City of Regina

Industrial Growth Study – Final Report

August 2007

Executive Summary

Metropolitan Knowledge International, in association with UMA, Meridian Planning Consultants, and the Centre for Spatial Economics, has completed an industrial growth study on behalf of the City of Regina, to determine the strategic directions for future industrial growth in the City. This report presents the findings of the study. The report provides a forecast of how much industrial land the City will require over the next twenty-five years, recommends where that industrial development should be accommodated, and provides a strategy for managing the pace of land development to meet variable demand.

Analysis and Key Findings

The methodology employed in undertaking the industrial growth study was based on economic forecasts for the City of Regina using a 2031 planning horizon. Employment forecasts for 2031 were used to calculate the demand for industrial land, which was then compared to the current supply of industrial lands. Four industrial land development options were then prepared in order to address the projected shortfall of industrial land. These options focused on the location, amount, and type of industrial use; each was then analyzed from a technical standpoint and evaluated according to a series of technical criteria that considered land use/environmental, transportation, and municipal servicing constraints.

This study deals with the requirement for fully serviced industrial land in the City of Regina, and does not deal with rural industrial developments such as the Sherwood Industrial Park, as the intent of the report is to focus specifically on employment growth and resulting industrial land requirements for the City of Regina. All forecasts deal specifically with the economy, land requirements, and resulting servicing impacts for the City of Regina.

Economic Context and Demand for Industrial Land

The economic forecasts completed for this study indicate continued employment growth in the City of Regina. The forecast considers the broader economic growth trends for the City, which reflect a strong employment base in industries with the greatest potential employment growth. Although overall employment in the City has increased at roughly the same rate as the provincial average, the analysis indicates that employment growth in the wholesale trade, warehouse, and transportation sectors are expected to experience the strongest growth.

The City has recently seen increased activity in industrial land sales. The economic forecasts suggest that this will likely continue, albeit at a slower rate. Growth in industrial employment in Regina is forecast to be concentrated in the wholesale trade and warehouse/ distribution sectors, while employment in manufacturing likely to decline over the forecast period. The bulk of growth is therefore likely to take the form of light industrial uses.

Employment densities were used to calculate the resulting demand for land by sector, producing a total industrial land need forecast for the period 2006 to 2031 of between 222 and 365 hectares of land (548.5 acres and 901.4 acres). This

equates to an annual absorption of 8.9 to 14.6 hectares (21.9 to 36.1 acres), a significant increase over the average rate experienced over the past few decades.

Supply of Industrial Land

The City of Regina is currently experiencing a shortage of serviced industrial land. The planned expansion of Ross Industrial Park will bring more land on stream in late 2007, however, much of the remaining industrial lands within the City are affected by significant constraints (e.g., fragmented parcels, poor accessibility, currently under development, or constrained by the aquifer or proximity to the landfill and Upgrader facility). Even once the expansion of the Ross Industrial Park is available to the market, there will be a supply of industrial lands to meet needs for the short term future only. There is a net overall land requirement for 155 to 298 hectares (383 to 736 acres) of additional land to meet forecast demand to 2031.

Further, there is a lack of large parcels within the City that could be made available to a prospective large industrial user. The City's ability to attract new, large employers may be challenged by not having a suitable location identified and readily available to host them.

Expansion Options

Two primary issues are highlighted by the supply and demand analysis described above, namely that there is a short-term shortage of large, serviced parcels that can be offered to prospective firms requiring land expansive facilities, and that the City will face an overall shortage of industrial lands in the medium and long term. In order to address this projected shortfall, five geographic areas were considered as potential locations for industrial expansion, namely:

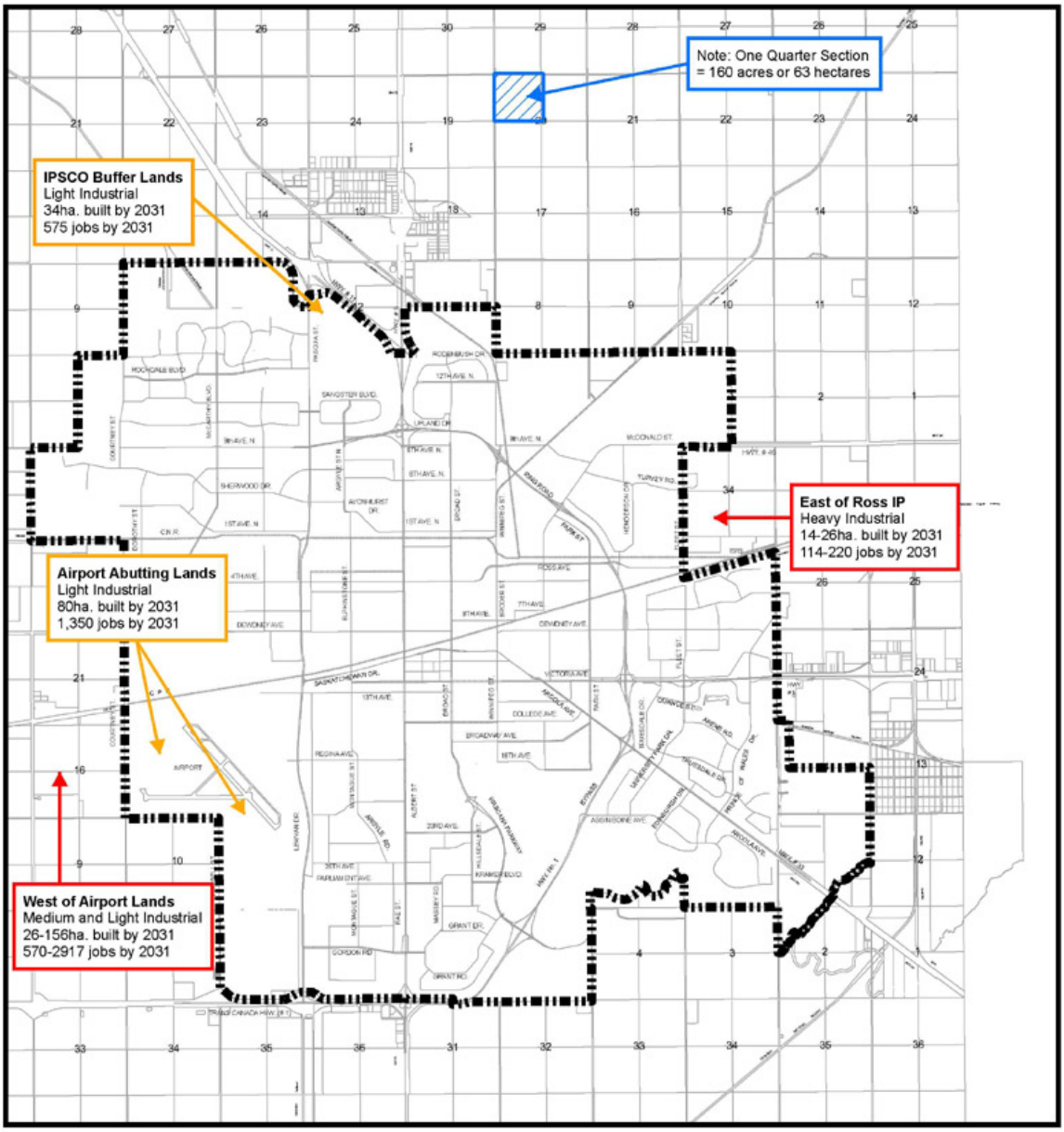
- North of Ross Industrial Park, northwest of the Co-op Refinery, outside the City's boundary;
- East of Ross Industrial Park, immediately north of the CPR mainline, outside the City's boundary;
- North of Argyle Park/Kensington Greens, within the 1,000 metre buffer lands south of IPSCO;
- Lands currently designated industrial adjacent to Regina Airport;
- Lands west of the Airport, outside the City's boundary

Four broad strategic options (Options A through D) were developed by combining these potential expansion areas, to provide a supply that would meet the identified demand for land. The options were presented to key stakeholders and the public for their input. The options are described in Section 5 of this report; analysis of each option from a land use, environmental, transportation, and municipal servicing perspective is contained in Chapters 6 through 10 of this report.

Preferred Option

On the basis of the underlying assumptions and analysis, Option B has been recommended as the most appropriate development strategy. The map overleaf shows the areas recommended for growth.

Preferred Industrial Growth Option (B)



This option includes four industrial growth areas:

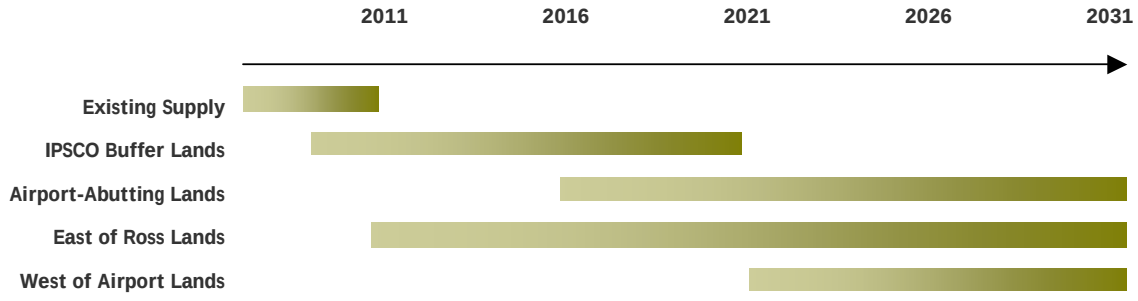
- Lands designated industrial adjacent to the Airport, per the Southwest Sector Plan
- The IPSCO Buffer Lands, north of Argyle Park/Kensington Greens
- An expansion of Ross Industrial Park to the east, outside the City's boundaries
- Lands west of the Airport, outside the City's boundaries.

This option is preferable for several reasons. Development of light industrial uses adjacent to the Airport is desirable, as warehouse and distribution facilities and other "clean", light industrial uses are a compatible form of development near an airport. This location also provides good connections to rail, air, and road transportation facilities, and best supports the economic development objectives of the Regina Regional Economic Development Authority. Similarly, light industrial uses in the IPSCO buffer lands provides a logical buffer between residential and commercial uses in the Rochdale Boulevard Area and IPSCO to the north.
By also providing for an additional expansion of the Ross Industrial Park, the option also ensures continued availability of lands for firms that wish to expand in this area, and maintains available lands on the east side for access to Highway 1 and rail infrastructure in this area. It also provides for a potential location for heavier industry in this area.

From an infrastructure point of view, Option B has the additional advantage of providing more flexibility in terms of when servicing is provided, such that growth can take place on lands east of Ross at the same time as development of the lands west of the airport, allowing for the timing of major potential infrastructure projects to be spread out. This flexibility also provides greater choice to the market, in terms of offering multiple potential locations.

Recommendations: Potential phasing and strategy implementation

The City has a short term need for additional lands, as well as the longer-term requirements identified by this study. The proposed phasing strategy would see the introduction of several new industrial areas in the short term, to provide a supply of lands to meet the current high demand, with more lands coming on stream as demand requires later in the forecast period. Although more detailed infrastructure planning will be required to link the infrastructure requirements associated with these new growth areas with the City's existing plans, a logical phasing of the option would be as follows:



In order to achieve this timing, planning for the IPSCO Buffer Lands would commence immediately, and planning work for annexation of the East of Ross lands

would be required to commence immediately. More detailed planning for the Airport Abutting Lands should also commence, with an anticipation of these lands coming on stream between 2012 and 2016. Finally, lands West of the Airport would be annexed, planned, and serviced to come on stream roughly in 2021.

Implementation Considerations

Key implementation considerations for this strategy are as follows:

- *Providing lands for heavy industrial users.* Aquifer constraints impact virtually all potential industrial growth areas in and around Regina. The East of Ross lands are identified for heavy industrial use in the preferred option, but this area is itself relatively limited in size. Further work will be required in the medium to long term to identify additional suitable lands for heavy industry.
- *Ensuring a range of parcel sizes are available, including large parcels to accommodate potential large new industrial users.* When new lands are brought on stream, it will be critical to ensure that large parcels are available, through the detailed planning conducted at the time. The identified growth areas all allow for large parcels to be provided.
- *Maintaining a Larger Supply.* Given the reality of higher demand for industrial land, and the volatility of that demand, it is very important that the City ensure that a much longer-term supply of industrial lands be protected and the supply maintained. It is also important to ensure that there are choices available to the market – that is, that firms searching for industrial lands have a variety of potential locations to choose from. The City needs to ensure that a larger supply of available lands is available to prospective new or expanding industrial firms, to ensure economic development opportunities are not missed.
- *Facilitating Development.* Having historically been the major industrial landowner and developer in the City, the City of Regina is now one of several large industrial landowners/ developers, and the role of the private land market is growing. The City must increasingly be a facilitator, not a developer, of industrial land.
- *Responding to future opportunities.* The potential exists for new transportation infrastructure west of the Airport. The timing of the construction of this infrastructure will help determine when industrial lands in this area should be brought on stream.

The recommended locations should have minimal impacts on any nearby areas provided that there are appropriate land use and environmental controls in place, all of which are within the authority of the City. Additionally, in identifying and zoning a range of "character" industrial areas based on the degree of compatibility of adjacent uses with the objective of creating a positive environment for like-users to group together is likely to foster the synergy of support services and shared initiatives for a positive and productive business climate.

Through the implementation of this long term strategic plan the City will provide a foundation for long term stability, the ability to plan for the efficient and comprehensive extension of municipal and provincial infrastructure and a means of undertaking the necessary planning and governance measures to implement the long term growth strategy. This will also provide for lands to ensure market choice, help attract businesses, and most effectively support the City's ongoing prosperity.

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1 Introduction

For decades, Regina has experienced generally steady but slow industrial expansion. Although economic boom and bust cycles affected the City, stability and moderation have characterized the market for industrial land and the expansion of the City's industrial sectors.

The past few years have seen a remarkable change in this long-term pattern of stability. Strong demand for industrial land has fuelled a rapid increase in the number and scale of industrial land purchases. Regina employment has shown strong growth as well. From 2001 to 2006, the Regina Census Metropolitan Area (which includes surrounding communities) experienced an increase in employment of about 6,000 jobs, and early data for 2007 indicates continued strong employment growth.

As a consequence of this growth, the supply of industrial land in Regina is being rapidly depleted. The City of Regina has therefore initiated an Industrial Growth Study to determine the strategic directions for future industrial growth in the City.

1.1 Study Purpose

The purpose of the study is to determine how much industrial land the City will require over the next twenty-five years and to recommend where that industrial development should be accommodated. The terms of Reference for the Study list the following anticipated outcomes:

- *An estimate of the amount of industrial land that will be required by the City of Regina to accommodate demand for light, medium and heavy industrial uses over the next 20+ years.*

- *A strategy for managing the pace of industrial development to accommodate wide variations in demand for land that may occur over the next 20+ years.*

- *Identification of possible areas for the projected industrial growth to be accommodated, including a detailed assessment of the advantages and disadvantages of each option and the cost of providing City of Regina fire, transit, water, wastewater, drainage and roadway services to each growth area option.*

- *A recommended industrial growth area or areas with sound rationale supporting the recommendation.*

Most of the industrial development in Regina to date has occurred in the City's northeast sector, primarily in Ross Industrial Park. Ross Industrial Park has been the main industrial area within the City of Regina since the Park's inception in 1962. The inventory of available industrial land within the current boundaries of Ross Industrial Park inside the City limits is sufficient for the short-term. However, to accommodate future industrial

growth, the City will need to annex and service additional land for industrial development. Consulting services are required to assist the City of Regina in identifying how much land will be appropriate to accommodate potential future industrial growth, estimate when that land will be needed, and identify the optimal location or locations for that development to occur. Long-term industrial growth planning will ensure that the City can continue to offer a choice of lot sizes, locations, configurations and zoning designations to accommodate light, medium and heavy industrial uses and facilitate economic development.

1.2 Study Team

The consultant team is led by **Metropolitan Knowledge International**. Specialist firms are subconsultants as part of the team, with a focus on specific areas of expertise:

- Meridian Planning Consultants – Land use planning and policy
- UMA AECOM Ltd. – Engineering
- The Centre for Spatial Economics – Economic forecasting

1.3 Structure of this Report

This report is structured to follow the progress of the study as it was completed between April and July of 2007.

Initial work surrounding the preparation of economic forecasts for Regina is outlined in Chapter 2. Chapter 3 outlines the methodology for turning these employment forecasts into forecasts for land need. Chapter 4 looks at the current supply of industrial lands and the calculation of the shortfall of industrial lands.

Chapter 5 outlines the four options developed for expansion of the industrial land supply, including the location, amount, and type of industrial use. The following Chapters provide an analysis of the options from several perspectives, including Land Use/Environmental, Transportation, and Municipal Servicing. The various consultation components of the Study are outlined in Chapter 9.

Chapter 10 documents the evaluation of the options to select a preferred option. Chapter 11 provides an implementation and phasing strategy for the preferred option, and Chapter 12 summarizes the recommendations and conclusions of the Study.

2 Economic Forecasts

In the context of an industrial lands study it is logical to begin by considering the economic outlook for the City. While no economic forecast is ever entirely correct, forecasts of future economic trends and performance provide the required basis to understand the demand for industrial land.

2.1 Methodology

Economic forecasts for the City of Regina were prepared for this study by the Centre for Spatial Economics (C4SE). These forecasts looked at the Regina economy as a whole, to determine likely employment increases by sector. The forecasts have the year 2031 as the horizon year.

The economic and demographic projection alternatives prepared by C4SE for the City of Regina were developed using a spreadsheet-based model developed by the C4SE for that purpose. The model takes into account expected changing production, productivity and employment trends at the national, provincial and regional level. These external trends are combined with an assessment of the existing economic base of the City to develop reasonable alternatives regarding the potential for expansion of the City's economic base in the future.

2.2 Economic Context and Background for Forecasting

There are a number of economic trends at work in Regina that influence the forecast of industrial land requirements. To begin to understand these economic trends, C4SE looked at the location quotient for each industry in Regina. Location quotients measure the importance of employment by industry, by place of work in the Regina CMA (Census Metropolitan Area) and the City of Regina relative to the industry's importance as an employer to the Province as a whole. The table below shows employment by sector for Regina in 2001, the most recent year for which full census data is available.

	Employed by Place of Work				Location Quotient	Location Quotient
	Province	Regina CMA	City of Regina	City as % of CMA	Regina CMA	City of Regina
All industries	436,540	95,540	88,945	93	100	100
Agriculture, forestry, fishing, hunting	69,220	1,640	700	43	11	5
Mining, oil, gas extraction	8,720	720	195	27	38	11
Utilities	4,280	1,455	1,425	98	155	163
Construction	12,680	2,665	2,400	90	96	93
Manufacturing	26,655	5,440	3,695	68	93	68
Wholesale trade	17,560	4,095	3,775	92	107	106
Retail trade	49,180	11,570	11,235	97	107	112
Transportation, warehousing	16,480	3,885	3,605	93	108	107
Information, cultural industries	9,880	4,230	4,185	99	196	208
Finance, insurance	18,005	7,140	7,050	99	181	192
Real estate, rental, leasing	5,760	1,845	1,770	96	146	151
Professional, scientific, technical services	14,265	4,750	4,535	95	152	156
Management of companies, enterprises	220	65	65	100	135	145
Administrative support, waste management	9,380	3,635	3,565	98	177	187
Educational services	33,865	6,070	5,805	96	82	84
Health care, social assistance	52,365	12,040	11,680	97	105	109
Arts, entertainment, recreation	7,755	2,005	1,785	89	118	113
Accommodation, food services	31,060	7,285	7,035	97	107	111
Other services (except public administration)	21,250	5,220	4,975	95	112	115
Public administration	27,960	9,785	9,465	97	160	166

The City's location quotients suggest it is strong relative to the Province in the following sectors (the number in brackets indicating the amount of employment in the sector where 100 is the Provincial average:

- Information and culture (208)
- Finance and insurance (192)
- Administrative support, waste management (187)
- Public administration (166)
- Utilities (163)
- Professional, scientific and technical services(156)
- Real estate, rental and leasing (151)
- Management of companies, enterprises (145)
- Other (personal) services (115)
- Arts, entertainment, recreation (113)
- Retail trade (112)
- Accommodation, food services (111)
- Health care, social assistance (109)
- Transportation, warehousing (107)
- Wholesale trade (106)

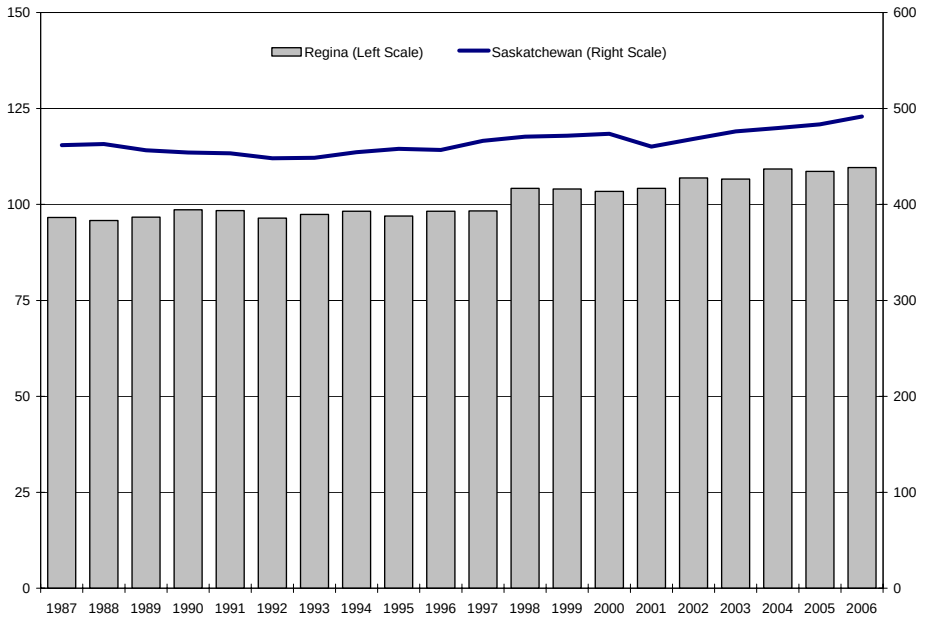
The City's location quotients suggest it has less employment relative to the Provincial average in:

- Construction (93)
- Educational services (84)
- Manufacturing (68)
- Mining, oil, gas extraction (11)
- Agriculture, forestry, fishing, hunting (5)

When broader economic growth trends are considered, the City's base is strong in the industries with the greatest potential employment growth, and its base is weaker in the industries with the least potential (primary, manufacturing). As a result, there is a reasonable likelihood of continued employment growth in the City, fundamentally good news for the Regina economy.

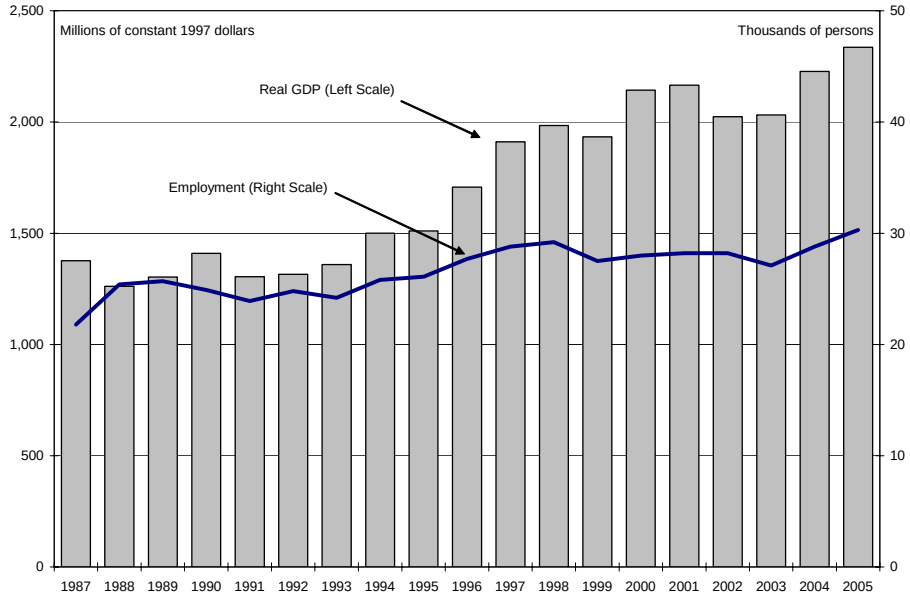
Employment Growth

Employment in Regina has increased at roughly the same rate as the provincial average. The chart below shows employment growth for the Regina Census Metropolitan Area (Regina and the surrounding rural municipalities), and employment growth in Saskatchewan as a whole.



Productivity Gains

Productivity is commonly measured as output per worker. Although Canada's "productivity gap" has received much attention in the national media, productivity growth in many industries has been extremely strong over the past two decades. Driven in part by international competition and the growing use of industrial technology, Canadian industries have become leaner. Saskatchewan and Regina are no exception. The chart below shows Output and Employment growth in the manufacturing sector in Saskatchewan from 1987 to 2005. Employment has grown



very slowly, while output has increased nearly 100% from levels in the late 1980s/early 1990s. The findings are significant in that they point to the prevalence of "jobless growth" in the Saskatchewan manufacturing sector. While output is increasing, employment growth is relatively stagnant.

2.3 Economic Forecast

The future need for workers in Regina is linked through the labour market to an age-cohort model of the City's population. Regina's net in-migration or out-migration is determined over the projection horizon by whether the demand for workers exceeds local supply, or vice versa. Local labour supply is determined by the existing and future age structure of the City's population, by expected future rates of participation across the age spectrum, and by prevailing and expected future rates of unemployment.

The C4SE small area model was used to generate projections of employment growth by sector. In accordance with this approach, different sectors are treated differently. The model:

- Projects primary sector job growth at the rate projected Province-wide
- Projects manufacturing job growth at the rate projected Province-wide
- Projects export-based jobs in tradable services at a rate linked to projected real GDP growth in Saskatchewan, Alberta and BC
- Projects export-based jobs in tourism at a rate linked to the growth in population 45 and over for the entire Province
- Projects export-based jobs in health at a rate linked to the growth in population 65 and over for the entire Province
- Projects export-based jobs in utilities, personal services and government at a rate linked to total population growth for the entire Province
- Projects community-based jobs at a rate linked to the pace of growth in the City's total population
- Population is modeled by age cohorts based on birth rates by age of mother mortality rates by age and net migration by age
- Growth in the population of the City aged 20 to 64 is driven by labour requirements considering projected participation and unemployment rates
- Migration rises and falls to clear the City's labour market

Using these approaches as a base, C4SE created three projections for the City. These were a base case projection, an "ambitious" case projection (more aggressive growth scenario), and a "restrained" projection (slower growth scenario).

In all three scenarios it is forecast that primary and manufacturing sector jobs will continue to decline. In all three we also assumed that tourism, health, other personal services and government services will be driven by the appropriate Province-wide population base, and therefore employment growth will be tied to population growth.

Like all other major cities across Canada at this time the City of Regina faces an eroding manufacturing employment base. Manufacturing employment declines reflect an expected gradual slowing in the rate of growth in manufacturing output coupled with an expected high rate of productivity growth. Due to this phenomenon, employment in manufacturing will be lower in 2031 than it is today throughout Canada's metropolitan areas. In a similar vein, agriculture, forestry and mining will all employ fewer people in the future than they do today.

All of these industries will produce more in the future than they do today. They just will not need as many workers in the future as they do now. Land use projections for these industries in the past have tended to tie future land needs to future employment. It is not clear, however, that land use by manufacturers or primary sector producers will decline in tandem with the expected declines in employment.

