
Central Transit Corridor Monitoring Program
Kitchener-Cambridge-Waterloo

2015 MONITORING REPORT

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1. Background

1.1 Summary

The Region of Waterloo has recognized the importance of monitoring change in the Central Transit Corridor (CTC) over time in order to understand the changing nature of the social, economic and environmental characteristics of the corridor. The CTC monitoring program is a multi-year project to monitor the corridor from the baseline year of 2011 until at least 2021, after ION has been constructed, opened for service, and is functioning within the community. A total of 16 baseline indicators were chosen, as well as themed indicators, for their ability to comprehensively describe key aspects of the corridor. The indicators provide a lens for monitoring activity in the corridor, as well as the protection of the community's important assets, such as heritage resources and affordable housing. Further, through a partnership with the University of Waterloo, the influence of rapid transit on urban growth and land use changes is being explored.

1.2 About ION

The idea of a north-south transportation corridor linking the Region's three cities began as early as 1976 when it was identified in the first official plan for the newly formed Region of Waterloo. In 2000, the Region assumed responsibility for transit, and three years later, included rapid transit in its Growth Management Strategy. With a mandate from the Province of Ontario to plan for major population growth and to comply with the Places to Grow Plan (2006), Council chose to investigate rapid transit to meet the community's growth and transportation needs. Years of technical studies and the completion of an extensive public consultation process led to Council's decision on June 2011 to approve the implementation of the ION Rapid Transit project to bring Light Rail Transit (LRT) to Waterloo Region in two stages. In 2014, construction began on the ION LRT service between Kitchener and Waterloo and on the ION bus rapid transit (BRT) service, which is the first step towards bringing LRT to Cambridge. At the completion of stage one, the ION rapid transit system will consist of 19 km of LRT connecting Waterloo to Kitchener, 17 km of BRT between Kitchener and Cambridge, and 23 stops along the 36 km transit corridor. After the completion of stage one, stage two will see the ION BRT route converted to LRT, thereby creating a continuous route through Cambridge, Kitchener, and Waterloo. Opening of ION LRT is scheduled for early 2018.

More information about ION can be found in the Region of Waterloo's ION Story report: http://rapidtransit.regionofwaterloo.ca/en/resources/ION_Story_revised_R_0315.pdf; and at the project website: www.regionofwaterloo.ca/rapidtransit.

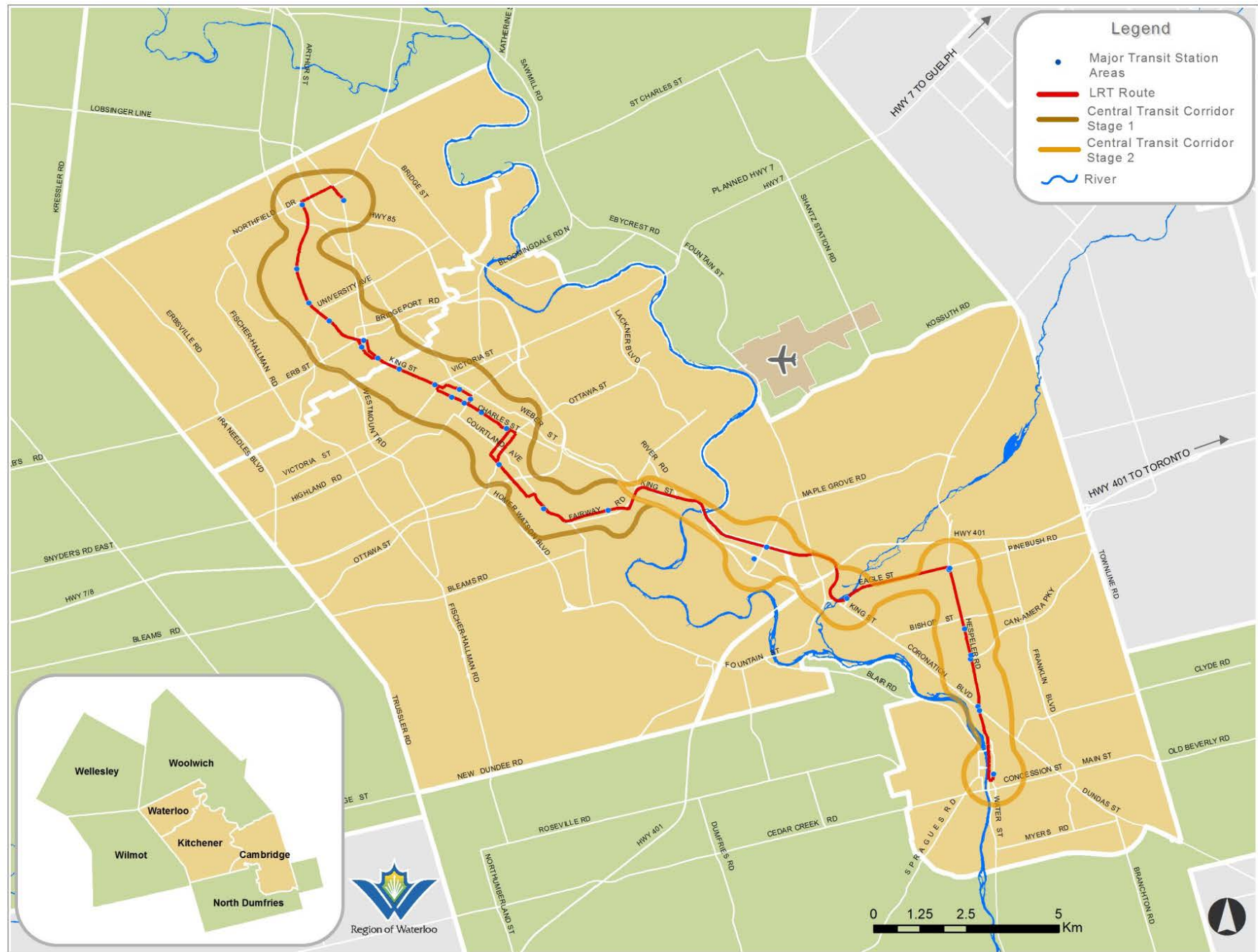
Along with ION, GRT will create an efficient, integrated, easy-to-use public transit system for all residents in Waterloo Region. New iXpress routes will be added for convenient crosstown travel, local bus service will be increased along with improved frequency in neighbourhoods,

and there will be one fare for all GRT and ION services. An expanded network of trails and path for cycling and walking will also complement the ION and iXpress bus routes and allow for connections between transportation modes.

1.3 The ION Central Transit Corridor

The Central Transit Corridor (CTC) is the area within approximately 800 metres of ION rapid transit stops, and the lands connecting these, to form a continuous corridor (Map 1). The 800-metre distance is generally accepted as the length people will walk (roughly 10 minutes) to access rapid transit. The CTC connects the three Urban Growth Centres (UGCs) of downtown Cambridge, downtown Kitchener and uptown Waterloo, as well as 23 rapid transit station areas. The geography of the CTC includes areas within the corridor that are expected to re-urbanize over time by incorporating the station area planning work that the Area Municipalities are undertaking, including secondary plans, as well as pre-established boundaries such as roads, rivers, property boundaries, and statistical boundaries already being used for monitoring.

Map 1 – Central Transit Corridor



2. The Central Transit Corridor Monitoring Program

2.1 Purpose of the Monitoring Program

Since Council's commitment to implement Light Rail Transit (LRT) in 2011, the Region of Waterloo has recognized the importance of monitoring change in the Central Transit Corridor (CTC) over time. The new rapid transit system will do more than just increase transit access throughout the Region. It also creates an opportunity to build healthy and vibrant communities along the route. The Central Transit Corridor Community Building Strategy (CBS) published on December 3, 2013, recommended how the community should grow around rapid transit stations. It also included a recommendation to establish and implement baseline metrics pertaining to transit investment in the Central Transit Corridor and to report back to Council with periodic updates. The CBS has also informed the development of the monitoring program, and continues to guide planning initiatives directed towards achieving the community-building goals of ION.

2.2 Monitoring ION's Goals

To monitor ION's two goals of moving people and building community, the monitoring program for the CTC explores the changing social, economic and environmental state of the Region's rapid transit corridor, by using data to look at the various ways the CTC is being transformed by ION. A total of nine dimensions are explored as shown in Table 1.

2.3 Baseline and Annual Indicators

For each dimension, one or more indicators have been chosen. These indicators will be collected and reported on annually. In total, sixteen indicators have been developed through the CTC Monitoring Program.

Some of the baseline indicators cannot be measured each year due to constraints in data availability. When possible, an additional indicator was added to ensure that all nine dimensions can be reported on annually. For instance, Cultural Vibrancy (the indicator for the Arts and Culture dimension) can only be measured every five years when the data is collected through the Region of Waterloo's Workplace Count project. Therefore, the number of restaurants in the corridor is used as the indicator to illustrate year-over-year change in the Arts and Culture dimension. A total of 12 of the 16 baseline indicators are updated annually.

Table 1. Goals, Dimensions and Indicators

Goal	Dimension	Indicator	Metric
Moving People	Mobility	Transit Ridership	Number of trips made using Grand River Transit (million)
		Daily Transit Activity	Per cent of daily average transit activity which occurred in the CTC
	Sustainable Modes of Transportation	Transit Mode Share	Per cent of mode of travel share which was on transit across the CTC
		Active Transportation	Per cent of mode of travel share which was pedestrian and cyclist in the CTC
		Walkability	Per cent of population living in "high" or "very high" walkable areas in the CTC
Building Community	Vibrant Communities	Land Use Mix	Per cent of all regional land uses which were found in the CTC
		Population	Per cent of Region's residents who live in the CTC
	Art and Culture	Cultural Vibrancy	Number of arts and culture establishments in the CTC
		Restaurants	Per cent of the Region's restaurants in the CTC
	Heritage	Heritage Resource Retention	Number of demolition permits on pre-1920 and designated built heritage resources in the CTC
	Investment	Building Activity	Dollar value of building permits in the CTC for new construction (million)
		Assessment Value	Assessed value of properties in the CTC (billion)
	Environment	Emissions	Tonnes of net air emissions per capita in Cambridge, Kitchener and Waterloo
	Crime and Safety	Perception of Safety	Per cent of people in Cambridge, Kitchener and Waterloo who perceive that their downtowns are safe at night
		Calls for Service	Per cent of police calls for service which were related to potential public perception in the CTC
	Inclusive Community	Home Ownership Affordability	Per cent of housing transactions which were affordable to low and moderate income households in the CTC

2.4 Themed Indicators

Each year, new themed indicators will be created to present selected dimensions in a more robust way. The proposed schedule for the themes and some potential indicators are presented in Table 2. The schedule was organized to account for the time when data will be available for the indicators, such as the data that is available only after the 2016 census. In 2016, the dimension of focus was “the environment” and two new themed indicators were developed: “trails and pathways”, and “publically-accessible green spaces”. A review of the themed indicators is proposed in 2021.

Table 2. Proposed Reporting Schedule

Reporting Year	Dimension	Potential Indicator
2017	Investment	Land values Investor Confidence Vacancy Public Sector Investment Revenues
2018	Mobility Sustainable Modes of Transportation	Way-finding Vehicular Miles Efficiency Mode Share Active Mobility Connectivity Walkability
2019	Vibrant Communities Art and Culture Heritage Architecture and Design	Density of Population and Employees Cultural Employment and Clustering Employment Density Great Places to Visit Creative Public Spaces Public Art Streetscapes High Quality Urban Places Surface parking lots
2020	Inclusive Community Crime and Safety	Social Support Agencies Rental Affordability Perception of Safety Traffic Accidents
2021	10 Year Review	

3. Monitoring Results and Analysis

The CTC monitoring program will measure change during the periods of post ION announcement (2011 – 2014), construction (2015 – 2017), ION service start (2018), and early operation (2019 - 2021). These stages are not discrete – for example, although ION was announced in 2011, there was anticipation of its approval by council in the years leading up to the final council decision. However, they are generally useful to understand the changes occurring in the corridor.

The first report from the monitoring program was the Monitoring Change in the Central Transit Corridor – Baseline Report, dated November 17, 2015, which described key aspects of the corridor in the post-announcement period from 2011 to 2014. Since construction of ION had not yet been started, these results did not reflect the direct effects of ION infrastructure, but may show indications of change in the CTC in anticipation of ION.

This second report in the program, Monitoring Change in the CTC - 2015 Annual Update, provides a first look at the state of the CTC during the first full year of ION construction and provides an update on 12 of the 16 key indicators that can be measured annually. It also reports on the first of the theme areas: the environment. Results are summarized in Tables 3 and 4.

