

Figure 22: Illustrative Regulating Plan with an Industrial Transect included. (Evan Allan, 2018)

CentrePort's industrial transect is again reflected in the organization of its street requirements, transitioning from walkable and safe pedestrian-oriented streets to industrial corridors intended for speed and movement of goods using large vehicles. CentrePort's design requirements therefore follow an inverse or negative correlation where the higher the level

industrial character (I3 – Industrial Heavy with Industrial Corridor) – the less design standards are required, and vice versa. This relationship is important to understand for the specific implications to potential industrial transects and the recognition of a specific hierarchy of road classifications and design standards that are separate from other land uses.

Figure 23: CentrePort's Design Standards (The Rural Municipality of Rosser, 2015)

Other jurisdictions have recognized industry's inherent incompatibility and have introduced specific measures to mitigate the transition from non-industrial uses to industrial to further allow and encourage industrial land use within urban areas. For example, the City of Calgary employs an *Industrial Edge District* which is characterized by:

> (a) locations on the perimeter of industrial areas where the industrial parcel shares a property line with a residential district, local street or lane abutting a residential district;
>
> (b) a limited range and size of uses; and
>
> (c) limitations on outside activities, vehicular access, and parking and loading, aimed at mitigating the impact of uses on nearby non-industrial parcels.
>
> (The City of Calgary, 2008)

Winnipeg, like many other cities in Canada and North America, employs an industrial mixed-use district (MMU) that specializes in business oriented industrial uses that produce no nuisances or land use conflicts. However, as seen in the previous section, the MMU district only accounts for 2% of Winnipeg's employment lands and has not garnered a wider application.

Another benefit of an industrial transect is its potential relationship and placement amongst other zones. The industrial transect could therefore serve to buffer incompatible industrial land uses from other uses while still ensuring a continued place within the larger urban fabric.

A key finding from this practicum has been the unique challenges associated with industrial development and the specific effects of this type of development within an urban environment. In a similar way that transect plans seek the appropriate allocation of urban elements along a continuum, an industrial transect could provide an organizing principle that redefines the appropriate mix and level of intensity of various industrial uses to provide a means of incorporating industrial land use into the urban fabric in a way that doesn't negatively affect surrounding non-industrial land uses. This can be achieved by providing a predictable and efficient method of structuring industrial land use that can easily be attached to existing modes of land use regulation. This mode of regulation would go beyond both Euclidean styles of regulation and the traditional form-based codes that fail to address industrial land use.

Central to a functional industrial transect are clear rules about how the transect operates within the city structure as well as use and design guidelines that employ the principles of industrial urbanism.

6.2.2 Re-define and Re-classify Industrial Developments

Central to any regulatory document, definitions ensure a universal interpretation of policy statements that can otherwise be misconstrued or misinterpreted. As well, land use classifications are important as a means of grouping land uses by shared characteristics and common land use impacts. Together, these methods of implementation have important functions within regulatory documents, specifically within zoning by-laws. Industrial uses are typically grouped together because of perceived the level of nuisance or because the specific operations that occur on site (either within a building or outside). As seen in this practicum, industrial developments largely maintain a negative perception, both by members of the public and by practitioners. But industrial developments are also changing and have become much cleaner and exhibit much less nuisance than their early 20th century counterparts.

In order to address the negative perceptions of industrial development, it is suggested that Winnipeg review the definitions and classifications present within its zoning by-law and update these terms as part of an Industrial Land Use Master Plan. This practicum has shown that some industrial activities will never be compatible with other land uses, but other uses, including production, distribution or repair-based industries, can be compatible with other land uses, including commercial and/or mixed-use areas. By re-classifying these uses, their availability for integration into other areas of the city increases, and negative perceptions will be reduced.

Winnipeg's Development Plan, *OurWinnipeg,* no longer uses the term "industrial", replacing it with 'employment uses'. This is a step toward reducing negative stigma and recognizing the importance of industrial uses to the local and regional economy. However, this name change does not extend to Winnipeg's Zoning By-law, where industrial zone names are based on the 'manufacturing' term, despite many other land uses being permitted there.

6.2.3 Develop and Apply Industrial Design Standards

A third recommendation for the Industrial Land Use Master Plan is the development and application of industrial design standards. Currently, Winnipeg's zoning by-law provides a limited number of design standards for industrial buildings, regardless of their location or land use impact. Comparatively, commercial zones require a much higher level of design.

Table 4: City of Winnipeg Design Requirements (The City of Winnipeg, 2006).

