TORONTO

STAFF REPORT
ACTION REQUIRED

Basement Flooding Protection – Infrastructure Upgrades New Study Areas and Progress Update

Date:	December 18, 2014
To:	Budget Committee
From:	General Manager, Toronto Water
Wards:	All Wards
Reference Number:	P:\2014\Cluster B\TW\BC15001

SUMMARY

The purpose of this report is to advise City Council on the city wide expansion of the Basement Flooding Protection Program. This report details the boundaries of new study areas, the proposed schedule for completion of the new studies, and provides a ward by ward update regarding infrastructure upgrade accomplishments.

RECOMMENDATIONS

The General Manager, Toronto Water, recommends that:

1. City Council requests the General Manager, Toronto Water, to initiate and expedite the completion of new Basement Flooding Protection Environmental Assessment studies for the remainder of the City, specifically identified as Study Areas 42 through 67 and in the order of priority as shown Schedule A of this report.

FINANCIAL IMPACT

The proposed 10 year Toronto Water Capital Budget Plan (2015-2024) includes a total of $1.546 billion (including carry forward funding) for the construction of projects in the Basement Flooding Protection Program (BFPP) over ten years.

Expanding the BFPP across the entire City will require the undertaking of Environmental Assessment (EA) studies to examine the capacity of sewer and storm drainage systems. The Capital Budget Plan impact for undertaking the studies on a city-wide basis is estimated to be $4 million per year, beginning in 2015, and continuing for an estimated 14 years.

The estimated cost to construct projects identified by the EA studies in an expanded city-wide BFPP (including construction projects not presently within the existing 34 priority study areas) will require additional capital funding beyond the 10 year plan. The capital cost implications, beyond the 10 year plan, are not known at this time, but can be estimated to be well over $1 billion.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information

DECISION HISTORY

City Council, at its meeting on December 16, 2013, requested the General Manager, Toronto Water, to report back on the schedule of future Basement Flooding Protection Program study areas (for Study Area 42 and beyond), across the remainder of the City, as part of Toronto Water's 2015 Budget Submission. The Council decision can be viewed at: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2013.EX36.17

ISSUE BACKGROUND

The City's Basement Flooding Protection Program is a multi-year program aimed at reducing the risk of future flooding during extreme storm events. Under the program, the City is undertaking Environmental Assessment (EA) studies in basement flooding study areas and implementing recommended sewer infrastructure improvements to reduce the risk of future flooding.

Basement Flooding EA Studies

On the afternoon and evening of July 8, 2013, severe thunderstorms and heavy rains flooded many parts of the City, causing damage to public and private property and infrastructure, stranding thousands of commuters, and leaving tens of thousands of residents and businesses without electricity. More than 4,700 basement flooding complaints were received during and immediately following the storm. Many of the impacted properties were located outside of the existing Basement Flooding Protection Program's 34 priority study areas resulting in the need to reconsider how basement flooding risks are assessed and addressed city wide.

The Basement Flooding Protection Program, as a result of the impacts of the July 8, 2013 storm event, moved from being a program based on priority areas to a city wide based program. This change in approach was adopted by City Council at its meeting on December 16, 2013 and the adoption was based on the information contained within a Staff Report entitled "Expansion of

the Basement Flooding Protection Program's Priority Study Areas Staff Report". The report can be found at:
http://www.toronto.ca/legdocs/mmis/2013/ex/bgrd/backgroundfile-63918.pdf

In addition to the geographic expansion of the Basement Flooding Protection Program that was adopted, a methodology to define and prioritize new Basement Flooding Protection Program study areas based on the density of reported basement flooding complaints per sanitary sewer subsewershed for major storm events since 2000 was also adopted.

In 2014, the City has experienced four major storm events (i.e. rainfall events greater than a 1 in 25 year return period design storm event). Dates of the recent flooding events and the corresponding number of basement flooding complaints reported to the City are summarized below in Table 1.

Table 1: Recent Major Storm Events and Flooding Complaints Reported to the City

Date of Storm Event	Number of Reported Flooding Complaints
June 25, 2014	667
August 1, 2014	95
August 4, 2014	188
October 16, 2014	343

With the addition of the 2014 storm events, a total of 14 storm events are now being used to prioritize new Basement Flooding EA studies across the City. These storm events include:

- May 12, 2000
- August 19, 2005
- July 18, 2007
- July 8, 2008
- July 15, 2012
- July 31, 2012
- August 10, 2012
- May 28, 2013
- June 28, 2013
- July 8, 2013
- June 25, 2014
- August 1, 2014
- August 4, 2014
- October 16, 2014

Infrastructure Upgrade Implementation

Once an EA study is complete, the recommended basement flooding protection projects for that study area are sequenced into a 5-year BFPP Project List, which is presented on an annual basis to City Council, to undergo engineering design and construction. The projects are prioritized and

scheduled, as per Council approved criteria to protect the greatest number of properties as soon as possible, within approved budgets, and are coordinated with other capital projects.