It is recognized that there are many factors that influence each of these indicators. The economy, policies, programs and political decisions at many levels of government are large influences on change in the Region, both inside the CTC and well as more broadly.

The CTC monitoring program will continue to measure and report on indicators until at least 2021. This provides an opportunity for a comprehensive review of the change happening in the corridor along the LRT route before, during, and after the construction and operation of ION. These metrics are important in helping to tell the story about the different ways ION is moving people and shaping the future of our communities.

Table 3. Indicators for the CTC Monitoring Program (2011 to 2015)

Goal	Dimension	Indicator	Metric	2011	2012	2013	2014	2015
Moving People	Mobility	Transit Ridership	Number of trips made using Grand River Transit (million)	19.7	21.3	22.0	21.6	20.3
		Daily Transit Activity	Per cent of daily average transit activity which occurred in the CTC	67%	65%	67%	64%	63%
	Sustainable Modes of Transportation	Transit Mode Share	Per cent of mode of travel share which was on transit across the CTC	-	-	-	-	5%
		Active Transportation	Per cent of mode of travel share which was pedestrian and cyclist in the CTC	5%	-	-	-	-
		Walkability	Per cent of population living in "high" or "very high" walkable areas in the CTC	55%	56%	56%	57%	57%
Building Community	Vibrant Communities	Land Use Mix	Per cent of all regional land uses which were found in the CTC	69%	69%	69%	69%	69%
		Population	Per cent of Region's residents who live in the CTC	17.5%	17.6%	17.8%	18.0%	18.1%
	Art and Culture	Cultural Vibrancy	Number of arts and culture establishments in the CTC	722	-	-	-	-
		Restaurants	Per cent of the Region's restaurants in the CTC	50%	51%	52%	52%	52%
	Heritage	Heritage Resource Retention	Number of demolition permits on pre-1920 and designated built heritage resources in the CTC	13	36	11	9	12
	Investment	Building Activity	Dollar value of building permits in the CTC for new construction (million)	\$486	\$262	\$227	\$546	\$262
		Assessment Value	Assessed value of properties in the CTC (billion)	\$10.0	-	-	\$12.0	\$12.8
	Environment	Emissions	Tonnes of net air emissions per capita in Cambridge, Kitchener and Waterloo	2.52	2.42	2.40	2.57	2.61
	Crime and Safety	Perception of Safety	Per cent of people in Cambridge, Kitchener and Waterloo who perceive that their downtowns are safe at night	65%	-	-	-	-
		Calls for Service	Per cent of police calls for service which were related to potential public perception in the CTC	40%	41%	43%	43%	-
	Inclusive Community	Home Ownership Affordability	Per cent of housing transactions which were affordable to low and moderate income households in the CTC	55%	56%	53%	54%	57%

Table 4. Monitoring the Environment (2015)

Dimension	Indicator	Metric	2015
Environment	Trails and Pathways	Length of trails and pathways in the CTC	78 km
	Public Greenspaces	Area of public greenspaces in the CTC	398 ha

3.1 Goal: Moving People

Together with investments in the active transportation network and planned improvements to service levels and the regional transit network, the ION rapid transit system has the opportunity to greatly enhance mobility within and between Cambridge, Kitchener and Waterloo.

It is unlikely for the indicators measuring mobility and sustainable modes of transportation to portray significant changes in the CTC during the post-announcement and construction phases of ION. Nevertheless, monitoring these indicators will allow for a comprehensive comparison of behaviour change over the years since ION was announced, and after ION has been constructed, opened for service, and is functioning within the community.

3.1.1 Mobility: Total Transit Ridership

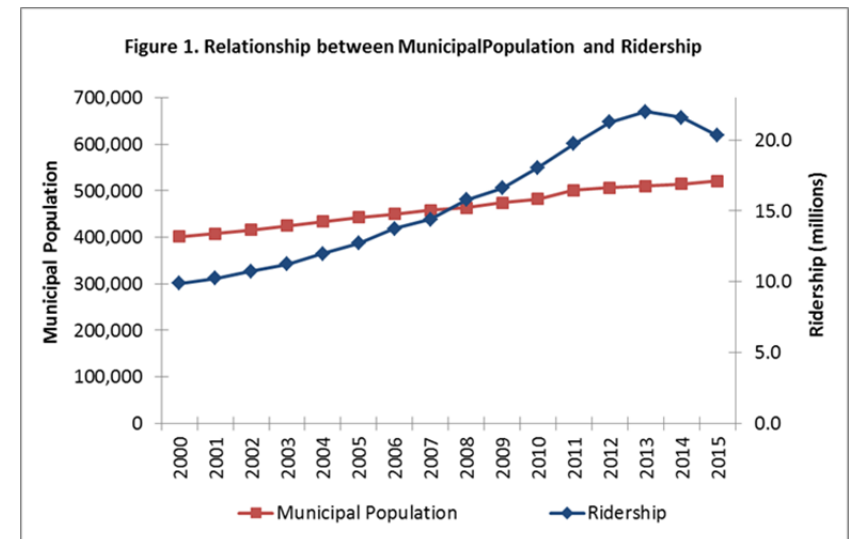
20,327,109 trips were made across Waterloo Region using Grand River Transit in 2015

Total transit ridership within the Region grew by 605,143 trips between 2011 and 2015 to over 20.3 million trips, which represent an increase of 3 per cent from 2011. On a per capita basis, the total transit ridership in the service area grew from 45.6 to 46.7 between 2011 and 2015 (Table 1). This indicates that on average, a person living in the Region would take 46.7 trips on the GRT in 2015.

Table 1. Total Transit Ridership per capita within the Transit Service Area from 2011 to 2015

	2011	2012	2013	2014	2015	Growth (%)
Total Transit Ridership	19,721,966	21,274,042	22,000,737	21,596,989	20,327,109	3%
Municipal Population (for settlements with bus service)	500,700	505,920	509,445	514,611	520,670	4%
Transit Service Area Population	432,266	438,563	435,780	434,437	434,988	1%
Total Transit Ridership per capita (Service Area)	45.6	48.5	50.5	49.7	46.7	2%

There has been a recent decline in the transit ridership in 2014 and 2015. These ridership trends are consistent with those experienced by other transit authorities across Southern Ontario As described in the Grand River Transit (GRT) Business Plan 2017-2021 Interim Report (TES-TRS-16-17, August 9, 2016), this recent decline was due to several factors: i) loss of school board funded high school trips; ii) service impacts due to construction detours; and iii) fare increases above inflation coupled with service reductions in 2013 and 2014. Other factors include lower fuel prices and perhaps some transit trips shifting to ride-sharing services. With the completion of construction projects together with the planned service improvements in 2017-2021, ridership is expected to increase.¹



¹ For information on service improvements to the regional transit network and planned ridership growth strategy, please read the **GRT Business Plan 2017-21 Interim Report:** <http://www.grt.ca/en/aboutus/grtbusinessplan2017.asp>

3.1.2 Mobility: Total Daily Transit Activity

63 per cent of the daily average transit activity in the Region occurred within the CTC in 2015

In 2015, the daily transit activity, which is the number of people who boarded or got off a Grand River Transit (GRT) bus, was 116,135 within the CTC. Between 2011 and 2015, there was an overall increase of 7,844 riders (Table 1). Recent declines in daily transit activity can likely be attributed to several factors including localized service impacts influenced by construction detours within the CTC. The total daily activity remains stable outside the CTC (Table 1).

Table 1. Total Daily Activity from 2011 to 2015					
Scale	2011	2012	2013	2014	2015
CTC	108,291	114,917	122,199	119,248	116,135
Outside CTC	53,839	61,243	59,133	68,371	68,233
Region	162,130	176,160	181,332	187,619	184,368

The CTC is continuing to capture more than half of the total daily transit activity occurring within the Region (Table 2). In 2015, approximately 63% of the total daily activity in the Region occurred within the CTC, indicating that nearly two out of three riders travelling in the Region had boarded or alighted at a GRT bus stop within the CTC.

Table 2. Distribution of Total Daily Activity within Region					
Scale	2011	2012	2013	2014	2015
CTC	67%	65%	67%	64%	63%
Outside CTC	33%	35%	33%	36%	37%
Region	100%	100%	100%	100%	100%

3.1.3 Sustainable Modes of Transportation: Walkability

57 per cent of the population living in the CTC lived in “very high” or “high” walkable areas in 2015

Approximately 104,231 people live in the Central Transit Corridor including 59,106 that live in very high or high walkable areas in 2015². Areas that are considered to be walkable are those that are characterized by residential land uses in proximity to a variety of destinations (retail, schools, etc) and small block sizes that are conducive to walking. Over half (57 per cent) of the population within the CTC live in very high or high walkable areas while 34,336 (33 per cent) live in moderate walkable areas, and 10,789 (10 per cent) live in very low and low walkable areas in 2015. In the time period between 2011 and 2015, the population in the CTC living in very high or high walkable areas increased by 5,531 people, while the population in moderate walkable areas increased by 1,184, and the low or very low walkable areas increased by 809 people.

Table 1. Estimated Population in Walkability Ratings within the CTC

Walkability Rating	2011		2012		2013		2014		2015	
	Population	%	Population	%	Population	%	Population	%	Population	%
Very High Walkable	22,675	23%	22,512	23%	22,784	23%	23,517	23%	23,805	23%
High Walkable	30,900	32%	32,318	33%	33,603	33%	34,354	34%	35,301	34%
Very High and High Walkable	53,575	55%	54,831	56%	56,388	56%	57,871	57%	59,106	57%
Moderate	33,152	34%	33,116	34%	33,961	34%	34,331	34%	34,336	33%
Low	4,417	5%	4,159	4%	4,226	4%	4,093	4%	4,494	4%
Very Low	5,563	6%	5,553	6%	5,757	6%	5,873	6%	6,295	6%
Low and Very Low	9,980	10%	9,712	10%	9,983	10%	9,966	10%	10,789	10%
Total Population in CTC	96,707		97,659		100,332		102,168		104,231	

Residents living in more walkable neighborhoods have been shown to walk, cycle and use transit more and own fewer cars than those living in less walkable areas in Waterloo Region. Population growth within the CTC is anticipated to continue during the next several years. Changes currently underway in the CTC are expected to shift some “moderate” and “low walkable” areas to become “high” or “very high” through more dense and mixed-use developments, and by connecting people to more trails and pathways throughout the corridor.

² Population estimates are currently based on the 2011 Census of Population and reflects the most up to date information. It is anticipated that the current population estimates in this report will be restated in 2016 to reflect the 2016 Census of Population.

3.2 Goal: Building Community

ION is a catalyst for building community in the CTC. Indicators that monitor the building community goal of ION strive to tell a story about how the ION LRT system may influence social, economic, and environmental aspects in the CTC and contribute to change in the community. Measuring these dimensions provides snapshots of the ways people and the market may be adapting to a new higher-order transit service over the pre-and-post implementation phases of ION.

3.2.1 Vibrant Communities: Land Use Mix

69 per cent of Waterloo Region's land uses were found within the CTC in 2015

There were 196 unique land uses within Waterloo Region in 2015 and 135 of them were located within the CTC. The CTC therefore represents 69 per cent of all land uses in the Region. The number of land uses within the corridor has been stable since 2011, with a net increase of four land uses from 131 in 2011 to 135 in 2015.

A total of nine properties in the CTC experienced a change in their land use code in 2015 to a new code that was not existing in 2011. Land use codes for six out of the nine properties changed to a code related to a new form of condominium ownership. The remaining three properties were industrial uses that may be subject to the Special Purpose Business Property Assessment Review (SPBPAP)³ conducted by the Municipal Property Assessment Corporation (MPAC), which resulted in several new industrial land use codes that have emerged in the Region and CTC in 2015.

Table 1. Percentage of Unique Land Use Codes Existing in the CTC					
Scale	2011	2012	2013	2014	2015
CTC	131	132	131	132	135
Region	191	192	190	190	196
Per cent in CTC	68.6%	68.8%	68.9%	69.5%	68.9%

³ See section 5.2 of the report for an explanation on the Special Purpose Business Property Assessment Review.

3.2.2 Vibrant Communities: Population

18.1 per cent of the Region's residents were living in the CTC in 2015⁴

Approximately 104,200 people were estimated to be living within the CTC in 2015, representing 18.1 per cent of the Region's population of 576,500 (including students) (Table 1). From 2011 to 2015, the number of residents within the CTC has been increasing at a faster rate (1.9 per cent annually) than the population outside the CTC (1.0 per cent annually), and across the Region as a whole (1.1 per cent annually).

