To	City of Hamilton	Page	1

Residential Drainage Assistance (RDA) Program

Subject: East 37th Street, Seventh Ave., East 36th Street and Macassa Ave.

Date	May 25, 2022	Project Number	60656489

1. Scope of Study

The City of Hamilton requested that AECOM complete a review of flooding concerns of the rear yards on the blocks bounded by East 37th Street, Seventh Ave, East 36th Street and Macassa Avenue. This block of homes will be described as the Study Area (**Fig. 1**). The review will be completed under the Residential Drainage Assistance Program.

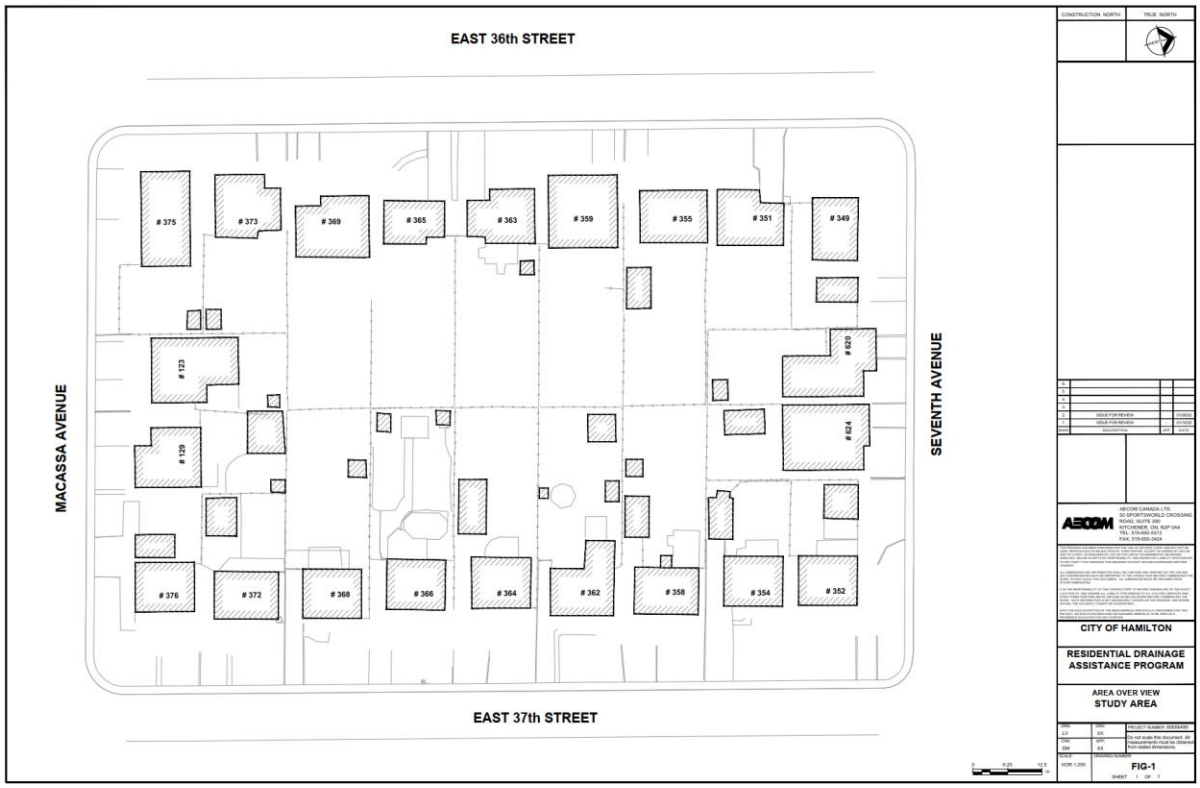


Fig.1 Study Area *

*Full size drawings are included in Appendix A

The residents, within the Study Area, have raised concerns about the amount of storm runoff from rainfalls or snow melts that is ponding within the rear yard. The ponding has limited the use of their property because of the soggy conditions created by a lack of drainage from the rear yards.
The City of Hamilton initiated this study:

- To assess the causes of the drainage issues;
- To determine if there were any mitigation measures that could be put in place to alleviate some of the flooding concerns; and/ or
- To determine if a drainage outlet solution could be put in place to eliminate or reduce the flooding concerns.