As of the end of November 2014, the 25 completed Basement Flooding EA studies have recommended an estimated $1.625 billion of infrastructure improvement projects. Since construction began in late 2009 to the end of 2014, approximately $160 million of infrastructure upgrades will have been constructed within the Basement Flooding Protection Program. This value of construction represents approximately 10% of the total value of the improvements that have been recommended by the EA studies so far.

The construction of approximately $140 million of new infrastructure improvement projects will be initiated in 2015 and within the following 5 years (2016-2020), another approximately $445 million of additional construction will be initiated. By the end of 2020, the initiated and completed construction efforts will have represented approximately 45% of the total value (i.e. $745 million) of the works recommended by the first 25 EA studies. This planned effort is premised on the approval of the 2015 Toronto Water Capital Budget, which presents an acceleration of construction efforts above what was presented in the 2014 TW Toronto Water Capital Budget.

While many projects meet the $32,000 cost per benefitting property criteria, there are many projects that do not meet the cost per benefitting property. Of the $1.625 billion of recommended infrastructure improvement projects identified to date, approximately $880 million or 55% of the total value do not meet the $32,000 cost per benefitting property criteria. Fortunately, new EA studies are continually being completed and eligible projects (i.e. projects whose cost is less than $32,000 per benefitting property) continue to be added to the list of eligible construction projects to replace those projects that have already been completed. Once all of the EA studies are completed, a prioritization of the projects not meeting the $32,000 cost per benefitting criteria will need to be agreed upon to ensure that the entire City can be upgraded to meet the service standard expectations.

Ward by Ward Summaries

Progress in the Basement Flooding Protection Program varies considerably from ward to ward and this staff report highlights the accomplishments achieved to date. Specifically, the progress regarding EA studies and the construction of infrastructure upgrades is provided on individual pages for each ward in Schedule B.

These summaries highlight that while significant effort has been expended on this program and while significant accomplishments have taken place, there still remains a great deal of effort to achieve an elevated level of service to reduce the risk of basement flooding across the entire City.

The summary for each City ward includes:

- A map showing the limits of each ward along with different shading to identify the portions of each ward where studies have been completed, are ongoing, and still need to be started;

- A pie chart illustrating the proportion of each ward where an EA study has been completed versus not completed. It should be noted that the portion of the chart labelled as 'Area To Be Studied' includes both the areas where studies are currently ongoing and the areas of each ward whose study boundaries are being presented to City Council in this staff report.

- A pie chart illustrating the status of the works recommended through the already completed EA studies. This chart is subdivided into any of three categories, namely 'Active Construction and Design Projects', 'Projects undergoing Preliminary Design', and 'Deferred Projects'. This chart would only represent the total value of improvement works needed in a ward if the entire ward has been studied through the BFPP EA study program.

- As an alternative to the graphical representation of information, a summary table is also provided to describe the ward progress in text form.

COMMENTS

The Basement Flooding Protection Program – New Study Areas

As per the methodology approved by City Council in 2013, new Basement Flooding study areas have been delineated for the remainder of the City based on sanitary subsewersheds. A total of 26 new study areas, as shown in Figure 1 and Table 1, have been identified bringing the total number of study areas across the City to 67. The 26 new study areas cover approximately 37,870 ha or approximately 59% of the land area of the city.

