Industrial Zoning Review:
Land Use Analysis

Goals and Objectives

As part of the Industrial Zone Review (IZR) project, it was identified that a Land Use Analysis was needed to determine the ways that the land within the study area is currently being used. This was an exploratory analysis, analyzing whatever data was available to uncover trends and patterns that may help to answer the primary question:

What impact has zoning had on the current pattern of development in Leduc's industrial areas?

This process was further guided by probing questions:

- What are the differences between each district?
- What are the similarities between each district?
- Do similar uses and/or industries tend to cluster together?
- What types of land uses exist in the industrial area?

This analysis document does not offer concrete answers to these questions, but rather offers findings that can be used in further discussion and analysis, in hopes that some potential answers to these questions may be discovered.

Methodology

Both quantitative and qualitative analysis methods were completed to analyze the land use and built form characteristics of Leduc's industrial lands.

Qualitative Analysis

- In Person drive around and photo taking
- Google Street View 'drive around' to supplement in person survey

Quantitative Analysis

City business license data was compiled and analyzed to provide most of the findings in this report. While development permit data was also reviewed, it was found that business license data was more useful in determining the current use of the land than development permit data.

Basic GIS attributes, such as parcel size and building footprint, were also used to produce some of the findings in this report.

Findings

Land Use
How do different districts and overlays influence the land uses present in the industrial areas?
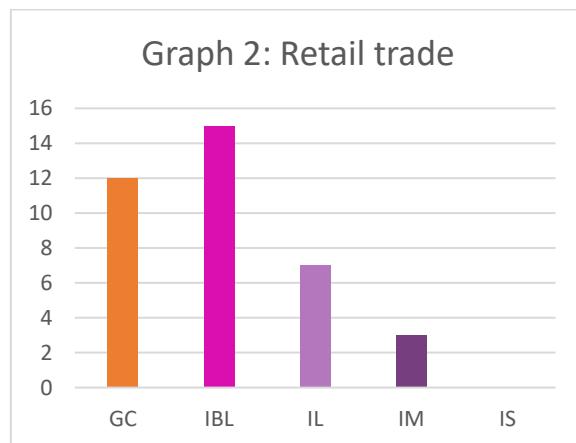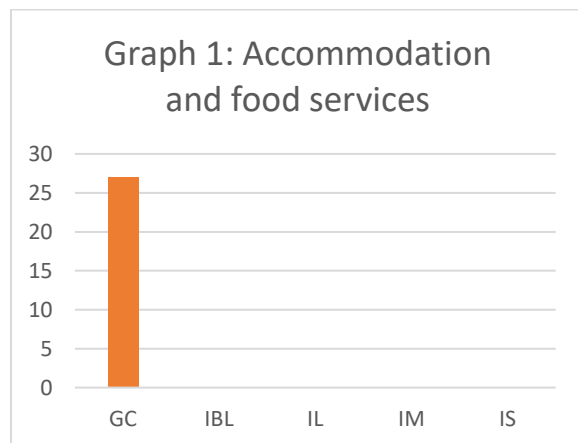
NAICS Codes

NAICS (North American Industry Classification System) Codes, are a coding system used by Statistics Canada to classify every different kind of business into a broad category. The City of Leduc records NAICS codes with each business license, allowing them to be easily used as an approximate representation of land use. While the NAICS codes cannot be used as a direct comparison to the land uses defined in the City of Leduc Land Use Bylaw, they are still useful as a reliable, standardized, and accessible data set that generally correlates to land use.
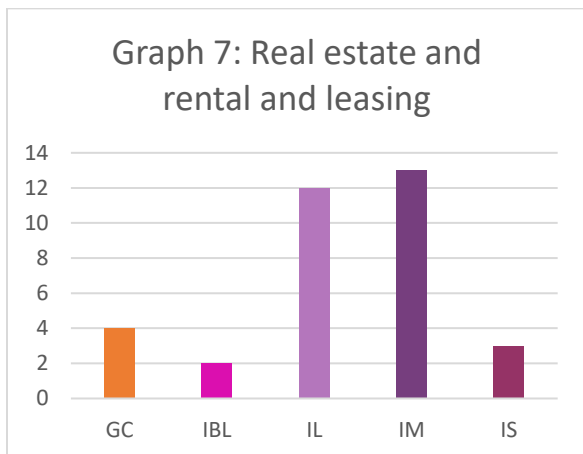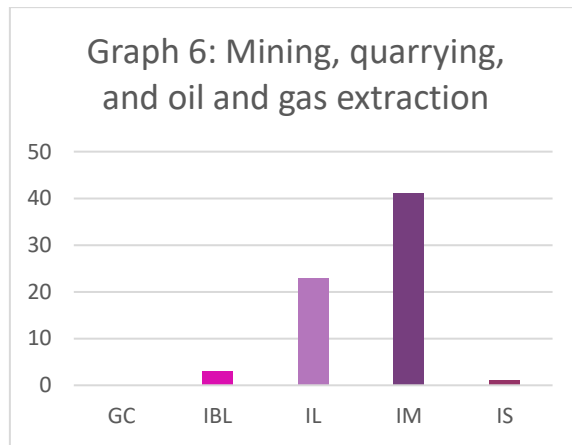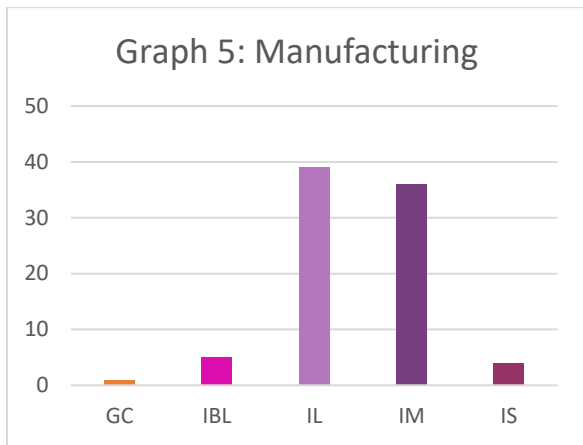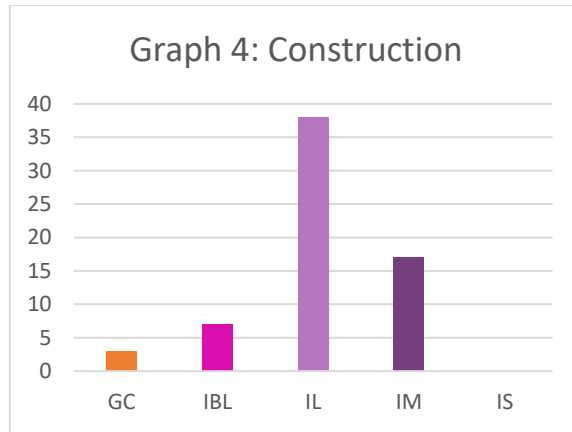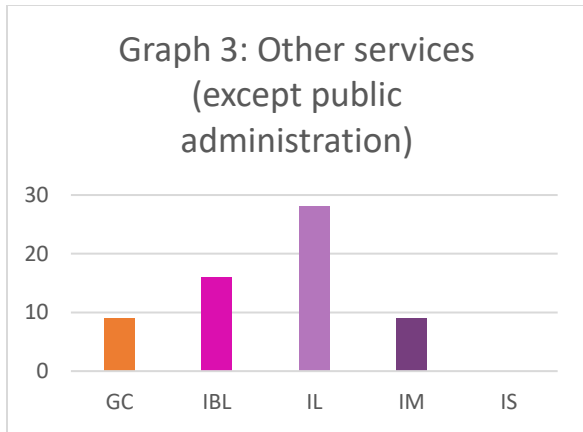
Top 3 Most Common NAICS Codes in Each District