2. Background Information

To better assess the flooding issues, AECOM completed a number of background reviews. AECOM's survey team completed a visual and topographic survey of the properties within the Study Area. In addition, a background review of available City of Hamilton Inspection Reports and Drawings was completed to identify existing storm and sanitary sewers in the area and to determine the depth of rock within the study area. Finally, a review of the City of Hamilton Drainage Design Guidelines was completed to verify City standards.

2.1. Existing Conditions

The homes within the Study Area are part of a mature subdivision. The majority of the lots within the Study Area have garages, fences, decks, shrubs, trees or other built structures that make access to the rear yards difficult. These features also hinder a conventional drainage system or neighbourhood rear yard drainage swales. The rear yards within the Study Area are lower in elevation than the front yards and there is no apparent drainage outlet from the rear yards to the front yards.

2.2. Topographic Survey

In March 2021, AECOM's topographic survey team visited the Study Area and completed a topographic survey (**Fig. 2**) of the rear yard to identify existing conditions. The survey team also took a series of photographs to show rear yard features (gates, fences, shrubs, etc.) that may not be identified on the topographic survey. The attached Fig. 2 is a graphical representation of the survey results. In general, the survey team noted the following:

- The topography of the area (slope of the yards) generally drains from south to north;
- Each of the individual lots have independent grading issues;
- The rear yards of the properties are lower in elevation than the municipal street elevation. There are no side yard swales that would allow any of the rear yards to drain to the streets and therefore any storm runoff is trapped in the rear yards; and
- There are no consistent swales that would allow storm runoff to drain along the property lines to a common outlet point or to the municipal outlet.