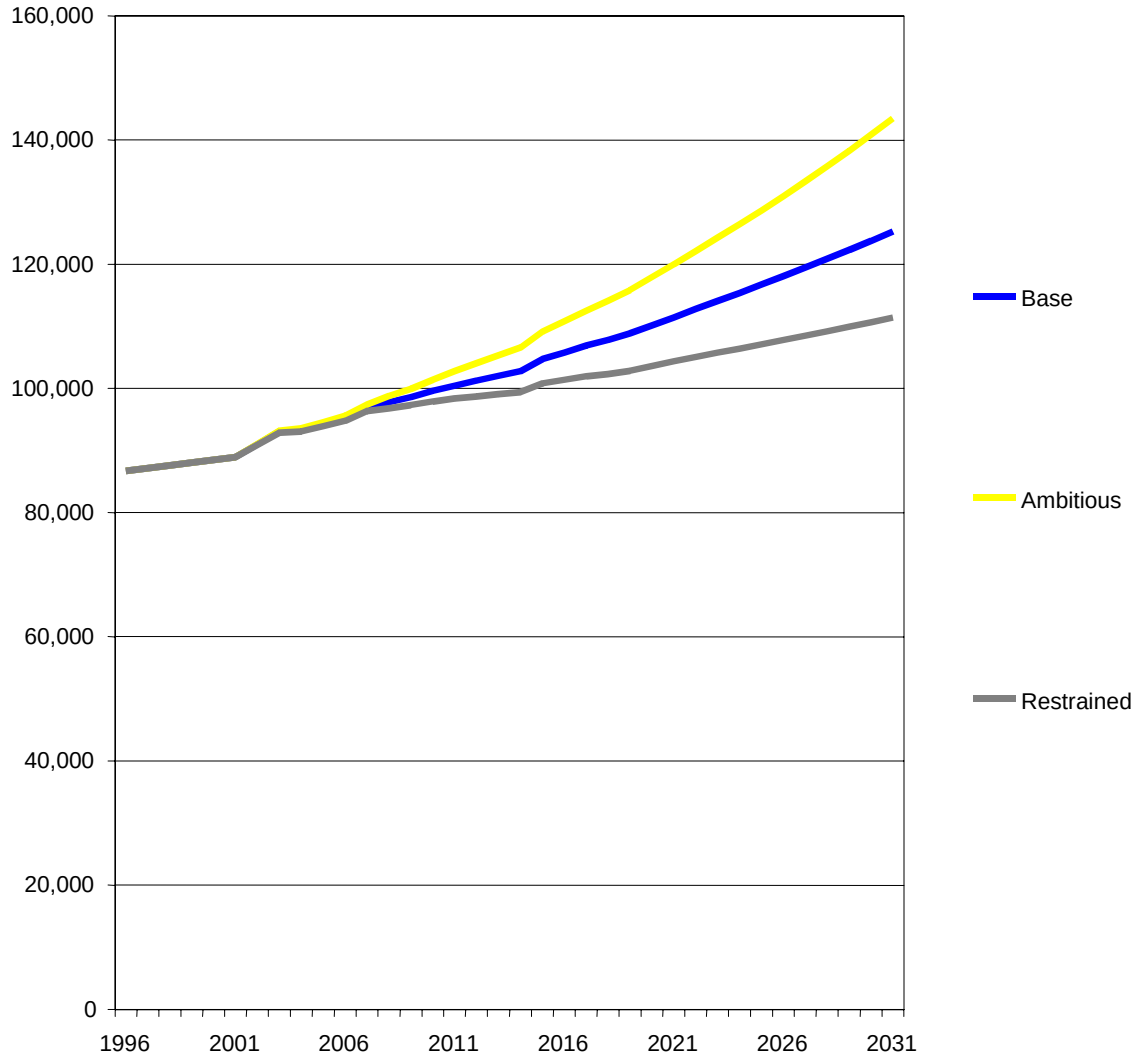
What is clear, however, is that goods production and distribution processes changed dramatically in recent decades, and will continue to change further in the future. Just-in-time material delivery among manufacturers coupled with retail emphasis on the minimization of inventories resulted in major gains in activities in warehousing, wholesaling and transportation. Furthermore, the outsourcing by goods producers of various research, design, marketing, accounting, protection and other activities led to major gains in activities in business services. These trends created jobs and land use requirements associated less with major industrial parcels and more with industrial parks and low rise office structures.

Our assessment of the City's economic base revealed a very strong presence in business services and finance. Alberta and British Columbia face expanding futures given their strengths in energy, other scarce resources and tourism. Both Provinces are experiencing acute skill shortages at this time. Regina is well positioned to provide (export) business services to the rest of Western Canada in the decades ahead because of to its strategic location and its well developed presence in business services. The projection alternatives we prepared for the City are driven primarily by different assumptions regarding the City's ability to penetrate this market.

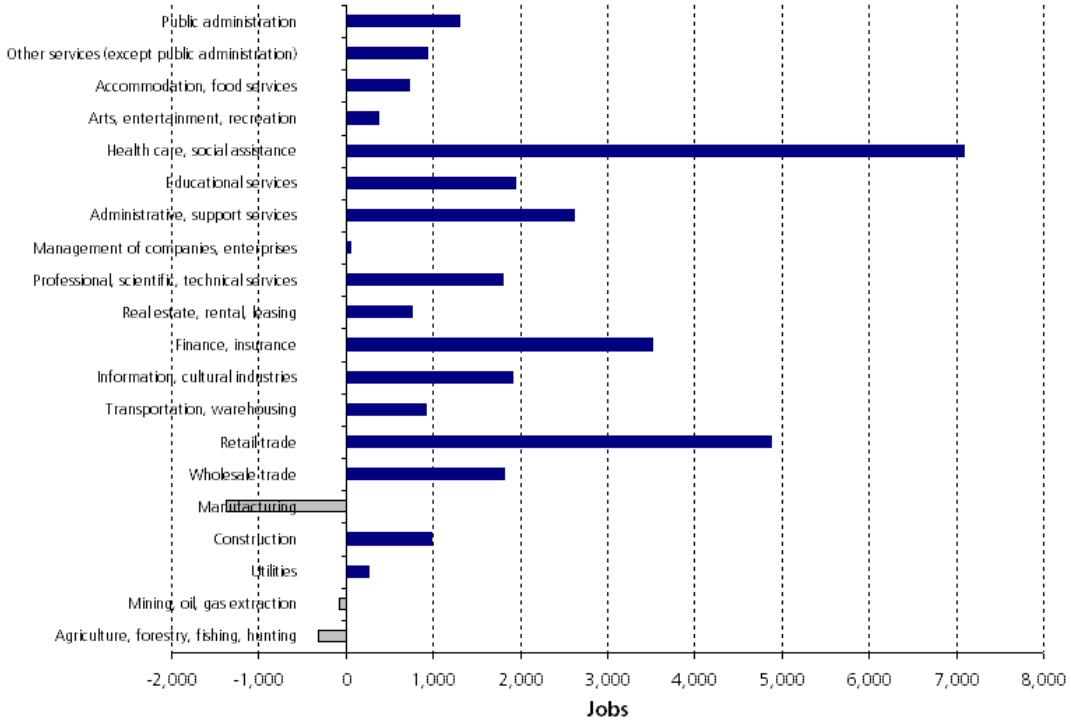
Of course each level of increased success in tradable services results in Regina attracting more workers and their dependents to the area. Attached to each tradable service alternative future, therefore, is a different level of community service requirements. Major trends in the delivery of retail services (toward power centres, etc.) and government services (toward reduced staffs and increased reliance on technology), coupled with major shifts in the need for quasi-public sector services (less emphasis on education; more emphasis on health care) pose major challenges for urban land use planners beyond those posed by the shifts underway in the production and distribution of goods.

Employment growth by sector in Regina is shown on the charts below, and on the next page.

Overall Employment Growth Forecast Scenarios – Regina 2006-2031

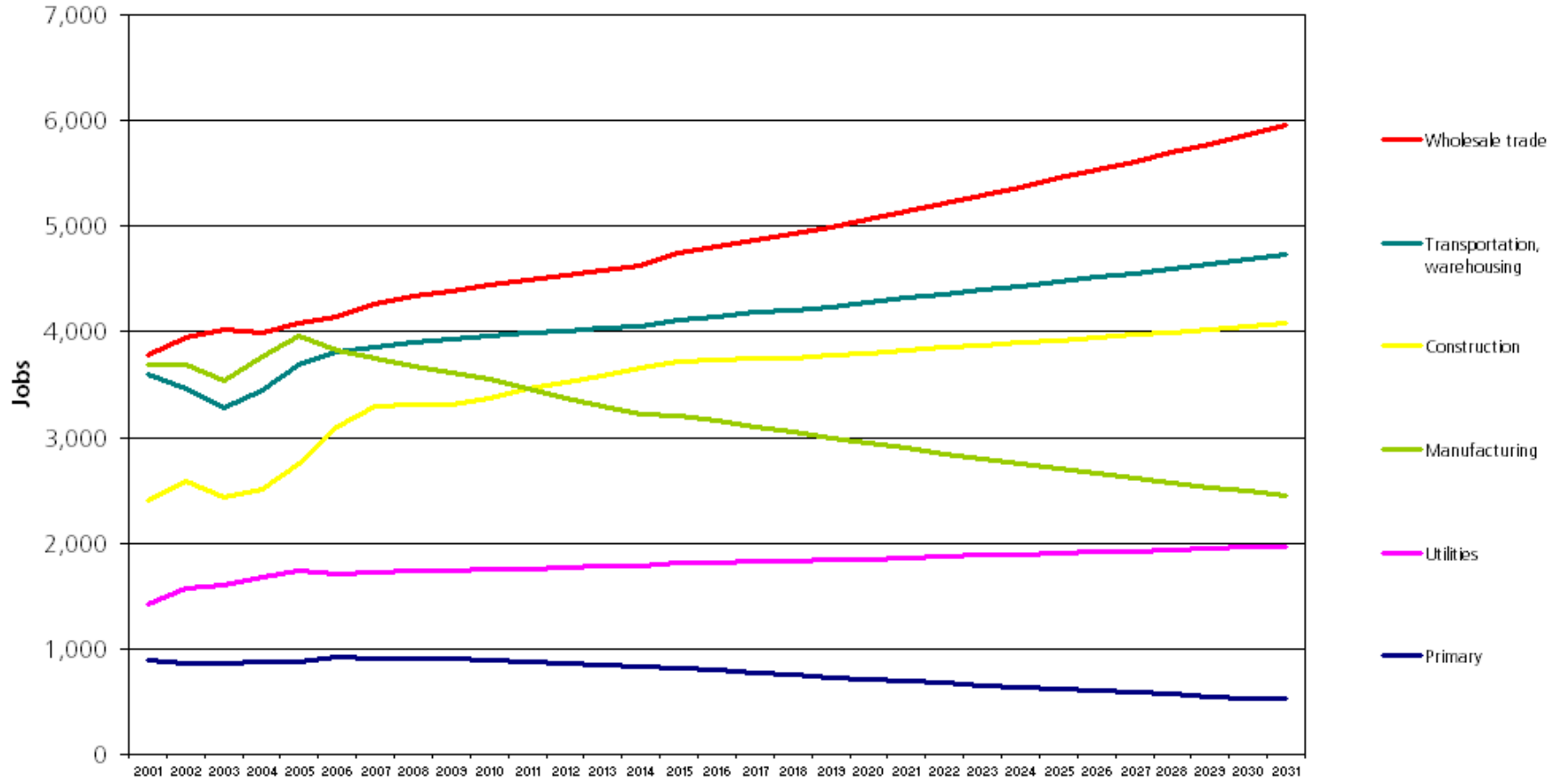


Regina - Change in Employment by Sector, 2006-2031
Base Case Forecast



Significantly, the largest employment growth sectors are service oriented – health care, finance/insurance/real estate, and retail trade. Of the sectors driving demand for industrial land, several will grow, while others are forecast to decline, as shown on the chart on the next page.

Regina - Employment by Industrial Sector, 2001-2031
Base Case Forecast



3 Demand for Land

Regina has recently seen a "spike" of activity in industrial land sales, both in terms of the sale of City-owned land and in private sector interest in the purchase of industrial land. Whether this more rapid pace of activity will be sustained is a key question for this study. While no definitive answer is possible (even the most robust private sector market forecasts typically do not look beyond five years), economic forecasts can provide a basis for a strategy that will address anticipated trends in industrial sectors of the economy, while remaining sufficiently flexible to respond to changes in the pace of demand for industrial land.

The forecasts for employment outlined in the previous section were used as the basis for the calculation of demand for land. As outlined in the previous section, these forecasts suggest that growth in industrial employment in Regina will be concentrated in the wholesale trade and warehouse/distribution sectors, with employment in manufacturing likely to decline over the forecast period.

This finding is consistent with the broader Canadian economic context, as manufacturing employment is lost to productivity increases and globalization, while distribution functions increase rapidly. This change – which is occurring almost everywhere in the country – is significant as it points to the need to consider the way that different sectors of industry use land in different ways.

3.1 Historic Densities

Land need forecasts were developed using assumptions concerning the percentage of employment in each sector that is likely to be housed on industrial land, and the density of employment in different sectors. Each sector is assigned an employment density (in jobs per hectare), based on observed densities elsewhere, and based on prior studies of Regina industry.

A 1979 employment lands study, the last comprehensive study of employment lands in Regina, examined densities in the Ross Industrial Park and found the following densities by sector (all figures in acres):

Employment Densities – Jobs Per Acre – Ross Industrial Park, 1979		
Sector	**Phase 1**	**Phase 2**
Manufacturing	8.1	3.9
Construction	6.45	5.68
Transportation	5.66	2.46
Wholesale	5.11	2.59
Services	3.19	

The above figures translate into a range of densities, from a low of about 8 jobs/hectare (3 jobs/acre) for services to 20 jobs/hectare (8 jobs/acre) for manufacturing. This study noted that densities typically increase in industrial areas over time, as companies expand their facilities on their current site. As the Ross Industrial Park was relatively new at the time, the study suggested densities would likely increase in the future. The following benchmark densities were used in the calculation of industrial land requirements at the time:

Industrial Employment Densities – Study Benchmarks		
Sector	**Jobs/Ac.**	**Jobs/Ha.**
Manufacturing	15	37
Construction	13	32
Transportation	6	15
Wholesale	10	25
Services	15	37

However, the study used a wide range around these factors, to generate a range of forecast land requirements. For example, the range varied from 8 to 25 jobs per acre for manufacturing (20 to 63 jobs/hectare).

More recently, employment data for the Ross Industrial Park was collected by Eco-Industrial Solutions Ltd. for the Regina Eco-Industrial Network Association. In their 2005 study of the Ross Industrial Park, the total number of employees was found to be 6,592, and the total developed area was 528 hectares (1304 acres) for an overall density of 12.45 jobs per hectare, or 5.05 jobs per acre.

This employment density is lower than one would ordinarily have expected for a relatively mature industrial area, although upon checking the employment figures against employment by sector, the figure for total employment in Ross IP is in roughly the right range given the total amount of industrial employment in the City. This figure strongly suggested that industrial densities in Ross IP have remained consistently lower than in other Canadian cities (no doubt partly due to the inexpensive price for land). Furthermore, it is consistent with trends seen elsewhere in industrial densities; that is, for overall densities to remain constant or decline as employment increases on-site for some firms are balanced or exceeded by declines in employment due to automation, outsourcing, and the amount in lower density sectors as a proportion of overall growth.

In other Canadian cities, density figures for employees per hectare in industrial areas vary widely, but have consistently been in the range of 30 jobs per gross hectare. This differs widely by sector, with densities in areas dominated by warehousing or primary industries with much lower densities, while areas with a large concentration of offices or labour-intensive smaller businesses having higher densities.

For the purpose of this study, sector densities were established based on these benchmarks, but reduced to account for the lower densities experienced in Regina. The densities used for land need calculations are shown at right.

Sector	Density (jobs/ha)
Agriculture, forestry, fishing, hunting	10
Mining, oil, gas extraction	10
Utilities	25
Construction	25
Manufacturing	30
Wholesale trade	20
Retail trade	40
Transportation, warehousing	10
Information, cultural industries	60
Finance, insurance	60
Real estate, rental, leasing	60
Professional, scientific, technical services	60
Management of companies, enterprises	60
Administrative, support services	60
Educational services	60
Health care, social assistance	60
Arts, entertainment, recreation	60
Accommodation, food services	60
Other services (except public administration)	60
Public administration	60

It should be noted that only a small proportion of employment in certain sectors will actually locate on industrial lands, and for some sectors, no employment at all can be anticipated on industrial lands. For example, education uses are very unlikely to locate on industrial lands, as these institutional facilities tend to locate in communities close to the demand for their services (such as elementary schools) or on large institutional parcels elsewhere (such as universities). Further details on the allocation of sectors to industrial lands is given in the next section.

3.2 Land Need Forecasts

To develop a baseline forecast of land need, densities were applied on a sector-by-sector basis to the forecast employment for the City of Regina. The resulting demand was then factored to account for the percentage that is likely to occur on industrial lands.

Demand for land was calculated by then applying a factor for the percentage of employment in each sector likely to occur on industrial lands. Regina's Zoning By-Law provided guidance in developing these factors. Regina has been very effective at ensuring industrial lands are used for industrial purposes, and that industrial uses do not "creep" into other zones. As such, industrial areas generally contain a limited range of non-traditional industrial sectors, such as retail or office-based uses.

Although the majority of service sector employment will go elsewhere, it is good practice to assume that a small proportion of service sector employment will occur on industrial lands. This employment will be likely housed in units such as small industrial multiples, industrial condominiums, or mixed office/industrial forms of development.

Sector	Percent on Industrial Land
Agriculture, forestry, fishing, hunting	0%
Mining, oil, gas extraction	0%
Utilities	25%
Construction	10%
Manufacturing	100%
Wholesale trade	100%
Retail trade	0%
Transportation, warehousing	100%
Information, cultural industries	10%
Finance, insurance	10%
Real estate, rental, leasing	10%
Professional, scientific, technical services	10%
Management of companies, enterprises	10%
Administrative, support services	10%
Educational services	0%
Health care, social assistance	0%
Arts, entertainment, recreation	0%
Accommodation, food services	0%
Other services (except public administration)	10%
Public administration	0%

To generate the overall demand for land, the forecast employment by sector was multiplied by the employment density by sector, then by the percentage of employment on industrial lands, to obtain an estimate of demand for industrial land. The calculation was completed for both the "base case" and the "ambitious case" option.

There was one important exception to this methodology. The economic forecasts indicate that employment in the manufacturing sector is likely to decrease over the forecast period. Using an employment density calculation would therefore result in a negative demand for land in this sector. However, as output is forecast to increase in line with increased productivity, it is likely that there will continue to be demand for land for manufacturing uses.

A land need forecast for manufacturing was generated by assuming that all employment reductions would occur due to productivity increases in manufacturing. As such, the difference between the loss due to productivity and the actual forecast employment loss can be considered the amount of "new growth" (new employment that counterbalances the loss due to productivity). In the base case, productivity was assumed to grow at 2.5% annually, a common forecast for productivity on a go-forward basis for the Canadian manufacturing sector. However, Saskatchewan has recently performed exceptionally well in terms of manufacturing productivity, averaging about 3.0% productivity growth. This figure was used for the "Ambitious Case" estimate.

The total resulting demand for land by sector is as follows:

Industrial Land Need 2006-2031 (Hectares)		
Sector	**Base**	**Ambitious**
Agriculture, forestry, fishing, hunting	0.0	0.0
Mining, oil, gas extraction	0.0	0.0
Utilities	2.6	4.6
Construction	3.9	6.2
Manufacturing	13.9	22.1
Wholesale trade	90.6	135.2
Retail trade	0.0	0.0
Transportation, warehousing	91.6	165.3
Information, cultural industries	3.2	4.1
Finance, insurance	5.9	10.2
Real estate, rental, leasing	1.3	2.2
Professional, scientific, technical services	3.0	5.4
Management of companies, enterprises	0.1	0.1
Administrative, support services	4.4	6.8
Educational services	0.0	0.0
Health care, social assistance	0.0	0.0
Arts, entertainment, recreation	0.0	0.0
Accommodation, food services	0.0	0.0
Other services (except public administration)	1.6	2.7
Public administration	0.0	0.0
Total 2006-2031 (hectares)	**222.1**	**364.9**
Total 2006-2031 (acres)	**548.5**	**901.4**
Annual Absorption (ha)	8.9	14.6
Annual Absorption (acres)	21.9	36.1

Clearly, significant amounts of demand for land are focussed in the wholesale trade and transportation and warehousing sectors, with lesser amounts forecast for the manufacturing and utilities sectors.

It should be noted that these are 25 year forecasts, which do not specifically reference the potential for one of Regina's existing large industrial users to expand (or contract) their operations. The Study Team did note that the Co-Op Upgrader Refinery has recently completed a transaction to acquire an additional 16.5 hectares (41 acres) of land in the Ross Industrial Park. It is likely that this single large user's needs are therefore met for some time to come. However, the potential exists for an unknown single large user to come to Regina that requires a large parcel of land, an issue we return to later in this document.

3.2.1 Allocation of Land by Sector to Zoning Categories

Land need was allocated among the three zoning categories above of heavy, medium, and light, by apportioning the growth by sector among the zones. This allocation is necessarily somewhat arbitrary, as it is impossible to forecast which specific businesses or production processes will come to Regina in the future. However, as different sectors have common characteristics that conform to the permitted uses within the three zones, the allocations can be undertaken with some confidence.

It is likely therefore that the above apportionment may change to some degree, and zoning should change as be introduced over time as the actual pattern of demand emerges.

Tables outlining the land need by sector appear below and on the following page.

Apportionment of Land Need Among Zones - Base Case

Sector		Land Need (ha)	Apportionment	Light	Med	Heavy	Total
Agriculture, forestry, fishing, hunting		0.0					**0.0**
Mining, oil, gas extraction		0.0					**0.0**
Utilities		2.6	Heavy			2.6	**2.6**
Construction		3.9	Heavy			3.9	**3.9**
Manufacturing		13.9	Heavy 35%, Medium 65%		9.0	4.9	**13.9**
Wholesale trade		90.6	Light 90%, Heavy 10%	81.7		9.0	**90.6**
Retail trade		0.0					**0.0**
Transportation, warehousing		91.6	Light 40%, Medium 60%	36.6	55.0		**91.6**
Information, cultural industries		3.2	Light/Prestige	3.2			**3.2**
Finance, insurance		5.9	Light/Prestige	5.9			**5.9**
Real estate, rental, leasing		1.3	Medium	0.0	1.3		**1.3**
Professional, scientific, technical services		3.0	Light/Prestige	3.0			**3.0**
Management of companies, enterprises		0.1	Light/Prestige	0.1			**0.1**
Administrative, support services		4.4	Light/Prestige	4.4			**4.4**
Educational services		0.0		0.0			**0.0**
Health care, social assistance		0.0		0.0			**0.0**
Arts, entertainment, recreation		0.0		0.0			**0.0**
Accommodation, food services		0.0		0.0			**0.0**
Other services (except public administration)		1.6	Light/Prestige	1.6			**1.6**
Public administration		0.0					
Note: Totals may not match exactly due to rounding		**222.0**		**136.4**	**65.3**	**20.4**	**222.0**

Apportionment of Land Need Among Zones - Ambitious Case						
Sector	Land Need (ha)	Apportionment	Light	Med	Heavy	Total
Agriculture, forestry, fishing, hunting	0.0					**0.0**
Mining, oil, gas extraction	0.0					**0.0**
Utilities	4.6	Heavy			4.6	**4.6**
Construction	6.2	Heavy			6.2	**6.2**
Manufacturing	22.1	Heavy 35%, Medium 65%		14.4	7.7	**22.1**
Wholesale trade	135.2	Light 90%, Heavy 10%	121.8		13.4	**135.2**
Retail trade	0.0					**0.0**
Transportation, warehousing	165.3	Light 40%, Medium 60%	66.1	99.2		**165.3**
Information, cultural industries	4.1	Light/Prestige	4.1			**4.1**
Finance, insurance	10.2	Light/Prestige	10.2			**10.2**
Real estate, rental, leasing	2.2	Medium	0.0	2.2		**2.2**
Professional, scientific, technical services	5.4	Light/Prestige	5.4			**5.4**
Management of companies, enterprises	0.1	Light/Prestige	0.1			**0.1**
Administrative, support services	6.8	Light/Prestige	6.8			**6.8**
Educational services	0.0					**0.0**
Health care, social assistance	0.0					**0.0**
Arts, entertainment, recreation	0.0					**0.0**
Accommodation, food services	0.0					**0.0**
Other services (except public administration)	2.7	Light/Prestige	2.7			**2.7**
Public administration	0.0					**0.0**
Note: Totals may not match exactly due to rounding	**364.9**		**217.3**	**115.7**	**31.9**	**364.9**

3.3 Absorption Method – Check on the Forecast

The "absorption method" is a simple methodology used to prepare an assessment of demand for industrial land, which does not use densities or look at economic growth trends. It uses the rate at which lands have been consumed in the past as a basis to project the amount of land required in the future.

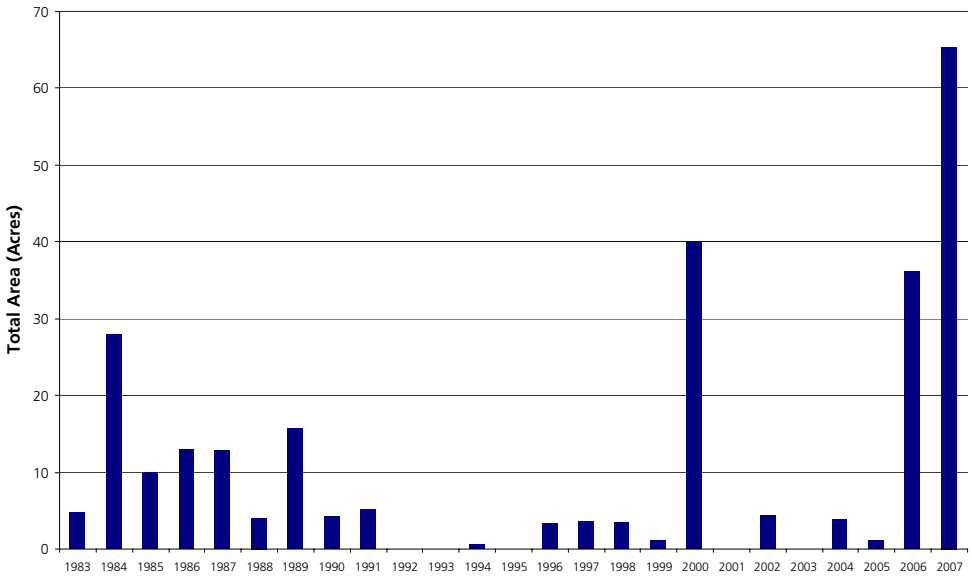
However, as the situation in Regina is fundamentally different from that experienced over the past several decades, this method is only appropriate as a "check" on other forecasting methods, to ensure the results are within a reasonable range.

Historically, nearly all the industrial land absorbed within the City of Regina over the past twenty-five years was located in the Ross Industrial Park. As referenced in the introduction, the amount of land sold annually has exploded in the last several years, as the chart below indicates. It should be noted that two extremely large transactions skew these figures somewhat – the sale of 16 hectares (40 acres) to SGI in 2000, and the sale of 16.5 hectares (41 acres) to the Co-op Upgrader Refinery in early 2007. However, even *without* the sale to the refinery, sales in 2007, as of the month of June, already exceed the amount sold in any other year except 2006 and 2000.