Table 1 below identifies the three most common NAICS codes in each land use district in the study area. There is significant overlap between the districts, resulting in seven unique NAICS codes which represent the most common or popular types of businesses in the industrial area. Below the table are seven graphs, one for each NAICS code, which shows the number of businesses with that code in each district.

Note that almost all of the businesses in the "Mining, quarrying, and oil and gas extraction" category are further classified as either "Drilling oil and gas wells" or "Support activities for oil and gas operations".

Table 1: Most Common NAICS Codes by District					
	GC	**IBL**	**IL**	**IM**	**IS**
1.	Accommodation and Food Services	Other Services	Manufacturing	Mining, quarrying, and oil and gas extraction	Manufacturing
2.	Retail Trade	Retail Trade	Construction	Manufacturing	Real estate and rental and leasing
3.	Other Services	Construction	Other Services	Construction	Mining, quarrying, and oil and gas extraction

Graph 1: Accommodation and food services

Graph 2: Retail trade

Graph 3: Other services (except public administration)

Category	Value
GC	9
IBL	16
IL	28
IM	9
IS	0

Graph 4: Construction

Category	Value
GC	3
IBL	7
IL	38
IM	17
IS	0

Graph 5: Manufacturing

Category	Value
GC	1
IBL	5
IL	39
IM	36
IS	4

Graph 6: Mining, quarrying, and oil and gas extraction

Category	Value
GC	0
IBL	3
IL	23
IM	41
IS	1

Graph 7: Real estate and rental and leasing

Category	Value
GC	4
IBL	2
IL	12
IM	13
IS	3

Industrial Protection Overlay

To assess what differences in land uses there may be in the Industrial Protection Overlay (IPO) compared to the entirety of the study area, the proportion of businesses with a certain NAICS code in each district were compared. The table below outlines four NAICS codes where there was a significant difference between the IPO and the entire study area (including the IPO) in one or both districts.

Table 2: IL and IM in Industrial Protection Overlay vs Study Area						
	IL (all)	IL (IPO only)	IL (Difference)	IM (all)	IM (IPO only)	IM (Difference)
Mining, quarrying, and oil and gas extraction	12%	25%	+13	24%	20%	-4
Manufacturing	20%	22%	+2	21%	8%	-13
Transportation and Warehousing	4%	0%	-4	8%	0%	-8
Professional, scientific and technical services	4%	6%	+2	9%	20%	+11

To ensure clear understanding of this table, take the first row, "mining, quarrying, and oil and gas extraction" as an example. The IL (all) column indicates that 12% of businesses in the IL district throughout the entire study area have the "mining, quarrying, and oil and gas extraction" NAICS code. The next column indicates that 25% of the businesses in the IL district in the Industrial Protection Overlay have that NAICS code. The following column indicates that there is an increase of 13 percentage points in the IPO compared to the whole study area.