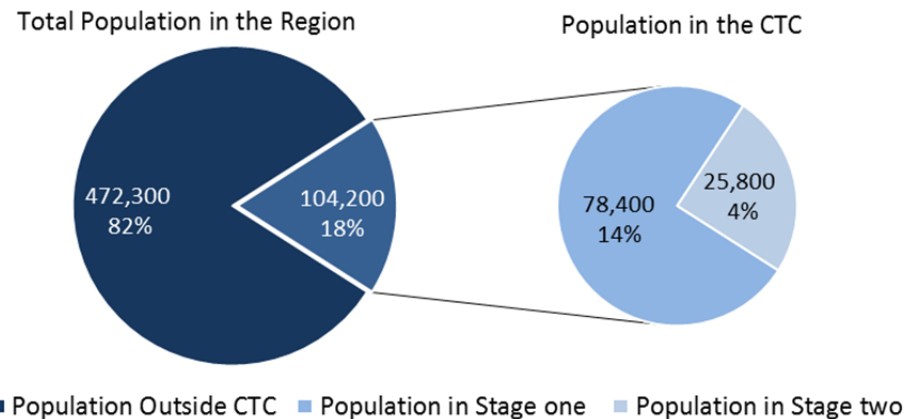
Table 1. Estimated Population Living within the CTC from 2011 to 2015

Scale	2011	2012	2013	2014	2015	Average Annual Change (%)
Stage one	71,700	72,300	74,800	76,500	78,400	2.3%
Stage two	25,000	25,400	25,600	25,700	25,800	0.8%
Total in CTC	96,700	97,700	100,300	102,200	104,200	1.9%
Total Outside CTC	454,900	458,800	462,000	466,900	472,300	1.0%
Total in Region	551,600	556,500	562,300	569,100	576,500	1.1%
Percent of CTC in Stage one	74%	74%	75%	75%	75%	
Percent of CTC in Stage two	26%	26%	26%	25%	25%	
Per cent of Region in CTC	17.5%	17.6%	17.8%	18.0%	18.1%	

Between 2011 and 2015, there was an estimated increase of 7,500 residents within the CTC and 17,400 outside the CTC. Over the same time period, the number of residents within stage one of the CTC has been increasing at 2.3 per cent annually, and in stage two, at 0.8 per cent annually.

Approximately 78,400 residents in the CTC were living in stage one in 2015, which is 14 per cent of the total population living within the whole Region (Figure 1). While stage one encompassed 75 per cent of the total population in the CTC in 2015, stage two captured 25 per cent of the total population, which equates to 25,800 people (4 per cent of the Region's total population).

Figure 1. Estimated Population Living within CTC in 2015



⁴ The year end population estimates are rounded to the nearest hundred for reporting. Population estimates are based on the 2011 Census of Population and reflect the most up to date information available. It is anticipated that the population estimates in this report will be restated in 2016 to reflect the 2016 Census of Population.

3.2.3 Art and Culture: Restaurants

52 per cent of restaurants in the Region were located within the CTC in 2015⁵

Table 1. Number of Restaurants (2011-2015)					
Scale	2011	2012	2013	2014	2015
Stage one	525	547	587	611	645
Stage two	206	234	236	237	244
CTC	731	781	823	848	889
Outside CTC	720	737	762	777	811
Region	1,451	1,518	1,585	1,625	1,700

Table 2. Distribution of Restaurants within the Region (2011-2015)					
Scale	2011	2012	2013	2014	2015
Stage one	36%	36%	37%	38%	38%
Stage two	14%	15%	15%	15%	14%
CTC	50%	51%	52%	52%	52%
Outside CTC	50%	49%	48%	48%	48%
Region	100%	100%	100%	100%	100%

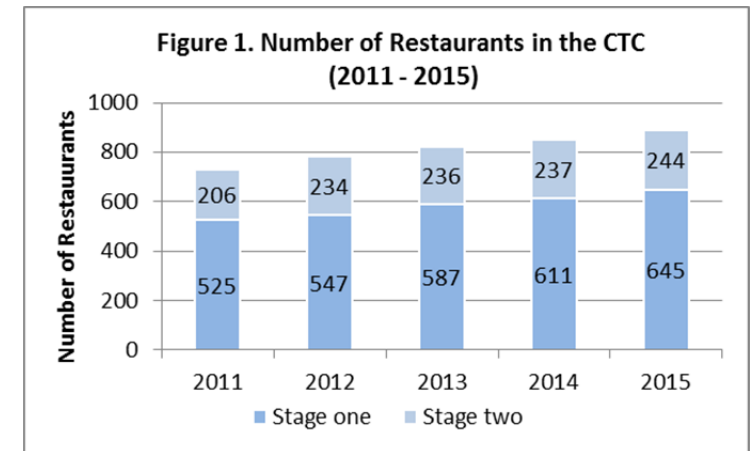
Table 3. Restaurants per 1,000 people (2011-2015)					
Scale	2011	2012	2013	2014	2015
Stage one	7.3	7.6	7.9	8.0	8.2
Stage two	8.2	9.2	9.2	9.2	9.5
CTC	7.6	8.0	8.2	8.3	8.5
Outside CTC	1.6	1.6	1.6	1.7	1.7
Region	2.6	2.7	2.8	2.9	2.9

In 2015, 889 restaurants were operating within the CTC (Table 1). Since 2011, the Region saw an increase of 249 restaurants, while the CTC saw an increase of 158 restaurants. Approximately 645 restaurants existed within stage one, representing 38 percent of the total number of restaurants in the Region, and 244 restaurants existed within stage two, making up 14 percent of the Region's total number of restaurants (Table 2). Stage one experienced the most increase in the number of restaurants, with an increase of 120 restaurants during the time between 2011 and 2015.

The distribution of restaurants within the Region has stayed relatively constant between 2011 and 2015. The CTC has consistently captured over half of the Region's restaurants since 2011 (Table 2).

In 2015, the density of restaurants per 1,000 people remained higher in the CTC than elsewhere in the Region. In 2015, there were 8.5 restaurants per 1,000 people⁶ in the CTC compared to 1.7 outside of the CTC (Table 3).

The data shows that new restaurants are continuing to open and remain open within both stages of the CTC despite the ongoing construction within the corridor (Figure 1).



⁵ The baseline for this indicator has been adjusted to reflect the most accurate information. See section 5.1 in the report for details on the update.

⁶ Please refer to the Population indicator to see the estimated year-end population numbers used to calculate the number of restaurants per 1,000 people from 2011 to 2015.

3.2.4 Heritage: Heritage Resource Retention

Twelve demolition permits were issued for formally recognized and pre-1920⁷ built heritage resources in the CTC in 2015

Table 1. Number of Demolition Permits on Formally Recognized and Pre-1920 Heritage Buildings

Year	Stage one	Stage two	CTC	Formally Recognized
2011	13	0	13	5
2012	34	2	36	2
2013	11	0	11	0
2014	9	0	9	1
2015	11	1	12	3
Total 2011-2015	78	3	81	11
Total 1995-2015	144	18	162	34

In 2015, demolition permits were issued for twelve built heritage sites in the CTC, three of which were for formally recognized buildings (i.e., listed on the Municipal Heritage Register or designated under the Ontario Heritage Act) (Table 1). Two of these reflected the demolition of the Mayfair Hotel and Hymmen Hardware building in downtown Kitchener. The twelve demolitions on built heritage resources represent 17 per cent of the 72 demolitions that took place within the CTC in 2015 (Appendix A). Eleven of the 12 demolition permits in 2015 were located in stage one, and one was located in stage two. Between 2011 and 2015 there were 81 demolitions on formally recognized and pre-1920 built heritage resources in the CTC. Of the 81 demolition permits, 78 (96.3 per cent) were located in stage one, and three were located in stage two of the CTC. Eleven built heritage resources that were formally recognized were demolished between 2011 and 2015.

Of the twelve demolitions in 2015, three were non-residential and nine were residential built heritage resources (Table 2). Eight of the nine demolitions on residential built heritage resources were the result of residential infill development in Kitchener and Waterloo, and one demolition was due to stage one LRT construction. The demolished buildings were constructed in the last quarter of the 19th century and early 20th century and reflect a variety of architectural styles.

Table 2. Number of Demolition Permits on Residential and Non-residential Built Heritage Resources by Location and Building Type

Scale	2011			2012			2013			2014			2015		
	Res	Non-Res	Mixed-use	Res	Non-Res	Mixed-use	Res	Non-Res	Mixed-use	Res	Non-Res	Mixed-use	Res	Non-Res	Mixed-use
Stage one	11	1	1	27	5	2	10	1	0	9	0	0	9	2	0
Stage two	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
CTC	11	1	1	28	6	2	10	1	0	9	0	0	9	3	0

⁷ Pre-1920 properties were selected as one criterion for identifying demolished heritage properties following an evaluation of peak construction booms observed in the Region between the mid-1800s to mid-1900s. 1920 was shown to be the last significant boom in construction of what are now considered to be historic properties (100+ years old). This time period represented the last post-war construction boom before more modern types of construction became popular in the form of planned communities and subdivision development.

3.2.5 Investment: Building Activity

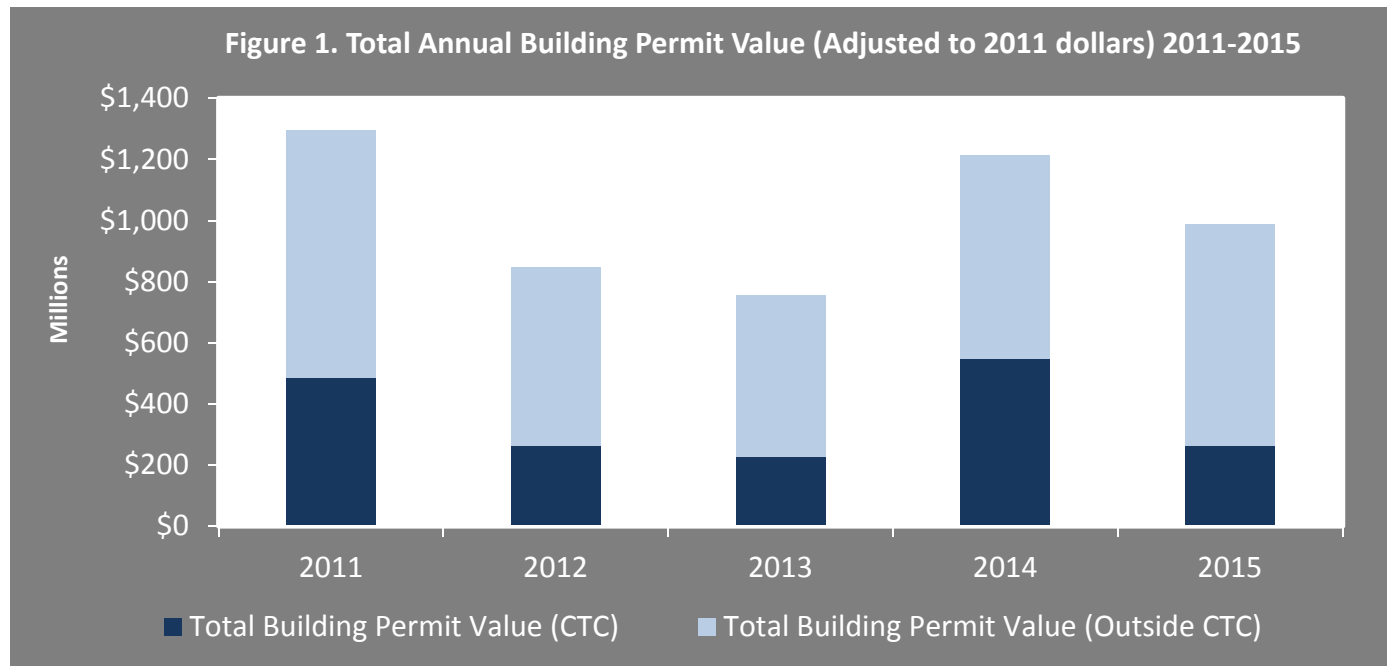
\$262 million in total building permit construction value took place within the CTC in 2015

Within the CTC, there was \$262.5 million in building permit activity in 2015 (Table 1), representing approximately 26.6 per cent of the total \$987 million within the Region (Figure 1). These values have been adjusted for inflation in order to track trends over time (see Appendix B for the unadjusted values). Of the building activity in the CTC, approximately \$116 million in construction value was for 1,153 new residential units, which represented a third of the total 3,553 residential units that were issued building permits across the Region. In the non-residential sector, \$146 million was invested in industrial, commercial and institutional projects in the corridor creating almost 800,000 square feet of new floor space, which made up 44 per cent of the total new non-residential square feet across the Region.

