CITY OF BURLINGTON

2019 Service Delivery Reviews

Winter Control – Leaf Collection – Fleet – DAP

November 27, 2019 – 19-1599

DRAFT TECHNICAL REPORT

PERFORMANCE CONCEPTS CONSULTING

DILLON CONSULTING

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1.0 Introduction & Background

The City of Burlington is committed to continuous improvement and ongoing accountability in the delivery of public services to its residents and businesses.

In a report to Committee of the Whole on June 10, 2019, the City Manager recommended Council initiate a funding request from the Provincial Audit and Accountability Fund. This $7.3M Fund was announced in May 2019 to support large municipalities in the execution of independent third party service delivery efficiency reviews. As per Audit and Accountability Fund directives, completed third party efficiency reviews should quantify any identified financial savings/expenditure control opportunities. An efficiency review final report must be posted on the City's website before yearend 2019.

1.1 Why These Four Reviews?

The City Manager's June 10th report to Committee of the Whole set out three services for review that are delivered by the Roads, Parks and Forestry department. They are as follows:

- Winter Control for Roads/Sidewalks;
- Curbside Leaf Collection; and
- Corporate Fleet.

The Mayor's Red Tape/Red Carpet initiative has identified the need for a fourth service delivery review focused on infill development approvals process (DAP) that precede the Building Permit application process.

Council endorsed the City Manager's recommended program of four service reviews at its June 17th 2019 meeting. The bundle of services to be reviewed represents $13.5M in gross expenditures (2019 budget). The following excerpt from the City Manager's June 10th report to Committee of the Whole is instructive re: expected deliverables.

Service	Focus of Review	2019 Gross Operating Expenditure
Corporate Fleet	Assess the corporate wide inventory of vehicles; Green Fleet Strategy, allocation and use of corporate vehicles and best practices.	$3.0 M
Leaf Collection	Assess the effectiveness and service level of the current program.	$0.8 M
Winter Maintenance	Assess efficiencies in service delivery and cost effectiveness of employing internal vs external resources, review of service standards and best practices.	$6.0 M
Pre-Building Permit Development Approval Process	Assess the detailed business process for Zoning clearance and verification, Site grading and alterations, and Committee of Adjustment variances.	$3.7 M

Finally, the City Manager indicated in his June report to Committee of the Whole that the 2019 Audit and Accountability Fund service reviews should support internal capacity building around continuous improvement tools linked to strategic management:

> "One of the outcomes of the reviews would be to develop a robust approach to service review that could be efficiently applied to all City of Burlington services. The services proposed in this report will effectively act as "pilot projects" for the development and refinement of Burlington's service review process. Subject to approval, use of the Provincial funding will help ensure service reviews become embedded in the City's ongoing strategic management of the organization. "

The Performance Concepts Consulting/Dillon Consulting review team was subsequently retained in August 2019 after an evaluation of our team's methodology/qualifications conducted by the City Manager and a City staff project support team.

This Draft Technical Report contains the Findings & Recommendations generated by the third party independent review team's completed execution of the four service reviews proposed by the City Manager and endorsed by Council.

This Technical Report also quantifies financial savings/cost avoidance, climate change adaptation gains, and operational efficiency opportunities as per the requirements of the Provincial Audit and Accountability Fund and the strategic priorities of City Council.

1.2 Project Team Structure & Methodology

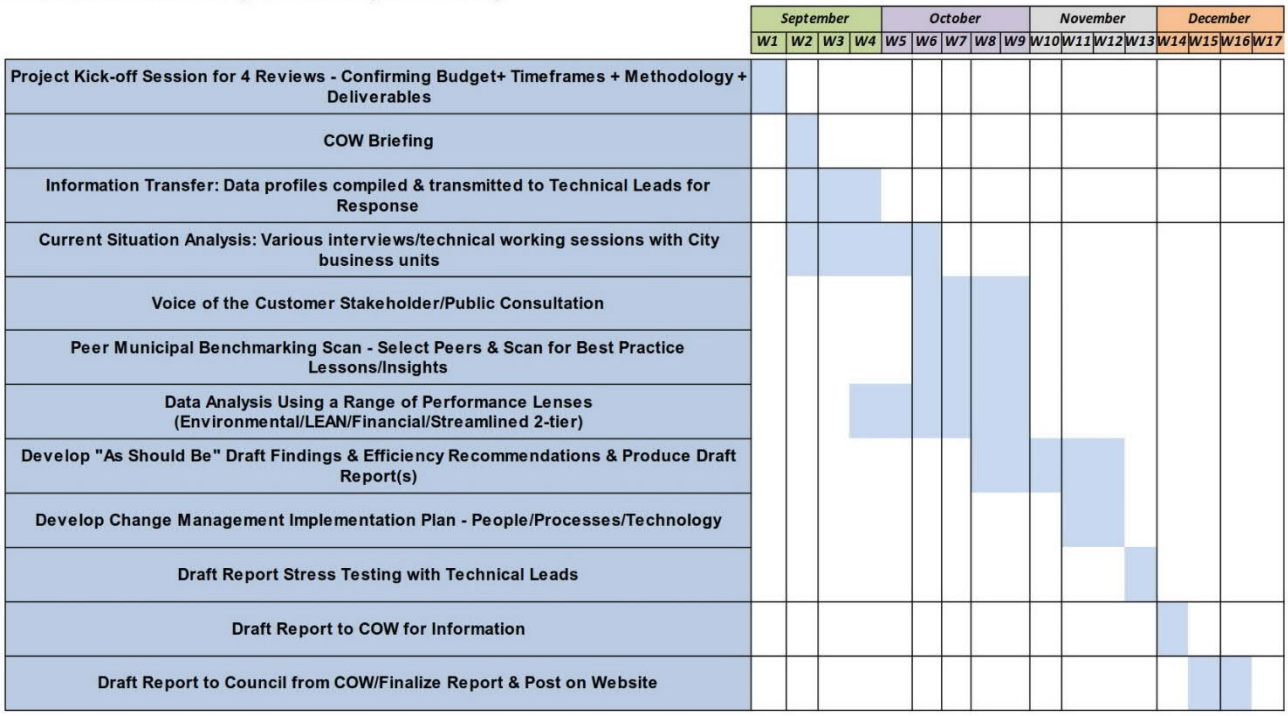
The following project management model was adopted by the City and the Performance Concepts/Dillon team to ensure timely transfer of financial and operational information required for timely and successful execution of the four service reviews.

Table: Project Management Model

Performance Concepts/ Dillon Team Leads	Technical Review Role	City Project Team Leads
Todd MacDonald & Darla Campbell	Project Coordination	Helen Walihura
Todd MacDonald	Winter Control	Mark Adam
Betsy Varghese	Leaf Collection	Mark Adam
Darla Campbell & Kathryn Palmer	Fleet	Jessica Wesolowski
Todd MacDonald	DAP	Brynn Nheiley

Using this project management model, the Performance Concepts/Dillon team executed our four service work plan according to the following critical path (reflecting revised Report submissions announced by the Province).

Project Critical Path
Consolidated Critical Path (new Deadline from Province)



The methodology utilized by the Performance Concepts/Dillon team across all four service reviews incorporated the following common elements:

- A data supported *Service Profile* that documented current operational processes and financial practices;
- A willingness to consider potential insights gleaned from *Voice of the Customer* surveys undertaken independently by the City during our team's review process;
- An "As Is" performance snapshot identifying operational efficiency improvement opportunities. The "As Is" snapshot includes peer municipal benchmarking using comparator groupings customized to fit each of the three forward-facing services being reviewed (Winter Control, Leaf Collection and Development Approvals Process); and
- An inventory of "As Should Be" operational/management improvements using a variety of performance improvement lenses (e.g. financial, climate change, process improvement and disentangled 2-tier municipal government).

This evidence-based methodology has generated "As Should Be" findings and recommended improvement opportunities. It has also informed our quantification of potential go-forward efficiencies and the necessary change management implementation actions/initiatives required to secure these efficiencies.

1.3 Performance Efficiency Lenses

The four service reviews have employed a number of performance lenses to identify improvement opportunities for Burlington. These performance lenses are as follows:

- A *financial sustainability lens* that focuses on the need for budget discipline, cost control and cost avoidance;
- A *process streamlining lens* that eliminates low value-added red tape and secures measurable reductions in service delivery timelines;
- A *level of service lens* that identifies pressures to maintaining current service levels and opportunities to reallocate resources to maintain or minimize eroding service levels;
- A *disentangled local government lens* that rationalizes the roles of the City and the Region, avoiding non-productive overlap or duplication of services; and
- A *climate change adaptation lens* that strips surplus carbon emissions out of City operations in line with and Council's climate change emergency declaration.

PERFORMANCE IMPROVEMENT LENS	Winter Control	Leaf Collection	Fleet	DAP
Financial sustainability lens (need for budget discipline, cost control and cost avoidance)	X	X	X	
Process streamlining lens (eliminate low value-add red tape and secure measurable reduction in service delivery timelines)	X	X	X	X
Level of service lens (identify pressures to maintaining current service levels and opportunities to reallocate resources to maintain or minimize eroding service levels)	X	X	X	X
Disentangled local government lens (rationalize the roles of the City and the Region, avoiding non-productive overlap or duplication of services)	X	X		
Climate change adaptation lens (reduce carbon emissions)	X	X	X	

The assortment of efficiencies identified across the four service reviews have been generated using differing combinations of these lenses as appropriate in each review. Not surprisingly the identified efficiencies are not all expressed in dollar terms; some are expressed in reduced greenhouse gas emissions, or reduced application processing days or productive blade-down plowing hours. The dollar based efficiencies are also somewhat diverse; appearing as increased non-tax user fee revenues streams, avoided impending cost spikes, and actual spending reductions that can be reinvested in given services or can flow to the bottom line based on future Council direction.

1.4 Voice of the Customer

The Performance Concepts/Dillon team has always employed a customer-centric point of view when executing operational reviews for municipal clients over the past 15 years. For instance, the "customer journey" experienced by applicants across the unavoidably complex Development Approvals Process (DAP) is central to a properly executed service review. Resident service level priorities/expectations around outcomes are also carefully considered in reviews of deployment based services such as Winter Control or Curbside Leaf Collection. The recommendations contained in this report across the four targeted City service areas are consistent with our team's commitment to improving customer based value and affordability.

The City has supported our team in this regard by executing a well-crafted resident survey on the three forward-facing services covered in this review. The City's survey (Get Involved Burlington) was executed in a timely fashion, in parallel with our team's independent research and investigations/analyses. The results of the City's resident surveys around DAP, Winter Control and Leaf Collection have informed our work without infringing on our obligation to provide Council independent third-party expert analysis and an evidence-based identification of efficiencies/improvement opportunities.

1.5 Technical Report Structure

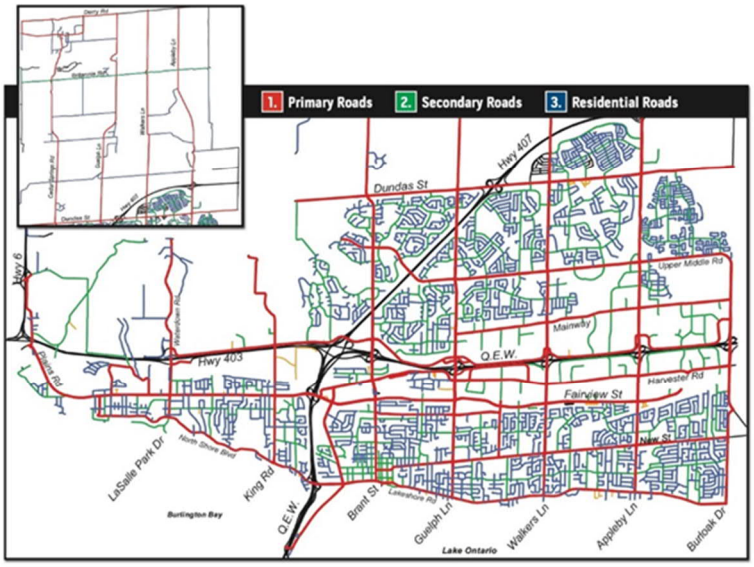
The next four chapters of this Technical Report set out the performance improvement storyline and opportunities associated with each of the four service reviews. The Technical Report summarizes the quantifiable service delivery efficiencies and operational improvements across the reviews.

The final chapter of the Technical Report delivers go-forward recommendations around triaged implementation priorities and internal City capacity building. In this chapter our team provides our strategic perspective on building go-forward capacity within the City to execute staff-driven improvement projects using LEAN or other continuous improvement toolkits.

2.0 Winter Control Review

2.1 Service Profile

The City of Burlington delivers winter control services across a roads network consisting of 1,883 lane kilometres. The Burlington road network is categorized by posted speed limits and average daily traffic counts (AADT) into primary, secondary and local winter maintenance categories. Under an MOU with the Region, Burlington also maintains 246 lane kilometres of Halton's primary roads.



System Km Profile	Burlington	Region	Total
Primary	480	246	725
Secondary	463	0	463
Local	694	0	694
Total	1637	246	1883

The City also provides winter control services across 847.2 kilometres of sidewalks. Sidewalk winter control service has traditionally been limited to plowing during major system-wide winter event responses. However, the upcoming winter season will feature material spreading for the first time in order to achieve bare sidewalks and avoid infrastructure damage caused by freeze/thaw cycles.

Burlington delivers a 24/7 service level through the Guaranteed Service Delivery (GSD) program for winter control from December 1st to March 31st. For winter events that fall outside the GSD period (i.e. November and April) Burlington uses a mix of Roads staff and contractor resources. Since the 2014-15 season there have been 20 winter events that occurred outside the GSD time period. Twelve of these events occurred in November. Winter contractor costs are typically incurred for these November winter events because City trucks required for winter operations are still being used for the annual Fall curbside leaf collection program, and they have not yet been configured for winter operations.

The annual winter control gross spending budget of $4.924M in 2015 has grown to $5.269 in 2019. Net of revenues, the property tax supported budget of $4.118 in 2015 has grown to $4.428M in 2019. Tax

supported spending growth of 7.5% over four budget years roughly mirrors the rate of CPI inflation over the same period. In recent years roughly 20% of annual/seasonal winter control costs can be attributed to spread materials. Early indications (i.e. media reports around Waterloo Region's $500k cost increase for salt supply) suggest potential price point exposure for the coming winter.

Burlington Winter Profile + Operating Costs

Winter Events Profile		
Season	**System-Wide Event Responses**	**Partial System Event Responses**
2014 – 2015	**11**	**49**
2015 – 2016	**7**	**48**
2016 – 2017	**6**	**41**
2017 – 2018	**16**	**46**
2018 - 2019	**13**	**53**
Average	**10.6**	**47.4**

	2015		2016		2017		2018		2019
	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Gross	$4,924,865	$5,067,036	$4,981,074	$4,891,124	$5,269,245	$4,173,941	$5,145,374	$4,261,571	$5,269,168
Net	$4,118,642	$4,196,288	$4,171,125	$4,056,703	$4,408,392	$3,444,380	$4,311,439	$3,550,496	$4,428,999

Over the past five winter seasons, Burlington has responded to an average of approximately 11 major winter events of varying severity/duration. The system-wide event data reveals a high degree of variability in a given winter from the 11 event average. All of the major winter events in a given winter season required a full system-wide event response across Burlington's mapped grid of 28 secondary/local road zones plus the entire multi-lane primary road network.

The City has also responded to an average of 47.4 limited winter events per season that required a partial system response delivered by differing blends of staffed City units and contractors.

Burlington's winter control resourcing is summarized in the table below. The Burlington winter control direct delivery/contracted model is a flexible hybrid; appropriate for the variety of winter event responses experienced across the 2014 to 2019 seasons.

City Resourcing	Contractor: MSO	Contractor: Fidale	Contractor: Anthony's
Manager + Supervisors (11 FTE)			
Operators (22 FTE Winter Roads) Operators (22 Parks FTE for Winter Roads) Operators (33 Parks FTE for Winter Sidewalks	11 Road plows + Operators 13 Combo Plow/Salt/Sand + Operators	10 Road Tractors + Operators	9 Sidewalk units + Operators
Service Level: 24/7 Guaranteed Service Delivery (GSD= other units) from December 1 to March 31st Two 12-hour GSD shifts A-B for winter roads (14 route zones)	Service level: 1.5 shifts of stand-by capacity (per 24 hour period)	Contribute to GSD as Required	Contribute to GSD

Burlington's diverse deployment toolkit features full-time Roads staff, seasonally deployed Parks staff and an assortment of Roads Parks and Forestry (RPF) supervisors. This group of City staff execute winter control services across roads, sidewalks, parking lots and transit stops. They represent a fixed cost component of the City's winter control budget.

The three contracted services provide the City with additional/flexible winter control capacity required for a variety of winter event scenarios (roads + sidewalks). The City cannot execute a system-wide event response to a significant winter event without the full participation of these contracted service providers. However, the contractors do have limited/finite capacity to respond. In the case of MSO, there is only capacity for a maximum of two 12-hour deployments across 14 routes/zones. After the first 24 hour period, MSO's capacity reportedly erodes. This response erosion happens because they do not fund two complete shifts with stand-by pay. They simply run out of staff who are eligible/qualified to work.

The contractors represent a blend of fixed and variable costs for the City's winter control budget.

2.2 "As Is" Current State

2.2.1 "As Is" Cost Recovery for Halton Region Primary Roads

Burlington provides winter and non-winter maintenance services for the portion of Halton's primary road network that falls within City boundaries. Halton has a similar maintenance arrangement with the Region's other three local municipalities.

As noted already in the Winter Control service profile, Burlington maintains 246 lane kilometres of Halton's primary road network. Winter Control cost allocations and billings vis-a-vis Halton Region are set in a longstanding MOU. That MOU is currently up for renegotiation by Burlington and the Region heading into the coming winter season.

The MOU currently allocates City winter control costs to the Region in the following fashion:

- 100% cost recovery of Highway 5/Dundas Street winter control costs (55 lane km). Eligible costs for 100% recovery billings are documented by a stand-alone Highway 5/Dundas Street budget cost-centre in the City's winter control budget; and
- Winter control costs for the remaining 144 lane km of Halton primary roads are billed back to the Region via a "vanilla" 13% cost driver derived from the Region's % share of *total system lane km's being maintained by Burlington*. This imprecise 13% costing factor is required because Burlington does not have a budget cost centre that isolates its maintenance-intensive primary road winter costs from its less maintenance-intensive secondary roads. Burlington's local road network winter costs are isolated in their own distinct cost centre.

The table below (next page) contains an overview of Burlington's seasonal winter spending adjusted from an annual reporting period into a winter season reporting period composed of a large winter January to April) plus a small winter (November-December). This seasonal cost adjustment is appropriate given the City's operational realities of managing staff and contractors across an entire season that spans two calendar budget years. The seasonal spending serves as an easy-to-follow base for reviewing the City's cost recovery billings to the Region.

Dundas Street machine hour effort/materials and associated costs are isolated; allowing for easy 100% cost recovery. However, the "Primary" winter control spending category is named in a misleading fashion within the City's budget structure. This City budget cost centre actually tracks expenses for both primary and secondary road categories. Therefore, Halton's primary road winter control machine hour effort/materials and associated costs are blended with Burlington's primary and secondary road winter control machine hour effort/materials and associated costs. It is this unfortunate blending of "apple and orange" road category costs that creates the need for the "vanilla" 13% factor used in the MOU to recover costs from the Region. If the City truly isolated its primary road network costs in a standalone budget cost centre, then a cost allocation factor of 21% (based on Halton's share of primary lane kilometres) would be perfectly appropriate from an activity based costing perspective.

The table also sets out the annual Halton cost recoveries by budget year as well as winter season.

Primary/Secondary Roads Budget									
	2015	2016	2017	2018	2019	2016 Season	2017 Season	2018 Season	2019 Season
Primary/Secondary Small Winter	$616,412	$593,929	$634,650	$573,966	$695,887	$2,882,791	$3,007,120	$2,969,569	$2,780,013
Primary/Secondary Big Winter	$2,292,993	$2,266,379	$2,413,191	$2,334,919	$2,206,047				
Dundas Small Winter	$97,473	$100,413	$93,971	$78,220	$78,175	$313,610	$341,766	$346,114	$329,529
Dundas Big Winter	$206,935	$216,137	$241,354	$252,143	$251,309				
Ops Small Winter	$27,800	$27,038	$27,084	$27,047	$26,764	$85,150	$93,280	$99,592	$99,566
Ops Big Winter	$59,688	$57,350	$66,242	$72,508	$72,519				
						$3,281,551	$3,442,166	$3,415,275	$3,209,108

Halton $ Revenue Recovery									
	2015	2016	2017	2018	2019	2016 Season	2017 Season	2018 Season	2019 Season
Small Winter Recovery	$98,018	$96,500	$106,682	$98,001	$93,413	$459,990	$481,473	$474,101	$476,904
Big Winter Recovery	$367,487	$361,972	$384,973	$367,419	$378,903				
Dundas Small Recovery	$97,411	$101,286	$107,304	$105,716	$78,715	$312,665	$329,307	$331,951	$357,025
Dundas Big Recovery	$206,997	$215,254	$228,021	$224,647	$251,309				
Ops Small Recovery	$4,450	$4,112	$4,745	$5,063	$4,292	$13,275	$14,297	$15,611	$16,688
Ops Big Recovery	$9,550	$8,825	$10,185	$10,866	$11,625				
Total Region Recovery (Small)	-$199,879	-$201,908	-$214,732	-$208,780	-$175,880	-$785,750	-$825,086	-$817,664	-$850,616
Total Region Recovery (Big)	-$584,034	-$585,871	-$623,178	-$602,932	-$641,837				
	$769,913	$775,012	$826,980	$795,783	$802,340	$785,930	$825,077	$821,663	$850,617

Dundas = 100%

Other Halton Primaries = 13% of total City lane km

Approximately $500k of the seasonal $800k+ Halton recoveries are generated by the 13% “vanilla” cost driver factor imbedded in the current MOU.

2.2.2 "As Is" Guaranteed Service Delivery (GSD) Roads Winter Control Model

Burlington delivers a 24/7 winter control service level to the public. Regardless of when a winter event occurs during any given day/week across the December-March season, the City can deploy a consistent/timely level of event response.

In order to deliver a 24/7 event response level of service most Ontario municipalities would be forced to deploy three shifts of staffed machines across a 24-hour period.

Burlington's Guaranteed Service Model (GSD) avoids the costly 3-shift default approach to 24/7 coverage. This innovative model delivers a 24/7 service level across the December-March winter season by deploying two 12-hour shifts of City staff "volunteers". GSD shifts A and B can be flexibly scheduled/deployed during a 2-week scheduling cycle to match the available staffed hours to forecast weather events. During the December-March period GSD staff do not take holidays. They receive a $4.75 per hour shift premium and they are paid at a "heavy machinery operator" hourly rate. Their service hours accrue certain pension calculation advantages.

The "no holiday during GSD" business rule has a significant operational impact beyond the winter season. Staff that forego a winter vacation probably take their entire vacation allotment during the summer months. This erodes the number of available productive work hours for road, park and sports field planned maintenance programs. Overtime funded hours become necessary to compensate for lost productivity due to vacation. The GSD vacation ban protects service delivery capacity during the winter season, but it generates difficult-to-quantify overtime costs in the non-winter programs delivered by the same staff.

The GSD two-shift deployment model is significantly less expensive for Burlington taxpayers than a conventional 3-shifts-per-day deployment model (i.e. 8 hours per shift) that would otherwise be required to deliver 24/7 guaranteed winter coverage. Performance Concepts estimates that a conventional 3-shifts per-day deployment model achieving 24/7 coverage would probably add an additional $700k to $1M per season to the winter control budget for staffing.

The GSD shift premium of $4.75 per hour has not been updated since 2005; thereby causing a significant decline in its purchasing power over time due to inflation. The number of City staff signing up for GSD has declined in recent years. The hours can be long, and the work can be difficult. The absence of even a short winter holiday can be off-putting to some City staff who may grudgingly participate in GSD or not participate at all. In the run-up to the 2019-2020 winter season it has not been clear that GSD staff sign-up rates would be sufficient to properly operate the program. This innovative, cost-saving program is suffering from moderate-to-serious sustainability risk.

2.2.3 "As Is" Single Yard Deployment Model for Winter Event Response

Burlington Roads Parks and Forestry (RPF) deploy from a single facility located at 3330 Harvester Rd. This 675+ hectare property includes an operations building, vehicle maintenance and washing, salt and sand storage domes, brine production and storage, ProMelt solution storage, a refueling facility, vehicle weigh scales and a general works yard. During the winter months, a portion of the yard is also used by the winter contractor for their operations. All winter operations are supervised from an undersized command post located on the ground floor of the operations building.

Refueling Pinch Point

Winter Event "Command Centre"

The Harvester Road facility is being used to its capacity and is quite congested. The refueling facility can only accommodate two trucks at a time and often becomes a choke point during a winter event response.

There is insufficient indoor storage for all needed vehicles and accessories, with some vehicles being plugged in outside with extension cords traversing wet ground. There is insufficient space to hold the winter season's salt requirements, so sand has been removed from one of the storage domes pending arrival of a third fabric storage facility that is currently on order. Access in and out of the property is limited to two controlled gates, but the slow operation of the gates renders them useless for security during winter events.

The location of the Harvester Road RPF facility and surrounding high traffic volumes cause additional bottlenecks with winter control units delayed in getting out onto their routes. This bottleneck (i.e. time wasting inefficiency) is exacerbated when road plow/combo units that are deployed on northern Burlington routes must cease productive work and drive back to Harvester Road to re-stock materials. This long, unproductive drive back to the Harvester Road re-supply location occurs four to five times during a significant winter event.

To date, RPF has adapted to these facility limitations with early shift starts and pre-positioning trucks to avoid rush hour impacts on timely deployment. Additional measures are required to address the lost productive machine hours associated with material re-stocking during a winter event.

2.2.4 "As Is" Contracted Roads Winter Control Model

The City manages the following portfolio of winter control service delivery contracts. Two contracts have a pending award for renewal. The major contracts for road plowing are now up for renewal. Some of these contracts have allowed CPI inflation adjustments in billing rates. Others have not; thereby creating upward price point pressure at renewal.

Tender #	Activity	Vendor	SAP Contract#	First Term	Optional Extensions	CONFIDENTIAL Pricing Information
1. RFT-311-19	Snow Plowing at City Facilities (Parks & Rec – Dylan Gauley / Wayne Ireland)	The Gordon Company	Pending award	Nov-15-19 to Mar-31-22	Annual CPI allowed Nov. 2022 – March 2023 Nov. 2023 – March 2024	
2. RFT-308-19	Sidewalk Snow Plowing (RPF – Mark Adam)	Anthony's Excavating	Pending award	Nov-15-19 to Mar-31-22	Annual CPI allowed Nov. 2022 – March 2023 Nov. 2023 – March 2024	
3. TEN-09-11	Roadway Plowing (RPF – Mark Adam)	MSO Construction	71000488	Dec. 2010 to Mar. 2018	Annual CPI allowed Dec. 2018 – March 2019 Dec. 2019 – March 2020	
4. TEN-09-12	Roadway Plowing (Combo Units) (RPF – Mark Adam)	MSO Construction	71000489	Nov. 2010 to Mar. 2018	Annual CPI allowed Nov. 2018 – March 2019 Nov. 2019 – March 2020	
5. RFQ-116-15	Windrow Plowing (RPF – Mark Adam)	CSL Group	71000733	Nov-15-15 to Mar-31-16	No CPI allowed Nov. 2016 – March 2017 Nov. 2017 – March 2018 Nov. 2018 – March 2019 Nov. 2019 – March 2020	
6. RFT-306-16	Roadway Plowing (Tractors) (RPF – Mark Adam)	Fidale Snow Services	71000776	Nov-15-16 to Apr-15-19	No CPI allowed Nov. 2019 – April 2020 Nov. 2020 – April 2021	
7. RFT-318-17	Municipal & Museum Lot Plowing (Transportation / AGB / Museums)	Buist Landscaping Inc.	71000824	Nov-15-17 to Mar-31-20	No CPI allowed Nov. 2020 – March 2021 Nov. 2021 – March 2022	
8. RFT-315-18	Snow Plowing @Bus Stops & Shelters (RPF – Mark Adam)	Anthony's Excavating	71000866	Nov-15-18 to Mar-31-21	No CPI allowed Nov. 2021 – March 2022 Nov. 2022 – March 2023	

The imminent renewal of the major road plowing contracts represents a significant financial risk event for Burlington. Market intelligence on GTA municipal winter contract renewals suggests significant price escalation is probable. Risk mitigation will be required to prevent significant negative property tax impacts. The need to play tax management "defence" around contract pricing may eliminate any potential service level enhancements around windrows or bare pavement service standards that came up in the City's "voice of the customer" survey conducted during this review.

The current mix of direct/contracted winter control delivery is advantageous to Burlington operationally and financially. A significant increase in the stand-by hour price for the upcoming road plowing contracts may change that calculation. An evidence based evaluation of potential contractor

submissions under the upcoming tendering process should include an in-source-outsource cost/benefit analysis. GSD expansion is one possible alternative that should be evaluated against any significant price spike for road winter control services.

2.2.5 "As Is" Information Technology/Performance Reporting

In many ways Burlington is operating its winter control operation using 1970's technology - a.k.a. with paper. The City Internal Auditor's September 2018 report on winter control is instructive in this regard. The Audit Report states the following:

> "After a winter event, City supervisors sift through time clock and scale data to record contractor start and finish times…specified start time call-in, operator equipment downtime etc. is recorded in a paper winter event."

Realistically, what this means is that there is no capacity to do timely winter control results reporting to City Management and Council - for a $5M City program. Performance Concepts/Dillon was unable to obtain post-event road network cleanup times for review. These post-event cleanup times are at the core of the Provincially mandated Minimum Maintenance Standards the City attempts to meet as an operational service standard. The data confirming these MMS standards are in fact being complied with are stored in paper-filled binders packed in boxes. City staff lack basic information technology tools like the Ontario Good Roads Association winter season planning app - an easily available tool. Winter unit truck drivers navigate routes (including routes they may not know well) with clip board written instructions they must read during difficult-to-drive-in winter events. There are no tablets or dashboard nav-devices that guide them across their routes. This basic kind of technology support is widely available across municipal winter control operations.

Aside from the City website "Where's My Snowplow" public information feature, it is not clear to our team what benefit the City is receiving from its current Automatic Vehicle Location (AVL) contract. Spread rate reporting and route status/completion reporting using AVL data during an event is a standard large municipality practice, yet Burlington's operational performance dashboard designed by Management cannot be populated with AVL data (up until now).
Operational performance and fiscal accountability are suffering due to a chronic under-investment in appropriate data management tools.

2.2.6 Peer Municipal Benchmarking

In order to compare Burlington winter control operations to similar peers, a short survey was developed using the on-line MentiMeter.com polling tool. Five municipalities that are normally used as comparators for Burlington were selected and were contacted to participate in the

survey. Communications between the peer municipalities and the Performance Concepts/Dillon Consulting team indicated the peers' willingness to complete the surveys. Unfortunately, the survey was distributed shortly before the onset of the early winter storm that affected all of the peer municipalities in mid-November. Despite numerous communications to encourage completion of the survey, peer municipalities reported being too busy with winter operations to participate. At the end of the available time period, three completed surveys were available for comparison with Burlington. The simplified results are summarized below:

- One respondent operates thirty (30) routes from one yard, the second twenty-six (26) from two (2) yards, while the other operates fifty-two (52) routes from three yards. These compare to Burlington's forty-eight (48) routes from one yard.

- Respondents reported the average length of their routes as between twenty-four (24) and seventy-three (73) km (average 49). These compare to Burlington's seventy (70) kms.

- One respondent reported using twenty (20) direct and one hundred and twenty five (125) contractor resources for road plowing/salting, the second twenty-seven (27) direct and sixty-eight (68) contractor, while the other reported three (3) direct staff and forty-nine (49) contractor resources . Burlington utilizes eighteen (18) direct and thirty (30) contractor resources.

- Two respondents reported their winter control season as November 15th to March 31st while the third reported November 15th to April 15th. These compare to Burlington's December 1st to March 31st GSD season and an extended contractor season covering late November and early April.

- Two respondents deploy two (2) eight-hour shifts (Days and Nights) with a single afternoon patroller, while the other deploys direct staff on eight-hour day shifts with on-call and call-back, while their contractor provides 24/7 coverage with various shifts. Burlington's GSD program staffs two twelve-hour shifts, five days a week, with contractors on stand-by and call-back for 12 hour shifts.

- One respondent reported twelve (12) full-time and twelve (12) seasonal staff, the second reported eighteen (18) staff, while the other primarily contractor-based respondent reported three (3) City staff operators and additional patrol and supervisory staff. This compares to Burlington's twenty-two (22) full-time and fifty-five (55) seasonal staff.

- All three respondents reported allowing winter control staff to take vacation during the winter control season under Collective Bargaining conditions that limited the number of staff and

prioritized operational requirements. Burlington currently does not allow vacations during the winter control season for GSD staff.

- One respondent currently uses the provincial minimum maintenance standard as it's standard while the other respondents and Burlington currently exceed provincial minimum maintenance standards by Council direction.

- All three respondents and Burlington currently utilize AVL technology to various degrees, for response management, performance reporting and public availability of plow location. None of the three currently use a Storm App to assist in response management or dashboard generation.

- All three respondents and Burlington currently tender for stand-by rates in the RFPs that secured their contractors

While the peer municipalities being compared obviously utilize different combinations of contracted and in-house staff to deliver winter control services, there are no obvious deficiencies in service delivery that are exclusive to Burlington. Technology and applications to help manage storm events are lacking from all three municipalities. The three peers seem to be advanced in allowing staff to take controlled vacations during the winter control season, while Burlington's GSD program seems to be a best practice in value-for-money terms.

2.3 "As Should Be" Performance Improvement Opportunities

2.3.1 "As Should Be" Halton Cost Recovery

The Performance Concepts/Dillon team has conducted an activity-based costing analysis of Halton roads cost recovery. The analysis has concluded that the "As Is" vanilla cost allocation based on Halton's share of total Burlington lane kilometres is sub-standard. During the course of this analysis Performance Concepts delivered an October 2019 interim memo to the City setting out an improved cost allocation justification. The purpose of the interim memo was to provide timely analysis/support to City officials renegotiating the MOU with the Region for the upcoming 2019-2020 winter season. The following excerpt from the interim memo is noteworthy:

> " The 13% billing factor in the MOU is only valid if all the lane km of roads maintained by Burlington consume very similar amounts of winter control staff effort, machine hour effort, and spread material volumes. This is clearly not the case. Primary road lane km's (whether City or Region) consume significantly more effort and materials during a winter event response than the rest of the secondary/local road system. Halton roads are ALL primary roads; representing 21% of the primary road network in Burlington. Therefore, Halton should be billed 21% of primary road system winter maintenance costs.
>
> At this point in time, the City does isolate its own primary road winter control costs, or Region primary road costs beyond Highway 5/Dundas Street. On a go-forward basis, cost tracking refinements for the primary road network should be possible using AVL technology to document actual machine hours and material consumed by Halton primary roads. Our final report will speak to this AVL technology refinement.
>
> In the meantime, a reasonable cost approximation can be made in the form of a "2-times effort" factor for primary roads. Burlington primary roads (including Halton roads) receive 4-vehicle tandem clearing per lane km during winter event responses. Other roads do not. As well, primary roads are the priority during any significant winter event response; receiving more pass km of effort and spread materials than other road categories.
>
> The Performance Concepts review team recommends that a "2-times" weighting factor be used as a defendable proxy for AVL tracking in order to better estimate winter control costs for all of Burlington's primary roads - including Halton's primary lane km's. This "2-times" factor coincides/mirrors an allocation of estimated primary road costs to Halton in line with its 21% share of total primary road lane km's.
>
> Using the "2-times" factor, we estimate the Halton share of total Burlington winter control costs would increase by approximately $150,000 to $175,000 per season, based on spending patterns

across recent winter seasons. Detailed financial modeling (attached) will be contained in our Winter Control final report to be submitted later this year. "

The financial modeling in the table below is the same modeling referenced in the October interim memo. Annual "As Should Be" recoveries for Halton roads over the past four winter seasons all migrate upwards towards $1M. In total these recoveries would increase by approximately $600k over the 2016-2019 seasons. The annual average increase will likely fall within the $150k to $175k range. The annual savings could offset necessary investments in GSD and technology upgrades without any negative tax impacts.

Halton $ Revenue Recovery									
	2015	2016	2017	2018	2019	2016 Season	2017 Season	2018 Season	2019 Season
Small Winter Recovery	$98,018	$96,500	$106,682	$98,001	$93,413	$459,990	$481,473	$474,101	$476,904
Big Winter Recovery	$367,487	$361,972	$384,973	$367,419	$378,903				
Dundas Small Recovery	$97,411	$101,286	$107,304	$105,716	$78,715	$312,665	$329,307	$331,951	$357,025
Dundas Big Recovery	$206,997	$215,254	$228,021	$224,647	$251,309				
Ops Small Recovery	$4,450	$4,112	$4,745	$5,063	$4,292	$13,275	$14,297	$15,611	$16,688
Ops Big Recovery	$9,550	$8,825	$10,185	$10,866	$11,625				
Total Region Recovery (Small)	-$199,879	-$201,908	-$214,732	-$208,780	-$175,880	-$785,750	-$825,086	-$817,664	-$850,616
Total Region Recovery (Big)	-$584,034	-$585,871	-$623,178	-$602,932	-$641,837				
	$769,913	$775,012	$826,980	$795,783	$802,340	$785,930	$825,077	$821,663	$850,617

2016 Season "Should Be" Recovery	2017 Season "Should Be" Recovery	2018 Season "Should Be" Recovery	2019 Season "Should Be" Recovery	
$943,591	$999,498	$996,608	$939,325	
Difference	Difference	Difference	Difference	
$157,661	$174,421	$174,944	$88,708	$595,734

2.3.2 "As Should Be" Strengthened GSD Model

The GSD 2-shift deployment model delivers a 24/7 winter control service level. It delivers an ongoing efficiency dividend of $750k to $1M per season. GSD does so by providing a superior level of flexible response to winter events; the 10 available A and B shifts per 2-week scheduling period can be moved around to overlap with forecast winter events. Staff volunteer to participate in the flexible GSD deployment model outside the normal scheduling parameters associated with the collective agreement. In return the City pays the $4.75 shift premium as part of a GSD compensation package.

The GSD shift premium has not been adjusted for inflation since its inception in 2005. The shift premium in 2019 should be updated to $6.50 to reverse the purchasing power lost to inflation. The updated shift premium will act as a renewed financial incentive for staff to participate in GSD, despite the long hours and sometimes difficult work environment. Immediate implementation of the updated shift premium for the 2019-2020 winter season is critical to strengthening GSD sustainability. The $50-$55k in additional compensation costs can be financed from the financial dividend associated with improved Halton primary road cost recovery. Eroding staff willingness to participate in GSD detected by management in recent seasons should be reversed. Going forward, a CPI inflation adjustment to the GSD shift premium should be built into the annual winter control budget.

Original GSD $ Shift Premium (2005)	GSD $ Shift Premium Updated For Inflation	Estimated Annual $ Impact of Updated Shift Premium on Roads GSD	3 Shift Alternative to Roads GSD (Extra $ Cost Avoided)
$4.75	$6.50	$50k-$55k	$750k-$1M

The City should also consider an exception to the "no vacation during GSD" business rule. The vacation exception should initially apply to the 28 GSD plow/combo unit operators on shifts A and B. By permitting a series of spread-out 5-day vacation allotments during the 17 week GSD season, the City would alleviate some of the vacation-based erosion of productive maintenance hours during the summer months. Summer overtime costs could and should be reduced as a result.

2.3.3 "As Should Be" Contracting Model

2.3.3.1 Future Contract Structure for Roads Winter Control

As the City finalizes its RFP structure for the upcoming road plowing contract renewal(s) Performance Concepts/Dillon has identified the following contract design parameters for consideration:

Contract Element	Recommended Approach
1. Contract Length	An 8-year term plus an option for two single-year extensions.
2. Bid Price	Require an hourly stand-by rate price submission. Provide an hourly winter event response call-out price in the RFP. Include a fuel price adjustment factor to hedge the risk for a contractor associated with impossible-to-manage fluctuations in fuel costs. Also include an annual CPI-anchored adjustment in the seasonal stand-by hourly rate.
3. Required Resources	Require two guaranteed 12-hour shifts A and B (5 shifts per week for A and B) to mirror the City's GSD deployment commitment. Stand-by rate funding for both shifts. Eliminate existing plow-only units in favour of more efficient combo units. Provide pricing for new plow/sand/salt units with mandated spreader/AVL technology. Pricing options as follows: 8 units with 16 operators 10 units with 20 operators 12 units with 24 operators 14 units with 28 operators

Contract Length: An 8-year term plus an option for two single-year extensions.

Bid Price: Require an hourly stand-by rate price submission. Provide an hourly winter event response call-out price in the RFP. Include a fuel price adjustment factor to hedge the risk for a contractor associated with impossible-to-manage fluctuations in fuel costs. Also include an annual CPI-anchored adjustment in the seasonal stand-by hourly rate.

Required Contractor Resources:

Require two guaranteed 12-hour shifts A and B (5 shifts per week for A and B) to mirror the City's GSD deployment commitment. Stand-by rate funding for both shifts. Eliminate existing plow-only units in favour of more efficient combo units.

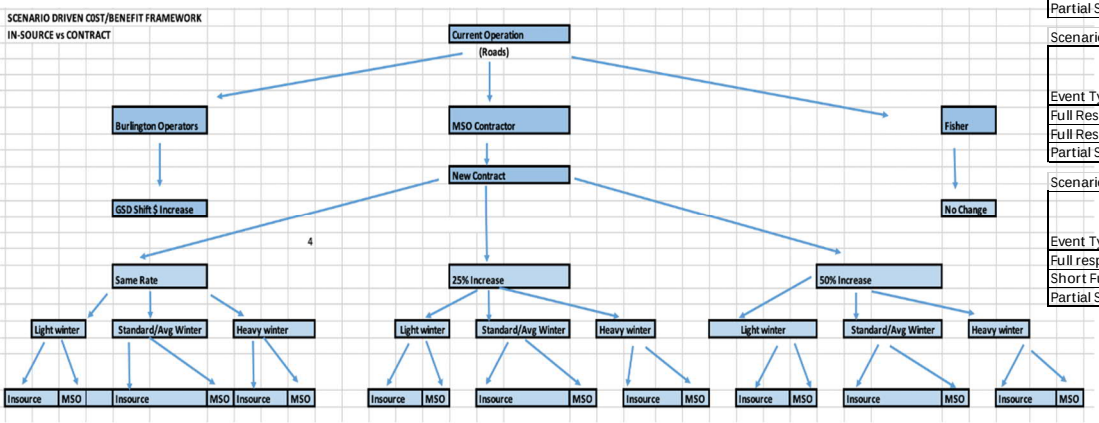
Provide pricing for new plow/sand/salt units with mandated spreader/AVL technology. Pricing options as follows:

- 8 units with 16 operators
- 10 units with 20 operators
- 12 units with 24 operators
- 14 units with 28 operators

The menu driven approach to differing numbers of staffed contractor units is critically important. It will allow the City to consider productivity improvements derived from introducing winter event re-supply depots. Fewer contractor units may be required under the new contract to service 14 route zones plus primaries.

2.3.3.2 Managing Risk Re: Contract Price Escalation

A cost-benefit analysis has been designed and executed to support the City in evaluating upcoming contract bid prices for roads plowing. It applies to the work currently being executed by MSO across primary roads and 14 route-zones. The diagram below explains the cost-benefit methodology.