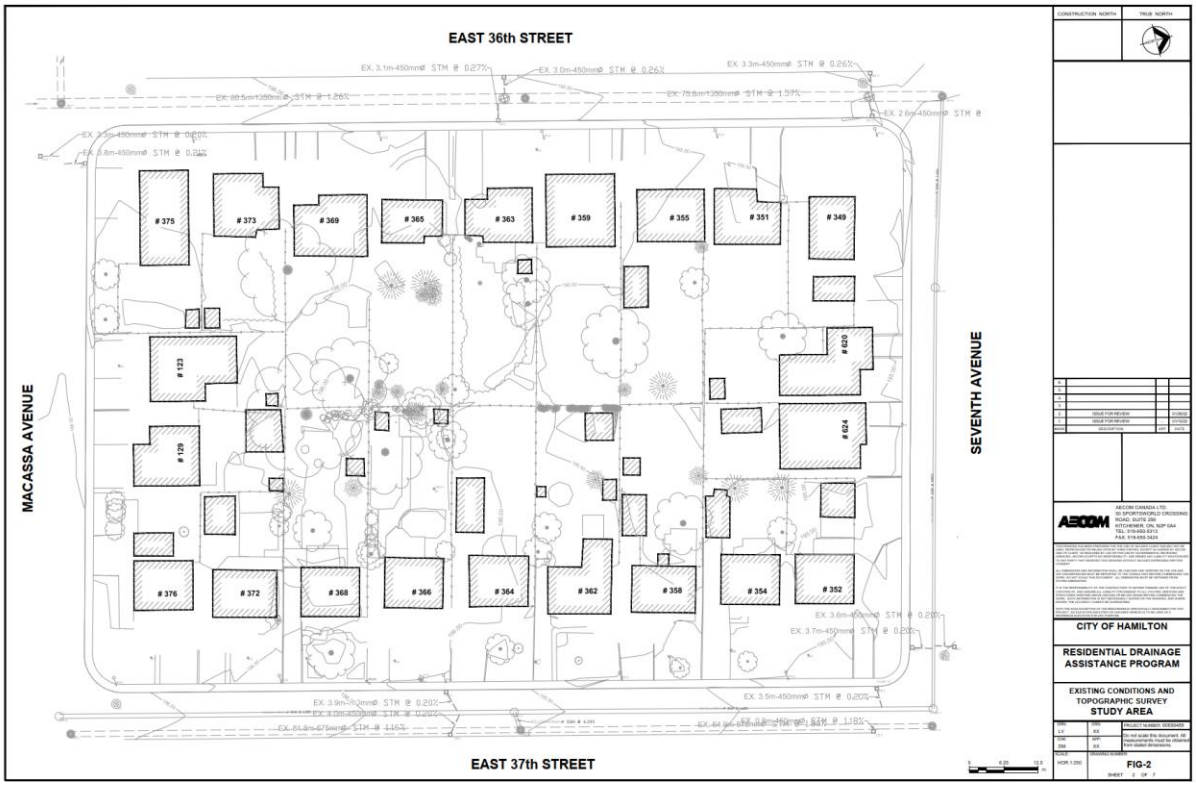


Fig 2. Topographic Survey of the Rear Yards*

*Full size drawings are included in Appendix A

2.3. Background Information Review- Drawings, Reports

AECOM reviewed the historic “Inspection Reports” and Engineering drawings received from the City of Hamilton from Sept 1991 for East 37th Street. These reports were prepared during the installation of the combined storm sewer on East 37th Street and East 36th Street.

The intent of the Inspection Reports review was to determine if the local bedrock elevation in the area would be an issue with preparing options to alleviate the drainage issue. The Inspection Reports noted that rock was encountered within the construction project but the elevations were not noted on the Engineering drawings. However, there were indications that the bedrock level was approximately 191.8 to 192.3m in elevation from the Inspection Reports.

2.4. City of Hamilton Drainage Design Guidelines

In newer subdivisions, the grading of residential lots is governed by the City of Hamilton’s “Engineering Guidelines for Servicing Lands under Development Applications”. Section 2.5.2 of the Guidelines outlines the “Design Criteria” that must be followed to prepare residential lots for ready for house construction.

Drainage from rear yards is normally directed from the back of the yards to side yard swales (running along the side property line) which would convey storm runoff to the municipal street and then to the municipal catchbasin (storm sewer) system.

The intent of the guidelines is to ensure that each residential lot is independently drained thereby reducing the risk of rear yard flooding issues. Unfortunately, the age of this subdivision pre-dates the current Engineering Guidelines and the existing lot grading does not comply with the current specifications.

2.5. Existing Infrastructure

A review of the existing municipal infrastructure was completed to determine suitable outlets for any proposed storm drainage system. The review concluded that the only available storm sewer outlet was along East 37th Street. The other streets (East 36th Street, Macassa Avenue and Seventh Street) had only combined sewers with no dedicated storm sewers and were considered as unacceptable for usage as storm outlets for this project.

3. Recommended Options

3.1. Design Considerations

Subsequent to the topographic survey, the design team reviewed the following:

1. The existing drainage patterns within the rear yards;
2. Options are available to collect storm runoff; and
3. Options for storm runoff be conveyed to the municipal storm sewer system.

3.2. Drainage Options

After reviewing the topographic survey information, the inspection reports and the restrictions within the rear and side yards, the following solutions/measures were considered to help alleviate some of the drainage issues. The proposed solutions will not eliminate soggy back yards or minor flooding issues but is intended to provide an outlet for storm runoff to be able to be conveyed from the rear yards the municipal storm sewer.

3.2.1. Option 1

The first option reviewed was to create a swale (small ditch) along the rear property lines across the multiple properties. The swale would begin at 368 East 37th Street/369 East 36th Street and continue to 358 East 37th Street/ 355 East 36th Street. The swale would capture storm runoff from both sides of the property divide and provide an overland flow route for storm runoff to a rear yard catchbasin at the northerly end of the swale. The rear yard catchbasin would be connected to a storm sewer from the rear yards to the street storm sewer (Option 1 on **Fig. 3**) and convey storm runoff away from the rear yards.

The construction of the swale along the property lines would require the removal of fences and any obstructions that would hinder the construction or operation of the swale. The operation of the swale across multiple properties would require the co-operation of all neighbours to ensure that the operation of the swale was not encumbered or obstructed thereby reducing the effectiveness of the swale.