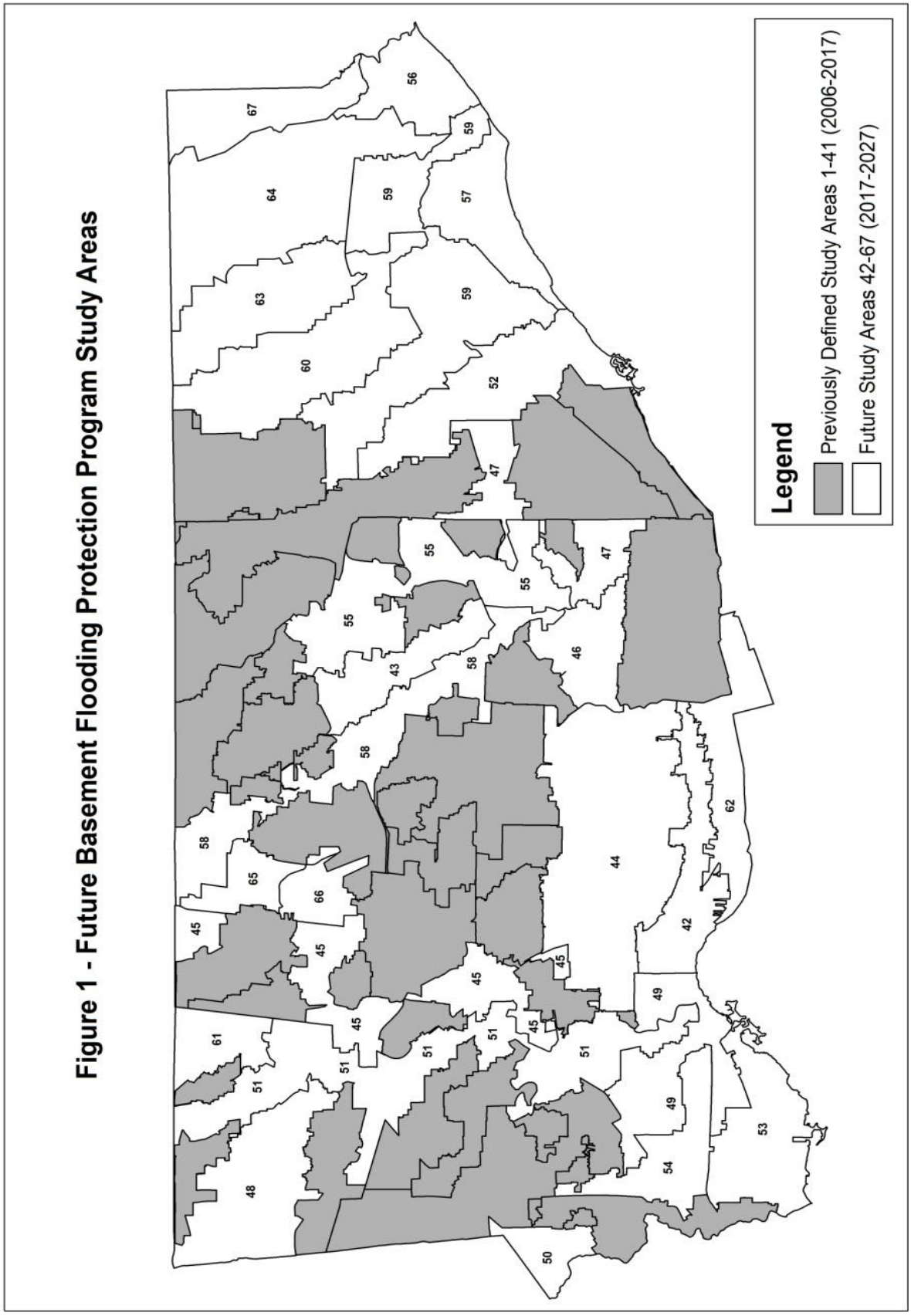


Figure 1 - Future Basement Flooding Protection Program Study Areas
Legend
Previously Defined Study Areas 1-41 (2006-2017)
Future Study Areas 42-67 (2017-2027)

The Council approved methodology requires sanitary subsewersheds with greater densities of flooding complaints to be prioritized for study before those areas with smaller densities of flooding complaints. The new study areas are numbered 42 through 67 and are ordered in sequence of greatest flooding complaint density to lowest flooding complaint density.