Winter Event Scenarios

Scenario: Light Winter

Event Type	Frequency Over Season	Duration (Hours)
Full response event	4	24
Short Full response	5	18
Partial System Response	35	12

Scenario: Standard/Average Winter

Event Type	Frequency Over Season	Duration (Hours)
Full Response (long)	5	24
Full Response	6	18
Partial System Response	47	12

Scenario: Busy Winter

Event Type	Frequency Over Season	Duration (Hours)
Full response event	6	24
Short Full response	8	18
Partial System Response	59	12

The analysis compares the cost-effectiveness of City GSD versus a new contractor; with each delivering winter services across 14 secondary/local route-zones and primary roads. The model considers three winter season event scenarios: Light, Standard/Average and Heavy. Each season's weather scenario contains a different mix of stand-by hours and event-response callout hours. City GSD and a future contractor (referred to as MSO for convenience sake only) have hourly stand-by rates and callout rates that are applied against each winter season event scenario. Price comparisons across the seasons can be used to make service delivery inferences about in-sourcing or out-sourcing decisions. The model will be useful for evaluating actual pricing data submitted during the imminent road plowing RFP.

The table above also contains the detailed composition of winter events that constitute the Light, Average/Standard and Heavy hypothetical winters used in the cost-benefit model. It is exceedingly difficult/impossible to definitively forecast future winter scenarios, but these hypothetical scenarios reflect actual experience in Burlington blended with reasonable variations in winter event frequency and intensity/duration. The 11 system-wide response events in the Standard/Average Winter Scenario reflect the past five seasons in Burlington. The Light Winter includes 9 system-side response events, while the Heavy Winter contains 14 system-wide response events.

The following three tables set out the results of the cost-benefit analysis across the contract pricing scenarios applied against three winter season event scenarios (Light, Standard/Average, Heavy).

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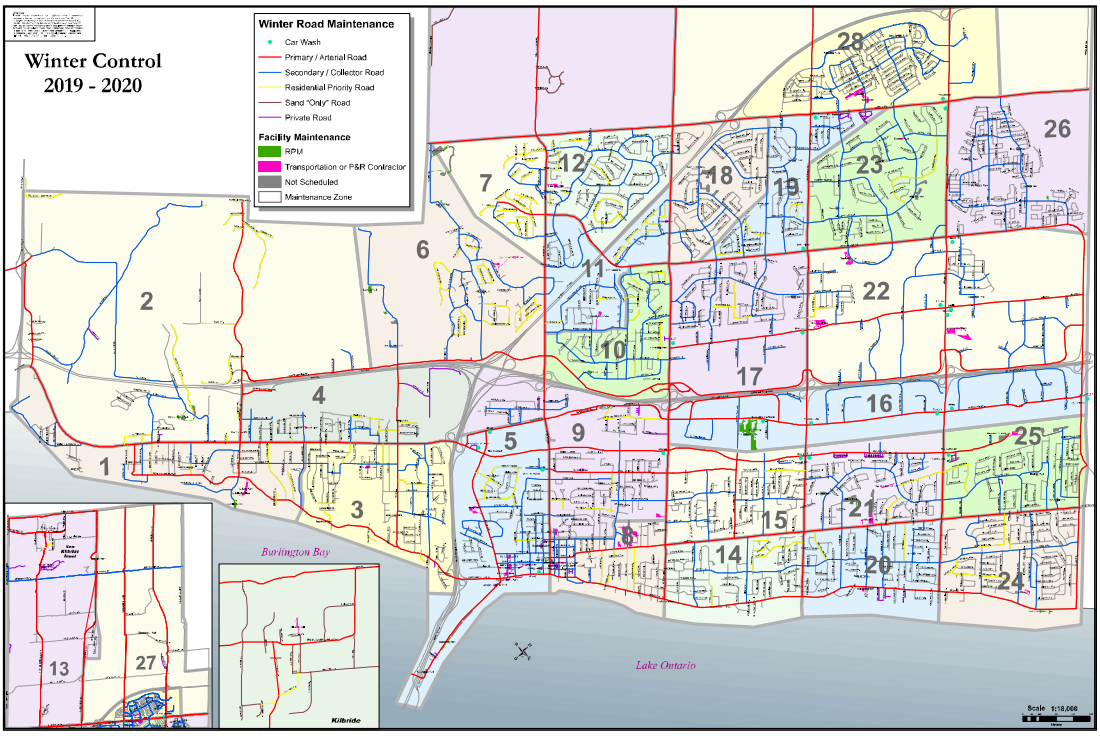
2.3.4 "As Should Be" Winter Event Response Model

As noted earlier in this report, the City of Burlington deploys its entire roads winter maintenance operations/fleet from a single site located at 3330 Harvester Rd. All City and contractor plow units deploy from the Harvester location and proceed to their various assignments, which can vary depending on the type of winter event. In the course of this review our team observed that "blade down" productive machine hours were probably being lost due to excessive travel time (back and forth) between assigned routes and Harvester Rd. for re-stocking of spread materials. We hypothesized that "blade up/spreaders off" non-productive travel time could be reduced; thereby securing increased efficiency. We concluded that the key requirement to secure travel time efficiencies would be a materials re-stocking depot or depots (located appropriately) to serve existing north Burlington plow/sand/salt routes. In short, a spread materials re-stocking alternative to Harvester Road.

A simulation of the productivity improvements generated by hypothetical re-stocking depot(s) has been undertaken by our team in association with colleagues at Transnomis Solutions Inc. Transnomis Solutions has utilized their proprietary ITS Central system to model selected existing City winter control routes to document efficiencies/productivity gains that could result. The full Transnomis technical analysis is attached as an appendix to this report .



The 13 routes selected for the simulation were all north of Upper Middle Rd; routes with longer travel times and problematic traffic congestion during Monday-Friday workday trips to/from Harvester Road.

Three potential restocking locations for salt, brine and salt were identified as follows for the purpose of simulation modelling:

- "Cityview" – Cityview Park at 2500 Kearns Rd. (NW)
- "Harrison" – Harrison Ct. industrial area (NE); and
- "Kilbride" – Kilbride Fire Hall at 2241 Kilbride St.

A simulated full-response winter event was used for the modelling. During the simulated 12-hour event City/contractor trucks initially plow and treat primary/secondary routes. At the end of the event a full system clean-up is executed across all primary, secondary and local roads. Key performance metrics were calculated at the end of the simulation as follows:

1. The number of Round Trips (all assigned primary and secondary roads on a route) completed during the event
2. Productive distance/time travelled
3. Non-productive distance/time travelled
4. Total distance/time travelled

The calculated simulation metrics have allowed our team to compare the potential benefits of adding one or more of the alternate supply locations to the Harvester "status quo" and determine for each route which alternate supply location would add the greatest "blade down" productivity. Combining the Harrison site with Harvester gave the greatest "blade down" productivity yield, although not significantly greater than Cityview (20 minutes less in time savings). As expected, adding a Kilbride location to either the Harvester/Cityview or Harvester/Harrison combinations offered significant savings for the Kilbride routes.

	Harvester "Status Quo"		Depot Options			
Route	Total Distance Travelled (meters)	Prod Time (secs)	Best Alternate Location	Prod Time (secs)	Improve Ratio	Distance Saved (meters)
Tandem 1 to Area 19	361,623	34,976	Harvester	34,976	1.000000	0
Tandem 1 and 1a to Area 23	399,473	44,897	Harvester	44,897	1.000000	0
Tandem 2 and 2a to Area 28	259,579	37,379	Harrison	39,887	1.067096	17,415
Tandem 4 and 4a to Area 10 and 11	391,001	43,787	Cityview	45,286	1.034234	2,077
Tandem 6 an 6a to Area 6	356,168	39,809	Cityview	41,123	1.033008	9,122
Tandem 10 to Area 26	347,148	37,943	Harrison	39,508	1.041246	10,870
Tandem 11 to Area 7	347,153	42,295	Cityview	44,756	1.058187	12,919
Tandem 11 to Area 12	367,605	44,706	Cityview	45,769	1.023778	7,378
Tandem 12 to Area 27	344,776	27,735	Harrison	35,055	1.263926	8,030
Tandem 13 and 13a to Area 13	391,465	37,103	Kilbride	39,687	1.069644	22,130
Tandem 13 and 13b to Areas 13 and 27	418,156	40,018	Kilbride	46,971	1.173747	48,286
Tandem 14 to Area 13	377,679	32,573	Kilbride	45,252	1.389249	3,752
Dundas Tandem #1	318,450	42,745	Harrison	49,464	1.157188	3,262
Dundas Tandem #2	318,450	42,745	Harrison	49,464	1.157188	3,262
Dundas Tandem #3	318,450	42,745	Harrison	49,464	1.157188	3,262
Dundas Tandem #4	318,450	42,745	Harrison	49,464	1.157188	3,262
		634,201		701,023	1.105364	155,027
	Mins	10,570		11,684	Kms	155.0
	Hours	176.2		194.7		
			Improvement	18:34:00		155.0

The Harrison/Kilbride combination of re-stocking depots yielded a 18.5 hour increase in productive "blade down/spreader working" time across the system; which included six additional plow circuits on various routes in the simulation. The Harrison/Kilbride option generated a 10.5% overall productivity improvement system-wide - and is equivalent to two additional plows on the road throughout the winter event. In addition, even though six additional circuits were provided, truck travel was reduced by a total of 155 km during the event.

During the simulation exercise, Transnomis Solutions identified long "blade up/spreader off" non-productive travel time between primary and secondary route assignments. A complete route optimization study would be a beneficial next step to minimize non-productive route time.

2.3.5 "As Should Be" Information Technology/Performance Reporting

A technology transformation is required to bring Burlington's winter control operation into the 21st century. Existing City information management projects should be able to generate all of the required improvements. Performance Concepts/Dillon have noted the following "must have" toolkit:

- An AVL solution that supports a winter control performance dashboard. The performance dashboard will be used to evaluate winter event response performance during and after major system-wide events. Staff have developed an operational dashboard focused on material spread rates versus target and actual plow route coverage/progress versus planned. It is also desirable to record pass kilometres and spread rates across the Halton primary road network to ensure

accurate cost recovery. At minimum City primary network costs/effort must be isolated from the rest of the system for Halton billing purposes. Post-event clean-up AVL data must be separated from AVL data associated with plow unit effort and pass kilometres expended during the event. Once AVL is being used properly, cost per pass kilometre unit cost performance indicators can be assembled and compared across City units and contractor units (by event and across the season). An important note: Burlington currently does not have access to contractor AVL data - a problematic limitation to rolling out a performance dashboard.

- Dashboard mounted cameras and tablets are one-time technology upgrades that will pay operational performance dividends. Cameras will help manage driver performance and reduce liability. Tablets will provide visual guidance to drivers unfamiliar with certain routes and automatically record route completion; thereby avoiding sub-optimal route coverage and improving operational safety during difficult weather conditions.

- The rollout of the city's new maintenance management system (MMS) should include robust event specific reporting of expended labour hours (GSD + contractor) against local, secondary and primary road categories. A similar structure should be developed for sidewalks. Budget cost centre structures should be amended to mirror these MMS labour tracking categories. The OGRA winter management app is an affordable bridging option for the upcoming season; pending MMS future rollout.

2.4 Findings & Recommendations

2.4.1 Documented Efficiencies

Documented efficiencies include significant non-tax revenue enhancement, cost avoidance, and process improvement action items. An updated cost-recovery model with Halton region will yield an estimated $150k-$175k in reduced tax burden per season. These revenues can easily fund the necessary re-investment in the GSD shift premium plus key technology investments. In turn the GSD shift premium investment will reverse problematic GSD staffing erosion and avoid the expensive 3-shift model ($700k to $1M in new costs) that would otherwise have been required to preserve 24/7 winter control service levels.

The productivity improvements associated with a winter event re-supply depot could reduce the total number of contracted road units required in the soon-to-be tendered road plowing contract. This reduction in required units could offset a significant portion of any contract price escalation.

"As Should Be" Improvement	Cost Addition (Investment)	Cost Reduction	Cost Avoidance
1. Improved Halton Roads Recoveries/Billings Methodology		Seasonal reduction of $150k to $175k in property tax funding of winter control	
2. GSD Shift Premium Upgrade	Shift premium upgraded from $4.75 to $6.50 to recover inflation erosion since 2005. Seasonal increase of $50k to $55k in property tax funding of winter control.		Cost avoidance of 3rd shift required to maintain 24/7 winter service level if GSD erodes. Cost avoidance of $700k to $1M via shift premium upgrade.
3. Future Contract Design	Contract RFP for road plowing to include 2 full shifts of stand-by event response. Actual cost subject to stand-by hour bid rate. No public disclosure of this modeled cost.		Cost-benefit model's analysis will provide decision support to identify in-sourcing cost avoidance (savings) of $400k to $650k per season if contract bid price spikes. Contract upgrade to 2 full stand-by shifts will balance event response capacity with GSD and deliver reduced liability plus improved public safety during severe/prolonged winter events.
4. Temporary Re-supply Depots		Improved productivity of 18.5 machine hours over a simulated winter event – equivalent to the work delivered by 2 units in that same event at current productivity levels. Should reduce impending RFP purchase of contractor units by 2 units (14 down to 12).	Productivity savings will reduce required # of contracted units; thereby offsetting a significant portion of expected/negative contract cost impacts.
Total Impact	**$50-$55k per season plus amount TBD after RFP**	**$150-$175k per season plus amount to be determined after RFP**	**Estimate of avoided costs falls within range of $1.1M to $1.650M per season**

2.4.2 Overall Conclusions & Implementation Priorities

The efficiencies associated with improved Halton roads cost recovery and the GSD Shift premium upgrade have already been implemented going into the 2019-2020 season. On a net basis, these two initiatives have generated a net bottom-line cost savings of $100k or more per season for Burlington. They have also avoided a financially significant cost spike of $700k to $1M that would otherwise have been required if GSD participation had continued to erode, and a conventional deployment model third shift was required to maintain 24/7 service.

The remaining "As Should Be" efficiency options can be implemented during the upcoming season (i.e. temporary re-supply depots) or in preparation for the 2020-2021 season (I.e. execute a new roads winter contract and/or consider insourcing if contract prices supports this type of restructuring).

While the "As Should Be" IT investments supported in this review do not generate an easy-to-quantify efficiency dividend, they are nevertheless sound investments in operational safety, performance planning/measurement, and cost-recovery billing improvements re. Halton. They can be financed in large part by the imminent Halton billings dividend with no adverse property tax impact.

From an overall risk management perspective, the City will continue to "play defence" when it comes to winter control. At current budgeting levels existing 24/7 service levels need to be protected rather than expanded. Any expansion of existing property tax supported winter control service levels should be dealt as a decision-unit with via the 2020 budget process. Cost management and cost avoidance, rather than service level enhancement, will continue to be the focus at current budgeted levels.

Recommendation Highlights:

The efficiencies associated with improved Halton roads cost recovery and the GSD Shift premium upgrade have already been implemented going into the 2019-2020 season. On a net basis, these two initiatives have generated a net bottom-line cost savings of $100k or more per season for Burlington. They have also avoided a financially significant cost spike of $700k to $1M that would otherwise have been required if GSD participation had continued to erode, and a conventional deployment model third shift was required to maintain 24/7 service.

The remaining "As Should Be" efficiency options can be implemented during the upcoming season (i.e. temporary re-supply depots) or in preparation for the 2020-2021 season (I.e. execute a new roads winter contract and/or consider insourcing if contract prices supports this type of restructuring).

From a risk management perspective, the City will continue to "play defence" when it comes to winter control. Cost management and cost avoidance, rather than service level enhancement, will continue to be the focus.

Affordable 24/7 service level protection will require significant productivity improvements from initiatives like the temporary material re-stocking depots. A complete route optimization study would be an appropriate next-step.

Improved service delivery sustainability in the upcoming road plowing contract is a necessary investment to manage liability risk and protect the travelling public during and after severe/prolonged winter events. Climate/weather volatility moving forward will require prudent risk management for extreme winter events, despite a short term cost impact.

3.0 Loose Leaf Review

3.1 Service Profile

3.1.1 Description of the Service

There are two waste collection programs within the City of Burlington (City) that handle leaf waste. The first service is provided by the City to the majority of households and is a loose-leaf, curbside collection program that is carried out by City staff and equipment. The schedule for this program has varied slightly over the years as collection zones have changed but in general, the collection of loose leaves runs in the late fall (typically November).

The other service is provided by Halton Region (Region) which involves the collection of paper bagged, binned, and/or bundled leaf and yard waste (LYW) from urban areas (represents approximately 93% of the total number of private dwellings within the City). This program runs from April to mid-December and occurs bi-weekly on the same day as garbage collection. In addition to the collection of LYW, Halton also provide a weekly Blue Box collection program for recycling items, a weekly Green Cart organics program bi-weekly garbage collection, and bi-weekly bulky waste collection.

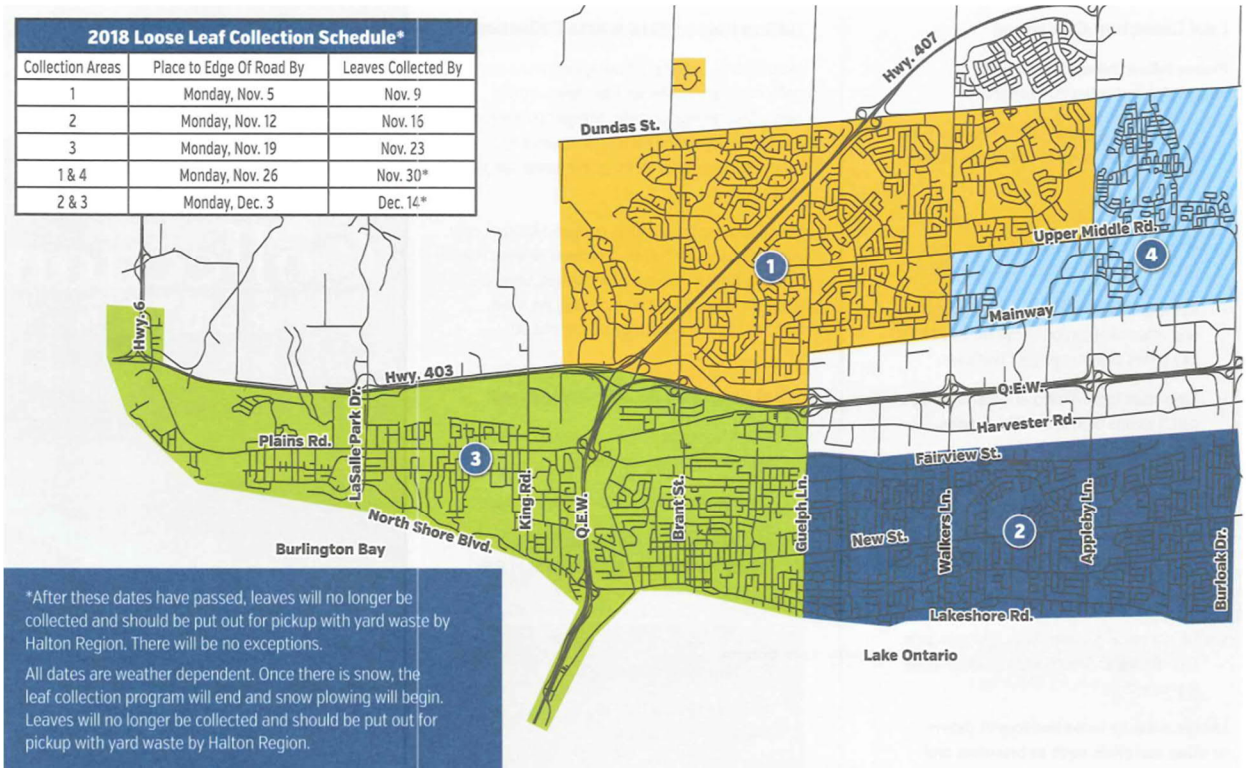
This report will examine the loose-leaf collection program being offered by the City in terms of how it's implemented, the costs to run it and associated efficiencies and inefficiencies. The report will also provide the approach and results of how the program compares to other similar municipal programs as well as provide a summary of feedback received from a recent public survey. The report is based on 2018 data received from the City and in some cases, historical data from 2015 to 2018 to understand past trends and estimate annual averages. We acknowledge that in 2019 the program has a slightly different delivery model but expect that the changes do not majorly impact the major findings of the service review.

3.1.2 Deployment Model

Staff beginning training on the loose-leaf collection program in the last three weeks of October and deploy in early November with the goal of collecting the leaves within an approximate six-week period. At present, there are four collection zones with three of the zones receiving two collections (Areas 1, 2, and 3) as they contain more households in general plus larger lots and/or more mature trees that produce a high quantity of leaves in the fall. The 2018 schedule and map from the Leaf Collection Program brochure is presented below in Figure 1. The schedule provides dates when residents are to place their leaves to the edge of the road by and dates when City staff will collect the leaves by. This is to provide City staff with greater flexibility in completing the routes as efficiently as possible.

Importantly, this figure also describes that collection is weather dependent. The winter maintenance program (i.e., snow removal) is a mandated and regulated service whereas loose leaf collection is a discretionary service. Therefore, whenever there is an early snowfall, winter maintenance will take priority over loose-leaf collection to stay in compliance with the regulations and residents are instructed to place any remaining leaves into bags/bins for collection by the Region.

Figure 1: Loose-Leaf Collection Program Map and Schedule (2018)



The deployment model for this program fluctuates slightly each year in terms of schedule, staffing and equipment. Staff and equipment from the Parks and Roads divisions of the City are utilized to deliver the loose-leaf collection program. There are currently 86 staff within the Parks and Roads departments at approximately a 70% and 30% split, respectively. Of the 86 staff, 80% (or 69 City staff) are brought in to deliver the seasonal loose-leaf program. A timeline of where and when staff work is presented in Figure 2. In the last three weeks of October, staff begin preparing and training on the loose leaf collection and winter maintenance programs. Staff work among the different areas between November and December as well, weather depending.

Figure 2: Current Schedule and Distribution of Roads and Parks Staff

Please refer to Section 1.2 for more information

Winter Maintenance (Roads)				Spring-Summer Maintenance (Roads and Parks)							Fall Leaf (Parks and Roads)
Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov

Generally, residents rake their leaves to the curb and the crews use large and/or small equipment (i.e., rakes) to gather the leaves for collection into the vehicles. The collected leaves are hauled to one of five central collection points and then transported to the Halton Waste Management Site in Milton for processing.

A schedule is developed each year where crews of staff are put together with different equipment and in 2018, there were eight crews as shown in Table 1 and Figure 3. Specifically, there were three loader crews that use equipment such as a loader and backhoe to collect leaves and five vactor crews that use suction enabled vehicles (see Figure 4 and Figure 5). It is noted that in 2017 this breakdown changed slightly with two vactor crews being combined into one loader crew due to the loaders being a more efficient means to collect the leaves.

Table 1: Breakdown of Staff and Equipment per Crew (2018)

Please refer to Section 1.2 for more information

Crew 1 (Loader 1)	Crew 2 (Loader 2)	Crew 3 (Loader 3)	Crew 4 (Vactor 1)	Crew 5 (Vactor 2)	Crew 6 (Vactor 3)	Crew 7 (Vactor 4)	Crew 8 (Vactor 5)
9 staff	9 staff	9 staff	5 staff	5 staff	5 staff	5 staff	5 staff
1 Loader operator	1 Loader operator	1 Loader operator	1 Vactor trailer unit	1 Vactor trailer unit	1 Vactor trailer unit	1 Vactor trailer unit	1 Vactor trailer unit
1 Backhoe operator	1 Backhoe operator	1 Low-bed trailer driver	1 Low-bed trailer driver	2 Low-bed trailer drivers	1 Low-bed trailer driver	1 Low-bed trailer driver	1 Low-bed trailer driver
1 Low-bed trailer driver	1 Low-bed trailer driver	1 Skid Steer operator	1 Single-axle dump truck driver	3 Rakers	1 Single-axle dump truck driver	1 Tandem dump truck driver	1 Single-axle dump truck driver
1 Street Sweeper operator	1 Street Sweeper operator	1 Street Sweeper operator	3 Rakers		3 Rakers	3 Rakers	3 Rakers
4 Tandem dump truck drivers	4 Tandem dump truck drivers	4 Tandem dump truck drivers					
1 Raker	1 Raker	1 Raker					

Figure 3: Staff Collection Schedule (2018)

Please refer to Section 1.2 for more information

Crew 6, Crew 7, Crew 8 (8-hour shift)				
Monday	Tuesday	Wednesday	Thursday	Friday
Crew 1, Crew 2, Crew 3 (10-hour shifts)				
	Crew 4, Crew 5 (10-hour shift)			

Figure 4: Loader Crew

Figure 5: Vactor Crew

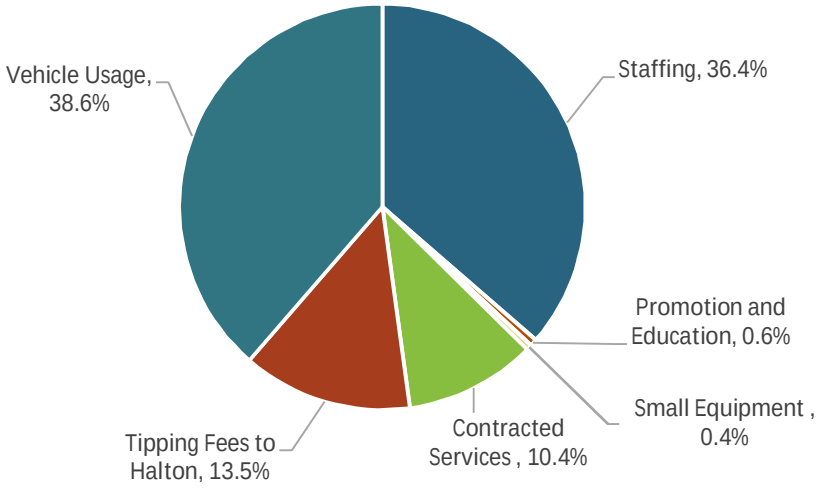
3.1.3 Financial Information and Trends

City staff provided historical financial information on the loose-leaf collection program from 2015 to 2018. The annual operating costs ranged around $588,000 in 2017 to $864,000 in 2018 with the average annual operating cost between these four years of approximately $753,000. Costs can fluctuate year-to-year and/or vary from budgeted costs due to additional collection periods or, in the case of 2017, the costs were less than budgeted due to the program being cut short as a result of early snowfall. In 2019 the operating budget for the loose leaf collection program is approximately $828,800.

Figure 6 presents the distribution of the average annual operating costs to run the loose-leaf collection program. Vehicle usage (i.e., fixed hourly rate to cover fuel, parts/labour, insurance, depreciation, etc.) and staffing contribute the highest costs. The City pays the Region tipping fees on a per tonne basis (approximately $25 per tonne) to process the collected leaves at the Region's Halton Waste Management Site in Milton. The tipping fees account for approximately 14% of the total average annual operating cost. Contract services follows, at 10%, which involves hauling the leaves from the five central collection points to the Halton Waste Management Site for processing. Promotion and education of the program, including signage, and purchase of small equipment such as rakes contribute to approximately 1% of the total average annual operating cost.

Figure 6: Distribution of Average Annual Operating Costs (2015 – 2018)

Description of costs provided above.



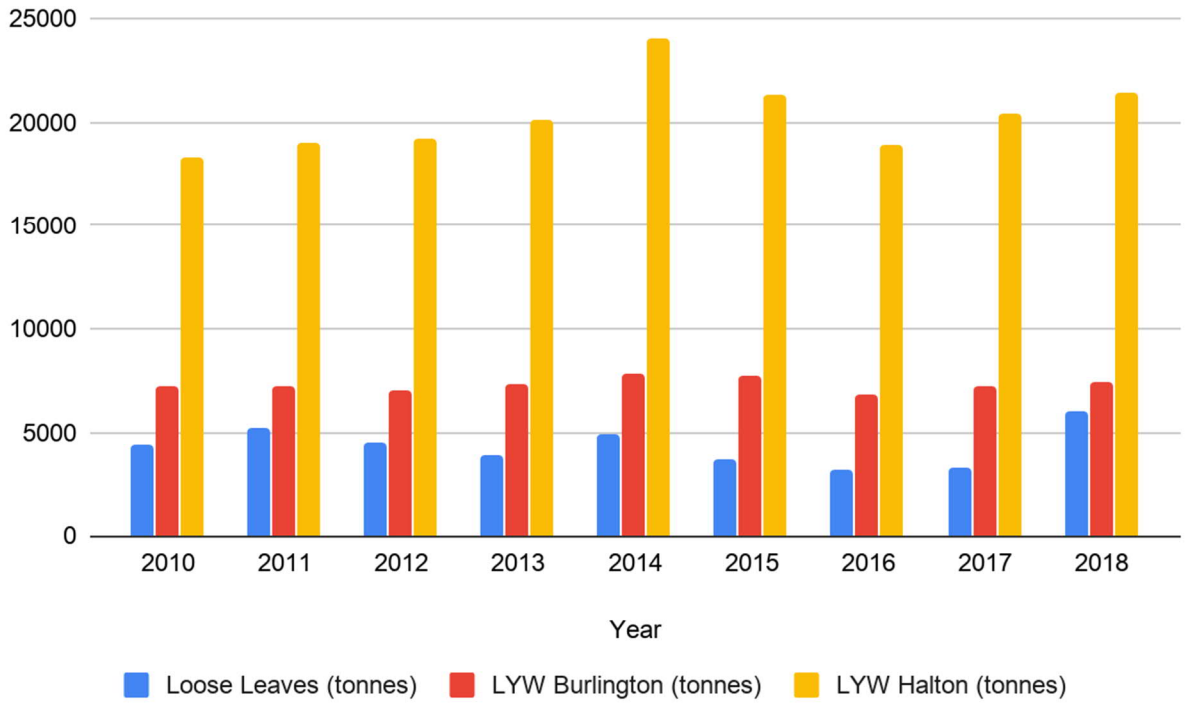
3.2 "As-Is" - Current State

3.2.1 Current Service Delivery Performance Snapshot

3.2.1.1 Loose Leaf Collection Program

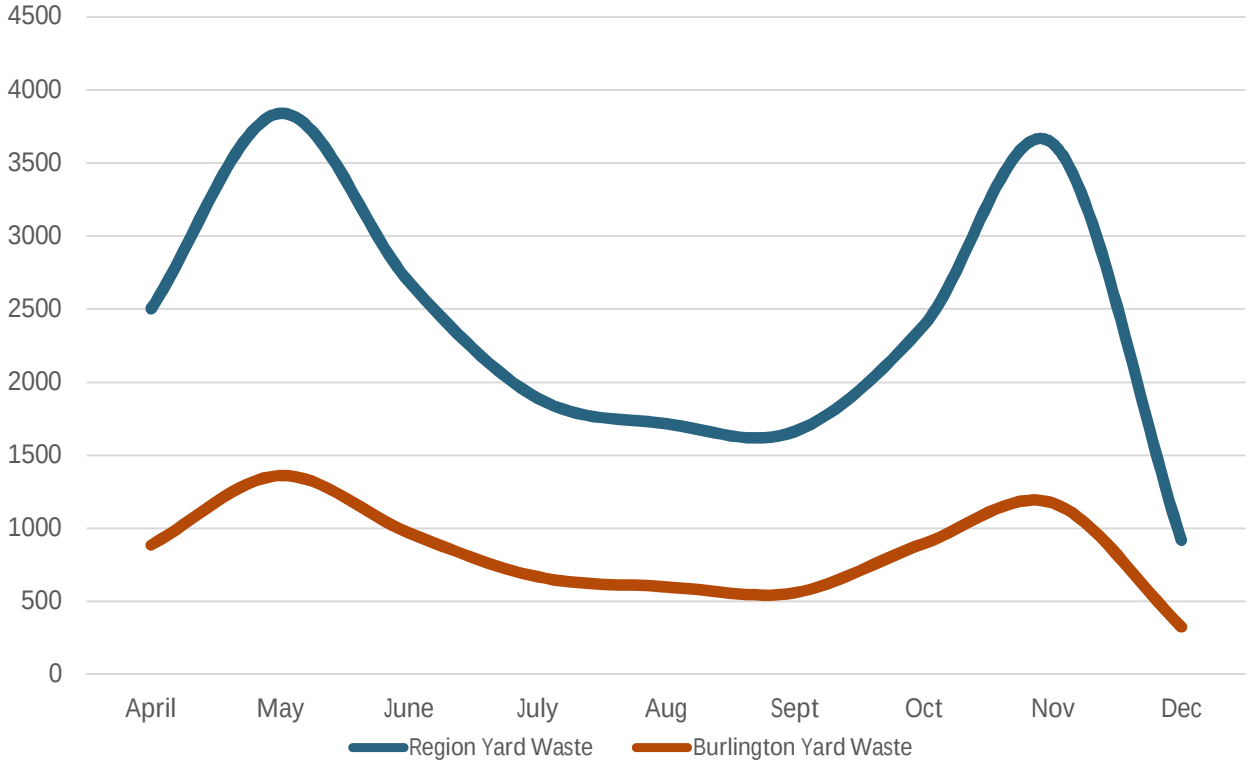
The City provides collection of loose-leaves to approximately 97% of households within the City. Halton Region provides LYW collection to the City. The historical quantities of loose-leaves collected by the City and LYW collected by the Region in both Burlington and the Region as a whole, is illustrated in Figure 7. Note that the quantities of LYW collected in Burlington (red bars) is also included in Halton Region's annual totals (yellow bars). As previously mentioned, the loose-leaf program was cut short in 2017 as a result of early winter weather.

Figure 7: Historical Quantities of Loose-Leaves and LYW Collected by City and Region (2010 – 2018)
See description above.



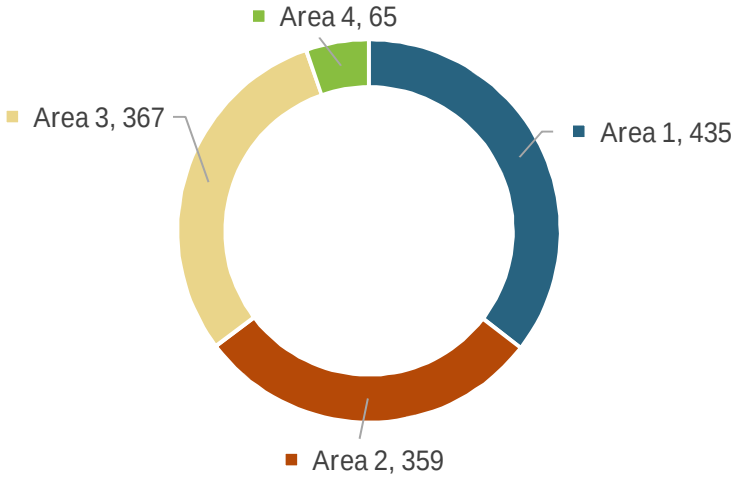
Leaf and yard waste generation varies seasonally with peaks in the spring and fall seasons and low points in the summer and winter, in terms of quantities collected. The amount of precipitation and temperature impact the generation of LYW. Figure 8 provides the average monthly quantities of LYW collected by the Region in both the City and the Region as a whole based on data received by the Region from 2014 to 2018. Similar to Figure 7, the quantities of the City's LYW is also included the Region's monthly totals.

Figure 8: Average Seasonal Variation in LYW Collected by Halton Region (2014 – 2018)



In terms of environmental impacts, the greenhouse gas emissions were estimated using the total distance travelled by the 34 vehicles currently required to deliver the loose-leaf collection program. ***Figure 9*** presents the estimated distance travelled, by area, during the program. For collection areas that receive two collections per season, the distances were doubled. The total distance travelled to complete the loose-leaf collection by the City is estimated to be 1,230 km per season. An emission factor for on-road diesel vehicles (2,748 g CO_2e/L fuel) and an assumed diesel fuel efficiency for a heavy duty truck (57 L/100 km) was applied to give an estimated 66 tonnes of CO_2 equivalents generated by the City to deliver the loose-leaf program. To put this into perspective, this is equivalent to approximately 14 cars driving for a year (based on each car travelling approximately 18,000 km per year).

Figure 9: Total Distance Travelled by Loose-Leaf Collection Area per Year (2018)



3.2.2 Municipal Benchmarking

To evaluate the efficiency and effectiveness of the loose-leaf collection program in Burlington, the service review involved comparing the City to other similar jurisdictions that both offer a loose-leaf program and some that offer a seasonal LYW program only. The comparator municipalities chosen, demographic information taken from Statistics Canada Census data and the rationale for inclusion, are presented in Table 2. The City of Burlington demographic data from Statistics Canada is also included for comparison purposes. It is noted that the City offers the loose-leaf program to approximately 97% of households and Table 2 is for the whole City. Results from the benchmarking are discussed further in Section 3.1.1.

Table 2: Comparator Municipalities Contacted for Service Review and Rationale for Inclusion

Comparator Municipality	Demographics				Loose Leaf Collection (Y/N)	Rationale for Inclusion
	Population Size (persons)	Population Change 2011 to 2016 (%)	Area (km^2)	Density (persons/km^2)		
Burlington	183,314	4.3	186	986	Y	-
Cambridge	129,920	2.5	113	1,150	Y	Offers separate loose-leaf plus Regional LYW, similar density
Guelph	129,920	2.5	113	1,150	Y	Similar loose-leaf program, population, and area

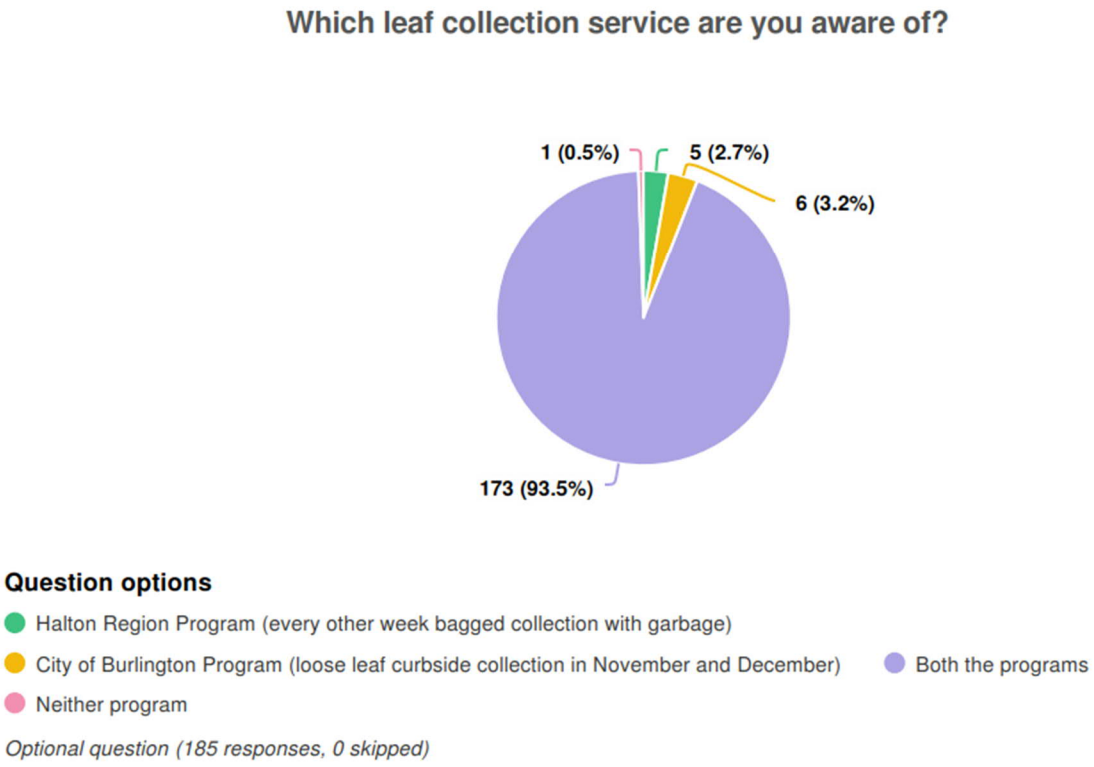
Comparator Municipality	Demographics				Loose Leaf Collection (Y/N)	Rationale for Inclusion
	Population Size (persons)	Population Change 2011 to 2016 (%)	Area (km^2)	Density (persons/km^2)		
Oakville	193,832	6.2	139	1,394	Y	Same program, part of Halton, similar population
St. Catharines	133,113	1.3	96	1,387	N	Program previously offered.
Whitby	128,377	5.2	147	873	N	Similar density, area, does not provide loose leaf

3.2.3 Public Survey Feedback

A public survey was released through Get Involved Burlington to collect information on resident's perceptions and understanding of existing services, including the loose-leaf collection program. The survey was released on October 23, 2019 and closed on November 4, 2019. A total of 185 residents participated in the survey. A summary of the results on the existing program are provided in this section and questions related to the potential future of the program are provided in Section 3.1.2.

The majority (93.5%) of residents surveyed were aware of both the City of Burlington's curbside loose leaf collection (loose-leaf) and Halton Region's bagged/binned LYW curbside collection (bagged/binned). Small percentages of respondents were only aware of the loose-leaf program (2.7%) or the bagged/binned program (3.2%). Refer to Figure 10. These responses indicate that education and information campaigns about the programs are effective.

Figure 10: Awareness of Available Programs in the City to Manage LYW (Survey Response)



Based on these results it is perhaps not surprising that the majority (92%) of respondents reported they had used the Region's LYW program and only 8% had not used it and when asked to specify why not, many indicated that it was due to living in an apartment (33%) or using a lawn care service (7%). The remaining 60% of respondents had specific answers around mulching or generally allowing leaves to remain on their property.

About 82% of respondents reported using the loose-leaf collection program. Of the almost 18% of respondents who indicated they did not use the program, almost 65% indicated that they use the Region's program instead. Others stated that they let the leaves stay on the lawn, they compost at home, it's not available in their area and it was a waste of money.

3.2.4 Emerging Performance Issues and Risks

The following provides some of the key issues and risks associated with the loose-leaf collection program based on the consulting team's observations and feedback from City staff.

3.2.4.1 Timing

The key issue associated with the loose-leaf collection program is the impact weather can have on program planning. City staff plan for the program in terms of promotion and education materials to the public and City Council, moving staff from the Roads and Parks departments, staff training and preparing equipment. However, given the fact that winter maintenance (i.e., snow removal) is a priority service, the loose-leaf program can be interrupted or cut short in the event of winter weather during the originally scheduled timelines to complete the program. Although residents are informed of the potential for disruption or stoppage of the loose-leaf program if winter weather comes early in promotional and educational materials (e.g., brochure, website, social media), the City is still inundated with complaints when it does happen. Primary complaints are associated with leaves not being collected and reduced number of collections.

The weather also impacts the timing of transitioning staff between Parks and snow removal and the transitioning of equipment from loose-leaf collection to winter maintenance.

3.2.4.2 Health and Safety

The only acceptable materials in the program are leaves however, it is common to find branches, wood pieces, pumpkins and even concrete pieces in the piles of leaves brought to the curb for collection. Collection operators and the public are at risk of slipping or tripping over unacceptable materials mixed in with the leaves.

In the event that not all leaves are collected (e.g., program stopped earlier, resident raking leaves after designated 'collect by' date), the leaves freeze with the winter weather making it difficult to shovel and creating a slippery surface.

Lastly, leaves can clog catch basins which can lead to flooding on roads. City staff do try to prevent this from happening by proactively clearing catch basins. Flooding in the winter can create additional slip hazards to the public.

3.2.4.3 Resources

As previously mentioned, unacceptable materials are sometimes mixed in with the raked leaves. In addition to creating slip hazards to operators and the public, the vacuum truck can get damaged if large materials get stuck in the hose. This leads to down time of equipment for maintenance purposes.