Table 1. Building Activity from 2011 to 2015 in the CTC (Adjusted to 2011 dollars)⁸										
Structure Type	2011		2012		2013		2014		2015	
Residential	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
Singles	\$4,167,241	13	\$3,211,428	12	\$3,097,176	11	\$3,273,894	10	\$1,537,916	5
Semi-detached	\$103,000	4	\$1,103,382	18	\$1,578,387	20	\$2,182,596	25	\$474,329	2
Townhouses	\$6,192,614	44	\$26,863,455	179	\$7,826,907	48	\$14,645,713	92	\$5,806,837	50
Apartments	\$198,660,800	1,144	\$95,920,508	611	\$126,863,632	610	\$305,075,639	1,604	\$108,283,703	1,096
Total	\$209,123,655	1,205	\$127,098,772	820	\$139,366,102	689	\$325,177,842	1,731	\$116,102,785	1,153
Structure Type	2011		2012		2013		2014		2015	
Non-Residential	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.
Commercial	\$41,302,500 ⁹	165,331	\$45,479,790	391,308	\$21,433,456	76,667	\$34,011,353	144,132	\$84,414,090	519,751
Industrial	\$8,500,000	3,600	\$2,435,525	20,909	\$3,705,524	28,196	\$14,404,554	8,818	\$8,361,508	115,860
Institutional	\$227,079,899	246,346	\$87,451,140	269,053	\$62,822,306	236,186	\$172,509,378	322,103	\$53,664,588	155,164
Total	\$276,882,399	415,277	\$135,366,456	681,270	\$87,961,287	341,049	\$220,925,285	475,053	\$146,440,187	790,775
Total Value	\$486,006,054		\$262,465,229		\$227,327,389		\$546,103,126		\$262,542,971	

⁸ Values adjusted using CPI to 2011 dollars. For unadjusted values, please see Appendix B.

⁹ In 2011, there was an additional commercial building permit to convert industrial use to office use at 51 Breithaupt St. valued at \$5 million, which added 152,671 sq. ft.



Specifically in 2015 on the non-residential side, there were 28 properties that had a building permit worth more than \$1,000,000 in the CTC, of which five had a building permit worth over \$10,000,000. These five building permits were for the addition to the Applied Health Science Building at the University of Waterloo in Waterloo, renovation of the new Google headquarters at Breithaupt Block near transportation Hub in Kitchener, the construction of a new 11-theatre Cineplex near Fairway Mall in Kitchener, a new multi-use building with retail, restaurant and office use in Waterloo, and renovation and addition of a new restaurant and library to the Old Galt post office in Cambridge. On the residential side, 10 properties had a building permit worth more than \$1,000,000 and three out of the 10 properties had a permit worth over \$10,000,000. These new residential developments include apartment buildings with ground floor commercial space, upscale dwellings for young professionals, and a 25-storey apartment building in an established neighbourhood. These new residential developments are an indication of more intensified forms of housing and mixed use within the CTC.

Building activity is a useful indicator of investment, however it also illustrates trends in housing choices. The regional shift in housing choices towards higher density development is visible in the type of residential construction taking place in the CTC, with 1,096 new apartment units contributing 93.3 per cent of the total residential construction value in the CTC. For further detail on the shifting trends towards more dense forms of housing, please see Appendix B.

3.2.6 Investment: Assessment Value

Property in the CTC was valued at \$12.8 billion in 2015

Overall, assessment values have been on the rise since 2011 for both the CTC and the Region (Table 1). An increase in property assessment values may indicate a relationship between the investment in ION and economic growth within the corridor. There have been a number of new high value and high quality developments as well as renovations of existing buildings as evidenced by the current value assessment growth from \$10 billion in 2011 to \$12.8 billion since 2011. This is an increase of an average of \$553 million (6 per cent) annually from 2011 to 2015 (Table 2).

Table 1. Assessment and Tax Revenue in CTC for 2011 and 2015				
Scale		2011	2014	2015
Stage One	Assessment Value	\$6,901,223,489	\$8,485,672,537	\$9,030,061,090
	Tax Revenue	\$88,850,429	\$94,566,956	\$104,597,795
Stage Two	Assessment Value	\$3,081,562,884	\$3,558,976,488	\$3,720,072,513
	Tax Revenue	\$44,698,217	\$44,632,647	\$50,543,627
CTC	Assessment Value	\$9,982,786,373	\$12,044,649,025	\$12,750,133,603
	Tax Revenue	\$133,548,646	\$139,199,604	\$155,141,422
Outside CTC	Assessment Value	\$44,330,752,867	\$53,601,648,569	\$56,351,458,766
	Tax Revenue	\$489,058,774	\$547,958,665	\$581,888,210
Region	Assessment Value	\$54,313,539,240	\$65,646,297,594	\$69,101,592,369
	Tax Revenue	\$622,607,420	\$687,158,269	\$737,029,632

Municipal taxes (regional and area municipal) collected on properties within the CTC were valued at \$155 million in 2015. Between 2011 and 2015, the change in tax revenue was 16 per cent within the CTC, resulting in a yearly average rate of change of 3.2 per cent (Table 2). Stage one had a 18 per cent increase in tax revenue over five years. Stage two and outside the CTC had a 13 per cent and a 19 per cent increase in assessment value respectively.

Table 2. Assessment and Tax Revenue Change from 2011 to 2015					
Scale		Change from 2011 to 2015	Per cent Change	Average Annual Change	Average Annual Per Cent Change
Stage One	Assessment Change	\$2,128,837,601	30.8%	\$425,767,520	6.2%
	Tax Change	\$15,747,366	17.7%	\$3,149,473	3.5%
Stage Two	Assessment Change	\$638,509,629	20.7%	\$127,701,926	4.1%
	Tax Change	\$5,845,410	13.1%	\$1,169,525	2.6%
CTC	Assessment Change	\$2,767,347,230	27.7%	\$553,469,446	5.5%
	Tax Change	\$21,592,776	16.2%	\$4,318,998	3.2%
Outside CTC	Assessment Change	\$12,020,705,899	27.1%	\$2,404,141,180	5.4%
	Tax Change	\$92,829,436	19.0%	\$18,565,887	3.8%
Region	Assessment Change	\$14,788,053,129	27.2%	\$2,957,610,626	5.4%
	Tax Change	\$114,422,212	18.4%	\$22,884,443	3.7%

A number of major projects within the CTC have contributed to the increase in assessment growth in 2015. There were eight properties in the CTC that experienced an assessment increase of greater than \$10,000,000 between 2014 and 2015.

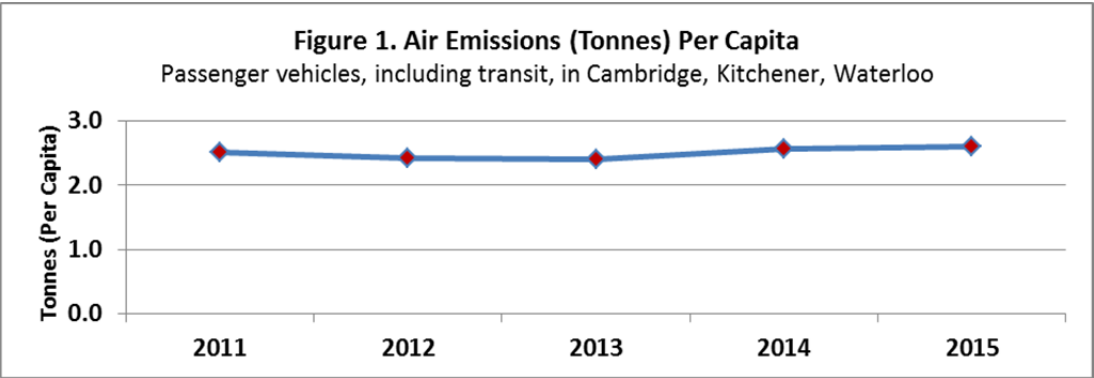
While assessment growth is a good indicator of the change in value of properties, not all changes in assessment result in an increase in tax revenue. Reassessments and the resulting assessment phase-ins are included in the year-to-year assessment change; however, reassessments do not generate additional property tax revenue. Additionally, several of these new/improved buildings (such as hospitals or municipal buildings) will not contribute to tax revenues due to their tax-exempt status. Of the \$12.8 billion total assessment in the CTC in 2015, \$1.4 billion was on tax-exempt properties. As a result, the tax change in the CTC increased at a lower rate than the regional tax change.

3.2.7 Environment: Emissions

2.61 tonnes of net air emissions from local passenger transportation per person was seen in Cambridge, Kitchener and Waterloo in 2011

There was a 3.6% increase in emissions per person from local passenger transportation from year 2011 (baseline) to 2015. An adjusted baseline¹⁰ indicates 2.52 tonnes air emissions per person in 2011 and 2.61 Tonnes in 2015.

The change in emissions between years 2011 and 2015 can be explained by two major influential factors regarding mode share/transit ridership and private ownership of non-transit passenger vehicles. Generally, increases in transit ridership will help reduce or stabilize emissions from privately owned non-transit passenger vehicles. Although transit ridership did increase significantly from 2011 – 2013, there was a decline in ridership during the years 2014 and 2015. Also, while growth in non-transit passenger vehicles registered within the three local cities was lower from 2011 - 2013 it increased significantly in 2014 and 2015. Overall, transit ridership increased by a modest 3% from 2011 - 2015 (see Total Transit Ridership indicator) whereas growth in cars, SUVs, pick-ups and motorcycles within the tri-city area grew collectively by 22% during the same period. These inverse trends resulted in a net increase to air emissions similar to the growth in population for the Cities of Cambridge, Kitchener, and Waterloo during this time (4.2%).



Increases in emissions can be expected to continue for several more years until use of local transit, non-motorized transportation modes increase more substantially, and the private vehicle stock turnover moves more significantly to alternatively fuelled cars such as electric vehicles, which have zero tailpipe emissions. This could take another 5-10 years to occur as ION and GRT buses become increasingly utilized as the infrastructure matures and there is greater consumer adoption of electric and other alternatively fuelled vehicles. In addition, increases in use of carshare, rideshare, bikeshare, cycling and walking will help drive down emissions per capita.

¹⁰ The baseline for this indicator has been adjusted to reflect the most accurate information. See section 5.1 in the report for details on the update.

3.2.8 Crime and Safety: Police Calls for Service

43 percent of police calls for service related to potential public perception of safety occurred within the CTC in 2014¹¹

Table 1. Percentage of Police Calls for Service Related to Potential Public Perception

Scale		2011	2012	2013	2014	Average Annual Change (%)
CTC	Number of Calls	17,024	17,549	17,601	17,447	0.8%
	% in CTC	40%	41%	43%	43%	
Outside CTC	Number of Calls	25,400	25,299	23,738	23,562	-2.4%
	% outside CTC	60%	59%	57%	57%	
Region	Number of Calls	42,423	42,847	41,339	41,009	-1.1%

There were just over 41,000 calls for police service within Waterloo Region in 2014 that were identified as potentially being related to public perception of crime and safety and of those, approximately 17,447 calls (43 per cent) took place within the CTC (Table 1). The subset of police calls for service that are included in this count are those that a member of the public might notice, such as graffiti, intoxicated person, or unwanted persons (see Appendix D). Police calls for service do not represent actual criminal activity; the majority of calls for service that police respond to are not criminal in nature.

Increases in the selected calls for service may affect public perceptions of safety and are important to track over time.

The number of calls for service made within the CTC has been relatively consistent, experiencing a small increase over 2011 (0.8 per cent annually, and is consistently less than half of all the calls made within the Region. The small increases in the selected calls for service within the CTC may be due to a variety of factors: population growth, a greater number of people visiting or travelling through the CTC, changes in police procedures, and increases in citizen engagement and reporting. On a per capita basis, there were 17.1 calls per 100 people living in the CTC in 2014 (Table 2). The number of calls made per 100 people living in the CTC has been relatively consistent, tapering by 1 per cent per year since 2011.