Despite these two strong years, average absorption of industrial lands prior to 2006 was approximately 2 hectares (5 acres) per year. When the recent strong years are included, the average absorption rate since 1983 jumps to 4 hectares (10 acres) per year. Since 2000, the average annual absorption is about 8 hectares (19 acres) – but this assumes no further sales in 2007, and includes two years where there were no sales at all!

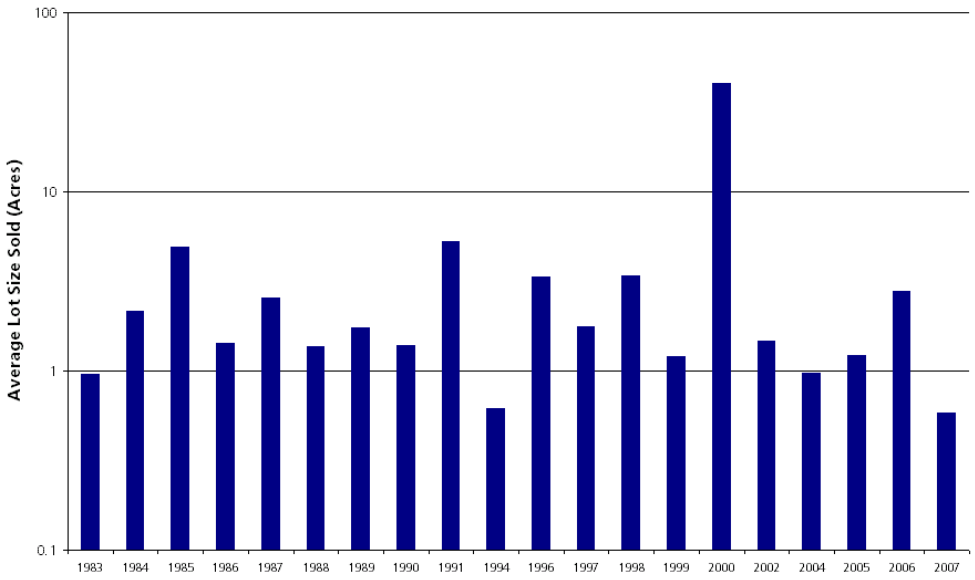
Taking the long view, it is clear that the demand for industrial land is closely tied to economic cycles. The relative strength of the late 1980s was reflected in demand for industrial land, with absorption of roughly 4.5 hectares (11 acres) per year from 1983 to 1989. Demand then tailed off to nearly nothing, with absorption averaging less than one hectare (2 acres) per year through the 1990s. The recent boom market has again changed the market landscape.

Regina - Total Area of Lots Sold in Ross Industrial Park
1983-2007



Due to the volatile nature of the market and the resulting absorption rates, the Study team does not place a great deal of faith in the absorption rate method as an indicator of future growth. However, taking the long view, it is interesting to note that the forecast pace of absorption of 8.9 hectares (21.9 acres) annually in the base case scenario is roughly equivalent to the pace of absorption since 2000, but considerably greater than the pace experienced over the past twenty-five years as a whole.

Regina - Average Area of Lots Sold in Ross Industrial Park
1983-2007



The average area of lots sold in the Ross Industrial Park has not demonstrated a change over time. The single large sale in 2000 to SGI stands out, however, generally sales have not demonstrated a trend to become larger or smaller over the years. This is significant in that, although parcels of various sizes have been sold, there is no consistent trend toward a need for larger or smaller parcels.

4 Current Supply of Industrial Lands

The "raw" supply of vacant industrial lands in Regina available for development was determined by City staff using assessment data and Geographic Information Systems (GIS). As of May 2007, a total supply of 190 hectares (469.9 acres) was identified. The supply is shown on the aerial photograph on the following page.

4.1 Constraints Affecting Supply and Net Supply

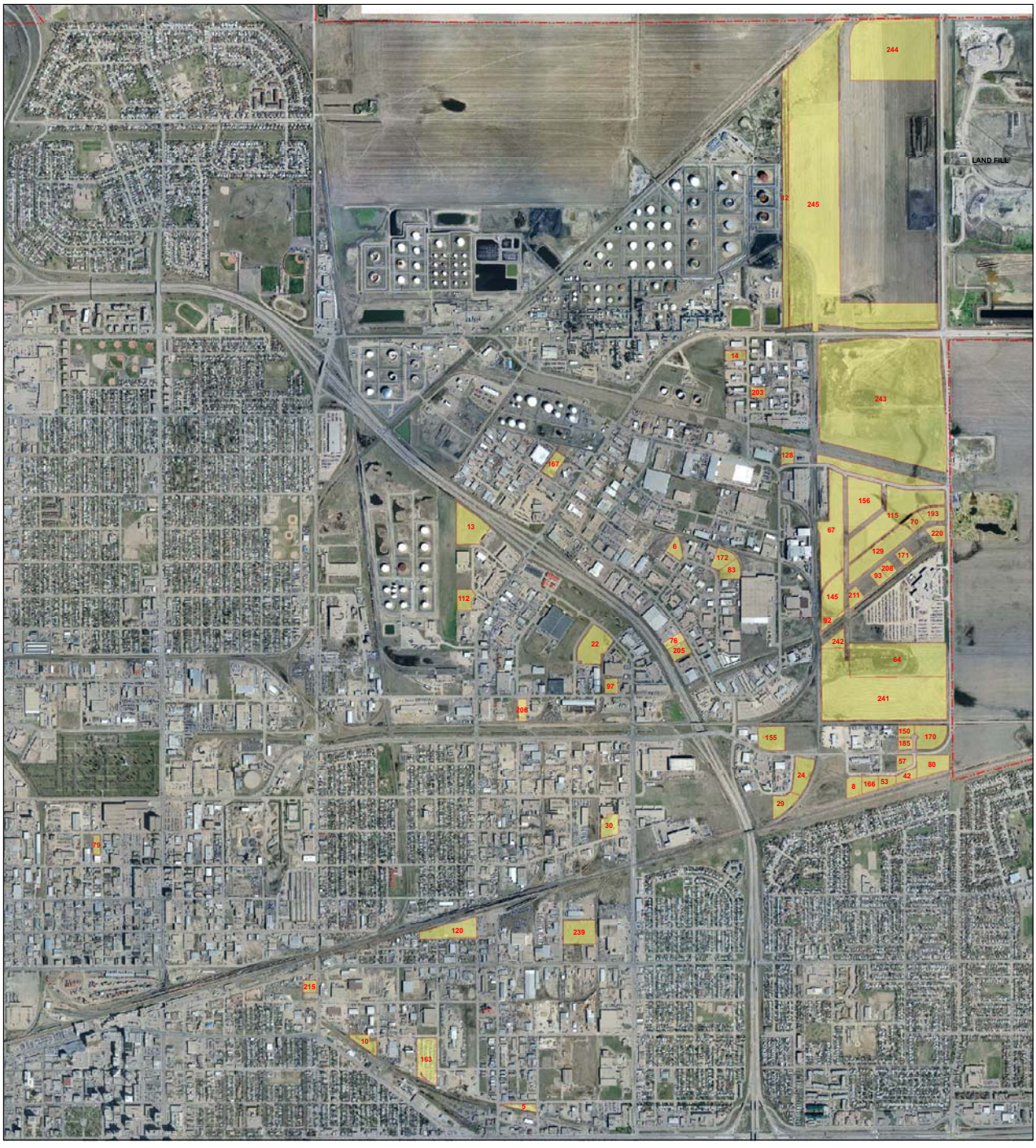
Although the supply appears substantial, it is recognized that much of this supply may be subject to several constraints, including:

- Parcel fragmentation – some of the supply consists of relatively small or scattered parcels of land unsuitable for most modern industrial users;
- Poor accessibility – some of the supply consists of parcels located within older industrial areas that have relatively poor road access and/or are in areas of the City where traffic constraints may limit operations. This is particularly true of lands to the north of the Downtown core and in the Tuxedo industrial park;
- Lands that although currently vacant, will shortly be developed as a result of a recent purchase or agreement. The remaining parcels within the Tuxedo Industrial Park (approx. 6.5 hectares, or 16 acres) are excluded from the supply inventory, as these were sold recently but are awaiting development;
- Aquifer constraints. Many of these lands are located in the high aquifer sensitivity zone and are therefore precluded from most or all types of industrial development. The location of the aquifer overlay zones are shown on the aerial photograph that follows;
- Proximity to the landfill and Upgrader facility. Due to odour and other negative impacts of being in close proximity to these sites, several parcels for future expansion are clearly less attractive to light or prestige industrial users than others.

The lands surrounding the landfill site are constrained by being both close to the landfill site and by being in the high aquifer sensitivity zone. These lands total a large portion of the vacant "supply" indicated on the map, consisting of some 98 hectares (242 acres) combined.

In early 2007, several vacant parcels were sold to industrial users, including a large sale to the Co-op Upgrader for expansion of that facility. The lands sold to the Upgrader Refinery have been excluded from the supply, as discussions with Co-Op officials indicate that this is a long term expansion area that will likely not house much employment (the lands are primarily to be used as a tank farm). However, with regards to other recent sales, as the baseline for the employment forecasts is 2006, it is not necessary to remove these parcels from the supply as the employment that will locate on those parcels would be considered within the overall forecast period.

REGINA'S VACANT INDUSTRIAL PROPERTIES



Legend

City limits

Vacant Industrial Lands Area = 190 hectares (469 acres)

Regina
CITY OF REGINA
Planning, Building and Bylaw Enforcement Department
Urban Planning Division

O:/UP/ARC/PROJECTS/REGINA VACANT INDUSTRIAL LANDS.mxd

May 16, 2007

The City is currently experiencing a relatively severe shortage of serviced industrial land. Most of the remaining lands that are not affected by the constraints above are not yet on the market, being located in an expansion area of Ross Industrial Park that will not be on-stream until fall 2007. Once these lands are available to the market, on the basis of the forecast of demand, there will be a supply of industrial lands to meet needs for the short term future only.

Including this planned expansion area, the balance of industrial lands available in the City of Regina is as follows:

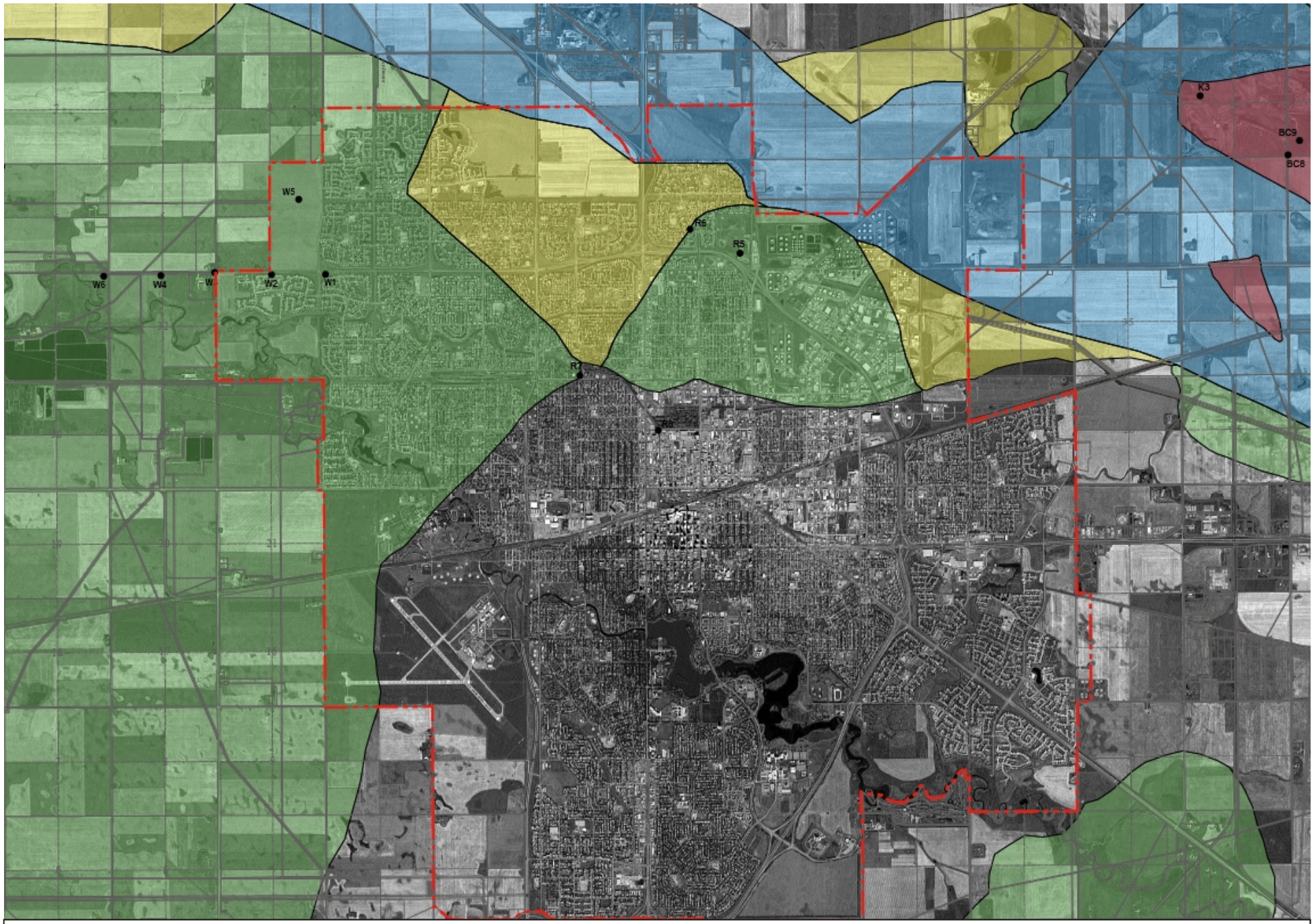
Zoning	**Area**
IA (light)/ IP (prestige)	13.4 hectares
IB (medium)	47.7 hectares
IC (heavy)	6.1 hectares
Total	**67.3 hectares**

In addition, as noted, there are lands designated urban holding (UH) which could be used for future development. However, nearly all of these lands are limited by one or more of the constraints above, in particular, the high aquifer sensitivity zone, which preclude use for any industrial purposes per Chapter 10 of the Regina Zoning By-Law, No. 9250. The aquifer protection zones are shown on the map overleaf.

4.2 Net Land Need

Given the existing net supply above, the overall net land need is as follows:

Land Need (hectares)			**Existing Supply**	**Net Need**	
	Base	Ambitious		Base	Ambitious
Heavy	20.4	32.9	6.1	14.3	26.7
Medium	65.1	114.2	47.7	17.4	66.5
Light	136.5	217.9	13.4	123.1	204.5
	222.0	**364.9**	**67.3**	**154.8**	**297.7**



Regina Aquifer Sensitivity

Sensitivity - Extreme
Sensitivity - High
Sensitivity - Moderate
Sensitivity - Low
Well Site Locations

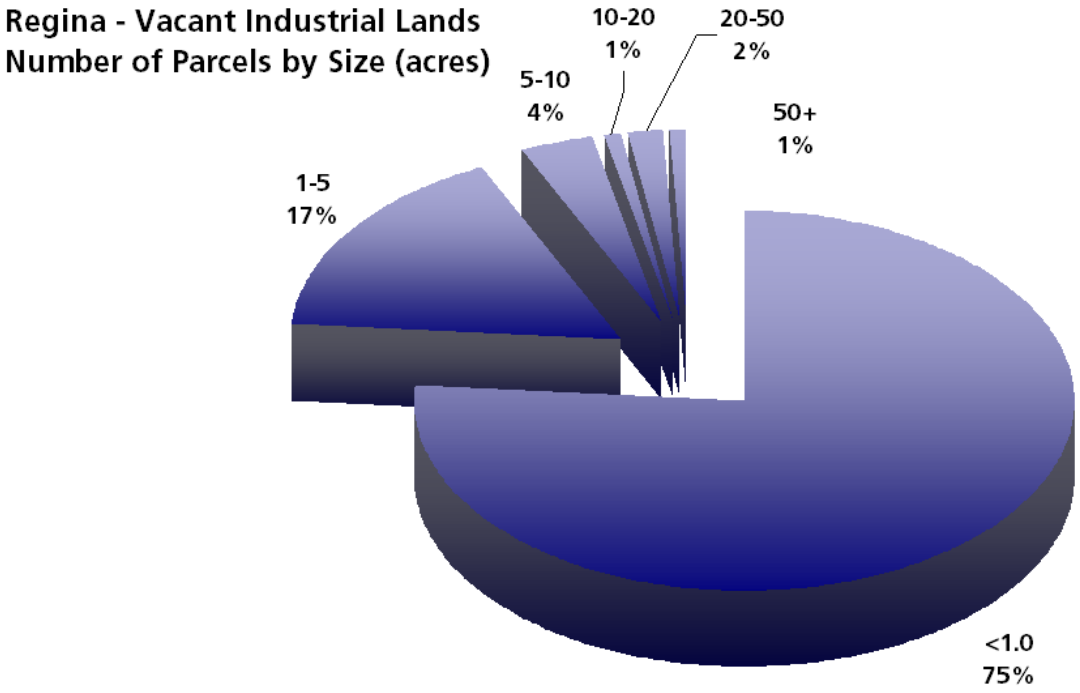
N

Regina
CITY OF REGINA
Engineering and Works
April 25, 2005

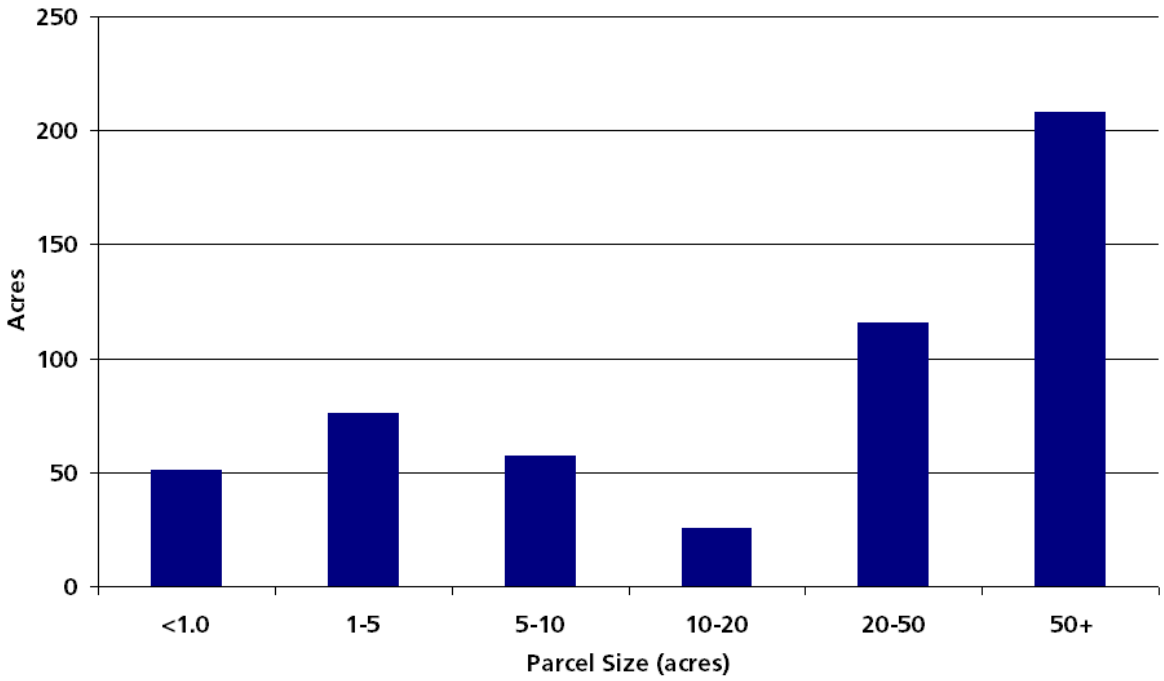
4.3 Parcel Size and Need for Large Parcels

The distribution of currently available industrial land by parcel size is shown on the graphs below. Although 75% of the total number of parcels are less than one acre in size, this totals only about 21 hectares (50 acres) out of the total 190 hectare (470 acre) supply. Roughly 40% of the supply is contained in the large parcels in the east part of the Ross Industrial Park (future expansion area), of which as noted a very significant portion could be considered constrained by being within a medium or high aquifer sensitivity zone, adjacent to the landfill area or, to a lesser extent, by being downwind from the Co-Op refinery. The graphs below and on the next page outline the distribution of parcels by size within the existing inventory.

Due to the constraints affecting the large parcels within the existing supply, there is a need for additional large parcels of land to house potential large industrial users in the future. The industrial lands strategy must include growth options that allow for these larger parcels to be provided, to ensure a full range of parcel sizes can be offered to the market.



Regina - Total Vacant Industrial Lands by Size of Parcel (acres)



5 Expansion Options

As outlined in the previous section, the existing supply of designated or planned industrial lands, including the planned subdivision of the final stages of the Ross Industrial Park, may be sufficient in total amount to provide for the City's needs for the short term. However, there is a shortage of large, serviced parcels that can be offered to prospective firms requiring land expansive facilities. Further, in the medium and long term, Regina will face an overall shortage of industrial lands.

A portion of this demand can be accommodated on lands within the City's boundaries that are currently designated urban holding, but are either planned or can be considered appropriate for industrial development. These lands include the lands inside the "IPSCO buffer", north of Argyle Park and Kensington Greens, and certain lands abutting the Regina Airport. These areas are described in more detail below.

However, these areas will not alone accommodate the overall demand for land over the forecast period. As such, there is a need to determine the location of potential expansion areas for industrial growth outside the City's boundaries.

First, however, the Study Team took a "big picture" look at the objectives of the City and the potential risks that needed to be considered in developing options to respond to the demand for land.

5.1 Options Development

From the perspective of the development of a strategy for the City of Regina the achievement of economic prosperity, within a sustainable and cohesive land use framework, is the ultimate goal. Inherent in any City action, however, there are risks involved. In the current context, the Study Team sees three major risks associated with industrial lands to be considered:

1. Not having enough land, leading to missed opportunities to support business in Regina;
2. Spending public money unnecessarily, by planning for growth that does not occur;
3. Land use conflicts, resulting from not planning far enough ahead.

Our assessment of these risks is as follows:

1. Ensuring that an ample, long-term supply of land is available to the market addresses this issue. In an uncertain climate, it is appropriate to ensure this risk is mitigated by designating sufficient lands to ensure all opportunities can be met. The risk of under-supply is considerably greater than the risk of oversupply, and for this reason, estimates of land need should err on the side of caution and assume a robust pace of growth. As with most forecasts the main issue is not what will happen but when.

2. The financial risk can be mitigated by ensuring the timing of infrastructure expenditures is as closely tied to actual market demand as possible. The ability to do this will be affected by the structure of the industrial land strategy – if the strategy requires a large expenditure on infrastructure to service a single large area of land, the City will be faced with a higher risk of "unnecessary" spending than if growth occurs through incremental expansion of existing services in multiple areas. This suggests the need for a strategy that will allow infrastructure spending to occur in a flexible manner tied to the actual rate of growth. Infrastructure in this context includes piped services and the transportation network.

3. Land use conflicts, particularly with regard to residential-industrial interface, are a significant issue in certain areas. For example, if industrial growth occurs upwind of a future residential area, and includes heavy industry generating emissions, then adjacent residential development may not be compatible. Transportation and piped service expansions need to be co-ordinated and occur in a logical and consistent pattern. The City has done an excellent job of creating a functional urban structure that maximizes the efficiency of infrastructure and the quality of life; this should not be compromised.

Several other key issues are salient that will need to be addressed by the options:

- *Stronger forecast growth in distribution related sectors of the economy* rather than manufacturing or other traditional industrial uses – this makes good transportation access a more important factor in selecting location than with other, more traditional industrial uses
- *Status of future transportation infrastructure* – the construction of new transportation infrastructure could be a "catalyst" for industrial development in adjacent areas. Although the degree to which firms that are shipping or receiving need to be located adjacent to the infrastructure is questionable, it would without question change the character of the lands in the area. Noise concerns and truck traffic would make residential expansion in the area undesirable. Industrial use of the adjacent area would therefore be more compatible.
- *Latent demand and latent supply* – the potential presence of firms in Regina today with expansion plans will need to be accounted for.
- *Ensuring sufficient large parcels* exist for larger firms/development
- *Ensuring prestige locations* exist for users with requirements for high visibility and a "cleaner" environment
- *Mitigating environmental impact, particularly on the aquifers*
- *Taking the opportunity to realize eco-industrial networking opportunities*

5.2 Four Options for Expansion

Per direction from the City of Regina, and additional consideration of suitable lands, the study team has considered five general geographic areas as potential locations for industrial expansion:

- North of Ross Industrial Park, northwest of the Co-op Refinery.
- East of Ross Industrial Park, southeast of the Co-op Refinery.

- North of Argyle Park/Kensington Greens, within the 1000m buffer lands south of IPSCO.
- Lands adjacent to the Airport (note – these are already designated in the Southwest Sector Plan for industrial use)
- West of the Airport

Using the economic forecasts of employment by sector as a basis, four options have been developed which allocate the forecast demand to these five different geographic areas. These options are outlined on the subsequent pages. The options also account for conditions relating to the IPSCO Buffer lands and lands abutting the airport.

"IPSCO Buffer" Lands

In all options, the lands within the 1000m buffer zone around IPSCO are included for development as light industrial and warehouse uses. These two irregularly shaped parcels are vacant and extend south from the City boundary to the existing/future residential communities of Argyle Park/Kensington Greens.

These lands have been considered for development for light industrial uses, as these are appropriate uses to locate between heavy industry (IPSCO) and the commercial and residential areas to the south.

A total of 34 hectares (84 acres) has been identified for industrial use in this area. This figure was arrived at by assuming a portion of these lands fronting on Pasqua Street and on Rochdale Boulevard, would develop for commercial uses. From a transportation perspective, there are significant challenges associated with developing the buffer lands east of Highway 6, north of Kensington Greens. Direct road access to Highway 6 is unlikely to be possible and road access would therefore need to be provided to the north or east, requiring a new railway crossing and creating an indirect access route. It would be possible to house all of the proposed 34 hectares west of Highway 6, including a commercial buffer; however, further study of transportation access, aquifer impact, and water, wastewater, and stormwater systems will be required at the concept planning level to establish the limits of industrial lands in this area. Further, engineering analysis of the IPSCO buffer lands only considered the lands west of Albert Street.

"Airport Abutting" Lands

Certain lands have already been designated for industrial development near the Regina Airport as part of the Southwest Sector Plan. These lands total about 101 hectares (250 acres), located in two parcels immediately west and immediately south of the airport. All four options assume these lands will develop for light industrial or warehouse uses by 2031. The net amount of total land that can be developed for industrial use in these areas was reduced by a net-to-gross factor of 80%, to account for the land area that will be required for roads and stormwater detention facilities.