About 80% of the available staff in the Parks and Roads departments are involved in delivering the loose-leaf collection program (almost 70 staff). It is likely that there would be other work within the City that staff could do, including a better transition between Parks and snow removal, if they were not doing leaf collection.

Similarly, vehicles (aside from vacuum trucks) would also likely be able to serve other purposes within the City.

3.2.4.4 Complaints

The City receives a high volume of complaints related to the leaf collection program that is dealt with manually or by email. As mentioned above, common complaints include leaves not collected (if set out after the collection vehicles have passed), when is the City coming back to collect, cannot bag all the leaves for Region collection, snow falls early and the leaves remain all winter long and that leaves are still there in the spring and there's no City service to collect them.

3.3 "As-Should Be" Future State

3.3.1 Analyses Identifying/Supporting Specific Performance Improvement Opportunities

3.3.1.1 Benchmarking

As mentioned in Section 2.1.1, the service review involved reaching out to specific municipalities to obtain information on their LYW program(s). A questionnaire was prepared and emailed to staff that focused on questions related to service levels, quantities managed, costs, etc. A copy of the questionnaire template is provided in Appendix A. Of the five targeted municipalities, three provided a fairly full set of responses, one provided data from 2016 and one did not have time to complete within the requested timeframe. In addition, Halton Region was approached to provide data on the LYW collection programs for Burlington and the Town of Oakville. Follow up with municipal representatives was completed through telephone calls and/or email in order to clarify the information provided.

The level of data provided varied as there are differences in levels of service, how the program is funded as well as how program costs are calculated, which makes it challenging to conduct straight comparisons to the City. That said, through follow-up with municipal representatives, the data was refined to the extent possible. Program information such as service levels, service delivery approach, quantities managed and staff levels are provided in Table 3. When comparing the City to other municipalities that offer the loose leaf collection service, it appears that the City is offering a similar level of service in terms of collection frequency (1 to 4 collections) and months the service is offered (late Fall).

Table 3: Summary of Data Received from Comparator Municipalities (2018)

Refer to Sections 2.2.2 and this section for more information.

Comparator Municipality	Months Service is Offered	Service Frequency	Who Delivers the Service	Number of Households that Receive Program	Processing	Approximate Annual Tonnes	Staff Required	Equipment Required
Burlington - Loose-Leaf	Oct - Nov	1-2x/zone	The City of Burlington	70,500	Halton Waste Management Site	6,000	52	3 loader, 2 backhoe, 9 low bed trailer, 3 single axle dump truck, 13 dump trucks, 1 skid steer, 3 street sweepers
Burlington - LYW	Apr - Nov	Bi-weekly with garbage collection	Halton Region			7,500	~22 (for all collections)	3 loaders, 6-12 garbage trucks, 1 tub grinder, 1 screener, 2 stackers
Cambridge - Loose-Leaf	November	One visit per household	The City of Cambridge	50,000	Waterloo Region Waste Management Site	1,540	48	(pick-up, raker, loader, backhoe, 4-5 dump trucks) x4 2 vacuum trucks, 2-3 sweepers
Cambridge - LYW	Mar - Dec. Christmas trees in Jan.	Bi-weekly	Contractor through Region of Waterloo	157,000		38,000	N/A	1-2 loaders (LYW), 10-14 trucks (LYW and green bins)
Guelph - Loose-Leaf	November	1x in November	City Operations Department	49,000	Private sector facility	1,980	N/A	N/A

Comparator Municipality	Months Service is Offered	Service Frequency	Who Delivers the Service	Number of Households that Receive Program	Processing	Approximate Annual Tonnes	Staff Required	Equipment Required
Guelph - LYW	Spring & Fall	1x spring, 1x fall	Private sector through Solid Waste Resources	49,000	Private sector facility	565	N/A	N/A
Oakville - Loose Leaf	Oct - Dec	Older areas - 3x Newer areas - 1x	Town of Oakville	30,000 house receive program	Halton Waste Management Site	4,250	45	3 loaders, 14 tandem axle dump trucks, 11 vacuum leafers
Oakville - LYW	Apr - Nov	Bi-weekly with garbage collection	Halton Region	68,000		9,000	~22 (for all collections)	3 loaders, 6-12 garbage trucks, 1 tub grinder, 1 screener, 2 stackers
St. Catharines - LYW	Year Round	Weekly	Niagara Region	155,000	Niagara Region Landfill	N/A	N/A	N/A
Whitby - LYW	April - November	Bi-weekly set out limit in spring and summer, no limit in fall	Town of Whitby	40,000	Durham Region	4,800	3 - low season 4-6 - peak season	3 side loaders, 1-2 rear loading waste vehicles

N/A – Not available

Municipalities provided costing data (most are 2018 actual costs with the exception of one 2016 dataset) but cautioned its use in direct comparisons to the City noting that some data was not reviewed/confirmed by municipal finance departments. The City of Guelph's LYW program was not included in the cost range below as the service is offered twice a year compared to seasonally by the comparator municipalities.

The intended purpose of the benchmarking is to see how the City performs against other similar municipalities and not to scrutinize the costs of participating municipalities. For that reason, and noting some concerns regarding the public nature of this report, cost information is presented as a range for all programs reviewed. Average tip fees, cost per household serviced, and annual operating budgets are provided in Table 4.

Table 4: Cost Ranges for Comparator Municipalities and City Costs

Refer to Section 2.2.2 and this section for more information.

	Loose-Leaf			LYW		
	Average Tip Fees ($/MT)	Cost Per Household	Annual Operating Cost	Average Tip Fees ($/MT)	Cost Per Household	Annual Operating Cost
Range	$25 to $35	$4 to $33	$223,000 to $1 million	$34	$4 to $15	$680,000 to $993,100
Burlington	$25	$12	$864,000	$34	$11	$756,000

Additionally, opinions and perceptions were collected from City representatives on the loose leaf collection program. The feedback ranged from positive (i.e., residents like it, City is responsible to manage City trees, saves money since clearing debris and preventing clogs in catch basins) to negative (i.e., expensive program, clogs catch basins, causes flooding). One common theme among all comparator municipalities was the challenges during the transition from the leaf collection season to the winter maintenance program.

3.3.1.2 Public Survey Feedback

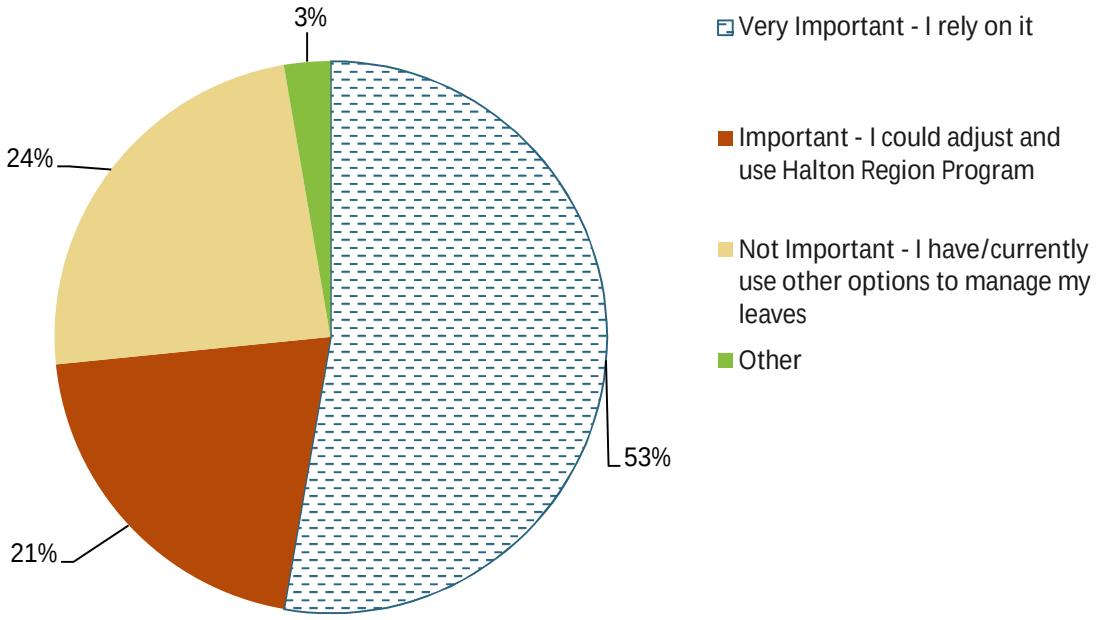
In the Get Involved Burlington public survey that was conducted in the fall of 2019, residents were given information about the purpose of the loose leaf service review and how the City has declared a climate change emergency and then asked about the importance of the loose leaf collection program. The next question described some of the operational challenges (e.g., same vehicles used for snow removal, timing of program delivery, clogged sewers) and then asked the question again about the importance of the loose leaf collection program. The responses are described in this section.

Residents were given this information prior to answering the question on how important the loose leaf program is:

> The review that is currently underway on City services includes determining if and/or where efficiencies can be gained from environmental, financial and social perspectives. In addition, the City has declared a Climate Change Emergency, with a goal of the City operations being net carbon neutral by 2040.

Of the 184 respondents to this question, 53% indicated that they rely on the loose leaf program and that it is very important to them while 45% indicated that it was either not important to them or that they would be able to adjust if the program was removed (Figure 11).

Figure 11: Response to Importance of Loose-Leaf Program with Climate Change Information (2019)
Refer to Section 3.1.2 for more information.



The second time information was provided, respondents were told that:

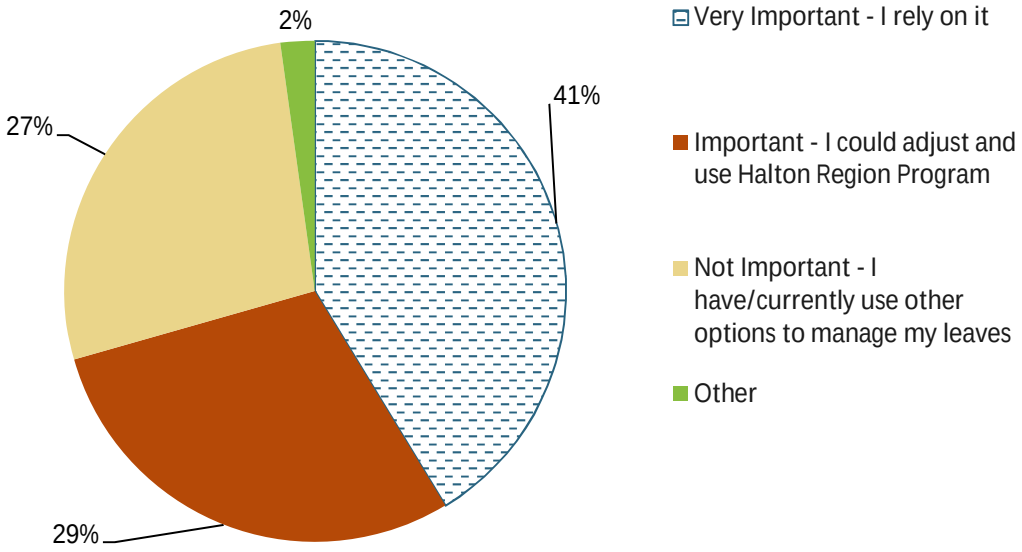
> The City uses the same trucks for loose-leaf collection as for snow removal so when the first snowfall hits, the trucks need to have snow removal equipment installed. This can sometimes happen before all the leaves have been picked up, which could result in the program ending and the remaining leaves may be plowed onto your boulevard. In addition, leaves raked to the curbside can lead to clogged sewers.

Given this information they were once again asked the importance of the loose leaf program to them. This additional information resulted in a decreased number of respondents indicating that the program was “very important - I rely on it” (from 53% to 41%). Additionally, those that indicated they could

adjust and use another program or that is was not an important program for them increased from 45% to 56%.

Figure 12: Response to Importance of Loose-Leaf Question with Climate Change and Operational Challenges Information (2019)

Refer to Section 3.1.2 for more information.



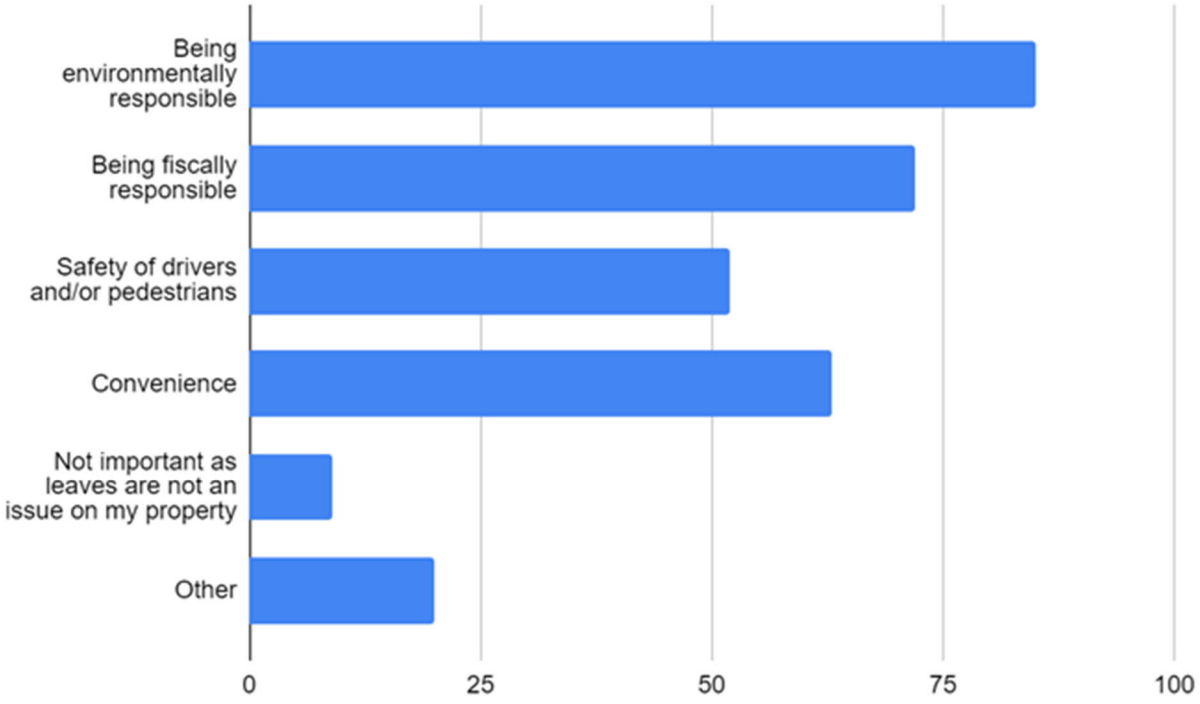
Comments provided by survey respondents varied in terms of opinions and perceptions of the program from positive (i.e., older neighbourhoods with high tree coverage needs the program, bagging the high quantity of leaves would be problematic) to negative (i.e., wind creates more work after leaves are raked to the curb, clogs sewer, causes flooding)

Finally, respondents were asked to choose up to two attributes of a leaf collection service that were most important to them. The majority of respondents selected:

1. Being environmentally responsible (e.g. reducing greenhouse gas (GHG) production associated with leaf disposal – CO2 and other GHGs are released from collection and processing vehicles).
2. Being fiscally responsible (e.g. reducing worker hours required to offer services, wear and tear on City infrastructure and the maintenance required to deliver the service, etc.).

Convenience was the next most comment response. The results of this question are presented in Figure 13.

Figure 13: Response to "When Thinking About the Loose-Leaf Program, What's Most Important to You (choose 2)?" (2019)



Some respondents further elaborated that the "convenience" option did not properly describe their need for the service. They indicated that the large number of mature trees on their property and in their area made bagging leaves an infeasible option. Further, some respondents indicated that extending the regional bagged/binned leaf pick up could lessen the blow for residents in heavily treed areas if the loose leaf collection is removed. With some concern expressed for discouraging tree planting if the loose leaf collection service is removed.

3.3.2 Performance Lens(es) and Efficiencies

As mentioned above, it appears that the City's loose leaf collection program is operating similarly to other municipalities that offer the same program.

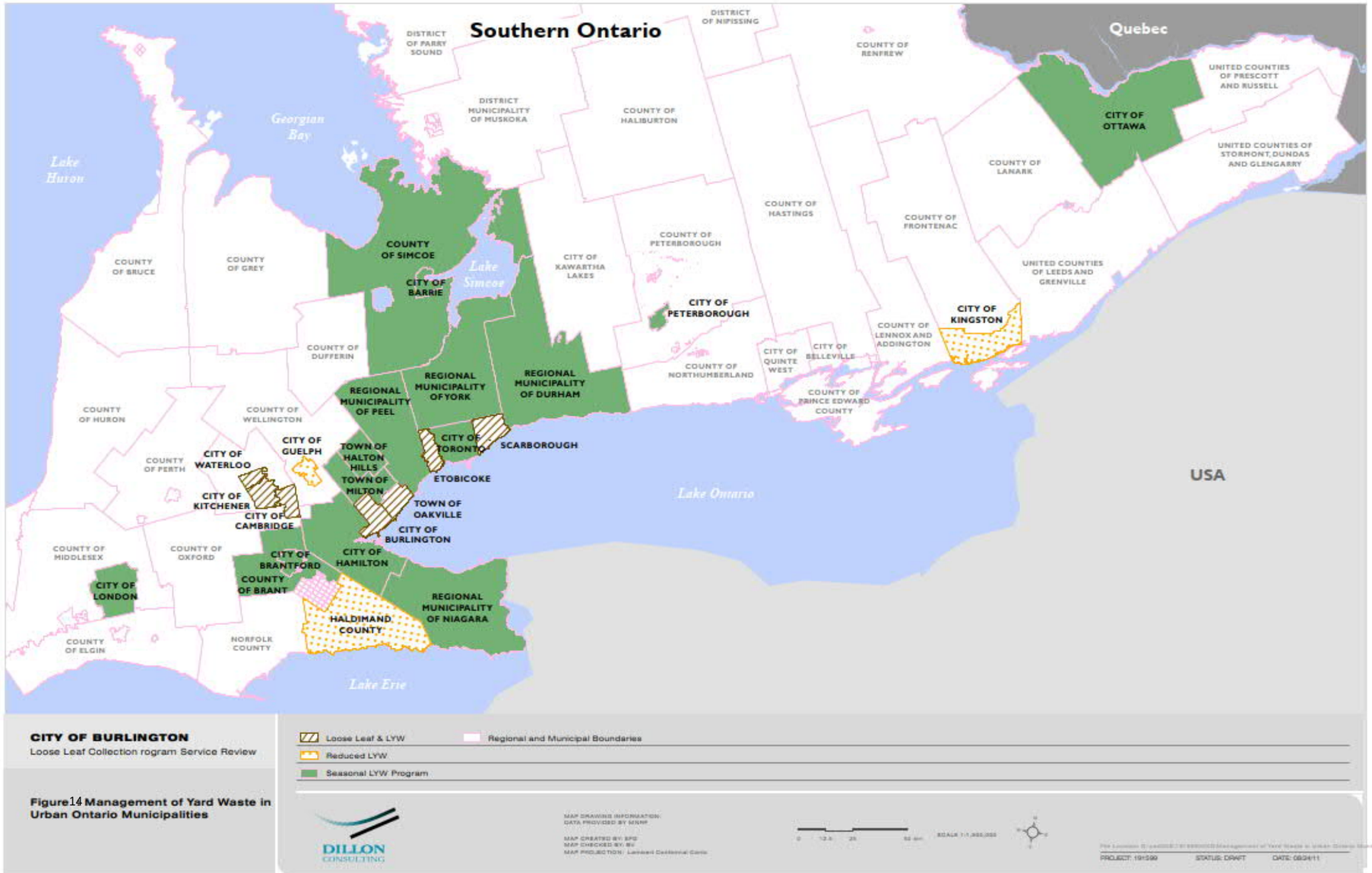
In terms of City staff offering this program, there have been challenges with operating the service particularly with respect to timing, resourcing and equipment. This year, there was an early snowfall in

November that caused an abrupt stoppage to the loose leaf collection program and the quick transition to the winter maintenance program. As previously mentioned, the winter maintenance program is regulated and the loose leaf collection program is a discretionary program and therefore, the winter maintenance program takes priority. This however, causes frustration to residents who expect that the service is offered and in turn, results in an increase in calls handled by the City's customer service line. In terms of general efficiencies, the main stress of the program relates to weather and the impact an early snowfall has on the ability to complete the program each year. Therefore, there are no efficiencies associated with this main pain point of the program.

When comparing the types of programs offered to other Ontario urban municipalities to manage leaf and yard waste, the City's loose-leaf collection program is among the minority. There is a distinct difference between the level of service offered as the majority of urban municipalities in Ontario offer a seasonal leaf and yard waste collection program that typically lasts from the start through to the end of the growing season (generally from April through November). The amount of collections offered varies from weekly all season long to more frequent collections in the spring and late fall and less frequent collections in the summer. A small number of selected urban municipalities offer a reduced level of leaf and yard waste collection such as a small number of collections for bagged leaf and yard waste in the spring and fall.

To illustrate this, Figure 14 provides a snapshot of some of the urban Ontario municipalities and the types of services offered to manage leaf and yard waste. The map demonstrates the most comment service offered to manage leaf and yard waste is through a seasonal bag-based program.

Figure 14: Management of Yard Waste in Select Urban Ontario Municipalities



3.4 Findings & Recommendations

3.4.1 Findings

The service review conducted on the City of Burlington's loose-leaf collection program identified that the program is operating in line with other comparable municipalities that offer a similar program in terms of service levels, staffing levels and origin (i.e., parks, roads), equipment used and availability of Regional government providing seasonal LYW collection. Operational challenges are experienced by all comparators pertaining to early snowfalls and the impact that has on the ability to complete the program.

The general public are aware of both programs offered to handle LYW (City, Region) and both are commonly used as per the public survey results. In terms of City staff operating the program, there are noted challenges associated with weather and provision of sufficient time to transition staff and equipment. Early snowfalls cause the program to be disrupted or stopped completely resulting in an increase in customer complaints handled by City staff and potential creation of health and safety hazards associated with frozen and slippery leaves left behind. Leaves have the potential to clog catch basins which results in street flooding creating more slippery road conditions. When comparing the program to how other urban municipalities in Ontario manage LYW, it is clear that the City is among the minority as most offer only a seasonal LYW collection program.

3.4.2 Recommendations

Going forward, it is recommended that the City consider the findings in this report along with the following four potential options on the future of the loose-leaf collection program:

1. Maintain Program – keep the existing program as-is.
2. Enhance Program – keep the existing program as-is from a resident standpoint but conduct a study on options to provide a consistent level of service (e.g., contractor, additional City resources).
3. Modify Program – conduct a study to determine the areas with a high percentage of tree coverage and provide the service to only those areas.
4. Remove Program – stop the loose-leaf collection program and continue with Halton Region's seasonal LYW program.

Table provides advantages and disadvantages associated with each of the four options.

Table 5: Advantages and Disadvantages with Loose-Leaf Collection Program Options

Option	Advantages	Disadvantages
1. Maintain Program	• No change in resident behaviour • Maintain same level of service • Staff are familiar with operations	• Still experience struggles with timing and impact on other departments • No change in GHG reductions • Continue to handle large volume of customer complaints • Pay processing fees to Region
2. Enhance Program	• No change in resident behaviour • Maintain same level of service • Staff are familiar with operations • Reduced complaints if program is consistently completed • Reduced effects from early snowfalls	• Potential challenges with timing and impact on other departments • May need to hire contractors or retain additional City staff to fill resourcing gaps which will increase operating costs • No change in GHG reductions • Pay processing fees to Region
3. Modify Program	• Reduces GHG impact • Frees up some staff and equipment for other City services • Potential reduction in customer complaints • Reduces processing fees to Region	• Some challenges will still exist with timing and impact on other departments • Program will need to be modified as different neighbourhoods mature • Reduced level of service • Will likely encounter temporary public opposition • Challenges with allocating costs
4. Remove Program	• Biggest reduction in GHG emissions • Frees up all staff and equipment for other City services • All waste collection concerns would be directed to Region • Eliminate processing fees to Region	• Will likely encounter temporary public opposition • Roads may need additional time to remove debris from catch basins and respond to flooding • Reduced level of service

4.0 Corporate Fleet Review

4.1 Service Profile

The scope of the assessment for the Corporate Fleet review included active, on-road vehicles. Active vehicles are defined as vehicles with kilometerage and/or fuel usage data available for one or more of the assessment years (2017 or 2018).

Not included in the scope of the study included:

- Equipment; and
- Vehicles/equipment managed by Transit and Fire Departments.

This fleet service delivery review is a high-level study that considers larger trends in the overall fleet composition and usage, not an individual vehicle-by-vehicle operational analysis.

Performance lenses for this study include:

- Climate (i.e. greenhouse gas [GHG] reductions);
- Financial deferral of costs;
- Process improvement; and
- Level of service.

4.1.1 Objectives

The current fleet service delivery review considered the following objectives:

1. Identifying opportunities for cost savings while maintaining the required levels of service;
2. Benchmark comparisons to peer municipalities on specific areas of interest; and
3. Providing preliminary guidance for the forthcoming update to the City's Green Fleet Strategy.

In the context of this fleet study, efficiency categories considered included:

- Spending reductions, spending avoidance, high Return on Investment (ROI) spending investments;
- Improved business process performance; and,
- GHG reduction and sustainability.

4.1.2 Fleet Costs

Based on the City's 2019 Operating and Capital Budget[1], overall costs for the fleet include:

[1] As per <https://www.burlington.ca/en/your-city/resources/Budget/2019-Budget/2019-Budget-Book-Combined-WEB.pdf>.

- Capital expenditures for Fleet Vehicles in 2019 was $3,393,619, with annual average from 2017 to 2019 of $2,159,037; and
- Operating expenditures for Fleet Vehicles in 2019 is $2,927,168.

4.1.3 Methodology

The fleet service delivery review was conducted using fleet data provided by the City's Roads and Parks Maintenance Department (Fleet Services area) and a municipal scan/survey of peer municipalities. These approaches are discussed in further detail in the sub-sections below.

4.1.3.1 Fleet Analysis

A fleet inventory was provided by the City of Burlington that included the make, model, year, City Department, Service Area (sub-Department), and other data (including whether the vehicle is a hybrid) specific to individual vehicles in the fleet. Full year data sets were provided for 2017 and 2018, and partial year data set for 2019. The data included fuel consumption and kilometers traveled by individual vehicles which was used to calculate vehicle usage trends including: fuel efficiency, GHG emissions, and estimated annual fuel costs. Data from 2017 and 2018 was used to develop annual vehicle usage trends given that the full years of data were available.

In addition, special operational requirements were identified by City staff for vehicles that are:

- Auxiliary power providers for specialized equipment (e.g. aerial lifts on HD trucks);
- Mobile offices; and/or
- Take-home vehicles (authorized to be driven to and from an employee's home on a daily or occasional basis).

Select vehicle units (55 units total) were removed from the assessment due to:

- Lack of complete data; or
- Unreliable data (e.g. fuel efficiency rates above 100 L/100 kilometers or below 4 L/100 kilometers).

Additional data provided by the City included a sample set of percent idling rates based on a 2018 study of 29 sample vehicles. Where available, idling rates were also integrated into the study.

4.1.3.2 Municipal Scan/Survey

In addition to evaluating the City of Burlington's current operations, a peer municipal survey was released to understand and learn alternative methods for fleet management. The survey was circulated to six peer municipalities in the Greater Toronto and Hamilton Area (GTHA) and/or municipalities with similar climate, population and green fleet action strategies. The municipalities that participated in the benchmarking survey included:

- City of Hamilton;

- Town of Oakville;
- City of Toronto;
- City of Richmond (British Columbia);
- City of Ottawa; and
- City of Mississauga.

See **Appendix C1** for a summary of raw survey results.

In addition, the City completed an internal survey in 2017 on the subject of the City's take-home vehicles. The results of the internal survey were also reviewed and included in this study.

4.2 "As-Is" Current State

4.2.1 Fleet Inventory

The City's fleet is comprised of 169 active on-road vehicles. Dillon classified these vehicles by type and service level (heavy duty or light duty).

Vehicles were classified as:

- Car;
- SUV (Sports Utility Vehicle);
- Truck; or
- Van.

Vehicles were further classified by Dillon based on their gross vehicle weight rating (GVWR), as per the Province of Ontario's definition of 'commercial vehicle'[2]:

- Light duty (LD) vehicles with a gross vehicle weight rating (GVWR) of 4,500 kg or less; or
- Heavy duty (HD) vehicles with a GVWR greater than 4,500 kg.

In addition, each vehicle was allocated by the City to specific City Departments and Service Areas, defined in Table 1 below. This table presents only the Departments which were considered 'in-scope' in this study.

[2] Province of Ontario's Highway Traffic Act O.Reg 419/15 defines commercial vehicle as having a GVWR above 4,500 kg. <https://www.ontario.ca/laws/regulation/150419>

Table 6: In-Scope City Departments and Service Areas

Department	Service Area
Building & Bylaw	o Animal Control* o Municipal Law Enforcement and Licensing o Building Code Permits and Inspection
Transportation	o Traffic Operations Management o Parking Management*
Roads, Parks & Forestry	o Cemetery* o Corporate Management* o Fleet Services* o Organized Sport Support* o Parks and Open Space Maintenance o Road and Sidewalk Maintenance o Sign Production* o Surface Water Drainage o Tree Management
Recreation Services	o Organized Sport Support o Recreation o Arts and Culture* o Tyandaga Golf Course*
Capital Works	o Roads and Structures - Design and Construction o Environment and Energy* o Surface Water Drainage* o Facilities and Buildings-Design and Construction

* Where there are two or fewer vehicles allocated to a single Service Area, the count is grouped under the "other" category throughout this analysis. In addition, vehicles not identified as being allocated to one of these Departments or Service Areas are defined under the "other" category.

Note that data for the 19 vehicles allocated to the Building Code Permits & Inspection Service Area (BCP&I) are presented separately as well as in aggregate with the entire fleet inventory throughout this report. The budget for the BCP&I Service Area is managed and allocated separately from the general Fleet Management budget and is tied to building permit revenue and reporting.

Figure 1 presents the number of active on-road vehicles in the City's fleet by classification and includes both the total quantity of vehicles and the associated percentage allocation within the overall on-road fleet. Figure 2 presents the number of both conventional and hybrid vehicles by vehicle classification.

Figure 15: Vehicle Inventory by Classification

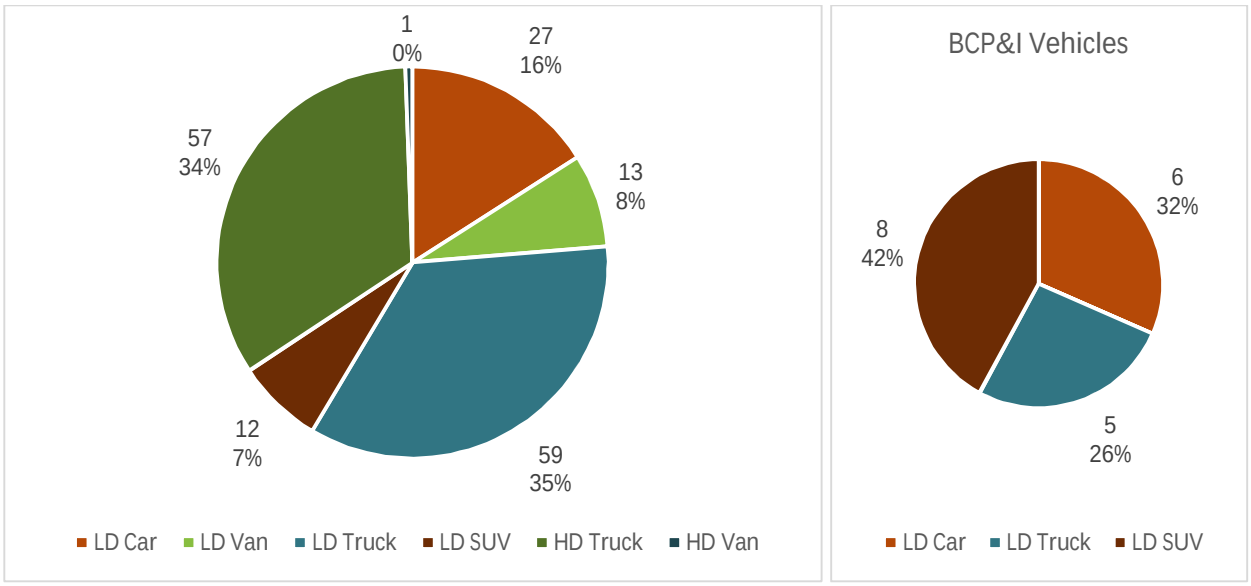
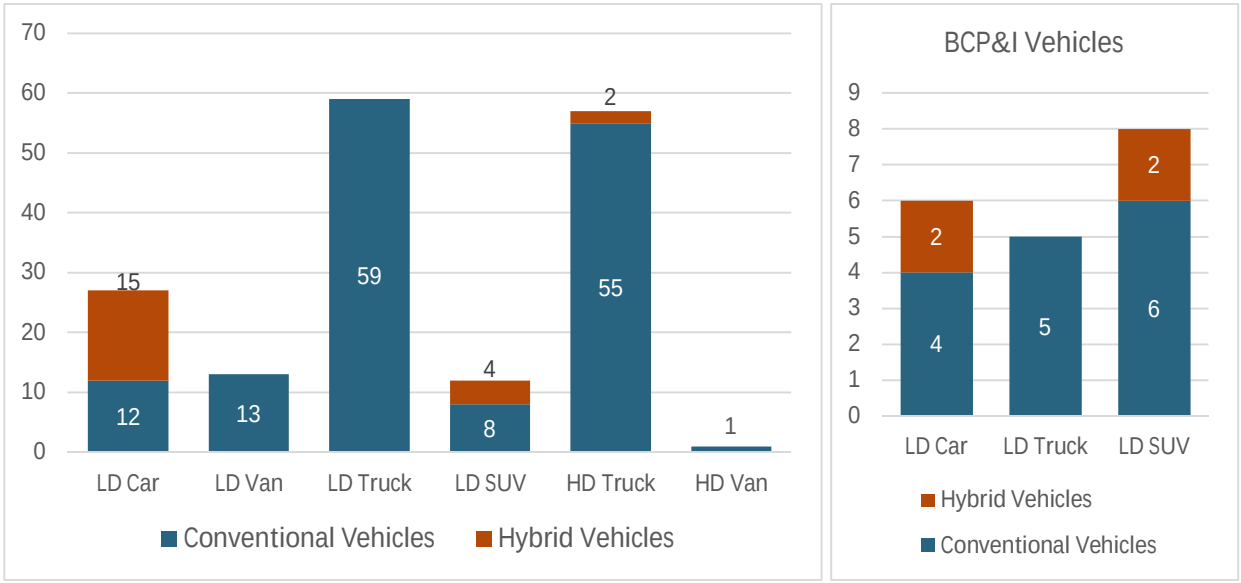


Figure 16: Conventional and Hybrid Vehicles by Classification†



† One HD Truck hybrid system has been dis-engaged due to operational challenges.

Figure 3 and Figure 4 present the quantity of active on road vehicles by Department and Service Area, respectively.

Figure 17: Vehicle Inventory by Department

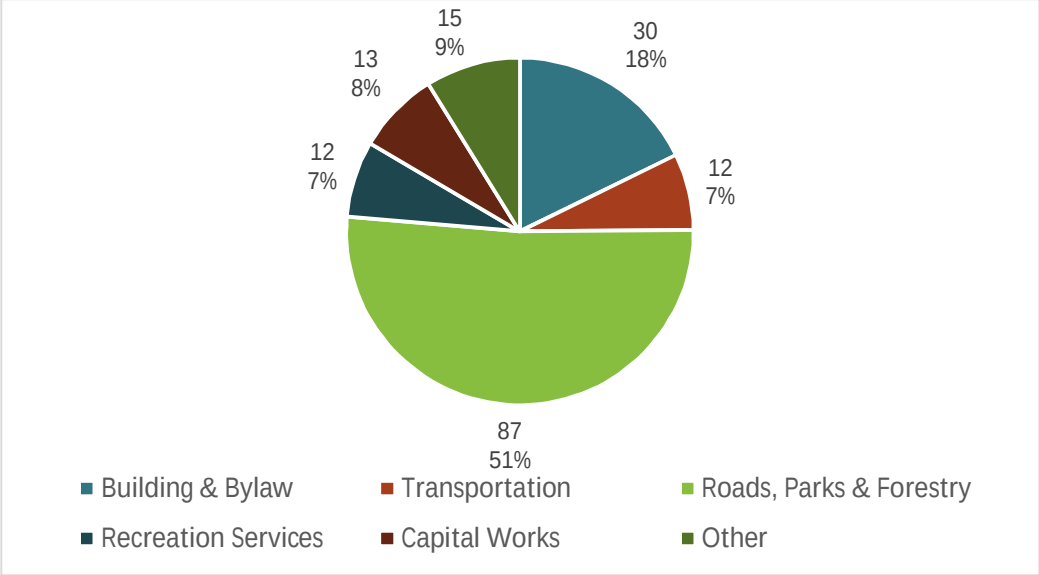
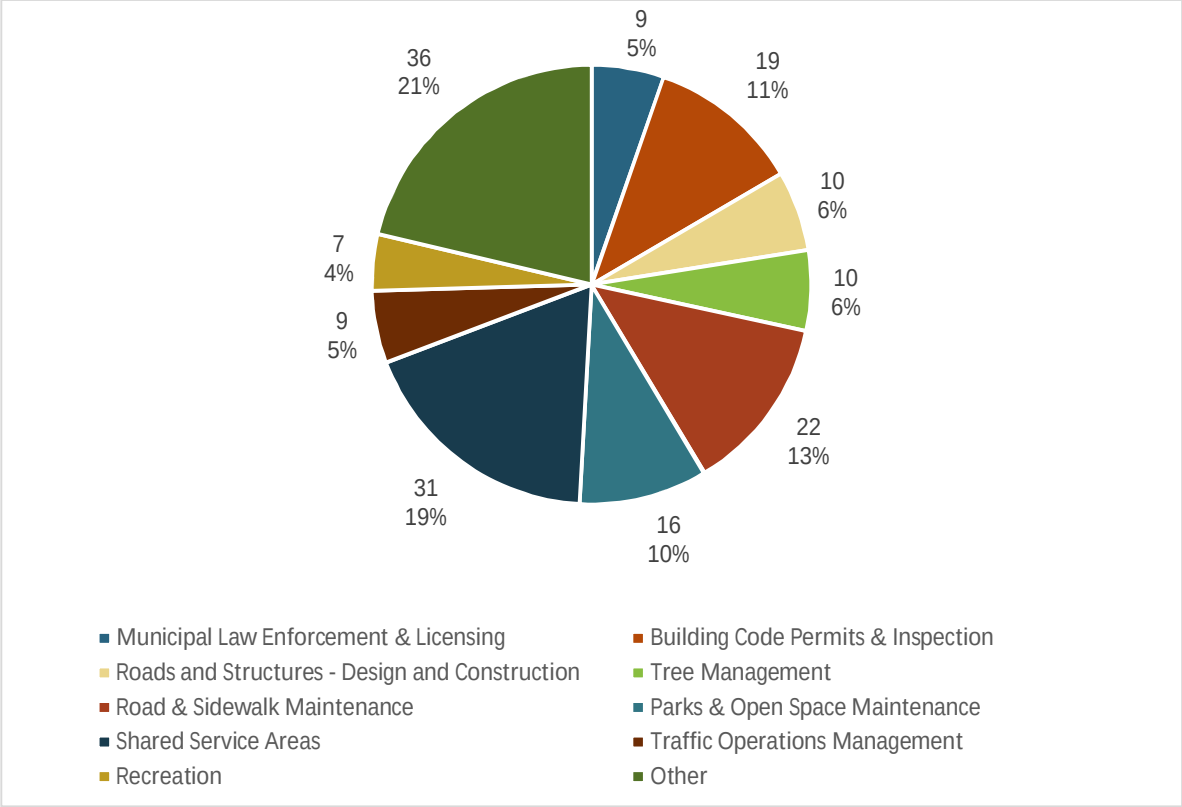


Figure 18: Vehicle Inventory by Service Area



4.2.2 Climate Change Implications

The National Inventory Report 1990–2017: Greenhouse Gas Sources and Sinks in Canada (Environment and Climate Change Canada, 2019) methodology was used to estimate the GHG emissions from the City's on-road fleet. The 2017-2018 fuel consumption data (by vehicle) was used to develop average annual emissions of carbon dioxide equivalent[3] (CO_2e) by vehicle classification, as presented in Figure 5. The 2017-2018 average annual emissions GHG emissions by Service Area are presented in Figure 6. In addition, Table 2 presents GHG emissions by Service Area, with contextual information such as the number of vehicles within that Service Area, the kilometers travelled, and the average fuel efficiency.

[3] CO_2e. 100-year global warming potential for carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) considered.

