TORONTO City Planning

This bulletin presents the results of an analysis to create FSW ratios to support the Land Needs Assessment to determine the quantity of land required to accommodate forecasted employment growth to 2051. For more information, please visit us at: https://www.toronto.ca/city-government/data-research-maps/research-reports/planning-development/

profile TO

Floor Space per Worker Ratios

Median Floor Space per Worker Ratios

Office	29 sq m
Retail	28 sq m
Small-Format Retail	21 sq m
Large-Format Retail	50 sq m
Industrial (excluding Storage)	85 sq m
Institutional and Other (excluding Places of Worship)	63 sq m
Education	82 sq m
Place of Worship	195 sq m

Introduction

A Floor Space per Worker ratio (FSW) is a metric that estimates the average amount of gross floor area (GFA) occupied per employee. The City of Toronto commonly uses this metric in exercises where employment projections must be converted into GFA, such as Development Charges By-law Background Studies. FSWs can also be used in reverse to estimate the employment that may be generated from proposed development.

FSWs are also often used in the development and market analysis industries in determining how much employment a non-residential project might yield, or how much non-residential GFA might be needed to meet the demands of a particular tenant. FSWs used by private sector entities are often proprietary information and it can be unclear whether they are comparable to the information the City uses when converting jobs into GFA or vice versa. Many industries' needs for space have evolved in recent years, prompting the City's review.

Analysis conducted by Hemson Consulting Ltd. as part of the background work supporting TOcore, the study that resulted in Toronto's Downtown Plan, found evidence that FSWs commonly applied to office space overstated the level of employment generated.[1] This overstatement could be occurring because commonly used ratios may not consider non-leaseable area, vacant space and sub-lease vacancy, and excess space held by tenants that are in the process of staffing up or downsizing. In addition, common ratios applied to other uses such as industrial and institutional are subject to a high degree of individual variability by sub-use.

Between 2021 and 2023, the City of Toronto prepared its Land Needs Assessment (LNA), a component of the Municipal Comprehensive Review of the Official Plan with regards to A Place to Grow: the Provincial Growth Plan for the Greater Golden Horseshoe, 2020 ("Growth Plan"). The LNA is a provincially mandated study to determine the quantity of land required to accommodate forecasted population, household, and employment growth to 2051. The work undertaken through the LNA was an important input into the City's growth management and intensification strategy. To estimate the land required to accommodate future employment, employment forecasts contained in Schedule 3 of the Growth Plan were translated into small-area projections by industry sector. One of the inputs used to create the employment projections was FSW ratios.

Given the information needs of the LNA employment projections, changing employment trends, and the consultant's findings that office FSWs in the literature may overstate employment generated, a detailed city-wide analysis was conducted by City Planning staff to calculate updated FSW ratios. Data sources that the development industry may use in their FSW calculations for individual development projects, such as leaseable area, are not always readily available or comparable at a city-wide level. However, the City of Toronto maintains its own longitudinal city-wide datasets involving relevant and standardized data, including the Development Pipeline and the Toronto Employment Survey. Therefore, the City's FSW review analysis compared actual and proposed space by use in Development Pipeline projects to actual employment reported by the Toronto Employment Survey.

The resulting FSWs differed from the ranges of FSWs found in the literature, particularly for the Office sector, but most of the literature did not provide enough details about their data sources and methodologies to determine whether they were relevant to the Toronto context or appropriate for the needs of the LNA. The Development Pipeline and the Toronto Employment Survey used in the City's methodology aligned with other components of the LNA. The analysis may not be appropriate for other purposes, such as market analysis and office space needs planning. The analysis was especially appropriate for the LNA, and potentially for other City analyses as well.

Jurisdictional Scan

Jurisdictional Scan Overview

A jurisdictional scan was conducted to identify other Floor Space per Worker ratios (FSWs) in current use, and determine how those ratios were calculated, what they are based on and what they include, to understand how those compare to the City's FSWs. This secondary research involved analysing and compiling findings from municipal plans, planning consultants' reports, commercial real estate publications, and academic journals published in North America and other places around the world during pre- and post-COVID-19 pandemic times. Appendix A: Detailed Jurisdictional Scan Results describes the findings of the jurisdictional scan in detail.

There are different bases from which FSWs are calculated and measured. Differences in methodology, measures and types of floor space included make it difficult to compare FSWs, and to determine how comparable the FSWs from the City's analysis are to those from other sources. The variety of methodologies may cause figures to appear larger or smaller in comparison to the City's research. The characteristics of the literature reviewed made it difficult to compare these published FSWs with the City's FSW analysis. The issues with reports that were reviewed are summarised here:

- The majority of the literature either referenced other reports as their data sources, included data sources that were not clearly cited or did not clearly explain the methodology used, making it difficult to understand how the FSWs were produced and what spaces they included.
- There is some variation in how the different reports described the Office, Retail, Industrial and institutional sectors, and most of the literature does not describe what is included in each sector.

- The majority of the literature reviewed dealt with the Office sector, whereas only half of the reports dealt with the other sectors.
- Many of the sources did not specify whether their FSWs represented a minimum, average, or median calculation. Those that do specify their measure reported an average floor space per worker ratio. The City's LNA FSW medians therefore represent a different measure than most of what is found elsewhere in the literature.
- Most of the literature did not provide any explanation of the types of space included in their calculations, such as whether they included communal space such as conference or breakout rooms.

Even before the COVID-19 pandemic, in response to the rise in workplace populations and costs, there was a general expectation in the literature that employers would densify their workplaces in the future. Despite such assertions, the FSWs in the most recent reports were not uniformly lower than those in the older reports. However, where the literature speaks to differences in one place over time, there was some evidence of declining FSWs.

Limited research on FSWs has been published since the onset of the COVID-19 pandemic. Overall, FSWs are impacted by capacity limitations, public health and safety regulations, and the accelerated shift towards hybrid work caused by the pandemic.

Overall Jurisdictional Scan Conclusions

Many authors expect that FSWs are going to continue to decrease due to the changing nature of work and use of employment space. Recently, factors such as staffing cuts, condensed office equipment, and greater space efficiency have enabled tenants to lease smaller spaces which, in turn, result in lower FSWs. However, the inconsistency and lack of clarity among most of the reports make it difficult to understand and compare FSW trends because they are from varying geographies and do not specify how space measurements are calculated or what spaces they include. Research regarding floor space per worker ratios is limited, particularly in a post-pandemic environment. Further research and monitoring will be necessary as the world adjusts to changing expectations and costs in a post-pandemic environment. The City's analysis represents an effort to comment on the state of FSWs in Toronto just before the COVID-19 pandemic occurred, given that subsequent trends may still be in flux.

Methodology

Data Sources

The City's FSW review analysis was based on two City of Toronto datasets, the Development Pipeline and the 2019 Toronto Employment Survey. Both datasets represent reliable, consistent historical sources of data that have been maintained over time and will continue to be updated in the future.

The Development Pipeline

The Development Pipeline consists of all development projects in the City of Toronto with any development activity in a given timeframe. For the FSW analysis, the Pipeline included projects with activity between January 1, 2001, and June 30, 2021, to yield sufficient data for the results to be analyzed by different sectors. A development project is the collection of Planning and Building Permit Applications having to do with a single site. Development activity refers to progress at any stage of the approvals and development processes, including: Planning application submission, review and approval; Building Permit application and issuance, construction, occupancy, and completion. As-of-right construction, or development below the Site Plan Control threshold, is not captured by the Development Pipeline.

Projects are categorized into three general statuses, based on the stage of the development approvals and construction activity they reached between January 1, 2001 and June 30, 2021:

- Built projects are those which became ready for occupancy and/or were completed during the period.
- Active projects are those which have received at least one Planning approval but which have not yet been built.
- Under Review projects are those which have not yet been approved or refused, and those which are under appeal.

The FSW analysis was based on the non-residential gross floor area (GFA) values from built Development Pipeline projects only, to help ensure that:

- only employment that was related to and resulting from the project was captured, and
- projects that were not fully occupied were excluded.

Total non-residential GFA includes existing non-residential GFA on a site before development occurred, plus any net-new non-residential GFA occurring as a result of development. Total non-residential GFA was used as this value represents the total amount of space available to business occupants, as some establishments may occupy both pre-existing and net-new space.

The Pipeline also breaks down total non-residential GFA into 4 major land use sectors: Office, Retail, Industrial, and Institutional/Other. The amount of GFA in each of these sectors was used to determine the predominant non-residential land use in the FSW ratio.

The Toronto Employment Survey

The Toronto Employment Survey collects annual employment information from business establishments across the city. This information is used to monitor the city's economic structure, employment and land use activity, as well as monitor the progress of the City of Toronto's Official Plan policies. The Survey programme has undertaken consistent data collection since 1983 and has provided a continuous series of snapshots of the city's changing economic composition and evolving land uses. The collection of survey information enables the City to monitor long-range economic trends and emerging activity in areas identified for employment growth in the Official Plan, including Downtown, the Centres, Secondary Plan Areas, and designated Employment Areas. The Survey results enable the creation of effective long-range employment projections, inform planning for urban infrastructure and municipal services, and assist in

monitoring the city's progress toward its investment and fiscal goals.

Each establishment surveyed is assigned an activity code that describes the predominant employment activity in detail, such as a print shop, pharmacy, bank branch, or public elementary school. The Survey summarises these specific activity codes into six broad employment sectors:

1. Manufacturing and Warehousing,
2. Retail,
3. Service,
4. Office,
5. Institutional, and
6. Community and Entertainment.

For the FSW analysis, 2019 Employment Survey data was used as it is the most recent pre-pandemic year and therefore better reflects employment trends as they occurred before the disruptions of the pandemic.

Analysis

Data Validation and Overall Approach

Point-based Pipeline data and point-based employment data were mapped, along with polygon-based parcels. Employment data points were joined to the Pipeline data points that fell within the same parcel. FSWs were calculated as the sum of employment from all establishments in a given parcel divided by the total non-residential gross floor area in that parcel. FSWs were based on the total non-residential GFA as opposed to being broken down by the individual categories of non-residential GFA for several reasons:

1. Some parcels contained multiple land uses but only one establishment, such as an industrial workshop that also contains office functions or a retail showroom. As there is only one occupant with one overarching business activity, it is not possible to split the total employees for that establishment into industrial, office, or retail jobs.
2. Some parcels, particularly mixed-use buildings and retail plazas, may have been built with the intention of being occupied by retail uses but may ultimately have been occupied by businesses carrying out other activities, such as daycares or office functions. In these cases, calculating FSWs based on the built GFA use breakdown means that employment projections based on those FSWs will include a measure of variability in how the space may be occupied.

In order to correctly combine Toronto Employment Survey results with development projects, projects meeting the following criteria were excluded from the analysis:

1. Projects that were not yet built;
2. Projects that were fully completed after 2018 or that became ready for at least partial occupancy after 2019, because many of these projects were not yet occupied by a business as of the 2019 Employment Survey;
3. Projects with no recorded total non-residential GFA;
4. Records with an FSW less than 5, because many of these projects had no response in the Employment Survey and/or appeared not to be fully occupied; and
5. Employment Survey establishments with construction activity codes, as these records indicated that construction activity was still taking place on the site and that the proposed non-residential space may therefore not yet be fully built and occupied.