Options Mapping

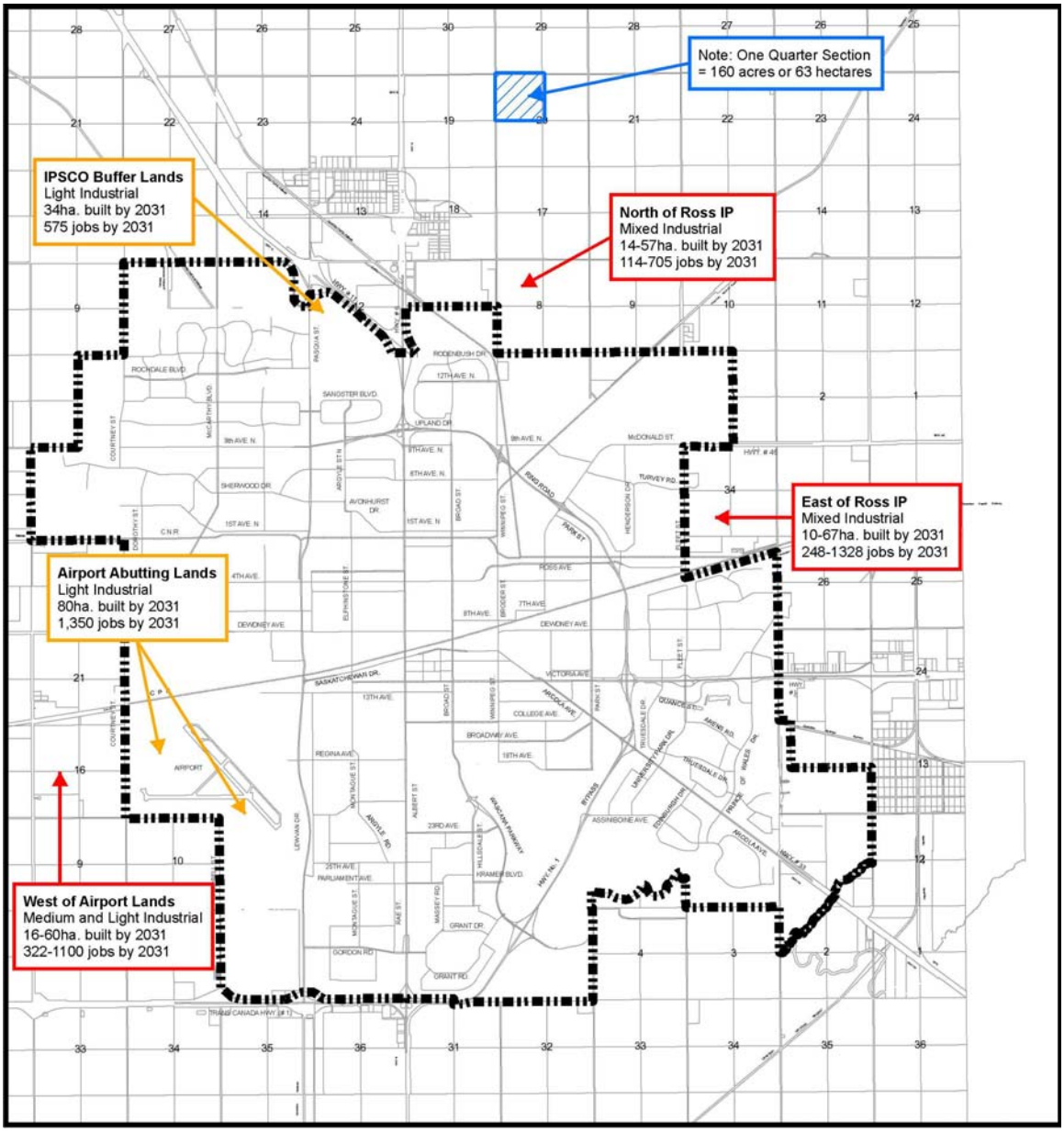
The maps on the following four pages lay out the four conceptual options for growth. Subsequent chapters analyse the merits of these options from several perspectives, concluding with an evaluation of the options in Section 10.

Note that the lands marked with orange boxes are common to all options – the Airport Abutting Lands and the IPSCO Buffer lands. Lands marked by red boxes are proposed options outside the urban boundary.

Option A – Dispersed Growth

In this option, industrial growth would be spread out among four areas. In the IPSCO buffer lands, light industrial and warehouse uses would locate on lands identified as a buffer area within 1,000 metres of the existing IPSCO operation. Lands west of the Airport would be targeted for distribution and warehouse uses. The lands currently designated in the Southwest Sector Plan, adjacent to the airport, are assumed to develop for warehouse or light industrial uses.

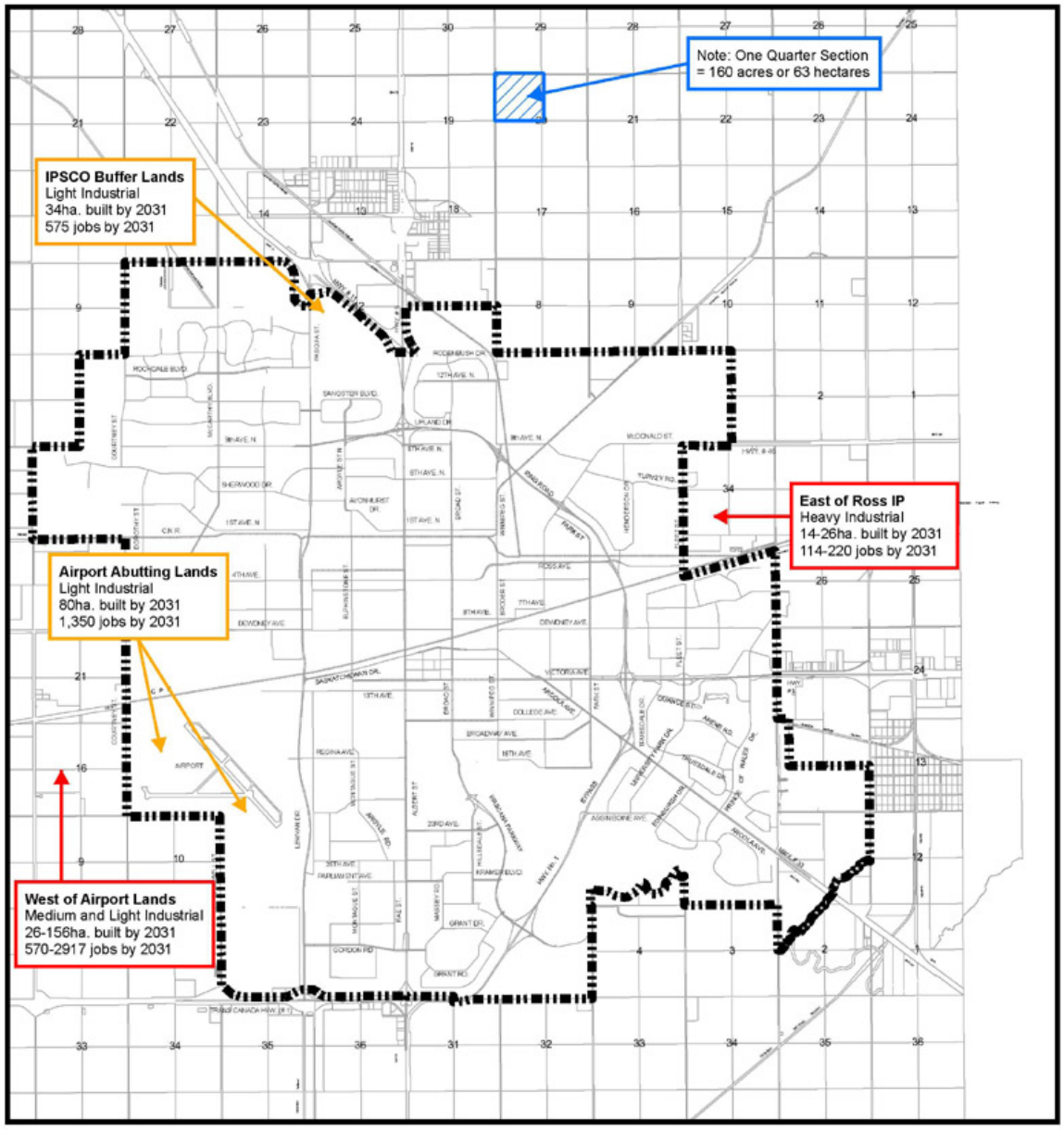
North and East of the Ross Industrial Park, incremental expansion of the industrial park would continue, with zoning for heavy and mixed industrial uses where permitted by aquifer sensitivity zoning regulations.



Option B – Manufacturing East of Ross, Other Uses at Airport

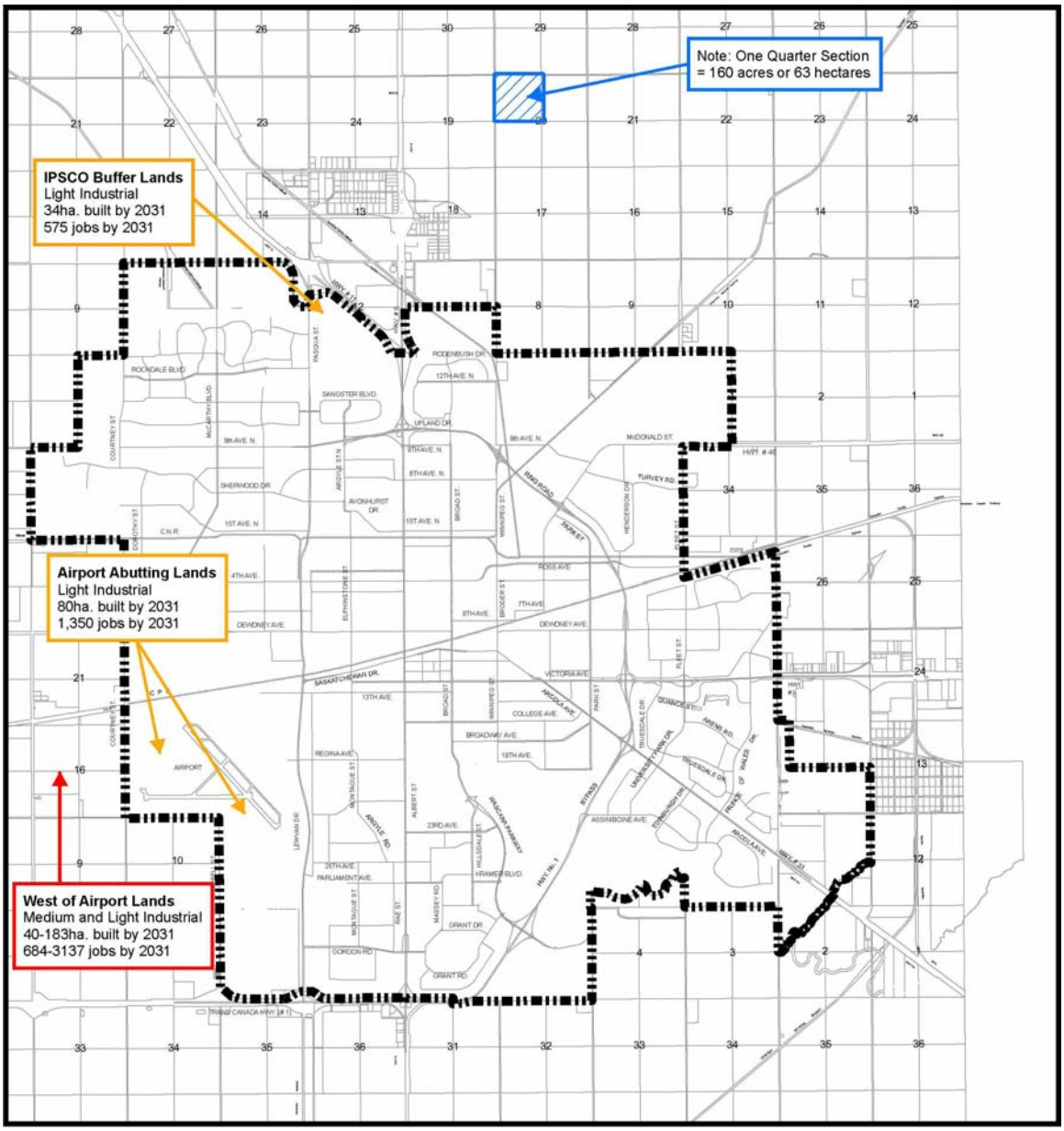
In this option, manufacturing uses and other heavy industrial uses would be concentrated through further expansion of the Ross Industrial Park to the east, with light industrial and warehouse uses west of the Airport. The anticipated strong growth in warehouse/distribution uses would mean substantially more lands would be required near the Airport than east or north of the Ross Industrial Park. The lands currently designated in the Southwest Sector Plan, adjacent to the airport, are assumed to develop for warehouse or light industrial uses.

The segregation of uses in this option may allow each area to develop its own industrial identity; the airport as a major distribution centre, with the Ross Industrial Park a more traditional manufacturing-oriented area.



Option C – Airport-Focussed

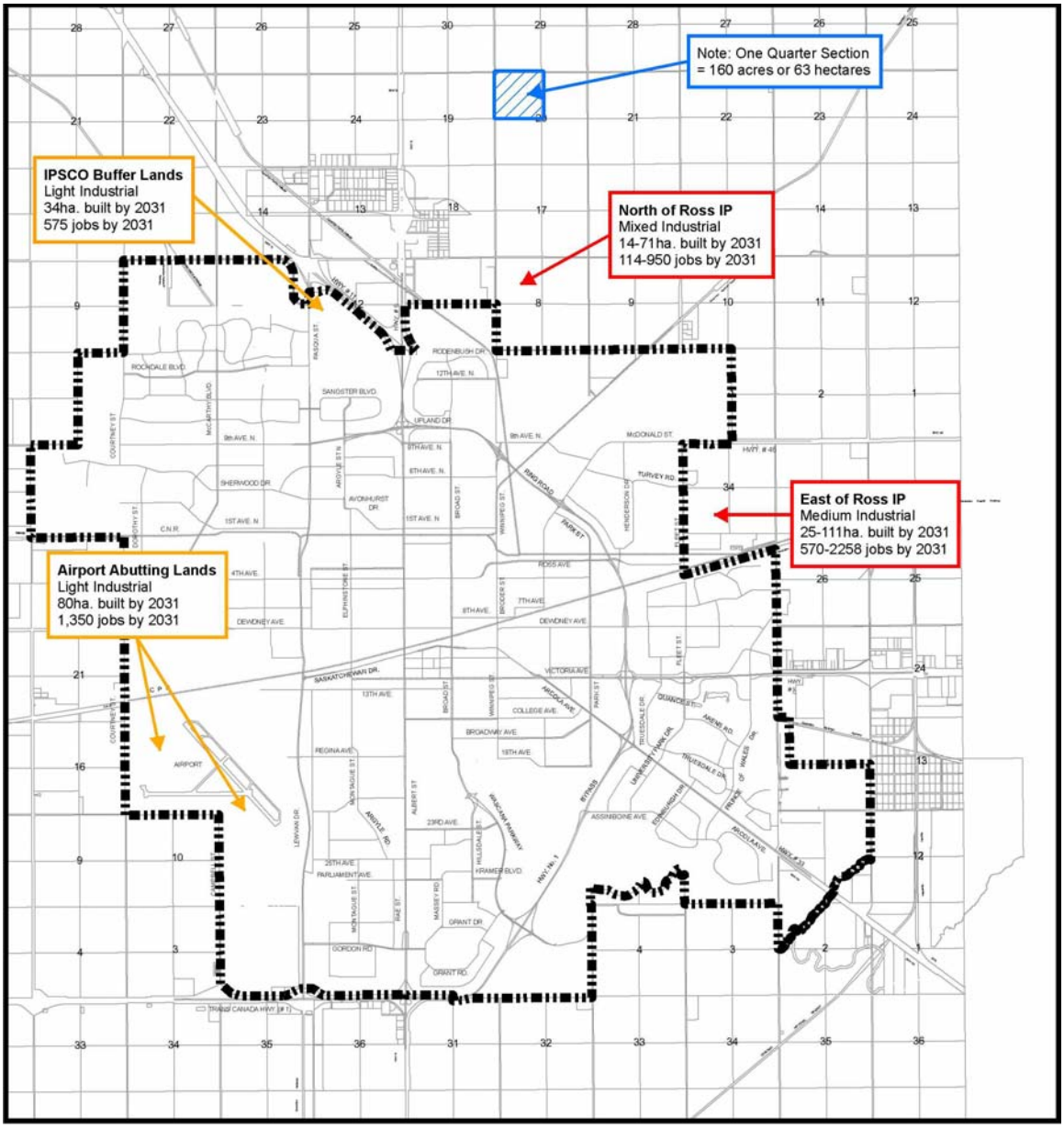
In this option, industrial expansion in the long term would be focussed at the Airport. While the subdivision of the final stages of the Ross Industrial Park would be built out, and could be expected to house manufacturing industries and some mixed industrial uses, the bulk of new development would occur adjacent to the airport. The lands currently designated in the Southwest Sector Plan, adjacent to the airport, are assumed to develop for warehouse or light industrial uses. In this option, certain heavy industrial uses may not be easily accommodated, due to aquifer restrictions, and the potential for emissions to be blown by prevailing winds into residential areas.



Option D – Ross Focussed

In this option, industrial expansion in the long term would continue the current pattern of industrial expansion in Regina, with expansion occurring to the north and east. If transportation constraints can be addressed, the area to the north of Ross Industrial Park may be suitable for warehouse/distribution facilities, while heavier industries can locate to the east of Ross Industrial Park.

The lands currently designated in the Southwest Sector Plan, adjacent to the airport, are assumed to develop for warehouse or light industrial uses.



6 Land Use and Environmental Analysis

The existing urban structure of the City of Regina reflects the geography of the prairies and the consistent but moderate rate of growth over the past four decades. With few natural constraints to development the City has grown symmetrically around the downtown, serviced by a road network in a grid pattern interrupted only by the railway lines and the Wascana Creek. Residential neighbourhoods are found in all four quadrants, employment areas are located downtown, in the north east and in the major institutional uses found throughout the City.

In many ways the City's land use pattern is classic and ideal. Mobility is easy and traffic rarely intrudes into neighbourhoods. Retail centres are located adjacent to major intersections, industrial uses are found at the periphery of the City and generally downwind from the residential areas. It is important that the selection of new industrial areas maintains the successful planning of the City, builds on the existing urban structure and maximizes the opportunity for economic development.

The following analysis comments on the land use and environmental considerations relevant to the selection of new areas for employment. The analysis considers land use compatibility and consistency with the current land use pattern and regulations. There are three potential locations bordering on but outside the City limits, without specific boundaries and two sites within the City limits that are under consideration, as noted in the earlier maps.

6.1 Land Use Compatibility

An essential objective in planning a community is the separation of uses that may negatively impact each other. Perhaps the most classic of these is the need to separate industrial uses from residential areas, given the potential impacts of noise, emissions and traffic. In the context of Regina this separation, which has been so well accomplished in the City's planning to date, can continue no matter which option or area is selected, provided proper zoning is put in place.

The locations and sites selected for analysis were based on availability, adjacent compatible uses and the maximization of use of existing and potential infrastructure. Two of the choices are specific sites, the IPSCO buffer lands of 34 hectares (84 acres) and the Airport abutting lands of 80 hectares (198 acres). The three other locations could vary significantly in size as they are located outside of the current City boundaries. These three locations are North of Ross, East of Ross and West of the Airport. All five areas are shown on the map for Option A in Chapter 5 above.

The North of Ross lands would have a residential area located in close proximity to the southwest. However given the potential size of the lands and their relationship to the residential area an appropriate buffer could be established to minimize impacts. In addition the nature of the industrial uses in the southern part of the area could be restricted to indoor uses and operations, which would further limit

impacts. The North of Ross lands are also in a location that would not require a transportation route to be shared with the residential area to the south-west.

The East of Ross lands occupy a notch of land bounded by the rail line to the south and Fleet Street to the west. There is a residential community located south of the main CP rail line, which would serve as a substantial buffer itself. Again, with proper zoning and buffers the use of this area for some forms of industry should not raise incompatibility issues. Traffic patterns should not impact the residential area to the south.

The third location consists of the West of Airport lands, located outside of the City limits and relatively unconstrained as to size. There are isolated rural residential uses in this area but no significant residential community that would be impacted. Much of the area is already subject to noise from the airport and CP main line operations. Significant residential areas lie directly downwind of this area, however.

The IPSCO buffer lands lie east of Pasqua Street and south of the highway within the City limits, as well as a smaller parcel of about 20 hectares (49 acres) east of Highway 6, north of Kensington Greens. At the present time there are vacant lands to the south that are intended to develop for residential purposes in the future. The IPSCO buffer lands are finite in area and it is expected that some of the land would be used for commercial uses adjacent to Pasqua Street, leaving about 34 hectares (95 acres) to locate in the two remaining buffer zone areas. Given that the southern border would be shared with a residential area there again may be need for some land to be used as a buffer and a need for restrictive zoning.

For the buffer zone area between Pasqua Street and Highway 11, traffic would exit directly onto Pasqua Street or the Highway. However, access to the parcel to the east of Highway 6 is more constrained, as the proximity to the Hwy 11/Hwy 6 interchange limits the ability to directly access Highway 6 from this parcel. Access would need to be provided via arterial roads to the north and east, which would entail crossing the rail line – a potentially expensive requirement.

The lands identified as abutting the airport consist of two parcels totalling approximately 80 hectares (198 acres). The development of additional industrial lands adjacent to the airport also would result in industrial uses in close proximity to an existing residential area, although in this case the airport itself causes impacts similar to that of an industrial use. These lands have been identified in the Southwest Sector plan for industrial development.

While these potential impacts suggest that the Airport and IPSCO buffer lands may not be as appropriate from the compatibility perspective than the lands North and East of Ross Industrial Park, it should be noted that the range of impacts resulting from industry is a function of the nature of the use, much of which can be regulated by the zoning by-law. As such a degree of compatibility can be ensured through municipal regulation. The City's zoning by-law currently recognizes three forms of industrial use, light, medium and heavy, with an increasing expectation of potential impacts and thus need for greater separation from sensitive land uses.

Compatibility can also be an issue for industries themselves. There are many manufacturing operations that have a degree of sensitivity to impacts from other industrial users. As well, light manufacturing uses with significant office

components and no outdoor functions tend to congregate with like users in business parks that offer greater visual amenity and corporate image. Just as these forms of industrial uses can be located quite close to residential areas provided appropriate buffers and traffic patterns can be created, and the nature of uses limited by municipal regulation, so would these uses prefer to be separated from heavy industrial operations.

Provided the appropriate mitigation and land use controls are in place there is no potential land use incompatibility that would eliminate any of the options. This conclusion is based on the assumption that:

- the lands abutting the airport and the lands west of the airport do not include any industrial uses with fugitive (off-site) emissions that would impact the airport and residential areas to the east;
- the IPSCO buffer lands are limited to indoor, office and light manufacturing uses;
- the North of Ross lands would have an appropriate buffer to the south-west; and,
- the East of Ross lands have a broad use permission but buffer the residential areas to the south, if necessary.

6.2 Housing Light, Medium, and Heavy Industry

The preferred growth option must address the need for a range of industrial uses to be housed in an appropriate manner. Our earlier analysis identified the balance of heavy, medium, and light industry that is likely to be required. Although this provides a basis for the establishment of new industrial areas serving varying industrial types, it should be recognized that flexibility must be maintained to ensure that lands will be available to serve the actual distribution of industry by type as the City grows in the future. The flexibility inherit in the different options is addressed below.

6.2.1 Heavy Industry

"Heavy" industry includes those uses that may produce emissions, including airborne pollutants and/or noise, and those with outdoor operations that may cause conflicts with surrounding uses.

The demand analysis identified a relatively low need for heavy industrial lands over the forecast period, as it is anticipated that growth will occur primarily in economic sectors that will not require this type of facility. However, some growth is identified (estimated at 20 to 33 hectares, or 49 to 81 acres), per section 4.2, above.

Finding a location for heavy industry has been a major challenge for this study. There are very few lands within the identified growth areas that are suitable for heavier (ie. emissions-producing) industries, for two major reasons:

- The aquifer protection regulations impact virtually all lands adjacent to the City boundary from the Airport in the west, north to the IPSCO buffer

lands, along the northern boundary east to the landfill site, and along the eastern boundary south to just north of the CP mainline. Although the degree of aquifer sensitivity varies, this is a substantial constraint as the aquifer regulations limit industrial development.

- The direction of prevailing winds means locating heavy industrial uses north-west of residential areas may result in emissions travelling into residential areas

As noted, the area east of Ross Industrial Park contains an area immediately north of the CP mainline, which is not within an Aquifer Protection Zone. The potential for rail access could also be attractive for a heavier industrial user. This location, although north of a residential area, may be the most appropriate location for heavy industry available among the growth options. Options A, B, and D incorporate this growth area, allowing for the 14.3 to 26.7 net hectares of land need required for heavy industry.

Option C, which does not include these lands, is limited by its lack of a location for heavy industry. Although it may be possible to locate some "heavy" industries in low aquifer sensitivity zones, depending on emissions and proper mitigation techniques, this option is clearly less favourable than one that includes lands that are not within an aquifer protection zone.

6.2.2 Medium and Light Industry

Medium and light industry is less difficult to house, as it generally produces fewer emissions that may be of concern. All four options have sufficient lands to house medium and light industry, provided that these uses are located within the areas in conformity with aquifer protection regulations and with due regard to abutting residential and commercial zones.

6.2.3 Provision of large parcels

The provision of large parcels is another important consideration from a market perspective. All four options include multiple growth areas of currently vacant lands. The manner in which these areas are subdivided into parcels should consider the need for at least one large parcel of 10 hectares (25 acres) or greater in size, to allow the City to have a site to offer a potential large industrial user. All options contain lands that could be subdivided in such a fashion as to create these large parcels.

6.3 Consistency with the Development Plan

The Regina Development Plan has identified potential growth areas to accommodate a population of 300,000 persons. This Plan has determined the land need, general land use pattern and the supporting elements of infrastructure.

Future residential expansion is planned to the northwest, southeast, east, and southwest.

While the growth to the north west and south east would not be located in proximity to any of the industrial location options, the growth area to the east would be south and east of the East of Ross area, although farther away from the potential industrial area than the existing community directly south of the CP mainline. The development of the lands directly south of the airport for residential uses would be in some proximity to the lands adjacent to the airport and the West of Airport options. However, the long term transportation network would separate the residential areas from any industrial uses by the upgraded Pinkie Road bypass, running north to south, and located on the airport's western boundary.

6.4 Achieving economic objectives and minimizing risk

Employment in Regina, as a City remote from other major urban centres, can be particularly subject to economic cycles and/or downturns in individual sectors of the economy. One strategy to deal with this risk is to ensure that employment is as diversified as possible. In land use terms this means providing as wide a variety of locations and circumstances to potential employers as possible, thus meeting the greatest range of needs. Locational factors for employers, while varying by industry, in the Regina context generally consider as important the nature of adjoining users, flexibility for expansion and access to the highway system. In providing employment locations the City should maximize the opportunities provided by the existing infrastructure, both to take advantage of efficiencies as well as to minimize new capital costs.

The suitability of the Ross Industrial Park and the potential for expansion to the east and north for medium and heavy industrial users is well established and adjacent land uses are compatible for most forms of industry. However, uses are severely restricted in much of this area by the Aquifer Protection Regulations. All development in this area must conform to these regulations, which prohibit some types of industrial use, and in the case of the high sensitivity zone, prohibits all industrial uses. The limitations resulting from the extent of the protection zones is generally greater in the North of Ross area than East of Ross.