One thing to note from the above table is the complete absence of Transportation and Warehousing from the Industrial Protection Overlay. This is surprising given that 45 Street, the main arterial running through the IPO, is also a designated Heavy Truck Route and Dangerous Goods Route. Furthermore, many of the parcels fronting onto 45 Street are in the IPO. This is an area where a higher concentration of Transportation and Warehousing businesses may be expected, not a lower concentration as we are seeing. (Transportation and Warehousing type uses are not prohibited from the IPO.) Further study on this may be needed.
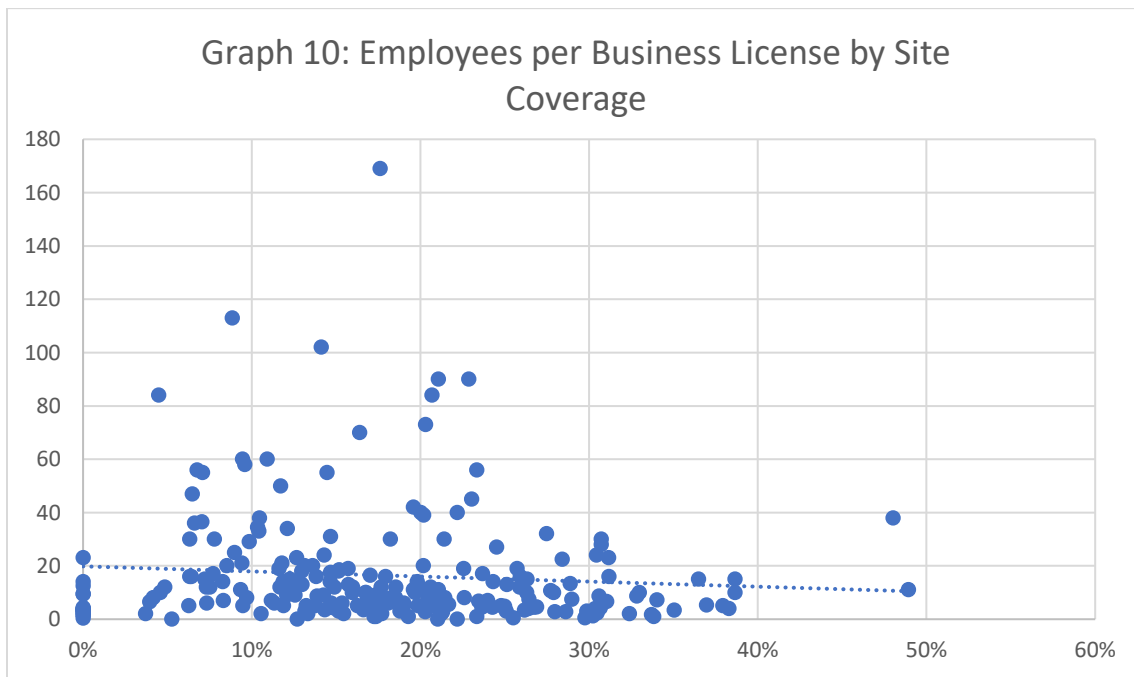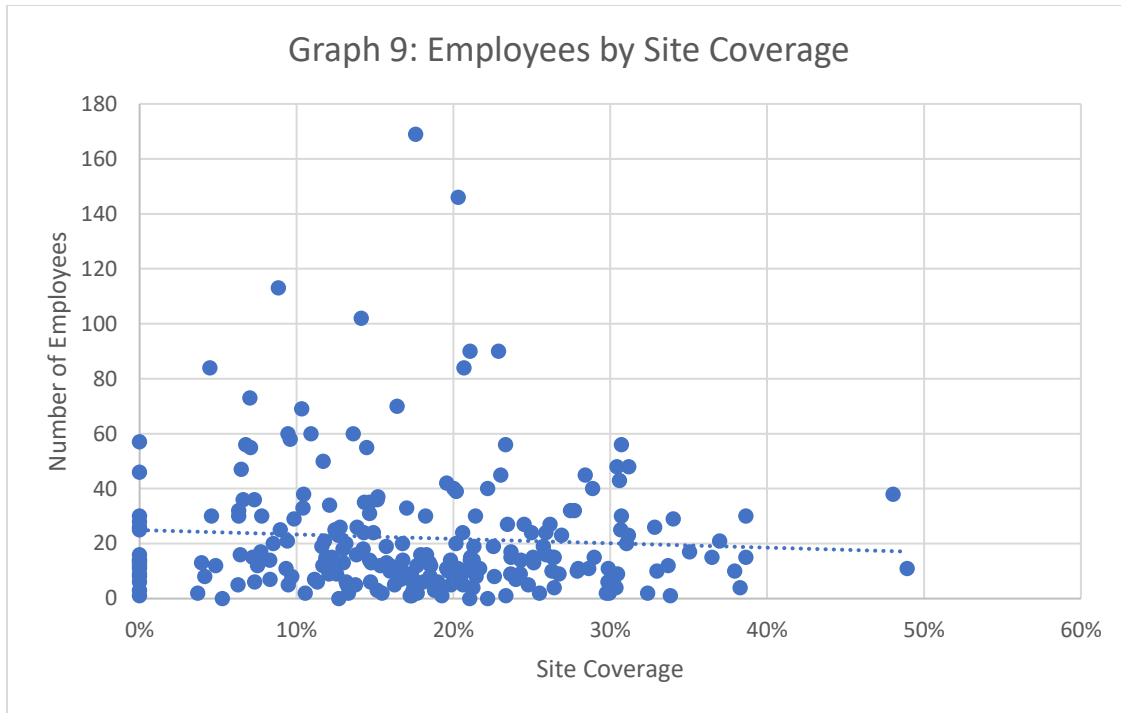
Employees

The number of employees by business is included in the City's business license data. The average number of employees per business in each district is shown in Graph 8 below.


Graph 8: Average Employees per business
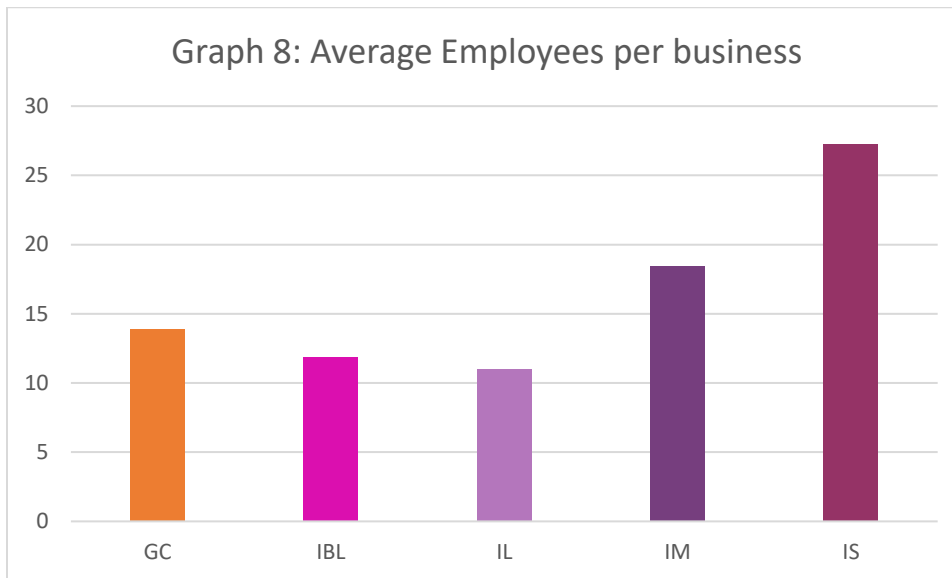
Although IS has the highest average number of employees per business, IS is an outlier in this category, as there only seven businesses in this district for which employee data is available. Out of the other districts, IM has the highest average, with an average of 18.43 employees per business. The IM district also contains two businesses with 250+ employees, the highest of businesses surveyed.