This option was dismissed as causing too much damage and disruptions to the rear yards with the removal of trees/shrubs/fences and buildings to construct the swale.

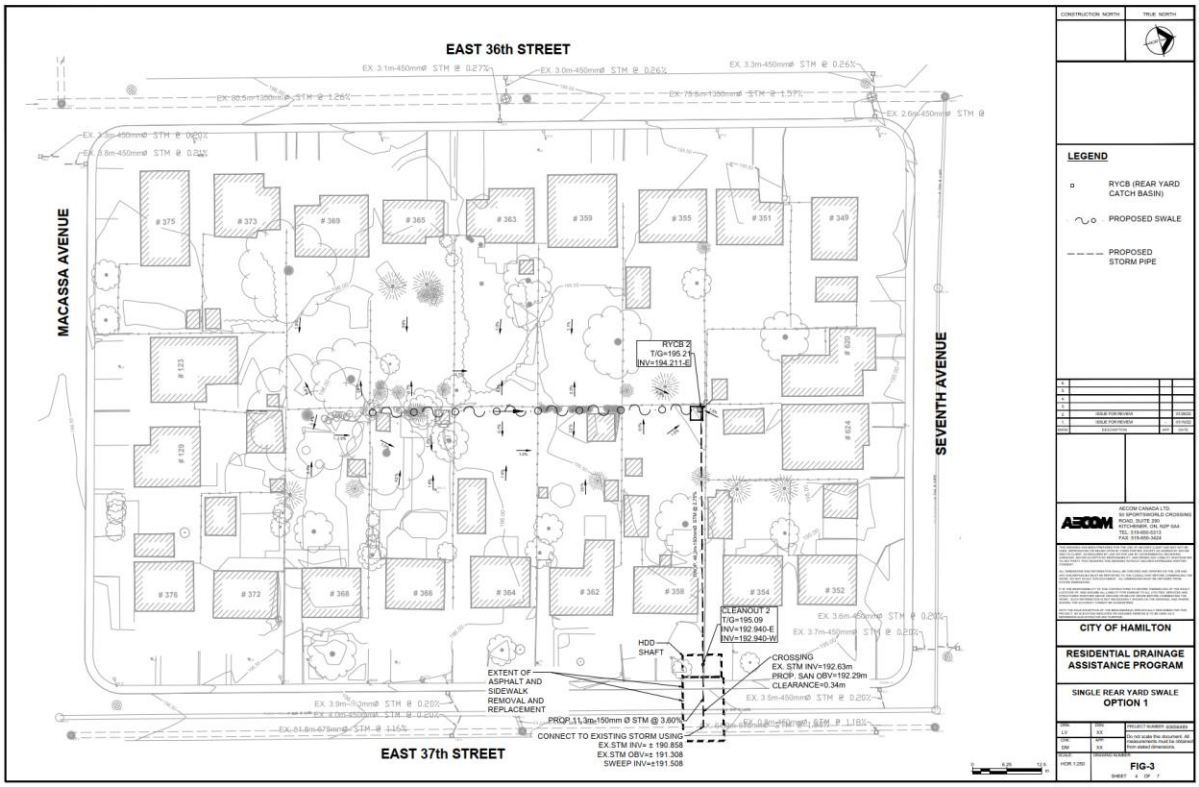


Fig. 3 Option 1 - Single Rear Yard Swale*

*Full size drawings are included in Appendix A

3.2.2.Option 2

Option 2 **(Fig. 4)** would include the installation of two swales across the properties within the Study Area. The swales would be located in the middle of the rear yards in an effort to minimize damage to the existing rear yards and to reduce construction impacts. The first swale would begin at 368 East 37th Street and convey runoff to a rear yard catchbasin located at 358 East 37th Street. Similarly, the second swale would begin at 369 East 36th Street and convey runoff to the rear yard catchbasin located at 358 East 37th Street. The rear yard catchbasins would be connected to the municipal storm sewer system.

As noted in Option 1, the successful operation of these swales would require the co-operation of the neighbours not to hinder the flow of storm runoff across their properties.