Design Requirement	Commercial Zones	Industrial Zones
Façades and Articulation	2 of 4 options required	1 of 3 options required
Entryway Design and Location	2 of 10 options required	1 of 10 options required
Rooftop Utility Screening Required	Yes	No
Outside Screening must be aesthetically similar	Yes	No
Pedestrian Design Features	Yes*	No
Pedestrian and Bicycle Access	Yes*	No
Paths and Pathways	Yes*	No
Façade Articulation	Yes*	No

**Applies to Large Commercial Developments

The addition boulevards, street trees and the provision of active transportation on public streets as well as higher standards for buildings materials, landscaping requirements, buffering or hiding outside storage can be applied to zones of an industrial transect via an inverse correlation, akin to the development standards present in CentrePort. Area-specific interventions can also be planned for including the location and arrangement of truck routes to avoid noise and light pollution, as well as offering various sizes and configurations of industrial parcels which would reflect their position along the industrial transect.

6.3 Provide for Industry in Local Area Plans

Within Winnipeg's planning hierarchy, Local Area Plans (LAPs) provide the highest level of policy detail for specific urban areas and provide key directions for regulatory documents Including the City's zoning by-law. LAPs establish a vision for a specific area and build consensus around policies related to land use, urban form, transportation, parks, and other planning principles. LAPs can take several different forms including *Neighbourhood Plans* for already established communities and *Area Master Plans* for identified Major Redevelopment Sites. LAPs provide an opportunity to plan for industrial land use within the urban fabric. This can be achieved in several ways:

Neighbourhood Plans can be used to improve the planning, intensity and integration of existing industrial areas within the city. As seen in Chapter Three, Winnipeg contains several large industrial districts. The development of industrial Neighbourhood Plans could provide additional policies and direction within these existing industrial districts to further expand protections, respond to changes in surrounding communities and accommodate future growth. Because Winnipeg's existing industrial areas are situated amongst other land uses they present opportunities to fully realize the principles of industrial urbanism whereby industry can be fully integrated into the urban fabric. Opportunities for enhanced transportation, improved design standards, industrial mixed-use, and the implementation of an industrial transect are all possibilities for an industrial Neighbourhood Plan.

Area Master Plans can provide for industrial land uses within Winnipeg's Major Redevelopment Sites. Currently, two Major Redevelopment Sites sit on designated industrial lands (see Figure 4). One of these sites, Bishop Grandin Crossing, is already set to establish a mixed-use area complete with residential, commercial and industrial land uses, being a first for Winnipeg.

Figure 24: Bishop Grandin Crossing Conceptual Site Plan (Hopewell Residential, 2018).

Major Redevelopment Sites are identified in *OurWinnipeg* as strategic development opportunities that can serve as catalysts for other development in the city. Ensuring the last remaining industrial Major Redevelopment Site maintains its industrial nature is an important step in keeping industrial land use viable within central urban areas in Winnipeg.

6.4 Make Serviced Industrial Land a Priority

One of the largest constraints for industrial development, as reported by informants, is a lack of adequately serviced industrial land. This research has shown that the availability of serviced land affects industrial developers differently than residential or commercial developers. This is due to slow build-out periods, low return on larger industrial parcels, and the negative effect that industrial land use has on the neighbouring land uses. In turn, industrial development is often

forced away from population centres and further into the suburban areas of the city, or into other jurisdictions where servicing is less expensive.

Utilizing a similar approach to all forms of development in the city puts industrial land uses at a disadvantage when it comes to development potential. Given the expected shortfall of serviced industrial land indicated in the 2008 *Employment Lands Study,* it is recommended the city re-evaluate its approach to the servicing of industrial lands and re-organize their priority in keeping with other land uses. By planning for and providing services to industrial areas, the City can increase development potential and enable the industrial market to stay competitive.

6.5 Seek a Supportive Political Climate for Industrial Land Use Planning

Elected officials and community members can support the continued investment in the industrial sector by following the recommendations of *OurWinnipeg* in terms of the various employment lands policies found within It. Since policy decisions are made at the council level, political buy-in is an essential factor towards adopting policies that are more inclusive of industrial needs and requirements. Additionally, site specific decisions for conditional uses and variances are made by selected committees within the City's approval system. Elected officials that sit on these committees can demonstrate their support by voting on matters that forward the goals of the City with regard to industrial development.