Graphs 9 and 10 show the relationship between the number of employees on a parcel and the site coverage. Graph 9 simply shows the number of employees on a site organized by the site coverage of that site. Graph 10 shows the number of employees on a site, divided by the number of business licenses on a site, organized by site coverage. Note that there are a number of business licenses that do not report the number of employees, so this data is not perfect. However, these graphs are able to show that overall, there is little correlation between the site coverage and the number of employees.

Graph 9: Employees by Site Coverage

Graph 10: Employees per Business License by Site Coverage

Graphs 11 and 12 show the relationship between the number of employees on a parcel and the building area. They indicate that there may be a small positive correlation between building area and the number of employees. However, it is worth noting that the parcels with the highest number of employees do not have the largest buildings, but midsize buildings. In fact, the largest buildings typically have employment numbers below the trendline.

Graph 11: Employees by Building Area

Graph 12: Employees per Business License by Building Area
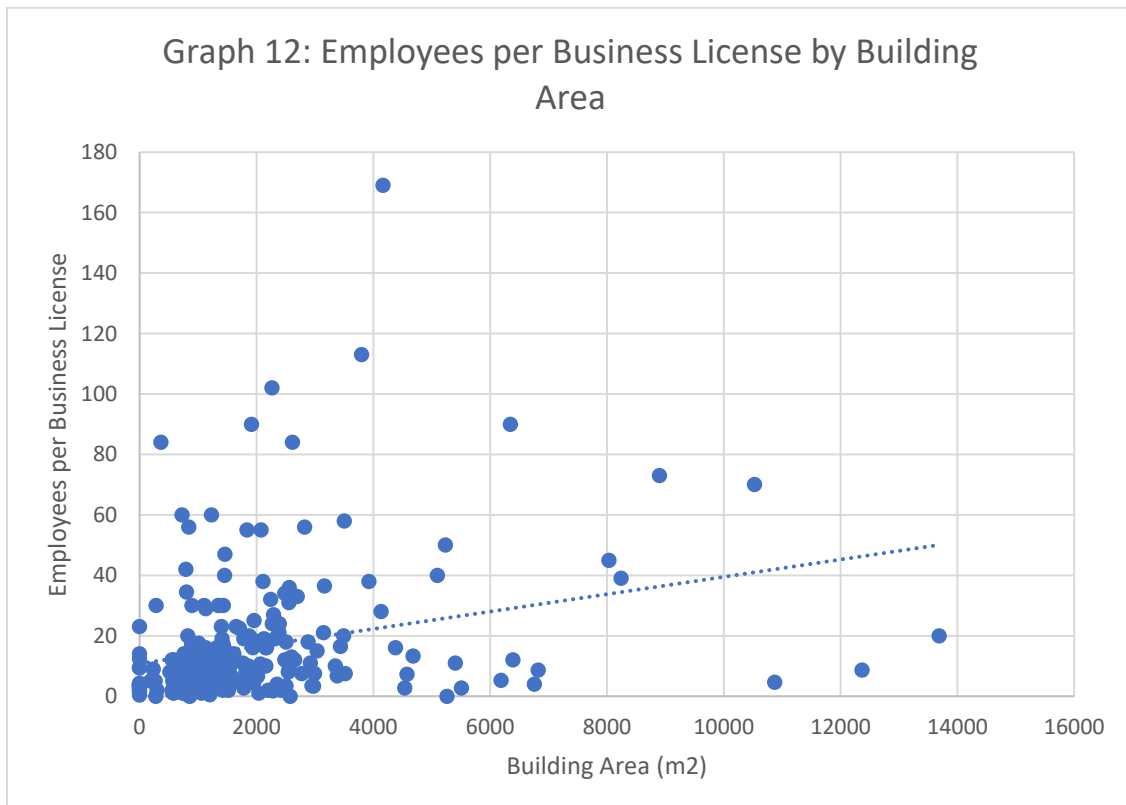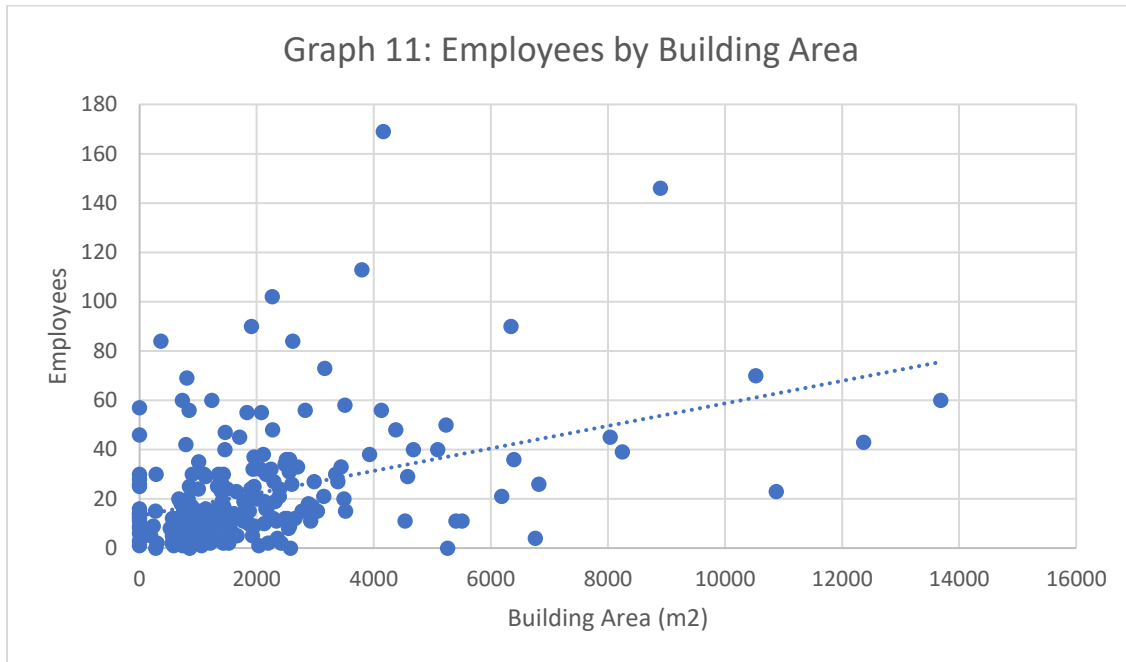
Vacant Land