Figure 19: GHG Emissions by Vehicle Classification (tonnes CO_2e)

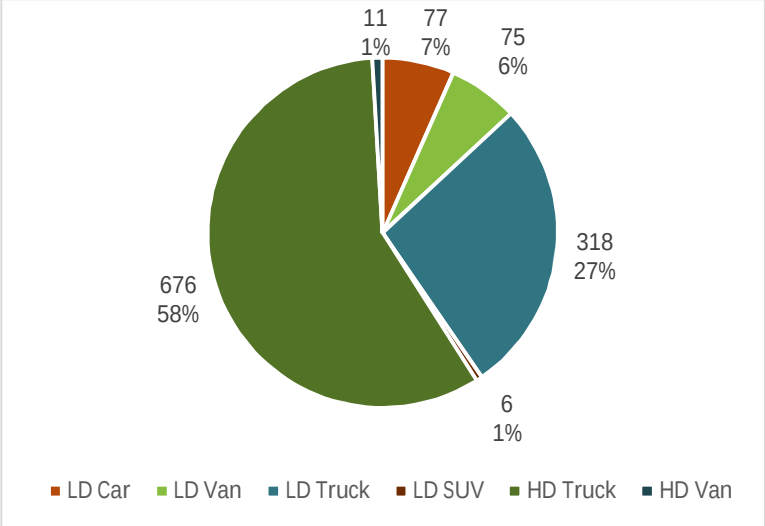
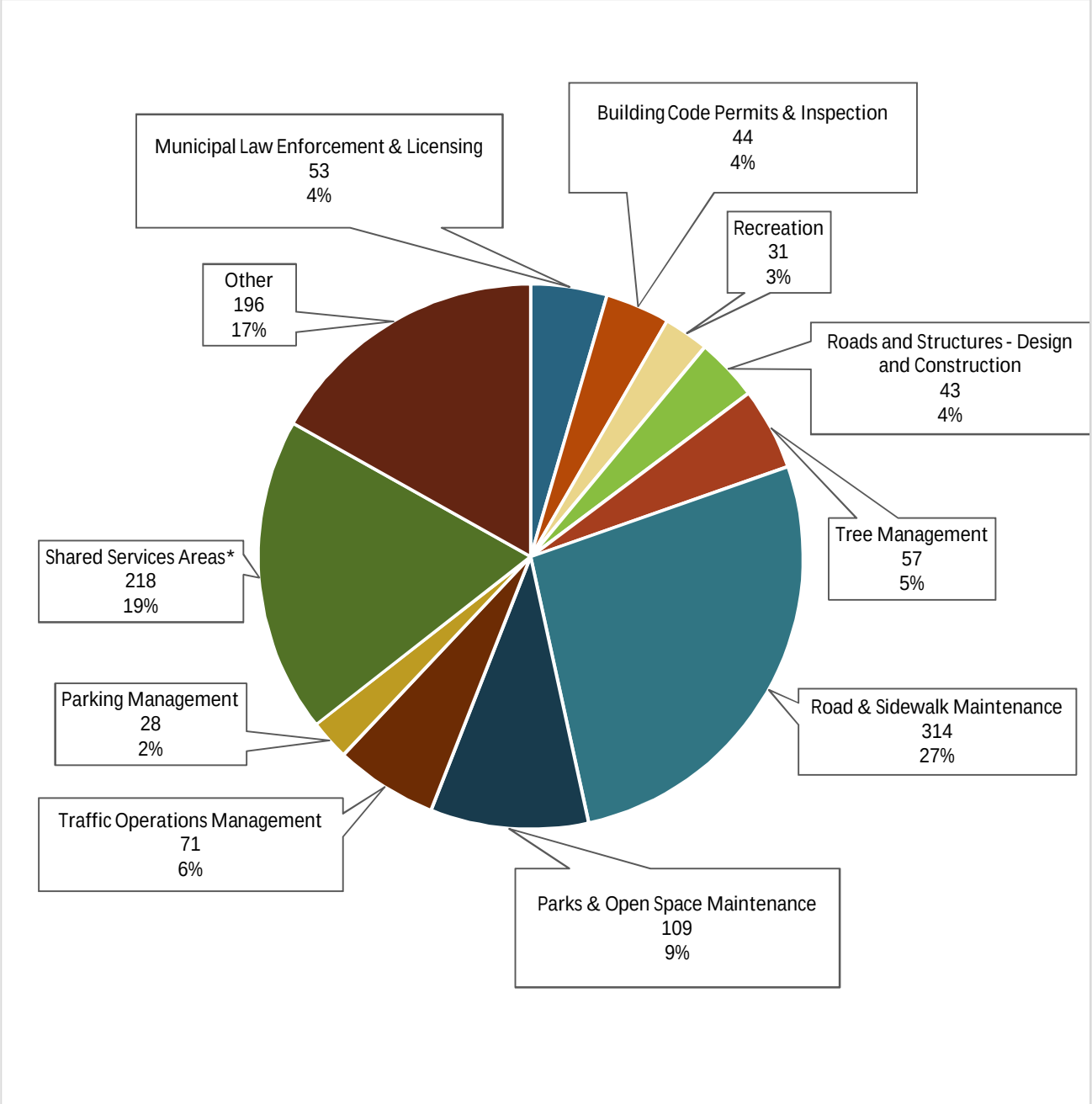


Figure 20: GHG Emissions by Service Area (tonnes CO_2e)



* Shared Service Areas includes:

Organized Sport Support, Recreation
Environment & Energy, Facilities and Buildings-Design and Construction
Organized Sport Support, Road & Sidewalk Maintenance
Parks & Open Space Maintenance, Road and Sidewalk Maintenance
Tree Management, Road and Sidewalk Maintenance
Surface Water Drainage, Road & Sidewalk Maintenance
Fleet Services, Recreation

Table 7: GHG Emissions by Service Area

Service Area	GHG Emissions (tonnes CO_2e)	Vehicle Count	Average Kilometerage†	Average Fuel Usage (L)†	Average Vehicle Fuel Efficiency (L/100 km)
Road & Sidewalk Maintenance	314	22	349,099	120,804	53.69
Parks & Open Space Maintenance	109	16	172,937	41,824	24.64
Traffic Operations Management	71	9	94,692	28,876	25.56
Tree Management	57	10	63,557	21,600	37.89
Municipal Law Enforcement & Licensing	53	9	174,427	22,734	12.25
Building Code Permits & Inspection	44	19	181,974	19,200	10.98
Roads and Structures - Design and Construction	43	10	141,955	18,629	12.34
Recreation	31	7	89,035	13,498	14.36
Parking Management	28	3	191,426	11,969	10.23
Shared Services Areas*	218	32	n/a	n/a	n/a
Other	196	32	n/a	n/a	n/a
Total	1,164	169	n/a	n/a	n/a

† Average annual kilometerage and fuel usage over 2017 and 2018

* Shared Service Areas includes:

Organized Sport Support, Recreation
Environment & Energy, Facilities and Buildings-Design and Construction
Organized Sport Support, Road & Sidewalk Maintenance
Parks & Open Space Maintenance, Road and Sidewalk Maintenance
Tree Management, Road and Sidewalk Maintenance
Surface Water Drainage, Road & Sidewalk Maintenance
Fleet Services, Recreation

4.2.3 Potential Areas for Fleet Usage Efficiency Improvements

A review of the available fleet data identified five key potential inefficiencies/usage habits which developed the basis for the recommendations presented in Section 4.4. As described in the sub-sections below, these topics include:

- Large vehicle classes;
- Low travel vehicles;
- Vehicle sharing;
- Take-home vehicles; and
- Idling.

4.2.3.1 Large Vehicle Classes

As noted in the fleet inventory presented in Section 2.1, 34% of the on-road fleet are HD trucks, 35% are LD trucks, 8% are vans, and 7% are SUVs. This leaves only 16% as LD cars. The majority of City vehicles are large and therefore have comparatively larger fuel consumption rates and GHG emission rates. It is understood that for a variety of operational reasons, LD cars may not be suitable for certain job functions. However, there is an observed trend of relatively large vehicle classes within the City's on-road fleet.

4.2.3.2 Low Travel Vehicles

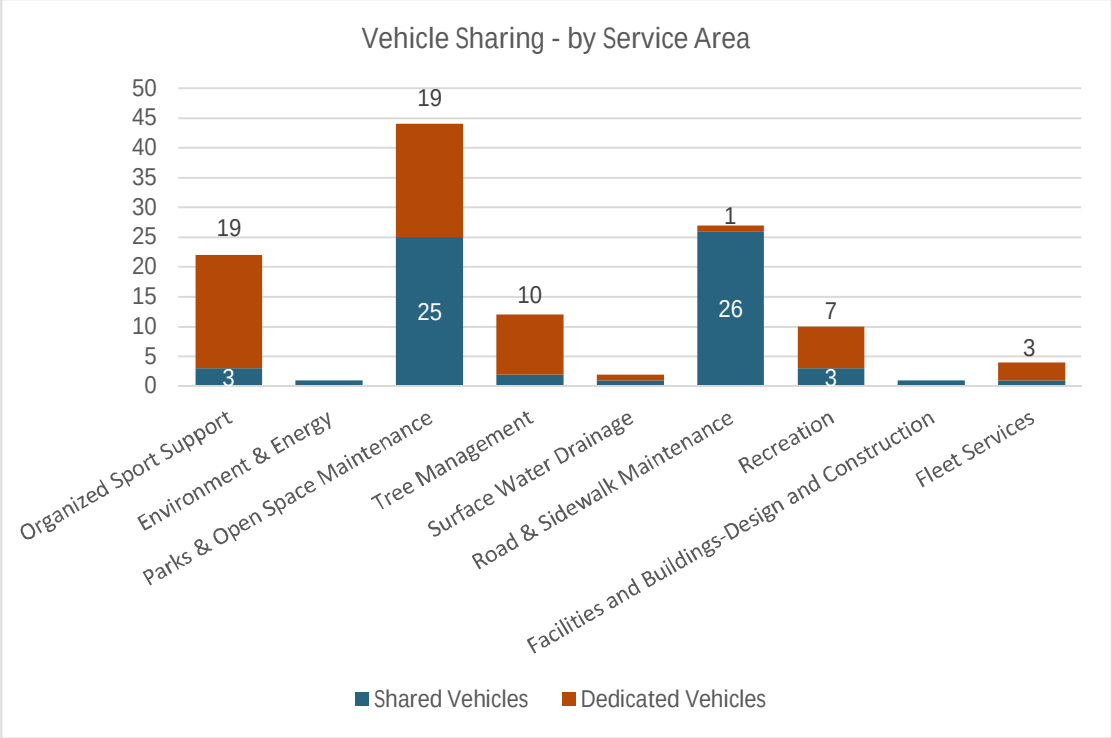
A total of 80 vehicles are identified as low travel vehicles (less than 10,000 kilometers travelled annually), representing 47% of the total on-road vehicle inventory, based on 2017 and 2018 kilometerage data. According to City documents such as a draft right-sizing assessment, 10,000 kilometers is the usage threshold for which a city-owned vehicle is more cost-effective than paying out personal mileage on employee-owned vehicles.

As such, it is suggested that low usage vehicles may be candidates for non-replacement and/or task sharing. It is also important to note that in many cases, there may be operational rationale for individual vehicles to travel a relatively small number of kilometers annually, and this must be considered on a case-by-case basis. However, the general low kilometer trend observed across the fleet may point to the opportunity to downsize the fleet as a whole (i.e. reduce the total number of vehicles).

4.2.3.3 Vehicle Sharing Between Service Areas

A total of 32 active on-road vehicles are currently shared between two or more Service Areas. The quantity of both shared and dedicated vehicles by Service Area are presented in Figure 7. Fourteen (14) vehicles of these vehicles which share Service Areas are also identified as low kilometerage vehicles. Further vehicle sharing practices may present an opportunity to reduce the overall fleet size.

Figure 21: Number of Shared and Dedicated Vehicles by Service Area†



† Services Areas with dedicated vehicles only (i.e. no shared vehicles) not presented in this figure. Service Areas without shared vehicles are not depicted above.

4.2.3.4 Take-Home Vehicle Policy

The City does not currently have an official written take-home (personal use) vehicle policy for their fleet. However, the City currently allows for 49 in-scope vehicles (29% of the total active fleet) to be dedicated to a single employee who is permitted to take the vehicles to their personal residence at the end of the work day. Many of these take-home vehicles are observed to be attributed to City Departments and/or Service Areas in which employees do not necessarily work in an office consistently including building/property inspection works, by-law etc.). Commute or personal kilometerage versus work-related travel does not appear to be tracked or logged on a consistent basis.

Questionnaire: Review of Take-Home Vehicle Policy Employee Awareness

As part of this study, the responses to a 2017 questionnaire which was provided to 18 City employees, to understand their views on the current take-home vehicle practices, were reviewed. Employees were asked eight questions to determine what they understand about the take-home vehicle initiative and how they feel about potential future changes to this policy. The first question asked was if the employees were aware of a current policy for take-home vehicles. Of the 17 responses, 100% of the employees were not aware of a current policy for take-home vehicles. This indicates employees do not know when, who or what responsibilities/positions warrant the provision of a City-owned take-home vehicle. As a result, all employee respondents identified that a policy should be implemented to ensure

consistency throughout the organization and provide transparent rules and accountability. However, before a policy is developed, 63% of the employees indicated that an evaluation be completed to understand the efficiency and cost benefits of keeping or removing the take-home vehicle initiative, so as to provide context to the final outcome.

If and when a policy is developed, 40% of the employees indicated that the take-home vehicle operations should be limited to only employees that require it as part of their role (i.e. on-call staff, senior leaders, etc.). More than half of the employee respondents indicated that the policy should not have or be restricted by distance travelled as it would be difficult to enforce and implement at this time. Employees did raise concerns that the implementation process should be carefully presented as to not result in a decrease in morale and the potential for financial hardship for some employees. To ensure seamless operations, 82% of the employees indicated that a minimum 6 month notice period would be required if the policy changes to allow for employees to adjust for the unexpected expense of changing their commute.

4.2.3.5 Idling

The sample set of percent idling rates from a 2018 study on 29 vehicles provided by the City demonstrates idling rates which are higher than expected. As demonstrated in Table 3 (Table 9 BCP&I only) below, idling rates of the individual City vehicles sampled in the study ranged from 20% to 72% with an average of 36%. According to the 2018 study, this represents 4% - 44% of the vehicles fuel consumption directed toward idling activity, with an average of 15%. Unless there is operational rationale for a particular vehicle to idle (e.g. to power auxiliary equipment as discussed in Section 4.4.4), time that a vehicle spends idling is inherently its most inefficient operating state. Elevated levels of idling observed in the 2018 study may indicate that there are opportunities to reduce fuel consumption by targeting high-idling vehicles.

Table 8: Idling Rates – Total On-Road Active Fleet

	Idling Time	Idling Fuel Usage
Minimum	20%	4%
Maximum	72%	44%
Average	36%	15%

	Idle Fuel Usage (L)
Average per Vehicle	~200
Total	~5,800

Table 9: Idling Rates - Building Code Permits & Inspection Service Area

	Idling Time	Idling Fuel Usage
Minimum	27%	4%
Maximum	72%	44%
Average	45%	14%

	Idle Fuel Usage (L)
Average per Vehicle	~200
Total	~1,200

4.2.4 Overview of Current State

The following potential opportunities exist for efficiencies in moving the City fleet's current state to a future state:

1. Identifying and addressing unnecessarily large vehicle units;
2. Identifying and addressing low-travel vehicles;
3. Investigating opportunities for increasing vehicle sharing between Service Areas;
4. Developing and introducing a take-home vehicle policy; and
5. Investigating and addressing the operational rationale for vehicle idling habits.

4.3 "As-Should-Be" Future State

The City's 25-year strategic plan published in 2016 includes the commitment to have net carbon-neutral operations by 2040. Further, on April 23, 2019, the City of Burlington declared a climate emergency, which elevated climate action to be a priority consideration in all City actions and decisions. In terms of fleet, the path forward to implementing the necessary carbon emissions reductions is presumably via a Green Fleet Strategy or similar. As stated in the City of Burlington Corporate Energy and Emissions Management Plan: 2019-2024 (CEEMP), the City intends to prepare an update to the 2008 Green Fleet Strategy. The recommendations presented herein are intended to support and guide the forthcoming update to the Green Fleet Strategy.

In order to meet the City's carbon neutrality objectives, the City will need to continue shifting to hybrid and electric vehicles, with the goal of full or near-full conversion of the fleet to low or no carbon emission vehicles over the next 20 years. In addition, the City will need to invest in technologies and studies to support these shifts including:

- A detailed Fleet Operations Analysis, including the study of the operational requirements of individual vehicles, and how they may be used more efficiently;
- The adoption of on-board vehicle data capture (automated vehicle location [AVL] including GPS location, fuel use, kilometers travelled, idling rates, and driver behaviour, and other metrics);
- Dedicated personnel to track vehicle performance including fuel efficiency and opportunities for improvement and conduct reporting to relevant departments/service areas for both individual vehicles and the fleet as a whole;
- Greater adoption of hybrid technologies across all vehicle classifications; and
- Development of electric vehicle charging infrastructure to facilitate transition to greater electric vehicle adoption within the City.

These modifications would require that policy and technological shifts be implemented to support successful deployment. Some of the required shifts include:

- Enhanced funding from provincial and federal governments to allow for faster and more consistent integration of technological solutions, including fleet analytics, electric charging infrastructure, and technology to support reserving/signing out shared vehicles;
- Addition of resources (personnel) to capture, analyze and report on data related to fleet performance and costs, and future enhancements (technologies, operational considerations) that may be relevant to the City;
- Changes within the City to allow for the Fleet Department to have enhanced management over the City's fleet, as the current structure provides hurdles to this corporate function to be delivered equally across Departments (e.g., level of engagement and responsiveness of customers in others Departments); and
- Continued allocation of expenditures to unit owners (Departments/ Service Areas) such that there is transparency on the cost of vehicle operations and owners can be held accountable for the full costs.

4.4 Findings & Recommendations

Five recommendations have been identified, including:

1. Right-sizing vehicles;
2. Right-sizing/reducing the overall fleet;
3. Investing in hybrids;
4. Piloting auxiliary power options; and
5. Introducing a take-home vehicle policy.

The recommendations are further discussed in the sub-sections below.

4.4.1 Right-Size by Vehicle

Of the on-road vehicles in the fleet, 34% are HD trucks, 35% are LD trucks, 8% are vans, and 7% are SUVs. This leaves only 16% as LD cars. In summary, the majority of City vehicles are large and therefore have comparatively larger fuel consumption rates and GHG emission rates. It is understood that for a variety of operational reasons, LD cars may not be suitable for certain job functions. However, the rationale for procuring larger vehicles should be clearly identified in each case.

It is recommended that the City develop and implement a customized 'Right-Sizing Assessment' process. The process should be implemented at the outset of purchasing a new or replacement vehicle. Table 10 below lists criteria that may necessitate the need for a larger vehicle. Each vehicle procurement will need to be assessed on a case-by-case basis; however, a written process/procedure would provide transparency, accountability, and consistency in the right-sizing process. Note that criteria such as driver personal preferences and historical vehicle size should not be considered in the right-sizing assessment (exceptions may apply for driver accessibility or other needs, on a case-by-case basis). If the assessment does not suggest any reasonable operational requirements for an increased vehicle size, then a LD car

(ideally hybrid) should be used as the default. If the assessment does suggest that operational requirements necessitate a larger vehicle, then the most fuel efficient vehicle that still meets operational needs should be selected[4]. In order to effectively implement the right-sizing assessment across the organization, it is recommended that authorization must be acquired from a high level of management if vehicle users decide not to abide by the Fleet Services right-sizing assessment vehicle recommendation.

Table 10: Suggested Vehicle Right-Sizing Assessment Criteria

Assessment Criteria	Assessment Analysis
Off-Road Travel – Will the vehicle travel off-road regularly? Will the vehicle be on construction sites regularly?	Vehicles that travel off of paved roadways (e.g. on boulevards, on construction sites) may require larger vehicle classes.
Towing Capability – Will the vehicle be required to tow equipment? What is the required towing capacity? What is the weight of the equipment being towed? How often will the vehicle tow?	Vehicles towing equipment regularly may require larger vehicle classes. If the vehicle is not towing equipment regularly, the potential to share a larger vehicle may exist.
Equipment – Will the vehicle have mounted equipment? How often will the mounted equipment be used? Will the vehicle be used as a mobile office? Will the vehicle be used to transport equipment or materials (e.g. signs)?	Vehicles with mounted equipment may require larger vehicle classes. If the vehicle does not have the equipment mounted regularly, the potential to share a larger vehicle may exist. If the vehicle is required to transport materials regularly larger cargo capacity/truck bed space may be required.
Safety/Security – Is the vehicle operated in the vicinity of large heavy duty equipment?	Vehicles operating in the vicinity of equipment with poor sightlines may require larger vehicle classes for visibility.
Other Operational Requirements – Are there other operational requirements that necessitate a certain vehicle size?	Certain unique operational requirements may require a larger vehicle class.
Other Personnel Requirements – Are there other personnel related requirements that may necessitate a certain vehicle size (e.g. accommodations for disabilities).	Certain unique personnel requirements may require a larger vehicle class.

4.4.1.1 Cost Implications

As previously discussed, the current analysis did not consider the operational requirements of individual vehicle units. However, Table 11 presents general estimated cost savings of downsizing individual vehicles across classes.

[4] Fuel efficiency ratings for various vehicle makes/models is available from Natural Resources Canada's Fuel Consumption Guide which is updated annually <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/fuel-consumption-guide/21002>

Table 11: Right-Sizing Vehicles Cost Implications†

Downsizing Category	Capital Cost Savings	2020 – 2024 Fuel Savings*	Total 5-Year Savings
Heavy Duty Truck → Light Duty Truck	$2,000	$3,500 - $4,000 per year	$20,000
Light Duty Truck → Hybrid SUV	$18,000	$2,000 - $2,500 per year	$30,000
Light Duty SUV → Hybrid Car	n/a	$500 - $700 per year	$4,000

† Costs are approximate. Costing basis provided in Appendix C2.

* Based on the fuel consumption for the average fleet annual kilometerage of 15,500 kilometers/year. Annual fuel savings for 2020 includes a $20/tonne CO_2e carbon tax with a $10/ year increase up to $50/tonne carbon tax in 2024 (as currently projected).

Given that the Right Sizing Assessment would be implemented during the replacement process, cost savings associated with this recommendation would be distributed over time, and would be depended on the degree to which vehicle downsizing is undertaken across the fleet.

4.4.2 Right-Size/ Reduce Fleet

A second component of right-sizing involves the consideration of the fleet as a whole. Right-sizing the fleet strikes the balance of owning/managing the smallest possible fleet while still meeting operational needs such that employees can efficiently and effectively do their work to the level of service expected by City residents.

There are a number of vehicles that show low kilometers travelled. Specifically, there are 80 vehicles (approximately 47% of the active on-road fleet) which travelled less than 10,000 kilometers in 2017 or 2018 (see Appendix C3). Analysed in a slightly different way, there are 66 vehicles (39%) which travelled less than 10,000 kilometers averaged over 2017-2018 reporting years (including four vehicles in the BCP&I Service Area). Note that there is operational rationale for individual vehicles travelling low kilometers for many vehicles, which must be considered on a case-by-case basis. However, the general low kilometerage trend may point to the opportunity to downsize the fleet as a whole (i.e. reduce the total number of vehicles).

It is recommended that the City undertake an assessment of vehicles with low kilometerage (e.g. less than 10,000 kilometers per year). The option for interdepartmental or task sharing should be considered for vehicles that have no operational rationale for low kilometerage. Investing in an AVL system would provide valuable vehicle usage information to support and rationalize vehicle sharing on a unit-by-unit basis.

In addition, the 'Right-Sizing Assessment' discussed in the previous section should include an assessment of kilometers travelled in the case of a replacement vehicle. If the total annual kilometerage was less than 10,000 – 15,000 kilometers (and there is no reasonable operational rationale), then non-replacement, car sharing across Service Areas, or other means of reducing fleet size should be

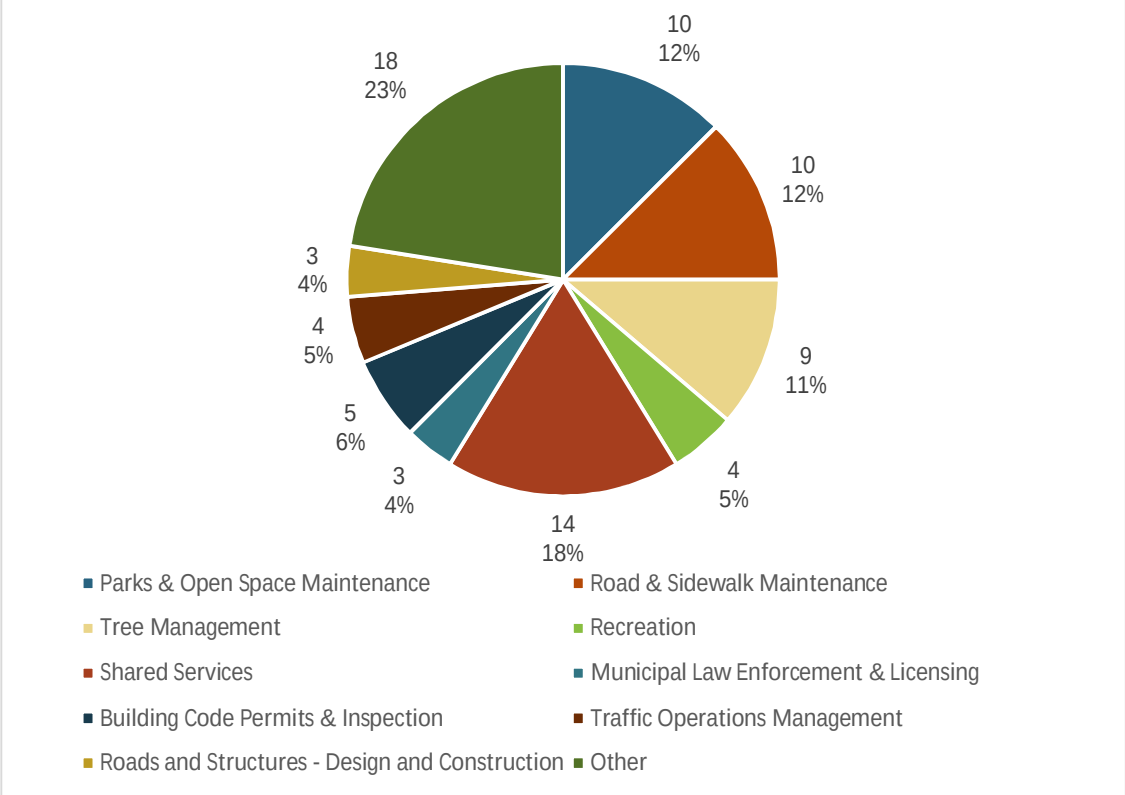
considered. It is recommended that this process be undertaken gradually, through the implementation of a rigorous vehicle replacement assessment process, as opposed to a sudden reduction in the vehicle fleet. A gradual approach will mitigate potential impacts to fleet functionality for City staff.

Current vehicle sharing between Departments/Service Areas is typically on a seasonal basis. There is currently no formal system for vehicle sharing tracking as vehicles are parked at the same shared location (City Operations Centre). Service Area Supervisors coordinate vehicle sharing internally. The move towards greater interdepartmental task sharing will necessitate an investment in vehicle tracking technology and/or an electronic vehicle booking/sign-out system.

The Service Areas which may benefit from this low kilometerage assessment, and which currently demonstrate the greatest potential for task sharing within a Service Area include (see Figure 22):

- Parks and Open Space Maintenance;
- Road and Sidewalk Maintenance; and
- Tree Management.

Figure 22: Low Travel Vehicles (<10,000 km) - by Service Area



4.4.2.1 Cost Implications

It is not possible to determine which vehicles have a reasonable operational requirement for low usage, or low kilometerage without conducting a thorough vehicle-by-vehicle analysis. However, reducing the number of individual vehicles in on-road fleet has obvious capital cost savings. For example, if one third (approximately 27) of the low-kilometerage vehicles were removed from the fleet through improved vehicle sharing practices, approximately $1,100,000 in capital cost savings could be observed over the vehicles' regularly scheduled replacement/lifecycle period. Similarly if one fifth (approximately 16) of the low-kilometerage vehicles were removed from the fleet, approximately $665,000 in capital cost savings could be observed over the vehicles regularly scheduled replacement period. Investment in AVL technology is a key element to this low-kilometerage vehicle assessment, as it would allow for the capture and analysis of data related to driver behaviour and usage. An approximate breakdown of this analysis is presented in Table 12.

Table 12: Fleet Reduction Cost Implications[α]

Vehicle Class	Number of Low-travel Vehicles	Approximate Capital Cost of Replacement Vehicle	Capital Cost Savings if ONE THIRD of Low Kilometer Vehicles were NOT Replaced[β]	Capital Cost Savings if ONE FIFTH of Low Kilometer Vehicles were NOT Replaced[β]
LD Car	13	~$19,000	~$80,000	~$50,000
LD Truck	25	~$47,000	~$390,000	~$235,000
HD Truck[γ]	33	~$50,000	~$545,000	~$325,000
LD Van	6	~$32,000	~$65,000	~$40,000
LD SUV	3	~$23,000	~$25,000	~$15,000
Total	80	-	~$1,100,000	~$665,000

α Assumptions:

- Vehicles with less than 10,000 kilometers travelled in 2017 or 2018.
- Capital cost savings based on Manufacturer's Suggested Retail Price (MSRP) of a vehicle typical to the City's existing fleet. The City's negotiated tender price may differ.
- Approximate capital cost is presented for conventional vehicle replacement. Hybrid premium not included.

β Vehicle assessments should be undertaken to determine whether or not there is operational rationale for vehicles travelling low kilometers.

γ HD truck count includes 15 units which are identified as snow plows. Capital cost of HD Truck replacement assumed to be a 'typical passenger vehicle' as per Appendix C2.

4.4.3 Invest in Hybrids

The City has set a target to achieve net carbon neutrality by the year 2040, as stated in the City's Strategic Plan. As previously mentioned, moving toward carbon neutrality will require a significant uptake in hybrid and electric vehicles.

The City currently has 21 hybrid vehicles within its fleet (15 LD cars, four SUVs and two HD trucks). The City does not have any fully electric vehicles at this time.

Procuring hybrid vehicles in lieu of conventional vehicles during regular replacement processes may demonstrate a slightly higher capital investment, but will also demonstrate fuel savings and GHG emission reduction over time. It is recommended that the City prioritize investment in hybrid vehicles over conventional vehicles as vehicles come due for replacement.

Currently, trucks (both HD and LD) make up 85% of the City's on-road fleet related GHG emissions, as presented in Figure 19 of Section 4.2.2. Hybrid and electric technology is often more focused on LD vehicles. And although LD vehicles may be excellent candidates for hybrid or electric replacement (given the lower capital cost differentials and operational requirements of these types of vehicles in City functions), the City will see greater GHG emissions reductions with a focus on HD trucks.

As presented in Table: **13** below, the observed fuel efficiencies for conventional and hybrid vehicles in the City's fleet show that by transitioning to hybrid vehicles, the fuel efficiency of vehicles could improve by approximately 5 L/100 kilometers on average across various vehicle classes.

Table: 13: Observed Fuel Efficiencies for Conventional and Hybrid Fleet Vehicles

Vehicle Classification	Average Fuel Efficiency Conventional (Hybrid) [L/100 km]	Minimum Fuel Efficiency Conventional (Hybrid) [L/100 km]	Maximum Fuel Efficiency Conventional (Hybrid) [L/100 km]
LD Car	9.9 (5.8)	6.9 (3.0)	13.3 (8.8)
LD Van	18.2	11.0	22.1
LD Truck	17.7	12.3	37.0
LD SUV	10.7 (5.9)	7.4 (3.7)	17.0 (8.2)
HD Truck	51.7 (46.1)	24.0 (45.6)	97.9 (46.5)
HD Van	29.8	n/a	n/a

4.4.3.1 Conventional Truck Conversion Technologies

Currently, the market is limited for hybrid and/or electric pickup trucks. As such, reducing the GHG emissions associated with LD trucks will have to be achieved through reducing the overall usage of such vehicles in the near term. There are, however, new technologies on the market which provide conversion of LD pickup trucks to hybrid. These after-market technologies can be installed on Ford, Chevrolet, GMC, Isuzu vehicles and possibly on others[5]. It is recommended that the City invest in hybrid conversion technologies for LD trucks where no hybrid vehicle class is commercially available.

XL Fleet Electrification (XLFE) is an example of a company offering these services. XLFE quotes an estimated 25% – 50% reduction in fuel consumption post-installation of the conversion technology, at a

[5] XL (2019). Electrify Your Favorite Fleet Vehicles. Accessed November 7, 2019 from https://www.xlfleet.com/content/vehicles/

cost of approximately $10,000 per LD truck ($20,000 for conversion to PHEV). Neighbouring municipalities/regions including Oxford County, City of Toronto, and York Region have converted a portion of their fleet using XLFE technologies. XLFE technology includes the installation of a traction motor for regenerative braking, and a battery pack for energy storage. XLFE also offers an option which includes plug-in charging capacity (conversation to plug-in hybrid)[6].

4.4.3.2 Cost Implications

See Table 14 for fuel efficiency, capital cost savings, fuel savings, and overall GHG reductions with the replacement/conversion of a single conventional LD truck with a hybrid LD truck. The same information is also provided for a conventional LD car replacement with a hybrid in Table 10. Through the lens of ROI, it is estimated that it would take approximately 5 to 10 years for the increased capital cost of a LD truck to be balanced by fuel cost savings (dependant on observed fuel efficiency improvements), and approximately 4 years for the LD car.

Table 14: LD Truck Single Vehicle Conversion to Hybrid Cost Implications

	Conventional	Hybrid	Difference
Fuel Efficiency* (L/100 km)	18.0	9.0 to 13.5	-4.5 to -9.0
Capital Cost‡	~$47,000	~$57,000	~ +$10,000
Annual Fuel Cost†	~$3,500	~$1,500 to ~$2,500	~-$1,000 to -$2,000
Annual GHG Emissions (tonnes CO_2e)	6.47	3.24 to 4.85	-1.62 to -3.24

* Based on observed City fuel efficiency averages from 2017-2018. Hybrid fuel efficiency improvements estimated to be 25% - 50%, as per XLFE data.

‡ Hybrid capital cost investment estimated to be $10,000 as per XLFE data.

† Based on observed average vehicle kilometers travelled in 2017 and 2018 (15,500 kilometers). Projected carbon tax included. Costs are presented for 2020.

Table 15: LD Car Single Vehicle Replacement with Hybrid Cost Implications

	Conventional	Hybrid	Difference
Fuel Efficiency* (L/100 km)	9.8	6.1	-3.7
Capital Cost	~$19,000	~$23,000	~ +$4,000
Annual Fuel Cost†	~ $2,000	~$1,000	~-$1,000
Annual GHG Emissions (tonnes CO_2e)	3.53	2.18	-1.35

*Based on observed City fuel efficiency averages from 2017-2018

† Based on observed average vehicle kilometers travelled in 2017 and 2018 (15,500 kilometers). Projected carbon tax included. Costs are presented for 2020.

[6] XL (2019). Fleet-Ready™ Upfits: Electrification Without Limits. Accessed November 7, 2019 from https://www.xlfleet.com/content/technology/

4.4.4 Consider Auxiliary Power Options

City staff have identified that there are currently 27 on-road vehicles in the fleet with the function of providing auxiliary power to mounted equipment (e.g. aerial lifts) or lighting. These vehicles leave their engines idling in order to power the necessary equipment. In addition there are 30 vehicles used as mobile offices (17 under BCP&I Service Area).

It is recommended that the City invest in the implementation of auxiliary power options in vehicles identified as being mobile offices or otherwise requiring auxiliary power. Vehicles identified as having high-idling rates study (as discussed in Section 4.2.3.5) may also be considered for early adoption of this technology to determine savings potential and ROI rates prior to a larger investment in this technology option. The GRIP Idle Management System is an example of an after-market vehicle retrofit option which reduces vehicle idling. GRIP quotes an estimated 30% reduction in vehicle idling post-installation[7].

4.4.4.1 Cost Implications

Cost implications for the investment in GRIP technology for HD trucks range from approximately $7,500 to $18,000 as presented in Table 16. The estimate for GRIP installation in a LD vehicle (for use in powering a mobile office, for example) is approximately $5,000 with necessary options (including installation). The estimated fuel savings resulting from the investment in auxiliary power are presented in Table 17.

Table 16: Heavy Duty Truck (Aerial) GRIP Upfitting Cost Estimate

Simplicity Air Ltd. GRIP Technology	Cost per Vehicle*
GRIP Installation	$7,500
Option #1 - Replace Original Equipment Manufacturer Batteries	$1,500
Option #2 - Diesel Espar Heater Kit	$3,500
Option #3 - AC System	$5,500
Capital Cost	$7,500 - $18,000
Estimated Cost Savings per HD Truck (over 5 years)‡	~$8,500

*Costs are approximate and represent an estimate prepared on October 7, 2019 by Simplicity Air Ltd. (Quote #1649) for the City of Burlington. Costs are subject to change without notice and are exclusive of HST.
‡Cost savings estimate is approximate. Includes carbon tax and fuel cost as detailed in Appendix C2.

Table 17: Auxiliary Power Vehicles Estimated Savings

Auxiliary Power Requirements	Vehicle Count	30% Fuel Usage (Estimated Fuel Savings)*	Estimated 5-year Savings*
Mobile Office Only	30	23,000 L	~ $150,000

[7] GRIP Idle Management Inc. (n.d) Deploying Anti-Idling Technology to Reduce Operational Costs and Improve Fleet Performance. Retrieved November 13, 2019 from https://wicleancities.org/wp-content/uploads/2019/05/Duncan-Curd-GRIP-Idle-Management.pdf

Auxiliary Power Requirements	Vehicle Count	30% Fuel Usage (Estimated Fuel Savings)*	Estimated 5-year Savings*
Auxiliary Equipment Only	27	35,000 L	~ $235,000
Total Requiring Auxiliary Power	57	58,000 L	~ $385,000

* Totals may not add up due to rounding

* Estimated cost savings for vehicles active in 2017 and/or 2018 based on unit-specific average fuel use, kilometerage, and fuel efficiency data. Cost savings for new vehicles active in 2019 only estimated based on average vehicle kilometers travelled in 2017 and 2018 (15,500 kilometers). Does not include the cost of auxiliary power equipment.

4.4.5 Refine the Take-Home Vehicle Policy

As described in Section 4.1.3.2, a benchmarking scan involving six per municipalities was undertaken as a par this assessment. Full details of municipal scan results are presented in **Appendix C1**.

All six peer municipalities permit staff to take-home vehicles, under specific policy or job function conditions, generally on-call/emergency functions. All municipalities surveyed also park fleet vehicles at secure satellite facilities (e.g. community centres, public works buildings, etc.), with security features ranging from cameras, to locked gates/fencing, to simple lighting. One municipality highlighted that their fleet's AVL (including GPS) provided an additional element of security, as these devices allow remote tracking of the vehicles with notification of unauthorized vehicle access or movement.

The results of the municipal and employee surveys indicate that it would be beneficial for the City to develop and introduce a take-home vehicle policy to provide clear direction on when take-home vehicles are appropriate, and implement the policy consistently across City Departments.

This policy may include, but is not limited to:

- Clarifying roles and/or functions that may warrant taking a vehicle home (ex. employee is on-call);
- Identifying and providing two to three secure 'satellite' parking locations to accommodate employees who do not necessarily work in a consistent office location; and
- Clarifying the application and approvals procedure for either:
  - Take-home vehicles; or
  - Parking vehicles at a satellite location overnight.

Results of the municipal scan indicated that eligibility criteria for take-home vehicles included primarily job functions related to responding immediately to emergency events (e.g. on-call response to water main breaks, fire response).

4.4.5.1 Cost Implications

As discussed in Section 4.2.3.4, personal use kilometers on take-home vehicles are not accurately tracked. As such reliable data on fuel use associated with personal vehicle use is not readily available. However, estimates from City staff (based on approximate home locations of individual take-home

vehicle operators) estimate that approximately 30% of take home-vehicle kilometers can be considered "personal use". Based on this assumption, the estimated savings in fuel usage costs and GHG emissions are presented in Table 18.

Table 18: Take-Home Vehicle Policy Estimated Savings

Reduction in Kilometerage	Annual Fuel Cost Savings*	Annual GHG Emissions Reduction (tonnes CO_2e)*
30% Reduction (~235,000 km)	~ $38,000	70.9

* Totals may not add up due to rounding. Annual fuel cost savings includes carbon tax savings.

4.4.6 Recommendations Summary

The following five key recommendations for cost savings and GHG reduction opportunities within the City's fleet are suggested:

1. Develop and implement a customized 'Right-Sizing Assessment' process to be implemented at the outset of purchasing a new or replacement vehicle;
2. Undertake an assessment of vehicles with low kilometerage to identify further opportunities for vehicle sharing within Service Areas and interdepartmentally, and to identify candidate vehicles for 'non-replacement';
3. Prioritize investment in hybrid vehicles over conventional vehicles as vehicles come due for replacement, and retrofit existing conventional vehicles with hybrid conversion technologies;
4. Invest in the implementation of auxiliary power options in vehicles identified as being mobile offices or otherwise requiring auxiliary power; and
5. Introduce a take-home vehicle policy, and implement it consistently across Departments.

In order to meet the City's carbon neutrality objectives, the City will need to prioritize investment in hybrid and electric vehicles over conventional vehicles, with the goal of full or near-full conversion of the fleet to low or no carbon emission vehicles over the next 20 years. In addition, the City will need to invest in technologies and studies to support these shifts including:

- A detailed Fleet Operations Analysis, including the study of the operational requirements of individual vehicles, and how they may be used more efficiently;
- The adoption of AVL (including GPS location, fuel use, kilometers travelled, idling rates, and driver behaviour, and other metrics);
- Personnel resources to track vehicle performance including fuel efficiency, assess AVL analytics, and identify opportunities for improvement for both individual vehicles and the fleet as a whole;
- Hybrid conversion technologies; and
- Electric vehicle charging infrastructure.

These modifications would require that policy and technological shifts be implemented to support successful deployment. Some of the required shifts include:

- Enhanced funding from provincial and federal governments to allow for faster and more consistent integration of technological solutions, including fleet analytics, electric charging infrastructure, and technology to support reserving/signing out shared vehicles;
- Addition of resources (personnel) to capture, analyze and report on data related to fleet performance and costs, and future enhancements (technologies, operational considerations) that may be relevant to the City;
- Changes within the City to allow for the Fleet Department to have enhanced management over the City's fleet, as the current structure provides hurdles to this corporate function to be delivered equally across Departments (e.g., level of engagement and responsiveness of customers in others Departments); and
- Continued allocation of expenditures to unit owners (Departments/ Service Areas) such that there is transparency on the cost of vehicle operations and owners can be held accountable for the full costs.

5.0 DAP

5.1 Service Profile

5.1.1 Focus of DAP Service Review

The Development Approvals Process (DAP) is a forward facing City service composed of three major components: i) Planning Act mandated land use decisions, ii) Engineering driven servicing/grading solutions, and iii) Building Code Act permits and inspections. From a customer journey perspective, DAP should be an efficient, coordinated and predictable "conveyor belt" designed to secure timely and predictable regulatory decisions from the City and other agencies as required. This service delivery review zooms in on the infill development component of DAP that immediately precedes Building permit applications. The review addresses Burlington's multi-residential and non-residential Site Plan approval stream as well as Site Plan-exempt residential re-development scenarios.

5.1.2 Development Approvals in Post-Greenfield Burlington

Burlington has almost completed its urban form evolution from a GTA greenfield growth municipality into a mature, built-out City primarily experiencing infill redevelopment. Experts agree that municipal development approvals in a greenfield municipality are inherently straight-forward compared to the complex development approvals issues faced by an infill municipality. There are economies of scale inherent in sub-division based planning, servicing and grading/drainage matters. Zoning in a greenfield setting is typically less complicated. Inspections for multiple residential units can be efficiently bundled for execution on one site. There are typically few neighbourhood "spillover" issues during greenfield development for Council and staff to contend with. Greenfield public consultation is generally less intensive and less contentious.

Infill development is a different story. Both the policy framework and the execution of municipal infill development approvals is more complex. The interests of new development and existing development are not necessarily the same. A difficult balancing act of these interests is required. Applicants for infill development projects rightly expect timely, consistent and predictable municipal decision-making processes. Neighbours and established communities rightly expect minimal disruption and no adverse impacts on their properties. They also expect their neighbourhood character issues to be given appropriate weight in the decision-making process for new construction.

The consequences of infill development are clear in terms of Burlington's approvals process timeframes and required staff resourcing. While a mature infill municipality like Burlington may experience lower overall application volumes than it did during its greenfield development phase, the staff processing effort per application is orders of magnitude higher and the technical challenges are more difficult to resolve.

5.1.3 Red Tape/Red Carpet

Under the leadership of the Mayor's Office, Burlington has undertaken the Red Tape/Red Carpet initiative to engage with concerned citizens/builders/businesses around performance issues and improvement opportunities associated with the development approvals process (DAP). Constructive criticism about a confusing and uncoordinated development approvals "journey" have been brought forward by builders and consultants operating in the custom home construction sector. Their critique has played an important role in positioning and informing our team's work.

5.1.4 Bill 108 Game Changer

Provincial legislative changes have put considerable pressure on municipal DAP processes across Ontario. Bill 108 has compressed the "No Municipal Decision" timeframe trigger for Local Planning and Appeals Tribunal (LPAT) appeals pertaining to Official Plan Amendments, Re-zonings and Draft Plan of Sub-division. Municipalities have responded by attempting to compress DAP processing timeframes in an attempt to match the new Bill 108 timeframe triggers. Burlington has made Planning Act application processing a priority to manage LPAT appeals risk resulting from Bill 108. In turn, timely deployment of finite available resources to applicable law clearances has been negatively affected.

Reality for Burlington: Bill 108 is a DAP Game Changer

- Bill 108 legislated process changes merge elements of previous OMB + LPAT models
- Compressed Planning Act timeframes for triggering a "no-decision" appeal by applicants

	Pre-Bill 139	Bill 139	Bill 108
Official Plan/Official Plan Amendment	180 days	210 days	120 days
Zoning By-Law Amendment	120 days	150 days	90 days
Draft Plan of Subdivision	180 days	180 days	120 days

← Also applies to OPA/Re-zoning Combo-pack

* Site Plan Control Section 41 "no decision" timeframe for triggering an LPAT appeal is 30 days.