As indicated by the informants of this practicum, the provisions of adequately serviced industrial lands and the continued political support to work with industrial developers and industrial users is integral to the continued success of industrial districts in the city. Planners play an important role by continually informing elected officials of the city-wide benefits that industry provides and need

to address them in different ways to maximize their potential. Planners can also help build awareness and educate both residents of an industrially identified area and the larger public on the merits of industrial development.

6.6 Chapter Summary

The recommendations provided in this chapter show many opportunities to improve industrial development within Winnipeg. Solutions to these problems are not easy and will involve the cooperation and collaboration of many different partners. At the highest level, the development of an Industrial Land Use Master Plan would provide planners and decision makers in Winnipeg with the opportunity to reinvigorate the industrial land use sector establish a new set of industrial policies to support future industrial growth. Following the release of the 2018 Employment Lands Study, Winnipeg will have extensive and updated data with which to make informed decisions regarding industrial land use.

Part of every master planning process is a robust engagement program to learn from industrial users and members of the public. The re-definition and re-classification of industrial land uses will open new opportunities for business owners and lessen the risks associated with potential land use conflicts which provide some of the biggest constraints for industrial development. Additionally, the creation of industrial design standards can ensure high quality industrial areas become the standard in the city, further reducing land use conflict and attracting new business.

However, the creation of a master plan is not the end, and further actions are needed. Local Area Plans, continued servicing and infrastructure investments and supporting political climates are needed to ensure the industrial sector in Winnipeg remains an important and well-regarded

economic driver for years to come. This practicum has shown the important role industry plays in Winnipeg and the importance of continued investment.

> **IR:** "What I think everybody is missing is that industrial development is the engine behind everything else. It drives housing, it drives commercial, it drives everything, it's jobs. You have to invest…"

7 Conclusion

7.1 Responding to the Research Questions

This practicum was guided by four separate research questions. By addressing the core themes of each question throughout the course of the project, a series of recommendations were developed. Below is a summary response to each question explaining how the key lines of inquiry used in this practicum have or have not addressed the questions.

1. What lessons can planners learn from CentrePort's planning and zoning?

CentrePort represents a novel case of industrial land use planning unique to Winnipeg and Manitoba. CentrePort has shown that industrial development can be conceptualized and considered in a much different light than previously thought. History has shown a peculiar relationship between urban settlements and industrial development, largely inspiring the ubiquitous Euclidean zoning that seeks to separate land uses to the detriment of urban form. As planning has changed, so too has industry but we are only now beginning to see the potential that more flexible industrial land use planning holds.

CentrePort also shows the potential of a form-based code to be applied to industrial development. This relatively new planning tool has typically been applied to residential or commercial areas, however, CentrePort shows that, with slight alterations, the tenets of new urbanism can be applied to industrial development in new and exciting ways. Where once industrial development was relegated to "special districts" outside of the standard transect, the introduction of an industrial transect, based on the scale and intensity of industrial character can be realized.

These changes have ushered a new movement; *industrial urbanism*. Academics and practitioners are beginning to understand the importance of maintaining and developing our industrial areas, not only for economic reasons, but for the overall health of cities. CentrePort can be considered part of this movement, in recognition of its novel ideas, and expanded policies that seek to promote the use and development of industry in Winnipeg.

As a limitation of this study, CentrePort is relatively new and as such, lessons may still be learned as its planning is further implemented over time. Both the effectiveness and ultimate form of CentrePort will better inform planners and decision makers as to the ability and relevancy of CentrePort's planning.

2. What is the current role of industry in the land use planning framework of Winnipeg?

Winnipeg has always benefited from its industrial past. With several, large industrial areas and a very diverse Industrial sector, the city has seen modest but steady economic growth over the years. But Winnipeg is not without constraints to its industrial development. As the recent industrial land use study shows, Winnipeg is facing a shortfall of serviced industrial land. As pressures mount, planners can be more active in their role to plan for industrial development. Many of the interview participants in this research referred to industrial development as an "afterthought" and something not requiring much attention. But as Winnipeg continues to grow and seeks to become a thriving and vibrant city, there is little excuse to leave out one of the core sectors of land use. Winnipeg's current development plan does provide a vision for its employment lands in the years to come, however, as this practicum has shown, there is much work to be done.

3. How and in what ways can a conceptual zoning framework better address the needs and current challenges facing urban industrial development?

This practicum has shown how the development of an industrial transect can be used to conceptualize and address many of the constraints currently facing industrial development in Winnipeg. Many of these constraints are complex and interrelated which supports the suggestion of overall change to planning and zoning for industrial development.