Table 2. Police Calls for Service Related to Potential Public Perception per 100 People

Scale		2011	2012	2013	2014	Average Annual Change (%)
CTC	Calls within CTC	17,024	17,549	17,601	17,447	0.8%
	Population within the CTC	96,707	97,659	100,332	102,168	1.9%
	Calls per 100 People in CTC	17.6	18.0	17.5	17.1	-1.0%
Outside CTC	Calls outside CTC	25,400	25,299	23,738	23,562	-2.4%
	Population outside the CTC	454,929	458,883	461,982	466,884	0.9%
	Calls per 100 People outside CTC	5.6	5.5	5.1	5.0	-3.2%
Region	Calls within Region	42,423	42,847	41,339	41,009	-1.1%
	Population within Region	551,636	556,542	562,314	569,052	1.1%
	Calls per 100 People within Region	7.7	7.7	7.4	7.2	-2.1%

¹¹ 2014 was the most recent year for which data was available at the time of the writing of this report

3.2.9 Inclusive Communities: Home Ownership Affordability

57 per cent of the housing transactions were affordable to low and moderate income households within the CTC in 2015

In 2015, more residential property transactions were below the affordability cut-off than above it. There were 693 residential 'market value' transactions within the CTC, with 392 (57 per cent) of the transactions below the affordability cut-off (Table 1). Approximately 301 (43 per cent) of the residential transactions within the CTC exceeded the affordability cut-off. Of the number of affordable transactions in the CTC, 216 occurred within stage one and 176 occurred within stage two. Since the baseline year of 2011¹², there have been 1,821 affordable transactions and 1,507 transactions that exceeded the affordability cut-off within the CTC. The affordable cut-off is defined using the 'market approach', which is the value of housing for which the purchase price is at least 10 per cent below the average purchase price of a resale unit in the regional market area. For the analysis, a transaction is considered 'market value' if it exceeds \$10,000, is not a corporate transaction, and is not between family members.

While the CTC had 57 per cent of residential transactions that met the affordability cut-off in 2015, the Region had approximately 2,384 (35 per cent) out of 6,883 residential unit transactions that met affordability cut-off.

Table 1. Residential Units Under the Affordability Cut off (transactions over \$10,000)						
Year		2011	2012	2013	2014	2015
Stage one Affordable Cut off¹³		\$263,349	\$270,967	\$281,678	\$290,778	\$300,857
Stage two Affordable Cut off¹⁴		\$243,239	\$260,713	\$268,423	\$281,278	\$297,290
# of Transactions Between \$10,000 and Cut Off	Stage one	202	240	195	202	216
	Stage two	156	139	141	154	176
	CTC	358	379	336	356	392
	Region	2,364	2,322	2,416	2,289	2,384
# of Transactions Over \$10,000	Stage one	373	442	384	397	409
	Stage two	282	233	256	268	284
	CTC	655	675	640	665	693
	Region	6,209	6,296	6,421	6,354	6,883

¹² The baseline for this indicator has been adjusted. See section 5.1 in the report for details on the update.

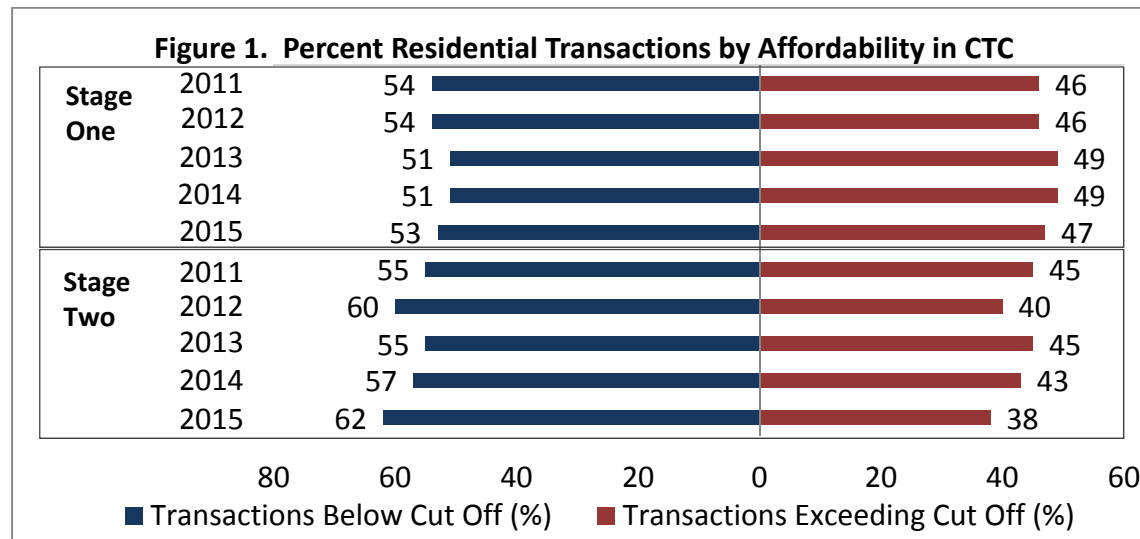
¹³ 10 per cent below the average residential re-sale transaction through the MLS System provided by the Kitchener-Waterloo Association of REALTORS.

¹⁴ 10 per cent below the average residential re-sale transaction through the MLS System provided by the Cambridge Association of REALTORS.

In 2015, the median residential unit transaction value of \$299,000 within stage one was under the affordability cut-off by \$1,857 (Table 2). In stage two, the median transaction value of \$275,000 was \$22,290 less than the affordability cut-off. Median transaction values outside the CTC are higher than the median transaction value within the CTC. Median transaction values outside the CTC and within the whole Region are higher than the affordability cut-off of \$300,857. Thus, the majority of transactions within the CTC are considered more affordable than transactions elsewhere in the Region.

Table 2. Median Transaction (\$) Values from 2011 to 2015					
Scale	2011	2012	2013	2014	2015
Stage One	\$257,300	\$263,500	\$280,500	\$290,000	\$299,000
Stage Two	\$235,500	\$245,000	\$257,750	\$267,500	\$275,000
CTC	\$248,000	\$256,000	\$274,625	\$283,000	\$288,000
Outside CTC	\$288,500	\$299,900	\$205,000	\$322,500	\$335,625
Region	\$284,000	\$294,950	\$304,900	\$318,250	\$330,000

For the CTC, the percentage of affordable transactions has remained stable during the interim years. In part, this could be due to the number of apartment units coming on to the market (Figure 1).



4. Monitoring the Environment

The environment is one of the dimensions that the CTC Monitoring Program measures as it represents an important characteristic of the Central Transit Corridor (CTC). In the 2015 Monitoring Report, the Region reported on emissions as an annual indicator for the environment dimension. As a further exploration of the environment theme, this report will look at the indicators 'Trails and Pathways' and 'Public Greenspaces' to describe the state of the environment in the corridor, and to consider the potential influence of ION on the environment (Table 1). As part of the Region-wide transit system, ION can augment trails and pathways in connecting people to the multi-modal transportation corridor. However, the presence of ION and related intensification pressures may place development pressures on the natural environment within the CTC.

Table 1. Environment Thematic Indicators

Opportunity	Dimension	Indicator	Metric	Indicator Value (2015)
Building Community	Environment	Trails and Pathways	Length of trails and pathways in the CTC	78 Kilometres
		Public Greenspaces	Area of public greenspaces in the CTC	398 hectares

The Region and local area municipalities are planning to integrate transit stations with the trails and pathways surrounding ION station areas to support a seamless, multi-modal and low-emissions transportation system. Enhancing mobility throughout the Region, greening the CTC, and enhancing access to the Valley System are among the key opportunities identified in the Region's Community Building Strategy. The Region's Strategic Plan (2015-18) further identifies the improvement of environmental sustainability and livability in intensifying urban and rural settlement areas as a strategic objective.

The local area municipalities have proposed recommendations as part of their station area planning processes to develop and improve trail connections. Over the next few years, the CTC will also see the addition of new multi-use trails along King Street North and Caroline Street South. Area Municipalities have recently made enhancements to existing trails, and are planning further improvements to the Iron Horse Trail and Waterloo Park trail network. The Waterloo Spur Line trail was a recent addition to the trail system.

The two additional indicators in the environment dimension provide data about the current trails and pathways and public greenspaces in the corridor, which will allow for future review and assessment of the greening of the corridor.

4.1 Environment: Trails and Pathways

Indicator

78 kilometres of trails and pathways were present in the CTC in 2015.

Importance

The Region of Waterloo's Community Building Strategy identifies the provision of trails and pathways as an opportunity to enhance mobility throughout the Region, to promote healthy communities, and to green the corridor. Trails and pathways contribute to enhancing mobility throughout the Region by linking more origin and destination points that can be travelled by various modes of active transport. Providing areas for active transport use not only improves health and quality of life, but also reduces personal vehicle emissions and minimizes air pollution.

Throughout the CTC, trail and pathway networks can form green corridors encompassing a variety of parks and conservation areas that are accessible to residential neighbourhoods, commercial areas, and employment nodes. ION has the potential to connect more people to a greater network of trails and pathways across the CTC and the Region than ever before. Trails and pathways that connect to public open greenspaces can support healthy lifestyles by increasing the physical and mental well-being of people, as residents are encouraged to exercise outdoors.

ION can provide an opportunity for residents throughout the CTC to access multiple trail networks, and conveniently connect to public green spaces and cultural heritage resources within walking and biking distance from future rapid transit stations. For instance, the Iron Horse Trail is an established urban greenway that conserves natural, cultural and heritage landscape values of the Region, and attracts users across a range of activities through all seasons.

Methodology

The trails and pathways data is obtained from Regional and local area municipality mapping datasets, which is updated periodically as new infrastructure is added to the regional network. This indicator measures off-road multi-use recreational trails that are owned by the municipal, provincial, and federal governments within the boundaries of the cities of Cambridge, Kitchener and Waterloo. Trails and pathways that are part of the Region's townships as well as unmaintained, private or informal footpaths are excluded in the analysis. The total length of total trails and pathways that exist within the CTC in 2015 was summed in kilometres. The density of trails was calculated by dividing the total length of trails in kilometres

within the CTC by the total area of the CTC in square kilometres. On-road cycling lanes were excluded from this indicator.

Results

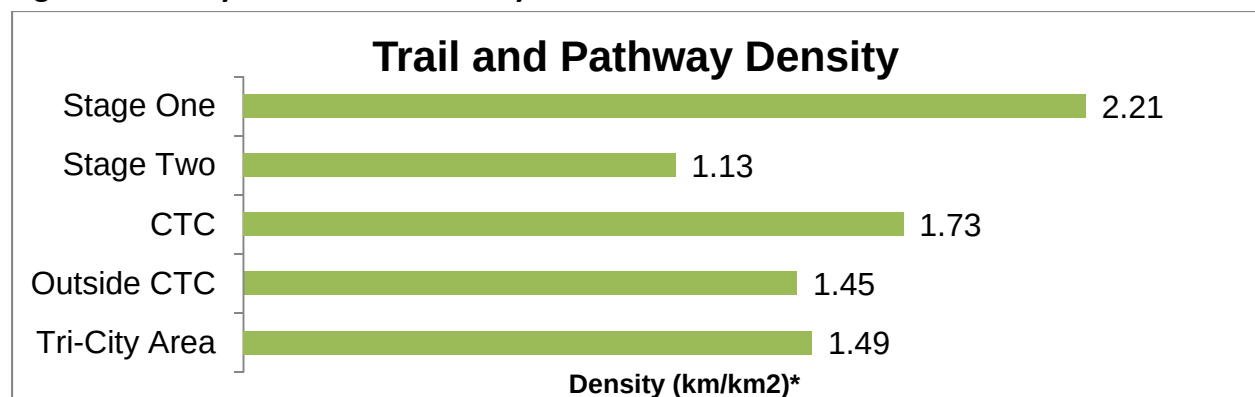
The CTC had 78 kilometres of trails and pathways in 2015 with 55 kilometres in stage one and 23 kilometres in stage two. These trails make up 16 per cent of the total length of trails and pathways that exist within the cities of Cambridge, Kitchener, and Waterloo (Table 1). The three cities have 475 kilometres of trails and pathways of which 397 kilometres (84 per cent) are outside the CTC.

Table 1. Length and Percentage of Trails and Pathways

	Length (km)	Percentage of Total
Stage One	55	10%
Stage Two	23	5%
CTC	78	16%
Outside CTC	397	84%
Cities of Cambridge, Kitchener, Waterloo	475	100%

The density of trails is higher in the CTC than outside the CTC. In 2015, for every square kilometre in stage one, there was approximately 2.2 kilometres of trails, while in stage two, there were approximately 1.13 kilometres of trails for every square kilometre (Figure 1). Although there are longer lengths of trails outside the CTC than within, the higher density of trails within the CTC implies that residents living within the CTC, particularly in stage one, have access to more trails in their proximity than residents that live outside the CTC.

Figure 1. Density of Trails and Pathways



*Size of various geographic scales used in calculations; stage one: 25 km², stage two: 20 km², CTC: 45 km², outside CTC: 274 km², and Tri-City area(Cities of Cambridge, Kitchener, and Waterloo): 319 km²

Analysis

Since ION's announcement, the trail network has increased in length, with the addition of the Waterloo Spur Line Trail running along 2.5 kilometres of a rail spurline. The Waterloo Spur Line Trail strengthens connectivity within the CTC by linking Kitchener's Innovation District, and the site of the future regional transit hub, with the Trans Canada Trail and the Iron Horse Trail in Uptown Waterloo.