Figure: Clearances Required for Site Plan & Site Plan Exempt Projects

Bill 108 has compressed timeframes that trigger an LPAT appeal. OPA and Re-zoning LPAT appeal timeframes have been cut by a third. Bill 108 has upped the ante on the City to process Planning Act applications on timelines that approach/mirror the LPAT trigger times. As a result, the City staff who deal with Planning Act applications and Zoning/Grading approvals (that are the subject of this review) face difficult triaging decisions about where to devote finite resources.

Given all of the above scope defining factors, this 3rd party independent service review has been undertaken to answer the following fundamental question:

Are Burlington's "As Is" development approvals processes, staffing commitments, IT tools, and cost recovery user fees efficiently and effectively calibrated to deal with the complexities and realities of infill development in a mature, post-greenfield City?

5.1.5 Zoning and Grading/Drainage Clearances: Background & Origins

In 2005 the Province passed Bill 124 amendments to the Building Code Act. Bill 124 imposed mandatory building permit decision timeframes on all Ontario municipalities. For instance, under Bill 124 complete building permit applications for single family housing would require a permit issuance decision by the municipality in ten business days or less. The compressed timeframes contained in Bill 124 posed a significant operational challenge for high volume building permit municipalities like the greenfield Burlington of 2005.

In order to simplify the building permit process that was subject to "the Bill 124 clock", Burlington undertook a significant re-engineering of its traditional development approvals approach. The Zoning compliance check and the Grading/Drainage plot plan review that had traditionally been executed by City staff after the receipt of a complete building permit application would now precede the complete building permit application. The City would require building permit applicants to first acquire a Zoning Clearance certificate and a Grading/Drainage Clearance certificate. The result was a significant streamlining of the "on the clock" Bill 124 building permit process, which would focus exclusively on Building Code compliance. The City could now avoid the coordination challenges of dealing with zoning compliance and grading/drainage issues during a compressed ten business day timeframe. In 2005-2006, Burlington's Zoning and Grading/Drainage Clearances were expected to be issued in 5-7 business days after receipt of a complete application. See Figure X.

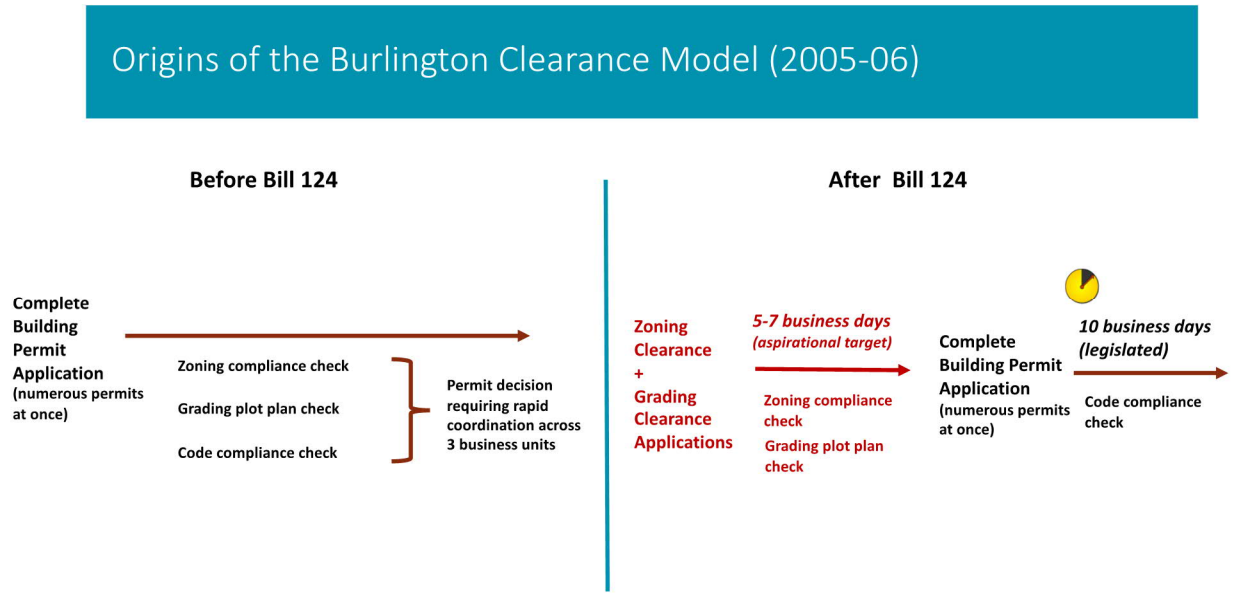


Figure: Origins of the Burlington Clearance Model (2005-06)

Zoning and Grading/Drainage clearances have evolved from their greenfield development origins in 2005-2006 to become important elements of Burlington's infill development approvals processing model in 2019. See Figure.

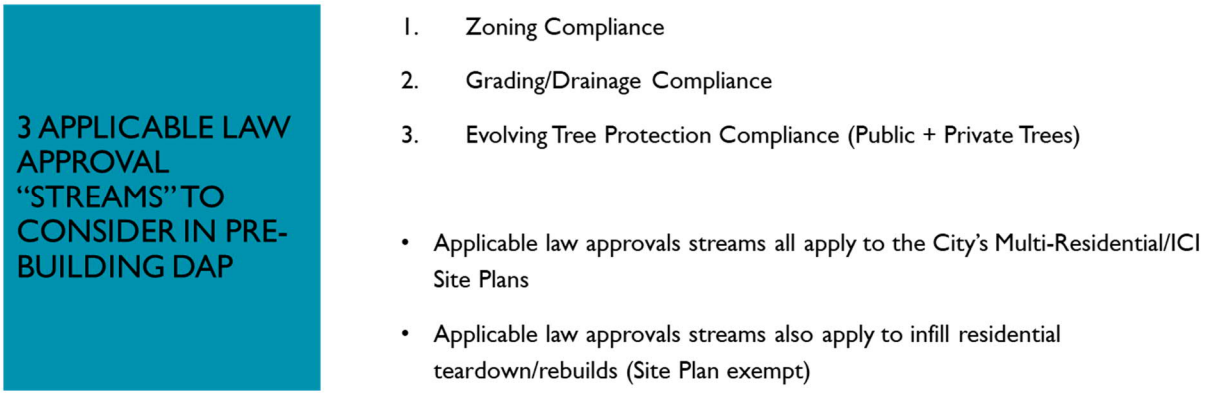


Figure: Clearance Required for Site Plan & Site Plan Exempt Projects

This clearance driven infill development approvals model is explored below in more detail in the "As Is" section of this report.

5.2 "As-Is" Current State

5.2.1 "As Is" State of Infill Residential Development Approvals

In Burlington infill residential development on a single lot of record is exempt from Site Plan control. In recent years approximately 100 tear down/rebuild houses and 200+ significant additions/accessory buildings have been approved annually through the City's Site Plan exempt development approvals clearances model. A fluctuating but significant volume of minor accessory buildings, swimming pools and decks are also processed under the Site Plan exempt approvals model.

The Performance Concepts team (and expert City planning staff) believe a compelling legal argument can be made that Grading/Drainage and Tree Protection By-laws are "linked elements" of the Zoning By-Clearance, which in turn is indisputably applicable law for Building Permits. Therefore, we conclude there are three distinct streams of "applicable law" approvals in Burlington that infill residential development applicants need to satisfy in order to submit a building permit application. These three applicable law approval streams are set out in the "As Is" figure below.

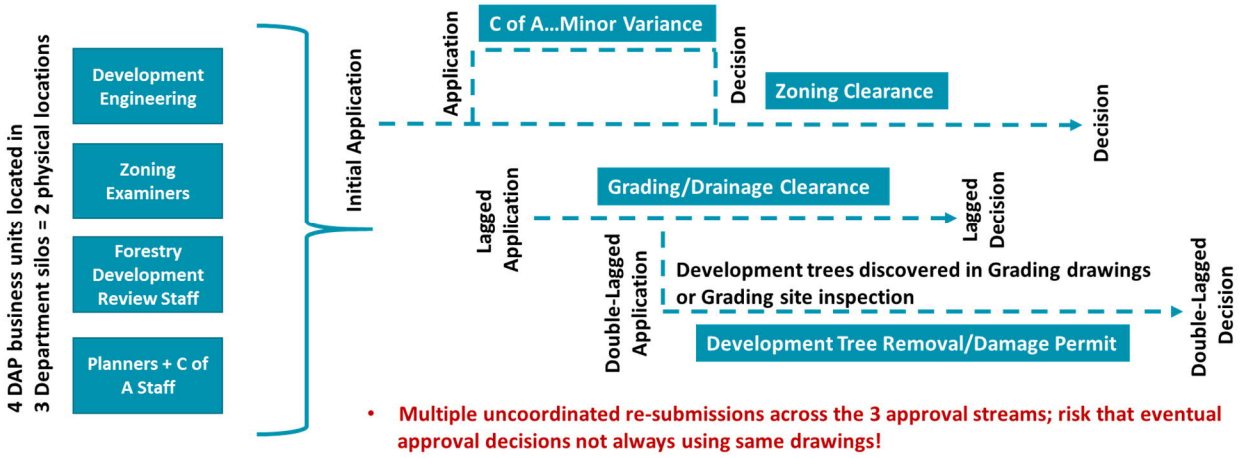


Figure: "As Is" Current Processing Realities

Zoning and Grading/Drainage Clearances are mandatory requirements for each and every residential infill building permit application. The Chief Building Official (CBO) currently will not accept a building permit application without these Clearances. Our team fully supports the CBO in taking that position. A parallel City permit to remove or damage a qualifying pubic tree or a qualifying private "development tree" should also be required when appropriate. This relatively new business rule is consistent with tree canopy protection, and the City's climate change emergency resolution. The number of private "development trees" requiring removal/damage permits would increase significantly if Council expands, and makes permanent, its private tree bylaw across the entire City. For instance, Oakville currently processes around 900 private "development tree" permits annually. Burlington is not yet properly resourced to take on this expanded review/site inspection burden. A City report containing the staff resourcing business case for overseeing development tree matters (prior to Building permit applications) is imminent.

Currently the City's Zoning and Grading/Drainage clearances can be/are applied for separately and can be/are processed on independent timelines - despite the fact that the technical rationales for these approvals can be interwoven and should be resolved in parallel. The tree removal/damage permit is almost never applied for at the same time as the Zoning/Grading clearances. In fact, many applicants are unaware of the need to apply for all three applicable law approvals. Grading/drainage clearance drawings may or may not display impacted development trees that require a permit. If they do, then Engineering Development unit staff notify the applicant and Forestry staff of the need for a permit. Often the existence of tree permit requirements only become evident when Engineering Development staff conduct a site visit associated with the Grading/Drainage clearance application review process. The City's website does not emphasize the interrelationship of the three applicable law permits, nor does it layout the optimal customer journey process for obtaining the necessary approvals prior to building permit application.

From the perspective of the applicant's development approvals journey the current process is disjointed, inefficient and sluggish. Applicant dissatisfaction has been well documented through the Mayor's Red Tape/Red Carpet initiative. Four City business units imbedded in three City departments, residing in two separate buildings, are charged with administering the three applicable law approval flows.

From a risk perspective, the current model for executing pre-building permit applicable law approvals is not sustainable. The isolated/uncoordinated execution of these three applicable law approval process flows could, and probably does, result in materially different sets of drawings being used by staff to clear the way for a building permit application for a tear down/rebuild house, an addition, or an accessory building.

Of particular note; there are no standardized "applicable law" decision timeframe targets currently in place in Burlington. City staff deal with processing timeframe demands on a "best efforts" basis, that is dependent on workload and application volumes they experience at any particular point in time. Staff were unable to extract Clearance timeframe reports from the City's AMANDA workflow system despite numerous requests made by the Performance Concepts/Dillon team during this review. The City is essentially "flying blind" in terms of any situational awareness of the overall approval timeframes being experienced by applicants across the three streams of applicable law approvals for infill residential redevelopment.

Finally, the City's current organizational design is not optimal for efficient DAP execution. The four core business units that need to seamlessly coordinate their DAP processing efforts are currently imbedded in three different City departments located within multiple City buildings. The City Manager is currently reconfiguring the City's overall organization design to improved service delivery performance and reduce risk. His model of restructuring will include a series of increasing specific org design refinements. The organization design holy grail of "form must follow function" will be useful in considering organization design refinements that will align with DAP processing improvements.

The following figure itemizes the various performance improvement issues.

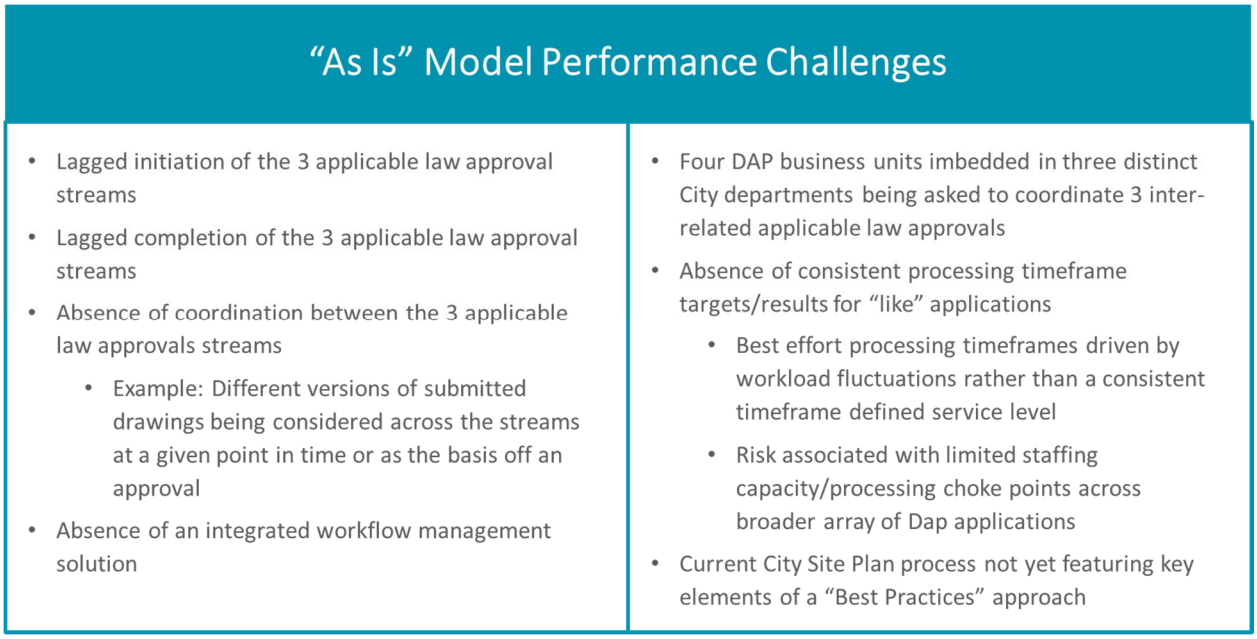


Figure: "As Is" Model Performance Challenges

5.2.2 "As Is" State for Infill Site Plan Approvals Process

Site Plan approval is an applicable law requirement for multi-residential and non-residential development in Burlington. No building permits are issued without draft approved or final approved Site Plans. Zoning and Grading/Drainage clearance certificates (including stamped paper drawings) are currently produced at the end of the Site Plan approval process in order to trigger Chief Building Official acceptance of building permit applications.

There is an emerging consensus across the Greater Golden Horseshoe regarding "best practices" in municipal development approvals business rules and processes. These "best practices" definitely apply to Site Plan approvals in Burlington and across the rest of the Greater Golden Horseshoe. The municipal "best practices" consensus involves the following matters:

Mandatory pre-consultation meetings with applicants and municipal staff are critical to developing mutually agreed-upon "complete application" submission requirements. High-quality complete application submissions enabled by fulsome pre-consultation reduce the number of required downstream technical review cycles, the number of applicant re-submissions, and the overall timeframes for approval.

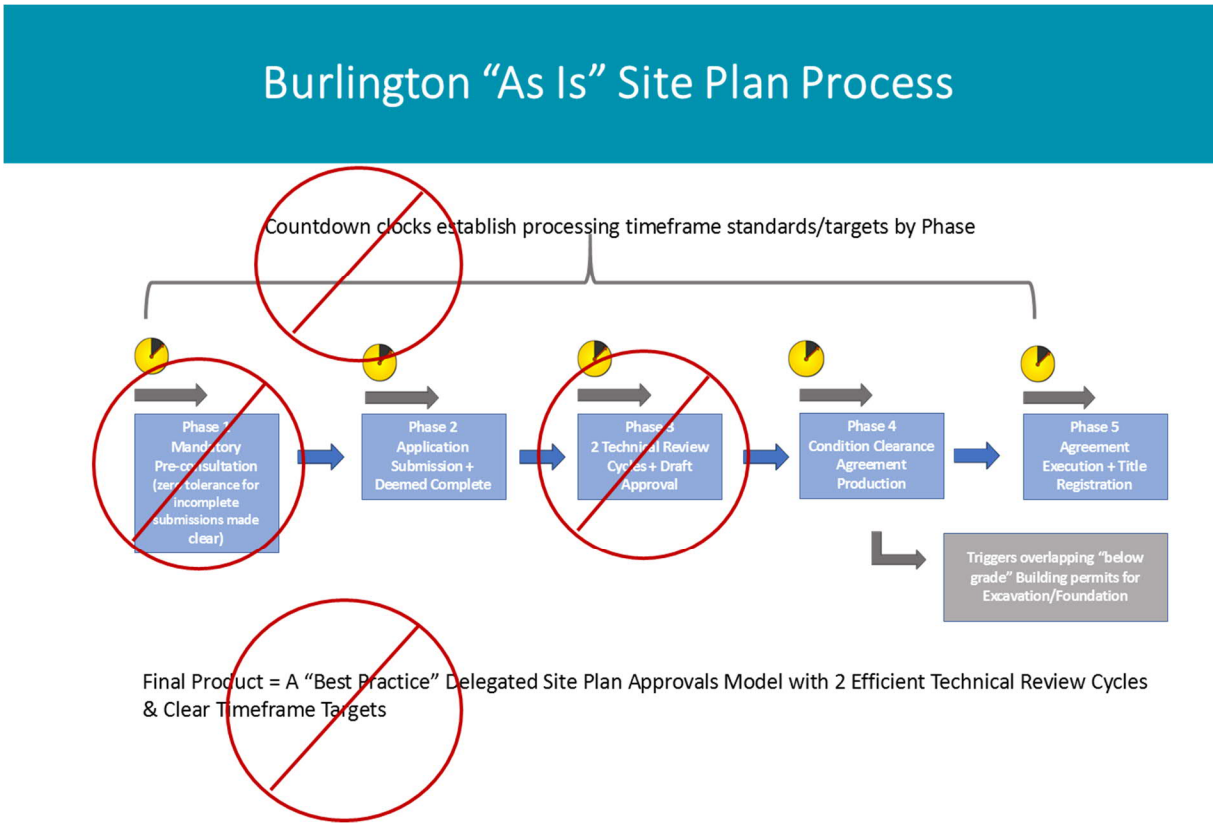
Zero tolerance business rules regarding incomplete application submissions is actually good customer service. Once application submission requirements are made clear to the development community in a mandatory pre-consultation meeting, the acceptance of incomplete applications is poor customer service. Incomplete application intake requires a municipality to expend finite staff resources chasing down missing information or engaging in uncoordinated technical review cycles based on inconsistent

information (commonly referred to as the drib -and-drabs problem). These sub-optimal intake processes actually penalize experienced and competent applicants (with excellent submission quality) from receiving prompt and expedited attention from staff. In short, good customer service is all about rewarding high-quality submissions and not enabling sub-par submissions. Any other approach risks systemic process breakdown from a LEAN management perspective.

High performance e-portals and workflow software can provide "countdown clock" LEAN processing support for municipalities that commit to consistently achieving application processing timeframe targets. To employ LEAN terminology, workflow software countdown clocks provide both internal staff "push" and external customer "pull" across the Site Plan approvals process. (Please see https://youtu.be/DoXE_IX3Zzo for an explanation of LEAN push and pull)

Delegated Site Plan approval to senior City staff compresses approval timeframes without compromising governance accountability. Controversial files can still be elevated for Council consideration. Compared to a municipality like Vaughan, where Committee of the Whole and Council deal with virtually every Site Plan application, Burlington's process is significantly streamlined via delegation. Council has been farsighted in trading low value-added control for high value-added results.

The figure below documents important process improvement opportunities (consistent with LEAN thinking) present in the current Burlington Site Plan approvals model. The red circles indicate "best practices" in process streamlining not yet incorporated within the Burlington Site Plan approvals process.



Specifically, Burlington does not yet require mandatory applicant/City staff pre-consultation working sessions to establish precise submission requirements. Burlington does not yet operate according to a "zero tolerance" approach regarding the intake incomplete application submissions. Burlington does not yet utilize a high-performance DAP workflow software solution featuring "countdown clocks" that support timeframe target setting and achievement. Widely available cloud-based workflow solutions incorporate countdown clock functionality "out of the box".

Burlington does however employ delegated staff approvals to significantly shorten Site Plan approval timeframes. Staff and Council should be commended in this regard. Delegation shaves off an estimated 50-60 processing days from the City's approvals process. Council has wisely traded low-value added control for high value-added results. Delegation should continue to be the default processing rule, with minimal examples of file escalation for Council involvement and intervention.

5.2.3 "As Is" Role of Committee of Adjustment in Securing Applicable Law Clearances

The City has a precise and exacting Zoning By-law that has internalized previous policy guidelines around community character. In order to secure the required Zoning Clearance, many applicants require Minor Variances from the Committee of Adjustment. Minor Variances are required for 25% or more of residential infill projects. Applicants often pursue these Minor Variances prior to embarking on the somewhat siloed Grading/Drainage Clearance or Tree Removal/Damage Permit processes. The figure

below captures the sub-optimal process looping result of applicants moving through the Committee of Adjustment process prematurely to secure a Zoning Clearance without addressing interwoven grading and tree protection requirements. Multiple passages through the Committee of Adjustment for additional variances occurs; largely because applicants are not being supported with a roadmap by the City that properly links these four interrelated processes (Zoning, Grading/Drainage, Tree Protection, Minor Variance). The AMANDA workflow tool does not link these interrelated process flows properly either; as evidenced by the inability of the City to provide reports on the number Minor Variances linked to Clearances applicants have submitted for.

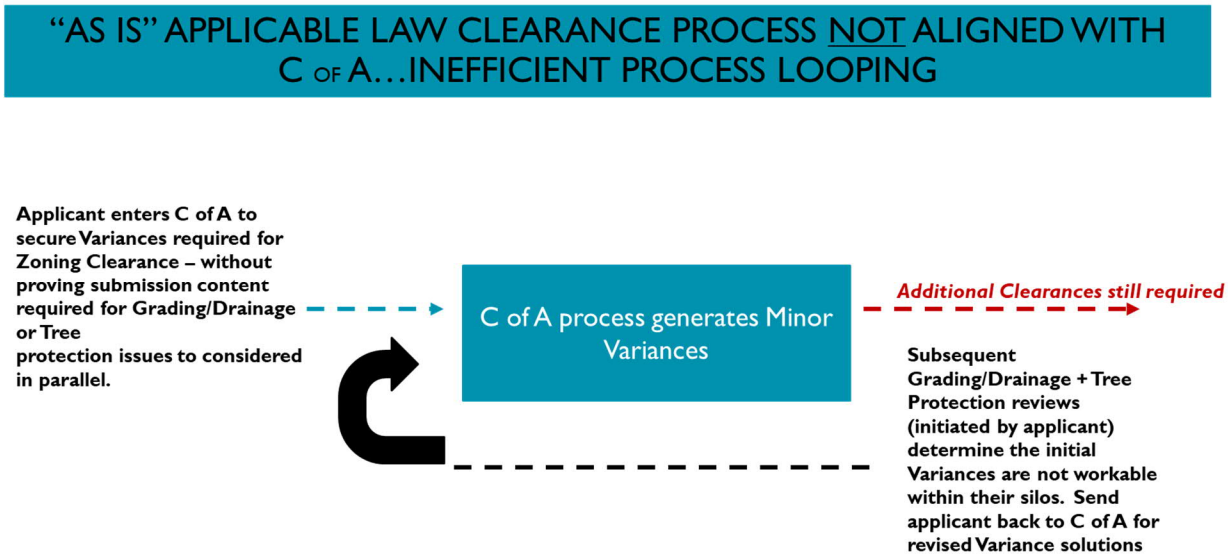


Figure: Sub-Optimal Use of C of A Detour to Secure Clearances

5.2.4 "As Is" Staff Resourcing & Cost Recovery Issues for Applicable Law Clearances/Permits

Staff resourcing for Burlington's Development Approvals Process (DAP) service delivery model has not been comprehensively reviewed during its transition period out of the past greenfield model into the mature city infill redevelopment model. Current staffing levels were adequate for the economies-of-scale driven subdivision model of the past. The critical issue moving forward is whether resourcing levels are adequate for the effort intensive, complex realities of infill re-development.

5.2.4.1 Development Engineering

In the Development Engineering business unit, staff are fully involved in processing and commenting on Planning Act applications impacted by Bill 108 (OPA/Re-zonings/Site Plans). Development Engineering staff also review and comment on numerous Committee of Adjustment applications. Development Engineering plays the lead role in the intake and issuance of Grading/Drainage Clearances for all infill residential development applications. The new Grading and Drainage By-law has had the unintended consequence of significantly increasing the number of clearance applications being generated (some with relatively minor projects with marginal impacts). Finally, the Development Engineering business

unit monitors construction site management by Site Plan applicants and Clearance applicants. If there are neighbour-to-neighbour grading/drainage conflicts in established/mature residential areas, staff are often called upon to mediate these conflicts by providing "as built" documentation of approved grading versus current grading in place.

Current workload burdens facing Development Engineering have prevented staff from including swimming pools in the Grading/Drainage by-law. This omission is illogical given the fact that swimming pools require a Zoning Clearance and a swimming pool related accessory building requires a Grading/Drainage Clearance. If swimming pools are added to the portfolio of structures requiring a Grading/Drainage clearance, a range of low impact building projects (e.g. 2nd floor additions could likely be removed to compensate.

5.2.4.2 Forestry

The Forestry business unit is currently in the midst of a shifting mission/mandate based Council's declaration of a climate change emergency. A robust urban tree canopy is an effective and important climate change adaptation tool and municipal asset. Unregulated private tree removal for development purposes is inconsistent with tree canopy maintenance/expansion. The pilot By-law in Roseland (43-2018) is setting the stage for a city-wide by-law. At this point, Forestry is not properly staffed to oversee the expansion of the pilot by-law. A business case combining fee adjustments necessary to create a viable revenue stream, as well as a staffed unit to oversee tree removal/damage permits and by-law compliance is being developed. A report due before end-of-year will set out the business case rationale and the revenue/cost budget. Performance Concepts has reviewed the business case and concurs that fee modernization and staffing investments are necessary to meet tree protection policy objectives. These same staff investments will play a critical role in the timely processing of tree protection permits that need to be integrated into the applicable law Clearance model for infill residential development.

5.2.4.3 Zoning Examination

The Zoning Examiners business unit is grappling with the workload impacts of complex teardown/rebuild infill housing. Technical review of these non-traditional, often architecturally complex houses requires detailed mathematical calculations of setbacks and lot coverage in order to consider a Zoning Clearance application. The processing and review time per application is significantly greater than the time required in the greenfield Burlington era. The significant information requirements/detailed drawings often generate multiple re-submissions from applicants to be deemed complete. Frequent counter support to guide applicants is the norm for Zoning Examiners, despite the fact that 4 Zoning Examiners cannot staff a five-day-per-week counter without an adverse impact on file processing productivity. Zoning Examiners also comment on Planning Act applications and are impacted negatively by Bill 108

timeframe compression. Finally, Zoning Examiner capacity is consumed by their core commenting role on Minor Variance applications processed by the Committee of Adjustment.

5.2.4.4 Cost Recovery Improvement

One potential solution to Burlington's existing staffing capacity "pain-points" can be found in a sustainable stream of non-tax revenues. Like Planning Act fees and building permit fees, the application fees associated with Zoning Clearances, Grading/Drainage Clearances and Tree Protection Permits should generate a cost recovery revenue stream. The figure below (next page) documents "As Is" cost recovery shortcomings associated with the key applicable law clearance fees.

	Current Fee	Estimated Average Processing Time	Estimated Processing Time Covered by Current Fee
Zoning Clearance	Single family/semi $450 fee Additions $295	Approximately 9 application processing hours per Clearance	5.5 billable hours consume the entire infill House $450 fee…leaving 3.5 hours per Clearance subsidized by property taxes 3.6 billable hours consume the entire Additions $295 fee…leaving 5.4 hours per Clearance subsidized by property taxes
Grading/Drainage Clearance	Single family/semi or Additions/Accessory > 74 Sq. M $1,350 fee + $5,000 security deposit	Approximately 20 application processing/site inspection hours per Clearance	17 billable hours consume the entire infill House/Addition/Accessory Fee…leaving 3 hours per Clearance subsidized by property taxes
Tree Removal/Damage Permit	$100/Tree up to $500	7-9 application processing/site inspection/contravention enforcement hours per Permit	4 billable hours consume an 3-tree Fee…leaving 3-5 hours per Permit subsidized by property taxes

Figure: Current Cost Recovery Performance is Sub-Optimal

The Zoning Clearance fee of $450 for infill teardown/rebuild infill houses covers 5.5 billable hours of Zoning Examiner effort. A typical/average application consumes approximately 9 hours of Zoning examiner effort. The "orphaned effort" of 3.5 hours per application is being subsidized by property taxpayers. The current fee needs to increase by an estimated $286 to achieve cost recovery.

The Zoning Clearance fee of $295 for a residential infill addition to a house covers 3.6 billable hours of Zoning Examiner effort. The "orphaned effort" of 4.4 hours per application is being subsidized by property taxpayers. The current fee needs to increase by an estimated $441 to achieve cost recovery.

The Grading/Drainage fee of $1,350 for an infill teardown/rebuild house, an infill addition, or a large accessory building covers 17 billable hours of the designated Development Engineering staffs' effort. A typical/average application consumes an estimated 20 hours of effort. The "orphaned effort" of 3.0 hours per application is being subsidized by property taxpayers. The current fee needs to increase by an estimated $238 to achieve cost recovery.

The Tree removal/Damage fee (three tree scenario) of $300 for an infill teardown/rebuild house covers 4.0 billable hours of Forestry staff effort. A typical/average application consumes an estimated 7-9 hours of effort. The "orphaned effort" of 3-5 hours per application is being subsidized by property taxpayers. The current fee needs to increase by an estimated $246-$410 to achieve cost recovery.

Total $ Impact on A Teardown/Rebuild House

The current overall cost recovery performance deficit for an infill teardown/rebuild house is as follows:
Table: Revenue Generation Improvement Opportunity (All Streams)

Applicable Law Clearances Billable Hour Processing Effort (Teardown/Rebuild Infill House)	Staff Billable Hours Currently Recovered from Existing Fees	Orphaned Billable Hours Currently Requiring Property Tax Subsidy	Fee Increases ($) Required for Full Cost Recovery
36-38 hours	**26.5 hours**	**9.5-11.5 hours**	**$770-$934 per site**

Total $ Impact on Small Projects

The staff effort associated with minor projects requiring clearances does not decrease proportionately compared to a more complex teardown/rebuild house; it remains relatively "sticky" since the administrative processes/site visits are quite similar in many respects. Performance Concepts has estimated that orphaned effort for minor projects requiring applicable law clearances would run at approximately 50% of major projects; 5-6 hours for each of the 250 or so annual applications. This equates to $400-$500 of cost recovery revenue improvement per site/project.

5.2.5 "As Is" DAP Workflow IT Toolkit

Burlington currently uses AMANDA as its information repository and workflow management tool for DAP. AMANDA is widely used by numerous Ontario municipalities for these same purposes. The City is planning an AMANDA system upgrade in Q1 2020. There appears to be a corporate commitment to AMANDA as the go-forward DAP workflow tool.

That being said, it needs to be acknowledged that there is a wide-ranging dissatisfaction with AMANDA among frontline DAP staff participants in Burlington and beyond (across the GTA municipal community). Performance Concepts believes AMANDA's workflow management functionality is not particularly robust. Expert City staff agree. Performance Concepts has observed across numerous assignments that timely extraction of relevant data reports out of AMANDA is not easily achievable. Finally, our team can

report that AMANDA is not at all flexible in term of accommodating new/changing business process configurations. Typically changing municipal business processes are only accommodated via subsequent AMANDA version releases. Many municipalities simultaneously employ different release versions of AMANDA because all valued functionality is not carried into subsequent release versions. Numerous GTA municipalities are actively considering AMANDA alternatives, and a number have already opted for alternative cloud-based/portal equipped solutions.

In parallel to the City's imminent AMANDA upgrade, Burlington has committed a cloud based CRM solution. The Burlington CRM solution is using a modified Microsoft Dynamics 365 platform. The Dynamics 365 platform is also a robust workflow management solution being adopted by government regulatory agencies across Canada. Dynamics 365 is currently being used by a large GTA municipality to pilot an alternative DAP workflow solution to AMANDA. A DAP pilot workflow "experiment" using the City's already-purchased CRM tool would not be inconsistent with current rollout plans of CRM across City business units.

In the course of this review, Burlington staff (despite a much-appreciated protracted effort) were not able to extract basic data reports from AMANDA on DAP application volumes or processing timeframes that were requested by our team. In defence of staff, this was not a unique one-time event. Performance Concepts has experienced report extraction blockages from AMANDA across multiple DAP reviews executed for Ontario municipalities.

There are probably a number of potential reasons for this reporting failure aside from the AMANDA software itself; including the way DAP operational data is being organized, certain City business units involved in DAP not using AMANDA at all, and inconsistent substandard data entry practices. It must also be acknowledged that the AMANDA tool itself has serious functionality limits that need to be acknowledged moving forward.

Burlington faces a difficult imminent choice; move forward with an existing, familiar, imperfect workflow tool that, at best, offers limited functionality compared to breakthrough CRM tools like Microsoft Dynamics 365. Or pause around AMANDA implementation and consider a CRM pilot/experiment that might catapult the City into a "best practices" leadership position re. DAP information management. Any software tool, in and of itself, cannot transform Burlington DAP performance. But combined with the other "as Should Be" improvements identified in this report, a CRM workflow tool experiment/pilot could act as a "force multiplier" in generating game-changing improvements in DAP execution.

5.2.6 Peer Municipality Benchmarking

A survey questionnaire was developed to guide interviews conducted with other municipalities that were considered comparable peers to the City in terms of size and development patterns.
The following five municipalities were selected for comparison:

- City of Hamilton;
- City of Kitchener;
- City of Markham;
- City of Richmond Hill; and
- Town of Oakville.

Interviews were conducted by phone with senior staff in each municipality between October and November 2019. The questionnaire consisted of almost ninety questions in total, split into three portions focussed on the zoning, grading and tree approval permitting processes.
Questions touched on the following topics:

- Approvals process approach;
- Staffing resources and organizational structure;
- Application volumes;
- Intake processes and application completeness;
- Service standards;
- Inspections and enforcement; and
- Use of information technology resources.

Peer survey response rates varied between the three main focus areas, with grading seeing the lowest response rate. Repeated efforts were made to contact and follow up with senior municipal staff to complete interviews by phone. In cases where staff did not respond or interviews could not be scheduled within the timeframe of the study, supplementary information was sought from publicly-accessible sources (e.g., municipal websites) and included where available.

A detailed record of peer benchmarking feedback is contained in an appendix to this report.

Highlighted observations appear in the figure below. Overall, peer benchmarking does not point to a "best practices" approach to Site Plan-exempt infill residential development approvals. Some municipal peers are using Site Plan control to try to coordinate Zoning, Grading and Tree Protection approvals prior to Building permit application. Others are not effectively coordinating these matters prior to Building permit application. Finally, one peer is using an optional version of a Zoning clearance.

HIGHLIGHTS FROM INTERVIEWS

- Hamilton Piloting Site Plan control for infill residential tear down/re-builds in Ancaster
- Oakville DESP authorizes a streamlined Site Plan control process for teardown/re-builds. Delegated to Development Engineering Director to address Grading/Drainage + Trees
- Markham Zoning Preliminary Review (ZPR) mirrors Burlington Zoning Clearance – but is optional prior to Building permit application

- Zoning Clearances not typically employed by most peers
- Private Development Tree protection focus (across the peers) has been on Subdivision & Site Plan…not Site Plan exempt infill teardown/re-builds
- Peers not yet effectively dealing with Private Development Tree issues not appearing on Grading or Building permit application drawings (no well-executed coordination)

Figure: Peer Benchmarking: No Peer Approach to Emulate Re: Infill Teardown/Re-Builds

5.3 "As-Should-Be" Future State

5.3.1 "As Should Be" Model for Infill Residential Development Approvals

Having documented and evaluated the City's "As Is" processes for the three streams of applicable law approvals required for infill residential building permits, the creation of an "As Should Be" processing model is appropriate. The figure below sets out our team's recommended "As Should Be" processing model.

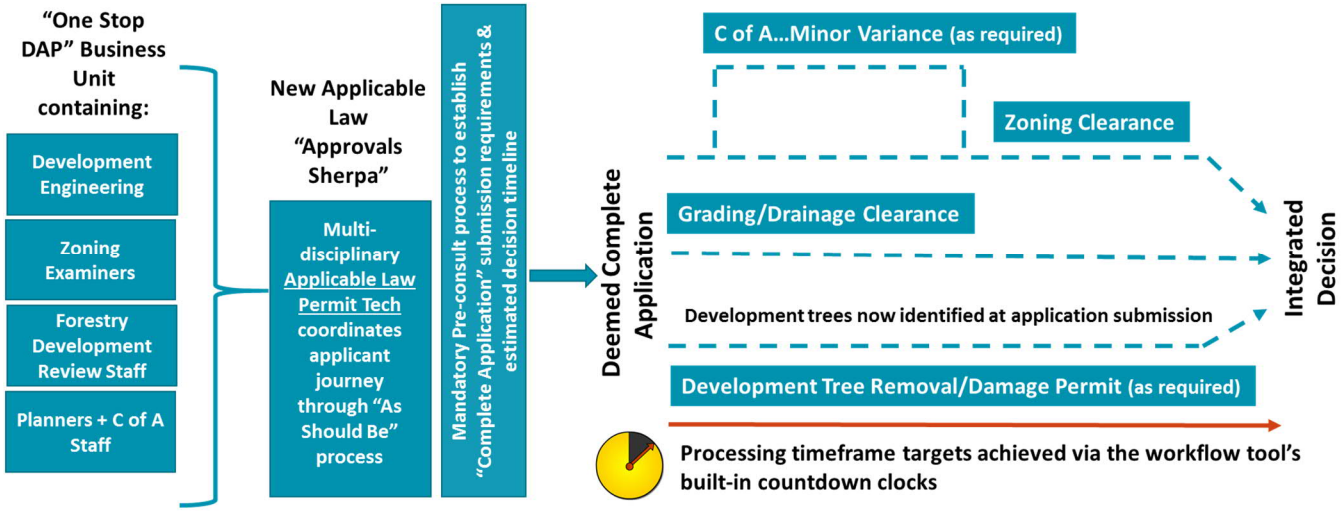


Figure: "As Should Be" Applicable Law Clearance Processing Model

The "As Should Be" model features the following process improvements; based on peer municipal best practices and our team's wide-ranging expertise in reviewing municipal DAP.

- **A single "Applicable Law" Clearance** that incorporates and coordinates the previously siloed Zoning, Grading/Drainage and Tree Protection review streams. The new integrated Clearance would have one application intake point and one final decision point;

- At the beginning of the applicant journey a **multi-disciplinary Applicable Law Clearances Permit Tech will coordinate two-stage application intake**. The Permit Tech will have adequate/appropriate content knowledge to ensure the overall process (including submission requirements and processing timeframes) are clearly communicated to applicants at the outset of the process. The Permit Tech will schedule a **mandatory pre-consultation meeting** to determine and document the precise set technical submission requirements for each application. Following the pre-consultation session, applicants will agree to these submission requirements in writing;

- Upon receiving a submitted application package, the Permit Tech will evaluate the package and deem it complete (or incomplete, which will trigger the submission package to be returned to

the applicant). No incomplete submissions packages will be accepted for processing. When the package is eventually deemed complete by the Permit Tech, a new Clearance decision "countdown clock" will be triggered. The City will then be committed to processing the application and arriving at a decision according to a new measurable service level standard (i.e. X number of business days to be determined by the City). If/when additional information or action is required of an applicant, the countdown clock turns off. It turns back on again when action is again required of the City to move the application review/decision forward. In this way the countdown clock focuses exclusively on City-controlled performance and not applicant/consultant responsiveness or lack thereof; and

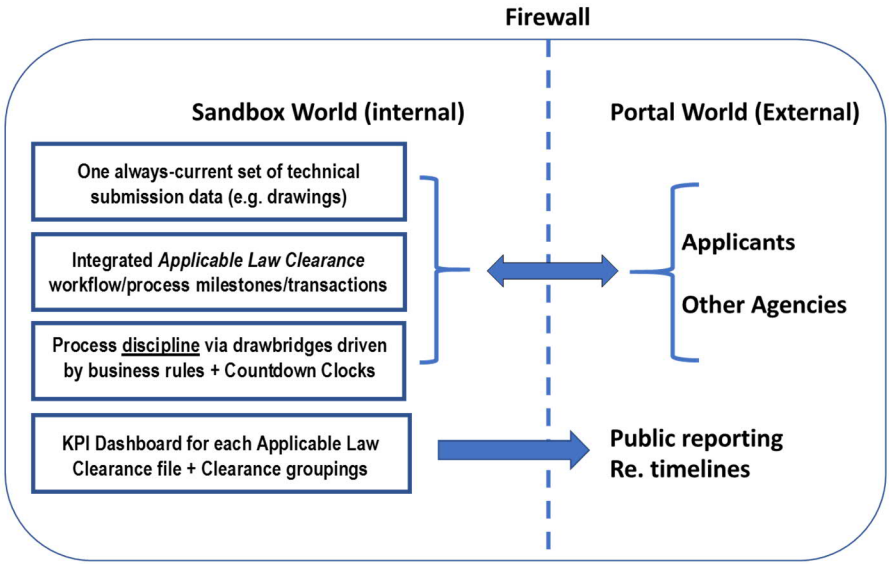
- The previously siloed business units responsible for the three streams of approvals should function in a closely coordinated interdisciplinary team. Technical staff regularly involved in the process will all be located at City Hall (in reasonable proximity). A designated City Senior Manager should have full accountability to ensure the cross-disciplinary teams are integrated, and that the "As Should Be" process functions as designed. Consideration should be given to an organization design model that creates "One Stop DAP" by integrating Forestry and Development Engineering business units inside the Community Planning, Regulation and Mobility Service Group.

5.3.2 Enabling "As Should Be" Using Advanced Workflow Tools

The Performance Concepts/Dillon team has concluded that a robust, configurable workflow tool is necessary to leverage the coordination and integration required of City staff working on the "As Should Be" Applicable Law Clearance. These tools are widely available and are increasingly being utilized by governments across Canada engaged in regulatory approvals. The DAP service is, of course, a regulatory approval process at the core of the City's service delivery mission and mandate. Existing cloud based workflow tools and solutions are readily adaptable to DAP implementation. Our team has direct knowledge of cloud-based workflow tool functionality already being tested/adopted by GTA municipalities to better coordinate DAP. The key benefit of these tools is the flexibility in configuring "As Should Be" processes, enforcing process execution timeframes and providing easy-to-access robust performance reporting. The cloud based storage of data is in some respects an incidental benefit.