Below is a map pulled from the [2020 Annual Monitoring Report](#) (AMR) showing all vacant lots in Leduc at the end of 2020. There are a number of vacant lots throughout the industrial area of a variety of districts. However, the majority are IM (north of 65th Ave) and IL (south of 65th Ave). Exact numbers are shown in Table 3 below. Only two non-residential vacant lots were absorbed between 2019 and 2020, as the total number of non-residential vacant lots fell from 119 to 117 in that time period.
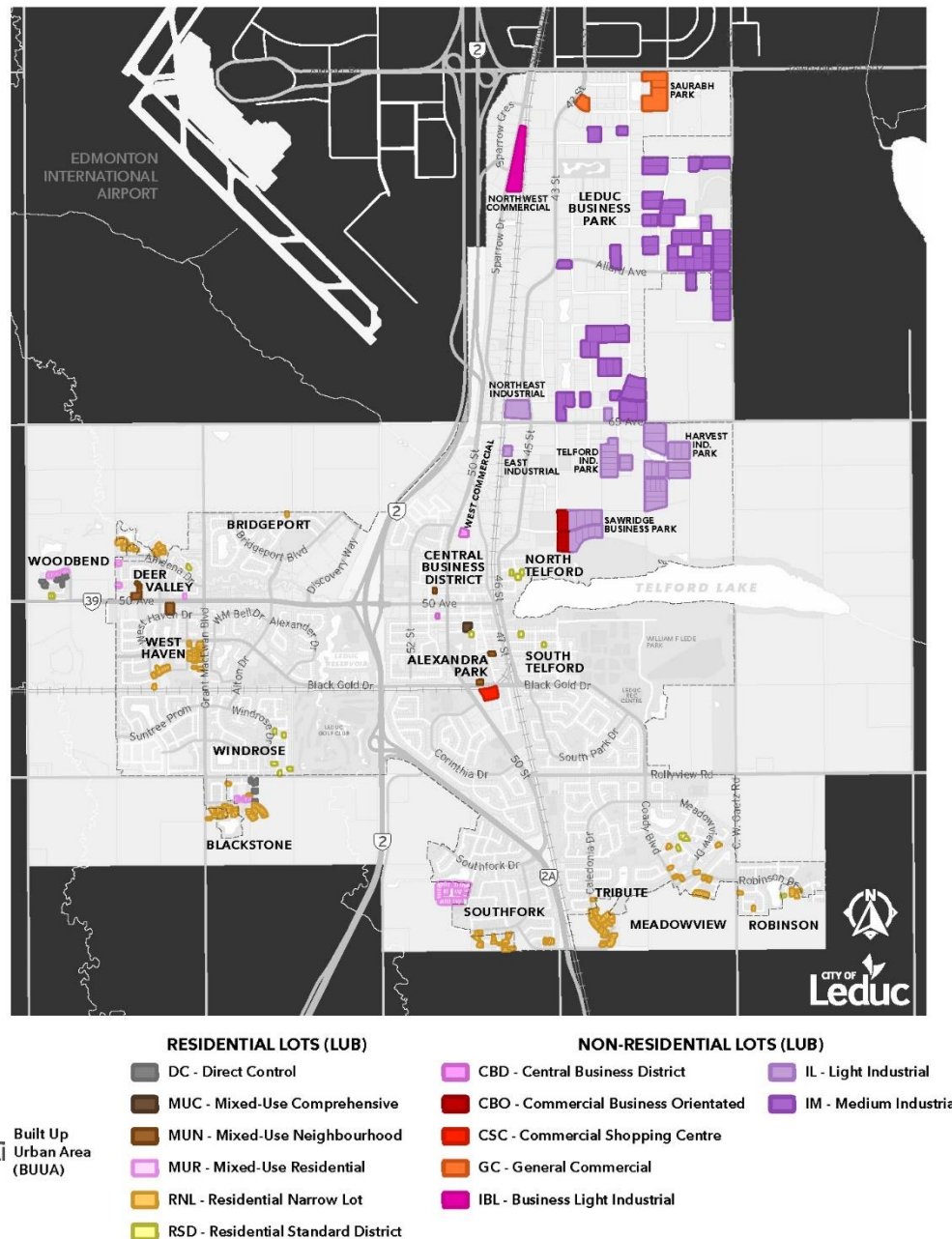

Figure 1: 2020 Vacant Lots Map

Table 3: Vacant Non-Residential Lots by District (2020)	
Land Use District	**Number of Vacant Lots**
CBO – Commercial Business Oriented	8
GC – General Commercial	4
IBL – Business Light Industrial	3
IL – Light Industrial	38
IM – Medium Industrial	61

Built Form

How do different districts and overlays influence the built form of the industrial areas?