The remaining records were then reviewed manually. Records were omitted if they excluded establishments, had visibly vacant units, had been geocoded to the wrong parcel, were superseded by a more recent Pipeline project, or otherwise had data issues that contributed to under- or over-representing employment or gross floor area.

This work occurred in two phases.

Phase 1: Single-Occupant Analysis

Initially, only projects in parcels that contained one establishment were included in the analysis to be certain that parcels with vacant non-residential units were excluded. However, it was not possible to determine whether business establishments were fully staffed for the current market condition. Projects included in this phase met the following criteria, in addition to the general criteria above that applied to both phases:

1. Includes FSWs in parcels containing a development project with one establishment in the 2019 Toronto Employment Survey.
2. Excludes Toronto Employment Survey records with unit numbers in the address (which might suggest that there are other units in the parcel that are vacant).

In this phase, records were categorised as follows:

1. Office records were those where 60% or more of the non-residential GFA consisted of office GFA and where the Toronto Employment Survey (TES) 6-sector category was Office.
2. Retail records were those where 60% or more of the non-residential GFA consisted of retail GFA and where the TES 6-sector category was Retail or Service.
3. Industrial records were those where 60% or more of the non-residential GFA consisted of industrial GFA and where the TES 6-sector category was Warehousing/Manufacturing.
4. Institutional and Other records were those with 1 sq m or more of institutional and other GFA and with a TES 6-sector category Institutional, or Community and Entertainment. Most institutional projects consisted of 100% institutional and other non-residential GFA.

The FSWs of the records meeting these criteria were graphed as box-and whisker plots in Tableau by major land use sector. [2] In each sector, outliers were identified generally as records that fell outside of the box-and-whisker plot, or one and a half times the interquartile range. Outliers were omitted by placing a maximum FSW limit on each land use sector. Outliers were identified systematically and a small finite number were removed to avoid arbitrarily excluding a large number of records which would skew the results. Table 1 shows the resulting number of records in each land use sector in Phase 1, after exclusions and outliers were removed.

Table 1: Number of Results in the Phase 1 (Single-Occupant) Analysis

Sector	Sub-Sector	Number of Records	Max FSW Included (sqm)	Outliers Excluded by Max FSW Limit
Office	**Total**	**25**	**65**	**2**
Retail	**Total**	**102**	**100**	**6**
Industrial	**Total**	**46**	**600**	**6**
	Total excluding Storage	44	**600**	2
Institutional and Other	**Total**	**127**	**600**	**1**
	Total excluding Places of Worship	108	**600**	1

Phase 2: Multiple-Occupant Analysis

The initial single-occupant analysis provided some valuable insights but yielded only 25 Office records and no hospital records in the Institutional sector. The Office sector is crucial to planning for future employment growth in many parts of the City of Toronto such as Downtown. Moreover, reviewing Office FSWs was a key driver for the FSW analysis given Hemson Consulting's findings that Office FSW literature may overestimate employment depending on whether hotelling staff or communal space such as conference rooms are included.[3] Hospitals are a subsector that was of particular interest to the City's employment projections exercise, as many of these large institutions are expected to expand over the horizon of the employment projections to support the growing population. Therefore, additional analysis was done on these two sectors to include parcels that contained more than one employment establishment.

The single-occupant analysis also limited the types of business establishments that were included in the Office sector as well as in other sectors. For example, the results included many pharmacies, bank branches, liquor stores, and hardware stores, as these types of businesses are often owned by large corporations that tend to develop stand-alone properties. To include a wider variety of businesses, and to maintain a consistent methodology between sectors, the inclusion of multiple-occupant records was ultimately expanded to all non-residential land use sectors.

This phase therefore included FSWs in parcels containing a development project with one or more establishments in the 2019 Toronto Employment Survey and did not exclude employment records with unit numbers in the address. The analysis excluded records where units were visibly vacant, and those office projects with many internal occupants where it was not possible to confirm whether or not any units were vacant. Additionally, as with Phase 1, it was not possible to determine whether business establishments were fully staffed for the current market condition.

In this phase, development project parcels sometimes included businesses in more that one employment sector. Records were therefore categorised as Office, Retail, Industrial, or Institutional and Other based solely on the distribution of non-residential GFA where the predominant use represented 60% or more of the non-residential GFA.

The FSWs of records meeting these criteria were graphed as box-and-whisker plots by land use sector. In each sector, outliers were identified generally as records that fell outside of the box-and-whisker plot, or one and a half times the interquartile range, the span of the box. Outliers were omitted by placing a maximum FSW limit on each land use sector. Outliers were identified systematically and a small finite number were removed to avoid arbitrarily excluding a large number of records which would skew the results. Table 2 shows the resulting number of records in each land use sector in Phase 2, after exclusions and outliers were removed.[4]

The phase 2 results were the version used as a key input in the final LNA.

Table 2: Number of Results in the Phase 2 (Multiple-Occupant) Analysis

Sector	Sub-Sector	Number of Records	Max FSW Included	Outliers Excluded by Max FSW Limit
Office	**Total**	**61**	**80**	**2**
Retail	**Total**	**256**	**100**	**13**
	Small Format	188		3
	Large Format	68		10
Industrial	**Total**	**90**	**1000**	**4**
	Total excluding Storage	**87**		**2**
Institutional and Other	**Total**	**238**	**600**	**4**
	Total excluding Places of Worship	**202**		4
	Community	49		1
	Education	93		0
	Place of Worship	36		0
	Other	60		3

Observed Median FSWs by Land Use and Sub-Sector

Median Floor Space per Worker ratios were summarised by the predominant non-residential land use, with outliers excluded. Medians were chosen as opposed to averages as the averages skewed all sectors of FSW higher, reflecting the fact that there is a certain minimum amount of space per worker possible for each sector but that there is no upper limit to how large an FSW could be. The Floor Space per Worker ratios that resulted from the analysis are shown in Table 3. The results described in this section reflect the phase 2 results that supported the final LNA.

Within each major land use sector, specific land uses were included that describe the land use activity in greater detail, such as Office – Health Services, and Retail – Food and Beverage. To see the definitions of these specific land uses, see Appendix B: Specific Land Use Definitions. There were very few records with certain specific land uses, so they were grouped into related subsector groups within each major land use sector. To see a list of which specific land uses were included within each subsector group, see Appendix C: Specific Land Uses Included in Each Major Land Use Sector.

These subsector groups allowed for a more nuanced exploration of FSWs than looking at the four major land use sectors alone. For some major land use sectors, there were enough records and variation between subsector groups that more specific FSWs could be derived for these groups. This was the case for the Retail and for Institutional and Other major sectors.

Office

For the Office sector, three groupings emerged: Mixed Use – Residential/ Non-Residential, Office – Commercial, Government and Other, and Office – Health Services (see Figure 1). Commercial, Government and Other had the highest median FSW at 30 square metres while Health Services had the lowest at 21 and Mixed Use (typically office uses at the base of apartment buildings) fell in the middle at 25. However, the Mixed Use grouping only contained 9 records and a wide range of observed median FSWs from 6 to 43 (see Table 4). Therefore, the major Office sector was not broken down into more specific Office subsector groupings in the LNA analysis. The overall observed Office median FSW was 29 square metres per employee, based on 60 total records.

Table 3: Observed Median Floor Space per Worker Ratios by Land Use

Land Use Sector	**Median FSW** (square metres per employee)
Office	**29**
Retail	**28**
Small Format Retail	21
Large Format Retail	50
Industrial (excluding Storage)	**85**
Institutional and Other (excluding Places of Worship)	**63**
Community	40
Community Centres	*51*
Daycares	*34*
Emergency Services	*34*
Hospital	*39*
Education	82
Education - Elementary Schools	*81*
Education - Secondary Schools	*96*
University / College	*57*
Place of Worship	195
Other (All other institutional and other uses)	52

Figure 1: Observed Median Office FSW Ratios

Table 4: Observed Office FSW Ranges by Subsector Grouping, in Square Metres per Worker

Land Use Grouping	Number of Records	Lower Whisker	Lower Hinge	Median	Average	Upper Hinge	Upper Whisker
Total	**60**	**6**	**20**	**29**	**31**	**36**	**58**
Mixed Use – Residential / Non-Residential	9	6	20	25	27	32	43
Office - Commercial, Government & Other	34	8	25	30	36	41	62
Office - Health Services	17	6	15	21	22	32	43

Retail

For the Retail sector, two groupings emerged: Small Format Retail and Large Format Retail (see Figure 2). Small Format Retail generally represents retail uses in spaces with relatively small GFAs and therefore generally lower FSWs. Small Format Retail includes the following specific land uses:

- Mixed Use – Residential/Non-Residential, which often involves small retail units at the base of apartment buildings;
- Neighbourhood Shopping Centres, which consist of strip plazas containing mostly small retail units;
- Restaurants/Taverns, which had the lowest FSWs of all Retail land uses as many restaurants employ lots of staff who may work in close quarters, particularly at peak periods;
- Retail – Auto Related, which includes gas stations and autobody shops that typically have a very small footprint; and
- Retail – General Merchandise and Services, which include stand-alone stores (other than big box stores) and services such as salons, and which can have relatively small GFAs depending on the nature of the business.

The median FSW for the Small Format Retail subsector grouping was 21 square metres per employee, based on 188 records (see Table 5).

In contrast, the Large Format Retail subsector represents retail uses that tend to have a large GFA, yielding higher FSWs. Large Format Retail includes the following specific land uses:

- Big Box Retail Categories, which are over 40,000 square feet (3,716 square metres) by definition. They tend to serve customers who arrive by car who may be shopping in bulk, for large items, or for a large variety of items that all require storage within the store's footprint;
- Hotel/Motel, a use that involves the rental of a large amount of GFA that is not occupied by staff most of the time;
- Retail – Auto Sales and Rental, which requires a lot of space for storing vehicles;
- Retail – Entertainment, which often involves a large amount of GFA for customers to assemble, such as a movie theatre; and
- Retail – Food and Beverage, which can include a range of GFAs but in many cases includes a large area for food storage and refrigeration.