What does the literature tell us?

A reliable and interconnected network of multi-use trails could influence a change in travel behaviour amongst residents living within the CTC. Trails and pathways that connect to parks and destinations outside the CTC can encourage residents to lead healthier and more active lifestyles, and in turn lower the usage of private vehicles for short-term trips.

In an urban environment, large tracts of greenspace are not readily available and are expensive to maintain and purchase. However, smaller green corridors with trails and pathways can become convenient and accessible places for recreational activities and connecting to nature (Gobster, 1995). The prevalence of underutilized railway corridors, waterways, and hydro line corridors in urban areas are excellent opportunities for beautifying and greening potential public open spaces (Little, 1990). Trails and pathways can act as green corridors that provide shade and microclimate in the urban area, and supplement existing greenspaces that connect to various destinations in the CTC. Furthermore, trails and pathways provide habitat for wildlife, reduce urban flooding potential, improve water quality, act as a recreation resource, and contribute to the improvement of local transportation infrastructure (Searns, 1995). Greenways and trail corridors with natural vegetation can preserve biodiversity by fostering healthy habitats for forest-breeding birds in urban areas (Mason et al., 2007). Trails and pathways can be naturally landscaped with small shrubs and tree canopies to provide areas for sanctuary and enhanced esthetic qualities. Taylor et al. (1995) identified the importance of establishing urban greenways that connect nodes of greenspaces via trail and pathway networks to allow residents to access parks, gardens, and amenities conveniently.

Trails and pathways are a key part of promoting sustainability and lower-emission intensive forms of transportation. However, they not only provide direct environmental benefits, but can contribute to public health, and serve recreational and transportation needs. For example, Krizek and Johnson (2006) found that the presence of trails and pathways in proximity to commercial uses is conducive to higher levels of active transportation, as residents are more likely to walk or cycle to their destination when living within 200 to 400 metres of a trail. Cities that enhance pedestrian trail infrastructure to allow safe, direct routes from residential to non-residential destinations have seen increases in levels of outdoor physical activity at the

neighbourhood scale (Fitzhugh et al., 2010). A strong and connective network of trails and pathways have been identified as a strategy for municipalities to lessen their transportation emissions, contribute to positive health, and promote active forms of transportation (Krizek et al, 2007).

4.2 Environment: Public Greenspaces

Indicator

398 hectares of public greenspace were present in the CTC in 2015

Importance

The intensification of residential and employment land uses around ION may cause pressures to develop on open space. Greenspace is an important component of a complete community and provides multiple environmental and social benefits for people living, working in, or visiting the CTC. Vegetated spaces remove air pollutants and improve air quality, aid carbon sequestration, facilitate storm water capture to reduce flooding potential, and add to the Region's canopy cover, which helps reduce the urban heat island effect. Greenspaces that are supplemented by trails can promote healthy and active lifestyles for residents that live in proximity to the amenity. Many greenspaces in the CTC have become endowed with social and cultural values and meanings that are special to local residents. Greenspaces provide venues for community engagement, leisure, gathering, and recreation and social activities. Overall, public open greenspaces can provide a sense of belonging for different social groups and foster inclusiveness in a diverse community.

Methodology

This indicator identifies public greenspaces as municipally owned or recognized parks, and properties owned by the Grand River Conservation Authority. Public greenspaces can include playgrounds, neighbourhood parks, storm water management ponds, and trails. The data is collected from datasets maintained by the Cities of Cambridge, Kitchener and Waterloo. For this analysis, properties were excluded when they had a sole public works or indoor recreation function (i.e., the Waterloo Recreation Complex), cemeteries, golf courses, and semi-public spaces such as schoolyards and post-secondary institutional land. Greenspaces within the townships of the Region were not included in the analysis. To calculate the percentage of land area that is greenspace within stage one and stage two of the CTC, the size of greenspace within the CTC was divided by the total land area of stage one and stage two respectively. To calculate percent distribution of greenspace that falls within stage one and stage two of the CTC, the size of the greenspace is divided by the total area of greenspace within the Cities of Cambridge, Kitchener, and Waterloo combined.

Results

The CTC had a total of 398 hectares (3.98 km²) of greenspace, with 169 hectares (1.69 km²) in stage one, and 229 hectares (2.29 km²) in stage two. The total greenspace area in the CTC represents 9 per cent of the total land area of the CTC. It also represents 10 per cent of the total greenspace area within the Cities of Cambridge, Kitchener, and Waterloo. If we consider the full extent of greenspaces that are partially within the CTC but also extend beyond the boundaries of the CTC, then the total area of greenspaces accessible from the corridor totals 502 hectares (5.02 km²) (Table 1).

Table 1. Public Greenspace

Scale	Land Area (km ²)	Within CTC		Accessible to CTC		Greenspace in Land Area (%)	Distribution of Greenspace (%)
		ha	km ²	ha	km ²		
Stage One	25	169	1.69	212	2.1	7%	4%
Stage Two	20	229	2.29	290	2.9	11%	6%
CTC	45	398	3.98	502	5.0	9%	10%
Outside CTC	274	3,743	37.4			14%	90%
Tri-City Area	319	4,141	41.4			13%	100%

Analysis

ION will allow residents to travel along the corridor and access an array of public greenspaces, including those that extend beyond the boundaries of the CTC. The five largest greenspaces that are accessible to the CTC include:

1. Riverside Park, Cambridge – 92 ha
2. Dumfries Conservation Area (GRCA), Cambridge – 71 ha
3. Waterloo Park, Waterloo – 48 ha
4. Victoria Park, Kitchener – 19 ha
5. Riverside Park (GRCA), Cambridge – 9 ha

These five greenspaces have a combined total of almost 250 hectares, and make up 62 per cent of the greenspaces in the CTC by size. Large parks often become anchors or nodes in the greenspace network, with linear parks acting as corridors that connect greenspaces to residential neighbourhoods, employment areas, and transit options. Each of the downtowns in the cities of Cambridge, Kitchener, and Waterloo are associated with a large park that serves as a destination. These large parks offer a multitude of functions that can accommodate a diversity of social and cultural uses.

Table 2. Characteristics of Public Greenspace in the CTC

	Size of Greenspace				Number of Spaces				Total Area		Total Spaces	
	Stage One		Stage Two		Stage One		Stage Two		CTC		CTC	
Classification*	Area (ha)	%	Area (ha)	%	#	%	#	%	Area (ha)	%	#	%
Small (< 1ha)	19	5%	9	2%	67	44%	38	25%	28	7%	104	68%
Medium (1-5 ha)	52	13%	15	4%	24	16%	9	6%	67	17%	33	22%
Large (5-20 ha)	50	13%	35	9%	6	4%	5	3%	85	21%	12	8%
Significant (> 20ha)	48	12%	170	43%	1	1%	2	1%	218	55%	3	2%
Totals	169	42%	229	58%	98	64%	54	36%	398	100%	152	100%

*Classifications were adapted from Van Herzele and Wiedemann (2003), and Nicol and Blake (2000).

There are a total of 152 unique greenspaces in the CTC ranging in size from small parks to large conservation areas (Table 2). There are 104 small greenspaces across the CTC that make up 7% of the CTC's total greenspace inventory by size, and are typically playgrounds or parkettes within predominantly residential areas. Medium sized greenspaces make up 17 percent of the CTC's total greenspace inventory by size, and include places such as Knollwood Park in Kitchener, Studiman Park in Cambridge, and Kingscourt Park in Waterloo. Large parks make up 21 per cent of the CTC's total greenspace inventory by size, and include destinations such as Victoria Park in Kitchener, Bechtel Park in Waterloo and Gordon Chaplin Park in Cambridge.

What does the literature tell us?

Public greenspaces are valuable to the urban environment as they have the potential to enhance the quality of life of residents: greenspaces provide escape from sedentary lifestyles, improve air and water quality, and are catalysts for improving public health. Greenspaces also cultivate a sense of place by providing venues for relaxation, recreation, and social gatherings. Arnberger and Eder (2015) found that a person's preferences towards greenspaces were similar to their preferences when seeking stress relief, as greenspaces were seen by residents as places to restore physical and mental well-being. Furthermore, in an urban environment, greenspaces close to where people live and work have been identified as places that can fulfill a person's desire to relax and connect to the natural environment (Chiesura, 2004; Lanarc, 1995). Burgess et al (1986) found that residents in London highly valued greenspaces in their communities that are natural and green, and conducive to a diversity of recreational, social and cultural activities. In addition, Harrison et al (1986) suggests that greenspaces can effectively provide environmental services that benefit urban residents in compact communities that are otherwise found in rural communities.

A small neighbourhood park less than a hectare in size will attract significantly less people than a large city park that is multiple hectares in size (Nicol and Blake, 2000). However, safeguarding a variety of greenspaces throughout the CTC can accommodate a variety of visitors ranging from cyclists, parents with children, dog walkers, and older adults to name a few (Harrison and Burgess, 1988; Van Herzle and Wiedemann, 2003). In addition, residential properties that are adjacent to an accessibly located, and well designed and managed neighbourhood park can experience an increase in property value as the area surrounding the greenspace intensifies (Jim and Chen, 2010). Overall, greenspaces provide multiple benefits such as providing access to the natural environment, improving public health, supporting active and passive activities, satisfying socio-cultural needs, and raising property values.

5. Updates to Indicators

5.1 Adjustments and Corrections in Data and Definitions

Four indicators have updated 2011 baseline figures that reflect changes in either the source data or adjustments and corrections in the definitions used to query the indicator values. Comparisons between the data shown in the 2015 update report and the original baseline monitoring report may not be valid for the following indicators; however, the baseline data has been updated in this report.

Restaurants

The baseline methodology used a query to record the count of restaurants that were inspected rather than the total number of restaurants existing. The assumption was that all restaurants were inspected at least once a year, as this was not the case, the assumption had led to an underrepresentation of the total number of restaurants that existed in the Region between 2011 and 2014. The updated methodology uses a more refined query to extract the total number of restaurants that existed at any point in time in the given year regardless of whether or not the establishment had an inspection that year. This provides a more accurate count of the number of restaurants that actually existed in a given year.

Furthermore, the updated methodology has refined the definition of a food establishment to remove all facilities categorized as a produce vendor, farmer's market vendor, and flea market vendor to capture only the establishments that prepare ready-to-eat food to the public on a regular basis. Raw-food vendors (i.e., deli meats vendor, cheese shops) are commonly captured at the farmer's market and flea market and do not meet the definition of a restaurant. As there is no consistent method of differentiating raw food vendors and non-raw food vendors at the farmer's market and flea market in the database, these categories were removed from the query. These updates provide a more accurate glance at the number of restaurants that prepare ready-to-eat food to the public on a regular basis within the CTC.

Emissions

Updated data for a number of the variables (mode share, peak hour person trips, transit ridership and average annual distance travel) were incorporated into the transportation emissions model and resulted in adjusted and more accurate values for the years 2011 - 2014. These adjustments influence the amount of emissions attributed to passenger vehicle travel (non-transit) within the model.

Police Calls for Service

A refinement in the query for police calls for service to select the appropriate call types listed in Appendix E of the Baseline Monitoring report has resulted in the rebasing of the data results for the years 2011- 2013.

Affordable Housing

The average price of a resale unit in the Kitchener-Waterloo and Cambridge real estate board area that has originally been published by the Canada Mortgage and Housing Corporation (CMHC) will no longer be available as of 2015. In order to continue to monitor housing affordability, the Kitchener-Waterloo Association of REALTORS® and Cambridge Association of REALTORS® were approached, and agreed to provide the re-sale residential average prices through the MLS® System. In order to provide comparable results over time, the real estate board provided data back to 2011, the base year, and the whole time series was recalculated for this report.

The assumption on 'Market Transactions' has been updated. Previous methodology included all residential unit transactions valued over \$10,000 and excluded transactions that were sold by a limited company. The updated assumption includes only transactions over \$10,000 that were sold to a person, rather than a company or estate. The person on both ends of the transaction must be different to exclude transactions that were bought by and sold to the same person. To prevent the counting of duplicate transactions that had the same unique identifier for the same property, each transaction with a unique identifier was counted once. This removed the possibility of including duplicate transaction values attached to multiple parcels for the same property in the calculation of average annual residential unit transaction values.

5.2 Anticipated Change

Potential or anticipated changes to data may require published years to be restated to ensure that the indicators value reflect the most up-to-date and current information.