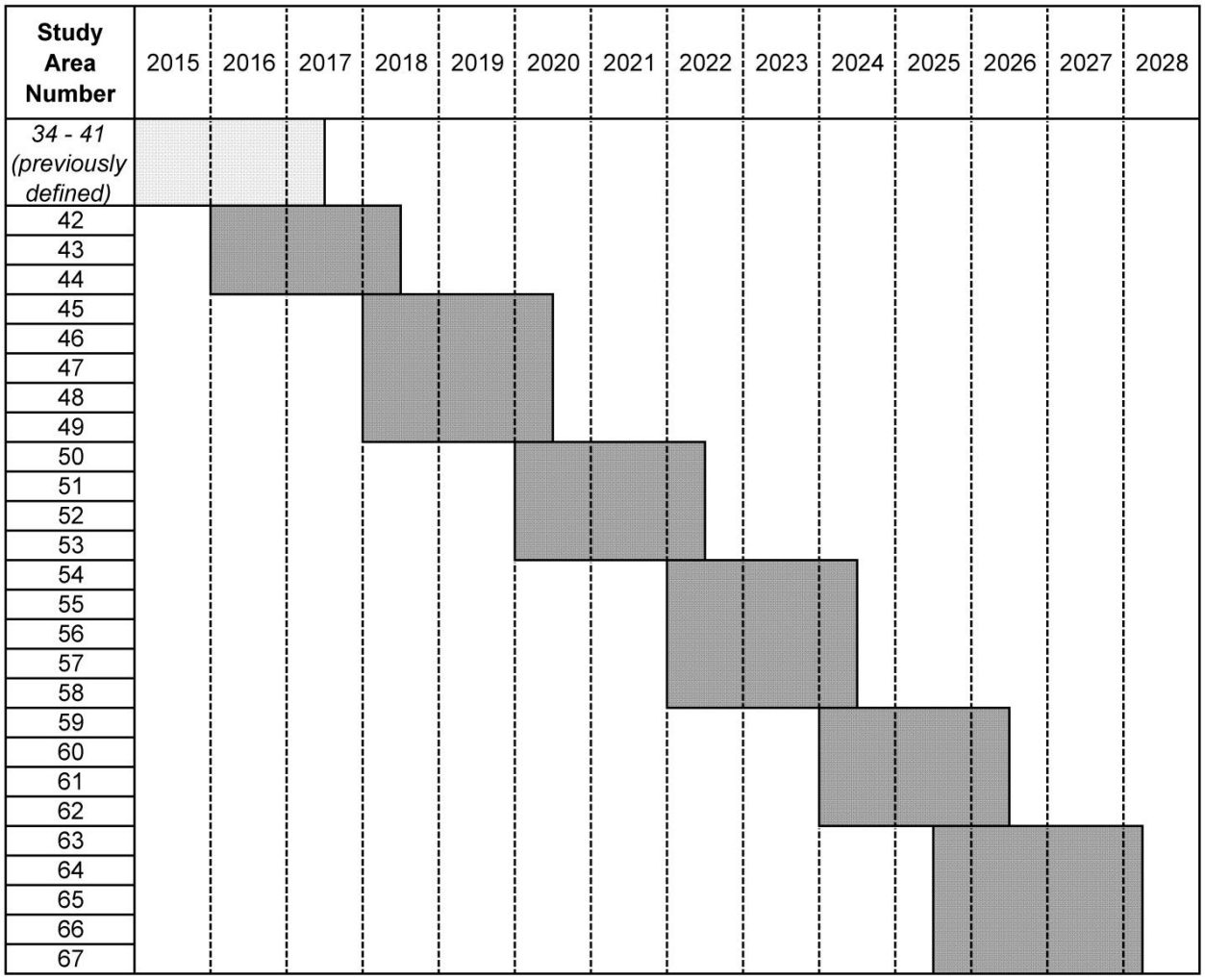
Table 2: New Basement Flooding Protection Program Study Areas (Areas 42-67)

Study Area Number	Subsewershed/Area Name	Study Area (ha)
42	**High Level**	1,083
43	**Wilket Creek**	843
44	**Mid-Toronto**	3,562
45	**Black Creek-Mt.Dennis-St.Clair**	1,709
46	**Cadorna**	815
47	**Massey Creek-Bermondsey**	1,098
48	**West Humber**	1,638
49	**South Mimico Creek-Queensway**	1,373
50	**Elmcrest**	414
51	**Humber**	2,854
52	**Dorset Park**	1,699
53	**Long Branch-Lakeshore**	1,312
54	**Mendota**	909
55	**East Don**	1,851
56	**Cumber-West Rouge**	851
57	**Morningside**	1,081
58	**West Don**	1,852
59	**Highland Creek**	3,112
60	**East Highland Creek**	2,070
61	**Emery**	589
62	**Low level**	1,076
63	**Malvern**	1,435
64	**Meadowvale**	2,791
65	**Dufferin**	462
66	**Downsview Airport**	413
67	**Northeast Highland Creek**	979

EA Study Preliminary Schedule

With the goal of examining the areas of the city with greater densities of flooding complaints first, a preliminary schedule has been developed for the completion of EA studies across the remainder of the City. This schedule provides timelines for all previously identified study areas that have not yet been initiated (i.e. Areas 34 through 41), and the newly identified areas presented in this staff report (i.e. Areas 42 through 67). The schedule is presented in Figure 2 below and in Schedule A.

Figure 2: Basement Flooding Protection Program – Preliminary Study Schedule



The schedule considers all of the components required to commence and complete an EA study including external consultant capacity, internal management and technical review capacity, engineering analyses, consultation with the public and interested parties, and fulfilling the requirements of the Municipal Class Environmental Assessment process.