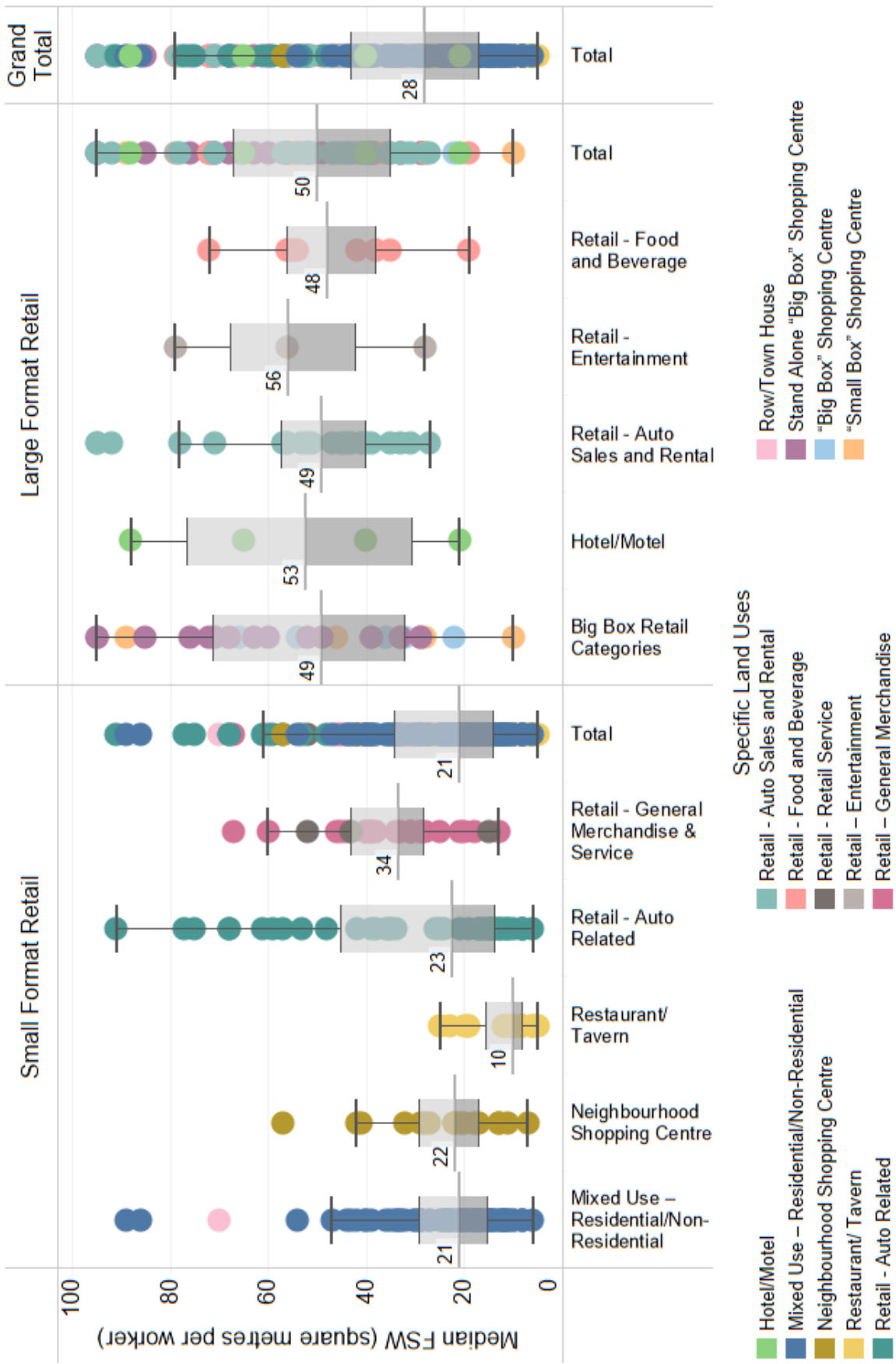
The median FSW for the Large Format Retail subsector grouping was 50 square metres per employee, based on 68 records.

While there were enough records and variation between them to break the Retail sector into the Small and Large Format Retail subsector groupings, this level of detail was not included in the LNA analysis as there was not enough information available in the LNA to estimate what form future Retail might take. Therefore, the LNA analysis relied on the overall median Retail FSW of 28 square metres per employee.

Table 5: Observed Retail FSW Ranges by Subsector Grouping, in Square Metres per Worker

Land Use Grouping	Number of Records	Lower Whisker	Lower Hinge	Median	Average	Upper Hinge	Upper Whisker
Total	**256**	**5**	**17**	**28**	**33**	**43**	**79**
Small Format Retail	**188**	**5**	**14**	**21**	**26**	**34**	**61**
Mixed Use – Residential / Non-Residential	86	6	15	21	24	29	47
Neighbourhood Shopping Centre	17	7	17	22	25	29	42
Restaurant/ Tavern	19	5	8	10	12	16	25
Retail - Auto Related	40	6	14	23	31	45	91
Retail - General Merchandise & Services	26	13	28	34	35	43	60
Large Format Retail	**68**	**10**	**35**	**50**	**52**	**67**	**95**
Big Box Retail Categories	29	10	32	49	52	71	95
Hotel/Motel	4	21	31	53	54	77	88
Retail - Auto Sales and Rental	22	27	40	49	54	57	78
Retail – Entertainment	3	28	42	56	54	68	79
Retail - Food and Beverage	10	19	38	48	47	56	72

Figure 2: Observed Median Retail FSW Ratios, in Square Metres per Worker

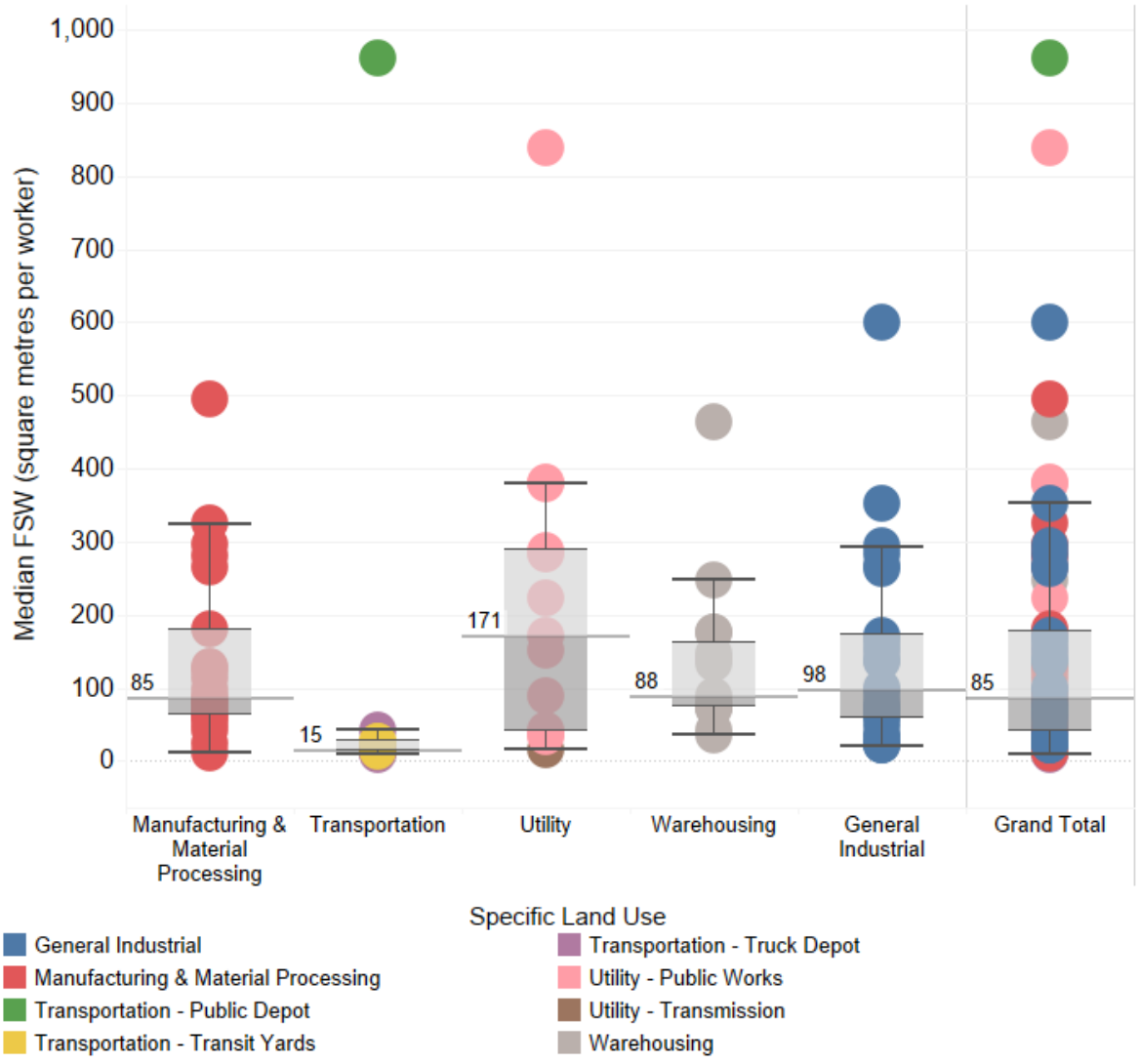


Industrial

For the Industrial sector, six subsector groupings emerged (see Figure 3):

1. Manufacturing and Material Processing, which includes records with a wide range of GFA and employees and therefore a wide range of FSWs;
2. Storage. Most of this grouping's records were omitted as outliers because this grouping by nature includes extremely high GFAs often with very few staff. The Storage records that were included in the analysis had such high FSWs that they skewed the total Industrial FSW noticeably; therefore, Storage records have been omitted from Figure 3;
3. Transportation, which had very low FSWs as it includes transit yards and truck yards which may have very little indoor GFA. This grouping also includes public transit stations which may house relatively few employees as staff may not be directly allocated to a single transit station; as a result, the one public transit station record that met the criteria for inclusion had a very high FSW;

Figure 3: Observed Median Industrial FSW Ratios, in Square Metres per Worker



4. Utility, which includes a wide range of median FSWs as some sites are serviced by few staff and/or are only occasionally visited by staff while others require many staff to operate;
5. Warehousing, which includes large GFAs for storage of goods but which may also require a fair number of staff to manage those goods; and
6. General Industrial, for records where the specific Industrial activity could not be determined.

While there was enough variation between the different Industrial uses to identify the six Industrial subsector groupings, some of the groupings (particularly Storage) did not have many records (see Table 6). Moreover, there was not enough information available in the LNA to estimate what specific uses might occur on future Industrial sites. Therefore, the subsector-level of detail was not included in the LNA analysis. Because of how different the Storage grouping was from the remainder of the Industrial groupings, the LNA analysis relied on the overall median Industrial FSW excluding Storage records, which was 85 square metres per employee, based on 87 records.

Table 6: Observed Industrial FSW Ranges by Subsector Grouping, in Square Metres per Worker

Land Use Grouping	Number of Records	Lower Whisker	Lower Hinge	Median	Average	Upper Hinge	Upper Whisker
Total	**90**	**9**	**43**	**87**	**165**	**222**	**464**
Total excluding Storage	**87**	**9**	**42**	**85**	**148**	**176**	**353**
Manufacturing	22	11	63	85	138	180	325
Storage	3	416	468	519	631	739	958
Transportation	11	9	14	15	105	26	43
Utilities	13	16	41	171	225	288	381
Warehousing	15	36	74	88	135	161	248
General Industrial	26	21	59	98	145	172	294

Institutional and Other

There were enough records and variation between them to break the Institutional and Other sector into four subsector groupings (see Figure 4):

1. Community, which includes recreation centres, day cares, hospitals and emergency services including ambulance depots, fire halls, and police stations. This subsector grouping had the lowest FSW of all of the Institutional and Other groupings as most of these uses employ many staff relative to their space.
2. Education, which includes all levels of educational uses from elementary to secondary to post-secondary. These uses tended to have relatively high FSWs as many of these facilities have a lot of space that is not necessarily occupied at all times, such as gymnasia, and many are filled with significantly more students than staff.
3. Places of Worship - this grouping typically includes large areas for congregants to gather and employs very few staff, often relying on volunteers. The Place of Worship records had such high FSWs that they skewed the total Institutional FSW noticeably; therefore, Places of Worship records have been omitted from Figure 4.
4. Other and Remaining Uses - this grouping mostly consists of uses with medium to high FSWs, including Public Galleries (libraries, museums), Residential Institutions (Nursing Care/ Retirement Homes, Correctional Facilities, Hostels), uses with large outdoor spaces (golf courses, cemeteries, and historic sites) and uses that did not fit into any other grouping. Many of these uses feature a large number of employees, a small amount of GFA, or both.