Foremost of these constraints is the availability of industrial land, often driven by a lack of servicing and the potential for land use conflict. The use of an industrial transect addresses both constraints by allowing industrial development to fully integrate into the urban fabric recognizing and capitalizing on the available compatibility between land uses. In traditional Euclidean zoning, there is an established separation between land uses, especially between industrial lands and others uses. Using an industrial transect, these lands are provided for in a logical manner and situated within the city based on their level of industrial intensity. By re-integrating industrial development into the urban fabric, the allotment of serviced lands becomes more available and the risk of potential land use conflict is reduced.

An industrial transect would include further measures such as design guidelines and expanded classifications for industrial developments. By identifying industrial activities based on their level of intensity, planners and decision makers are better able to place them where they can be appropriately accommodated. For uses that may experience some level of incompatibility, the use of design guidelines and additional siting measures can further their ability to integrate into the urban fabric.

4. What physical and policy-based planning and/or zoning strategies should cities pursue to apply the principles of industrial urbanism?

Many strategies have been discussed in the findings and analysis of fthis practicum and constitute the recommendations found in Chapter Six of this practicum. In summary, these physical and policy-based strategies include:

1. Developing and adopting an industrial land use master plan
2. Identifying and employing an industrial transect
3. Re-defining industrial land uses
4. Re-classifying industrial land use groups
5. Developing and applying industrial design standards
6. Providing for industry in Local Area Plans (both for existing and future industrial areas)
7. Making serviced industrial land a priority
8. Seeking a supportive political climate for industrial developments

7.2 CentrePort's Current Status

This research provides a case study of CentrePort and its core planning documents, but CentrePort does not exist in a vacuum and is rapidly developing. While this practicum did not evaluate CentrePort's planning or the impact of its development, there are currently two multi-lot sites in active development (roughly 160 acres of serviced, I2 Zoned land) and further eight sites either sold or conditionally sold for future development. In addition to the many industrial areas in various stages of development, both the CentrePort Canada Rail Park (in the RM of Rosser) and the CentrePort lands in the City of Winnipeg are currently in the planning stages.

Several infill sites have been completed in CentrePort's pre-existing industrial park areas along Brookside Boulevard (Route 90) since the adoption of the Secondary Plan and Zoning By-law. The majority of CentrePort's industrial development, including any recently completed infill, has been zoned I2 or I3 and largely resembles conventional industrial park developments. One

conditionally approved site is seeking I1 zoning and may introduce several new features to the Special Planning Area in the near future.