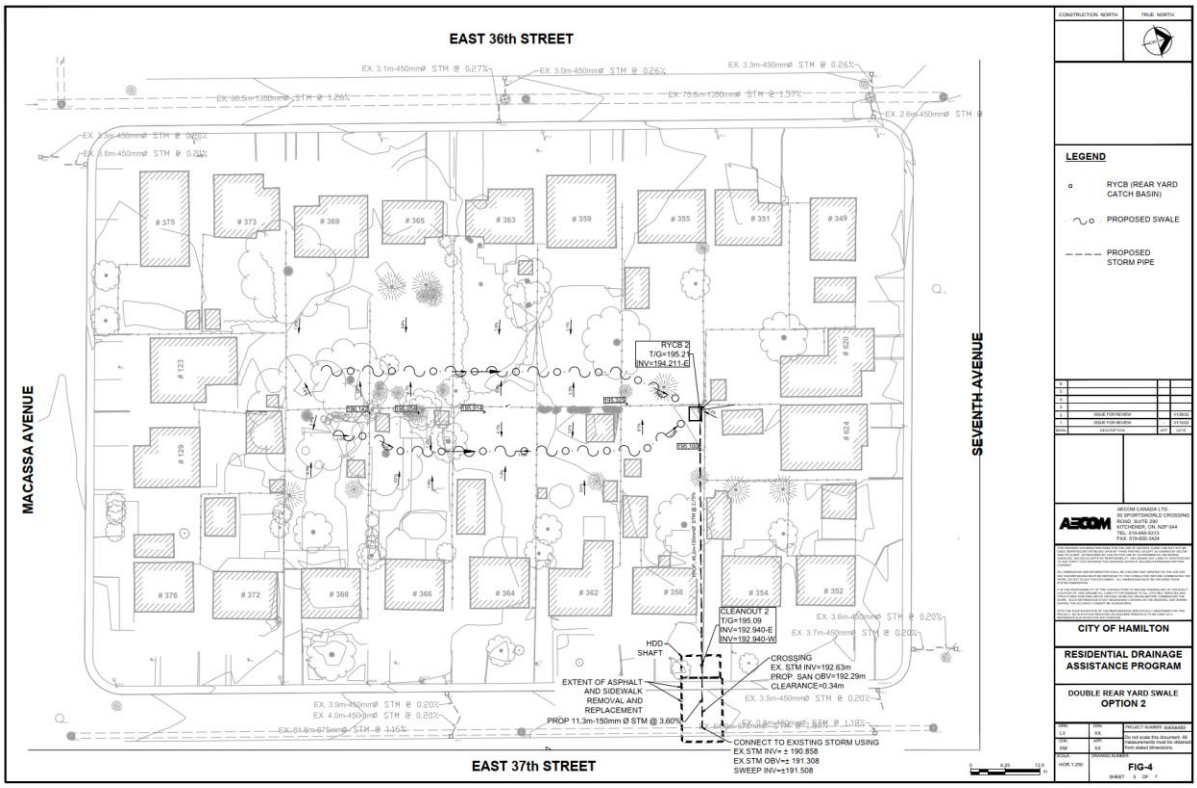


Fig. 4 Option 2 - Double Rear Yard Swales*

*Full size drawings are included in Appendix A

This design would not eliminate all of the localized flowing issues in the individual lots or rear yards. However, this option would provide an outlet of major flooding concerns (spring melts, large storm events). This option could be installed minimizing the damage done during construction.

To minimize costs, we recommend installing a rear yard catchbasins (in lieu of standard municipal catchbasins) used for landscaping areas. This type of catchbasins is smaller in size and is generally used in landscaped areas. The type of catchbasin system is also recommended due to the construction limitation issues (limited room for installation on side yards).

This option would provide an outlet for stormwater from the backs along East 37th Street and also provide a secondary drainage outlet for the rear yards along East 36th Street.

3.2.3.Option 3

Option 3 **(Fig.5)** would include the installation of a swale along the backyard at 358 East 37th Street. The swale would be connected to a rear yard catchbasin which would collect and direct storm runoff to the storm sewer on East 37th Street. The swale would allow for the collection of stormwater from a number of properties and direct the runoff to the proposed rear yard catchbasin.