6.4.1 The Market View

The City's economic development objectives are best met by balancing the cost of providing infrastructure with the range of choice of industrial locations that results. For example, in an ideal circumstance the City could offer a range of locations that would meet all market needs, including industrial uses that have outdoor operations and create impacts, business park uses that have primarily office employment, and warehousing and distribution facilities that need large areas of land and excellent trucking and/or rail access. In addition, by having a variety of locations and a supply of land that exceed demand, the cost of land would be lower than otherwise.

6.4.2 *Putting choice, incompatibility, environment and the market together*

The Ross Industrial area now provides virtually all of the potential industrial locations to prospective businesses. The nature of industrial uses varies significantly and, as the results of this study indicate industrial employment in Canada, Saskatchewan and Regina has and will continue to change. The trends show an actual reduction in the amount of manufacturing employment, as productivity increases, and an increase in employment in the warehousing and distribution sector. In general terms industrial operations are becoming more automated and more specialized, separating or outsourcing office, distribution and storage functions from the primary manufacturing operation.

Employers look to locations that will allow their businesses to function efficiently; compatible and like neighbours provide a sustainable environment and usually result in support facilities locating in an area to serve the primary uses. Restaurants, print shops, cleaners, banks and more specialized facilities are examples of secondary uses that serve both the employees personal needs and the industries' service requirements.

While industrial uses are concentrated into a single area of the City at the moment, the north-east, it is interesting to note that the pattern of industrial uses in Ross Industrial Park does not show a great deal of "clustering" of similar uses. The opportunity exists today to create more choice in industrial location, and to do so in a manner that achieves a variety of public objectives. This means limiting the range of industrial uses at specific locations in a manner consistent with the economic objectives of the City.

For example, through zoning and the marketing of new industrial areas, expansion areas could be established that have a distinct "character". Instead of mixing all types of industry, a particular growth area could be designated as a "distribution district", with use permissions and zoning that limit the range of potential industrial uses to wholesale trade, warehouse, and distribution facilities. A concerted marketing effort to identify this area as a distribution hub, together with infrastructure planning that ensures transportation infrastructure is available to support these types of uses, may increase the attractiveness of the area for these types of uses.

This issues is addressed in more detail in Chapter 11 of this report; however, for the purposes of evaluation of options from a land use perspective, the issue is best addressed by options that provide a broader range of potential expansion areas. Options C and D are the most limited in this sense, as Option C has the fewest new industrial areas identified, and as Option D consists of two expansions to the existing Ross Industrial Park, where a "mixed industrial" character is already established.

7 Transportation Analysis

The objective of the road network infrastructure review is to identify road network deficiencies and to recommend an infrastructure plan required to support the fully developed industrial growth areas. Improvements may be a combination of geometric, traffic control or structural improvements. The analysis examines the effect of a combination of new network links and improvements to existing network links.

Based on information gathered from the development of options, the amount of traffic generated by each of the growth area options for the forecast weekday afternoon peak hour were established. The afternoon peak hour was chosen for this analysis as it represents the time of greatest daytime traffic on the road network. The afternoon peak hour was also chosen in order to be consistent with the recent traffic analyses conducted for the Northwest, Southeast and Southwest Sector Road Network Studies, which analyzed traffic forecast for the afternoon peak hour.

The distribution and assignment of new trips to the future road network will determine future road infrastructure requirements. The forecast timeframe for analysis corresponds to traffic volumes and road network developed for a 235,000 population forecast scenario.

Appendix A illustrates the Regina Road Network Plan, as approved by City Council in July 2007. It was assumed that the City's recommended road network required to service a population of 235,000 is already in place (as illustrated in Appendix A) and available to service the new industrial growth areas.

7.1 Previously Identified Road Network Upgrades

All five industrial growth areas have required road network upgrades identified through previous road network plans - these may impact access to and be required to service the future industrial growth areas.

The following key roadway infrastructure requirements required to service the five new industrial growth areas have already been identified through the City of Regina Road Network Plan, as well as through the Northwest, Southeast and Southwest Sectors Road Network Updates.

West of the Airport / Airport Abutting Lands

Three new interchanges have been identified:

- an interchange at the intersection of Lewvan Drive and Highway No. 1 (the detailed design is currently in progress and construction will likely occur within the next couple of years)
- an interchange at the intersection of Pinkie Road and Highway No. 1 – this interchange would not be required based on forecast traffic volumes, but may be provided in the long term as part of grade separating Highway No. 1 and the west bypass of the City

- an interchange at the Saskatchewan Drive and Lewvan Drive intersection is anticipated to be the most efficient solution for this intersection due to the expected magnitude of future turning movements, as well as the existing grade changes at this intersection resulting from the presence of the railway crossing structure
- this area will also require the reconstruction of Pinkie Road (i.e. the West Bypass) from Highway No. 1 to Highway No. 11. Pinkie Road is currently a 2-lane gravel road of varying standards. Pinkie Road was identified as the westerly corridor component for the National Highway Network in the 1996 Regina Regional Highway Plan, as well as the western part of the City of Regina bypass
- portions of Dewdney Avenue west of Lewvan Drive have also been identified as requiring structural upgrades to accommodate an increase heavy truck traffic. Dewdney Avenue is currently a heavy truck route through the City of Regina
- extension of Parliament Avenue west of Lewvan Drive - due to impending development, the first 800 metre segment of Parliament Avenue west of Lewvan Drive is anticipated to be required immediately in order to serve initial commercial development. The staging of construction for the remainder of Parliament Avenue west of Lewvan Drive will be dictated by the rate at which the future neighbourhood develops.

IPSCO Buffer Lands

- there is a requirement for a new interchange at the intersection of Pasqua Street and Ring Road
- in conjunction with the Pasqua Street and Ring Road interchange, Pasqua Street will require widening from its existing 4-lane cross section to a 6-lane cross section. Even as a six-lane roadway, Pasqua Street is anticipated to be near capacity between Rochdale Boulevard and Ring Road in the future. Pasqua Street forms part of the City of Regina heavy truck route.
- one of the gateway intersections to the northwest, the intersection of Pasqua Street and Rochdale Boulevard is anticipated to experience continued capacity issues in the future. This intersection will require re-configuration in order to achieve an acceptable level of service in the forecast afternoon peak hour
- modifications to the Pasqua Street and Highway No. 11 interchange will be required to alleviate capacity issues for the westbound left turn movement (i.e. those vehicles traveling northwest on Highway No. 11 wishing to go south on Pasqua Street. This is currently an off ramp which terminates at Pasqua Street as a left turn at a stop sign)
- extension of Argyle Street to the future neighbourhood north of Argyle Park is recommended and facilitates an alternative route for Argyle Park residents to access development north of Rochdale Boulevard. This link would be an indirect alignment to minimize the use of this roadway as a short-cutting route by non-Argyle Park residents

- Ring Road (north of Victoria Avenue) and Victoria Avenue (east of the Ring Road) are links that have both been identified as having capacity issues in the future
- the construction of a new east-west roadway north of the existing City Limits between Fleet Street and Prince of Wales Drive has been identified. This roadway will provide another access into the northeast and provide an important link to the industrial park
- a short grade-separated link on Fleet Street across the CPR mainline that would provide a mid-way crossing point for north-south traffic between Ring Road and Prince of Wales Drive. The origins of this traffic are in the industrial area; however, heavy truck traffic would be restricted on this link.
- Ross Avenue and Fleet Street throughout the Ross Industrial Park have both been identified as requiring widening from a 2-lane cross section to a 4-lane cross section
- addition of traffic loops at the Ross Avenue and Ring Road interchange will provide service for traffic to and from the north on Ring Road. The measure is intended to facilitate routing into and out of the Industrial Park
- for the lands north of Ross Industrial Park, Winnipeg Street is one of the only roadways that provide north-south access into this area. Winnipeg Street north of the Ring Road has been identified as require widening and/or road upgrades to serve as a future arterial roadway
- Inland Road and Tower Road, have both been identified as being part of the Northeast Bypass. These are long term initiatives, but may be beneficial to providing an upgraded highway network to service these industrial lands

7.2 Development of New Industrial Vehicle Trips

Trip generation rates were derived from the Institute of Transportation Engineers (ITE) - 7th Edition Trip Generation Manual. Logarithmic equations, where available, were used in place of average rates. The total number of new vehicle trips generated for each of the industrial options for the weekday afternoon peak hour are shown below in Table 7.2.1.

As noted above, the afternoon peak hour was chosen for this analysis as it represents the time of greatest daytime traffic on the road network. The afternoon peak hour was also chosen in order to be consistent with the recent traffic analyses conducted for the Northwest, Southeast and Southwest Sector Road Network Studies, which analyzed traffic forecast for the afternoon peak hour.

The number of new trips generated are based on the number of employees forecast for the manufacturing (heavy), industrial park (medium) and warehousing (light) industrial land use types for each of the four options. The average trip rates ranged from 0.5 trips per employee for the light industrial land uses to 0.6 trips per employee for the medium and heavy industrial land uses. The distribution of trips was 65 percent inbound and 35 percent outbound.

Table 7.2.1
Trip Generation

Options/Growth Area		Total Two-Way Afternoon Peak Hour Trips Generated (vph)					
		North of Ross	East of Ross	IPSCO Buffer	West of Airport	Airport Abutting Lands	Total Trips
Base	Option A	65	140	310	230	645	1,390
	Option B	-	65	310	345	645	1,365
	Option C	-	-	310	410	645	1,365
	Option D	65	345	310	-	645	1,365
Aggressive	Option A	380	655	310	575	695	2,615
	Option B	-	110	310	1,320	695	2,435
	Option C	-	-	310	1,430	695	2,435
	Option D	490	1,005	310	-	630	2,435

Key findings from the trip generation exercise include:

- trips generated for the base options range from 1,365 trips (Options B,C, and D) to 1,390 trips (Option A)
- trips generated for the aggressive options range from 2,435 trips (Options B,C, and D) to 2,615 trips (Option A)

The directions from which traffic will approach and depart the growth areas or trip distribution can vary depending on several location-specific factors, most importantly, the distribution of population and employment and characteristics of the surrounding road network. The distribution shown in Table 7.2.2 was used to distribute the trips to and from throughout the road network. It is based on the following:

- truck trips: the truck trip distribution is based on 2005 daily traffic volumes and commercial percentages on major highways in and out of the Regina area (i.e. north - Highway Nos. 11, 6; south – Highway No. 6; east – Highways No. 46, 1 and 33; and west – Highway No. 1)
- vehicle trips: the trip distribution for vehicle trips is based on population forecasts used in the City of Regina's EMME/2 model developed for the Northwest, Southeast and Southwest road network studies.
- A split of 30 percent trucks and 70 percent vehicle trips were assumed for the new trips generated by the new industrial developments. A weighted average was used to develop the overall trip distribution.

Table 7.2.2
Traffic Distribution

	Truck Trips		Vehicle Trips		Overall Distribution
	30%	Weighted	70%	Weighted	
North	25%	8%	20%	14%	**20%**
South	10%	3%	35%	25%	**30%**
East	50%	15%	30%	21%	**35%**
West	15%	5%	15%	11%	**15%**
Total	100%	30%	100%	70%	**100%**

The final step to developing traffic volumes is traffic assignment. Traffic assignments should consider logical routings, available, current and projected roadway capacities, and travel times. The key assumption in this trip assignment for this analysis was that the approved City of Regina Road network plan improvements were in place, as well as updates through the plan recommended through the City of Regina's *Southwest Sector Road Network Study, Southwest Sector Road Network Study and Southwest Sector Road Network Study*.

7.3 Key Findings

Key findings from the traffic analysis and infrastructure review for each of the growth areas are listed below. The road network modifications identified have been mapped and are shown in Appendix B.

The road network modifications identified below are required above and beyond the road network modifications that have already been recommended through other studies. For example, the improvements below do not include new infrastructure such as the interchange at Pasqua Street and 9th Avenue North, the widening of Pasqua Street to a 6-lane cross-section or new traffic signals for the Pasqua Street /Armour Road and Pasqua Street /Junor Drive intersections, which will be required to accommodate the increase in traffic from the IPSCO Buffer lands industrial growth area, but have been previously recommended through other studies.

Area 1 – North of Ross

The number of trips generated for this land area by each option ranges from 65 vph (Option A and D Base) to 490 vph (Option D Aggressive). Trip assignment or access for traffic to and from this parcel of land is limited to Winnipeg Street and Inland Drive.

Key infrastructure impacts from the increase in traffic are:

- base options (65 vph) will not have a significant impact on the road network
- aggressive options (380 – 490 vph) will require structural upgrades to Winnipeg Street to accommodate the increase in traffic
- is not anticipated to require widening of Winnipeg Street
- most significant impacts to turning movements:
  - westbound left turn at Highway No. 6 and Inland Drive (up to 90 vph)
  - southbound left turn at Ring Road and Winnipeg Street (up to 180 vph) – may trigger traffic signals at the interchange to accommodate increase in left turns
- will require geometric improvements and traffic signals at the intersection of Winnipeg Street and 9th Avenue N
- may require geometric or structural upgrades to the interchange at Ring Road and Winnipeg Street. Additional study would be required at a detailed level to establish required upgrades

Area 2 – West of the Airport

The number of trips generated for this land area by each option ranges from 230 vph (Option A Base) to 1,430 vph (Option C Aggressive). Key infrastructure impacts from the increase in traffic are:

- majority of traffic will route through the intersections of Lewvan Drive and Parliament Avenue, and Highway No. 1 and Pinkie Road
- for the aggressive options (up to 1,430 vph), the most significant impacts to turning movements at Parliament Avenue and Lewvan Drive are:
  - eastbound through (up to 170 vph) and westbound through (85 vph). These vehicle estimates are not related to heavy vehicle or

truck trips generated by the industrial developments. It is assumed that these trips are passenger vehicles gaining access to the Parliament Place and other adjacent neighbourhoods.

- ample capacity at this intersection to accommodate increase in traffic
- no intersection improvements are anticipated for either base or aggressive forecasts

- most significant impacts to turning movements at Highway No. 1 and Pinkie Road are:
  - southbound left turn (up to 325 vph) is forecast to operate at a Level of Service F with long delays for both base and aggressive option forecasts
  - may lead to safety issues
- aggressive options may trigger the need for a new interchange at the intersection of Pinkie Road and Highway No. 1
- will require the reconstruction of Pinkie Road from Highway No. 1 to Highway No. 11. Can be staged to accommodate demand (i.e. Highway No. 1 to Dewdney Avenue)

Area 3 – East of Ross

The number of trips generated for this land area by each option ranges from 65 vph (Option B Base) to 1,005 vph (Option D Aggressive). Key infrastructure impacts from the increase in traffic are:

- many opportunities for access to and from this area - majority of traffic will route through Fleet Street, Ross Avenue and Prince of Wales Drive. Again, these vehicle estimates are not related to heavy vehicle or truck trips generated by the industrial developments. It is assumed that these trips are passenger vehicles gaining access to neighbourhoods in East and Southeast Regina.
- base options will have little to no impact on surrounding road network
- aggressive options will have the most significant impacts on Fleet Street south of Ross Avenue - limited capacity at the intersection of Fleet Street and Dewdney Avenue to accommodate increase in traffic
- will require good access to Prince of Wales Drive. This can be accomplished through the extension of Ross Avenue between Fleet Street and Prince of Wales Drive. While this improvement was identified in the Southeast Sector Road Network Plan, it was a long-term initiative. This new roadway will be required to service the new industrial growth area.
- the impact of not providing the Fleet Street connection across the CP rail line was investigated. For the industrial area east of Ross Industrial Park, approximately 20 percent of the industrial traffic was originally assigned to the Fleet Street crossing – it was understood that this link is forecast to experience capacity issues downstream of the crossing, and as such, was not assigned a large percentage of the new trips. Without the

Fleet Street connection, the majority of this traffic would reassign to Prince of Wales Drive. In addition to the new trips already assigned to Prince of Wales Drive, it is anticipated that up to 500 vph in total (inbound and outbound) would utilize Prince of Wales Drive. The intersection of Prince of Wales Drive and Victoria Avenue is forecast to have enough reserve capacity to accommodate this increase in traffic.

Area A – Airport Abutting Lands

The number of trips generated for this land area by each option ranges from 630 vph (Option D Aggressive) to 695 vph (Option A, B and C Aggressive). Key infrastructure impacts from the increase in traffic are:

- majority of traffic will route through Lewvan Drive and Parliament Avenue. Again, these vehicle estimates are not related to heavy vehicle or truck trips generated by the industrial developments. It is assumed that these trips are passenger vehicles gaining access to neighbourhoods in South Regina.
- most significant impacts to turning movements are:
  - northbound left turn (up to 105 vph), eastbound right turn (195 vph) and southbound right turn (130 vph)
  - ample capacity at this intersection to accommodate increase in traffic
- no intersection improvements are anticipated

Area I – IPSCO Buffer

The number of trips generated for this land area by each option ranges from 305 vph (all aggressive options) to 310 vph (all base options). Key infrastructure impacts from the increase in traffic are:

- Three opportunities for east-west access to Pasqua Street (Rochdale Blvd, Junor Dr and Armour Rd)
- it was assumed that there will be no direct access to Highway No. 11 or Highway No. 6 from this area
- most significant impact will be to the westbound left turns at Rochdale Blvd., Junor Dr and Armour Rd (demand of up to 170 vph between all 3 intersections):
- very limited capacity at Rochdale Blvd to accommodate additional westbound left turn traffic
- will require a double westbound left turn at either Junor Dr or Diefenbaker Drive (both of these intersections are forecast to have a single left turn lane)
- will increase southbound through traffic on Pasqua Street, which is forecast to have capacity issues

7.4 Cost Estimates

The cost estimates prepared for this analysis are for the improvements required above and beyond the road network modifications that have already been recommended. However, if in some cases the industrial growth areas have triggered the need for an improvement sooner than planned, the costs for those specific improvements have been included.

The planning level cost estimates provide for a relative evaluation of the incremental costs of one option to the next and follow the same consistent set of assumptions, as identified below.

Table 7.4.1 identifies the planning level construction cost estimates for the recommended modifications identified for Options A, B, C and D. Costs were prepared for each location and type of construction. The identified potential construction costs are based on preliminary estimates of roadway materials, curb and gutter if the roadway is an urban cross section, structures, street lighting, traffic items (i.e. signals, pavement markings) and include a 15 percent allowance for engineering and a 15 percent allowance for construction contingency. The costs do not include landscaping, right-of-way acquisition, utility relocation or servicing.

In some cases, the right-of-way, servicing and utility relocation/servicing can be a significant portion of the construction cost. A detailed design review, which is outside of the scope of this review, would be required to establish these costs for each identified improvement.

A detailed breakdown of costs for each improvement is attached in Appendix C.

Table 7.4.1
Transportation Cost Estimates

Options		North of Ross	East of Ross	IPSCO Buffer	West of Airport	Airport Abutting Lands	Total Cost
Base	Option A	$ -	$ -	$250,000	$ 5,000,000	$ -	$ 5,300,000
	Option B	n/a	$ -	$250,000	$ 5,000,000	$ -	$ 5,300,000
	Option C	n/a	n/a	$250,000	$ 5,000,000	$ -	$ 5,300,000
	Option D	$ -	$ -	$250,000	n/a	$ -	$ 300,000
Aggressive	Option A	$1,400,000	$ -	$250,000	$ 5,000,000	$ -	$ 6,700,000
	Option B	n/a	$ -	$250,000	$20,000,000	$ -	$20,300,000
	Option C	n/a	n/a	$250,000	$20,000,000	$ -	$20,300,000
	Option D	$1,400,000	$1,900,000	$250,000	n/a	$ -	$ 3,600,000

The costs estimates for each option are:

- Option A - ranges from $5.3M to $6.7M
- Option B - ranges from $5.3M to $20.3M

- Option C - ranges from $5.3M to $20.3M
- Option D - ranges from $300,000 to $3,600,000

The assumptions for each of the component areas in this analysis are outlined below.

Area North of Ross – up to $1.4M

This includes the pavement rehabilitation of a 5 kilometre section of Winnipeg Street and Inland Drive ($640,000), upgrades to the intersection of 9th Avenue North and Winnipeg Street ($500,000) and two sets of traffic signals - one at the intersection of 9th Avenue North and Winnipeg Street and a second at the intersection of Winnipeg Street and Ring Road (2 signals at $150,000 each)

Area East of Ross – up to $1.9M

This includes the extension of Ross Avenue from Fleet Street to Prince of Wales Drive. This improvement is identified in the long-term 300,000 population forecast, but may be required earlier to accommodate aggressive Option D only. The construction of Ross Avenue from Fleet Street to Prince of Wales Drive is anticipated to require a two-lane rural cross-section in the long term. This 1.6 kilometre segment is estimated at $1,900,000. No traffic signals were included in this estimate.

IPSCO Buffer Area - $250,000

This includes the cost to construct a new left turn lane at either the intersection of Pasqua Street and Junor Drive or at the intersection of Pasqua Street and Armour Road.

Area West of the Airport – ranges from $5M to $20M

This includes the reconstruction of 5 kilometres of Pinkie Road from Highway No. 1 to Dewdney Avenue (estimated at $5M) and a new interchange at Pinkie Road and Highway No. 1 (estimated at $15M). The cost of the interchange is included in the Aggressive Options B and C only.

Airport Abutting Lands

No anticipated costs are required to accommodate the increase in traffic. The increase in industrial traffic can be accommodated at existing intersections and roadways (all options) with no modifications. However, if this industrial growth area is developed prior to the 235,000 road network identified for the Southwest Sector being fully constructed, the extension of Parliament Avenue west of Lewvan Drive will be required to service the area. The cost of extending Parliament Avenue from Lewvan Drive to Campbell Street is estimated at $4.3M.

8 Municipal Services Analysis

Review of the municipal infrastructure related to the Industrial Growth areas is meant to identify constraints in the existing systems and recommend infrastructure requirements to allow the fully developed industrial growth areas to proceed. Improvements to the water, wastewater, and stormwater systems are identified regarding external servicing.

Using information provided by MKI and the City of Regina (CoR), the flows generated and required by each of the development areas were determined. The size, location, and job numbers of the development areas within the options determined the required capacities.

8.1 Background for Servicing Analysis

8.1.1 Development of New Industrial Flows

Zoning Bylaw 9250, Chapter 5 outlines land uses permitted in the different zones. Table 5.3 from this chapter outlines the land uses permitted in the various Industrial Zones. For the purposes of this study, it was assumed that Zones IA & IA1 would apply to light industrial, Zones IB & IB1 to medium, and Zones IC & IC1 to heavy.

8.1.2 Water Servicing

Water flow rates were developed based on fire flows and domestic flow requirements. Fire flows were generated based on Table 4.5.3 of Section 10 in the CoR Developments Standards Manual (DSM). The peak domestic flow was determined using the CoR Design Criteria, as set out in CoR DSM Chapter 10 Section 4.3. The flows developed are shown below in Table 8.1.3.1.

Table 8.1.3.1
Water Flows (l/s)

Options/Growth Area		North of Ross	East of Ross	IPSCO Buffer	West of Airport	Airport Abutting Lands	Total
Base	Option A	301.8	253.8	258.8	254.9	270.5	1339.8
	Option B	-	301.8	258.8	258.8	270.5	1089.9
	Option C	-	-	258.8	310.5	270.5	839.8
	Option D	301.8	258.8	258.8	-	270.5	1089.9
Aggressive	Option A	310.8	270.4	258.6	267.0	271.0	1377.8
	Option B	-	303.4	258.6	294.8	271.0	1127.8
	Option C	-	-	258.6	348.2	271.0	877.8
	Option D	314.6	284.7	258.6	-	270.0	1127.9

Key findings from the flow development calculations are:

- flows for the base and aggressive options vary slightly within each of the areas; and,
- flows for each area are dictated by the fire flow requirements.

It is important to consider the need for and means of connection to the existing system for each area. Looping of a water system ensures that continual service can be provided. The location of each development area provides different opportunities for system connections.

The North of Ross area is located such that two connections of appropriate size are not feasible. One connection to the water main loop can be completed by running a new line along Winnipeg Street.

Another consideration is the elevation of the lands to be serviced. This element is important because of system pressure losses and ability of the existing system base pressure to service the area. Currently, developments above the 590.0 m ASL may require establishment of a second pressure zone and attendant booster pumping. Three of the development areas must contend with this issue:

- North of Ross – the entire area,
- East of Ross – the northeast corner; and
- IPSCO Buffer – the northern half of the area.

8.1.3 Wastewater Servicing

Wastewater flow rates were developed based on flow allowances provided by the City of London, Ontario Design Standards for Sanitary Sewer Collection Systems. The design population provided by the CoR DSM does not break out the different levels of industrial flows. The calculations also used the CoR infiltration allowance for weeping tile connected to the system and a peaking factor based on the projected population.

The flows developed are show in Table 8.1.4.1.

Table 8.1.4.1
Wastewater Flows (l/s)

Options/Growth Area		North of Ross	East of Ross	IPSCO Buffer	West of Airport	Airport Abutting Lands	Total
Base	Option A	40.1	20.3	43.9	25.6	98.0	227.9
	Option B	-	35.0	43.9	44.6	98.0	221.5
	Option C	-	-	43.9	76.5	98.0	218.4
	Option D	40.1	35.4	43.9	-	98.0	217.4
Aggressive	Option A	69.8	68.1	44.0	60.5	85.6	328.0
	Option B	-	63.9	44.0	214.9	85.6	408.4
	Option C	-	-	44.0	266.6	85.6	396.2
	Option D	68.6	142.7	44.0	-	98.1	353.4

Flows for the base options are between 54% and 70% of the aggressive options.

The next element to consider is connection to the existing system for each area. As servicing studies for the areas have not been completed, assumptions were made that a forcemain would be required for servicing the West of Airport lands and detention would be required for the remainder of development areas.

8.1.4 Stormwater Servicing

Flow rates for each of the areas were not generated as it was assumed that each development area would be responsible for detaining flows on-site until such time as existing system capacity is available and that the release rates would be at the 1:5 year return storm levels. As such the external servicing for stormwater would consist of trunks or channels.

There are three watersheds to be considered for all development areas: Wascana, Boggy, and Cottonwood Creeks. Wascana Creek watershed manages the flows in the existing City limits and for a small portion of the southwestern part of the North of Ross lands, all of the East of Ross lands, the northern portion of the West of Airport and Airport Abutting Lands, and all of the IPSCO Buffer lands. Boggy Creek watershed is where the majority of the North of Ross lands drains. The Cottonwood Creek watershed boundary extends through most of the West of Airport lands.

8.2 Key Findings

Infrastructure requirements identified in the key findings are at a very conceptual level only and do not identify linkages to other developments. Detailed servicing studies of the water, wastewater, and stormwater systems are required for each of the development areas. At the servicing study level, linkages to other development areas may be identified and modifications or changes to the servicing will be considered. Key findings from the municipal infrastructure review for each of the growth areas are detailed below.

Area 1 – North of Ross

Water servicing will not be looped and the lands will require a second pressure zone.

Wastewater servicing will require coordination between CoR and Consumers' Cooperative Refineries, as the identified tie-in location is near the confluence of the 450 mm main that services the refinery and the 750 mm main paralleling the Canadian Pacific Railway right-of-way south of the Ring Road and Winnipeg Street interchange.

The drainage divide between Wascana and Boggy Creeks runs through the southern portion of the area. Most of the development will drain towards Boggy Creek, therefore coordination with Saskatchewan Watershed Authority, Saskatchewan Environment, and the City will be required.

Area 2 – West of the Airport

Water servicing may be looped through connections to the 1050 mm main paralleling Lewvan Drive. Linkages with the Southwest Sector development may be developed.