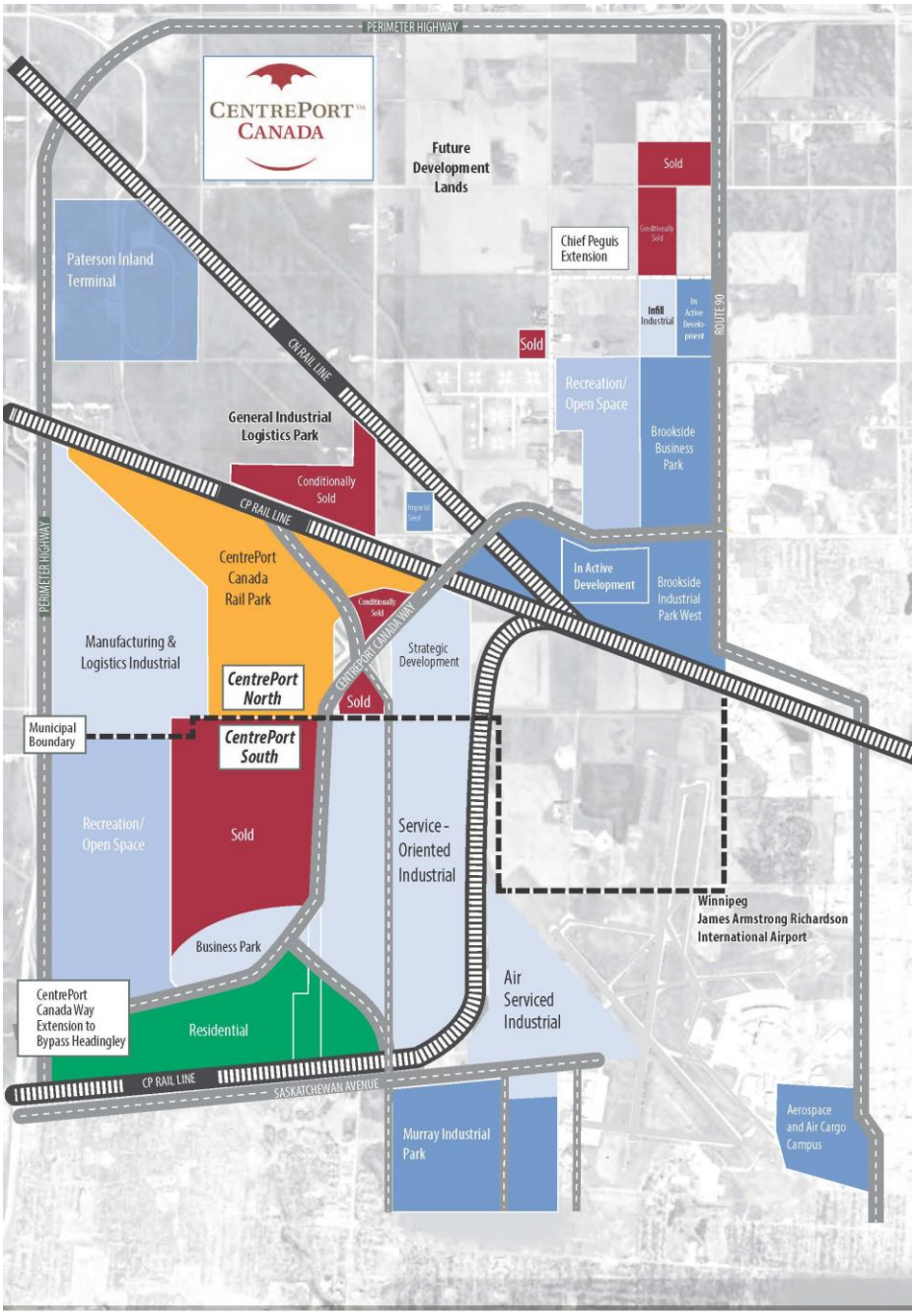


Figure 25: CentrePort Current Land Use Map (CentrePort, 2018)

7.3 Directions for Further Study

There are various opportunities for further research related to the study of planning and urban industrial districts. As additional typologies of industrial districts are constructed and maintained,

it would be informative to complete detailed evaluations of their planning frameworks based on the outcomes of their built form compared to the original intent of their planning model. Within Winnipeg specifically, CentrePort will continue to develop as servicing requirements are met and initial stages of development completed. This evolution will provide a great opportunity to inquire with industrial users who would have proceeded through the planning process within CentrePort as to their experiences and the outcome of their decision to develop.

Another planned but not yet constructed area of Winnipeg, Bishop Grandin Crossing, is scheduled to be built in the next five to ten years and will feature residential, commercial and industrial developments within a 100-acre site. The site has been described as the new standard for mixed-use development in Winnipeg and will become one of the first mixed-use communities to explicitly feature an industrial component. Like this research practicum, an exploratory case study of such a neighbourhood could aide in the understanding of industrial development in mixed-use communities using a real-world site where residents, business owners and industrial users could be questioned. This would provide additional insight into a relatively unknown area of planning.

Additionally, several of the recommendations made in this practicum have been based on the existence of negative perceptions about industrial uses among members of the public. Additional research would be important in assessing public opinion on specific industrial uses and in gauging attitudes toward mitigation, industrial design interventions and subsequent industrial transect models.

At a more theoretical level, additional studies could be conducted on cities that have recently completed industrial land use studies and the efforts made as a result of such studies to evaluate their effectiveness. The recommendations being made by these studies are continually

being informed by the latest academic research. This practicum alluded to the changing nature of industrial development in contemporary cities, but further research could provide more information on the extent of this change, and how impactful it might be.

7.4 Concluding Remarks

As industrial land use continues to gain importance in today's urban landscape, planners have an opportunity to rethink how such land uses are framed and incorporated within the urban fabric. While industrial land use has received a less attention in the planning community, this practicum has shown there are specific approaches that can change the status quo for the benefit of all. This practicum has also shown there are certain industrial land uses that are, by their nature, incompatible. But smaller, cleaner and greener industrial activities blur the line between industry and commercial activity and can provide the catalyst for change.

Initiating these changes will require a combined effort – not just from planners, but developers and politicians. Winnipeg is already on the right track in terms of a shift in thinking about industrial land use using the policies of *OurWinnipeg* and *Complete Communities.* However, despite promising goals, there is much work to be done. The development of an Industrial Land Use Master Plan along with the establishment of an industrial transect, a complete reclassification and redefinition of industrial activities and the development of industrial design guidelines will continue to change perspectives and encourage the type of industrial development that can remain an integral part of Winnipeg's economic portfolio.