IBL is the most efficient or 'business-dense' district. It has the highest average number of business licenses per parcel, even with the smallest average parcel size and the lowest average site coverage. This means it is potentially the most *intense* district (in terms of business activity), while being the least *dense* (in terms of buildings). (However, this is assuming that all businesses are at the same level of activity, which we know they are not. Business Licenses alone are not a complete picture of business activity intensity.)

Graph 13: Average Business Licenses per Parcel

District	Value
GC	~1.97
IBL	~2.12
IL	~1.85
IM	~1.63
IS	~1.6

Graph 14: Average Parcel Size (m2)

District	Value
GC	~12000
IBL	~9500
IL	~12000
IM	~15000
IS	~42500

Graph 15: Average Site Coverage (%)
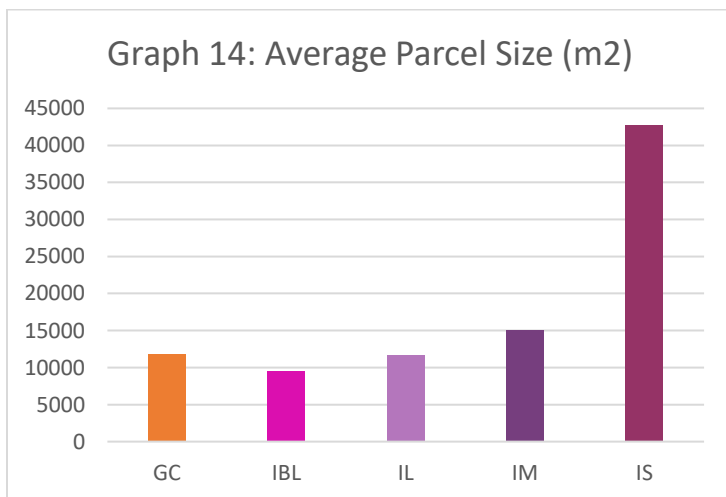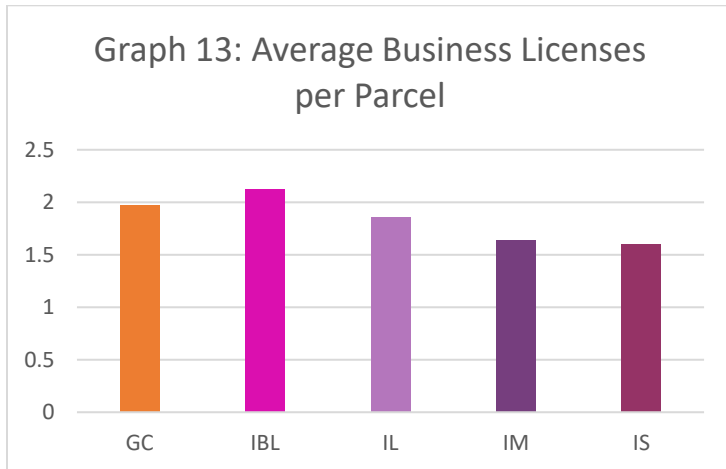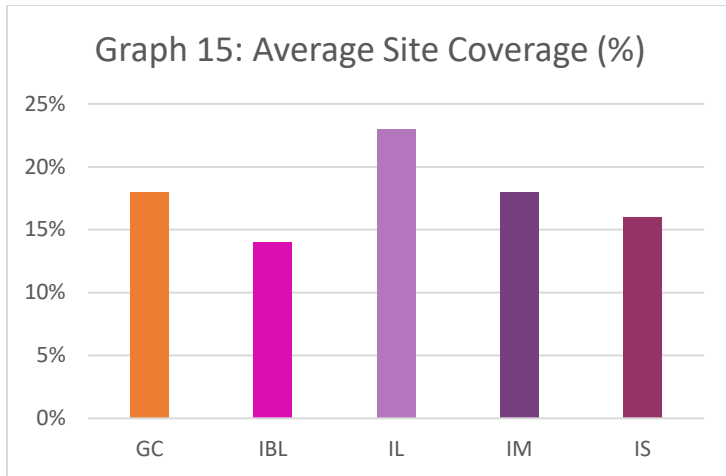
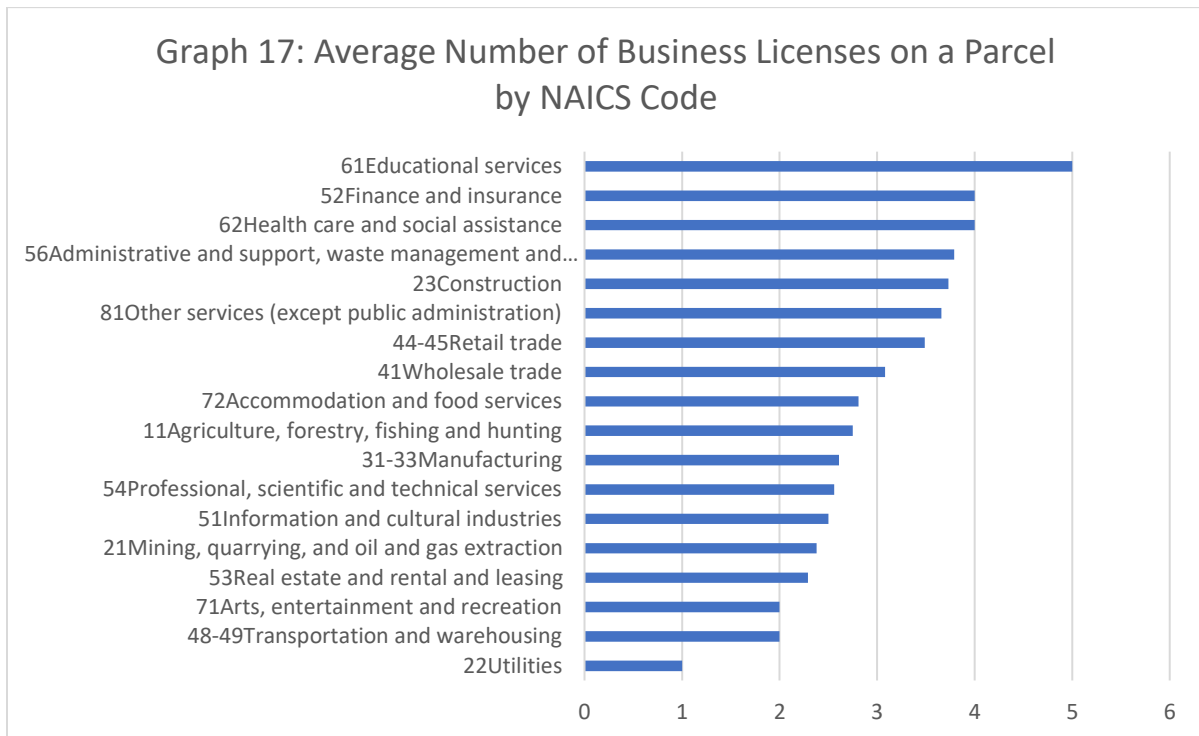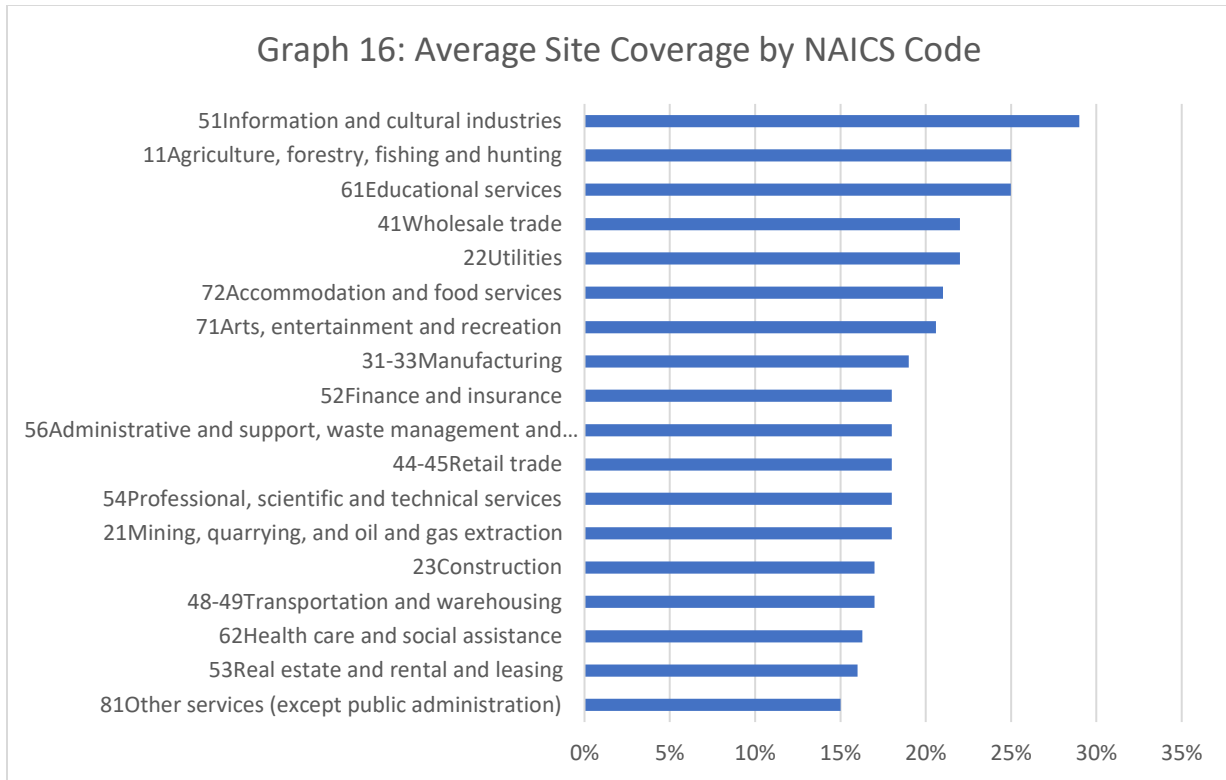| Table 4: Maximum Site Coverage vs. Average Site Coverage					
	GC	IBL	IL	IM	IS
Max Site Coverage	30%	30%	60%	60%	60%
Average Site Coverage	18%	14%	23%	18%	16%