Wastewater servicing will require a forcemain to the Wastewater Treatment Plant or a tie-in to the forcemain running from the McCarthy Boulevard Pumping Station to the Wastewater Treatment Plant. Linkages with Southwest Sector development beyond Courtney Street may be realized.

The drainage divide between Wascana and Cottonwood Creeks runs through the northern portion of the area. Most of the development will drain towards Cottonwood Creek, therefore coordination with Saskatchewan Watershed Authority, Saskatchewan Environment, and the City will be required. The northern portion of the area may be tied into the drainage channel being developed parallel to Courtney Street from Dewdney Avenue to Wascana Creek.

Area 3 – East of Ross

Water servicing may be looped through connections to the 900 mm main paralleling the Canadian Pacific Railway right-of-way and the 350 mm main on Turvey Road.

Wastewater servicing may require detention with a control structure and connection to the existing system at Henderson Drive to the 450 mm main paralleling the North Storm Channel.

Stormwater servicing of the area may be completed through extension of the North Storm Channel using culverts under Fleet Street. This upgrade was identified in the Area 12 Stormwater Study.

Area A – Airport Abutting Lands

Water servicing for the southern parcel in the Airport Abutting lands is considered in the Southwest Sector. The northern lands should be serviced in conjunction with the Area 2 lands.

Wastewater servicing of the southern parcel of the airport abutting lands is considered in the Southwest Sector. The northern lands should be serviced in conjunction with the Area 2 lands.

Stormwater servicing of the southern airport abutting lands parcel is considered in the Southwest Sector. The northern lands should be serviced in conjunction with the Area 2 lands or if separate, using a drainage channel connection to the channel west of Courtney Street.

Area I – IPSCO Buffer

Water servicing may be looped through the 300 mm stub on the east side of Pasqua Street at Junor Drive and the 400 mm main on Rochdale Boulevard east of Pasqua Street.

Wastewater servicing may be accommodated through the existing system tie-in at Junor Drive west of Pasqua Street.

Stormwater servicing of the area may be completed through tie-in to the existing system at Rochdale Boulevard west of Pasqua Street for the minor system and overland drainage will proceed to the double culverts on Pasqua Street north of Lakeridge.

8.3 Cost Estimates

Table 8.3.1 identifies the planning level construction cost estimates for the recommended servicing alternatives identified for Options A, B, C and D. Costs were prepared for each location and type of construction. The identified potential construction costs are based on preliminary estimates of material and construction costs. Also included are allowances for engineering and contingency, 10% and 25% respectively. The costs do not include landscaping, right-of-way acquisition, utility relocation or servicing. These costs are at a detail level that will only allow for comparison of the alternatives.

Table 8.3.1
Municipal Cost Estimates ($)

Options/Growth Area		North of Ross	East of Ross	IPSCO Buffer	West of Airport	Airport Abutting Lands	Total Cost
Water							
Base & Aggressive	Option A	4,400,000	20,000	4,200,000	3,100,000	-	11,730,000
	Option B	-	20,000	4,200,000	3,100,000	-	7,320,000
	Option C	-	-	4,200,000	3,100,000	-	7,300,000
	Option D	4,400,000	20,000	4,200,000	-	1,300,000	9,920,000
Wastewater							
Base	Option A	2,800,000	1,200,000	2,500,000	7,200,000	-	13,700,000
	Option B	-	2,000,000	2,500,000	7,200,000	-	11,700,000
	Option C	-	-	2,500,000	7,200,000	-	9,700,000
	Option D	2,800,000	2,000,000	2,500,000	-	6,000,000	13,300,000
Aggressive	Option A	4,500,000	3,900,000	2,500,000	7,200,000	-	18,100,000
	Option B	-	3,700,000	2,500,000	7,200,000	-	13,400,000
	Option C	-	-	2,500,000	7,200,000	-	9,700,000
	Option D	4,400,000	8,200,000	2,500,000	n/a	6,000,000	21,100,000
Stormwater							
Base & Aggressive	Option A	6,100,000	300,000	0	7,000,000	-	13,400,000
	Option B	-	300,000	0	7,000,000	-	7,300,000
	Option C	-	-	0	7,000,000	-	7,000,000
	Option D	6,100,000	300,000	0	n/a	3,200,000	9,600,000

The costs estimates for municipal infrastructure for each option are:

- Option A - ranges from $38.8M to $43.2M
- Option B - ranges from $26.3M to $28.0M
- Option C - $24.0M
- Option D - ranges from $32.8M to $40.6M

The breakdown of costs for each area into the elements listed in the Key Findings is outlined in the detailed cost estimates, provided in Appendix D.

8.4 Fire Services

The review of fire service requirements and costs was conducted separately from the municipal servicing analysis above. In order to determine service requirements, a meeting was held with Fire Department staff to discuss the provision of fire protection services to the proposed growth areas. The proposed growth areas were distributed to the Regina Fire Department prior to the meeting. At the meeting, each growth area was reviewed and the costs associated with any required infrastructure were identified.

The assessment of the service requirements for the growth areas was as follows:

Ipsco Buffer Lands

Although this area is somewhat distant from the nearest station, the area can be serviced by the existing station. Water pressure may be an issue in this area. The need for booster stations has been identified separately in this report to ensure sufficient pressure to this area.

North of Ross Industrial Park
Upgrades to Winnipeg Street could allow for extension of protection service into Section 17 if required using existing stations. North of this, there may be response time concerns particularly if lands are accessed via a dense network of curvilinear roads.

East of Ross Industrial Park
This area will likely require improved fire service. In the future, the existing fire station #5 at 2700 Arens Road, may be split into two stations, with one moving north from the existing location, and one moving south. In the opinion of Fire Department, lands as far east as Prince of Wales would likely be serviced easily from this relocated station.

The cost of a new station is estimated at $1.8M for the building, with land, design, and contingency and extra approximately $500,000, for a total of $2.3M. Apparatus (two trucks) to equip a station is approximately $1.2M in cost. The total capital cost for a new station is therefore $3.5M

Airport Abutting Lands
West of Airport Lands
These lands are just on the edges of the service area for Fire Station #4. As with the situation in the east part of the City, this station will be replaced by two new stations, one to the north, one to the south. The replacement of Station #4 is planned for 2008, which would see this station relocated to the area of Dewdney and Lewvan. This will allow better coverage of the airport area and with proper road upgrades, could potentially service the area west of the airport. In the longer term future, however, a station may be required further west to service both residential growth in the southwest sector and the proposed industrial development. As such, development of these lands is assumed to require a new station and apparatus, at a total cost of $3.5M.

The costs estimates associated with each option are therefore:

- Option A – $3.5M (two new stations)
- Option B - $7.0M (two new stations)
- Option C - $3.5M (one new station)
- Option D - $3.5M (one new station)

9 Consultation

The Industrial Growth Study included an extensive consultation program, which consisted of several components:

- Consultation with the public, through an open-house held June 26th at City Hall, and through the posting of materials on the City's website;
- Consultation with potentially affected landowners and major industrial users, through a letter and follow-up telephone interview
- Consultation with a broader mailing list of interested parties, through a direct mail-out invitation to the City open-house
- Consultation with key stakeholder organizations at two points during the study;

An open house was held at Regina City Hall on Wednesday, June the 26th, to allow all interested individuals an opportunity to view the progress of the study to date, including the draft options for industrial land expansion, and to speak with City staff and the Consulting Team. The open house was held between 4:30 and 8:30 pm in the City Hall Forum. Display boards were used to present the findings of the study to date, including summaries of the economic forecasts, supply analysis, draft options, and the proposed evaluation matrix. A comment sheet was available for attendees to submit their responses to the material presented.

Approximately sixty people attended the open house. Twelve of these individuals returned completed comment sheets at the open house, and an additional five comment sheets were received at a later date. In general, concerns were expressed concerning:

- Proximity to residential areas and limiting impact on residential neighbourhoods;
- Servicing requirements such as transportation and piped services, including the feasibility and extent of required upgrades, and associated costs;
- Environmental impacts, particularly impact on the aquifers, and in terms of the need for increased travel generated by the location of industrial areas;
- The need to take advantage of existing transportation infrastructure such as the rail mainlines and the airport;
- Traffic and road accessibility to the areas;

The respondents were asked to rank the four options, from 1 to 4. Sixteen of the seventeen respondents ranked the options, as follows:

Option A – Dispersed Growth	Rank (1-4):	1 (4), 2 (5), 3 (2), 4 (5)
Option B – Split Growth	Rank (1-4):	1 (3), 2 (2), 3 (10), 4 (1)
Option C – Airport Focussed	Rank (1-4):	1 (4), 2 (7), 3 (1), 4 (4)
Option D – Ross Focussed	Rank (1-4):	1 (5), 2 (2), 3 (3), 4 (6)

The input from these comments was valuable in assessing the options and was of assistance in considering many of the components of the option evaluation.

In addition to holding the open-house, the Study Team contacted a number of stakeholder organizations for direct consultation, including industry associations, other public bodies (such as Saskatchewan Highways and Transportation and the Rural Municipality of Sherwood), large industrial operators, major landowners, and transportation companies. The Study Team met with representatives from stakeholders at several points during the study, and many submitted comment sheets to the Study Team detailing their input and concerns.

10 Evaluation of Options

The evaluation of options was conducted by applying a series of criteria to the four options, within four broad categories: Market Suitability, Land Use/Environmental, Servicing, and Other. Some of the criteria are quantitative in nature, while others are qualitative. The criteria and units of measurement, where applicable, are listed below:

Market Suitability

- Provides for a mix of alternative industrial location options
- Supports economic development strategies
- Provides for a range of parcel sizes
- Accommodates demand for a mix of industrial types
- Responds to market requirements (e.g. services, supporting amenities)

Servicing

- Road capacity and cost to service
- Water capacity and cost to provide services
- Wastewater capacity and cost to provide services
- Stormwater capacity and cost to provide services
- Fire Services and cost to provide services
- Flexibility of service expansion requirements

Land Use

- Proximity to existing or proposed residential/commercial development
- Consistency with City Land Use Policies and Regulations
- Aquifer Sensitivity and Protection
- Emissions – noise, odour, particulates
- Incremental pattern of expansion

Other

- Degree of support from stakeholder organizations
- Degree of support expressed through public comments
- Suitability of each option for "green" infrastructure and eco-industrial networking
- Travel demand and trip length for employees
- Overall impact on natural environment/areas of environmental sensitivity
- Transit provision

In general, each of these criteria are addressed by analysis in the relevant section of this report.

10.1 Evaluation Matrices

The matrix on the following pages outlines the relative strength of each option in respect to each of the above criteria. A summary of the evaluation results, including the selection of a preferred option, is provided following the matrix.

● – Performs well relative to other options ◐ – Performs moderately relative to other options ○ – Performs poorly relative to other options

Criteria	Measurement Unit				
Market Suitability		**Option A**	**Option B**	**Option C**	**Option D**
Provides for a mix of alternative industrial location options	Qualitative	● Provides five potential different locations	◐ Provides four potential different locations	○ Provides three potential different locations, lack of suitable locations for heavy industry	◐ Provides four potential different locations
Supports economic development strategies	Qualitative	◐ Supports Regina-Moose Jaw corridor (RREDA priority 5A) Supports possible multimodal park priority (RREDA priority 2A)	◐ Supports Regina-Moose Jaw corridor (RREDA priority 5A) Supports possible multimodal park priority (RREDA priority 2A)	● Best supports Regina-Moose Jaw corridor (RREDA priority 5A) Best supports possible multimodal park priority (RREDA priority 2A)	○ Does not support these priorities
Provides range of parcel sizes	Lotting pattern/ Supply of large parcels	○ Aquifer constraints make North and East of Ross difficult for large parcels	◐ Larger airport concentration allows for larger parcels. Aquifer constraints make East of Ross difficult for large parcels	● Large concentration in single, less constrained area allows broadest range of parcel sizes	○ Aquifer constraints make North and East of Ross difficult for large parcels
Accommodates demand for a mix of industrial types	Qualitative	● Aquifer constraints limit use of North and East of Ross for heavier industry. Diversity of locations provides for mix of types.	● Aquifer constraints limit use of East of Ross for heavier industry. Diversity of locations provides for best mix of types.	◐ Lesser aquifer constraints, However, limits location to two areas suited only for light industry, and west of airport – range of industry possible but less choice of location.	○ Aquifer constraints limit use of North and East of Ross for heavier industry
Responds to market requirements (e.g. services, supporting amenities)	Qualitative	● Existing amenities in Ross Industrial Park available to expansion areas e.g. food services, garage/auto support, security, business services.	◐ Existing amenities in Ross Industrial Park available to East of Ross expansion area.	○ Few/No existing amenities west of Airport	● Existing amenities in Ross Industrial Park available to expansion areas.

● – Performs well relative to other options ● – Performs moderately relative to other options ○ – Performs poorly relative to other options

Servicing			Option A	Option B	Option C	Option D
Transportation	Local Road Capacity/ Congestion Condition	Degree of capacity constraint (LOS)	● Makes good use of entire City road network to distribute industrial trips. Localized capacity issues in the southeast and northwest areas of the City.	● Makes good use of entire City road network to distribute industrial trips. Localized capacity issues in the southeast and northwest areas of the City.	● Road network in the southwest has ample capacity to accommodate additional industrial traffic.	● Road network in the southeast has localized intersection capacity issues. Overall, can accommodate additional industrial traffic.
	Access to Highways	Proximity to Highways 1 EB/WB and Highway 11 NB, from centre of growth area	● One area adjacent Highway 1 EB, two are within 1km of Highway 11 NB, two others are appx. 4km from Highway 1 WB	● One area adjacent Highway 1 EB, one is within 1km of Highway 11 NB, two others are appx. 4km from Highway 1 WB	○ One area is within 1km of Highway 11 NB, two others are appx. 4km from Highway 1 WB	● One area adjacent Highway 1 EB, second within 1km of Highway 11 NB
	Availability/ Ease of Servicing	Incremental road requirements (km's of road, structures, etc.)	○ 8 km to 13 km of new or upgraded roadway required	● 8 km of new or upgraded roadway required, new interchange may be required at Highway 1/Pinkie Rd	● 8 km of new or upgraded roadway required, new interchange may be required at Highway 1/Pinkie Rd	● 1.5 km to 8 km of new or upgraded roadway required
	Infrastructure Cost	Dollars (Total)	● $5.3M - $6.7M	○ $5.3M - $20.3M	○ $5.3M - $20.3M	● $0.3m - $3.6M
	Access to Railways	Proximity of mainline Availability/Feasibility of spurs	● Three areas adjacent to CPR and/or CN mainlines, fourth area would require spur to CPR NW subdivision	● Both areas adjacent to CPR and/or CN mainline,	● Airport area is adjacent to CPR mainline and close to CN line to the north	● East of Ross adjacent to CPR, CN mainlines, North of Ross would require spur s to CPR NW subdivision
Water Capacity		Incremental servicing requirements	○ 8.3 km of pipe 2 booster stations	● 7.4 km of pipe 1 booster station	● 7.4 km of pipe 1 booster station	● 4.3 km of pipe 2 booster stations
	Infrastructure Cost	Dollars (Total)	○ $11.7M	● $7.3M	● $7.3M	● $9.9M
Wastewater Capacity	Availability/ Ease of Servicing	Incremental servicing requirements	○ Detention length 1.1 km Connection length 7.0 km Forcemain for west of airport to WWTP	● Detention length 0.8 km Connection length 4.9 km Forcemain for west of airport to WWTP	● Detention length 0.5 km Connection length 4.9 km Forcemain for west of airport to WWTP	● Detention length 2.3 km Connection length 3.2 km
	Infrastructure Cost	Dollars (Total)	○ $13.7M - $18.1M	● $11.7M - $13.4M	● $9.7M	○ $13.3M - $21.1M
Stormwater Capacity	Availability and Ease of Servicing	Incremental servicing requirements	○ Total channel length 7.1 km	● Total channel length 4.1 km	● Total channel length 4.0 km	● Total channel length 4.3 km
	Infrastructure Cost	Dollars (Total)	○ $13.4M	● $7.3M	● $7.0M	● $9.6M
Fire Services	Availability and Cost of Servicing	Capital costs of new Fire Hall and apparatus	● $7.0M capital cost Two new stations, including apparatus	● $7.0M capital cost Two new stations, including apparatus	● $3.5M Capital One new station, including apparatus	● $3.5M Capital One new station, including apparatus

● – Performs well relative to other options ● – Performs moderately relative to other options ○ – Performs poorly relative to other options

Flexibility of service expansion requirements		Qualitative	● Spreading the growth to multiple locations means more flexibility in timing of infrastructure provision	● Requirement for booster stations, potential interchange could require substantial expenditures	○ Single area, potential need for interchange limits flexibility	● Requirement for booster stations may require substantial expenditures, multiple areas increases flexibility
Overall Incremental Infrastructure Cost (including capital costs for fire facilities)		Dollars (Total)	○ $51.1M - $56.9M	● $38.6M - $55.3M	● $32.8M - $47.8M	● $36.6M - $47.7M

Land Use/Environmental		**Option A**	**Option B**	**Option C**	**Option D**
Proximity to incompatible land uses/minimizes land use conflicts	Distance to existing and proposed residential and commercial areas Presence/absence of sensitive land uses in area	● Dispersal into five areas increases number of potential conflicts, buffering can mitigate most/all incompatibilities	● More extensive use of airport-area lands in this option takes advantage of natural compatibility; East of Ross interface is buffered by rail line	● More extensive use of airport-area lands in this option takes advantage of natural compatibility, focuses industrial expansion in single area	● North of Ross is natural extension toward industrial area in RM of Sherwood, East of Ross interface is buffered by rail line
Consistency with Land Use Policies and Regulations and Development Plan	Qualitative	● All options conform to principles of the Development Plan, provided nature of uses are regulated as recommended	● All options conform to principles of the Development Plan, provided nature of uses are regulated as recommended	● All options conform to principles of the Development Plan, provided nature of uses are regulated as recommended	● All options conform to principles of the Development Plan, provided nature of uses are regulated as recommended
Aquifer Sensitivity and Protection	% of lands in high/medium/low sensitivity zones Severity of impact on aquifer of type of industrial use Potential cost of aquifer mitigation components	● Would likely include some development on lands with medium sensitivity, awkward to avoid high sensitivity area to North of Ross	● Would likely include some development on lands with medium sensitivity	● Airport-area lands have low/no aquifer sensitivity	○ Would likely include some development on lands with medium sensitivity, awkward to avoid high sensitivity area to North of Ross. This option involves areas with a more severe constraint and requirements for mitigation technology.
Emissions	Location upwind and in proximity to residential or commercial areas? Noise attenuation concerns?	● Some concern with adjacent residential if emissions from industry in East of Ross area, IPSCO Buffer Lands, Airport Abutting Lands. Potential for future emissions concerns with Southwest section residential expansion area if emissions generated west of Airport, and potential concern with compatibility with Airport operations.	● Some concern with adjacent residential if emissions from industry in East of Ross area, IPSCO Buffer Lands, Airport Abutting Lands. Potential for future emissions concerns with Southwest section residential expansion area if emissions generated west of Airport. Larger area may allow for better buffering of emissions-producing industries west of Airport.	● Some concern with adjacent residential if emissions from industry in IPSCO Buffer Lands, Airport Abutting Lands. Potential for future emissions concerns with Southwest section residential expansion area if emissions generated west of Airport. Larger area may allow for better buffering of emissions-producing industries west of Airport.	● Some concern if there are emissions from industry in East of Ross area.
Overall impact on natural environment/areas of environmental sensitivity	Qualitative	● No identified impact	● No identified impact	● Requires connection to a new watershed, some impact	● Requires connection to a new watershed, some impact

● – Performs well relative to other options ● – Performs moderately relative to other options ○ – Performs poorly relative to other options

Other		Option A	Option B	Option C	Option D
Degree of support from stakeholder organizations	Qualitative	● Ranked favourably by most, but not as strongly as Option C. Diversity of location felt to be strength of this option.	● Ranked favourably by most, but not as strongly as Option C. Diversity of location felt to be strength of this option.	● Consistently ranked as most favourable among the six stakeholder organizations. Promotes objectives of RREDA, REINA (though clustering), takes advantage of potential future transportation infrastructure	○ Ranked least favourably by stakeholders – concern with access, aquifer. Seen as missed opportunity.
Degree of support expressed through public comments and comments of commenting organizations/landowners.	Total Score based on ranking (higher score = consistently lower ranked)	● Total of ranking on 16 public comment sheets = 40	● Total of ranking on 16 public comment sheets = 41	● Total of ranking on 16 public comment sheets = 37	● Total of ranking on 16 public comment sheets = 42
Suitability of each option for "green" infrastructure and eco-industrial networking	Qualitative	●	● According to REINA, best supports eco-industrial networking by allowing clustering	○ According to REINA, "would not accommodate improvement in existing industrial areas and restricts the type of businesses that can operate in the area."	●
Travel demand and trip length for employees	Estimate of commuter trip lengths	● The more dispersed the employment locations the better the balance, with more options for job/home location decisions.	● Second best in terms of distribution to provide choice for commuting patterns	○ Not as good as A or B	○ Fewest choices.
Transit provision	Potential to Provide Service	● Has third highest number of total jobs west of Airport – extension of transit service to this area requires longer trips	● Has second highest number of total jobs west of Airport – extension of transit service to this area requires longer trips	○ Has highest number of total jobs west of Airport – more extension of transit service to this area requires longer trips	● Has fewest number of total jobs west of Airport, closer to existing #14 Route in Ross Industrial Park

10.2 Summary of Evaluation Analysis

The evaluation matrix in the previous section identified the relative performance of the four options using a series of criteria. The findings of the evaluation matrix are instructive in selecting a preferred option, but should be seen as informative rather than determinative, as a planning analysis involves many different considerations including both strategic and quantifiable factors.

10.2.1 Market Suitability

Five criteria were used to evaluate the market suitability of the four options. No one option performs consistently better than the others under these criteria according to this evaluation. However, Option D performed more poorly than the other three options, due to the fact that most of the lands identified in this option are within moderate or high aquifer sensitivity zones, which limits their utility to the market. From an economic development perspective, the objectives of the Regina Regional Economic Development Authority are better met by expansion west of the City, rather than east of the City, as a number of RREDA initiative are focussed in this area. However, from a market perspective, the availability of existing amenities and services in the Ross Industrial Park may provide benefit to new industrial users locating in an expansion to this area.

One of the City's objectives in planning for future land use is to ensure that there is a suitable range of choice of housing, retail uses, institutional locations and lands for industry. Just as individuals have different preferences for housing dependent on their financial and family circumstances, so industries have a very broad range of location needs. These needs are influenced by a number of factors such as means of shipment, nature of the use, proximity to suppliers, amount of land and cost of land. It is thus important that the City provide a range of choice of industrial locations, related if possible to the range of identified needs, in order to meet the City's objectives of providing employment and prosperity.

As such, given that the public objective in providing lands for industry is directly related to economic prosperity, the provision of a range of choice maximizes opportunity and minimizes the risk to the economic health of the City. As such, options that provide additional choice to the market are preferable to those with more limited choices.

10.2.2 Servicing

The servicing analysis used both qualitative and quantitative criteria to evaluate the four options. This analysis showed that Option A is clearly more costly and less desirable from a servicing perspective than the other three options. Option A is the most expensive to provide water, wastewater, and stormwater services, and has moderate costs relative to other options in terms of transportation infrastructure. However, overall, servicing costs associated with Option A are substantially higher than other options.

Options B and C, which introduce a more substantial amount of development into the areas west of the Airport, involve higher transportation infrastructure costs than either Options A or D. A key cost issue for these options is the need for an interchange on Highway 1 at Pinkie Road, which would be triggered by the amount of development identified in the Aggressive Case for both these options, but not in the base case options. However, even without the costs of the interchange, estimated at $15M, both Options B and C will require about $5.3M in new road infrastructure in the base case options.

The higher transportation infrastructure costs associated with Options B and C are offset by lower costs for piped services for these options. Options B and C are less expensive to provide with wastewater and stormwater infrastructure than Options A or D.

Overall, Option C has the lowest range of potential costs, followed by Option B. However, an important note is the "flexibility" criterion. By concentrating growth into a single new area outside the city boundaries, Option C limits the City's ability to provide infrastructure in a phased or gradual manner; the major facilities and equipment associated with this option would be required for any industrial growth to proceed if this area were to become the only available industrial lands in the City.

10.2.3 Land Use/Environmental

The Study Team carefully considered the fact that introducing new industrial areas in Regina in other areas of the City could have the effect of dispersing an "incompatible" land use, rather than concentrating it – which would seem to increase the risk of conflicts between industrial uses and other uses in areas of the City where this conflict has not existed before. However, when evaluating the options, it is apparent that this concern is not particularly severe in most of the proposed growth areas, and that some of the identified growth areas, such as the IPSCO buffer lands and the West of Airport lands, are particularly appropriate for industrial development in terms of land use compatibility.

From a land use perspective, the options have relatively few major differences. Option C, by only introducing industrial uses in a fewer number of new areas, reduces the number of potential land use conflicts with abutting residential areas. Option C also reduces the amount of development on medium Aquifer sensitivity zones, while Options A and D are likely to involve more severe constraints due to aquifer sensitivity. There will be a need to control development to ensure that land is available for high impact uses in appropriate locations, and that low impact uses do not consume the limited amount of land available for higher impact uses.

10.2.4 Other

The "other" category includes evaluation criteria such as the degree of stakeholder support for the option, the potential for eco-industrial networking, and the viability of transit provision. Option B scores best on these criteria. Although generally the second-favourite option when options were ranked during the consultation exercises, other merits include stronger potential for eco-industrial

networking and improving opportunities for reduced travel demand through shorter commuting.

10.3 Selection of Preferred Option

As noted, the evaluation matrix is a measure of the relative performance of the four options. Although some of these measures are quantitative, others are qualitative and the ranking of the options is subject to qualitative assessment by the Study Team (in consultation with City staff). For this reason, while this evaluation method is extremely useful in both ranking the options and identifying their relative strengths and weaknesses, it should also be considered in the context of the broader objectives of the strategy when selecting a preferred option.

A review of the evaluation matrix clearly identifies that two options meet the identified needs to a greater degree than the other two - Options B – Split Growth and Option C – Airport Focussed.

Option C does not provide any opportunity for ongoing expansion of firms that are in the Ross Industrial Park today. Option B, by providing an area for additional expansion to Ross in the long term can help ensure a greater diversity of lands on the market, ensure continued availability of lands for firms that wish to expand near Ross (for example, to retain arrangements with existing suppliers), and maintain available lands on the east side for access to Hwy 1 eastbound and rail infrastructure in this area.

Option B, by including the East of Ross area, provides for a potential location for heavier industry. Although aquifer constraints and proximity to residential uses in this area are a potential concern, the rail line in this area acts as a substantial buffer and considerable lands are available free of any aquifer constraint in the area north of the tracks.

From an infrastructure point of view, Option B has the additional advantage of providing more flexibility in terms of when servicing is provided. Growth can occur East of Ross at the same time as West of the Airport, allowing for the timing of major potential infrastructure projects to be spread out. This flexibility extends to the greater choice provided to the market by Option B.

Option B and Option C each have relative strengths and weaknesses, however, for the reasons above, the Study Team is recommending from a strategic perspective that Option B be carried forward.

11 Implementation and Phasing Strategy

This section outlines a potential phasing strategy for the preferred option.