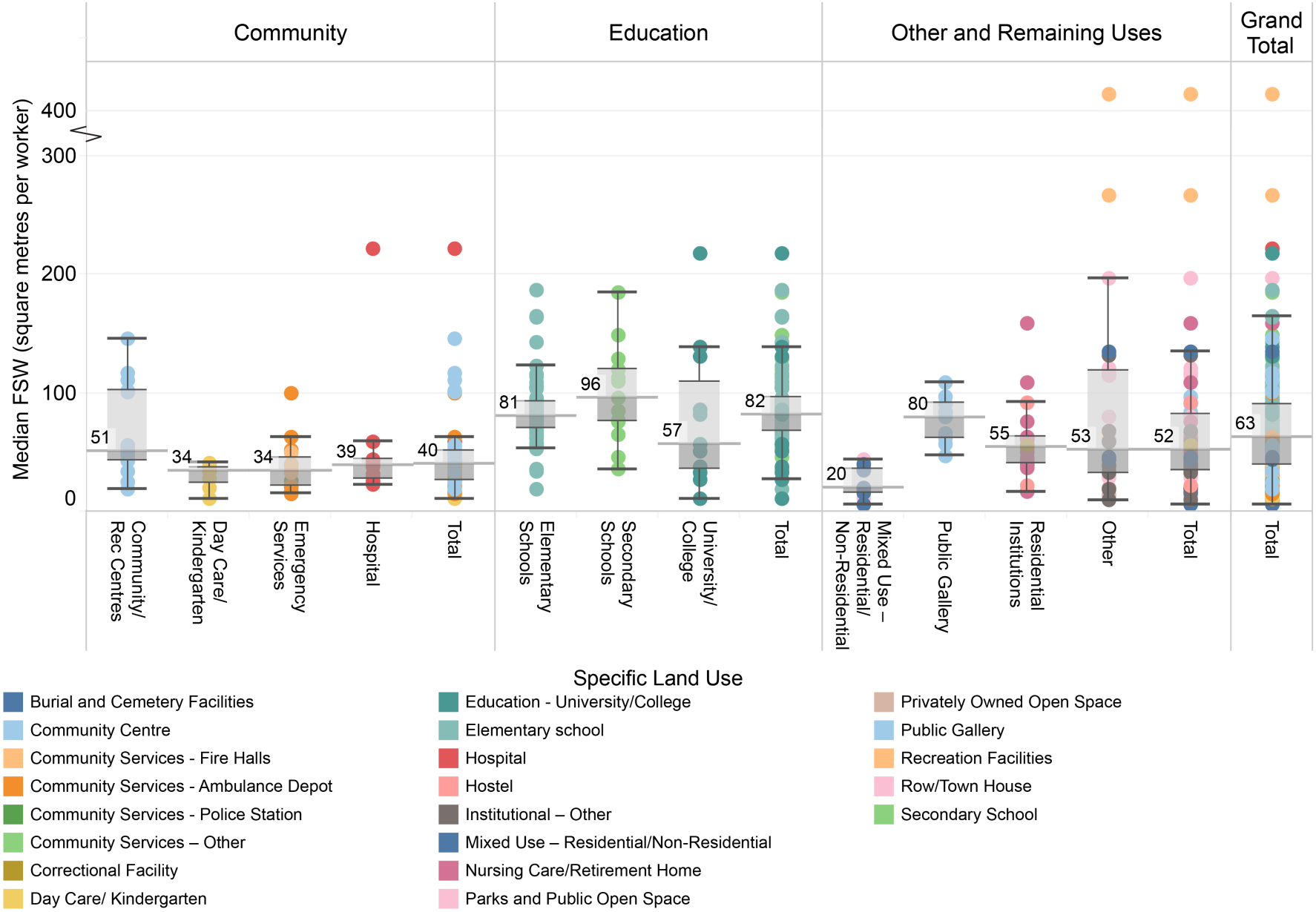
In the LNA, there was enough information available to estimate where Hospital and Educational uses might occur on future Institutional sites, as many of these sites are owned by major institutions or are otherwise earmarked for these particular uses. Therefore, the LNA analysis used these more specific median FSWs (39 square metres per employee for Hospitals, 82 for Educational uses) on sites where these uses were anticipated.

Where the specific Institutional and Other use was unknown or a use other than Hospital or Education, the LNA analysis relied on the overall median Institutional and Other FSW excluding Place of Worship records, which was 63 square metres per employee, based on 202 records (see Table 7). The Place of Worship grouping was excluded from the LNA analysis because its median FSW was so much higher than the remainder of the Institutional and Other groupings.

Table 7: Observed Institutional and Other FSW Ranges by Subsector Grouping, in Square Metres per Worker

Land Use Grouping	Number of Records	Lower Whisker	Lower Hinge	Median	Average	Upper Hinge	Upper Whisker
Total	**238**	**6**	**40**	**72**	**94**	**109**	**197**
Total excluding Places of Worship	**202**	**6**	**39**	**63**	**72**	**90**	**165**
Community	49	11	26	40	49	51	63
Community Centres	15	19	43	51	66	102	146
Day Care / Kindergarten	7	11	24	34	30	37	41
Emergency Services	15	15	22	34	38	45	63
Hospital	12	23	28	39	52	44	59
Educational	93	27	67	82	86	96	139
Education - Elementary Schools	69	53	70	81	84	92	123
Education - Secondary Schools	13	36	76	96	99	120	185
University / College	11	11	36	57	79	109	139
Places of Worship	36	29	113	195	219	316	528
Other	60	6	34	52	94	82	135
Mixed Use – Residential / Non-Residential	9	6	16	20	25	36	44
Public Gallery	9	47	62	80	77	91	109
Residential Institutions	18	17	40	55	60	63	92
Other	24	10	33	53	88	119	197

Figure 4: Observed Median Institutional and Other FSW Ratios, in Square Metres per Worker



Discussion and Implications

Applications of the Results

The FSW ratios in this analysis represent the results of comparing current development and employment information to assess the total space occupied by workers by land use. This analysis was undertaken to support the employment projections for the Land Needs Assessment. The LNA relied on data sources that were readily available at the city-wide level, which included the Toronto Employment Survey and the Development Pipeline. Both data sources have been consistently updated and maintained by the City of Toronto for decades and represent rich, comprehensive, longitudinal datasets that enabled the City to examine past trends. The sources will continue to be maintained in the future, allowing the City to continue to monitor FSWs.

The FSW analysis was designed to support the needs of the Land Needs Assessment. The results of this FSW analysis may not be appropriate for other purposes, such as market analysis and office space needs planning.

Through the LNA, City Planning staff were consulted about anticipated major redevelopment opportunities that were not yet reflected in the Development Pipeline. In addition, conversion sites in Employment Areas were incorporated to reflect where redevelopment could change the type and scale of non-residential gross floor area. Staff estimated the potential on each site. In estimating non-residential potential, staff provided their professional opinion on the estimated breakdown of total non-residential gross floor area by office, retail, industrial and institutional uses. Non-residential GFA in the Development Pipeline, major redevelopment opportunities and conversion sites were converted into employment using the updated FSWs in this analysis and applied as an input to inform the LNA Employment Projections from 2026 to 2051. For more information on the LNA and its Employment Projections, please see Planning and Housing Committee Item 2023.PH3.7, Our Plan Toronto: Land Needs Assessment.

Comparison of the City's Analysis with Other FSW Ratios

Comparison of the results of this analysis with other analyses is impacted by the different treatments of a variety of methodological factors, including the types of uses and tenants that were included, the source and accuracy of the employment information, and the composition of the floor areas. The City's analysis produced FSWs based on a consistent treatment of detailed data collected locally and screened carefully for internal consistency and uses which correspond to the City's evolving land use condition.

Office records were excluded if any occupants had noticeably missing data or data errors (such as parking GFA being include in total GFA), if it could not be determined whether any units in the project were vacant, or if a project and its occupants spilled over multiple parcels. The median FSWs of these 35 exclusions, which include several major office towers in Downtown and North York Centre, ranged from 14 to 2,677 square metres per person. Those with median FSWs of 25 square metres per person or less tended to be large multi-tenant office towers. Excluding these records ensured that there could be a degree of certainty that the Office FSWs that were included were capturing comparable data. However, it also meant that several large, multi-tenant office records, which may constitute the kinds of office developments that tend to be included in other authors' FSW analyses, were excluded. These exclusions may help to explain why the median Office FSW of 29 square metres per person in the City's analysis tended to be higher than what was found in the jurisdictional scan for Office uses, which ranged from 13 to 26 square metres per

person (see Table 8). Future research should explore multi-tenant office towers in more detail.

It was not possible to determine whether business establishments were fully staffed for the current market condition. While it was not stated in the literature reviewed, it is possible that other organizations' FSW ratios represent the amount of space needed for a business when it has no vacant positions, or after accounting for growth in its staff complement. The current FSW analysis measured business establishments' employment based on actual employment reported as of the day they were surveyed and not imputed or anticipated employment, whether future growth was anticipated or not. This may also account for the current analysis producing higher-than-average FSWs for the Office sector.

The gross floor area in the Development Pipeline represents the area as proposed, approved and built on a given site. It includes occupied space used for meeting rooms, lunch rooms, corridors, and common area circulation. All but one of the FSW publications reviewed for this analysis did not specify whether they included these types of areas. Some indicated that they included rentable space, which may or may not include these types of areas. It is therefore difficult to determine how comparable the FSWs are between this analysis and those from other sources.

Furthermore, the non-residential sectors identified in the jurisdictional scan's literature may or may not correspond with the sectors as they were defined in the City's analysis. For example, the Region of Halton report[5] includes a Major Office sector, but their Major Office FSW includes only employment in buildings 3 storeys or greater located in Employment Areas. In contrast, the City's Office sector included any type of office space. The Port Moody report[6] identified a Light Industrial sector, whereas the City's Industrial sector included any type of industrial space. And three of the reports[7,8,9] referred to a Commercial or a Retail/Commercial sector, whereas the City's analysis refers to a Retail sector. It is unclear what specific uses are included in the jurisdictional scan reports, and whether or not they include the same land uses as the City's analysis.