The figure below documents the functionality a DAP workflow tool requires to efficiently execute the "As Should Be" processes recommended in this review.

Cloud Based Workflow Tool: Coordinated Execution of Applicable Law Clearances



- **DAP cloud-based workflow tool will promote coordinated "As Should Be" City review processes across the 3 streams of technical review required for a new integrated *Applicable Law Clearance*. Predictable/repeatable approval timeframes are required for teardown/rebuild residential re-development applicants seeking a Building Permit.**

Figure: "As Should Be" Future State: Coordinated Execution of Applicable Law Clearances

Highlights of a "best practice" DAP management platform are provided below:

- A Portal World that enables applicants to submit applications, drawings, studies, technical re-submissions etc. The Portal also allows municipal staff to communicate with DAP applicants in terms of process milestone progression and notify them of issues requiring action. Finally, the Portal can provide access to the Region, Conservation Halton or other agencies involved in reviewing/approving applications made to the City;
- A Sandbox World that acts as a central repository for all application submission documents/drawings. Sandbox World automatically updates re-submitted applicant content; thereby ensuring only one version of any submitted document is active among City review team members. The Sandbox also contains the standardized workflow process milestones for each application type. It documents all staff approval points; creating a tracked progression trail of the City's detailed review and approvals. This approval trail can be shared with applicants on a "view only" basis across the Portal;
- Countdown clock functionality injects process discipline on each and every Clearance application. As countdown clocks wind down across the Zoning, Grading/Drainage and Tree Protection channels, staff will be alerted to move the file along. The countdown clocks will ensure each discipline coordinates their efforts to meet an overall agreed upon timeframe. The result will be conveyor belt style consistency and LEAN-style "push and pull" balance that satisfies both the City and applicants;

- A performance dashboard will enable low-effort standardized reporting to both the City and applicants. Reports can be easily tailored (in terms of detail) to multiple audiences. Reporting can be file specific, file category specific or area specific (e.g. by Ward). This would represent a marked improvement over the performance measurement functionality limitations experienced with AMANDA; and

- Approved Clearances can easily be linked to the Minor Variances that contributed to the approval via linked countdown clocks, as well as to downstream Building permits and inspections. Overall applicant journey processing timeframes (to occupancy) can be calculated and reported via these countdown clock linkages.

This menu of "best practice" functional requirements is provided in full by the Microsoft Dynamics CRM application already purchased by the City.

5.3.3 "As Should Be" Coordination of Applicable Law Clearance + Minor Variances

Applicants regularly seek relief from applicable law zoning provisions through an Application for Minor Variances. The approval of the Minor Variance (or amendment to the proposal to ensure compliance) is required to secure the Zoning Clearance. In the "As Should Be" model being proposed, Zoning decisions will only be made in close coordination with Grading/Drainage and Tree Protection review streams. It is crucial that the technical data and review process consider all three streams in parallel. Therefore, any needed detour to the Committee of Adjustment to secure Minor Variances needs to be executed as per the figure below.

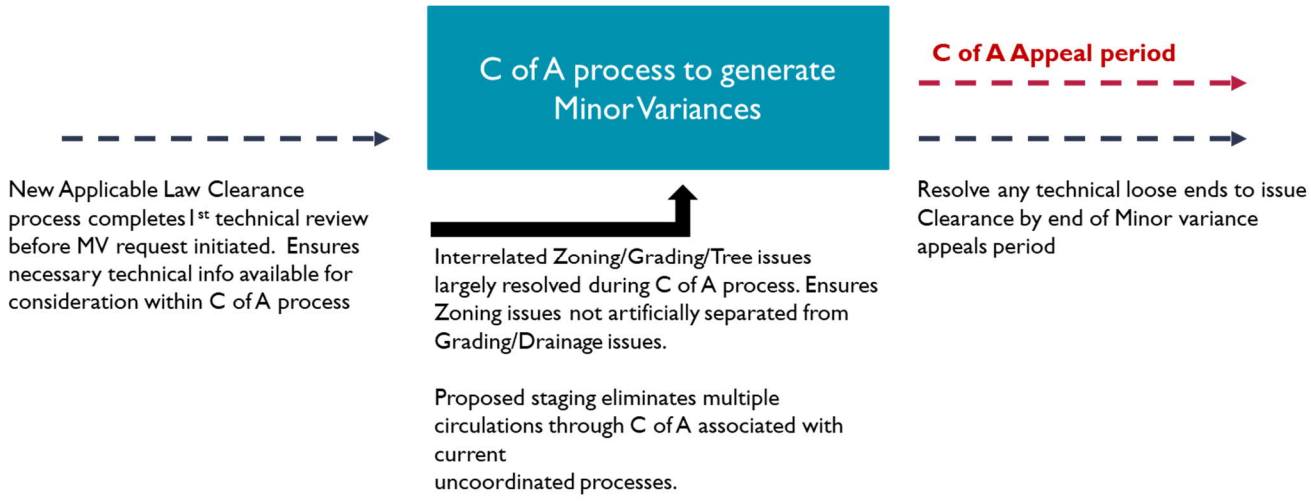


Figure: New Applicable Law Clearance Process + Required Minor Variances

The "As Is" problem of Committee of Adjustment process looping identified in this review can be solved by the City educating applicants and better policing the timing of entry into the Committee of Adjustment "detour". The "As Should Be" business rule is clear and straightforward. Applicants should apply for the new Applicable Law Clearance and proceed through one technical review cycle by City staff before proceeding to secure necessary Minor Variances. Then a technically viable solution can be devised in advance of the Committee of Adjustment process; culminating in single set of workable variances. Technical loose ends can be handled during the Minor Variance appeal timeframe, and a "just in time" Clearance can be issued after the appeal period ends. This eliminates the need for looping back for multiple passes through the Committee of Adjustment detour need occur.

5.3.4 "As Should Be" Model for Site Plan Approval of Infill Development

The "As Is" review of the Burlington Site Plan process set out in this report has already identified elements of "best practice" DAP execution that the City has not yet implemented. The figure below provides a high level summary of an "As Should Be" process that incorporates mandatory pre-consultation, zero tolerance for incomplete applications, and a compressed two review cycle pathway to draft Site Plan approval. The "As Should Be" process retains the significant efficiencies associated with delegated approval. It also incorporates the benefits of overlapping Building permits triggered for "below grade" excavation/shoring and foundation prior to final Site Plan approval (i.e. at the point where staff approval for construction is granted during the Condition Clearance Phase.

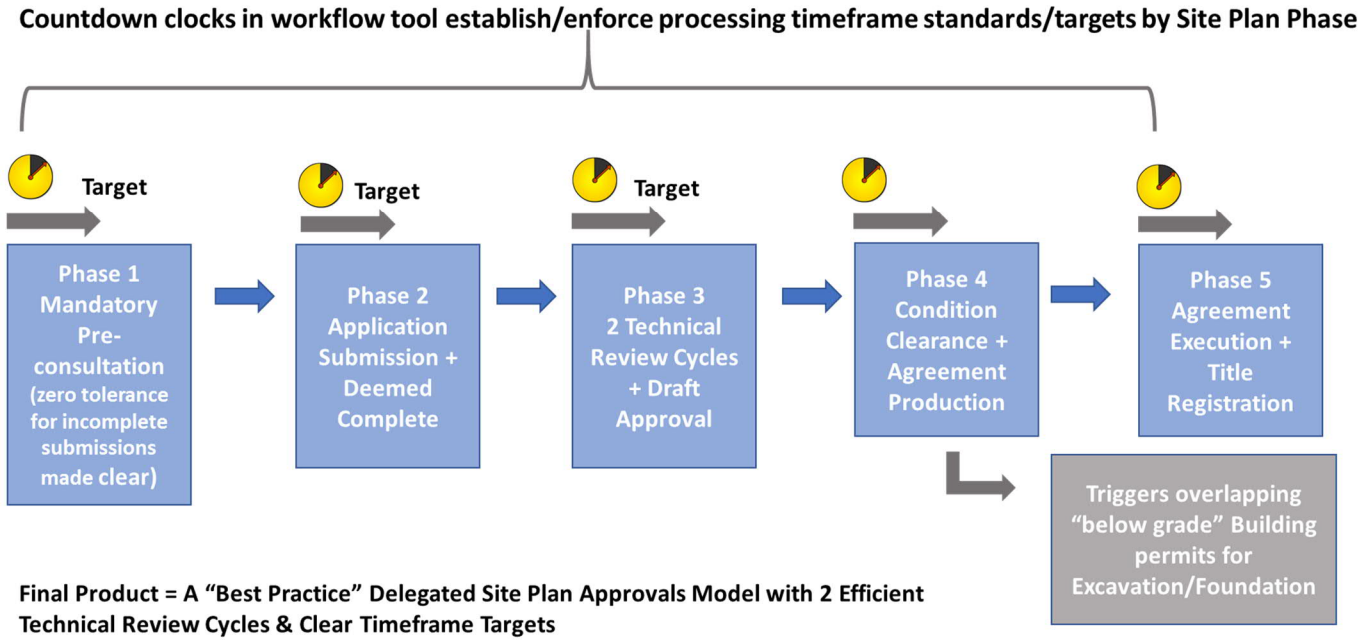


Figure: "As Should Be" Site Plan Processing Model

Appendix D-2 includes a detailed "As Should Be" process flow for Site Plan applications that integrates the benefits of cloud-based workflow software with DAP processing "best practices" such as mandatory pre-consultation and zero tolerance for incomplete application submissions. This kind of detailed process flow mapping is a high value-added first step in executing the cloud-based workflow pilot solution recommended in this report.

5.4 Findings & Recommendations

The City's change plan that evolves from this DAP review should be premised on the following proven recipe for success - using three sequenced change implementation lenses:

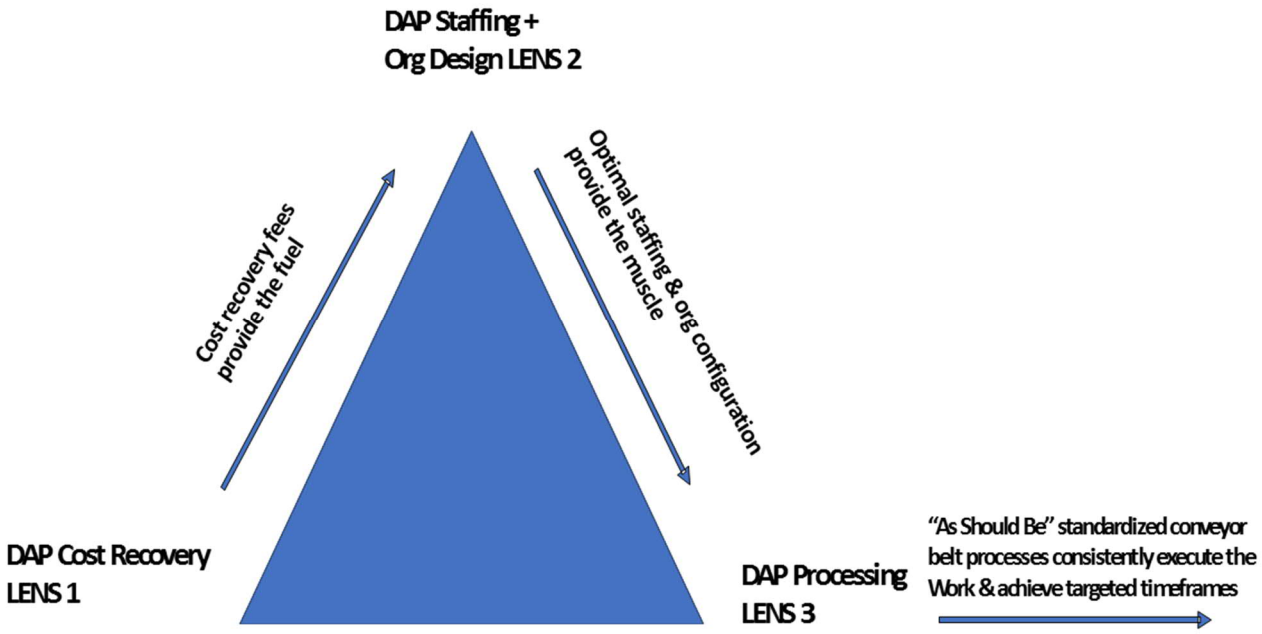


Figure: Integrated Approach to Change Plan

Improved cost recovery fee structures (Lens 1) will provide the financial fuel to secure Council approval for the staff muscle required to execute the new infill DAP "As Should Be" Applicable Law Clearance (Lens 2). Robust cloud-based workflow software will provide additional leverage/process execution discipline to successfully implement the needed "As Should Be" processes (Lens 3).

The documented service delivery efficiencies address the following performance lenses:

- Cost recovery/revenue generation; and
- Process efficiency.

5.4.1 Cost Recovery/Revenue Generation Performance Lens

Employing a cost control/revenue generation performance improvement lens the following measurable efficiencies have been documented in this review:

Table: Cost Recovery Efficiencies Available via Fee Restructuring

Applicable Law Approval Categories	Volumes + Tax Subsidy to Eliminate	Cost Recovery Efficiencies Available via Fee Restructuring
Tear/Down/Rebuild Houses + Additions/ Accessory Buildings > 75 sq. metres	100 annual applications with "As Is" $770-$930 tax subsidized cost per application. Additional "As Should Be" effort of $160 for the recommended mandatory pre-consultation. Total of $930- $1,090 tax subsidized cost per application.	$93,000 to $109,000
Accessory Buildings, Pools etc. < 75 sq. metres (minor clearances)	250 annual applications with $400-$500 tax subsidized cost per application	$100,000 to $125,000
TOTAL		$193,000 to $234,000 annually in reduced property tax burden

5.4.2 Process Efficiency Lens

Repeated attempts during this review to secure AMANDA processing timeframe reports for Zoning Clearances + Grading/Drainage Clearances + Tree Protection Permits + Minor Variances on selected properties failed. That being said, City staff have made it abundantly clear that the uncoordinated "As Is" processes mapped in this report have resulted in unacceptably long decision-making timeframes. The Mayor's Red Tape/Red Carpet feedback has confirmed this to be the case. Timeframe compression and predictability are "must have" improvements.

Performance Concepts believes it is not unreasonable to forecast that identified "As Should Be" process improvements supported with a strategic Permit Tech staffing upgrade at the counter, implemented in tandem with cloud-based workflow software, could reduce processing timeframes by as much a50% for residential infill Applicable Law Clearances. Significant Site Plan processing efficiencies would also be realized by implementing the detailed "As Should Be" model. A two-cycles delegated Site Plan model is achievable.
The figure below itemizes overall improvement opportunities identified in this DAP review.

Implement "As Should Be" Portfolio of Improvements over 2020

- Secure improved revenue generation re. Clearance based fees
- Optimize staffing & Org design (e.g. properly functioning Clearance Permit Tech + Development Engineering unit imbedded in One-Stop DAP)
- Integrated Applicable Law Clearance
- Refined approach to C of A (Variances)
- Site Plan "Best Practices" processing model
- Cloud-based workflow tool Pilot to secure Applicable Law Clearance + Site Plan "As Should Be" process improvements

Figure: Overall Improvement Opportunities Identified in the DAP Review

5.4.3 Key to Implementation: Get-it-Done Focus on Execution

The Performance Concepts/Dillon review team recommends Burlington create a rapid deployment LEAN restructuring team composed of external/staff champions to drive the implementation of the "As Should Be" model forward in 2020. The rapid deployment LEAN restructuring team should organize its efforts within a "Best Practices" workflow Pilot focused on the new Applicable Law Clearance. The ideal workflow tool for this Pilot is the already purchased Dynamics 365 CRM application. This pilot could realistically be completed by August 31st 2020. Detailed DAP fee re-design could also realistically be completed by the same end of August 2020 date. This recommended Get-It-Done execution project is a natural "Part 2" continuation of the Provincial grant-funded re-invention of the City's DAP service

6.0 Summary and Next Steps

6.1 Summary of Efficiencies & Discussion

Each of the reviews were presented earlier in the report in separate chapters. The purpose of this section of the Technical Report is to provide a summary of the efficiencies identified for each of the service reviews and to provide commentary on the cross-review efficiencies. Public services delivered by a municipality are complex and interrelated where changing one component of service delivery can have unintended consequences elsewhere. This section of the report is intended to identify any cross-cutting challenges and/or raise awareness of potential consequences.

The tables below present each of the recommendations arising from the four reviews and identifies which lens(es) were applied for each recommendation.

WINTER CONTROL RECOMMENDATIONS	Financial Sustainability	Process Streamlining	Level of Service	Disentangled Local Govt	Climate Change
WINTER CONTROL					
W-1: Improved Halton roads recoveries/billings methodology. Cost Reduction: $150k to $175k in City property tax funding of winter control	X			X	
W-2: Guaranteed Service Delivery (GSD) shift premium upgrade. Cost Investment: recover inflation erosion since 2005. Seasonal increase of $50k to $55k in City property tax funding of winter control.	X		X		
Cost Avoidance: of 3rd shift required to maintain 24/7 winter service level if GSD erodes. Cost avoidance of $700k to $1M via shift premium upgrade per year.	X		X		
W-3: Future contract design. Cost Addition: contract RFP for road plowing to include 2 full shifts of stand-by event response. Actual cost subject to stand-by hourly bid rate. No public disclosure of this modeled cost.	X				
Cost Avoidance: cost-benefit model's analysis will provide decision support to identify in-sourcing cost avoidance (savings) of $400k to $650k per season if contract bid price spikes.	X				
Cost Avoidance: contract upgrade to 2 full stand-by shifts will balance event response capacity with GSD and deliver reduced			X		

WINTER CONTROL RECOMMENDATIONS	Financial Sustainability	Process Streamlining	Level of Service	Disentangled Local Govt	Climate Change
liability plus improved public safety during sever/prolonged winter events.					
W-4: Temporary Resupply Depots. Cost Reduction: Improved productivity of 18.5 machine hours over a simulated winter event (equivalent to the work delivered by 2 units in the same event at current productivity levels). Should reduce pending RFP purchase of contractor units by 2 units (14 down to 12). Cost Avoidance: Productivity savings will reduce required # of contracted units, thereby offsetting a significant portion of expected/negative contract cost impacts	X X	X X	X		X

LOOSE LEAF COLLECTION RECOMMENDATIONS	Financial Sustainability	Process Streamlining	Level of Service	Disentangled Local Govt	Climate Change
LOOSE LEAF COLLECTION					
L-1 Scenarios provide a range of efficiency benefits. Reduce GHG: reduce emissions by up to 73 tonnes of CO2e per year					X
Cost Reduction: reduce or eliminate processing fees to Halton (up to $145k per year)	X	X		X	
Improve Service Level: frees up staff and equipment for other City services (approx. 50 staff and equipment)			X		
Reduce Duplication: Halton already provides leaf collection services as part of annual yard waste program				X	
Winter Control Readiness: staff and equipment available for winter control without seasonal transition time; better able to respond to earlier snow events			X		X

COPORATE FLEET RECOMMENDATIONS	Financial Sustainability	Process Streamlining	Level of Service	Disentangled Local Govt	Climate Change
COPORATE FLEET					
F-1 Right-Size Vehicles. Cost Reduction: Over 5 years save $4k to $30k per vehicle when reducing size of vehicle at time of replacement Reduce GHG: smaller vehicles generate less GHG. Replacement strategy includes hybrids as default.	X				X
F-2 Right-Size/Reduce Fleet. Cost Reduction: avoid $665k to $1.1M in capital when choosing to not replace vehicles.	X				
F-3 Invest in Hybrids. Cost Investment: additional capital cost of $4k to $10k per vehicle. Cost Reduction: fuel savings of $1,000 to $2,000 per year.	X X				X
F-4 Pilot Auxiliary Power Technologies. Cost Investment: capital cost of $7.5k to $18k per vehicle Cost Reduction: save $150k to $385k (5-years)	X X				
F-5 Take-home Vehicle Policy. Cost Reduction: save $38k in fuel per year Reduce GHG: reduce 70.9 tonnes of CO2e per year	X				X

DEVELOPMENT APPROVALS PROCESS (DAP) RECOMMENDATIONS	Financial Sustainability	Process Streamlining	Level of Service	Disentangled Local Govt	Climate Change
DEVELOPMENT APPROVALS PROCESS (DAP)					
D-1 Secure Improved Revenue Generation. Improve Revenue: $193,000 to $234,000 annually in reduced City property tax burden	X				
D-2 Optimize staffing and Org design		X	X		
D-3 Integrated Applicable Law Clearance		X	X		
D-4 Refined approach to C of A (Minor Variances)		X	X		
D-5 Site Plan "Best Practices" processing model		X	X		
D-6 Workflow Tool Pilot improvement process		X			

Of particular interest is the summary of the financial sustainability lens and the climate change lens, as these identify efficiencies that are quantifiable. See table below.

Table: Highlights of the Financial Sustainability Lens and the Climate Change Lens

Service Area	Cost Investment	Cost Avoidance	Cost Reduction	Reduce GHG
Winter Control	$50k to $55k per season	$1.1M to $1.65M per season	$150k to $175k per season	
Loose Leaf Collection		reallocate resources to other City services	$102k per year	73 tonnes CO_2e per year
Fleet: depends on # vehicles and implementation schedule	Additional capital for hybrid, for auxiliary power	$665k to $1.1M one time (over time)	$38k in fuel per year	70.9 tonnes CO_2e per year
TOTAL IMPACT	$50k to $55k per season PLUS additional capital for vehicles at time of replacement	$665k to $1.1M one time savings PLUS $1.1M to $1.65M per winter season	$290k to $315k per year	143.9 tonnes CO_2e per year

6.2 Capacity Building Insights/Ideas for City Continuous Improvement Program

6.2.1 Building Capacity Around Continuous Improvement - A Next Steps Roadmap

City government is best understood as a service delivery system. Inputs (staff, equipment etc.) are organized into business units/departments. In turn these City business units collaborate to create outputs; the forward-facing services (i.e. products) that are consumed by residents, businesses and other community stakeholders. Hopefully these service outputs generate positive outcomes/results that are measurable and commensurate with the budgeted/expended inputs. When viewed as service delivery systems, the traditional org structure model of a City government (vertical org chart silos and $ information) is turned on its side (real-world horizontal linkages and workflows). This real-world horizontal workflow version of a City government is a prerequisite for securing continuous improvement.

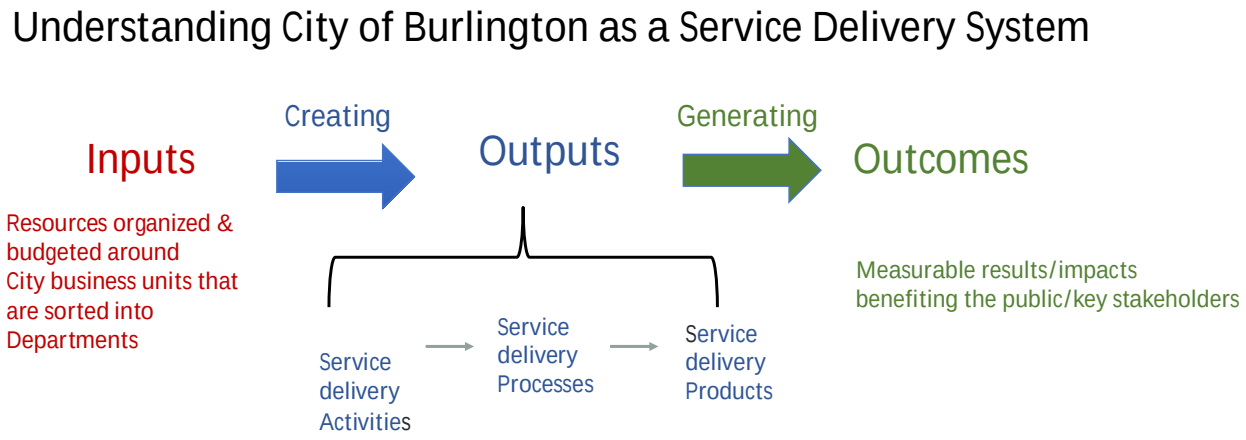


Figure: Understanding City of Burlington as a Service Delivery System

Key Performance Indicators (KPIs) are a second critical ingredient in the continuous improvement recipe for a City government. KPIs should be imbedded in the annual Plan-Deliver-Evaluate cycle of management/budgeting for a municipal service. KPIs support operational decision-making, results based target-setting, and results based public reporting. A KPI scorecard will both inform and expand a made-in-Burlington continuous improvement model. City staff should proceed to design KPI scorecards as implementation/execution tools for any of the 2019 Service reviews that will receive focused and rigorous execution in 2020 or beyond. Our team stands ready to support such an initiative, which requires active participation and buy-in from City staff.

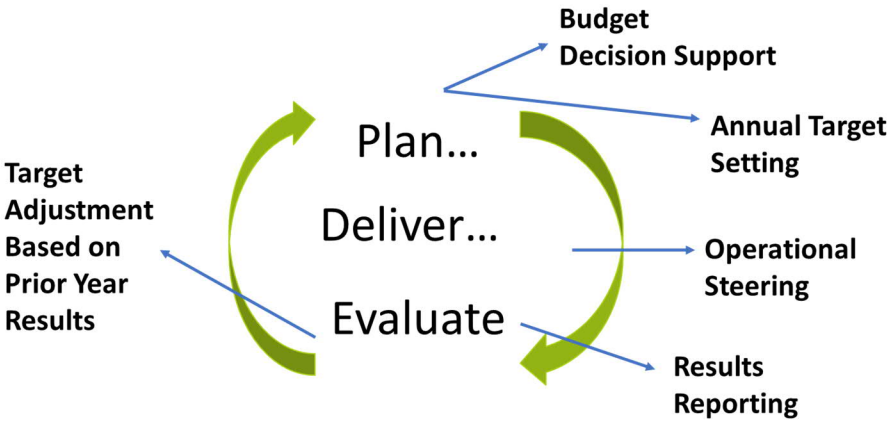


Figure: Using Key Performance Indicators (KPIs) Across Service Delivery Cycle

The amount of available capacity is a defining variable for designing a municipal continuous improvement program. Burlington has finite resources. An estimated 80% any organization's capacity to do anything is consumed in the Whirlwind of day-to-day operations - the Day Job. The Whirlwind must be recognized as an unavoidable constraint when considering the scope and reach of a continuous improvement program built around the expertise and commitment of existing City staff.

Figure: Capacity to Drive Change/Improvement Limited by Realities of the Whirlwind

To balance the need for Whirlwind (Day Job) stability with a focused effort towards continuous improvement, it is useful to think of municipal Service reviews as black boxes full of improvement ideas rolling down an assembly line. These boxes full of improvement ideas first need to be generated, and then each box needs to be opened up and properly assembled (i.e. executed). There is no point in creating so many black boxes that the City never gets around to assembling them, and they fall off the assembly line in a jumbled pile of un-executed ideas. Execution at a sustainable, measured pace is at

the heart of continuous improvement. For a continuous improvement program to actually work, the City should create a limited series of improvement idea black boxes in Year 1 (discovered via Service reviews). These improvement idea boxes must then be subjected to rigorous, focused execution in Year 2. Only as Year-1 improvement idea black boxes are executed in Year 2 should the City introduce new black boxes onto the continuous improvement assembly line. Failure to maintain a measured pace will prompt a corporate capacity "gag reflex" and reduce staff's commitment to continuous improvement. Reach must not exceed grasp.

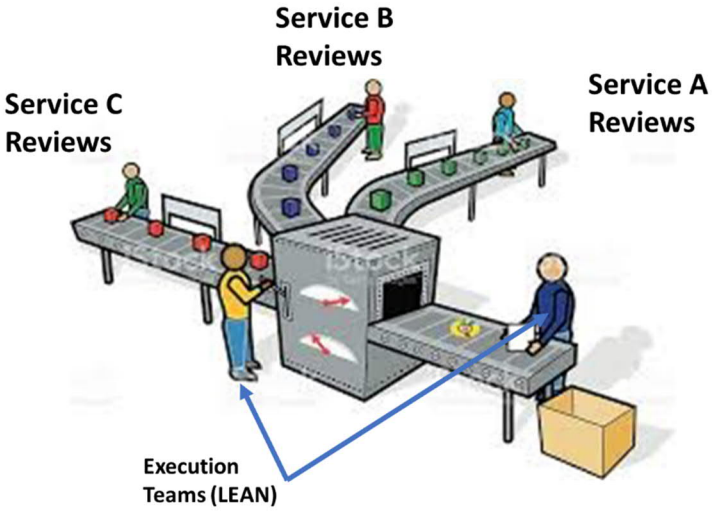


Figure: Avoid Imbalance of Too Many Reviews & Not Enough Execution

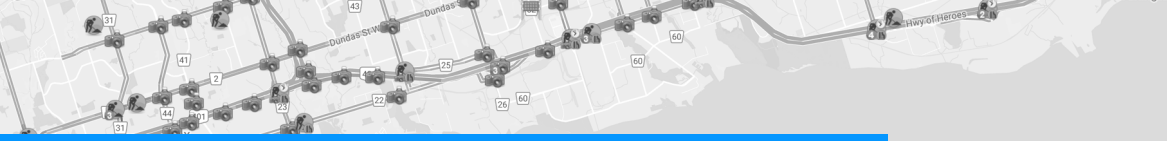
6.2.2 2020 Action Plan: Rollout a Part 2 Execution Project for the 2019 DAP Review (Pilot)

The now completed 2019 DAP review is an ideal pilot for developing the City's continuous improvement capacity around Year-2 Execution. DAP is a service that is central to Burlington's mission - high quality, environmentally sustainable city-building. DAP involves relatively complex processes involving multiple business units. Executing DAP continuous improvement via a LEAN-equipped execution team will send a strong signal across the organization: if our team can fix DAP your team can fix anything! Lessons learned around a LEAN driven Get-It-Done execution of the DAP service review will inform the launch platform for subsequent Year-1/Year-2 executed service reviews. Preparations for a Year-2 DAP execution pilot (driven by LEAN) can and should proceed without delay. This execution pilot is a legitimate and necessary extension of the provincially funded 2019 review. The Province has announced a 2020 continuation of the same grant-funded improvement program.

City staff should also consider a parallel 2020 LEAN driven execution of the 2019 Fleet review. Fleet is an indirect support function that has important performance improvement linkages with multiple City business units and forward-facing services. The Fleet review also aligns with Council's declaration of a climate change emergency. Finally, a LEAN review of Fleet can act as a learning platform for future reviews of City indirect support/administrative processes.

Appendix A

Winter Control



TRANSNOMIS

MEMORANDUM

To: John Prno
Performance Concepts Consulting

From: Simon Foo, Ph.D., P.Eng. (Transnomis)

Date: 2019-11-15

Re: City of Burlington Winter Control Simulation

Overview of How City Responds to Winter Events

The City of Burlington currently deploys its winter maintenance operation centrally from 3330 Harvester Road – "Harvester". All City and contractor trucks start at the Harvester location and proceed to their primary road assignments, usually as part of a tandem of multiple trucks. This allows multi-lane primary roads to be plowed from curb to curb at one time. Once a primary road assignment is completed, the tandem trucks split up and travel to their assigned areas to complete secondary roads/routes individually. Once secondary assignments are completed, trucks regather to repeat their primary road tandems, and so on throughout the day. Once the winter event ends and cleanup begins, trucks will first clear the primary and secondary roads, and then finally their assigned local roads.

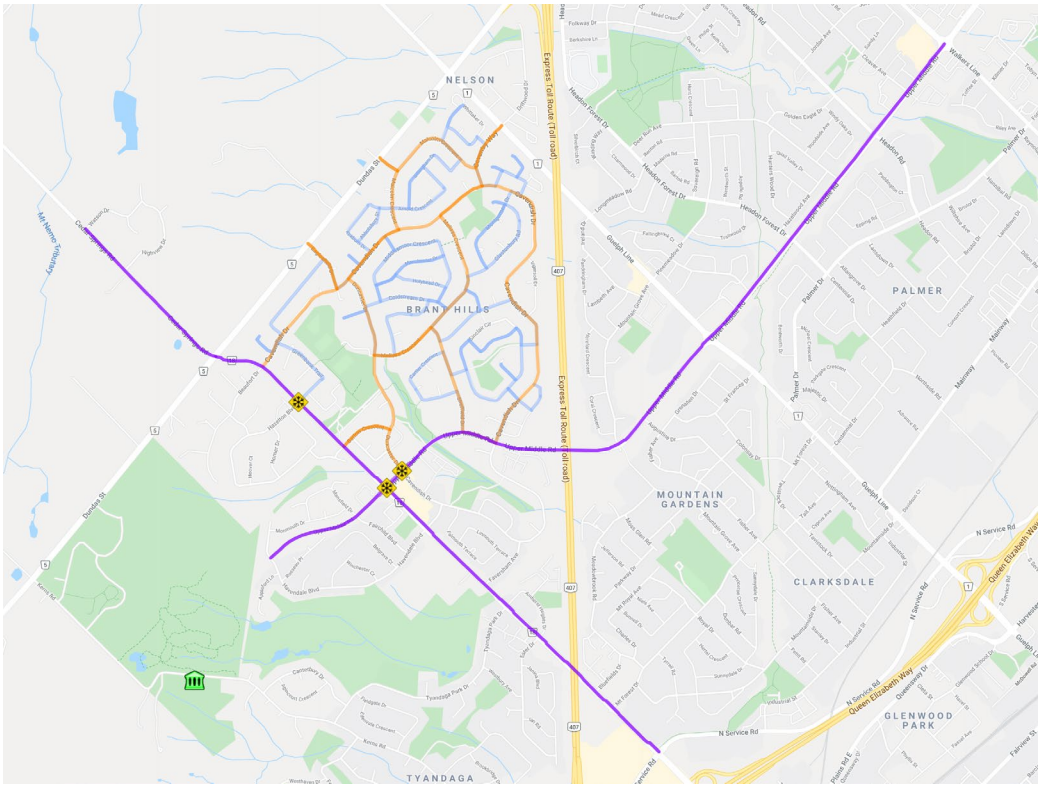
All City and contractor trucks currently return to 3330 Harvester numerous times per shift to restock (salt/brine) and to complete their shirt (refuel/salt/brine). To model the efficiency of multiple re-supply locations, a number of alternate potential locations have been identified to restock salt and brine as needed. These are:

- "Cityview" - Cityview Park at 2500 Kearns Rd.,
- "Harrison" - Harrison Ct. industrial area, and
- "Kilbride" - Kilbride Fire hall at 2241 Kilbride St.

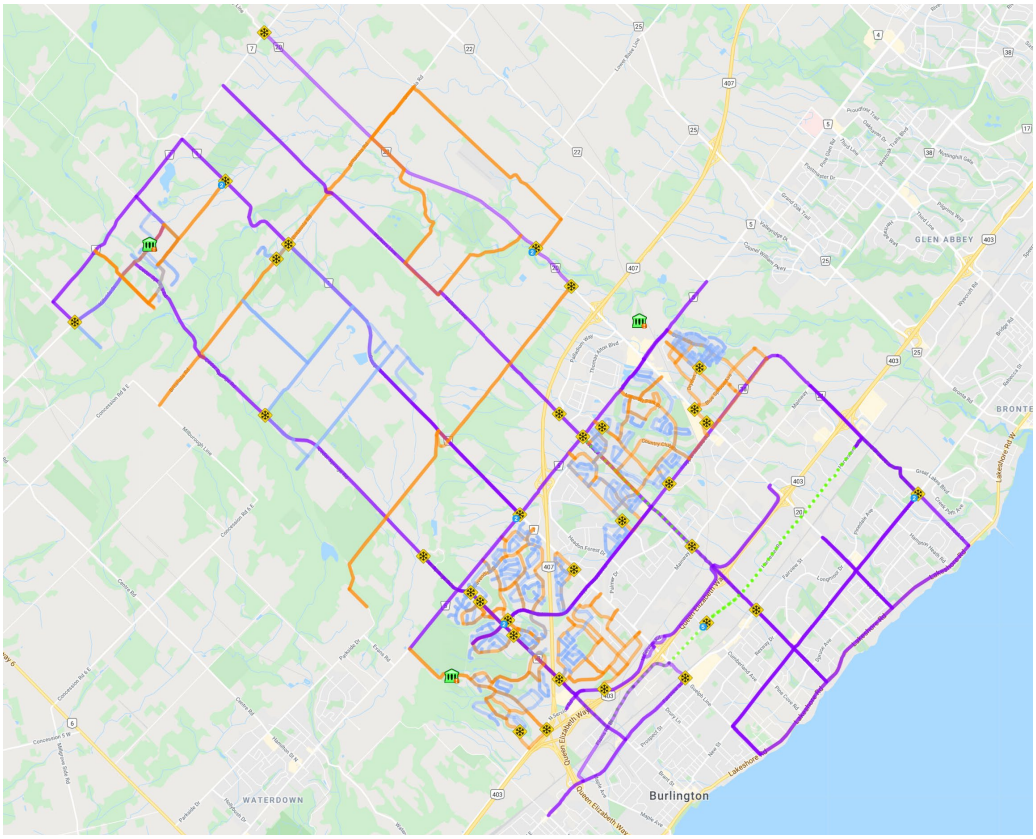
The purpose of this modeling assignment is to document efficiencies/productivity gains that could be secured if trucks in all the areas north of Upper Middle Road can restock at one of the above facilities plus Harvester, instead of only at Harvester (i.e., "Status Quo"). The zones included are Areas 6, 7, 11, 12, 13, 18, 19, 23, 26, 27, and 28. They are operated by truck routes: Tandem 1 and 1a, 4 and 4a, 6 and 6a, 10, 11, 12, 13, 13a and b, 14, and Dundas. For the purpose of this project, only these routes are considered.

Methodology of Improved Response Simulation

In order to simulate truck movements, the truck routes were traced using Transnomis Solutions' ITS Central system. Below is the route drawn for Route 42. Purple lines are the primary roads. Orange lines are the secondary roads. Light blue lines are the local / residential roads. The green building icon represents the alternate Cityview location. The routes are traced based on the file 2019-2020_RoadEchelonsSchedule.pdf.



Below is a map of all the routes (within scope of project) traced in the Transnomis ITS Central system:



A simulation program “run” has been developed to mimic the operation of the trucks along their assigned routes.

Each simulation scenario consists of a route, and a set of one or more yard locations. “Status Quo” is the case where the yard location is Harvester only.

A route consists of individual road segments that generally align with the road segments listed in the Road Echelon file.

Decision points are pre-determined before the simulation. They are assigned to the starting point of those road segments that are closest to the yard locations. There is one decision point for each yard location.

At the start of a winter storm event, a truck begins its journey at Harvester. It drives to the starting point of its primary road route. That distance is counted toward “non-productive distance” and that travel time is counted toward “non-productive time”. It then travels over the assigned primary roads.

Once these primary roads are complete, the truck will drive to the start of the assigned secondary roads (which counts towards non-productive distance and time).

At the end of each round of primary + secondary roads, we determine if it will be beyond the shift duration when the truck drives back to Harvester (counts towards non-productive time/distance). If so, it will drive back to Harvester. If not, the truck will go for another round of assigned roads.

This pattern repeats until the snow storm period is over.

When the storm period is over, the truck will go over the primary roads, secondary roads and local roads once in a final clean-up.

At each of the decision points, the truck operator determines if the unit has enough salt to get to the next decision point. If not, the operator will drive to the yard corresponding to the decision point (round trip counts towards non-productive time/distance).

Simplifying Assumptions

In order to create a tractable simulation, Transnomis has made a number of assumptions / simplifications:

- No consideration of traffic congestion, signal timing, etc.
- Do not consider time required to setup the tandem (wait time and formation)
- We treat sand the same as salt in terms of spread rates
- Same travel speed whether the truck is salting or not
- Same travel speed for local roads (would have minimum impact as local roads are salted only once at the end)

Simulation Parameters

Below are the parameters used for the simulation:

Parameter	Value
Storm duration	12 hours
Shift duration	12 hours
Time to refill	10 minutes
Salt capacity	70 km of route travel
Vehicle speed	25 km/hr

Simulation Results

The key performance metrics calculated for each simulation are:

1. # Round Trips (primary + secondary roads) during the winter event
2. Productive distance/time
3. Non-productive distance/time
4. Total distance/time

By comparing with Status Quo, we can estimate productivity improvements to the above four performance metrics.

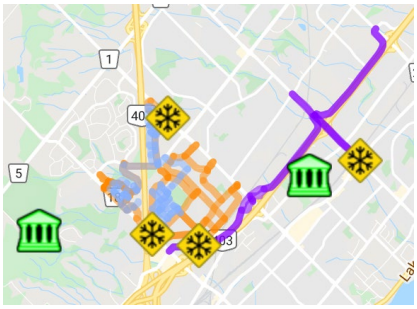
All distances below are in meters. Times are formatted as hours : minutes : seconds.