Something of note regarding the average site coverage percentage, is that no district is even close to the maximum allowed by the Land Use Bylaw (see Table 4 above). An area for further analysis could be to examine what is taking up the majority of site coverage in these districts (is it parking, landscaping, outdoor storage, etc.), and why are businesses not developing more of their site? Is it due to business needs, or are the City's landscaping or parking requirements forcing businesses to not utilize all of their allowable site coverage?

Only one parcel of those surveyed was found to be exceeding the maximum site coverage. This parcel is in the IM district and has 61% site coverage, exceeding the maximum by one percentage point.

Site Coverage and NAICS Codes
NAICS codes were used to compare land use with site coverage and business density. Graph 16 shows that the NAICS codes associated with the highest site coverage are "Information and cultural industries", "Agriculture, forestry, fishing and hunting", and "Educational services". These 3 NAICS codes have a higher average site coverage than any land use district (compare to Graph 15 above). However, Graph 16 is problematic because it does not account for multiple business licenses (with potentially different NAICS codes) on one site.

Graph 17 shows which NAICS codes are most and least likely to share their parcel with other businesses. For example, parcels with at least one "Education services" business have on average 5 businesses, the highest of any NAICS code. Generally, it appears that more commercial or office-oriented uses have more businesses per parcel on average, while more industrial uses like "Manufacturing", "Transportation and warehousing", and "Utilities" have on average fewer businesses per parcel.