Lastly, FSWs in the City's analysis were calculated as the sum of employment from all establishments in a parcel divided by the total non-residential gross floor area in that parcel. FSWs were not broken down by the individual subsectors of non-residential because some parcels and their occupants contained multiple land uses but only one establishment; it was not possible to split the total employees for that establishment into jobs by sector. An additional reason is that some parcels may have been built with the intention of being occupied by retail uses but may ultimately have been occupied by businesses carrying out other activities,

Table 8: Comparison of the City's Median FSWs with the Ranges Observed in the Jurisdictional Scan in Square Metres per Worker

Sector	City's Median FSW	Range of FSWs Observed in Jurisdictional Scan
Office	29	13 - 26
Retail	28	28 - 46
Industrial	85	33 - 89
Institutional	63	33 - 70

such as daycare or office functions. Parcels were therefore categorised by the predominant non-residential sector based on built GFA use as opposed to attempting to calculate a separate FSW for each sector found within the parcel. This approach makes the observed ratios more directly applicable to parcel-based Development Pipeline and Toronto Employment Survey information used elsewhere in the LNA. In most of the literature reviewed, it is difficult to determine from the described methodologies whether the FSW ratios were calculated based on parcels, buildings or leased units within buildings, and therefore difficult to determine how comparable the FSWs from other sources are to the results of this analysis.

The one report whose FSW calculations were based on total GFA is the Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan.[10] However, this analysis included factors for vacancy rates and the difference between net useable space, net rentable space and GFA; it used employment counts from the Census; and it is based in a city with a different land use planning framework and employment market. All of these factors mean that this analysis is not directly comparable to the City's analysis. This helps to explain the difference between the FSWs observed in the City's analysis compared to the Vancouver report's analysis (29 versus 25 square metres per person for Office, 28 versus 40 square metres per person for Retail/ Commercial, 85 versus 56 square metres per person for Industrial and 63 versus 34 square metres per person for Institutional, respectively).

As a result of the above differences in methodology, the observed FSW medians yield different employment projections than the ratios found in FSW literature would have yielded. The City's FSW analysis methodology was appropriate for supporting needs of the LNA because it used data that was comparable to other components of the LNA's employment projections. The City could repeat the analysis in the future using comparable data that is already collected and maintained by Toronto City Planning, at a greater frequency than other sources such as the Census. The City was able to be sure which uses were included in each sector, could control which outliers were excluded, and could explore subsectors of interest in detail. Other authors' FSW values may be appropriate in their respective jurisdictions and for other purposes, but in general, they rely on incomparable data sources or methodologies and/ or do not provide enough information publicly to determine whether their data sources or methodologies would be appropriate for the purposes of the City's Land Needs Assessment. Therefore, the differences between the median FSWs calculated by the City and the average FSWs calculated by the various authors reviewed are explainable, and not problematic. The different results may simply be appropriate for different purposes.

Limitations of the City's Analysis

Some Land Use Subsectors Contained No Useable Records

The City's analysis is not without limitations. For example, certain land uses had few or no records after the various criteria were applied to remove outliers and records that appeared to under- or over-represent employment or gross floor area. Land uses that had no records in the final FSW analysis are shown in Table 9.

For these specific land uses, few or no such properties had completed redevelopment during the time frame of the analysis. For those that had, the records were omitted because vacant units were present (or unable to be ruled out), there were errors in the GFA breakdown of the record, or the resulting FSWs fell outside of the included FSW thresholds for their sector. As a result, there are no records in the FSW analysis representing these uses.

Many of these land use activities are not common in Toronto and therefore a more generalized sector-based FSW is likely an appropriate proxy. However, Community and Regional Shopping Centres, which include malls and large shopping plazas, are located throughout the city, and many are in the early stages of being redeveloped at the time of this bulletin's publication. Similarly, Graphic Arts, New Media and Communications encompasses film studios, a strong and growing industry in Toronto. A few major film studio projects are currently under review or under construction, particularly in and near the Port Lands. It may be worthwhile to repeat the FSW analysis when these projects have been completed to more fully understand the unique FSW trends of these specific land uses.

Table 9: Land Use Activity Codes with No Records in the FSW Analysis

Code	Description	Definition
440	Adult Entertainment Parlours	Refers to premises where goods, entertainment or services that are designed to appeal to the erotic or sexual inclinations of customers are provided and includes the provision of body-rubs, kneading, manipulating, rubbing, massaging, touching or stimulating by any means of a person's body, but does not include premises or part of them where body-rubs performed, offered or solicited are for the purpose of medical or therapeutic treatment and are performed or offered by persons otherwise duly qualified, licensed or registered to do so under the laws of the Province of Ontario.
465	Community Shopping Centre	A shopping centre with more than two stores attached, under one ownership, generally greater than 150,000 but less than 750,000 square feet.
470	Regional Shopping Centre	A shopping centre with more than two stores attached, under one ownership, generally greater than 750,000 square feet.
485	Retail – Amusement	Refers to bowling alleys, billiard/pool halls, dance halls, amusement arcades and includes pinball parlors.
520	Graphic Arts, New Media and Communications	Includes film or recording studios, artists', photographers' or sculptors' studios, printing plants, publishing companies, photographic plants, radio and television broadcasting stations/studios, and computer hardware/software manufacturers.
610	Dormitory	Includes a building which contains a number of beds and serves as communal sleeping quarters such as residential clubs, fraternities, sororities, university residences, group homes or hospital residences.
695	Military Building	Includes barracks used for military purposes such as armouries.
715	Utility – Transmission	Includes commercial transmitters, transmission buildings, broadcasting and communications transmitters and rights-of-way.
730	Transportation - Airport Facilities	Includes airport and terminal buildings, air navigation or radio range stations, beacons, radar establishments and hangars.
740	Transportation - Port Facilities	Includes public dock and wharf, ferry terminal, lighthouse, canal, artificial channel, lock and shipping line terminals.
1305	Live / Work	A dwelling unit that is also used for work purposes, provided only the resident or residents of such accommodation work in the dwelling unit, and in which may occur home occupations, arts and crafts and/or the provision of services, where such activities are compatible with and do not detract from the residential amenity of the surrounding area.

The Analysis Excluded Records that Extended Beyond a Single Parcel

At the time the analysis was conducted, the City's Development Pipeline dataset was point-based. This meant that the there was no simple way to identify the full extent of a development project's site area, and individual parcels were used as a proxy for the site area. Point-based employment data was then joined to those parcels to calculate FSWs. However, some development project site areas involve more than one parcel containing employment establishments. In these cases, employment falling outside the one selected parcel would be missed, and as a result these records were omitted from the analysis.

Subsequent to this analysis, staff have been developing a polygon-based spatial dataset to represent the entire site area that each project in the Development Pipeline encompasses. If this analysis is repeated in the future, employment data points could be joined to the site areas they fall within, as opposed to joining them to one parcel representing the project's geographical extent. This would enable more records to be included in the analysis and would reduce the amount of manual validation required.

The Analysis Represents Pre-Pandemic Trends

The FSW analysis only included pre-pandemic data. This was because, while the Toronto Employment Survey continued throughout the pandemic, its primary survey methods changed from in-person interviews to telephone interviews. This tended to reduce the amount of detail collected about individual sites. Additionally, many businesses were temporarily closed, shifted staff from in-office to work from home, or increased or decreased from their usual staffing levels. Therefore, 2019 Toronto Employment Survey data was chosen to avoid using pandemic-era data that would be skewed, possibly only temporarily, by these massive changes in employment activity.

As a result, the FSW analysis speaks to pre-pandemic FSWs only. It is possible that employment patterns may change in the post-pandemic world. The extent to which fully remote or hybrid office work, i.e. working remotely part-time and in the workplace part-time, will persist is still a hotly debated topic as of the publication time of this bulletin.[11] The number of staff who are in-office simultaneously will impact the amount of space companies require, which may move some to adopt a hotelling model, downsize, or reconfigure their space. The City of Toronto is currently exploring permitting the conversion of office space into other non-residential uses and housing.[12] Other industries may change as well. Automation in Industrial spaces and the changing standards for delivering care in Institutional spaces may continue the pre-pandemic trend of increasing FSWs in those sectors.[13] Possible additional future trends outside the Office sector include a decreased need for the number of retail and service establishments near major office concentrations, retailers shifting from brick-and-mortar stores to online retail, an increase in warehousing and logistics to support online retail, and an increased interest in keeping supply chains local, including manufacturing.[14]

Any of these changes could also impact the amount of floor space per worker needed in these industries. It may be many years before certain companies and industries stabilise into a "new normal" way of operating. Therefore, it would be worthwhile repeating the analysis once the business world has had more time to determine what works for their operations.

The Analysis May Not Be Suitable for Other Uses

The FSW analysis was undertaken for the explicit purpose of supporting the employment projections of the Land Needs Assessment. As such, employment and GFA data sources were selected that were comparable with other inputs into those projections. These inputs include the Toronto Employment Survey used to estimate employment growth in the LNA from 2016 to 2021, GFA identified in the Development Pipeline used to estimate employment from 2016 to 2036, and GFA identified in Non-Residential Opportunity sites and potential Employment Conversion Request sites used to estimate employment from 2026 to 2051. These GFA inputs include space used for meeting rooms, lunch rooms, corridors, and common area circulation as they are based on the zoning by-law definition of GFA which does not exclude those uses.[15] It would have been inappropriate to rely on FSW ranges found in the literature to calculate the employment projections, as those FSWs may exclude space used for these purposes and therefore may not be comparable to the City's GFA inputs.

Similarly, the LNA was also undertaken at the parcel level as opposed to the building or non-residential unit level. It would have been inappropriate to apply FSW ranges found in the literature that may have been calculated at those levels instead of calculated for the total GFA within whole parcels. The current FSW analysis was designed to match the level of analysis needed for the LNA. The resulting FSWs may not be appropriate for those seeking to estimate how much space is needed to house a company of a certain size within a leased space, or looking to estimate how many employees a particular unit might comfortably accommodate.

Conclusion

Floor space per worker ratios are valuable tools that were needed for projecting employment under the provincially-mandated Land Needs Assessment. Recent FSW ratios were available in the literature; however, the methodology supporting these ratios were often not provided. Therefore, the City conducted an updated FSW analysis to support the employment projections for the Land Needs Assessment.

The FSW ratios in this analysis represent the results of comparing current development and employment information to assess the total space occupied by workers by land use. The resulting FSWs differed from the ranges of FSWs found in the literature, particularly for the Office sector, but most of the literature did not provide enough details about their data sources and methodologies to determine whether they were relevant to the Toronto context or appropriate for the needs of the LNA. The City's methodology used two data sources that are collected and maintained by the City of Toronto for the Toronto geography, the Development Pipeline and the Toronto Employment Survey, which aligned with other components of the LNA. The analysis resulted in FSWs specifically designed for the LNA and was especially appropriate for this purpose. City staff will continue to monitor evolving trends in where and how Torontonians work, and will continue to use this information to plan for our ever-changing city.

Appendix A: Detailed Jurisdictional Scan Results

Table 10 below shows a summary of the findings of the jurisdictional scan which include FSWs in four major sectors, Office, Retail, Industrial, and Institutional/Other; the methodology used to create them; the unit of measure; and the type of floor space included.