The time required to complete an EA study can vary from study to study and depends on the complexity and size of the sewer systems being analyzed. For example, as the study areas listed above range in size from a few hundred hectares to several thousand hectares each, variations in study duration are expected. As many of the variables affecting schedule can be difficult to predict, the provided preliminary schedule has been developed assuming 2.5 years to complete each EA study. Some will be completed more quickly and some will take longer to complete.

Several initiatives are being implemented to reduce the time it takes between starting a Basement Flooding EA Study and the physical implementation of recommended sewer improvements. These initiatives include changes to the contractual arrangements with consultants through to

aligning funding availability with funding needs. As efficiencies in the overall program delivery processes are realized, it may be possible to accelerate the preliminary schedule for undertaking and completing Basement Flooding EA studies.

Where schedules can be advanced within existing funding envelopes, schedule acceleration will automatically be undertaken. Should new major storm events take place before all studies can be initiated, the prioritization of the remaining study areas will be revised to reflect updated flooding complaint densities, with study area sequencing prioritized in the order of greatest flooding complaint density to lowest flooding complaint density.

To keep City Council informed of the progress on Basement Flooding Class EA studies, an updated schedule will be provided to City Council when advancement or delay of schedule is expected to exceed 1 year.

Next Steps

The next step is to initiate the new studies, as described in this report, and to move the works recommended by the studies into preliminary design in accordance with the council approved project prioritization criteria. With many new EA studies being initiated, an annual reassessment of the Capital Program will be undertaken to ensure that it is sufficiently funded to allow ongoing reasonable project delivery. This reassessment will be reported on through Toronto Water's annual Capital Budget submissions.

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SIGNATURE

Lou Di Gironimo
General Manager, Toronto Water

Schedule A:
The Basement Flooding Protection Program – EA Study Preliminary Schedule

With the goal of examining the areas of the city with greater densities of flooding complaints first, a schedule has been developed for the completion of EA studies across the remainder of the City. This schedule presents expected timelines for all study areas that have not yet been initiated, including the areas identified through past staff reports (i.e. Areas 34 through 41), and the new areas identified in this staff report (i.e. Areas 42 through 67).

Basement Flooding Prevention Plan Study Areas and Preliminary Schedule

Study Area Number	Subsewershed / Area Name	Wards	Study Start Year	Study Finish Year
34	**Massey Creek – Godfrey Fowler**	35, 36, 37	2015	2017
35	**Silver Creek**	2, 4	2015	2017
36	**Chapman**	2, 4	2015	2017
37	**Hillary**	15, 17, 21	2015	2017
38	**Etobicoke Creek**	3, 5, 6	2015	2017
39	**Berry Creek**	2	2015	2017
40	**Forman-Yonge**	15, 16, 21, 22, 25	2015	2017
41	**North Mimico Creek**	2, 3, 4, 5	2015	2017
42	**High Level**	13, 14, 18, 19, 20, 27, 28	2016	2018
43	**Wilket Creek**	23, 24, 25, 34	2016	2018
44	**Mid-Toronto**	11, 13, 14, 17, 18, 19, 20, 21, 22, 27, 28	2016	2018
45	**Black Creek-Mt.Dennis-St.Clair**	7, 8, 9, 11, 12, 13	2018	2020
46	**Cadorna**	26, 29, 31	2018	2020
47	**Massey Creek-Bermondsey**	29, 31, 32, 34, 35, 37	2018	2020
48	**West Humber**	1, 2	2018	2020
49	**South Mimico Creek-Queensway**	5, 6, 13	2018	2020
50	**Elmcrest**	3	2020	2022
51	**Humber**	1, 2, 4, 5, 7, 11, 13	2020	2022
52	**Dorset Park**	35, 36, 37, 38, 40, 43	2020	2022
53	**Long Branch-Lakeshore**	6	2020	2022
54	**Mendota**	3, 5, 6	2022	2024
55	**East Don**	24, 25, 26, 31, 33, 34	2022	2024
56	**Cumber-West Rouge**	44	2022	2024
57	**Morningside**	36, 43, 44	2022	2024
58	**West Don**	8, 10, 16, 23, 25, 26	2022	2024
59	**Highland Creek**	36, 37, 38, 39, 40,	2024	2026

		41, 43, 44		
60	**East Highland Creek**	37, 38, 39, 41, 42, 43	2024	2026
61	**Emery**	7	2024	2026
62	**Low level**	14, 18, 19, 20, 27, 28, 30, 32	2024	2026
63	**Malvern**	38, 41, 42, 43	2025	2028
64	**Meadowvale**	41, 42, 43, 44	2025	2028
65	**Dufferin**	8, 10	2025	2028
66	**Downsview Airport**	8, 9	2025	2028
67	**Northeast Highland Creek**	42, 44	2025	2028