Graph 16: Average Site Coverage by NAICS Code

51Information and cultural industries
11Agriculture, forestry, fishing and hunting
61Educational services
41Wholesale trade
22Utilities
72Accommodation and food services
71Arts, entertainment and recreation
31-33Manufacturing
52Finance and insurance
56Administrative and support, waste management and…
44-45Retail trade
54Professional, scientific and technical services
21Mining, quarrying, and oil and gas extraction
23Construction
48-49Transportation and warehousing
62Health care and social assistance
53Real estate and rental and leasing
81Other services (except public administration)

0%   5%   10%   15%   20%   25%   30%   35%

Graph 17: Average Number of Business Licenses on a Parcel by NAICS Code

61Educational services
52Finance and insurance
62Health care and social assistance
56Administrative and support, waste management and…
23Construction
81Other services (except public administration)
44-45Retail trade
41Wholesale trade
72Accommodation and food services
11Agriculture, forestry, fishing and hunting
31-33Manufacturing
54Professional, scientific and technical services
51Information and cultural industries
21Mining, quarrying, and oil and gas extraction
53Real estate and rental and leasing
71Arts, entertainment and recreation
48-49Transportation and warehousing
22Utilities

0   1   2   3   4   5   6

Finally, Graph 18 combines the data of the two previous graphs by considering the average site coverage of all parcels associated with each NACIS code, divided by the number of business licenses on that parcel. This process attempts to isolate each business from the other businesses that it shares a parcel with, thereby deriving a stronger correlation between average site coverage and each NAICS code. Now, "Information and cultural industries" remains associated with the highest average site coverage, but becomes tied with "Utilities". Notably, "Health care and social assistance" and "Educational services" are now associated with an extremely low average site coverage of less than 5%.

Graph 18: Average Site Coverage per Business License by NAICS Code
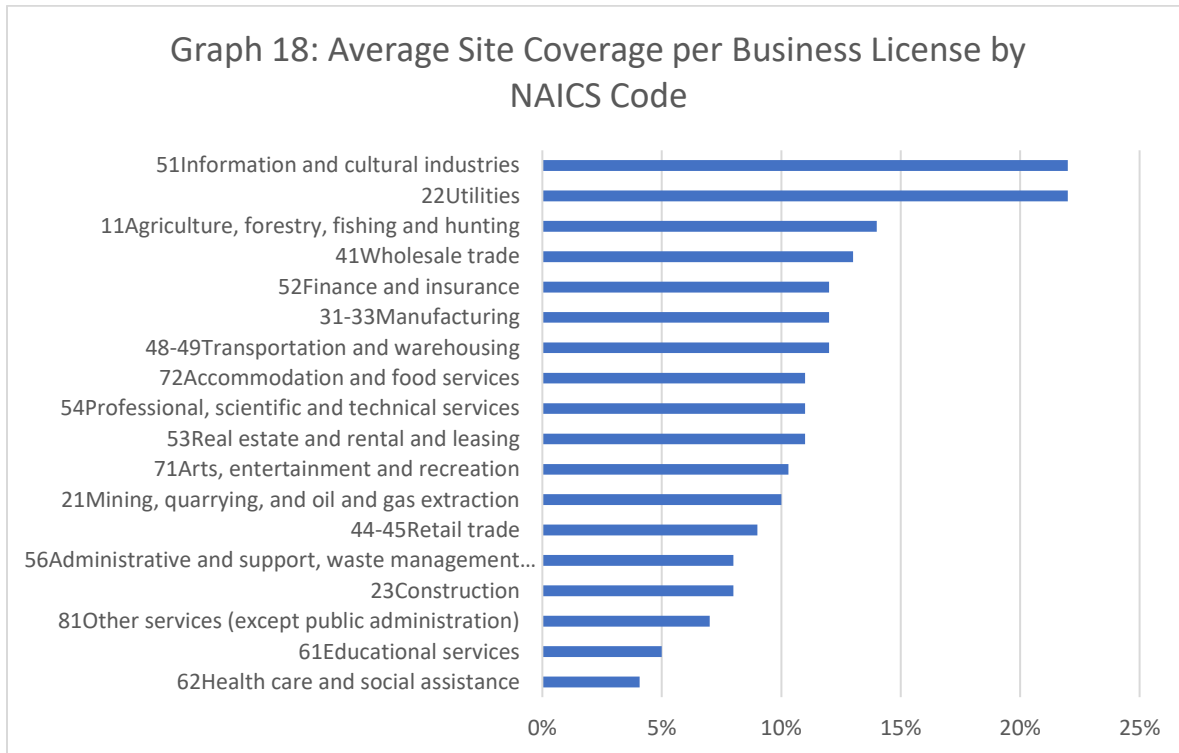
Drive About

A driving tour of the study area was conducted on August 5, 2021. Generally, the built form appeared to correlate with the land use district. Larger buildings and larger parcels were found in the IM district, while more multi-business buildings, smaller setbacks, and more recognizable "commercial" style businesses were found in the lighter districts such as IL and IBL. However, there were some interesting observations made.

There was little observable difference in built form and variety of businesses between areas zoned GC and those zoned IBL. IBL certainly had more "industrial" type businesses with larger yards and some outdoor storage, and GC contained several hotels. However, GC also had RV dealerships with large gravel lots. When taken on average, there was not a huge difference between the IBL and GC areas.

Figure 2: A building on the IBL side of Sparrow Drive

Figure 3: A hotel on the GC side of Sparrow Drive

Figure 4: A trailer storage yard on the GC side of Sparrow Drive

There were a number of newer buildings with high quality exterior finishes that were completely vacant. This may be an issue of timing, as these buildings were completed in that last 5 or so years as demand for industrial space has waned due to economic downturn, the COVID-19 pandemic, and other factors. However, it is also possible that some of these buildings may sit vacant due to particular design issues with specific buildings that may make these buildings non-functional for the targeted tenants.

Figure 5: A vacant building on 36 Street

Figure 6: A vacant building on 65A Avenue