Table 10: Summary of Findings from Jurisdictional Scan

Sector	Publication	Date Published	Date of Data Source	Data Source	Geography	FSW (sq m)	FSW Measure	Type of Floor Space Included
Office	The New Age of Hybrid Work	2023	2022 Q4	Office Tenancy Survey of Colliers tenants	Canada	23	Average	Not available
Office	The New Age of Hybrid Work	2023	2020 Q2	Office Tenancy Survey of Colliers tenants	Canada	26	Average	Not available
Office	Port Moody Economic Development Master Plan	2022	Various	Reference to previous studies	Port Moody, BC	16	Average	Not available
Major Office	Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan	2020	2016	2016 Census & City of Vancouver data	City of Vancouver, BC	25	Average	Total GFA, including factors for vacancy rate and the difference between net useable space, net rentable space & GFA.
Major Office	Investment Readiness and Employment Lands Study	2020	2006-2019	Halton Region data	Region of Halton, ON	20	Average	In Employment Areas. Buildings 3 storeys or greater.
Office	Space Matters Key office trends and metrics for U.S. occupiers	2018	2017	What Occupiers Want survey; Bureau of Labour Statistics; Moody's Analytics	United States	18	Average	Not available
Office	Planning Downtown: The Outlook for Office & Institutional Employment to 2041	2018	2008-2015	Toronto Employment Survey; Hemson, CBRE, Ministry of Infrastructure and Toronto Pipeline data	Downtown Toronto, ON	25	Median	Net rentable floor area used for office and common area purposes in buildings across Downtown
Office	Trends in Square Feet per Office Employee: An Update	2017	2017	CoStar Portfolio Strategy	United States	17	Not available	Not available
Office	Office Space Across the World: A Research & Insight Publication	2017	2017	Cushman & Wakefield data	Toronto, ON	13	Not available	Not available

Table 10 continued on next page

Table 10 continued

Sector	Publication	Date Published	Date of Data Source	Data Source	Geography	FSW (sq m)	FSW Measure	Type of Floor Space Included
Office	Employment Lands Strategy Surrey, British Columbia.	2008	2006	Lot, building & employment data from the City of Surrey Planning Department; floor space data from Cushman & Wakefield LePage	City of Surrey, BC	25	Not available	Not available
Retail/ Services	Port Moody Economic Development Master Plan	2022	Various	Reference to previous studies	Port Moody, BC	28	Average	Not available
Commercial	Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan	2020	2016	2016 Census & City of Vancouver data	City of Vancouver, BC	40	Average	Total GFA, including factors for vacancy rate and the difference between net useable space, net rentable space & GFA.
Retail/ Commercial	Investment Readiness and Employment Lands Study	2020	2006-2019	Halton Region data	Region of Halton, ON	46	Average	Not available
Commercial	Employment Lands Strategy Surrey, British Columbia.	2008	2006	Lot, building & employment data from the City of Surrey Planning Department; floor space data from Cushman & Wakefield LePage	City of Surrey, BC	46	Not available	Not available
Light Industrial	Port Moody Economic Development Master Plan	2022	Various	Reference to previous studies	Port Moody, BC	33	Average	Not available
Employment Lands	Shaping Guelph - Employment Lands Strategy	2020	2012-2019	2019 InfoCanada Business Directory and review of businesses operating on absorbed employment lands and available data on total employment and business floor space	City of Guelph, ON	89	Average	Not available

Table 10 continued on next page

Table 10 continued

Sector	Publication	Date Published	Date of Data Source	Data Source	Geography	FSW (sq m)	FSW Measure	Type of Floor Space Included
Industrial	Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan	2020	2016	2016 Census & City of Vancouver data	City of Vancouver, BC	56	Average	Total GFA, including factors for vacancy rate and the difference between net useable space, net rentable space & GFA.
Employment Lands	Investment Readiness and Employment Lands Study	2020	2006-2019	Halton Region data	Region of Halton, ON	72	Average	Not available
Industrial	Employment Lands Strategy Surrey, British Columbia.	2008	2006	Lot, building & employment data from the City of Surrey Planning Department; floor space data from Cushman & Wakefield LePage	City of Surrey, BC	60	Not available	Not available
Institutional	Port Moody Economic Development Master Plan	2022	Various	Reference to previous studies	Port Moody, BC	33	Average	Not available
Institutional	Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan	2020	2016	2016 Census & City of Vancouver data	City of Vancouver, BC	34	Average	Total Institutional floor space inventory is estimated to account for buildings not accounted for by BC Assessment Authority using building footprints from satellite photos and other secondary sources, such as interviews with healthcare organization publications, where available.
Institutional/ Government	Investment Readiness and Employment Lands Study	2020	2006-2019	Halton Region data	Region of Halton, ON	70	Average	Not available
Institutional	Employment Lands Strategy Surrey, British Columbia.	2008	2006	Lot, building & employment data from the City of Surrey Planning Department; floor space data from Cushman & Wakefield LePage	City of Surrey, BC	43	Not available	Not available

Data Sources

The literature review included municipal plans, planning consultants' reports, commercial real estate publications, and academic journals. The majority of the literature references other reports as their data sources, included data sources that were not clearly cited or did not clearly explain the methodology used, making it difficult to understand how the FSWs were produced and what spaces they included. Of the data sources that were identified, all were proprietary as the authors either used their own municipal data and/or conducted their own primary research through surveys to generate their data. Although published primary research is beneficial, in some cases the unknowns and gaps in the presented methodology affect the comparability of these sources to the City's FSWs. For example, Cushman & Wakefield's analysis used lot, building and employment data from the City of Surrey Planning Department and floor space data from Cushman & Wakefield Canada (formerly LePage) to develop FSWs for four land use sectors, Office, Industrial, Commercial, and Institutional.[16] Although this report indicates the data source, it does not explain how the data is produced nor does it specify the type of floor space included. Without understanding the details of these methodologies, we cannot fully compare the FSWs from the City's analysis to others.

Sectors

The results of the jurisdictional scan are organised roughly into four sectors: Office, Retail, Industrial, and Institutional. There is some variation in how the different reports describe these sectors; for example, the Retail sector includes FSWs variously described as retail/services, retail/commercial, and commercial. Most of the literature does not describe what is included in each sector. The majority of the literature found (10/11 reports) deals with the Office sector, whereas only five of the reports deal with the other sectors. As a result, much of this jurisdictional scan draws on the findings from the Office sector, but findings from other sectors are included where possible.

The floor space needs of each worker will vary depending on the sector and nature of each business. For example, automation in Industrial spaces and the changing standards for delivering care in Institutional spaces have increased their FSWs.[17] Conversely, over the past decade, coworking spaces have gained popularity as an alternative model to traditional workspaces. Coworking spaces involve "open concept" and shared offices, which have trended towards tight densities and lower FSWs from 6 square metres to 9 square metres.[18] The pandemic accelerated the shift to hybrid work and the subsequent rise in hotelling,[19] wherein workers do not have a permanent workspace and must book space when they come in to work,[20] which can also skew FSWs. There is a tendency to calculate the change in FSW based on the total employment assigned to a workplace, even if the actual number of workers in the office at any given time is well below this level. Colliers concluded that 44% of the surveyed 394 companies in Canada will not be providing a dedicated office or workspace to all employees, which will lead to a decrease in the average floorspace per employee.[21]

Geographies

The literature reviewed discusses FSWs in North American cities and other places around the world. The FSWs from the Greater Toronto Area, including other literature from Toronto and from the Region of Halton, or from other larger Canadian cities such as Guelph, Vancouver and Surrey are more relevant and comparable to the Toronto context, unlike smaller or American municipalities. Similar to Toronto, these four cities are relatively dense and may be subject to similar planning frameworks. As a result, their FSWs are more comparable. The FSWs reported in the literature from Toronto and these more relatable four geographies ranged from 15 to 25 square metres for the Office sector, from 40 to 46 square metres for the Retail or Commercial sector, from 56 to 89 square metres for Employment Lands or Industrial sectors, and from 34 to 70 square metres for the Institutional or Government sector.[22,23,24,25,26]

Measures

Some reports did not mention whether their FSWs represented a minimum, average, or median calculation. The majority of the sources that specified calculated the average floor space per worker. However, averages may skew the data if there are outliers in the dataset. For example, Hemson Consulting Ltd concluded that the total mean for office buildings across Downtown Toronto was 23 square metres while the median was 25 square metres.[27] Similarly, the City's LNA analysis looked at both median and average floor space per worker ratios, found that averages tended to skew notably higher than medians due to outliers, and therefore reported on median values instead of averages. This means that the City's LNA FSW values represent a different measure than most of what is found elsewhere in the literature.

Some reports measure area in Imperial units, square feet. The City's sources and analysis are in square metres. To allow for meaningful comparison between the two, the FSWs in square feet in the literature were converted to square metres and rounded to the nearest unit.

Types of Floor Space

Building floor space can be measured in a variety of ways, as reflected in the variations reported in the reviewed FSW publications. One specified that their FSWs for various sectors were based on total gross floor area (GFA), including factors for vacancy rate and the difference between net useable space, net rentable space and GFA.[28] Another report focused on Office FSWs was based on rentable floor area used for office and common area purposes.[29] All other reports did not provide any explanation of the types of space included in their calculations, or whether they included communal space such as conference or breakout rooms. This presented challenges in accurately determining whether FSWs were comparable to each other, or to the City's FSWs.

Reporting Periods

Even before the COVID-19 pandemic, in response to the rise in workplace populations and costs, there was a general expectation that employers would densify their workplaces in the future. As far back as 2008, Cushman and Wakefield LePage anticipated that FSWs in most sectors would decline in the future to utilize spaces more efficiently.[30] In 2018, Cushman & Wakefield expected more densification in offices in the future but at a slower pace than in the past eight years as businesses sought a balance between individual space usage and communal, conference, and focus-room spaces.[31]

Despite such assertions, there was little observable evidence of this trend occurring based on the various reports reviewed; the FSWs in the most recent

literature were not uniformly lower than those in the older literature. This may be due to variation in the data sources, methodologies, and geographies between the different literature sources. However, where the literature speaks to differences in one place over time, the evidence of declining FSWs is a bit clearer. In 2017, NAIOP found that office space per employee in the United States had been declining generally, aside from increases during recessions.[32] In another example, in New York City in 2017 the Empire State Building provided 14 square metres or more per office worker on a majority of their floors, whereas some developers were providing as little as 7 square metres of space per employee on certain floors of new buildings.[33]

Limited research on FSWs has been published since the onset of the COVID-19 pandemic. The only FSW literature published post-2020 that did not rely on past reports as the data source for its FSWs dealt with the Office sector. Colliers Real Estate Management Services initiated a series of national surveys of roughly 400 of their tenant companies to understand the effects of the COVID-19 pandemic and health-related lockdowns on their businesses and their recovery.[34] These reports provide insights into FSW trends and changes during pre- and post-pandemic times in Canada. In June 2020, 47% of their office tenants were looking to downsize with an average reduction rate by square footage of 41%.[35] However, as of Q4 2022, the number of tenants who reported a space reduction had dropped to 27% as tenants wanted more or the same amount of space.[36] Although the surveyed businesses were reported to be looking to retain the same amount of office space, their use of that space is different in a post-pandemic world. With the rise in hybrid work, one in two companies indicated that they would not dedicate specific office space such as a closed-door office or workstation to employees who do not work full time from the office.[37]

This trend could ultimately lead to a decrease in Office FSWs. In addition, the amount of floor space per worker may be impacted by growing demand for flexible office space, which includes bookable boardrooms or co-working spaces, which may be included in occupiable floor area. In their Q4 2022 report, Colliers predicted that flexible office space will encompass 8% of total office inventory in the market in the future, up from their Q2 2021 prediction of 6%.[38]

Overall, FSWs are impacted by capacity limitations, public health and safety regulations, and the accelerated shift towards hybrid work caused by the pandemic. For organizations returning to work under a hybrid model of work, the FSWs for office space in Toronto have declined from 26 square metres to 23 square metres, a 9% decline in the average floor space per employee.[39]

Appendix B: Specific Land Use Definitions

The following specific land uses and their descriptions are based on categories used in maintaining the Land use Information System II, the database from which the Development Pipeline is derived. While the FSWs in this analysis were based on a development project's predominant non-residential component (Office, Retail, Industrial, or Institutional and Other GFA), the project may also contain residential uses. Additionally, within these four major non-residential sectors, there are more specific land use categories that describe the land use activity in more detail. These more specific land uses are defined in Table 11.