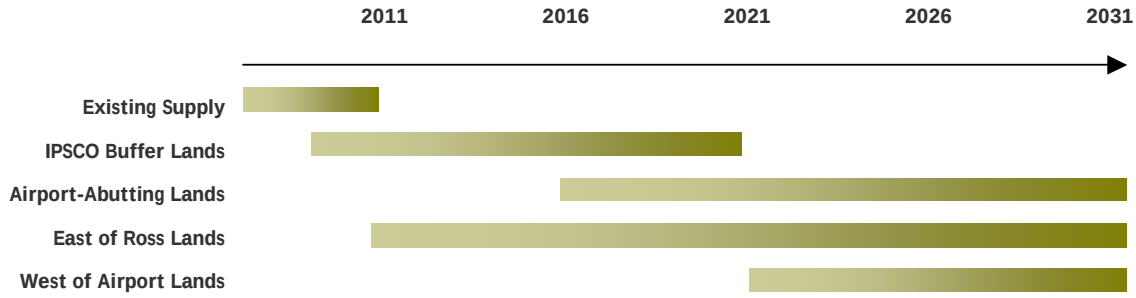
The City has a short term need for additional industrial lands, as well as the longer-term requirements identified by this study. A number of different phasing scenarios for the recommended option are possible in order to meet the immediate needs, as well as providing an efficient, demand driven means of ensuring a long term adequacy of employment lands. Although detailed planning will be required to link the infrastructure requirements associated with these new growth areas with the City's existing plans, a phasing strategy can be established at this point.

This strategy must be flexible enough to handle both a rapid growth scenario, which sees demand for industrial land remaining strong, and the potential to slow down the provision of industrial lands if demand for land weakens. One approach to achieving this flexibility is to have multiple areas in the planning stages at all times, with incremental development patterns in each area. The phasing strategy would therefore see several new growth areas developing at once, incrementally, as demand requires. This will ensure that no major infrastructure development occurs before it is required. As much of the land owned in the identified growth areas is privately owned, consultation with developers/landowners will be required as part of this planning process.

11.1 Phasing

Once the expansion to Ross Industrial Park is brought on-stream in late 2007, the existing supply of industrial lands in the City of Regina will likely be between 60 and 75 hectares (148 to 185 acres), depending on the amount of industrial land sold during the balance of 2007. Assuming the same pace experienced over the past few years, this amounts to only 2-3 years worth of supply, and the City would need to move immediately to plan and bring additional industrial lands on-stream. If the pace lessens, the need may not be as urgent. However, as noted previously, it is prudent for the City to maintain a supply of industrial lands suitable to meet many years worth of demand. The recommended phasing is shown on the chart below and outlined in this section.

The proposed phasing strategy would see the introduction of several new industrial areas in the short term, to provide a supply of lands to meet the current high demand, with more lands coming on stream as demand requires later in the forecast period. The strategy assumes the Base Case scenario.



2007-2011

Planning work should commence to bring the **IPSCO buffer lands** on stream as soon as possible. Commercial and residential development is occurring in this area already. Additional planning work must be done to design and zone industrial uses in these areas, considering specifically the challenges to road access on the parcel east of Highway 6. The IPSCO buffer lands will provide additional lands for light industrial use once available.

The City should also proceed immediately to plan an annexation request for the identified lands **East of the existing Ross Industrial Park**. In the base case for Option B, approximately 15 hectares (37 acres) are identified for industrial use East of Ross Industrial Park; this rises to about 27 hectares (67 acres) in the Ambitious Case. An annexation request should likely consider the higher figure as a minimum, to help create the flexibility to respond to market conditions in Regina, and to create a supply of lands suitable for heavier industry.

It is important to make these lands available to the market in the short to medium term, for several reasons. The currently planned expansion to the Ross Industrial Park will not provide more than a few years supply of lands, and firms wishing to remain in the Ross IP will face a shortage if this expansion does not occur. Further, this location is the only potential location for heavy industrial uses and expansion in this area takes logical advantage of the existing serviced area and planned expansion areas within Ross Industrial Park.

The introduction of these new industrial areas will create a strong market offering for the City of Regina, allowing new firms of different types and with different needs to be accommodated.

2012-2016

Depending on the pace of demand, planning work should commence to bring the **Airport Abutting lands** on-stream between 2012-2016 for light industrial uses. It is appropriate to proceed with servicing these lands, as the current period of strong demand may require this area to be added to the supply to meet relatively short-term needs. In total, the Airport Abutting Lands are estimated to provide approximately 80 hectares (198 acres) of net new industrial land once developed, which constitutes approximately nine years of supply in the base case and six years of supply in the ambitious case.

Servicing and internal road construction should occur in an incremental fashion, depending on the pace of demand. It is also recognized that some of the improvements planned to service this area will be constructed as part of residential expansion in the Southwest Sector, which is identified as a growth area. The timing of infrastructure in this area will therefore be tied to some extent on the timing of residential growth. The extension of municipal servicing to this area will also begin the process of servicing the lands West of the Airport.

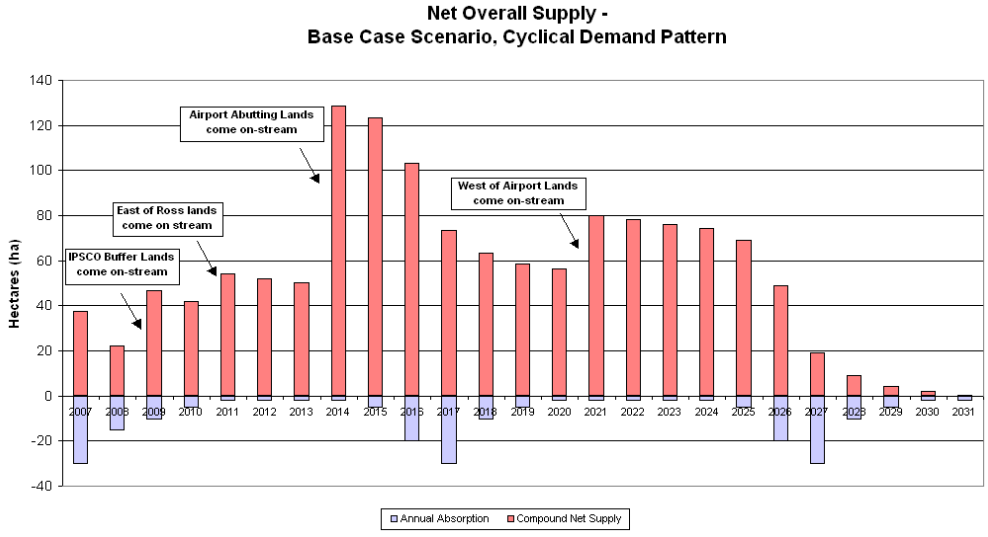
2017+

While the forecast demand indicates it will not be necessary to bring **lands West of the Airport** on-stream until after 2021 in the base case scenario for Option B, in the Ambitious Case scenarios, depending on the pattern of demand, it may be necessary to introduce these lands earlier, between 2017 and 2020. Further, the precise amount of lands required will depend on the pattern of demand over the next decade, and the amount of lands annexed and serviced should be adjusted in response to the pace of development experienced.

Several considerations affect the timing for these lands, which make it appropriate to introduce these lands later in the phasing strategy. First, the timing of investment in new transportation infrastructure in this area is unknown, but will affect this area. Second, the construction of road infrastructure, specifically Pinkie Road and the potential interchange, would occur later with this phasing, reducing the need for immediate infrastructure expenditures. Finally, developing these lands in the longer term rather than the short term allows for potential co-development of the construction of municipal infrastructure and road infrastructure with the residential development planned for the Southwest sector.

Sensitivity Analysis – Phasing of Preferred Option

The Study Team examined several phasing strategies for these lands, through sensitivity analysis of potential demand scenarios. The demand analysis conducted for this study identified an annual average of 8.9 hectares (22 acres) absorption in the base case scenario and 14.6 hectares (36 acres) annually in the "ambitious case" scenario. The actual pattern of demand is likely to fluctuate over the forecast period, along with the typical cyclical nature of the real estate market. The chart below shows how the phasing strategy responds to one possible pattern of demand. The demand shown below in the blue bars changes with the market cycle, but averages to 8.9 hectares annually (total of 222 hectares over the forecast period).



In this scenario, the Airport Abutting Lands are brought on stream in 2014, ensuring that a minimum supply of 50 hectares (124 acres) is maintained at all times until the late 2020's, at which point an update to this strategy will be required to identify new, long term growth areas.

The phasing strategy accommodates likely fluctuations in market demand, by ensuring a supply of lands is available at all times. Note that this scenario sees demand for land occurring in a "boom and bust" pattern; a different pattern of demand may suggest a slower or more aggressive timing for bringing lands on stream.

11.2 Heavy Industry and Long Term Demand

One key issue that has been consistently identified through the course of this study is the need for additional lands for heavy industry. Although the Study Team recognized the potential for heavier industry to locate East of Ross in the longer term, it remains the case that very few appropriate locations exist for heavy industry either within the City's boundaries or in the areas immediately adjacent to the City. Aquifer constraints severely limit the types of industries that can locate to the north and east of the City, with the exception of the small area identified East of Ross. Although aquifer constraints are less severe to the West, airborne emissions near the airport are problematic due to proximity to the airport. All development near the airport will need to conform to Transport Canada's recommendations contained in their guideline TP1247E, *"Land Use in the Vicinity of Airports".*

The importance of this concern is somewhat mitigated by the likelihood that the majority of industrial growth will likely be cleaner, light industries. However, it would be poor planning not to have any lands available to large, heavy user that might be on the horizon.

In the preferred option, heavy industrial uses would locate in the identified expansion area East of Ross Industrial Park. Given this need and the constraints on the identified areas, the City should consider identifying additional areas for heavier industry in their long-term planning should demand for this type of use emerge.

11.3 Ensuring A Long Term Supply

Given the reality of higher demand for industrial land, and the volatility of that demand, it is important that the City ensure that a much longer-term supply of industrial lands be protected and the supply maintained than is currently the practice. The Regina Development Plan currently mandates that a 1 to 1.5 year supply of serviced industrial land be maintained. In the opinion of the Study Team, it would be prudent for the City to maintain a larger inventory of lands, to allow the City the flexibility of responding to the needs of potential large users, and to respond to the increased demand that results from periods of strong market demand.

For example, the City of Calgary mandates that the City retain a 30-year supply of industrial land within its City limits. The *Growth Plan for the Greater Golden Horseshoe* in Southern Ontario also requires municipalities to maintain a supply of employment lands to meet demand through 2031. Although all of these lands do not need to be serviced, in practice, much of the supply is already serviced or is easily serviceable.

It is also important to ensure that there is choice available to the market – that is, to ensure that firms searching for industrial lands have a variety of potential locations to choose from within the City. Many municipalities include a "market choice factor" in their calculations of land need, or specifically set aside lands in addition to the known requirements to allow for market flexibility. To compete for industry on a provincial, national, and international scale, the City of Regina needs to ensure it has a competitive offering to the market – a range of suitable parcels of land.

At the root of the need for a larger supply of land is the need for flexibility. The bulk of growth forecast in this study is in the wholesale trade and warehouse/distribution sectors. Changing technology now means firms in these sectors can change their distribution processes every five years or less, resulting in new facility requirements that can require expansion or relocation. The ability to respond to these more agile firms is determined by the ability to offer suitable lands to firms on a short time frame.

As shown in the chart above, the phasing strategy established by this Study would ensure that a supply of at least 45 hectares (approximately 111 acres) of land be maintained at all times over the first twenty years of the twenty-five year forecast period. If demand exceeded the forecasts, additional lands in the West of Airport and East of Ross areas could be brought on-steam to ensure this level of supply is maintained. The City should also consider a policy in the Regina Development Plan to ensure that at least five years of serviced industrial land be available to the market.

Historically, the City has played a direct role in the market by acting as a developer of industrial land. This continues to be important to help ensure stability in pricing, by not allowing a restricted supply to drive up land prices. Although it is beyond the scope of this study to address the City's real estate policies, the Study Team does see an important economic reason for the City maintaining an active role in the industrial land market.

11.5 Strategic Implementation Considerations – Preferred Option

In implementing the preferred option, there are several strategic considerations based on the review and should inform the City's approach to bringing these lands on stream.

11.5.1 Character of Industrial Areas and Zoning

The City has the authority through zoning to both limit the nature of industrial uses and the form of industrial emissions. For example, zoning can be applied to ensure that industrial uses located close to residential areas are those that only operate

indoors. These zoning controls thus allow a larger industrial area to be tailored to minimize impacts on adjoining uses, providing the most limiting controls in areas in proximity to housing.

In a similar fashion the opportunity exists in the development and zoning of new industrial areas to explore the opportunity to group uses of a nature and form to maximize the feasibility of green initiatives.

The history of planning controls for industrial uses reflects the principle of compatibility. When zoning was first introduced it was accepted that the rights of the individual could be subsumed in the rights of the group in land use terms. In other words, people had a right to assume that no use would be established close enough to them to interfere in a detrimental way with their enjoyment of their property.

At the same time it is clear that the functional needs of certain land uses are consistent with some and not others. Heavy trucks service heavy industrial uses, cars and bicycles service residential areas. Residential areas value a visual amenity, industrial areas need sites for storage of unsightly materials. Planning groups like uses to avoid incompatibility.

Within the general category of industrial lands the same principles apply. A hierarchy of designations and/or zones would be as follows:

1. Prestige Industrial/Business Park
2. Light Industrial
3. General/heavy Industrial

Over the past three decades environmental legislation has taken over the role of regulating and mitigating emissions from industrial users. As a consequence the nature of the uses that are grouped through zoning generally revolves around whether the industrial operation is conducted indoors or outdoors. Many municipalities simply define light industrial uses being those that are conducted entirely indoors, and general industrial being permitted to have outdoor production and/or storage. Business Parks or Prestige Industrial areas are often simply indoor operations on large lots with substantial landscaping, or in other jurisdictions are primarily office functions with some research or limited assembly being permitted.

The goal in developing policy to categorize industrial lands and users in terms of their "character" is to maximize the functionality of the area in order to provide an attractive environment with like users and related supporting functions. Thinking of the industrial lands as a community with a distinctive character is a good concept in that there are a wide variety of residents/industries all with a common need for specific functions and with operations that do not pose problems for each other but rather are enhanced by their neighbours.

Recent changes to the classic industrial land use hierarchy have included the creation of mixed use zones that attempt to provide for industrial and retail uses or other forms of employment. This concept has had mixed success as the uses established seem to gravitate to those generating the highest land rent – primarily retail.

The vision for each industrial area can then be characterized as follows:

Ross Industrial Park, East of Ross Lands – The existing Ross industrial park is a mixed industrial area containing light, medium and heavy industrial uses. The currently planned expansion area would continue to house a mix of industrial uses. The proposed expansion area to the east could be the focus for heavy industrial uses, including users with outdoor operations. The wide variety in building forms and parcel sites in the existing Industrial park would provide opportunity for incubators for smaller users and medium-size parcels for expansion of existing industries. Full municipal piped services should be available. The area has reasonable access to the highway system, including the Ring Road and Highway #1.

Airport Abutting Lands – this would be an appropriate location for light industrial uses compatible with airport operations, including warehouse and distribution facilities, as well as industrial multiples and/or offices. The potential exists to create a "prestige" industrial area in this location, by ensuring only clean and light industrial uses locate in the area. Higher standards for landscaping and amenities such as green spaces should could be considered as part of the implementation plan for this area, resulting in a "premium" location which may be attractive to head office functions, research/development facilities, and other light industrial users.

IPSCO Buffer Lands – This location may be considered for a mix of industrial uses. In the southern portion of the area, adjacent to residential and commercial uses, these should be very light industrial uses, such as those with entirely indoor operations, warehouses, and/or offices.

West of Airport Lands – this area is an opportunity to create a "distribution district". The lands are a highly accessible location in close proximity to major transportation infrastructure (road, rail, and air). The areas would be characterized by major trucking activity, large-scale buildings with relatively low employment densities, modest amenity. As previously noted, uses with emissions that may affect airport visibility need to be prohibited in any new industrial lands adjacent to the airport.

12 Summary of Conclusions and Recommendations

The conclusions and recommendations of the Industrial Growth Study are as follows:

1. The estimated need for additional industrial land in Regina to the year 2031 is projected to be about 155 hectares in the base case scenario, and up to 298 hectares to 2031 in the ambitious case. The amount of serviced industrial land available today is insufficient to meet demand beyond the next few years.

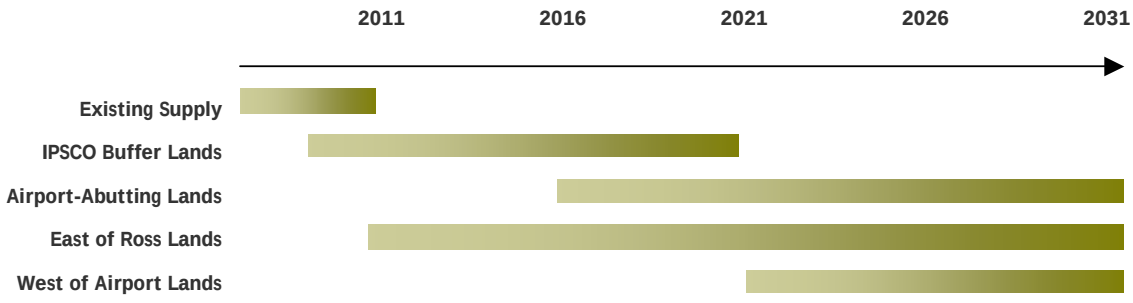
2. Achieving economic development objectives and economic stability can be assisted by having the greatest possible range of industrial lands on the market, balanced by the costs and impacts. Option B, which includes new industrial areas outside the City's boundaries west of the Airport and east of Ross Industrial Park, should be adopted as the recommended direction for industrial growth. As such, The City should create/confirm four industrial areas through municipal action as follows:

    - Airport abutting lands (80 hectares of developable land)
    - East of Ross (up to 26 hectares of developable land)
    - IPSCO buffer lands (34 hectares of developable land)
    - West of Airport lands (up to 156 hectares of developable land, as required)

3. The boundaries of the areas should be confirmed based on more detailed planning for the layout of each industrial growth area and for the expansion of roads and municipal servicing. Planning for servicing should proceed at a finer level of detail to determine which of these lands can be serviced most easily and at the lowest cost to the City.

4. The City should identify and zone a range of "character" industrial areas based on the degree of compatibility of adjacent uses with the objective of creating a positive environment for like-users to group together to foster the synergy of support services and shared green initiatives.

5. The City should act to ensure lands come on stream as required, where this is within the City's control or influence. The lands should come on-stream roughly in line with the timing outlined in the chart below.



Bringing the West of Airport Lands on-stream later in the forecast period will allow lands within the City's boundary adjacent to the airport to develop first, as well as the advancement of several potentially important infrastructure investments that could affect the scale and location of industrial development.

6. Additional meetings should be held with key organizations such as the Regina Regional Economic Development Authority, Saskatchewan Highways and Transportation, Regina Eco-Industrial Networking Association, and the Rural Municipality of Sherwood to continue discussions initiated by this study, and work through relevant implementation issues.

7. As noted in Section 11, in the preferred option, heavy industrial uses would locate in the identified expansion area East of Ross Industrial Park. Given this need and the constraints on the identified areas, the City should consider identifying additional areas for heavier industry in their long-term planning should demand for this type of use emerge.

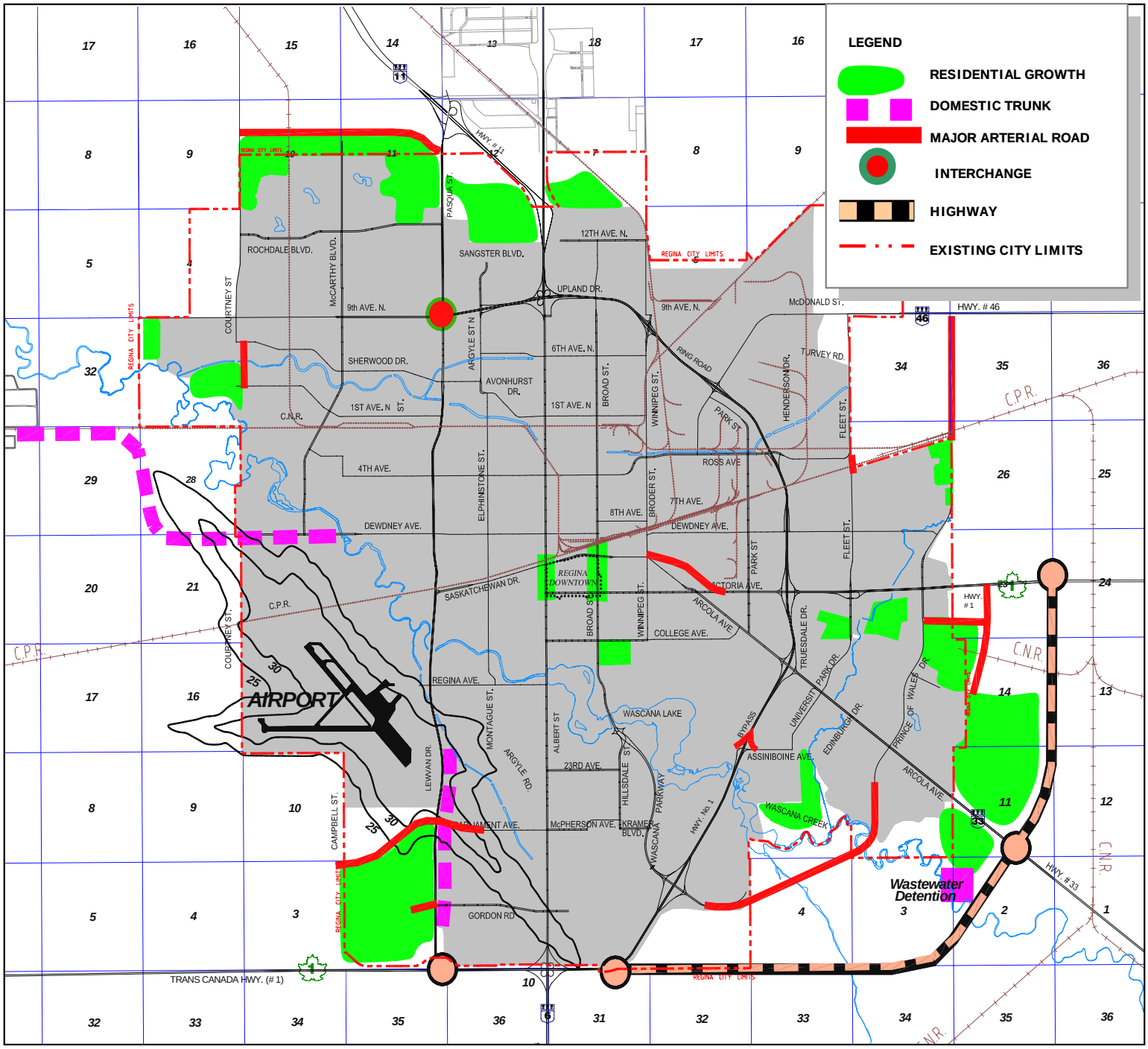
8. The phasing strategy established by this Study would ensure that a supply of at least 45 hectares (approximately 111 acres) of land would be maintained at all times over the first twenty years of the twenty-five year forecast period. If demand exceeded the forecasts, additional lands in the West of Airport and East of Ross areas could be brought on-steam to ensure this level of supply is maintained. The City should also consider a policy in the Regina Development Plan to ensure that at least five years of serviced industrial land be available to the market.

9. To compete for industry on a provincial, national, and international scale, the City of Regina needs to ensure it has a competitive offering to the market – a range of suitable parcels of land. All four options include multiple growth areas of currently vacant lands. The manner in which these areas are subdivided into parcels should consider the need for at least one large parcel of 10 hectares (25 acres) or greater in size, to allow the City to have a site to offer a potential large industrial user. All options contain lands that could be subdivided in such a fashion as to create these large parcels.

10. It is important that any annexation of lands for industrial purposes consider all possible growth scenarios, and as such, the City should request a annexation to provide sufficient lands within the East of Ross lands and the West of Airport Lands to plan for the "Ambitious Case" scenario. A more comprehensive annexation will provide long-term stability, which allows the City the ability to plan for the efficient and comprehensive extension of municipal and provincial infrastructure. It also provides a means of undertaking the necessary planning and governance measures to manage industrial growth in a manner that compliments the City's long-term growth strategy, and will provide for lands to ensure market choice, help attract businesses, and best support the City's ongoing prosperity.