Land Use Mix

A number of properties that were assigned a new land use code in Waterloo Region were identified to be part of the Ontario Ministry of Finance Special Purpose Business Property Assessment Review (SPBPAR) project. The SPBPAR project is focused on clarifying and refining the assessment methodologies applied to special-purpose business properties, such as mills, grain elevators, industrial lands, and farms. During this review process, several new industrial land use codes have emerged within the CTC and may be subject to change as codes have not been finalized. An example of a property undergoing the SPBPAR project review includes the Boehmer Box product packaging company, which was originally assigned a general land use code from 2011 until 2014 and changed to a pulp and paper mill land use code in 2015. Properties that are under the SPBPAR review may receive updates to their land use code in the future to reflect a more appropriate code.

Population

The population estimates from 2011 to 2015 will be restated in the next annual monitoring report to reflect the new 2016 Census of Population. The walkability indicator will also receive a restatement of its baseline indicator values as it uses the estimated population counts. Other indicators such as Restaurants that report on the number of restaurants per 1,000 people and the Police Calls for Service indicator that report on calls per 100 people will also receive updates.

6. Data Sources

The data presented in this report is the best available at the time of publication. Data is typically acquired from external agencies, and occasionally changes over time. All such changes to indicators over the course of the monitoring program are fully documented.

Indicator: Transit Ridership

Scale: Regional

Measurement Interval: Annual

Data Source: GRT ridership indicator is calculated based on daily data obtained from the electronic fare boxes on buses, as well as the sales of various passes.

Indicator: Daily Transit Activity

Scale: CTC

Measurement Interval: Annual

Data Source: The data for the ridership information comes from MOBILEstatistics, which allows for Automatic Passenger Counter (APC) data queries to be made and downloaded.

Indicator: Walkability

Scale: CTC

Measurement Interval: Annual

Data Source: The five walkability categories were determined from the NEWPATH study that was performed in 2009, which assessed the walkability of Kitchener, Waterloo and Cambridge.

Indicator: Land Use Mix

Scale: CTC

Measurement Interval: Annual

Data Source: The Municipal Property Assessment Corporation (MPAC) provides data on each land parcel within the Region, including land use information.

Indicator: Population

Scale: CTC

Measurement Interval: Annual

Data Source: The total resident population of Waterloo Region is estimated annually, based on building activity, vacancy rates, and long-term changes in the average number persons per units for various dwelling types. The year-end estimates include usual residents in both private and collective dwellings, temporary postsecondary students not counted by the Census, other foreign and temporary residents, as well as an adjustment for the net undercount of the population.

Indicator: Restaurants

Scale: CTC

Measurement Interval: Annual

Data Source: The distinct list of the restaurants is derived from the Region of Waterloo Public Health data and is compiled annually by Information Technology Services (ITS).

Indicator: Heritage Resource Retention

Scale: CTC

Measurement Interval: Annual

Data Source: An inventory of formally recognized (listed and/or designated) and pre-1920 built heritage resources was compared using demolition permits acquired from Area Municipalities.

Indicator: Building Activity

Scale: CTC

Measurement Interval: Annual

Data Source: Figures on building activity in both the residential and non-residential sectors are compiled annually by Regional staff, based on data supplied by the Area Municipalities.

Indicator: Assessment Value

Scale: CTC

Measurement Interval: 2011, 2014, 2015

Data Source: The most updated parcels for the fourth quarter of 2015 were sourced from MPAC (Municipal Property Assessment Corporation) and used to determine the total assessment of parcels within the CTC.

Indicator: Emissions

Scale: Cities of Cambridge, Kitchener, and Waterloo

Measurement Interval: Annual

Data Source: Greenhouse gas (GHG) emissions and Criteria Air Contaminants (CAC) were estimated using data inputs involving: vehicle in operation (VIO - (by vehicle class, fuel type and fuel efficiency rating), mode share, peak hour person trips, transit ridership, and average annual distance travelled (AADT).

Indicator: Calls for Service

Scale: CTC

Measurement Interval: Annual

Data Source: The annual Waterloo Regional Police Service (WRPS) occurrence data was obtained through open source data from the Waterloo Regional Police Service website.

Indicator: Home Ownership Affordability

Scale: CTC

Measurement Interval: Annual

Data Source: Re-sale residential average prices are obtained through the MLS® System provided by the Kitchener-Waterloo Association of REALTORS® and Cambridge Association of REALTORS®.

Indicator: Public Greenspaces

Scale: CTC

Measurement Interval: 2015 Only

Data Source: Parks and greenspace data is obtained from local area municipalities.

Indicator: Trails and Pathways

Scale: CTC

Measurement Interval: 2015 Only

Data Source: Active transportation network data was obtained from ITS (Information Technology Services).

For a more comprehensive explanation of the use of data and methodology for each indicator, please read the Baseline Monitoring report.

7. Partnership with the University of Waterloo

The Region of Waterloo entered a partnership with researchers from the University of Waterloo to engage in a three-year study to quantify, monitor and measure the socio-economic, and core-area intensification impacts of ION on the CTC. The project, called ‘Light Rail Transit and Core Area Intensification: Unpacking Causal Relationships’ is led by Dr. Dawn Parker and Dr. Jeff Casello with aid from PhD, Masters, and undergraduate students from the University.

The goal of the partnership is to explore and understand the causal dynamics between the anticipated developments of ION, intensification of the core area and socio-economic changes in the CTC. This research complements the CTC monitoring work conducted at the Region of Waterloo. CTC indicators relating to investment, mode choice, land use mix, and housing affordability will benefit from the overall findings of this research.

7.1 WATERloo Regional Model (WARM)

To better understand the interaction between land-market processes and transportation behaviours throughout the implementation and operation of light rail, a team within the School of Planning at the University of Waterloo is developing a microsimulation model. In addition to Drs. Parker and Casello, Dr. Xiongbing Jin has been serving as a post-doctorate research fellow assisting in model development. This model is called the WATERloo Regional Model (WARM). To simulate the dynamics of this complex land-market and transportation system, the WARM model will include individuals and households who will choose between transportation modes and residential locations. Specifically, homebuyers and sellers, renters and property owners, and developers will be simulated in WARM. More information on the WARM Project can be found at <http://research.wici.ca/projects/warm/>

In 2016, Robert Babin completed the initial models to estimate residential preferences for WARM through his Master’s thesis, Estimating Homebuyer Preferences Under Intensification: Hedonic Modelling of Open Space and Multimodal Transit Amenities Preceding Light Rail in Kitchener-Waterloo (Babin, 2016) <http://hdl.handle.net/10012/10936>

Babin’s research specifically focused on the links between home values, amenities related to intensified urban environments, and the development of light rail in Kitchener-Waterloo. Babin modelled home sales between 2005 and 2015 to provide a baseline estimate of relevant residential real estate price drivers in Kitchener-Waterloo. His models controlled for the physical and neighbourhood characteristics of homes, as well as appreciation at various scales. This hedonic model is a statistical regression model that is used to estimate the value that different characteristics add to a good’s total market value – in this case residential properties.

After 2011, homebuyers of single-detached homes in the CTC are estimated to have paid just over 4.5% more than buyers of single-detached homes outside the CTC. Townhomes in the CTC sold for less than those outside before 2009, but between 2009 and 2011, the negative price effect on townhomes in the CTC decreased. Single-detached, semi-detached, and duplex home values were found to increase with walkability (a measure of how convenient walking is as a transportation mode in different locations), and even more so for single-detached homes within the CTC. The walkability measure used in this research came from the prior NEWPATH model led by regional staff and various academic partners, which included measures of street connectivity, residential and retail density, and land use mix.

7.2 WARM Research Summary

Several University of Waterloo School of Planning research team members are contributing to the Waterloo Regional Model. They include:

- Property size preferences and the value of private and public outdoor spaces amid a shift to high-density residential development: A case study of Kitchener-Waterloo, Ontario (DeFields, 2013) ; <http://hdl.handle.net/10012/7778>
- Understanding Accessibility, Analyzing Policy: New Approaches for a New Paradigm (Neudorf, 2014) <http://hdl.handle.net/10012/8759>
- Developing Up and not Out: Understanding the Barriers to and Opportunities for Reurbanization along Waterloo's Central Transit Corridor (Antanaitis, 2014) <http://hdl.handle.net/10012/9022>
- The Development of a Household Travel Resource Allocation Model for Kitchener – Waterloo (Yeung, 2015) <http://hdl.handle.net/10012/9705>
- Understanding Developer's Decision Making in the Region of Waterloo (Tran, 2016)

Additional ongoing research includes:

- Development and Implementation of a Spatial-Temporal Analytical Framework to Investigate Land Use and Transportation System Interactions (Fard)
- Understanding residential location choice behaviour: an empirical agent-based housing market model for Kitchener-Waterloo (Huang)
- Rental Market Analysis in Kitchener-Waterloo, Ontario using a hedonic model (Pi)

More information on the WARM Project can be found at:

<http://research.wici.ca/projects/warm/>

8. References for Environment Theme Indicators

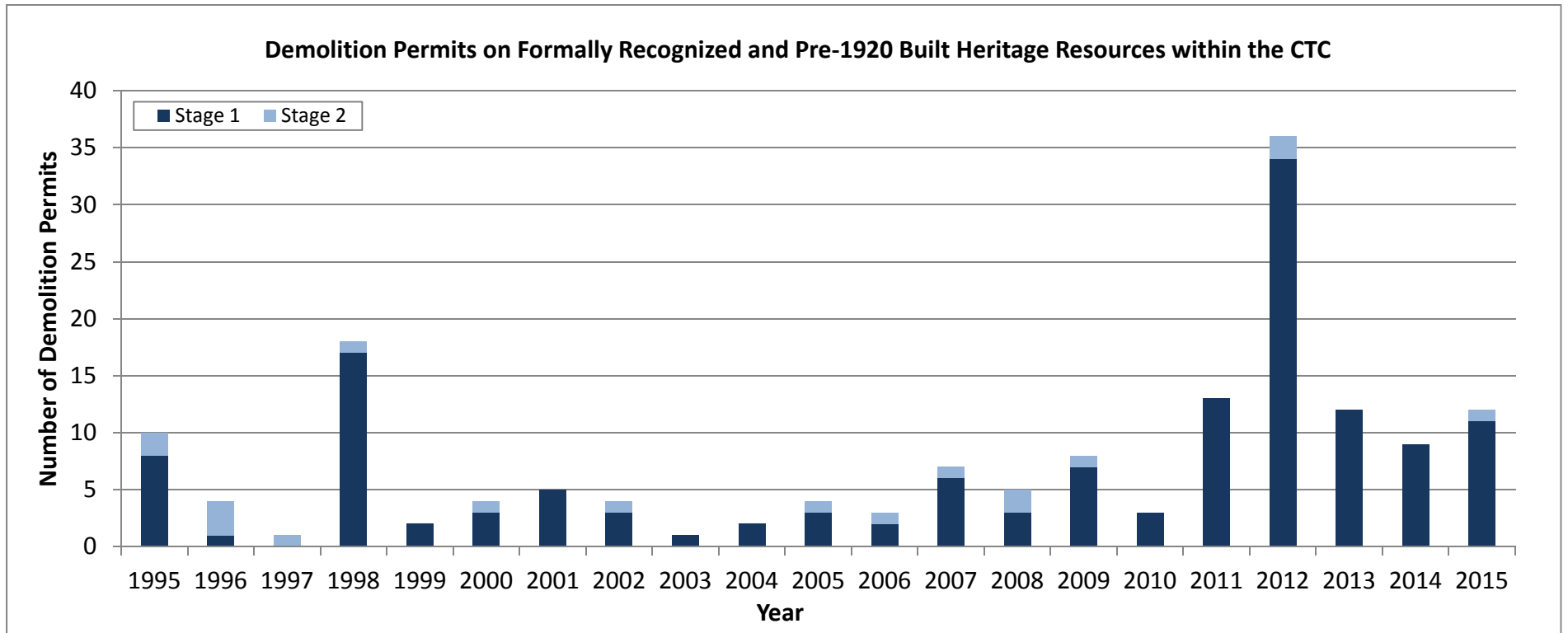
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Appendix A

Per cent of Demolition Permits on Formally Recognized and Pre-1920 Heritage Buildings within the CTC

Year	Total Demolition Permits on Heritage Structures	Total Demolition Permits within CTC	Per cent Demolitions on Heritage Structures
1995	10	29	34%
1996	4	31	13%
1997	1	9	11%
1998	18	23	78%
1999	2	39	5%
2000	4	23	17%
2001	5	30	17%
2002	4	56	7%
2003	1	41	2%
2004	2	29	7%
2005	4	34	12%
2006	3	33	9%
2007	7	36	19%
2008	5	54	9%
2009	8	37	22%
2010	3	41	7%
2011	13	75	17%
2012	36	62	58%
2013	11	76	14%
2014	9	94	10%
2015	12	72	17%
Total 1995-2015	162	924	18%
Total 2011-2015	81	379	21%

Out of the total 379 demolition permits issued within the CTC between 1995 and 2015, there were 81 demolition permits issued for pre-1920 and recognized built heritage resources.