Additionally, infusing industrial land use into future planning initiatives at a more local level, as well as placing a renewed focus on servicing industrial lands, can make strides in creating a supportive political climate within which industry can thrive. Together, these recommendations

have the potential to carry industrial land use from a downtrodden past into a bright and sustainable future.

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Appendix A: CentrePort Secondary Plan Analysis Table

Major Policy Area	Sub-Policy Area	Description
Guiding Policies	**General**	The general objective of the general policy section is to protect, enhance and promote land use and development that will contribute to the establishment of a comprehensively planned and functionally integrated inland port which is compatibly co-existent with the greater Rosser municipality.
	Sustainability	The sustainability policy section aims to incorporate sustainability into the development process and help reduce the impact of future development on the natural environment, improve efficiency of infrastructure and reduce energy use.
	Environmental Protection	The environmental protection policy section recognizes existing natural features and archaeologically significant sites within the plan area and policies in this section reinforce CentrePort Canada's mandate to protect the surrounding natural environment.
	Existing Development	Existing development recognizes the residential and other land uses currently present in the plan area and ensures new industrial development remains as un-intrusive as possible.
Land Use	**Service-Oriented Industrial Designation**	Lands identified as 'service-oriented industrial' are mainly intended for low impact industrial, commercial and retail uses that are relatively small to moderate in size. Commercial and retail uses are to be directed to site-specific nodes developed at strategic locations throughout the plan area, based on market demand. Service-oriented commercial and retail development will not be permitted to scatter generally across the plan area but must be clustered together and should support pedestrian-oriented streets and have higher building and streetscape design standards that improve the pedestrian experience. This section includes specific policies for both industrial uses and the commercial/retail uses.
	Manufacturing and Logistics Industrial Designation	Manufacturing and Logistics Industrial is intended for intense large-scale or heavy industrial uses, served by large buildings and cargo vehicles. These areas are accessible and interconnected but not pedestrian-oriented. The areas should not cater to highway

Major Policy Area	Sub-Policy Area	Description
		commercial uses, but rather to industries that are tied to the overall inland port concept.
	Rail Serviced Industrial Designation	To utilize access to existing rail infrastructure, the Rail Serviced Industrial designation is intended to help facilitate the development of a Common Use Rail Facility. The designation is intended for uses specifically oriented towards the rail facility.
	Open Space Designation	The Open Space designation is intended to protect existing public open space and ecologically sensitive areas within CentrePort. These include Little Mountain Park, existing creeks and drainage channels. These will be used to support ecological function and active transportation pathways within the plan area. Other small open space uses will be encouraged and approved upon review by the Approving Authority.
Transportation	**General**	Transportation is key for an inland port to function effectively and efficiently. The Transportation policy section outlines the key objective to facilitate all modes of transportation including cars, trucks, busses, bicycles and pedestrians. Rail and air transportation are both federally regulated, however the policies of this section will ensure future development does not negatively impact the operations of these means of transportation.
	Connectivity	The intent of the Connectivity section is to ensure the development of internal transportation network maintains a similar standard of development across municipal boundaries and that the transportation network improves local and regional connectivity.
	Roads	The Road Section identifies can classifies a road hierarchy including Expressway, Arterial, Collector and Local roadways.
	Street Overlays	The Street Overlay section is intended to guide form and character of adjacent development. All roads within CentrePort fall into one of three overlays, including: Industrial Corridors, Active Transportation Corridors and Walkable Streets. Industrial Corridors are the standard for all roads within CentrePort unless identified otherwise. Roads that share the right-of-way with active transportation facilities are identified as the Active Transportation Overlay. Lastly, Walkable Street policies will be used for commercial nodes.