Route / Truck	Scenario	# times refill	# Round Trips	Prod Dist	Non-Prod	Total Dist	% Prod Dist	Prod Time	Non-Prod Time	Total Time	% Prod Time	Non-Prod Dist Saved	Non-Prod Time Saved	# extra round trips
R01 5224	Harvester (Status Quo)	5	5	242902	118720	361623	67.20%	9:42:58	5:34:56	15:17:54	63.50%	-	-	-
R01 5224	Cityview Park	5	5	242902	169137	412039	59%	9:42:58	7:35:56	17:18:54	56.10%	-	-	-
R01 5224	Harrison Ct	5	5	242902	132153	375055	64.80%	9:42:58	6:07:10	15:50:08	61.40%	-	-	-
R01 5224	Cityview Park | Harrison Ct | Harvester	3	5	242902	118600	361502	67.20%	9:42:58	5:14:38	14:57:36	64.90%	120	0:20:18	1
R04 5217	Harvester (Status Quo)	5	4	311787	87686	399473	78%	12:28:17	4:20:27	16:48:44	74.20%	-	-	-
R04 5217	Harrison Ct	5	4	311787	87979	399766	78%	12:28:17	4:21:09	16:49:26	74.10%	-	-	-
R04 5217	Harrison Ct | Harvester	5	4	311787	87686	399473	78%	12:28:17	4:20:27	16:48:44	74.20%	0	0:00:00	0
R15 Combo 11	Harvester (Status Quo)	6	6	304077	86925	391001	77.80%	12:09:47	4:28:37	16:38:24	73.10%	-	-	-
R15 Combo 11	Cityview Park	6	5	262684	86772	349456	75.20%	10:30:27	4:28:15	14:58:42	70.20%	153	0:00:22	-1
R15 Combo 11	Cityview Park | Harvester	4	6	304077	84847	388924	78.20%	12:09:47	4:03:38	16:13:25	75%	2078	0:24:59	0
R25 Combo 13	Harvester (Status Quo)	4	8	276453	79715	356168	77.60%	11:03:29	3:51:19	14:54:48	74.10%	-	-	-
R25 Combo 13	Cityview Park	4	8	276453	70593	347046	79.70%	11:03:29	3:29:25	14:32:55	76%	9122	0:21:54	0
R25 Combo 13	Harvester | Cityview Park	4	8	276453	70593	347046	79.70%	11:03:29	3:29:25	14:32:55	76%	9122	0:21:54	0
R39 Combo 26	Harvester (Status Quo)	4	7	263495	83653	347148	75.90%	10:32:23	4:00:46	14:33:09	72.40%	-	-	-
R39 Combo 26	Harrison Ct	4	8	295026	76050	371076	79.50%	11:48:04	3:42:31	15:30:35	76.10%	7603	0:18:15	1
R39 Combo 26	Harvester | Harrison Ct	4	7	263495	72783	336278	78.40%	10:32:23	3:34:41	14:07:04	74.70%	10870	0:26:05	0
R41 5214	Harvester (Status Quo)	5	11	293719	53435	347153	84.60%	11:44:55	2:58:15	14:43:10	79.80%	-	-	-
R41 5214	Cityview Park	4	11	293719	40515	334234	87.90%	11:44:55	2:17:14	14:02:10	83.70%	12920	0:41:01	0
R42 5215	Harvester (Status Quo)	5	9	310460	57146	367605	84.50%	12:25:06	3:07:09	15:32:15	79.90%	-	-	-
R42 5215	Cityview Park	5	9	310460	49767	360227	86.20%	12:25:06	2:49:26	15:14:33	81.50%	7379	0:17:43	0
R44 5211	Harvester (Status Quo)	3	8	192604	152172	344776	55.90%	7:42:15	6:35:13	14:17:28	53.90%	-	-	-
R44 5211	Kilbride	3	9	214004	134973	348977	61.30%	8:33:37	5:53:56	14:27:33	59.20%	17199	0:41:17	1
R44 5211	Harrison Ct	3	9	214004	122741	336746	63.60%	8:33:37	5:24:35	13:58:11	61.30%	29431	1:10:38	1
R44 5211	Kilbride | Harrison Ct	3	9	214004	134973	348977	61.30%	8:33:37	5:53:56	14:27:33	59.20%	17199	0:41:17	1
R45 5219	Harvester (Status Quo)	5	5	257662	133803	391465	65.80%	10:18:23	6:11:08	16:29:31	62.50%	-	-	-
R45 5219	Kilbride	6	5	257662	111693	369355	69.80%	10:18:23	5:28:04	15:46:27	65.30%	22110	0:43:04	0
R46 5226	Harvester (Status Quo)	4	3	277900	140256	418156	66.50%	11:06:58	6:16:37	17:23:34	63.90%	-	-	-
R46 5226	Harrison Ct	4	3	277900	107796	385695	72.10%	11:06:58	4:58:43	16:05:40	69.10%	32460	1:17:54	0
R46 5226	Cityview Park	4	3	277900	114057	391956	70.90%	11:06:58	5:13:44	16:20:42	68%	26199	1:02:53	0
R46 5226	Kilbride	4	3	277900	91971	369870	75.10%	11:06:58	4:20:44	15:27:41	71.90%	48285	1:55:53	0
R46 5226	Harrison Ct | Cityview Park | Kilbride	4	3	277900	91971	369870	75.10%	11:06:58	4:20:44	15:27:41	71.90%	48285	1:55:53	0
R47 5209	Harvester (Status Quo)	4	4	226199	151480	377679	59.90%	9:02:53	6:43:33	15:46:26	57.40%	-	-	-
R47 5209	Kilbride	5	5	269418	104509	373927	72.10%	10:46:36	5:00:49	15:47:26	68.20%	46971	1:42:44	1
R48-51 Dundas	Harvester (Status Quo)	3	11	274010	44440	318450	86%	10:57:37	2:16:39	13:14:17	82.80%	-	-	-
R48-51 Dundas	Cityview Park	4	12	296844	20560	317403	93.50%	11:52:25	1:29:21	13:21:46	88.90%	23880	0:47:18	1
R48-51 Dundas	Harrison Ct	4	12	296844	18344	315188	94.20%	11:52:25	1:24:02	13:16:27	89.50%	26096	0:52:37	1
R48-51 Dundas	Cityview Park | Harrison Ct	4	12	296844	20560	317403	93.50%	11:52:25	1:29:21	13:21:46	88.90%	23880	0:47:18	1

Tandem 1 and 1a to Areas 19 and 23

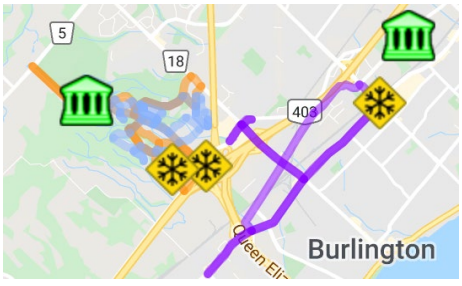
Tandems 1 and 1a benefit very minimally (if at all) with the new yards as much of the routes are south of Harvester.

Tandem 4 and 4a to Areas 10 and 11



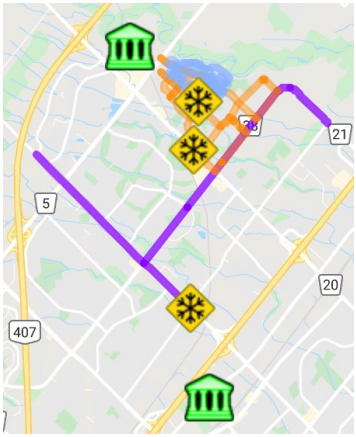
Tandems 4 and 4a benefit slightly with the addition of Cityview, as Harvester is a relatively short detour from the original primary road.

Tandems 6 and 6a to Area 6



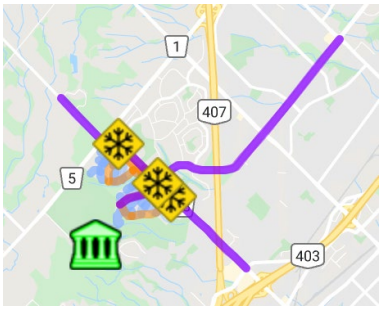
The addition of Cityview offers a modest saving of about 9km travel distance and 22 minutes of travel time as Harvester is a relatively short detour from the original primary road.

Tandem 10 to Area 26



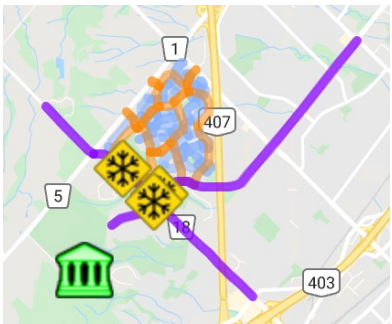
The addition of Harrison offers a modest saving of about 11km travel distance and 26 minutes of travel time as Harvester is a relatively short detour from the original primary road.

Tandem 11 to Area 7



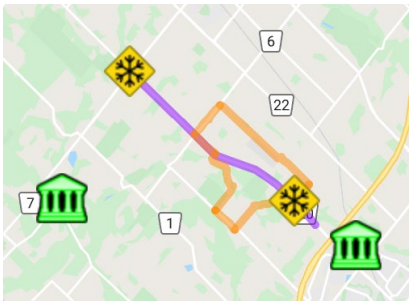
Cityview offers a 13km travel distance and 41 minutes travel time savings compared to refilling at Harvester. Much of this route is near Cityview Park.

Tandem 11 to Area 12



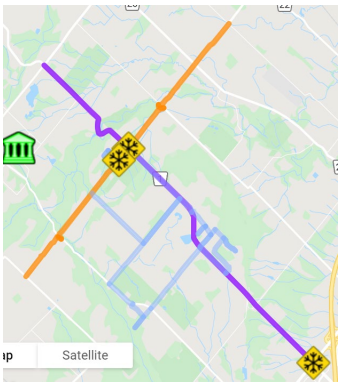
Cityview offers a 7km travel distance and 18 minutes travel time savings compared to refilling at Harvester. Savings are much less than Route 41 as the secondary and residential roads are closer to Harvester in this case.

Tandem 12 to Area 27



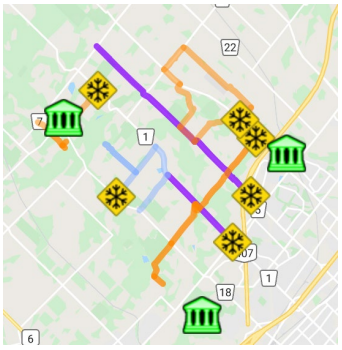
Significant savings can be achieved with just Harrison (29 km and 70 minutes). The south end of this route is quite close to Harrison. Kilbride is fair bit west of the route and as such, offers less benefit.

Tandems 13 and 13a to Area 13



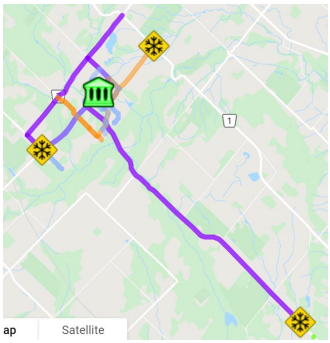
Kilbride offers savings of 22km and 43 minutes in non-productive travel. Savings may not be as pronounced as expected because the distance from the route to Kilbride is still significant (3.5 km) compared to 7.7 km for Harvester.

Tandems 13 and 13b to Areas 13 and 27



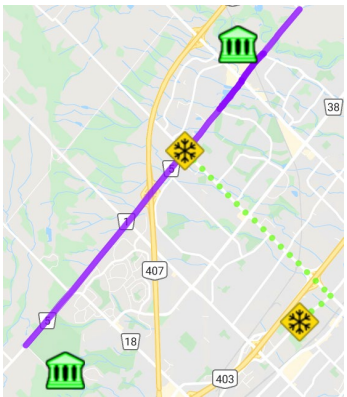
Kilbride offers the most significant savings (48km and almost 2 hours of non-productive travel) for these as Kilbride is directly on the route. Harrison offers less but still significant savings (32km and 1 hour 17 minutes).

Tandem 14 to Area 13



As expected, Kilbride offers some very significant travel savings (47km and 1 hour 42 minutes) as it is at the north end of Burlington and the route passes the Kilbride firehall.

Dundas Tandem



The Dundas tandems can benefit with the addition of either Cityview (24km / 47 minutes) or Harrison (26km / 52 minutes). Harrison offers slightly better savings because it is slightly closer to Dundas than Cityview. Note that since this affects 4 truck routes – the aforementioned savings are multiplied by 4.

All Routes Considered (Total Productivity Impact)

The table below shows the total savings if one new yard is implemented:

	Non-Productive Distance Saving	Non-Productive Time Saving (hours:minutes)
Kilbride	135 km	5:02
Cityview	153 km	5:57
Harrison	174 km	6:17

Based on this result, if only one new yard is to be implemented, it should be Harrison.

The table below shows the additional savings by implementing Cityview and Kilbride once Harrison is implemented. Note that the second new yard offers a very much diminished return.

	Non-Productive Distance Saving	Non-Productive Time Saving (hours:minutes)
Kilbride	85 km	3:04
Cityview	31 km	1:46

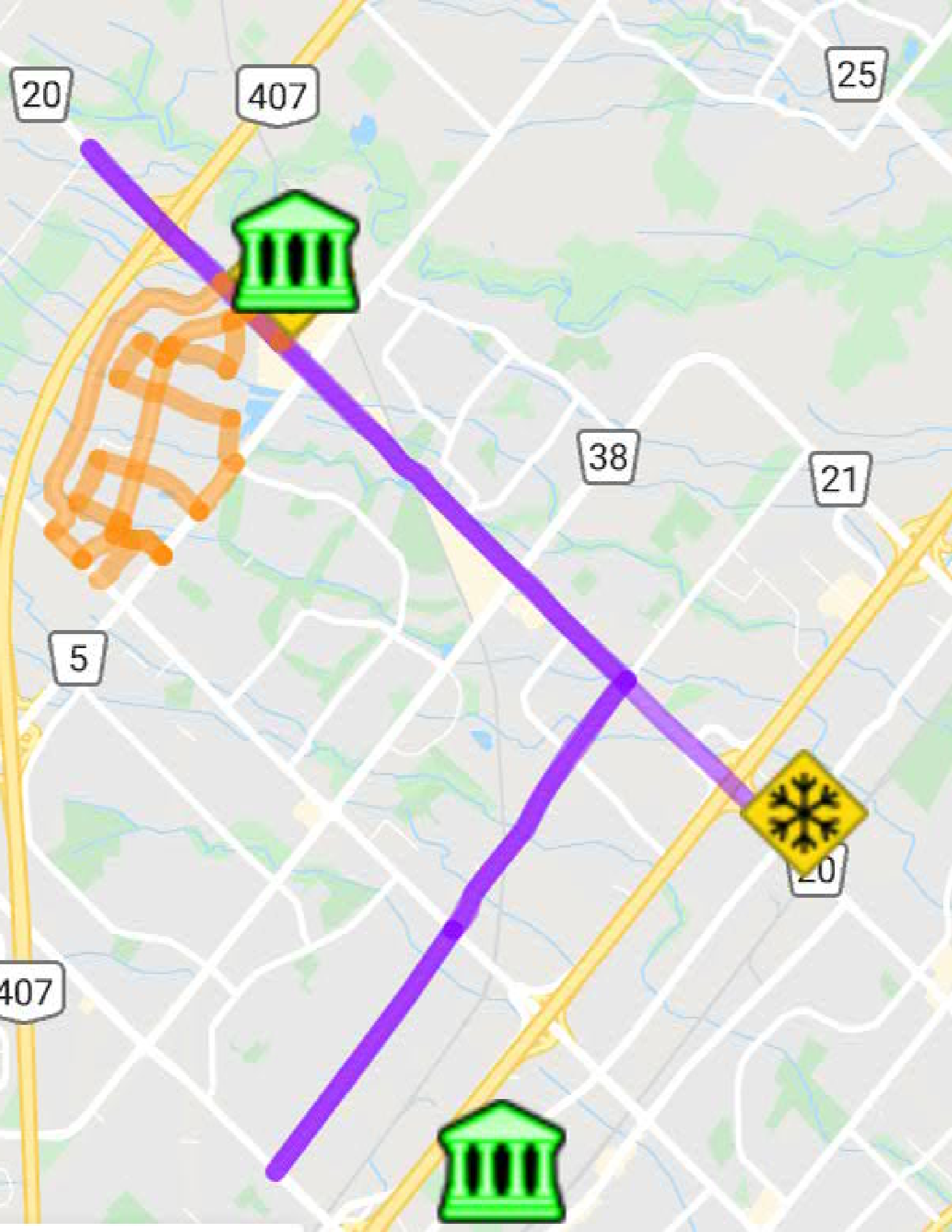
The second yard to be implemented should be Kilbride.

Note that the savings estimated above are based on a single 12-hour snow event occurring across all of the routes considered in this study.

Conclusions

The simulation offers some significant insight on how the addition of the Cityview, Harrison and Kilbride locations for refilling could help improve the efficiency/productivity of the winter maintenance operation of the City. We find that, just by adding Harrison, the City can reduce the amount of non-productive travel distance and time by 174 km and 6 hours respectively, over a 12-hour snow event.

During the course of entering the routes into the ITS Central system, we observed that a number of the routes have the start/end points of their primary roads quite a long distance away from the secondary roads. These include tandem routes 1 and 1a, 12, 13, 13a and b, and 14. It is recommended that the City optimize all routes such that less distance/time is wasted travelling between primary roads and secondary roads.


20
407
25
38
21
5
407

Route / Truck	Scenario	# times refill	# Round Trips	Prod Dist	Non-Prod	Total Dist	% Prod Dist	Prod Time	Non-Prod Time	Total Time	% Prod Time	Non-Prod Dist Saved	Non-Prod Time Saved	# extra round trips
R07 Combo 28	Status Quo	4	7	259579	95755	355333	73.10%	10:22:59	4:29:49	14:52:48	69.80%	-	-	-
R07 Combo 28	Harrison Ct	4	7	259579	78340	337918	76.80%	10:22:59	3:48:01	14:11:00	73.20%	17415	0:41:48	0
R07 Combo 28	Harrison Ct / Harvester	4	7	259579	78340	337918	76.80%	10:22:59	3:48:01	14:11:00	73.20%	17415	0:41:48	0

Appendix B

Loose Leaf Collection

Questions for Comparator Municipalities

Preamble: We're reaching out because we are doing a review of the leaf and yard waste collection program offered by the City of Burlington. Your City has been identified as a good comparator to evaluate Burlington's program against. We hope that you will share some of your data with us. Please provide the most up-to-date numbers possible but estimates are also fine. Feel free to reach out to Mychal-Ann Hayhoe if you have any questions mhayhoe@dillon.ca.

1 **1. Do residents of your City currently receive loose leaf, curbside collection?**

YES (Loose Leaf Questions)

During what months does the program run (select 'x' for all that apply)?

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Comments:

How frequently is the service offered?

	Weekly
	Bi-weekly
	Collection days (enter in #)
	Other (please explain):_____

2 Who delivers this service, the Regional or Local municipality (confirm department) or the private sector?

Response:

3 How many households are serviced?

_____ households

4 Where are the leaves processed?

Leaves:

LYW:

5 What is the average annual quantity of loose leaves collected?

_____ tonnes

How many staff are required for a) management of the program and b) delivery of collection services per collection day and c) other roles?

Response:

a)

b)

c)

NO (Leaf and Yard Waste (LYW) Questions)

During what months does the program run (select 'x' for all that apply)?

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Comments:

How frequently is the service offered?

	Weekly
	Bi-weekly
	Collection days (enter in #)
	Other (please explain):_____

Who delivers this service, the Regional or Local municipality (confirm department) or the private sector?

Response:

How many households are serviced?

_____ households

Where is the LYW processed?

Leaves:

LYW:

What is the average annual quantity of LYW collected?

_____ tonnes

How many staff are required for a) management of the program and b) delivery of collection services per collection day and c) other roles?

Response:

a)

b)

c)

How many vehicles do you use for the loose leaf collection program and what types?

a)	Loaders	
b)	Skid steers	
c)	Dump trucks	
d)	Garbage trucks	
e)	Vac truck	
f)	Other (please identify and list quantities for each)	

What is the per tonne cost to process?

Response:

What is the approximate annual operating cost to run the loose leaf program?

Collection:
Processing:
Other:

Do you have any issues or concerns with the program?

Response:

Are any changes being proposed to this program?

	No	
	Yes: please explain:	Response:

How many vehicles do you use for LYW collection program and what types?

a)	Loaders	
b)	Skid steers	
c)	Dump trucks	
d)	Garbage trucks	
e)	Vac truck	
f)	Other (please identify and list quantities for each)	

What is the per tonne cost to process?

Response:

What is the approximate annual operating cost to run the LYW program?

Collection:
Processing:
Other:

Do you have any issues or concerns with the program?

Response:

Are any changes being proposed to this program?

	No	
	Yes: please explain:	Response:

Appendix C1

Fleet - Municipal Scan Results

		CITY A	CITY B	CITY C	CITY D	CITY E	CITY F
(1)	Are staff allowed to take vehicles home? If yes:	Yes	Yes	Yes	Yes	Yes	No
(i)	Is there a policy regarding the roles/use of take-home vehicles?	Yes	Yes	Yes	Yes	Yes	No
(ii)	Does the policy have distance restrictions and/or specific job functions requiring take-home vehicles? Can the specifics of these be shared with us?	Still in development	No	Yes	Yes	Yes	Only Fire Chiefs are permitted (24 hour response)
(2)	Is any fleet parked at “satellite” locations (e.g municipal facilities aside from the main fleet lot)? If yes:	Yes	Yes	Yes	Yes	Yes	Yes
(i)	Is there a standard security protocol or amenities at these locations to protect the vehicle assets?	Yes	Yes	Yes	Yes	Yes	Yes
(3)	Does your Fleet Management Policy and/or Green Fleet Strategy include fire, emergency services, and/or transit vehicles within its scope?	Yes	Yes	Yes	Yes	Fire and EPS only	No
(4)	What department or service does Fleet belong to (i.e. corporate service from corporate office or within one or more department(s)? If within department(s), which one(s)?	Public Works	Corporate Services- Infastructure Commission	Corporate Services	Engineering and Public Works	Innovative Client Services	Transportation & Works Department
(5)	Are fire, emergency services, and/or transit fleet managed separately from other corporate fleet?	Yes	Yes	Yes	Yes	Yes	Yes
(6)	Is the fleet equipped with analytics/vehicle data units? If yes:	Yes	Yes	Yes	Yes	Yes	Yes
(i)	What is recorded (e.g. fuel consumption, kilometers, idling, GPS location, driving behaviours such as hard breaking or fast acceleration etc.)?	All the above on Select units	Yes	Fuel and Km for all	Fuel, km, GPS & Idling	Depends on the unit	Yes
(ii)	Are telematics included (e.g. real time data on driving behaviours)?	Select Units	No	Select units	Yes	No	Yes
(iii)	Does this include fire, emergency services, and/or transit?	No	unknown	Yes	No	Yes	Not included in Fleet
(7)	Do you have a dedicated FTE with a job function focused on fleet fuel efficiency and GHG reduction?	Yes	No	Yes	No	No	Yes
(8)	Any additional comments?	No	No	No	No	No	No

		CITY A	CITY B	CITY C
(1)	Are staff allowed to take vehicles home? If yes:	Yes	Yes	No
(i)	Is there a policy regarding the roles/use of take-home vehicles?	A revised “take home / personal” policy with definitions / business requirements was introduced in Public Works on Oct 20, 19 and is scheduled for implementation for end year.	There are old corporate SOP's/Policies to the matter which we are seeking to re-write ourselves.	Fire Chiefs are the only staff that are permitted to take Fleet Vehicles home and this is for 24 hour response to emergencies
(ii)	Does the policy have distance restrictions and/or specific job functions requiring take-home vehicles? Can the specifics of these be shared with us?	Units are aligned to job positions with take home units being a focus. Additional information could be provided year end.	No distance restrictions as yet which is one concern. Take home vehicles are limited to supervisory staff who are on call.	No
(2)	Is any fleet parked at “satellite” locations (e.g municipal facilities aside from the main fleet lot)? If yes:	Vehicles are parked at many locations throughout the city	Yes	Assests will be parked at a Municipal facility if not at a fleet site , such as community centres.
(i)	Is there a standard security protocol or amenities at these locations to protect the vehicle assets?	there are various security arrangements (some equipment locked in a public parking lot)	All premises are under cameras, card or wi-fi access locked gates and other security measures. Transit has its own major facility for the buses, most parked inside. Some vehicles are parked at Town Hall. Parking operations vehicles may be remotely kept at other town premises as convenient. Excluding Transit we have a main depot and two other depots, plus Harbours and Cemeteries.	Parking lot lights, fenced compounds and some sites have CCTV
(3)	Does your Fleet Management Policy and/or Green Fleet Strategy include fire, emergency services, and/or transit vehicles within its scope?	Part of the Office of Energy initiatives strategies include CAFE and GHG reduction targets	We have a green fleet policy administered by our Environmental Policy group with variations as may be required by Fire and Transit. Emergency Services is by our regional government.	Corporate Fleet Policy does not apply to Transit of Fire
(4)	What department or service does Fleet belong to (i.e. corporate service from corporate office or within one or more department(s)? If within department(s), which one(s)?	Fleet Services reports to Public Works, and is accountable to support many user groups / equipment outside of PW within the city	Fleet is a division of Roads & Works Operations within the Corporate Services-Infrastructure Commission.	Corporate Fleet is under the Transportation & Works Department, specifically the Works, Operations and Maintenance Division
(5)	Are fire, emergency services, and/or transit fleet managed separately from other corporate fleet?	Yes	Transit and Fire manage their own. Emergency Services is regional. Fleet however maintains Roads & Works, Parks, Hydro, Fire equipment.	Yes
(6)	Is the fleet equipped with analytics/vehicle data units? If yes:	Yes	Yes	Yes
(i)	What is recorded (e.g. fuel consumption, kilometers, idling, GPS location, driving behaviours such as hard breaking or fast acceleration etc.)?	Select units. Equipment is capable of all above	Where fitted yes to all of these items.	All the above
(ii)	Are telematics included (e.g. real time data on driving behaviours)?	As Above	Traceable but not real time as yet.	Yes
(iii)	Does this include fire, emergency services, and/or transit?	information above - no	would have to verify with Transit & Fire, no to EMS.	No. Transit and fire have their own telematics system not managed by Coporate Fleet
(7)	Do you have a dedicated FTE with a job function focused on fleet fuel efficiency and GHG reduction?	Fleet / Office of Energy Initiatives – not solely “focused” on, but a communal action item	Analytical duties/needs shared between Fleet Manager, Work Order Technician, Asset Management and others as required.	Yes - New position in 2019 - Fleet Business Improvement Specialist- Responsibility include analyzing telematics and Green Fleet data
(8)	Any additional comments?	No	No	No

		CITY D	CITY E	CITY F
(1)	Are staff allowed to take vehicles home? If yes:	Yes	Yes	Yes
(i)	Is there a policy regarding the roles/use of take-home vehicles?	Yes	High end supervisors, management that require on-call/emergency response eg. Highest supervisors in water get vehicles to respond to main breaks. These people have their own dedicated vehicles with the required equipment, specifications. They do pay a taxable benefit when using for personal use. They calculate how much they drive to and from work. 5 managers, 15 work vehicles - around 20 total allowed to be taken home of about 700 units. Carpool system. Carpool vehicles go home with staff and staff pay fee. 10-12 vehicles. Part of community emissions reductions plan. There is a policy for take-home vehicles. Manager of Dept has to approve request. Official take-home vehicle request form. Needs to be justified. Has to be authorized on 3 levels (management levels). Role is a determining factor in allowing take-home vehicle. Authorization form needs to be filled out if role is replaced with new person.	Yes
(ii)	Does the policy have distance restrictions and/or specific job functions requiring take-home vehicles? Can the specifics of these be shared with us?	Yes	Yes	No specific distance restrictions in this policy. Here's the bulk of the policy: " The personal use of City vehicles is strictly prohibited. Nevertheless, certain circumstances may arise where personal use of City vehicles is necessary for an individual to carry out his/her duties of employment. Specifically, such personal use of City vehicles includes the following: The employee is on-call to respond to emergencies and is authorized or required to take a vehicle home. The drive between the employee's regular place of work and his/her personal residence shall be considered personal use, even where such travel is required by virtue of the employee's duties. Distances travelled between the employee's home and the site of an emergency shall not be considered personal use. These authorized on-call situations require that the following conditions are met: § In order to respond to the on-call, the employee requires certain specialized equipment in the vehicle in order to provide for a rapid response. For a definition of "specialized equipment" please see the Definitions section. § On-call emergencies are generally directed towards the health and safety of the general population, or significant disruption to the employer's operations. When an employee has been authorized to take a vehicle home as outlined in the provisions above, the employee shall use a direct route from the last point of business to the employee's home. Note: Where the on-call is temporary or of a seasonal nature, or where it is related to severe weather warnings, the assignment of vehicles under this clause shall be limited to the duration of that emergency period. When an employee is on the road and is entitled to a break, the vehicle may be used for transportation to the nearest appropriate location. It is not permissible to take a City vehicle out for the sole purpose of going for a break. In other circumstances, where there are reasonable grounds to approve personal use of a City vehicle, subject to documented General Manager/Director approval."
(2)	Is any fleet parked at "satellite" locations (e.g municipal facilities aside from the main fleet lot)? If yes:	Yes	Most or all at Eng/Public works or City Hall. Reason to park at alternate locations is operational efficiency (related to Green Fleet Action Plan). Proximity to work locations.	Yes
(i)	Is there a standard security protocol or amenities at these locations to protect the vehicle assets?	Falls under general City locations/facilities access/security policies and procedures.	Most facilities have cameras on the lot (not all). Generally if in a remote area, it is gated and locked nightly. No specific policy, but in general have camera and/or gate/fence. Plus GPS and VDUs on vehicles in an added level of security. Digital 'fence' automatically notifies manager of unauthorized vehicle movements after hours.	Yes, there is security at these sites
(3)	Does your Fleet Management Policy and/or Green Fleet Strategy include fire, emergency services, and/or transit vehicles within its scope?	Yes, we have just released the new Sustainable City Fleets plan.	Yes - in reporting. But management is seperated. Fleet Management Policy trumps Green Fleet Strategy.	Yes, Fire and EPS
(4)	What department or service does Fleet belong to (i.e. corporate service from corporate office or within one or more department(s)? If within department(s), which one(s)?	Corporate Services	Engineering and Public Works. Not part of "corporate", within a separate department. But corporate makes final capital decisions.	Innovative Client Services (made up of: Fleet, Supply, HR, IT, Public Info and Media Relations, Service, Service Transformation, and Legal Services)
(5)	Are fire, emergency services, and/or transit fleet managed separately from other corporate fleet?	Yes	Community Safety - Fire dept and emergency, police, emergency programs, Eng and Public Works - main fleet (everything else). Public Transit provided regionally	Yes, Transit has it's own organization, however we share a Commercial Vehicle Operator Registration (and therefore have a joint safety program), Municipal Fleet buys non-revenue transit vehicles, and last we cooperate with regard to review of trends etc.
(6)	Is the fleet equipped with analytics/vehicle data units? If yes:	Yes	Yes	Yes
(i)	What is recorded (e.g. fuel consumption, kilometers, idling, GPS location, driving behaviours such as hard breaking or fast acceleration etc.)?	Fuel and usage (kilometres and engine hours) for all and other data for select units.	Includes fuel, km, GPS location, idling. Fuel management system - provides data analytics on fuel consumption usage, idling (All city vehicles EXCEPT fire). Each fire station has their own gas station. GPS/ Driving performance - GPS component run only on a handful a vehicles have this currently (pilot).	Depends on unit, we are currently implementing telematics.
(ii)	Are telematics included (e.g. real time data on driving behaviours)?	For Select Units	Analytics re driving behaviour and vehicle locations. Cautions GPS locations. Tracking vehicle only - cannot track people. Includes telematics and alerts to managers (security, location, km travelled, etc)	We are currently implementing telematics
(iii)	Does this include fire, emergency services, and/or transit?		Does not include Fire of Transit	Yes
(7)	Do you have a dedicated FTE with a job function focused on fleet fuel efficiency and GHG reduction?	Yes	No. Worked into role Fleet Manager when required. No dedicated person for that work. However, would like to do this in the future. Requires 1 or more people with this focus. A current budgetary "ask". Reems of data provided, poor at analysing it due to understaffing.	No
(8)	Any additional comments?	No	No	No

Appendix C2

Fleet - Vehicle Right-Sizing Cost Estimate Breakdown

The sample vehicle data for each vehicle class used to develop the cost implications for each recommendation in Section Error! Reference source not found. is presented in Table C2-1. Table C2-2 presents the fuel and carbon tax costs used for annual vehicle operation cost estimates.

Table C2-1: Right-Sizing Vehicle Assessment - Raw Data

Vehicle Classification	Make / Model of Sample Vehicle	Capital Cost† (MSRP)	Average Fuel Efficiency (L/100 km)	Average Fuel Consumption (L)
HD Truck	Chrysler Dodge RAM 4500	$49,520	37.3	5,782
LD Truck	Chrysler Dodge RAM 1500	$47,095	18.02	2,793
LD SUV	Mitsubishi RVR	$22,998	9.45	1,465
Hybrid SUV	n/a‡	$22,990	5.92	917
LD Car	Toyota Corolla	$18,990	9.83*	1,524
Hybrid Car	n/aᵅ	$29,498	6.08	943

† Capital cost for hybrids is the base cost of the conventional vehicle plus average hybrid premium cost[8]

‡ Typical Hybrid SUV not identified in fleet. Fuel efficiency data is presented for all Hybrid SUVs in fleet (Mitsubishi RVR and Mitsubishi Outlander PHEV)

* Fuel efficiency presented is for Toyota Matrix fleet vehicles, now discontinued

ᵅ Typical Hybrid Car not identified in fleet. Fuel efficiency data is presented for all Hybrid Cars in fleet (Chevrolet Volt, Hyundai Sonata, Toyota Prius, Toyota Camry, and Ford C-Max)

Table C2-2: Fuel and Carbon Tax Costs*

Year	Fuel Costs ($/L)	Carbon Tax ($/tonne)
2019	$1.16	$10
2020	$1.19	$20
2021	$1.21	$30
2022	$1.23	$40
2023	$1.26	$50
2024	$1.28	$50
2025	$1.31	$50

* All vehicles consume gasoline fuel for comparative purposes. Gasoline costs is 116.3 cents per litre in 2019 (based on Toronto September 2018 to September 2019 average) and inflated by 2% per year until 2025.

[8]Cunningham, Wayne; CNET (2012). The hybrid premium: How much more does a hybrid car cost? Retrieved November 1, 2019 from https://www.cnet.com/roadshow/news/the-hybrid-premium-how-much-more-does-a-hybrid-car-cost/
Toyota Canada (2019). Retrieved November 1, 2019 from https://www.toyota.ca/toyota/en/build-price/rav4

Appendix C3

Fleet - Low Travel Vehicles

Table C3 -1-: Low Travel Vehicles

Unit ID	Classification	Kilometerage 2017 (km)	Kilometerage 2018 (km)	Service Level	<10,000 KM 2017/2018 Average
0007-12	LD Truck	20,468	9,848	Animal Control	No
0014-12	LD Truck	9,510	15,893	Municipal Law Enforcement & Licensing	No
0015-10	LD Car	10,461	8,232	Building Code Permits & Inspection	Yes
0019-10	LD Car	3,322	0	Other	Yes
0024-12	LD Truck	7,200	5,928	Sign Production	Yes
0025-12	LD Truck	2,740	3,205	Building Code Permits & Inspection	Yes
0026-13	LD Truck	6,257	6,755	Building Code Permits & Inspection	Yes
0031-18	LD SUV	0	5,516	Building Code Permits & Inspection	Yes
0033-10	LD Car	16,257	5,549	Municipal Law Enforcement & Licensing	No
0036-13	LD Truck	9,131	13,439	Municipal Law Enforcement & Licensing	No
2002-11	LD Truck	6,691	8,820	Organized Sport Support, Recreation	Yes
2008-13	LD Van	8,289	7,476	Organized Sport Support	Yes
2009-09	LD Truck	11,080	4,714	Arts & Culture	Yes
2011-12	LD Truck	9,383	16,254	Recreation	No
2012-12	LD Truck	11,577	5,029	Organized Sport Support, Recreation	Yes
2015-10	LD Car	15,489	8,590	Recreation	No
2016-14	LD Truck	8,384	10,761	Recreation	Yes
2501-15	HD Truck	2,816	2,522	Tyandaga Golf Course	Yes
3002-11	LD Car	6,453	5,395	Fleet Services	Yes
3003-11	LD Car	6,828	4,026	Recreation	Yes
3019-12	LD SUV	10,354	8,661	Roads and Structures - Design and Construction	Yes
3048-09	LD Car	6,195	5,564	Roads and Structures - Design and Construction	Yes
3049-09	LD Car	6,990	17,413	Roads and Structures - Design and Construction	No

Unit ID	Classification	Kilometerage 2017 (km)	Kilometerage 2018 (km)	Service Level	<10,000 KM 2017/2018 Average
5001-08	LD Car	8,613	25,806	Building Code Permits & Inspection	No
5002-10	LD Car	9,659	6,734	Tree Management	Yes
5003-12	LD SUV	7,034	17,004	Fleet Services, Recreation	No
5004-17	LD Car	4,100	4,766	Environment & Energy, Facilities and Buildings-Design and Construction	Yes
5006-18	LD Truck	0	681	Organized Sport Support, Road & Sidewalk Maintenance	Yes
5009-13	LD Truck	5,735	4,315	Traffic Operations Management	Yes
5010-10	LD Truck	8,286	5,783	Parks & Open Space Maintenance	Yes
5014-09	LD Car	8,525	4,466	Tree Management	Yes
5015-11	LD Truck	6,931	11,189	Tree Management	Yes
5017-13	LD Truck	12,113	9,174	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	No
5018-10	LD Truck	8,923	5,339	Cemetery	Yes
5022-16	HD Truck	7,752	4,748	Parks & Open Space Maintenance	Yes
5023-13	LD Truck	21,646	5,982	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	No
5024-06	LD Truck	6,895	6,295	Fleet Services	Yes
5025-08	LD Truck	4,602	5,930	Parks & Open Space Maintenance	Yes
5026-07	LD Truck	10,564	661	Other	Yes
5027-18	LD Truck	0	229	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	Yes
5030-10	LD Truck	6,934	12,284	Parks & Open Space Maintenance	Yes
5037-18	LD Truck	0	3,242	Tree Management, Road and Sidewalk Maintenance	Yes
5041-18	LD Truck	0	649	Tree Management	Yes
5042-12	HD Truck	10,630	8,387	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	Yes

Unit ID	Classification	Kilometerage 2017 (km)	Kilometerage 2018 (km)	Service Level	<10,000 KM 2017/2018 Average
5047-14	HD Truck	2,463	2,074	Cemetery	Yes
5053-16	LD Van	10,313	8,695	Parks & Open Space Maintenance	Yes
5062-11	LD Van	7,082	6,995	Parks & Open Space Maintenance	Yes
5063-07	LD Van	10,483	7,999	Parks & Open Space Maintenance	Yes
5064-11	LD Van	8,490	8,910	Parks & Open Space Maintenance	Yes
5123-14	HD Truck	8,868	10,839	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	Yes
5126-15	HD Truck	11,105	8,762	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	Yes
5128-16	HD Truck	7,588	0	Parks & Open Space Maintenance	Yes
5129-08	HD Truck	8,593	7,125	Parks & Open Space Maintenance	Yes
5130-08	HD Truck	11,327	3,511	Other	Yes
5131-12	HD Truck	11,202	9,117	Parks & Open Space Maintenance, Road and Sidewalk Maintenance	No
5156-14	HD Truck	8,360	8,991	Traffic Operations Management	Yes
5157-09	HD Truck	8,666	7,220	Traffic Operations Management	Yes
5191-06	HD Truck	8,406	4,659	Other	Yes
5192-18	HD Truck	0	2,406	Tree Management	Yes
5193-18	HD Truck	0	363	Tree Management	Yes
5210-18	HD Truck	0	2,270	Road & Sidewalk Maintenance	Yes
5212-18	HD Truck	0	2,322	Road & Sidewalk Maintenance	Yes
5214-09	HD Truck	7,865	7,136	Road & Sidewalk Maintenance	Yes
5217-18	HD Truck	0	9,201	Road & Sidewalk Maintenance	Yes
5218-07	HD Truck	6,246	4,676	Other	Yes

Unit ID	Classification	Kilometerage 2017 (km)	Kilometerage 2018 (km)	Service Level	<10,000 KM 2017/2018 Average
5218-18	HD Truck	0	7,609	Road & Sidewalk Maintenance, Parks and Open Space Maintenance	Yes
5219-18	HD Truck	0	6,252	Road & Sidewalk Maintenance	Yes
5220-12	HD Truck	9,318	9,719	Road & Sidewalk Maintenance	Yes
5221-07	HD Truck	5,704	3,753	Other	Yes
5221-18	HD Truck	0	9,911	Road & Sidewalk Maintenance	Yes
5222-07	HD Truck	6,853	7,497	Road & Sidewalk Maintenance	Yes
5224-11	HD Truck	9,118	9,853	Road & Sidewalk Maintenance	Yes
5225-11	HD Truck	6,926	7,309	Road & Sidewalk Maintenance	Yes
5228-07	HD Truck	5,970	4,865	Other	Yes
5229-07	HD Truck	5,372	5,119	Other	Yes
5231-07	HD Truck	10,284	9,834	Tree Management	No
5232-07	HD Truck	9,039	8,405	Tree Management	Yes
5233-08	HD Truck	9,287	7,560	Tree Management	Yes
7026-14	LD Van	27,601	8,779	Parking Management	No
7028-10	LD Car	4,873	9,200	Traffic Operations Management	Yes

Appendix D1

Development Application Process (DAP) - Peer Benchmarking

1 Peer Benchmarking

A survey questionnaire was developed to guide interviews conducted with other municipalities that were considered comparable peers to the City in terms of size and development patterns. The following five municipalities were selected for comparison:

- City of Hamilton;
- City of Kitchener;
- City of Markham;
- City of Richmond Hill; and
- Town of Oakville.

Interviews were conducted by phone with senior staff in each municipality between October and November 2019. The questionnaire consisted of almost ninety questions in total, split into three portions focussed on the zoning, grading and tree approval permitting processes. Questions touched on the following topics:

- Approvals process approach;
- Staffing resources and organizational structure;
- Application volumes;
- Intake processes and application completeness;
- Service standards;
- Inspections and enforcement; and
- Use of information technology resources.

Response rates varied between the three main focus areas, with grading seeing the lowest response rate. Repeated efforts were made to contact and follow up with senior municipal staff to complete interviews by phone. In cases where staff did not respond or interviews could not be scheduled within the timeframe of the study, supplementary information was sought from publicly-accessible sources (e.g., municipal websites) and included where available.

The findings of the peer benchmarking interviews are described in the following sections.

1.1 Approach to Development Approvals

Survey questions were developed to understand the scale of development activity present within each municipal peer comparator, with particular regard to infill development of single-detached residential uses.

1.1.1 Building Permit Volumes

Kitchener reported processing 968 building permit applications for which the primary use was residential in 2018. Applications involving infill development of single-detached residential uses accounted for approximately five percent of files processed in 2018.

Oakville reported processing 1,278 building permit applications for which the primary use was residential in 2018. Applications involving infill development of single-detached residential uses accounted for approximately nine percent of files processed in 2018.

Richmond Hill processed 1,148 building permit applications for which the primary use was residential in 2018, however information regarding the proportion of those permits accounted for by infill development of single-detached residential uses was not available.

No information was available for Hamilton and Markham.

1.1.2 Applicability of Site Plan Control

Hamilton and Kitchener reported that infill development of single-detached residential uses is not typically subject to Site Plan Control. However, Hamilton has implemented a pilot project to regulate the redevelopment of residential properties located in mature neighbourhoods in Ancaster by way of the Site Plan Control process.[1] The policy is explicitly intended to allow the City to manage issues relating to site grading, elevations, and tree preservation. Applicable to lands zoned "Existing Residential (ER)" within the former Town of Ancaster, the following categories of development are subject to Site Plan Control:

- New dwellings;
- Substantial additions to existing dwellings;
- Accessory buildings or structures with a ground floor area greater than or equal to forty square metres; and
- Accessory buildings or structures which result in a lot coverage greater than thirty-five percent on lots subject to a maximum lot coverage of thirty-five percent.

Oakville has amended its Site Plan Control by-law to enable implementation of a specific approvals process whereby certain instances of infill single-detached residential development would be subject to the Town's regulatory authority under the auspices of Site Plan Control. Known as the "Development Engineering Site Plan" (DESP) process, the process applies to properties zoned for low-density residential uses located in the southern half of Oakville. Through the DESP process, authority to impose conditions relating to site grading and drainage is delegated to the Town's Director of Development Engineering.

Markham and Richmond Hill did not report whether Site Plan Control typically applies to instances of infill development of single-detached residential uses. While both municipalities generally exclude single-detached dwellings from the applicability of Site Plan Control, this exclusion does not apply in specific areas throughout each city.

1.2 Zoning Compliance Processes

1.2.1 Approaches to Zoning Compliance

Most of the City's peer comparators reported that they do not employ a standalone zoning compliance process, and instead conduct review of zoning compliance as part of the Building Permit or development approvals (e.g., Site Plan Control) processes.

[1] See: City of Hamilton. (2019, July 26). Pilot project—Building new homes in Ancaster's mature neighbourhoods. Retrieved November 15, 2019, from City of Hamilton website: https://www.hamilton.ca/city-planning/official-plan-zoning-by-law/ancaster-existing-residential-er-zone

Kitchener and Oakville employ the zoning occupancy certificate process as provided for in subsection 34(6) of the Planning Act, however such certificates are only intended to confirm whether a proposed change in use would be permitted according to the applicable zoning by-law(s). Hamilton employs what it refers to as the "Zoning Verification and Property Report," process, which proponents can pursue to confirm whether a proposed change in use is permitted, check if heritage restrictions or the need for conservation authority approvals apply, and confirm whether any outstanding permit issues are associated with a property. None of these processes are intended to fulfill the function of a fulsome review of zoning compliance.