Appendix A – Regina Growth Area Plan and Approved Road Network Plan

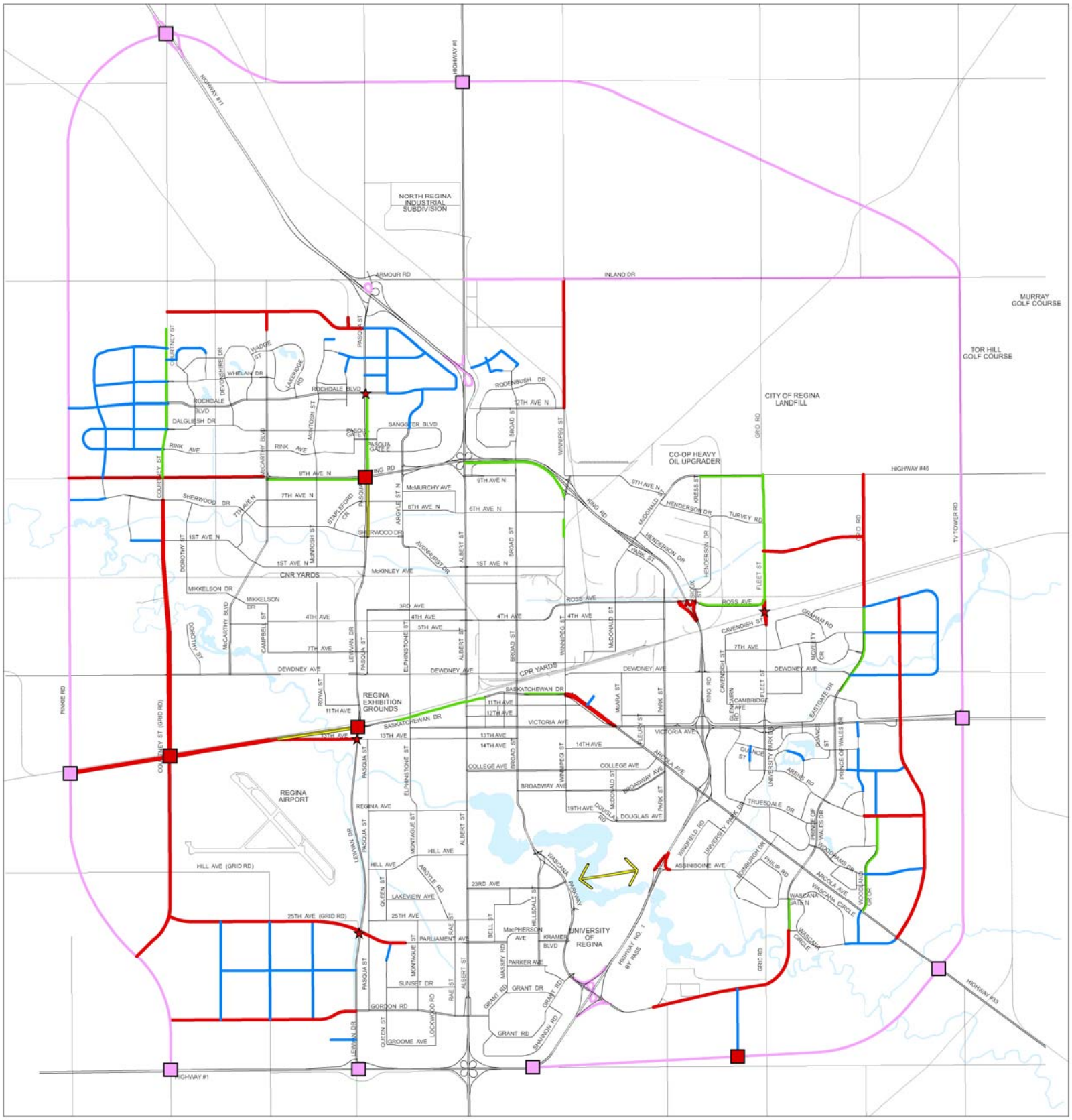
Regina Growth Scenario – 235,000 Population



SOURCE: Regina Development Plan-Part A (bylaw 7877)

Regina Road Network Plan

Approved by City Council July 23, 2007



Legend

- EXISTING ROAD
- FUTURE HIGHWAY BYPASS
- FUTURE ARTERIAL (>7500 per day, ie Albert St.)
- FUTURE ARTERIAL (not approved)
- FUTURE COLLECTOR (<7500 per day, ie Woodhams Dr.)
- FUTURE COLLECTOR (not approved)
- FUTURE ROAD WIDENING
- FURTHER STUDY NEEDED
- INTERSECTION IMPROVEMENT
- NEW CITY INTERCHANGE
- NEW HIGHWAYS INTERCHANGE

Note:

1) **The purpose of this plan is to show approximate locations of future roads.**

2) **Questions on the Regina Road Network Plan can be addressed to the Engineering and Works Deptartment @ 777-7000.**

3) **Some options fall under the jurisdiction of Saskatchewan Highways and Transportation and are presented for reference in the context of forming a road network plan.**

N W E S

Regina
CITY OF REGINA
Engineering and Works

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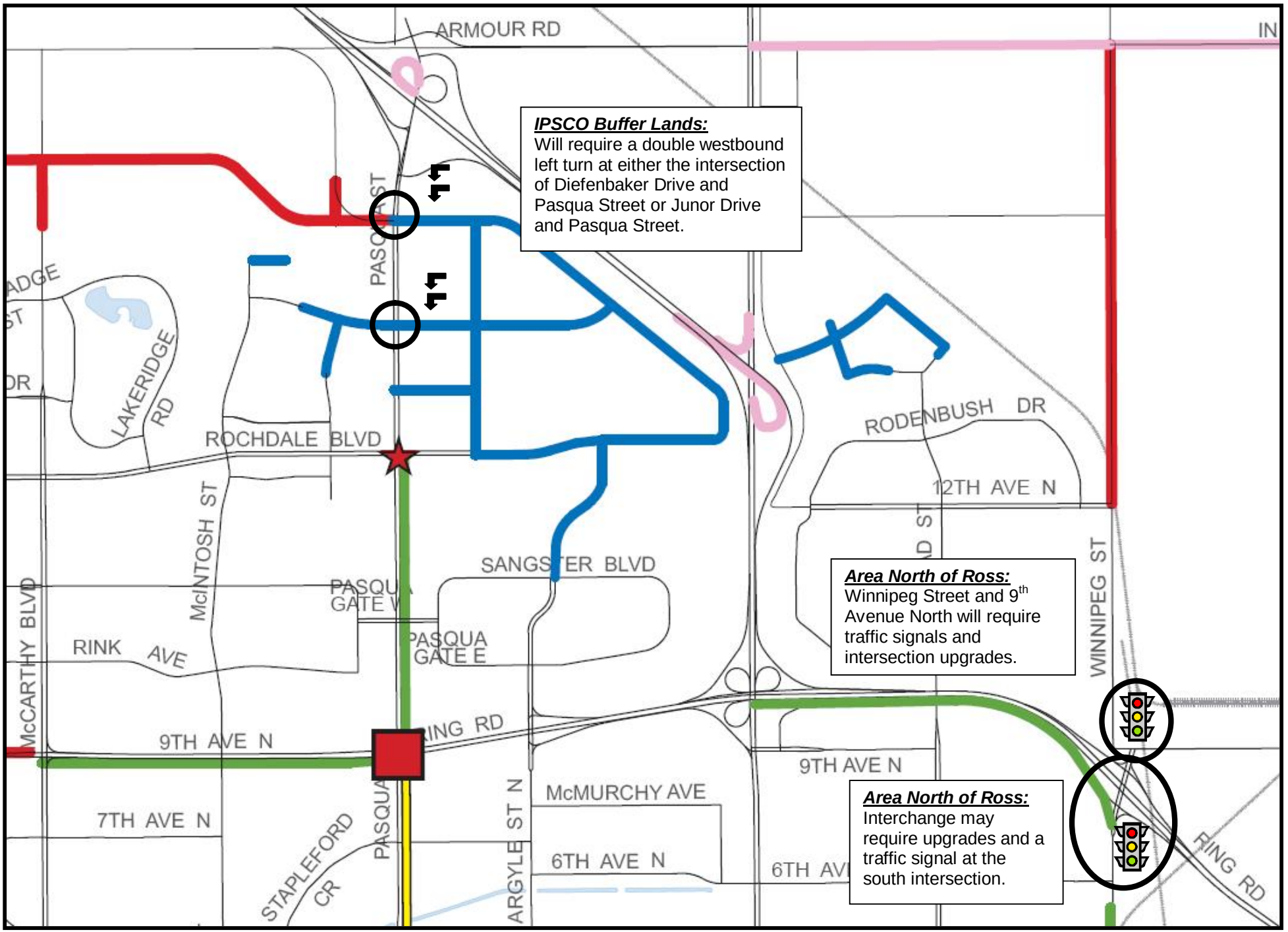
Plot: 2007_Road Network.pdf
Scale: NTS
File: U 2006-5.1
Date: July 23, 2007

Appendix B – Required Road Network Improvements

Recommended Road Network Modifications



Appendix C – Transportation Infrastructure Calculations

East of Ross Industrial Park

Roadway Segment Name:					
Ross Avenue - 2 Lane Rural Cross-section, No median	Inputs				
Roadway Width (m)	8				
Roadway Length (m)	1600	Quantity	Unit	Unit Cost	Item Total Cost
BC&G Length (m)	0	0	m	$ 100.00	$ -
Mono walk BC&G length (m)	0	0	m	$ 260.00	$ -
Median Curb Length (m)	0	0	m	$ 75.00	$ -
Median Infill Area (landscaping/concrete combination)	0	0	m2	$ 35.00	$ -
Asphalt Depth (mm)	100	1280	m3	$ 215.00	$ 275,000
Base Course Depth (mm)	180	2304	m3	$ 50.00	$ 115,000
Sub-Base Depth (mm)	300	3840	m3	$ 30.00	$ 115,000
Drainage Sand Depth (mm)	0	0	m3	$ 28.00	$ -
Weeping Tile length (m)	3200	3200	m	$ 10.00	$ 32,000
Approximate Excavation/Embankment depth (mm)	1000	12800	m3	$ 12.00	$ 154,000
Imported Clay Fill	0	0	m3	$ 8.00	$ -
Traffic Signals Installed (# intersections)	0	0	ea	$ 130,000.00	$ -
Stormwater System Allowance (1 - yes, 0 - no)	1	1	l.s.	$ 320,000	$ 320,000
Structure Allowance-Drainage Ditch Crossing	0	0	l.s.	$ -	$ -
Utility Relocates	0	0	l.s.	$ -	$ -
Lighting	1	1	l.s.	$ 400,000	$ 400,000
Pavement Markings	1	1	l.s.	$ 70,000	$ 70,000
Landscaping	0	0	l.s.	$ -	$ -

Summary:	*Total Cost*
Roadway Items	$ 691,000
Structures Cost	$ -
Landscaping Requirements	$ -
Utility/Lighting/Drainage Allowances	$ 720,000
Traffic Items (Signals/Pavement Markings)	$ 70,000
R.O.W. Acquisition	
Engineering (15%)	$ 222,000
Contingency (15%)	$ 222,000
Total	*$ 1,925,000*

Does Not Include:
Future Intersections, underground services, landscaping

West of Airport

Roadway Segment Name:					
Pinkie from Highway no. 1 to Dewdney	Inputs				
Roadway Width (m)	11.4	2m shoulders			
Roadway Length (m)	6500	Quantity	Unit	Unit Cost	Item Total Cost
BC&G Length (m)	0	0	m	$ 100.00	$ -
Mono walk BC&G length (m)	0	0	m	$ 260.00	$ -
Asphalt Depth (mm)	100	7410	m3	$ 215.00	$ 1,593,000
Base Course Depth (mm)	180	13338	m3	$ 50.00	$ 667,000
Sub-Base Depth (mm)	300	22230	m3	$ 30.00	$ 667,000
Drainage Sand Depth (mm)	0	0	m3	$ 28.00	$ -
Weeping Tile length (m)	0	0	m	$ 10.00	$ -
Approximate Excavation/Embankment depth (mm)	1000	74100	m3	$ 12.00	$ 889,000
Imported Clay Fill			m3	$ 8.00	$ -
Traffic Signals Installed (# intersections)	0	0	ea	$ 130,000.00	$ -
Stormwater System Allowance (1 - yes, 0 - no)	0	0	l.s.	$ -	$ -
Structure Allowance	0	0	l.s.	$ 1,000,000	$ -
Utility Relocates	0	0	l.s.		$ -
Lighting	0	0	l.s.	$ 200,000	$ -
Pavement Markings	1	1	l.s.	$ 75,000	$ 75,000
Landscaping	0	0	l.s.	$ -	$ -

Summary:	*Total Cost*
Roadway Items	$ 3,816,000
Structures Cost	$ -
Landscaping Requirements	
Utility/Lighting/Drainage Allowances	$ -
Traffic Items (Signals/Pavement Markings)	$ 75,000
R.O.W. Acquisition	
Engineering (15%)	$ 584,000
Contingency (15%)	$ 584,000
Total	*$ 5,059,000*

Does Not Include:
Future CP Rail Structure at Pinkie Rd Intersection, underground services, landscaping

North of Ross Industrial Park – Winnipeg Street and Inland Drive

Area North of Ross			
Structural Upgrades	5 km roadway		$ 636,000
Intersection Upgrades	1	$ 500,000	$ 500,000
Two Traffic Signals	2	$ 150,000	$ 300,000
			$ 1,436,000

	5000	metres
	8	width (metres)
	0.06	depth
	2.4	
	5760	tonnes material
$	85	$/tonne
$	489,600	subtotal
	30%	contingency
$	146,880	Contingency
$	636,480	total cost

Appendix D – Municipal Servicing Calculations

Cost Estimates for Wastewater							
Options		North of Ross	East of Ross	Ipsco Buffer	West of Airport	Airport Abutting Lands	Total Cost
Option A	Base	$ 2,800,000	$ 1,200,000	$ 2,500,000	$ 7,200,000	$ -	$ 13,700,000
	Aggressive	$ 4,500,000	$ 3,900,000	$ 2,500,000	$ 7,200,000	$ -	$ 18,100,000
Option B	Base	n/a	$ 2,000,000	$ 2,500,000	$ 7,200,000	$ -	$ 11,700,000
	Aggressive	n/a	$ 3,700,000	$ 2,500,000	$ 7,200,000	$ -	$ 13,400,000
Option C	Base	n/a	n/a	$ 2,500,000	$ 7,200,000	$ -	$ 9,700,000
	Aggressive	n/a	n/a	$ 2,500,000	$ 7,200,000	$ -	$ 9,700,000
Option D	Base	$ 2,800,000	$ 2,000,000	$ 2,500,000	n/a	$ 6,000,000	$ 13,300,000
	Aggressive	$ 4,400,000	$ 8,200,000	$ 2,500,000	n/a	$ 6,000,000	$ 21,100,000

Cost Estimates for Water							
Options		North of Ross	East of Ross	Ipsco Buffer	West of Airport	Airport Abutting Lands	Total Cost
Option A	Both	$ 4,400,000	$ 20,000	$ 4,200,000	$ 3,100,000	$ -	$ 11,720,000
Option B	Both	n/a	$ 20,000	$ 4,200,000	$ 3,100,000	$ -	$ 7,320,000
Option C	Both	n/a	n/a	$ 4,200,000	$ 3,100,000	$ -	$ 7,300,000
Option D	Both	$ 4,400,000	$ 20,000	$ 4,200,000	n/a	$ 1,300,000	$ 9,920,000

Cost Estimates for Stormwater							
Options		North of Ross	East of Ross	Ipsco Buffer	West of Airport	Airport Abutting Lands	Total Cost
Option A	Both	$ 6,100,000	$ 300,000	$ -	$ 7,000,000	$ -	$ 13,400,000
Option B	Both	n/a	$ 300,000	$ -	$ 7,000,000	$ -	$ 7,300,000
Option C	Both	n/a	n/a	$ -	$ 7,000,000	$ -	$ 7,000,000
Option D	Both	$ 6,100,000	$ 300,000	$ -	n/a	$ 3,200,000	$ 9,600,000

WATER COST ESTIMATES

UMA | AECOM

PROJECT: Industrial Growth Study
CLIENT: City of Regina
FILE NO.: G338-001-00
DATE: 07-08-27

SYSTEM: Base
DESIGN: SDCH
CHECKED: DC

Option A

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross	14.3	114					850	300	3,000,000	320	3,272,000	327,200	818,000	4,417,200	unlooped, above 590
3 - East of Ross			10.0	248			40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	574	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands					80.3	1336					0	0	0	0	cost to develop included with Area 2
2 - West of Airport			7.4	184	8.3	138	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	14.3	114	17.4	432	123.1	2048	8,290							11,681,280	

Option B

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross											0	0	0	0	
3 - East of Ross	14.3	114					40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	574	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands					80.3	1336					0	0	0	0	cost to develop included with Area 2
2 - West of Airport			17.4	432	8.3	138	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	14.3	114	17.4	432	123.1	2048	7,440							7,264,080	

Option C

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross											0	0	0	0	
3 - East of Ross											0	0	0	0	
I - IPSCO Buffer					34.5	574	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands					80.3	1336					0	0	0	0	cost to develop included with Area 2
2 - West of Airport	14.3	114	17.4	432	8.3	138	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	14.3	114	17.4	432	123.1	2048	7,400							7,246,800	

Option D

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross	14.3	114					850	300	3,000,000	320	3,272,000	327,200	818,000	4,417,200	unlooped, above 590
3 - East of Ross			17.4	432	8.3	138	40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	574	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands					80.3	1336	3,100	300		320	992,000	99,200	248,000	1,339,200	unlooped
2 - West of Airport											0	0	0	0	
Total	14.3	114	17.4	432	123.1	2048	4,290							9,953,280	

WASTEWATER COST ESTIMATES

UMA | AECOM

PROJECT: Industrial Growth Study **FILE NO.:** G338-001-00
CLIENT: City of Regina **DATE:** 07-06-21

SYSTEM: Base **DESIGN:** SDCH
CHECKED: DC

detention includes: pipe, installation, control valve, and manholes

Option A

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Detention Length (m)	Detention Cost ($/m)	Detention Cost ($)	Connection Length (m)	Connection Cost ($)	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross	14.3	114					426	4,000	1,704,000	2,130	170	362,100	2,066,100	206,610	516,525	2,789,235	require coord with CoR and CCRL
3 - East of Ross			10.0	248			215	4,000	860,000	50	135	6,750	866,750	86,675	216,688	1,170,113	detention
I - IPSCO Buffer					34.5	574	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands					80.3	1336							0	0	0	0	costs with Area 2
2 - West of Airport			7.4	184	8.3	138				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	14.3	114	17.4	432	123.1	2048	1,107			7,030			10,106,600			13,643,910	

Option B

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross													0	0	0	0	
3 - East of Ross	14.3	114					371	4,000	1,484,000	50	135	6,750	1,490,750	149,075	372,688	2,012,513	detention
I - IPSCO Buffer					34.5	574	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands					80.3	1336							0	0	0	0	costs with Area 2
2 - West of Airport			17.4	432	8.3	138				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	14.3	114	17.4	432	123.1	2048	837			4,900			8,664,500			11,697,075	

Option C

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross													0	0	0	0	
3 - East of Ross													0	0	0	0	
I - IPSCO Buffer					34.5	574	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands					80.3	1336							0	0	0	0	costs with Area 2
2 - West of Airport	14.3	114	17.4	432	8.3	138				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	14.3	114	17.4	432	123.1	2048	466			4,850			7,173,750			9,684,563	

Option D

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross	14.3	114					426	4,000	1,704,000	2,130	170	362,100	2,066,100	206,610	516,525	2,789,235	require coord with CoR and CCRL
3 - East of Ross			17.4	432	8.3	138	376	4,000	1,504,000	50	135	6,750	1,510,750	151,075	377,688	2,039,513	detention
I - IPSCO Buffer					34.5	574	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands					80.3	1336	1,039	4,000	4,156,000	1,000	315	315,000	4,471,000	447,100	1,117,750	6,035,850	detention
2 - West of Airport													0	0	0	0	
Total	14.3	114	17.4	432	123.1	2048	2,307			3,230			5,450,600			13,394,160	

STORMWATER COST ESTIMATES

UMA | AECOM

PROJECT: Industrial Growth Study
CLIENT: City of Regina
FILE NO.: G338-001-00
DATE: 07-06-21

SYSTEM: Both
DESIGN: SDCH
CHECKED: DC

Option A

Site		Industry						Cost						
		Heavy Industrial		Medium Industrial		Light Industrial		Channel	Channel	Total			Total	
		Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Cost ($/m)	Cost ($)	Engg 10%	Contingency 25%	Cost ($)	
1 - North of Ross	North	14.3	114					1,500	1,000	1,500,000	150,000	375,000	2,025,000	channel to Boggy Creek feeder
	South							1,500	2,000	3,000,000	300,000	750,000	4,050,000	channel to large storm trunk
3 - East of Ross				10.0	248			100	2,000	200,000	20,000	50,000	270,000	extension of existing channel
I - IPSCO Buffer	North					34.5	574			0	0	0	0	use existing Pasqua culverts
	South									0	0	0	0	use existing 1200 pipe
A - Airport Lands						80.3	1336			0	0	0	0	costs with Area 2
2 - West of Airport	North			7.4	184	8.3	138	1,200	2,000	2,400,000	240,000	600,000	3,240,000	channel to existing channel on west side of Dieppe Place
	South							2,800	1,000	2,800,000	280,000	700,000	3,780,000	channel to pond that is part of Cottonwood Creek watershed
Total		14.3	114	17.4	432	123.1	2048	7,100		4,500,000			13,365,000	

Option B

Site		Industry						Cost						
		Heavy Industrial		Medium Industrial		Light Industrial		Channel	Channel	Total			Total	
		Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Cost ($/m)	Cost ($)	Engg 10%	Contingency 25%	Cost ($)	
1 - North of Ross	North													
	South													
3 - East of Ross		14.3	114					100	2,000	200,000	20,000	50,000	270,000	extension of existing channel
I - IPSCO Buffer	North					34.5	574			0	0	0	0	use existing Pasqua culverts
	South									0	0	0	0	use existing 1200 pipe
A - Airport Lands						80.3	1336			0	0	0	0	costs with Area 2
2 - West of Airport	North			17.4	432	8.3	138	1,200	2,000	2,400,000	240,000	600,000	3,240,000	channel to existing channel on west side of Dieppe Place
	South							2,800	1,000	2,800,000	280,000	700,000	3,780,000	channel to pond that is part of Cottonwood Creek watershed
Total		14.3	114	17.4	432	123.1	2048	4,100		3,000,000			7,290,000	

Option C

Site		Industry						Cost						
		Heavy Industrial		Medium Industrial		Light Industrial		Channel	Channel	Total			Total	
		Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Cost ($/m)	Cost ($)	Engg 10%	Contingency 25%	Cost ($)	
1 - North of Ross	North													
	South													
3 - East of Ross														
I - IPSCO Buffer	North					34.5	574			0	0	0	0	use existing Pasqua culverts
	South									0	0	0	0	use existing 1200 pipe
A - Airport Lands						80.3	1336			0	0	0	0	costs with Area 2
2 - West of Airport	North	14.3	114	17.4	432	8.3	138	1,200	2,000	2,400,000	240,000	600,000	3,240,000	channel to existing channel on west side of Dieppe Place
	South							2,800	1,000	2,800,000	280,000	700,000	3,780,000	channel to pond that is part of Cottonwood Creek watershed
Total		14.3	114	17.4	432	123.1	2048	4,000		2,800,000			7,020,000	

Option D

Site		Industry						Cost						
		Heavy Industrial		Medium Industrial		Light Industrial		Channel	Channel	Total			Total	
		Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Cost ($/m)	Cost ($)	Engg 10%	Contingency 25%	Cost ($)	
1 - North of Ross	North	14.3	114					1,500	1,000	1,500,000	150,000	375,000	2,025,000	channel to Boggy Creek feeder
	South							1,500	2,000	3,000,000	300,000	750,000	4,050,000	channel to large storm trunk
3 - East of Ross				17.4	432	8.3	138	100	2,000	200,000	20,000	50,000	270,000	extension of existing channel
I - IPSCO Buffer	North					34.5	574			0	0	0	0	use existing Pasqua culverts
	South									0	0	0	0	use existing 1200 pipe
A - Airport Lands						80.3	1336	1,200	2,000	2,400,000	240,000	600,000	3,240,000	channel to existing channel on west side of Dieppe Place
2 - West of Airport	North													
	South													
Total		14.3	114	17.4	432	123.1	2048	4,300		1,700,000			9,585,000	

WATER COST ESTIMATES

UMA | AECOM

PROJECT: Industrial Growth Study
CLIENT: City of Regina
FILE NO.: G338-001-00
DATE: 07-08-27

SYSTEM: High
DESIGN: SDCH
CHECKED: DC

Option A

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross	26.7	220			30.0	485	850	300	3,000,000	320	3,272,000	327,200	818,000	4,417,200	unlooped, above 590
3 - East of Ross			36.5	842	30.0	485	40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	558	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands			10.2	231	70.3	1137					0	0	0	0	cost to develop included with Area 2
2 - West of Airport			7.4	462	39.7	1613	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	26.7	220	54.1	1535	204.5	4278	8,290							11,681,280	

Option B

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross											0	0	0	0	
3 - East of Ross	26.7	220					40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	558	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands			10.0	231	70.3	1137					0	0	0	0	cost to develop included with Area 2
2 - West of Airport			56.5	1304	99.7	1613	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	26.7	220	66.5	1535	204.5	3308	7,440							7,264,080	

Option C

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross											0	0	0	0	
3 - East of Ross											0	0	0	0	
I - IPSCO Buffer					34.5	558	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands			10.0	231	70.3	1137					0	0	0	0	cost to develop included with Area 2
2 - West of Airport	26.7	220	56.5	1304	99.7	1613	7,100	300		320	2,272,000	227,200	568,000	3,067,200	includes Airport Lands, savings may occur with SW development
Total	26.7	220	66.5	1535	204.5	3308	7,400							7,246,800	

Option D

Site	Industry						Cost								
	Heavy Industrial		Medium Industrial		Light Industrial										
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs	Length (m)	Size (mm)	Booster Station ($)	Cost ($/m)	Subtotal ($)	Engg 10%	Contingency 25%	Total Cost ($)	
1 - North of Ross	26.7	220			45.0	728	850	300	3,000,000	320	3,272,000	327,200	818,000	4,417,200	unlooped, above 590
3 - East of Ross			66.5	1535	44.7	723	40	300		320	12,800	1,280	3,200	17,280	northeast corner above 590
I - IPSCO Buffer					34.5	558	300	300	3,000,000	320	3,096,000	309,600	774,000	4,179,600	half above 590
A - Airport Lands					80.3	1299	3,100	300		320	992,000	99,200	248,000	1,339,200	unlooped
2 - West of Airport											0	0	0	0	
Total	26.7	220	66.5	1535	204.5	3308	4,290							9,953,280	

WASTEWATER COST ESTIMATES

UMA | AECOM

PROJECT: Industrial Growth Study **FILE NO.:** G338-001-00
CLIENT: City of Regina **DATE:** 07-06-21

SYSTEM: High **DESIGN:** SDCH
CHECKED: DC

detention includes: pipe, installation, control valve, and manholes

Option A

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Detention Length (m)	Detention Cost ($/m)	Detention Cost ($)	Connection Length (m)	Connection Cost ($)	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross	26.7	220			30.0	485	740	4,000	2,960,000	2,130	170	362,100	3,322,100	332,210	830,525	4,484,835	require coord with CoR and CCRL
3 - East of Ross			36.5	842	30.0	485	723	4,000	2,892,000	50	135	6,750	2,898,750	289,875	724,688	3,913,313	detention
I - IPSCO Buffer					34.5	558	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands			10.2	231	70.3	1137							0	0	0	0	costs with Area 2
2 - West of Airport			7.4	462	39.7	1613				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	26.7	220	54.1	1535	204.5	4278	1,929			7,030			13,394,600			18,082,710	

Option B

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross													0	0	0	0	
3 - East of Ross	26.7	220					678	4,000	2,712,000	50	135	6,750	2,718,750	271,875	679,688	3,670,313	detention
I - IPSCO Buffer					34.5	558	466	4,000	1,864,000	50	195	9,750	1,873,750	187,375	468,438	2,529,563	detention
A - Airport Lands			10.0	231	70.3	1137							0	0	0	0	costs with Area 2
2 - West of Airport			56.5	1304	99.7	1613				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	26.7	220	66.5	1535	204.5	3308	1,144			4,900			9,892,500			13,354,875	

Option C

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross													0	0	0	0	
3 - East of Ross													0	0	0	0	
I - IPSCO Buffer					34.5	558	466	4,000	1,864,000	50	135	6,750	1,870,750	187,075	467,688	2,525,513	detention
A - Airport Lands			10.0	231	70.3	1137							0	0	0	0	costs with Area 2
2 - West of Airport	26.7	220	56.5	1304	99.7	1613				4,800	1,000	5,300,000	5,300,000	530,000	1,325,000	7,155,000	forcemain to WWTP
Total	26.7	220	66.5	1535	204.5	3308	466			4,850			7,170,750			9,680,513	

Option D

Site	Industry						Cost									
	Heavy Industrial		Medium Industrial		Light Industrial		Length (m)	Cost ($/m)	Detention Cost ($)	Length (m)	Cost	Connection To Existing ($)	Total Cost ($)	Engg 10%	Contingency 25%	Total Cost ($)	
	Area (ha)	Jobs	Area (ha)	Jobs	Area (ha)	Jobs											
1 - North of Ross	26.7	220			45.0	728	727	4,000	2,908,000	2,130	170	362,100	3,270,100	327,010	817,525	4,414,635	require coord with CoR and CCRL
3 - East of Ross			66.5	1535	44.7	723	1,514	4,000	6,056,000	50	135	6,750	6,062,750	606,275	1,515,688	8,184,713	detention
I - IPSCO Buffer					34.5	558	466	4,000	1,864,000	50	135	6,750	1,870,750	187,075	467,688	2,525,513	detention
A - Airport Lands					80.3	1299	1,041	4,000	4,164,000	1,000	315	315,000	4,479,000	447,900	1,119,750	6,046,650	detention
2 - West of Airport													0	0	0	0	
Total	26.7	220	66.5	1535	204.5	3308	3,748			3,230			11,203,600			21,171,510	