Table 11: Land Use Codes included in the City's FSW Analysis

Land Use Code	Land Use Name	Land Use Code Definition
105	Single Detached House	Refers to a detached one-family dwelling house built as such. The detached house may contain more than one dwelling unit.
205	Row/Town House	Refers to a house in a series of more than two attached one-family dwelling houses. The row house may contain more than one dwelling unit and includes link homes and "casitas".
305	Apartment/ Multi Residential	Defined as a building other than a multiplex dwelling house with greater than six dwelling units but does not include row housing. The dwelling units may be contained in a mixed-use structure where the dwelling units are not directly accessible from street level and where another use is directly accessible at grade (e.g. retail).
310	Apartments in a Non-Residential Building	Includes apartments which are located in an Industrial, Commercial or Institutional Building when there are six or less dwelling units. Also covers apartments above commercial space in small buildings such as those in older commercial cores along arterial roads.
405	Office – Health Services	Includes general, business, labor and professional associations, trade unions, religious organizations, contractors, miscellaneous and non-profit associations and offices which serve an administrative function ancillary to another use.
410	Office – Commercial	Includes office types such as finance (including banks), insurance, real estate, travel agent, technical services including architects, planners, engineers and other technical services such as data processing services.
415	Office – Government	Defined as local, provincial, federal and international (e.g. consulate) or foreign offices, post office, courts of law and legislative offices.
420	Office – Other	Refers to a public or private medical, surgical, physiotherapeutic dental or other human health clinic. This includes opticians, optometrists, chiropractors, medical laboratories, radiologists and does not include a clinic that is accessory to a hospital.
425	Retail - Food and Beverage	Includes grocery stores, supermarkets, convenience stores, baked goods stores, herbal stores and liquor outlets.
430	Retail – General Merchandise	Defined as establishments providing a variety of goods and services such as department stores, variety stores and drug stores. Included are apparel establishments such as shoe, clothing, wool linens textiles and fur stores. Also included are household goods stores such as hardware, furniture, appliances, fixtures, lumber, lamps, antiques, ceramics, wallpaper/paints, carpets, drapes, locks and keys, glass and house wares stores. Includes bookstores, florists, automotive product sales, barber/beauty salons, pet stores, duplication shops, private art gallery, sporting goods and nurseries. Retail outlets which are considered specialty shops and which may manufacture products on the premises, for example, stained glass studios and pottery shops, are included within this category. The space allotted to the retail portion of a contractor's operation is also included hereunder.

Table 11 continues on next page

Table 11 continued

Land Use Code	Land Use Name	Land Use Code Definition
435	Retail - Retail Service	Includes rental services such as clothing, linen, TV and video, equipment and costume rentals and catering services. Repair and cleaning services are also included in this category and comprise jewelry stores, shoe repair services, laundromats, dry cleaning outlets and drapery/carpet cleaning services. Animal care centres such as veterinarian clinics/offices, dog pounds and kennels and humane society animal shelters. Also refers to a specialized school conducted for hire or gain such as driving schools, golf schools or commercial trade schools such as the Data Institute.
445	“Big Box” Shopping Centre	Big box shopping/power centre greater than 100,000 square feet with two or more main anchors such as discount or grocery stores with a collection of box or strip stores and in a commercial concentration concept.
450	Stand Alone “Big Box” Shopping Centre	Big box shopping/power centre greater than 100,000 square feet with one stand-alone store. (e.g. Home Depot)
455	“Small Box” Shopping Centre	Small box shopping centres less than 100,000 square feet with a minimum of 3 box stores with one anchor (large grocery or discount store)
460	Neighbourhood Shopping Centre	A shopping centre with more than two stores attached, under one ownership, generally less than 150,000 square feet.
475	Retail - Auto Sales and Rental	Includes yards, sales and rental offices and showrooms for new and used vehicles.
480	Retail - Auto Related	Includes establishments where petroleum products are sold and where ancillary repair service and/or car wash facilities may be provided. In addition, establishments where the repair and service of automobiles/trucks is provided and body, muffler and transmission shops are included.
490	Retail – Entertainment	Includes theatres, cinemas and other places of assembly.
495	Restaurant/ Tavern	Refers to an establishment serving food and/or beverages including fast-food and take-out establishments.
497	Hotel/Motel	Includes buildings used mainly for catering to the needs of the travelling public by the supply of food and sleeping accommodation.
505	Warehousing	Refers to a building or structure used primarily for the storage of goods, merchandise or other matter. Includes wholesale showrooms for equipment display, jobbers, manufacturers agents and wholesalers.
510	Storage	Means a storage area supplemental to another land use, for example, stockrooms or locker rooms. Includes lumber, contractors, machinery storage, truck storage, coal, gravel and sand stockpiling yards. Also includes grain elevators, tank farms and other storage areas of liquid, gaseous fuel, bulk commodity or chemicals in specially designed equipment.
515	Manufacturing & Material Processing	Includes manufacturers of food, beverage and tobacco products, leather, furs, carpet, textile, clothing, shoes and fabric manufacturing, furniture, fixture, paper and allied manufacturing, metal fabricating, machinery, transportation equipment, electrical products and fixture production establishments, petroleum, coal, chemical, rubber and plastic products and fixture production establishments.
Not Applicable	General Industrial	Indeterminate property use code.
605	Nursing Care/ Retirement Home	Refers to a building where the proprietor supplies gain lodging and also provides long-term nursing care. This includes a convalescent home, rehabilitation centre, retirement home and assisted living.

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Table 11 continued

Land Use Code	Land Use Name	Land Use Code Definition
610	Dormitory	Includes a building which contains a number of beds and serves as communal sleeping quarters such as residential clubs, fraternities, sororities, university residences, group homes or hospital residences.
615	Day Care/ Kindergarten	Includes private or public nurseries, kindergartens or day care centres (separate establishments).
625	Private Elementary School	Includes private schools at the primary, senior primary and junior high school levels.
630	Private Secondary School	Includes private schools at the secondary level.
635	Public Elementary School	Includes public schools at the primary, senior primary and junior high school levels.
640	Public Secondary School	Includes public schools at the secondary level.
645	University/ College	Includes senior technical schools and also other post-secondary establishments for the advancement of learning.
650	Place of Worship	Includes churches, synagogues or other buildings used for religious activities.
655	Public Gallery	Includes libraries, archives, public art galleries, public museums, planetariums, exhibition halls and other public exhibits.
660	Community Centre	Means a building or portion thereof used for community activities including arts, crafts, sports such as ice-skating swimming, roller skating, court and other games, social, charitable and educational activities and not used for any commercial purposes. This includes non-profit cultural clubs and halls and recreational facilities provided within structures not primarily engaged in community activities.
665	Community Services - Fire Halls	Defined as a non-profit service that supports community life and is commonly known as a fire hall/station.
670	Community Services - Police Station	Defined as a non-profit service that supports community life and is commonly known as a police station.
675	Community Services - Ambulance Depot	Defined as a non-profit service that supports community life and is commonly known as an ambulance depot.
680	Community Services – Other	Includes all other non-profit services that support community life such as rape crises centres and drug addiction centres.
685	Hospital	Includes medical treatment facilities which provide temporary accommodation including chronic care facilities and psychiatric institutions.
690	Hostel	Includes buildings operated by special organizations characterized by supervised accommodation having communal washroom and/or kitchen facilities such as the Salvation Army hostel and some Y.M.C.A. buildings.
697	Correctional Facility	Includes correctional facilities such as jails, prisons and criminal rehabilitation centres.
699	Institutional - Other	Unspecified type of institutional establishment.
710	Utility - Public Works	Includes sewage treatment plants, generating stations, hydro transformers, reservoirs, water purification plants and associated yards and buildings.
715	Utility – Transmission	Includes commercial transmitters, transmission buildings, broadcasting and communications transmitters and rights-of-way.

Table 11 continues on next page

Table 11 continued

Land Use Code	Land Use Name	Land Use Code Definition
720	Transportation - Transit Yards	Includes lines, yards and associated buildings on rights-of-way for the use of railways, streetcars and rapid transit.
725	Transportation - Public Depot	Includes buildings and depots of railway, subway, rapid transit, streetcar and bus lines.
735	Transportation - Truck Depot	Includes loading, bulk breaking and transshipping facilities.
805	Recreation Facilities	Curling clubs, health clubs, yacht clubs, racquet sports facilities, cricket clubs, commercial ice/roller skating rinks, multi-purpose halls, marinas and other clubs, zoos, amusement parks and racetracks.
905	Parks and Public Open Space	Refers to an area of land having facilities for rest and relaxation including public playgrounds, federal, provincial and municipal parks, conservation areas and any other recreational land not on water.
910	Privately Owned Open Space	Includes riding clubs and landscaped grounds not open to the public, mobile home parks, campgrounds, golf courses, ski resorts.
915	Burial and Cemetery Facilities	Refers to cemeteries and memorial gardens, crematoriums and other burial grounds.
1300	Mixed Use – Residential/ Non-Residential	Generalized land use code. Similar to Apartment/ Multi Residential, but with a significant proportion of non-residential GFA (30% or greater).

Appendix C: Specific Land Uses Included in Each Major Land Use Sector

The following four tables show which specific land uses were grouped together in subsector groupings within each of the four major non-residential sectors of Office, Retail, Industrial, and Institutional and Other.