Major Policy Area	Sub-Policy Area	Description
	Transit	The Transit policy section provides for the future integration of bus service to and from CentrePort.
	Active Transportation	The Active Transportation (AT) section provides for the establishment of an AT network within the plan area.
	Rail	Rail policies protect existing rail networks, their connections, and provide opportunities for future Common Rail Use Facility related uses.
	Air	In accordance with Canada's *Aeronautical Act*, development near the James Armstrong Richardson International Airport should protect and reinforce the operation of air transportation.
Urban Design and Landscaping	**General**	Urban Design and Landscaping will be applied to Active Transportation and Walkable Street Overlays to ensure a high standard of development throughout the plan area and enhance the identify of CentrePort as an innovative inland port. The policies of this section will be reinforced by the provisions outlined in the Zoning By-law. This section also includes several illustrations and example site plans to encourage and support the development of urban design principles.
	Service-Oriented Industrial	The section applies design standards to Service-Oriented Industrial lands adjacent to Walkable Streets and Active Transportation Corridors. Active storefronts, building envelopes, sitting areas, bike lanes and urban forms should be integrated where possible.
	Manufacturing and Logistics Industrial	Policies are generally permissive so as to not restrict the development and function of industrial uses but restrict building heights to three storeys maximum.
	Rail Serviced Industrial	Like the Manufacturing and Logistics Industrial areas, policies are permissive to allow all forms required for rail development.
	Street Trees	Trees are required along Walkable Streets and Active Transportation Corridors to provide for the pedestrian and AT experience.
Municipal Servicing	**General**	This section provides policies concerning water, wastewater and drainage throughout the plan area. At the time of writing Secondary Plan, CentrePort had not yet secured

Major Policy Area	Sub-Policy Area	Description
		water and wastewater servicing but was in the early stages of planning and agreements with adjacent municipalities and water co-ops.
Aggregate	**General**	To accommodate the existence of significant aggregate mineral resources in the plan area, the Aggregate policy section is intended to allow for the extraction of such resources prior to redeveloping the area for more intensive industrial land uses.
Implementation	**Interpretation**	This section provides policies concerning the rules of interpretation of maps, overlays and the specific language used in the plan.
	Phasing	Phasing is intended to follow the extension of servicing. Development should follow a contiguous pattern to facilitate the efficient use of services. Deviations may be considered to provide opportunities for un-serviced development. To maximize the development potential of CentrePort, significant amounts of light industrial uses should not be permitted before heavier industrial has had a chance to develop.
	Zoning	This section references the Zoning By-law and the standards established in its urban design framework.
	Concept Plans	The Approving Authority may request a developer prepare a concept plan as part of the development application process, touching on relevant development parameters.
	Development Applications **Engineering or Technical Studies** **Amendments** **Monitoring**	The final sections of the Secondary Plan deal are common administrative sections found in most Development Plans and Secondary Plans in Manitoba

Appendix B: CentrePort Zoning By-law Analysis Table

Part	Section	Description
Part I - Administration	**N/A**	Part I of the by-law serves as an introduction outlining the broad responsibility and powers of the zoning by-law. The sections of this part contain a standard set of administrative provisions including the general intent and purpose, responsible authorities, development agreements, permitting, non-conformance, and the issuance of variances.
Part II – Interpretation and Definitions	**N/A**	Part II deals with the interpretive provisions of the by-law including a list of all relevant terms and their associated definitions. Definitions serve several important functions including removing ambiguity, providing specific meanings to specific terms, and allowing for the shorthand of terms.
Part III – General Provisions	**N/A**	Part III provides development regulations that apply to all lands and developments within the planning area, regardless of the zone they appear in. These clauses include provision for parking, loading, signs, accessory uses, temporary uses, yards and several other specific uses with regulations that apply regardless of their zone.
Part IV – Zones	**N/A**	Part IV outlines the various zones and the zone-specific provisions of the CentrePort Special Planning Area. This part of the by-law contains several key regulatory sections including the use table, dimension (bulk) table and the required standards for sustainable development and performance. Part IV also contains the general descriptions of the land uses, building and streetscapes found within each zone. The CentrePort Zones are "form-based," which places the focus upon the built form and its relationship to the public realm. This provides stronger controls over urban character and function, and the means to achieve development objectives with greater certainty.
	I1 - Industrial Centre Zone	The Industrial Centre Zone is generally oriented toward light industrial uses and medium-scale retail, service, office and accommodation uses. Buildings have the smallest footprint but can be up to 10 storeys in height. Associated streetscapes are pedestrian-friendly with inviting sidewalks, street furniture and landscaping.
	I2 – Industrial General Zone	The Industrial General Zone is oriented toward industrial uses including manufacturing, distribution and trucking uses. Buildings are larger and up to 3 storeys