Markham employs a standalone zoning compliance process in the form of their Zoning Preliminary Review (ZPR) approach. The process is intended to confirm compliance with applicable zoning regulations prior to the submission of an application for building permit or other development approvals. As the process is optional, the ZPR is not required to apply for and submit an associated building permit application.

1.2.2 Organizational Structure and Resource Levels

No information was available regarding the organizational structure Markham employs to deliver the ZPR process, nor the typical level of effort required from staff to process ZPR applications which involve infill development of single-detached residential uses.

1.2.3 Intake, Processing and Service Standards

1.2.3.1 Application Volumes

No information was available regarding the volume of ZPR applications processed by Markham in 2018.

1.2.3.2 Intake Process and Fees

Markham has deployed a customer-facing online permitting platform (ePlans) through which ZPR applications can be submitted and processed.

Application fees are depend on the type of development proposed: for the 2019 calendar year, application fees were charged as a flat fee of $250.00 for low-rise residential uses and $350.00 for all other types of development.

No information was available regarding the rate of occurrence of incomplete ZPR applications.

1.2.3.3 Service Standards

No information was available regarding service standards and typical processing timeframes pertaining to Markham's ZPR process.

1.2.4 Inspections and Enforcement

No information was available regarding whether inspections are carried out as part of the ZPR process.

1.2.5 Information Technology

Markham is unique in offering a fully-digital, customer-facing online permitting platform, however the software system used to administer this system was not reported.

1.3 Grading Compliance Processes

Survey questions were developed to examine the means through which the municipal peer comparators regulate the alteration of site grading, with particular regard to standalone grading approvals processes.

Despite repeated efforts at contact and follow-up, responses from senior management responsible for grading review processes were limited to Hamilton and Oakville. Supplementary information was sought from publicly-accessible sources (e.g., municipal websites) and included where available. Accordingly, caution should be exercised in drawing conclusions from responses pertaining to grading compliance processes.

1.3.1 Approaches to Grading Compliance

All municipal peer comparators employ standalone grading compliance approvals processes to regulate site alteration, typically by way of site alteration permits. Such permits typically apply to all site alteration activities which would not otherwise be subject to development approvals processes such as Site Plan Control. Kitchener and Markham exclude properties larger than 0.405 ha (1.0 ac) in area from the need to obtain site alteration permits.

Several municipalities employ site alteration permitting processes which specifically apply to infill residential development. Markham has begun to employ its Residential Infill Grading and Servicing (RIGS) process in cases involving infill single-detached residential development which are not otherwise subject to Site Plan Control. Oakville applies the Development Engineering Site Plan (DESP) process to applications involving redevelopment of properties zoned for single-detached residential uses, however this process is unique in that it is implemented as a form of streamlined Site Plan Control.

Hamilton and Oakville both noted that while site alteration permits, if required, would need to be obtained prior to issuance of a related building permit, both permit processes could be pursued concurrently.

1.3.2 Organizational Structure and Resource Levels

Site alteration permitting in Hamilton and Oakville is administered by municipal departments primarily concerned with engineering-related matters. Both municipalities reported that review for grading compliance is undertaken by staff who are responsible for a variety of tasks, with permit review being one task among many.

Oakville reported that applications involving infill residential development which were processed through the DESP stream typically required 19 hours of staff time for review of grading compliance and issuance of a decision.

Data regarding typical staff effort required for review of site alteration permit files was not available from any of the municipal peer comparators.

1.3.3 Intake, Processing and Service Standards

1.3.3.1 Application Volumes

Hamilton reported having processed twenty-four site alteration permit applications in 2018, of which eighty-five percent involved infill development of single-detached residential uses.

Oakville reported having processed one-hundred and eighty DESP applications in 2018, all of which involved infill development of single-detached residential uses.

1.3.3.2 Intake Process and Fees

Hamilton and Kitchener make use of an application form which is specific to the site alteration permit process. Oakville employs an application form which is used for multiple development engineering-related permitting processes.

Hamilton and Markham allow for digital submission of site alteration permit applications, with the former being limited to email submissions while the latter employs a customer-facing online permitting platform (ePlans).

All municipal peer comparators levy application fees in relation to site alteration permits and related grading compliance processes. Fees for site alteration permits range as follows:

- Hamilton: $696.00 flat fee for residential uses, $2,770.00 flat fee for non-residential uses;
- Kitchener: $280.00 for the initial application, plus $175.00 for each revised submission;
- Oakville: $1,061.00 flat fee; and
- Richmond Hill: $476.00 flat fee.

Oakville charges a flat fee of $1,867.00 for applications made through the DESP stream.

Hamilton and Oakville reported that fee payments can only be made in person or by mail (i.e., cheque).

With respect to completeness of applications, Hamilton reported that virtually all site alteration permit applications it received in 2018 were considered incomplete at the time of submission, largely due to missing information. Conversely, Oakville reported much lower rates of incomplete applications for the DESP stream in 2018 (five to ten percent). Both Hamilton and Oakville reported that staff will reject incomplete applications when they are received.

1.3.3.3 Service Standards

Hamilton estimated that site alteration permit applications involving infill development of single-detached residential uses typically required fifteen business days to complete reviews and issue decisions in 2018.

Oakville reported that applications made through the DESP stream typically required ninety business days to complete review. As the DESP process is implemented under the auspices of Site Plan Control, the legislated timeframes which apply to the Site Plan Control process apply equally to the DESP process. Notwithstanding this requirement, Oakville noted that staff maintain an internal target of providing initial responses to DESP applications within fifteen business days.

Hamilton reported that while the site alteration permit process is not subject to legislated timeframes for review and issuance of a decision, staff work towards an internal service standard of fifteen business days. While this target turnaround time is communicated to the public, it is not framed as a commitment.

1.3.4 Inspections and Enforcement

Both Hamilton and Oakville reported that inspections are conducted as part of the grading compliance approvals process.

Hamilton reported that it treats inspections of infractions and related enforcement actions as a high priority, whereas Oakville reported that infractions are considered a lower priority than day-to-day application review given the level of available staffing resources.

1.3.5 Information Technology

Both Hamilton and Oakville employ CSDC AMANDA version 7 to coordinate the grading compliance approvals process.

Markham is unique in offering a fully-digital, customer-facing online permitting platform, however the software system used to administer this system was not reported.

1.4 Tree Permitting and Approvals

Survey questions were developed to examine the means through which the municipal peer comparators regulate the injury or removal of trees, with particular regard to permitting processes applicable to trees on private land.

1.4.1 Approaches to Tree Permitting and Approvals

Of the peer comparators that responded, all reported that regulations and necessary approvals apply to the injury or destruction of trees on both private and public property. In all cases, the regulatory scheme employed differed depending on whether the application involved trees on public or private land. For the purposes of this report, focus was placed on the means by which regulations and approvals applied to trees on private land.

Respondents typically noted that tree permitting processes were further subdivided between those that fell under the auspices of Planning Act applications (e.g., Site Plan Control, Plan of Subdivision) and those that did not involve broader development approvals processes: typically, development administered under Planning Act applications would be reviewed under the auspices of those processes and would not be subject to an applicable tree permitting by-law. Accordingly, for the purposes of this report, focus was placed on the means by which regulations and approvals applied to instances of development which were subject to applicable private tree permitting by-laws.

The requirement for approval to injure or destroy a tree on private land is typically triggered on the basis of the physical measurements pertaining to the tree in question, with particular regard to the diameter at breast height (DBH) value. The following variations to the triggers for approval apply:

- Kitchener: Trees on private land with a DBH of 10 cm or greater on lots of 1 acre in size or greater
- Oakville: Trees on private land with a DBH of 15 cm or greater
- Richmond Hill: Trees on private land with a DBH of 20 cm or greater

Respondents similar challenges between them with respect to the manner in which tree approvals integrated with the broader development approvals process. All respondents noted that, while by no means the intended policy outcome, it would be possible for a proponent to obtain a building or

demolition permit without first obtaining the applicable private tree by-law permit if a tree permit file had not already been created. Respondents noted that such instances are most likely to occur if a proponent does not consult with tree protection staff and does not clearly indicate existing trees on site drawings included with an associated building or demolition permit (in which case building permit intake staff may not check for applicable tree permitting requirements).

1.4.2 Organizational Structure and Resource Levels

Most respondents noted that the private tree by-law approvals process is administered by a municipal department or division primarily concerned with planning-related matters. Oakville is a unique exception in that all tree permitting matters, for both public and private land, are centrally delivered through the Parks and Open Space department.

Most respondents noted that review of private tree by-law applications is typically undertaken by staff whose primary role is to undertake such review, although such staff may perform other functions. Kitchener employs Senior Environmental Planners to administer the private tree by-law application process, however this task does not constitute their primary role.

Respondents noted that review of applications for private tree by-law approvals which involved infill development of single-detached residential uses typically required several hours of staff time.

1.4.3 Intake, Processing and Service Standards

1.4.3.1 Application Volumes

Respondents noted a wide range of scale with respect to application volumes pertaining to private tree by-law approvals processed in 2018, ranging from several files (Kitchener: six files) to several hundred files or more (Oakville: more than one thousand files; Richmond Hill: approximately three hundred files).

Most respondents were unable to report the proportion of private tree by-law approvals accounted for by applications involving infill development of single-detached residential uses. Kitchener reported a single application which involved the noted type of development, accounting for approximately twenty percent of the private tree by-law approvals files processed in 2018.

1.4.3.2 Intake Process and Fees

All respondents employ an application form which is specific to the private tree by-law approvals process. While all respondents reported that such applications can be submitted digitally, only Oakville has a customer-facing online application form; Kitchener and Richmond Hill allow for application forms to be submitted by email.

All respondents levy application fees applicable to the private tree by-law approvals process. Fees vary based on the scale of development proposed, as follows:

- Kitchener charges a flat fee of $124.00 for an initial application, plus a flat fee of $64.00 if the application is revised and resubmitted;
- Oakville charges $50.00 for the first tree and $340.00 for each additional tree in cases involving trees with a DBH of 24 cm or less, or a flat fee of $340.00 per tree in cases involving trees with a DBH greater than 24 cm; and

- Richmond Hill charges a base fee of $150.00 for the first tree plus an additional $50.00 for each additional tree, up to a maximum of $400.00 total.

All respondents reported that fee payments cannot be made online.

Respondents noted very low rates of instances of permit applications being incomplete at the time of submission. Richmond Hill estimated that less than ten percent of private tree by-law applications in 2018 may have been incomplete, due largely to the fact that applicants generally interface with intake staff prior to making an application. Kitchener noted the same explanation for their report of no applications failing to meet submission requirements in 2018. Oakville estimated that less than five percent of private tree by-law applications in 2018 may have been incomplete, due largely to the fact that the online application form cannot be submitted until all fields are completed (however this requirement does not apply to attachments, which can be missed).

Oakville and Richmond Hill reported that staff will not accept applications which are believed to be incomplete, whereas Kitchener reported that while staff may accept incomplete applications, their review effort will be limited to identifying deficiencies for resubmission. All respondents reported that staff will not undertake fulsome permit review activities until applications are deemed complete.

1.4.3.3 Service Standards

Kitchener and Richmond Hill estimated that private tree by-law permit applications involving infill development of single-detached residential uses typically required ten business days to complete reviews and issue decisions in 2018. Oakville reported that such processes typically required twenty-five business days to complete.

All respondents reported that the processing of private tree by-law permit applications is not subject to legislated requirements regarding timing of review and issuance of decisions. Both Oakville and Richmond Hill reported that they maintain a formal service standard with regard to permit processing times, however only Oakville makes this target known to the applicant. Oakville targets a permit turnaround time of five business days for high-priority applications (e.g., instances where infractions may be likely to occur) and twenty-five business days for all other applications. Richmond Hill targets a turnaround time of ten business days. Kitchener reported that it has not adopted any formal service standard applicable to private tree by-law permit applications as the volume of such applications is so low.

1.4.4 Inspections and Enforcement

All respondents reported that inspections are conducted as part of the private tree by-law permit process, however Kitchener noted that such inspections are only undertaken if staff believe it necessary to do so. Oakville and Richmond Hill reported that such inspections are typically undertaken during or after permit-related construction activities have begun or finished and are primarily intended to confirm that specific conditions of approval have been fulfilled.

Respondents noted that infractions are treated with varying degrees of priority, such that the staff resources allocated to addressing infractions varies depending on the circumstances. For example, Oakville noted that staff will prioritize responding to a notice of possible infraction involving an active construction site ahead of a case involving trees which have already been removed.

1.4.5 Information Technology

Both Kitchener and Oakville reported employing CSDC AMANDA to coordinate the private tree by-law permitting process, the former using version 6.1 and the latter having deployed version 7.

Richmond Hill reported that it does not currently make use of a formalized permit coordination software platform and instead uses Microsoft Excel to coordinate tree permitting files. It was also noted that Richmond Hill plans to deploy the Tyler EnerGov permit coordination platform across the organization to handle all development-related processes in 2021.

Appendix D2

Development Application Process (DAP) - Burlington "As Should Be" Site Plan

City of Burlington

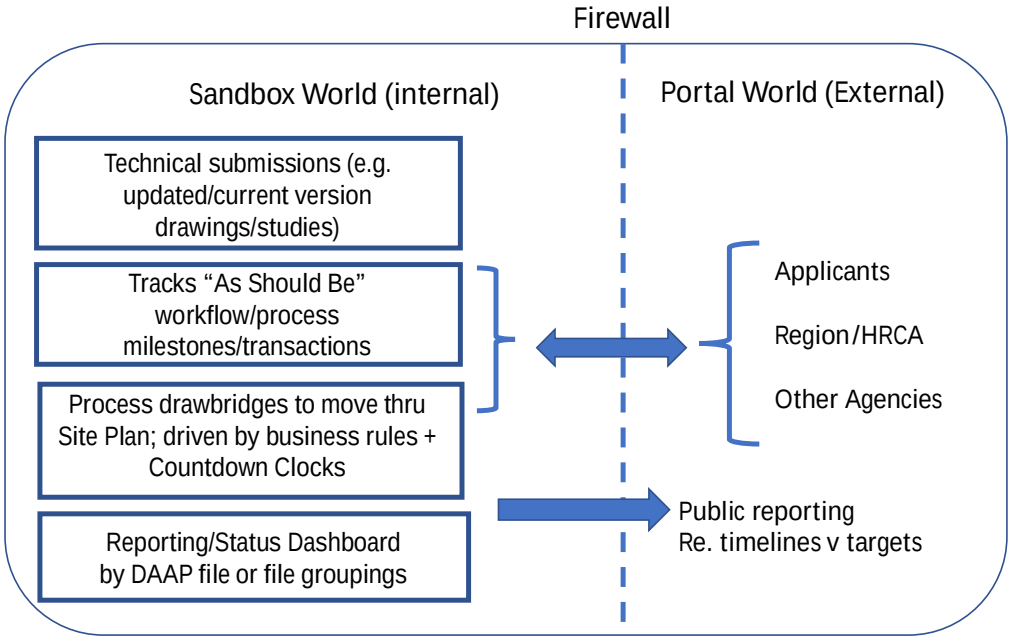
"As Should Be" Process Mapping for Delegated Site Plan Approvals

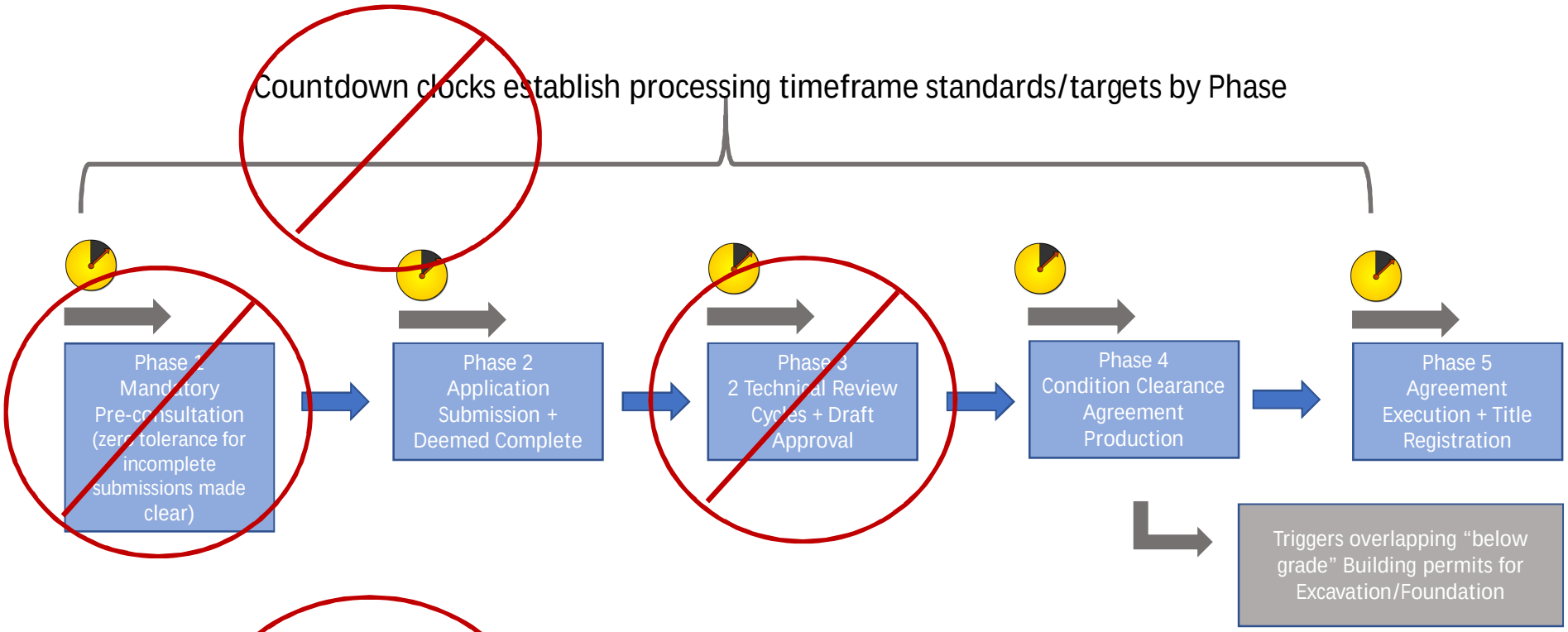
November 2019

PERFORMANCE CONCEPTS CONSULTING

Objectives of Proposed “As Should Be” Site Plan Processing Model

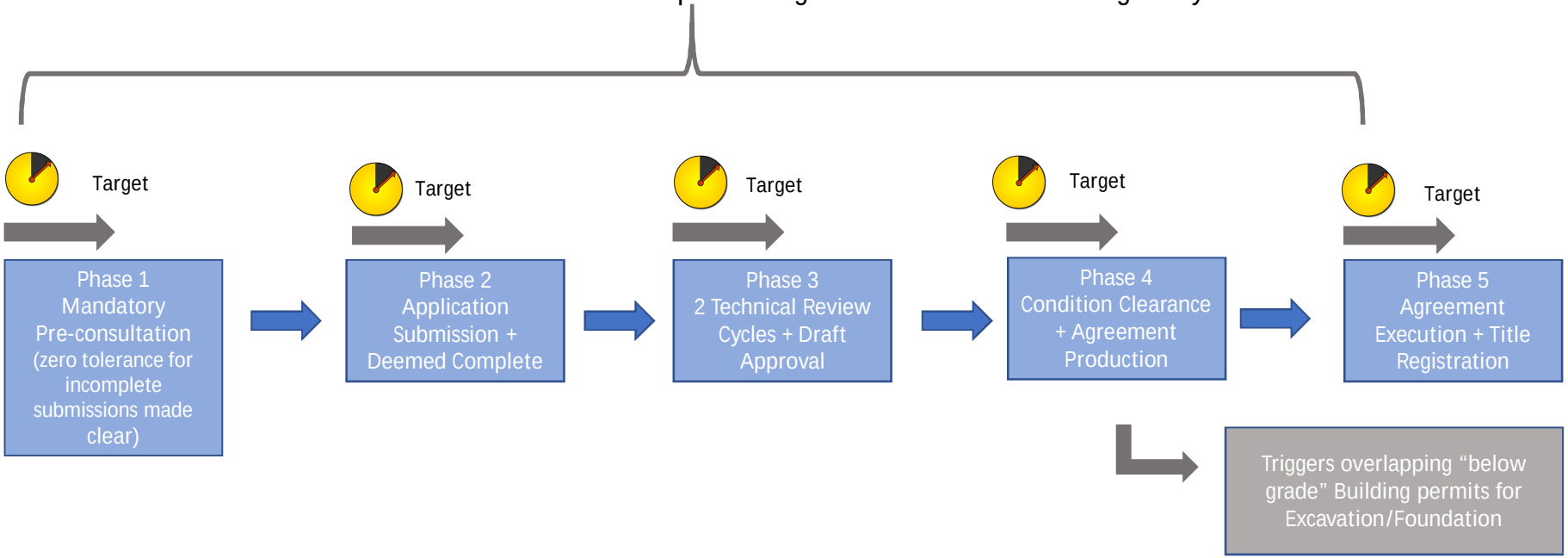
- Incorporate “best practices” re. streamlined Ontario municipal development approvals
- Leverage streamlined “As Should Be” Site Plan process with state-of-the-art cloud-based Portal/Workflow technology
    - Functionality of cloud-based Development Approvals Process (DAP) processing tool can amplify impact of “Best Practices”





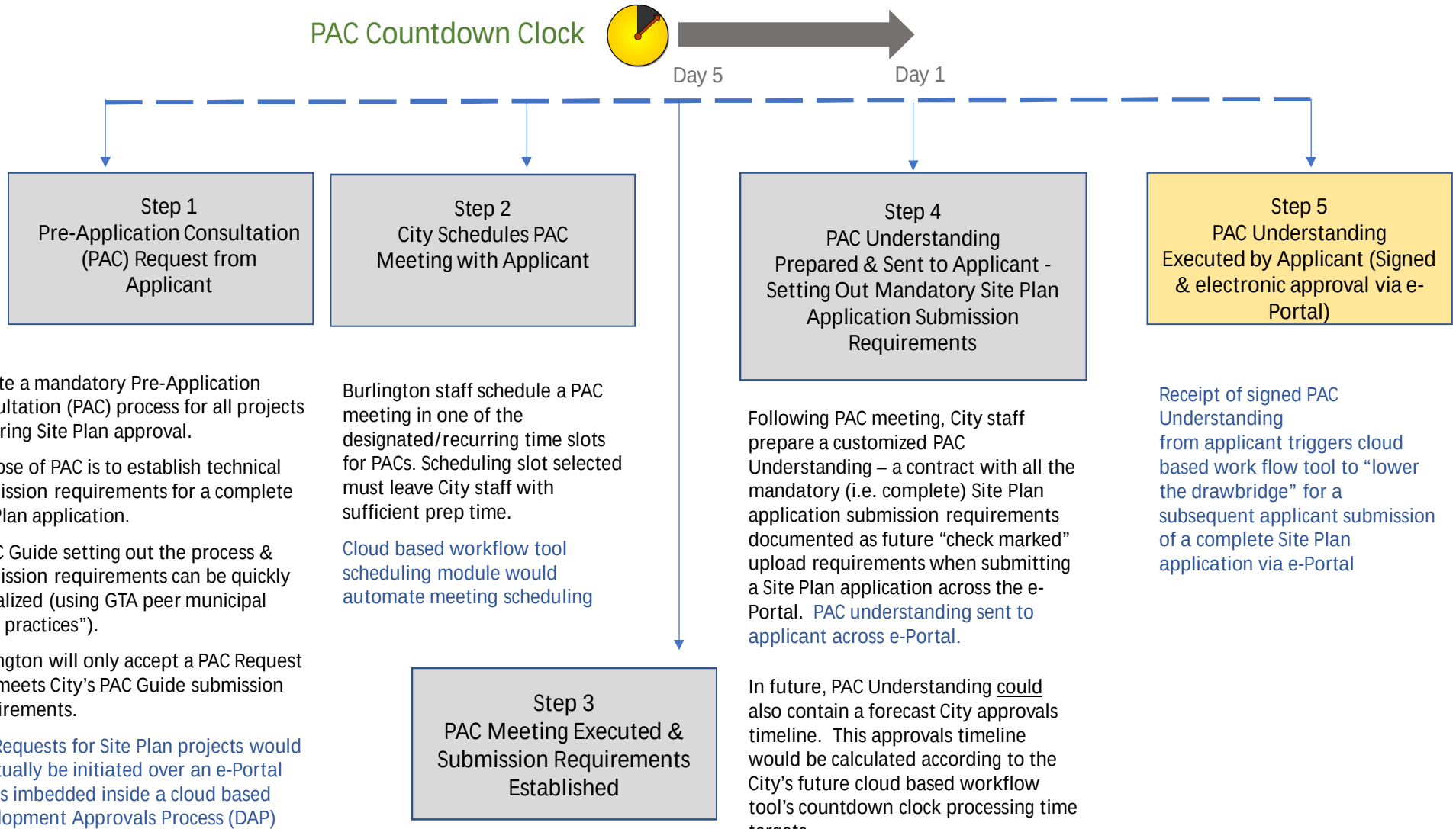
Final Product = A “Best Practice” Delegated Site Plan Approvals Model with 2 Efficient Technical Review Cycles & Clear Timeframe Targets

Countdown clocks in workflow tool establish/enforce processing timeframe standards/targets by Site Plan Phase



Final Product = A “Best Practice” Delegated Site Plan Approvals Model with 2 Efficient Technical Review Cycles & Clear Timeframe Targets

Phase 1 of “As Should Be”: Mandatory Pre-Consultation


PAC Countdown Clock
Day 5
Day 1
Step 1
Pre-Application Consultation (PAC) Request from Applicant
Step 2
City Schedules PAC Meeting with Applicant
Step 3
PAC Meeting Executed & Submission Requirements Established
Step 4
PAC Understanding Prepared & Sent to Applicant - Setting Out Mandatory Site Plan Application Submission Requirements
Step 5
PAC Understanding Executed by Applicant (Signed & electronic approval via e-Portal)
Initiate a mandatory Pre-Application Consultation (PAC) process for all projects requiring Site Plan approval.
Purpose of PAC is to establish technical submission requirements for a complete Site Plan application.
A PAC Guide setting out the process & submission requirements can be quickly formalized (using GTA peer municipal "best practices").
Burlington will only accept a PAC Request that meets City's PAC Guide submission Requirements.
PAC Requests for Site Plan projects would eventually be initiated over an e-Portal that is imbedded inside a cloud based Development Approvals Process (DAP) workflow tool.
Burlington staff schedule a PAC meeting in one of the designated/recurring time slots for PACs. Scheduling slot selected must leave City staff with sufficient prep time.
Cloud based workflow tool scheduling module would automate meeting scheduling
Following PAC meeting, City staff prepare a customized PAC Understanding – a contract with all the mandatory (i.e. complete) Site Plan application submission requirements documented as future "check marked" upload requirements when submitting a Site Plan application across the e-Portal. PAC understanding sent to applicant across e-Portal.
In future, PAC Understanding could also contain a forecast City approvals timeline. This approvals timeline would be calculated according to the City's future cloud based workflow tool's countdown clock processing time targets.
Receipt of signed PAC Understanding from applicant triggers cloud based work flow tool to "lower the drawbridge" for a subsequent applicant submission of a complete Site Plan application via e-Portal

Phase 2 of “As Should Be”: Application Submission + Deemed Complete

DAAP "Deemed Complete" Countdown Clock

Day 30 (legislated Planning Act timeframe) — Day 29-28 — Day 20 Target (10 business days elapsed):

Step 6a
Site Plan application Submission via Portal

City will only accept an application submission via the e-Portal that populates all check marked submission requirements documented in a signed Step 5 PAC Understanding. If accepted by e-Portal, drawbridge to Step 7-8 triggered. Will cross-reference building type, # floors, # units fields against PAC Understanding

Step 6b
Application Fees Payment Agreement

Workflow tool calculates Site Plan fees from worksheet imbedded in application submission form. Check marked applicant acceptance of Site Plan fees across e-Portal triggers Step 6b drawbridge. Actual payment of fees to be confirmed by next business day or application file frozen.

Step 7
Site Plan File Assigned to Review Team – Triggering a "Deemed Complete" Review Cycle

Workflow tool algorithm will notify internal City staff team to application:

- Site Plan Manager
- Development Engineering Manager
- Forestry Manager
- Zoning Manager
- Transportation Manager
- Region/HRCA Contacts

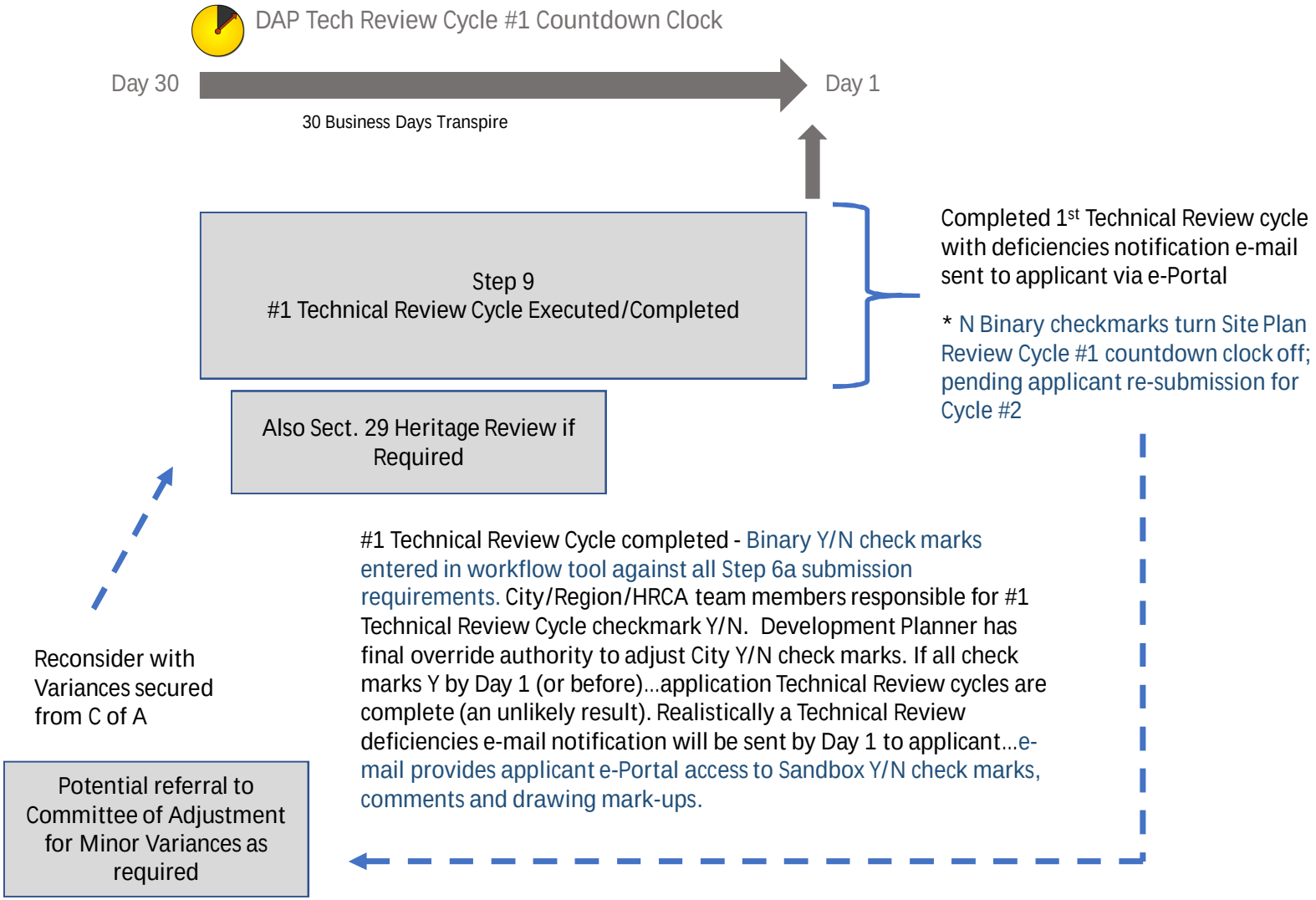
Managers will receive "assign the file" e-mail to immediately set-up staff team assignments (also Day 29). Manager assignment to lead staff team members by end of Day 28.

Rapid review cycle (moderate depth) proceeds; focus on submitted materials located in cloud-based workflow tool Sandbox & determination of "deemed complete".

Step 8
Technical Evaluation Resulting in "Deemed Complete" Decision/Notification to Applicant (or a re-submission)

"Deemed Complete" evaluation cycle executed - Binary Y/N check marks applied against all Step 6a submission requirements in Sandbox. City + Region + HRCA team members responsible for check marked Y/N review decisions. Development Planner has final override authority to adjust City Y/N check marks. If all check marks Y by Day 20 or sooner…application Deemed Complete. LPAT clock then starts at 6a date & Deemed Complete notification letter to applicant triggered via e-mail across Portal. If N for any Step 6a submission requirement…then application Deemed Incomplete & notification of ALL deficiencies prepared/sent by Development Planner. "Deemed Complete" clock turns off (pending an applicant resubmission) & only turns back on when a re-submission received. Accepted (Y) re-submission of Phase 1 materials eventually triggers LPAT clock to start at Step 9.

Phase 3 of “As Should Be”: Completion of Technical Review Cycle(s) + Draft Approval (delegated to staff)


DAP Tech Review Cycle #1 Countdown Clock
Day 30
Day 1
30 Business Days Transpire
Step 9
#1 Technical Review Cycle Executed/Completed
Also Sect. 29 Heritage Review if Required
Completed 1st Technical Review cycle with deficiencies notification e-mail sent to applicant via e-Portal
* N Binary checkmarks turn Site Plan Review Cycle #1 countdown clock off; pending applicant re-submission for Cycle #2
#1 Technical Review Cycle completed - Binary Y/N check marks entered in workflow tool against all Step 6a submission requirements. City/Region/HRCA team members responsible for #1 Technical Review Cycle checkmark Y/N. Development Planner has final override authority to adjust City Y/N check marks. If all check marks Y by Day 1 (or before)...application Technical Review cycles are complete (an unlikely result). Realistically a Technical Review deficiencies e-mail notification will be sent by Day 1 to applicant...e-mail provides applicant e-Portal access to Sandbox Y/N check marks, comments and drawing mark-ups.
Reconsider with Variances secured from C of A
Potential referral to Committee of Adjustment for Minor Variances as required

Day 15

DAAP Review Cycle #2 Countdown Clock

Day 1

15 Business Days Transpire

Step 10 Applicant Re-Submission via e-Portal for #2 Technical Review Cycle

Step 11 #2 Technical Review Cycle Executed/Completed

Completed 2nd cycle with completion e-mail sent to applicant if all Binary check marks are Y.

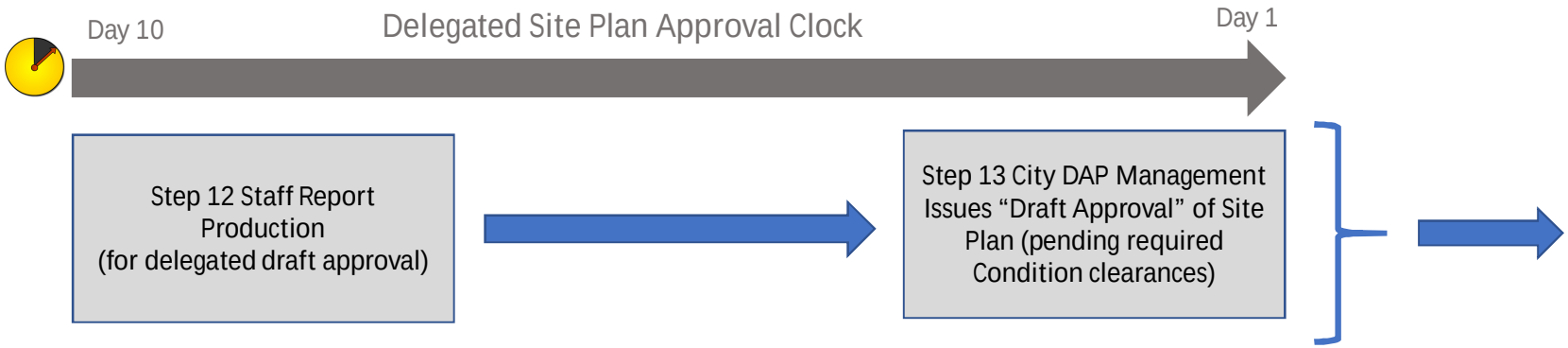
Target is for Burlington to be a 2-cycle Site Plan municipality.

* Any required 3rd cycle will trigger a face-to-face issue resolution session with applicant, and an additional review cycle supplemental fee will be imposed.

City will only accept an applicant technical re-submission via the e-Portal that populates all check marked re-submission requirements documented in the deficiencies notification e-mail sent at end of Step 9. If accepted across e-Portal drawbridge to Step 11 triggered.

2nd Technical Review executed/completed - Binary Y/N check marks against Step 6a submission requirements that were check marked N in #1 Technical Review Cycle. City/Region/HRCA team members are responsible for checkmark Y/N in #2 Cycle. Development Planner has final override authority to adjust City Y/N check marks. If all checkmarks Y by Day 1 or sooner …application technical review complete. A 2nd Technical Review deficiencies e-mail notification sent by Day 1 or sooner to applicant…e-mail provides access to Sandbox Y/N check marks, comments and drawing mark-ups.

* NB submission requirements that received Y check marks from #1 Technical Review Cycle do not require any re-submission in #2 Technical Review Cycle. Thus, submission requirements that are “in play” are winnowed down in each cycle by the cloud-based workflow tool.



Report must document zoning approval + servicing/other approval conditions to be cleared (appended approved drawings/studies etc.)

Report recommendation & conditions documented in workflow tool's Sandbox

Applicant notification across e-Portal re. draft Site Plan delegated decision re. "draft approval"

- Zoning compliance
- Site design/drawings
- Documented conditions to clear for final approval
- Calculated Securities/Fees to be paid to secure final SP approval

Phase 4 of “As Should Be”: Condition Clearance + Development Agreement Production

Step 14
Applicant submission of information via e-Portal to clear "draft approval" Conditions. (Condition clearance submission examples below)

- Info to populate Development Agreement
- Fees/Securities paid
- Required Inspections
- Construction Management Plan
- Revised drawings or studies (servicing/other)

Workflow tool Y/N checkmarks for each required data submission for Condition clearance… no Upload or progression unless all requirements received

Re-submit loops as required
(same process across portal as earlier technical review cycles)

Step 15a)
Technical review cycle executed by City/Region/other staff to clear conditions & approve final drawings for construction. Comments received/considered from Internal & External participants.

Cycle repeats until approval of information to clear all conditions. Countdown clock turns off between applicant submission cycles.

Step 15b)
Payment of required fees/securities confirmed.

Step 15c)
Conditions documented for post-construction return of Securities.

Binary Y/N checkmarks in workflow tool for each Condition cleared. Drawings designated as "approved for construction". Applicant notified across e-Portal of construction approval decision & informed of Building Permit trigger for below grade conditional permits (excavation/shoring + foundation).

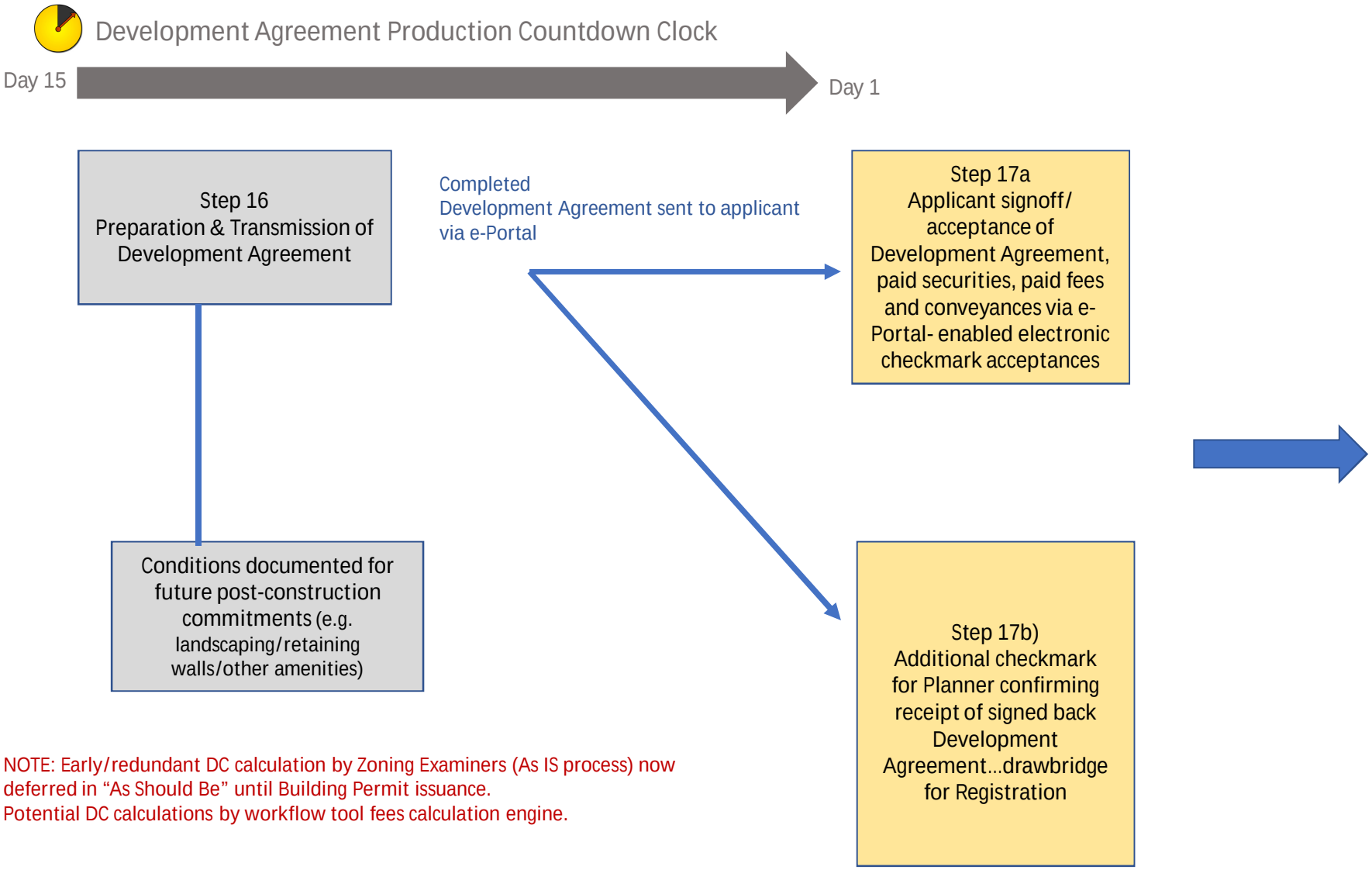
NOTES:
1. No Zoning or Grading/Drainage Clearance certificates required since Building staff notified of "approved for construction" status of drawings via cloud-based workflow tool.
2. DC calculation by Zoning Examiners pushed downstream after Final Site Plan approval; to above-ground Building Permit issuance

Approval checkboxes (Y) in workflow tool triggers system permission for building permit application submission via e-Portal & potential conditional excavation/foundation permits by CBO.

Paid securities/fees receipt to applicant across Portal

Post-construction Conditions refined/finalized. Applicant notified across Portal.

Phase 5 of “As Should Be”: Development Agreement Execution & Registration on Title



NOTE: Early/redundant DC calculation by Zoning Examiners (As IS process) now deferred in "As Should Be" until Building Permit issuance.
Potential DC calculations by workflow tool fees calculation engine.

Site Plan Final Approval Countdown Clock