Table 12: Specific Land Uses Included in the Office Sector

Subsector Grouping	Land Use Code	Specific Land Uses Included in Grouping
Mixed Use – Residential/Non-Residential	105	Single Detached House
	305	Apartment/ Multi Residential
	1300	Mixed Use – Residential/ Non-Residential
Office - Commercial, Government & Other	410	Office – Commercial
	415	Office – Government
	420	Office – Other
Office - Health Services	405	Office – Health Services

Table 13: Specific Land Uses Included in the Retail Sector

Subsector Grouping	Subsector Grouping Breakdown	Land Use Code	Specific Land Uses Included in Grouping
Small Format Retail	Mixed Use – Residential/Non-Residential	205	Row/Town House
		305	Apartment/ Multi Residential
		310	Apartments in a Non-Residential Building
		1300	Mixed Use – Residential/ Non-Residential
	Neighbourhood Shopping Centre	460	Neighbourhood Shopping Centre
	Restaurant/ Tavern	495	Restaurant/ Tavern
	Retail - Auto Related	480	Retail - Auto Related
	Retail - General Merchandise & Services	430	Retail – General Merchandise
		435	Retail - Retail Service
Large Format Retail	Big Box Retail Categories	445	“Big Box” Shopping Centre
		450	Stand Alone “Big Box” Shopping Centre
		455	“Small Box” Shopping Centre
	Hotel/Motel	497	Hotel/Motel
	Retail - Auto Sales and Rental	475	Retail - Auto Sales and Rental
	Retail – Entertainment	490	Retail – Entertainment
	Retail - Food and Beverage	425	Retail - Food and Beverage

Table 14: Specific Land Uses Included in the Industrial Sector

Subsector Grouping	Land Use Code	Specific Land Uses Included in Grouping
General Industrial	Not Applicable	Indeterminate property use code
Manufacturing	515	Manufacturing & Material Processing
Storage	510	Storage
Transportation	720	Transportation - Transit Yards
	725	Transportation - Public Depot
	735	Transportation - Truck Depot
Utilities	710	Utility - Public Works
	715	Utility – Transmission
Warehousing	505	Warehousing

Table 15: Specific Land Uses Included in the Institutional and Other Sector

Subsector Grouping	Subsector Grouping Breakdown	Land Use Code	Specific Land Uses Included in Grouping
Community	Community Centres	660	Community Centre
	Day Care/ Kindergarten	615	Day Care/ Kindergarten
	Emergency Services	665	Community Services - Fire Halls
		670	Community Services - Police Station
		675	Community Services - Ambulance Depot
		680	Community Services – Other
	Hospital	685	Hospital
Educational	Education - Elementary Schools	625	Private Elementary School
		635	Public Elementary School
	Education - Secondary Schools	640	Public Secondary School
		630	Private Secondary School
	University/ College	645	University/ College
Places of Worship	Places of Worship	650	Place of Worship
Other	Mixed Use – Residential/ Non-Residential	105	Single Detached House
		205	Row/Town House
		305	Apartment/ Multi Residential
	Public Gallery	655	Public Gallery
	Residential Institutions	605	Nursing Care/ Retirement Home
		610	Dormitory
		690	Hostel
		697	Correctional Facility
	Other	699	Institutional - Other
		805	Recreation Facilities
		905	Parks and Public Open Space
		910	Privately Owned Open Space
		915	Burial and Cemetery Facilities

Endnotes

1. Hemson Consulting Ltd, *Planning Downtown: The Outlook for Office & Institutional Employment to 2041*, 2018. Accessed from https://www.toronto.ca/wp-content/uploads/2018/04/87aa-city-planning-tocore-office-institutional-final-report.pdf on November 13, 2023.

2. A box-and-whisker plot displays common statistics of a set of data. The lower hinge of the box is the first quartile, the mid-point is the median, the upper hinge of the box is the third quartile, and the upper and lower whiskers represent 1.5 times the interquartile range (the range of the box). Data points that fall outside the whiskers are considered to be outliers. See Tableau Software LLC, *Box and Whisker Plots*, 2023. Accessed from https://www.tableau.com/data-insights/reference-library/visual-analytics/charts/box-whisker, 2023.

3. Hemson Consulting Ltd, *Planning Downtown: The Outlook for Office & Institutional Employment to 2041*, 2018. Accessed from https://www.toronto.ca/wp-content/uploads/2018/04/87aa-city-planning-tocore-office-institutional-final-report.pdf on November 13, 2023.

4. Note that the box-and-whisker figures shown in this bulletin represent each sector's dataset after outliers were removed. Therefore, the box-and-whisker plots here adjust to reflect only the included records, meaning that some records fall outside of the final box-and-whisker plots.

5. Watson & Associates Economists Ltd., I*nvestment Readiness and Employment Lands Study – Final Report*, 2020. Accessed from https://www.halton.ca/Repository/Halton-Region-2020-Investment-Readiness-and-Employ on November 13, 2023.

6. Vann Struth Consulting Group Inc., *Port Moody Economic Development Master Plan*, 2022. Accessed from https://pub-portmoody.escribemeetings.com/filestream.ashx?DocumentId=17060 on November 13, 2023.

7. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 13, 2023.

8. Watson & Associates Economists Ltd., I*nvestment Readiness and Employment Lands Study – Final Report*, 2020. Accessed from https://www.halton.ca/Repository/Halton-Region-2020-Investment-Readiness-and-Employ on November 13, 2023.

9. Cushman & Wakefield, *Employment Lands Strategy Surrey, British Columbia*, 2008. Accessed from https://www.surrey.ca/sites/default/files/media/documents/Employment_Lands.pdf on November 13, 2023

10. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 9, 2023.

11. Colliers Real Estate Management Services, *The New Age of Hybrid Work*. January 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on October 26, 2023.

12. City of Toronto, *Office Space Needs Study*, 2023. Accessed from https://www.toronto.ca/city-government/planning-development/planning-studies-initiatives/office-space-needs-study/ on December 12, 2023.

13. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 9, 2023.

14. City of Toronto, Toronto *Employment Survey 2020*. April 2021. Accessed from https://www.toronto.ca/wp-content/uploads/2021/05/9829-Toronto-Employment-Survey-2020-Bulletin.pdf on December 13, 2023.

15. City of Toronto, *Zoning By-Law 569-2013*. December 21, 2022. Accessed from https://www.toronto.ca/zoning/bylaw_amendments/ZBL_NewProvision_Chapter1.htm on November 17, 2023.

16. Cushman & Wakefield, *Employment Lands Strategy Surrey, British Columbia*, 2008. Accessed from https://www.surrey.ca/sites/default/files/media/documents/Employment_Lands.pdf on November 6, 2023.

17. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 9, 2023.

18. Cushman & Wakefield, S*pace Matters: Key Office Trends and Metrics for U.S. Occupiers*, 2018. Accessed from https://www.cushmanwakefield.com/-/media/cw/americas/united-states/insights/research-report-pdfs/2018/space_matters_gos_report_interactive.pdf on November 6, 2023.

19. Colliers Real Estate Management Services, T*he New Age of Hybrid Work*, 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on November 6, 2023.

20. Cambridge Business English Dictionary, *Hotelling*. 2023. Accessed from https://dictionary.cambridge.org/dictionary/english/hotelling on December 7, 2023.

21. Colliers Real Estate Management Services, *The New Age of Hybrid Work*, 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on November 6, 2023.

22. Hemson Consulting Ltd, *Planning Downtown: The Outlook For Office & Institutional Employment to 2041*, 2018. Accessed from https://www.toronto.ca/wp-content/uploads/2018/04/87aa-city-planning-tocore-office-institutional-final-report.pdf on November 6, 2023.

23. Watson & Associates Economists Ltd., *Investment Readiness and Employment Lands Study – Final Report*, 2020. Accessed from https://www.halton.ca/Repository/Halton-Region-2020-Investment-Readiness-and-Employ on November 6, 2023.

24. Watson & Associates Economists Ltd., *Shaping Guelph - Employment Lands Strategy*, 2020. Accessed from https://guelph.ca/wp-content/uploads/Shaping-Guelph-Employment-Lands-Strategy.pdf https://www.halton.ca/Repository/Halton-Region-2020-Investment-Readiness-and-Employ on November 6, 2023.

25. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 6, 2023

26. Cushman & Wakefield, *Employment Lands Strategy Surrey, British Columbia*, 2008. Accessed from https://www.surrey.ca/sites/default/files/media/documents/Employment_Lands.pdf on November 6, 2023.

27. Hemson Consulting Ltd, *Planning Downtown: The Outlook For Office & Institutional Employment to 2041*, 2018. Accessed from https://www.toronto.ca/wp-content/uploads/2018/04/87aa-city-planning-tocore-office-institutional-final-report.pdf on November 15, 2023.

28. City of Vancouver, General Manager of Planning, Urban Design and Sustainability, *Employment Lands & Economy Review Phase 2 Report: Emerging Directions for Consideration Through Vancouver Plan*, 2020. Accessed from https://vancouver.ca/files/cov/employment-lands-economy-review-phase-2-report.pdf on November 9, 2023.

29. Hemson Consulting Ltd, *Planning Downtown: The Outlook for Office & Institutional Employment to 2041*, 2018. Accessed from https://www.toronto.ca/wp-content/uploads/2018/04/87aa-city-planning-tocore-office-institutional-final-report.pdf on November 13, 2023.

30. Cushman & Wakefield, *Employment Lands Strategy Surrey, British Columbia*, 2008. Accessed from https://www.surrey.ca/sites/default/files/media/documents/Employment_Lands.pdf on November 6, 2023.

31. Cushman & Wakefield, *Space Matters: Key Office Trends and Metrics for U.S. Occupiers*, 2018. Accessed from https://www.cushmanwakefield.com/-/media/cw/americas/united-states/insights/research-report-pdfs/2018/space_matters_gos_report_interactive.pdf on November 6, 2023.

32. NAIOP Commercial Real Estate Development Association, *Trends in Square Feet per Office Employee: An Update*, 2017. Accessed from https://www.naiop.org/research-and-publications/magazine/2017/fall-2017/marketing-leasing/trends-in-square-feet-per-office-employee-an-update/ on November 6, 2023.

33. Cushman & Wakefield, *Office Space Across the World: A Research & Insight Publication*, 2017. Accessed from https://www.cushmanwakefield.com/en/japan/insights/office-space-across-the-world-2017 on November 6, 2023.

34. Colliers Real Estate Management Services, *The New Age of Hybrid Work*, 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on November 6, 2023.

35. Colliers Real Estate Management Services, *Office Recovery: Productivity, Working from Home and Space Demand*, 2020. Accessed from https://www.collierscanada.com/en-ca/research/office-recovery-report on November 15, 2023.

36. Colliers Real Estate Management Services, *The New Age of Hybrid Work*, 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on November 15, 2023.

37. Colliers Real Estate Management Services, *The Great Experiment: Dawn of the Hybrid Era*, 2021. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-recovery-report-fall-2021 on November 15, 2023.

38. Colliers Real Estate Management Services, *The New Age of Hybrid Work*, 2023. Accessed from https://www.collierscanada.com/en-ca/research/rems-office-report-release-q4-2022#:~:text=The%20New%20Age%20of%20Hybrid%20Work&text=Colliers%20Real%20Estate%20Management%20Services,space%20needs%20continue%20to%20evolve on November 15, 2023.

39. Ibid.

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