Between 1995 and 2015, thirty-four of the demolished buildings were issued on formally recognized heritage resources, while the remainder were on built heritage resources constructed pre-1920. During the same time period, approximately 88.9 per cent of the 162 demolition permits for on built heritage resources in the CTC were for buildings located in stage one.

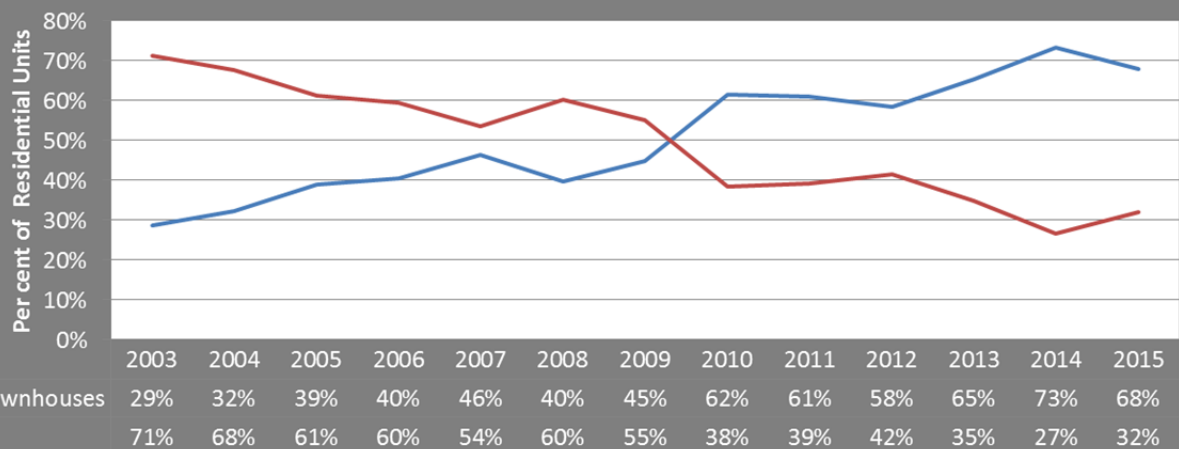
Appendix B

Building Activity from 2011 to 2015 in the CTC (Unadjusted)										
Structure Type	2011		2012		2013		2014		2015	
Residential	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
Singles	\$4,167,241	13	\$3,256,885	12	\$3,171,962	11	\$3,432,000	10	\$1,621,150	5
Semi-detached	\$103,000	4	\$1,119,000	18	\$1,616,500	20	\$2,288,000	25	\$500,000	2
Townhouses	\$6,192,614	44	\$27,243,704	179	\$8,015,900	48	\$15,353,000	92	\$6,121,112	50
Apartments	\$198,660,800	1,144	\$97,278,250	611	\$129,926,950	610	\$319,808,684	1,604	\$114,144,187	1,096
Total	\$209,123,655	1,205	\$128,897,839	820	\$142,731,312	689	\$340,881,684	1,731	\$122,386,449	1,153
Structure Type	2011		2012		2013		2014		2015	
Non-Residential	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.
Commercial	\$41,302,500	165,331	\$46,123,551	391,308	\$21,951,000	76,667	\$35,653,866	144,132	\$88,982,713	519,751
Industrial	\$8,500,000	3,600	\$2,470,000	20,909	\$3,795,000	28,196	\$15,100,194	8,818	\$8,814,046	115,860
Institutional	\$227,079,899	246,346	\$88,689,000	269,053	\$64,339,248	236,186	\$180,840,389	322,103	\$56,569,000	155,164
Total	\$276,882,399	415,277	\$137,282,551	681,270	\$90,085,248	341,049	\$231,594,449	475,053	\$154,365,759	790,775
Total Value	\$486,006,054		\$266,180,390		\$232,816,560		\$572,476,133		\$276,752,208	

Building Activity from 2011 to 2015 in the Region (Adjusted 2011 dollars)										
Structure Type	2011		2012		2013		2014		2015	
Residential	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
Singles	\$381,648,896	1334	\$282,185,364	922	\$258,854,774	847	\$301,271,242	956	\$364,632,136	1093
Semi-detached	\$10,222,129	91	\$11,844,359	117	\$9,974,159	121	\$13,379,288	137	\$8,533,171	44
Townhouses	\$43,588,458	301	\$75,115,031	476	\$81,912,114	524	\$104,632,910	675	\$113,195,546	688
Apartments	\$296,357,200	1860	\$135,229,100	883	\$179,015,348	1072	\$369,855,009	2037	\$190,230,297	1728
Total	\$731,816,683	3586	\$504,373,853	2398	\$529,756,395	2564	\$789,138,449	3805	\$676,591,150	3553
Structure Type	2011		2012		2013		2014		2015	
Non-Residential	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.
Commercial	\$102,528,894	687,886	\$110,868,026	409,483	\$62,928,099	78,467	\$100,549,678	655,744	\$116,569,061	780,636
Industrial	\$82,584,285	419,742	\$42,396,138	20,909	\$37,720,368	28,196	\$87,114,628	1,002,645	\$47,251,253	534,095
Institutional	\$380,961,899	553,673	\$189,399,338	269,053	\$125,261,613	236,186	\$235,227,373	490,469	\$146,974,367	466,555
Total	\$566,075,078	1,661,301	\$342,663,502	1,891,246	\$225,910,080	1,376,589	\$422,891,679	2,148,858	\$310,794,681	1,781,286
Total Value	\$1,297,891,761		\$847,037,356		\$755,666,475		\$1,212,030,128		\$987,385,831	

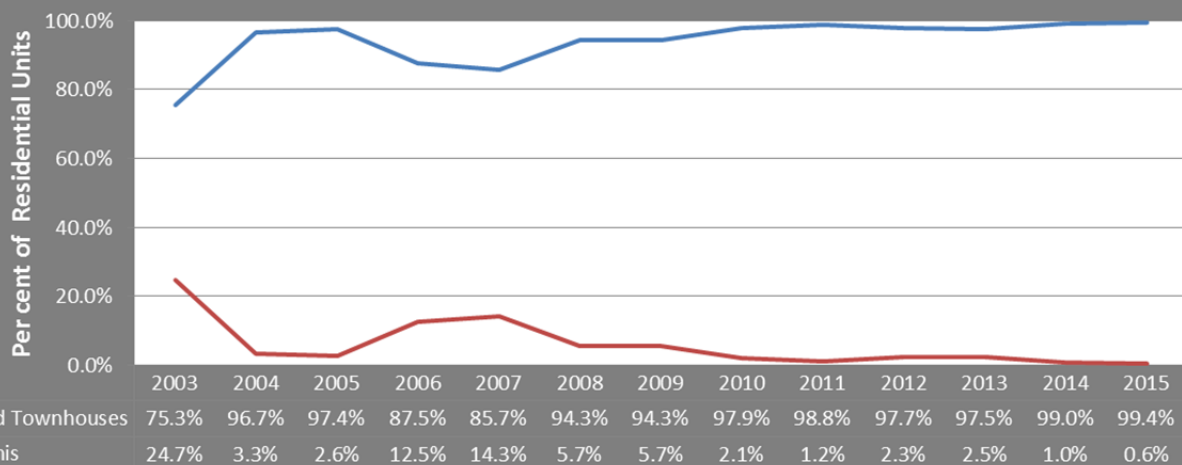
Building Activity from 2011 to 2015 in the Region (Unadjusted)										
Structure Type	2011		2012		2013		2014		2015	
Residential	Value	Units	Value	Units	Value	Units	Value	Units	Value	Units
Singles	\$381,648,896	1334	\$286,179,661	922	\$265,105,222	847	\$315,820,561	956	\$384,366,598	1093
Semi-detached	\$10,222,129	91	\$12,012,014	117	\$10,215,000	121	\$14,025,415	137	\$8,995,000	44
Townhouses	\$43,588,458	301	\$76,178,275	476	\$83,890,009	524	\$109,685,956	675	\$119,321,866	688
Apartments	\$296,357,200	1860	\$137,143,250	883	\$183,337,950	1072	\$387,716,450	2037	\$200,525,858	1728
Total	\$731,816,683	3586	\$511,513,200	2398	\$542,548,181	2564	\$827,248,382	3805	\$713,209,322	3553
Structure Type	2011		2012		2013		2014		2015	
Non-Residential	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.	Value	Sq. Ft.
Commercial	\$102,528,894	687,886	\$112,437,349	409,483	\$64,447,595	78,467	\$105,405,533	655,744	\$122,877,961	780,636
Industrial	\$82,584,285	419,742	\$42,996,250	20,909	\$38,631,185	28,196	\$91,321,662	1,002,645	\$49,808,565	534,095
Institutional	\$380,961,899	553,673	\$192,080,261	269,053	\$128,286,248	236,186	\$246,587,230	490,469	\$154,928,850	466,555
Total	\$566,075,078	1,661,301	\$347,513,860	1,891,246	\$231,365,028	1,376,589	\$443,314,425	2,148,858	\$327,615,376	1,781,286
Total Value	\$1,297,891,761		\$859,027,060		\$773,913,209		\$1,270,562,807		\$1,040,824,698	

Shifting Housing Choices in Waterloo Region



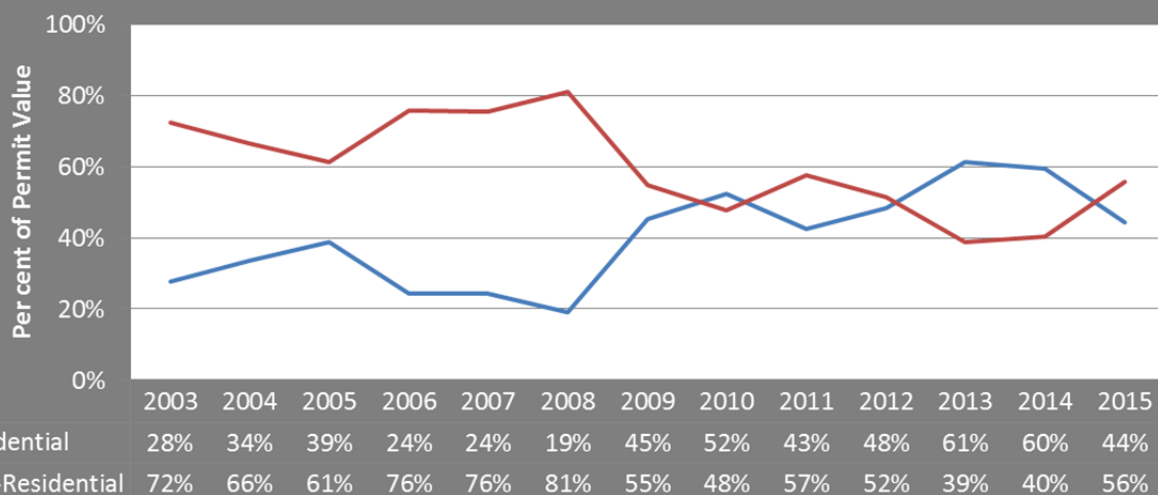
Since 2009, there has been a shift to develop higher density housing stock, particularly apartment units in Waterloo Region.

Percentage of Total Residential Units by Type within the Central Transit Corridor



This trend is evident in the CTC from 2003 to 2015 as new apartment units have been the dominant type of residential structure construction in the CTC.

Percentage of Total Residential and Non-residential Permit Value within the Central Transit Corridor



Over the long term, building activity has fluctuated by type within the CTC.

Appendix C

WRPS call type codes used to count the number of total police calls for service in the CTC

WRPS Call Type Codes					
9190	Prostitution	9000	Bomb Threat	9110	Break and Enter
9200	Gaming and Betting	9010	Homicide	9120	Theft over \$5000
9210	Drugs	9040	Sex Offence	9130	Motor Vehicle Theft
9290	Unwanted Contact	9060	Threatening	9790	Theft Under \$5000
9350	Intoxicated Person	9070	Assault	9180	Property Damage
9360	Unwanted Person	9080	Abduction	9920	Graffiti
9370	Mentally Ill	9090	Robbery		
9380	Public Mischief	9100	Extortion		
9470	Suspicious Person	9170	Offensive Weapon		
9480	Suspicious Vehicle	9460	Prowler		
9600	Abandoned Vehicle	9850	Human Trafficking		
9610	Liquor Offence	9900	Criminal Harassment		
9650	Youth Complaint	9050	Indecent Act		
		9310	Dispute		