Part	Section	Description
		in height. Streetscapes are comprised of utilitarian frontages including loading docks, and accommodations for trucking and delivery services.
	I3 – Industrial Heavy Zone	The Industrial Heavy Zone is intended for heavy industrial uses including multi-modal, inter-modal and specialized shipping facilities. Buildings have the largest footprint in the planning area and no more than 3 storeys in height. Streetscapes are industrial in nature.
	Open Space Zone	The Open Space Zone is intended to protect areas for parks and recreation and to protect environmentally sensitive lands.
	CentrePort Rural Zone	The CentrePort Rural Zone is intended to preserve and protect land for future industrial and commercial uses in keeping with the vision for CentrePort as an inland port. Existing lawful uses are permitted to continue in their current state until such time as they are required for industrial development. Existing use are predominantly residential or agricultural in nature.
	Walkable Street Overlay Zone	The Walkable Street Overlay Zone requires pedestrian-friendly streetscapes with inviting sidewalks and other amenities to support pedestrian comfort and commercial activity. Walkable Streets must be flanked on either side by land zoned I1.
	Active Transportation Corridor Overlay Zone	The Active Transportation Corridor Overlay Zone includes support for pedestrians, cyclists and public transit infrastructure to improve safety and aesthetic appeal.
	Industrial Corridor Overlay Zone	The Industrial Corridor Overlay Zone prioritizes the efficient movement of industrial traffic and cargo. Infrastructure is designed for large trucks with minimal amenities.
Appendix A	**N/A**	Appendix A includes two maps for the CentrePort area; a regional setting map and a zoning map.
Appendix B	**N/A**	Appendix B includes supplemental parking standards and illustrative guides including walkable street standards, active transportation corridor standards and industrial corridor standards, and a general design standard guide.

Appendix C: Interview Schedule

Interview Schedule

For the purposes of this research, industrial development is a generalized term meaning: manufacturing, transportation and logistics, resource extraction, warehousing, and goods movement in various scales and intensities.

Please state your name and describe your professional title.

1. How does your professional work relate to planning or zoning for urban industrial developments?
2. **a)** Drawing on your professional experience, what do you believe is the current state of urban industrial land use planning?

   b) What is the current state in Winnipeg?
3. Do you think urban industrial land use is adequately addressed in planning practice? Please qualify your answer.
4. a) What do you perceive to be the 'constraints' when planning for urban industrial development?

   b) Are these constraints present in Winnipeg?
5. As a framework or model for industrial land use planning, what are your thoughts on the CentrePort Secondary Plan and CentrePort Zoning By-law?
6. Do you perceive any challenges or barriers in the implementation of CentrePort's planning and zoning into the future?
7. a) Do you believe there's a place for industrial development in mixed-use planning or 'complete community design'? If so, where do you see it?

   b) Do you think stronger integration of urban industrial development can play a role in creating complete communities? Please qualify your answer.

   c) Drawing on your professional experience, do you believe industry has a place in the idea of urbanism, as you understand it today?

8. a) As Winnipeg continues to grow, what policies do you think it should pursue to ensure the retention and integration of both current and future urban industrial developments?

   b) To your knowledge, are there specific design strategies that Winnipeg should pursue to achieve these goals? What are they?

9. a) Do you think the CentrePort model will influence planning and zoning for existing or future urban industrial lands in Winnipeg?

10. a) Based on your professional experience, does land use planning influence the operation, viability or performance of an industrial district? How does/doesn't it?

    b) Based on your professional experience, *can* land use planning influence the operation, viability or performance of an industrial district? How can/can't it?

Additional questions for ***those identified to have worked on the CentrePort Secondary Plan and Zoning By-law:***

1. a) What was the impetus behind the creation of the CentrePort planning and zoning model?

   b) Were there any immediate challenges or barriers in its creation? If so, what were they?

2. What were the perceived benefits of choosing this hybrid model of industrial district as opposed to a traditional Euclidian industrial land use model?

3. Was there any opposition to the plan? From who and why?

4. In your opinion, does CentrePort promote a positive approach to urban industrial land use planning? How does/doesn't it?

Appendix D: Certificate of Ethics Approval

UNIVERSITY OF MANITOBA | Research Ethics and Compliance

Human Ethics
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PROTOCOL APPROVAL

TO: **Evan Allan** **(Advisor: David van Vliet)**
Principal Investigator

FROM: **Kevin Russell, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol J2017:091 (HS21052)**
"The New Industrial Urbanism: Planning and Zoning for Industry in CentrePort, Rosser, Manitoba"

Effective: October 11, 2017 **Expiry:** October 11, 2018

Joint-Faculty Research Ethics Board (JFREB) has reviewed and approved the above research. JFREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*.

This approval is subject to the following conditions:

1. Approval is granted only for the research and purposes described in the application.
2. Any modification to the research must be submitted to JFREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to JFREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to JFREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

Funded Protocols:
- **Please mail/e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer in ORS.**