In addition, a rear yard catchbasin would be installed in the north west corner of the 368 East 37th Street.

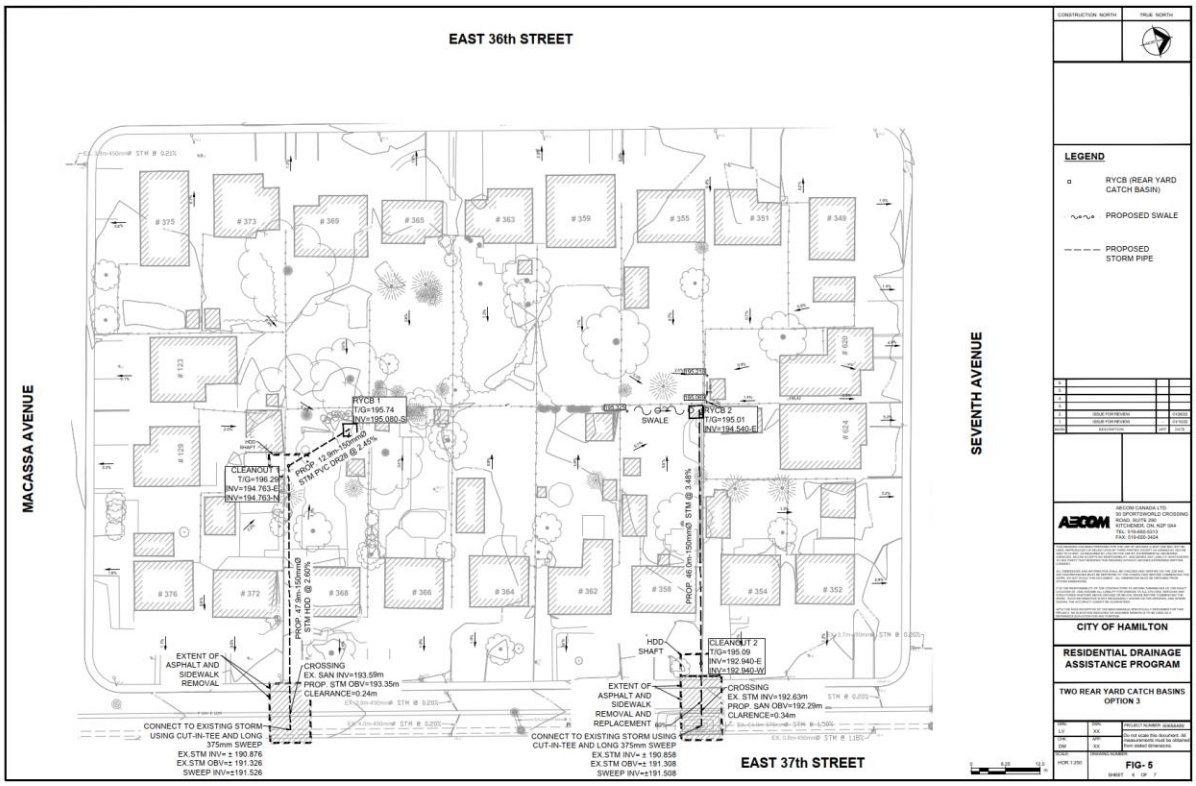


Fig. 5 Option 3 - Two Rear Yard Catchbasins*

*Full size drawings are included in Appendix A

The two rear yard catchbasins would be connected to the municipal storm sewer system.

This design would not eliminate localized flowing issues on all of the individual lots or rear yards. However, this option would provide an outlet of major flooding concerns (Spring melts, large storm events). This option could be installed to minimize the damage done during construction.

To minimize costs, we recommend installing a rear yard catchbasins (in lieu of standard municipal catchbasins) used for landscaping areas. This type of catchbasins is smaller in size and is generally used in landscaped areas.

This option would only provide an outlet for major overland stormwater from the backs along East 37th Street and East 36th Street. It would not provide localized relief from soggy rear yards during smaller or minor storm event.

This option, although minimzing the damage to most of the rear yards, was dismissed as not providing sufficient benefit to all neighbours.

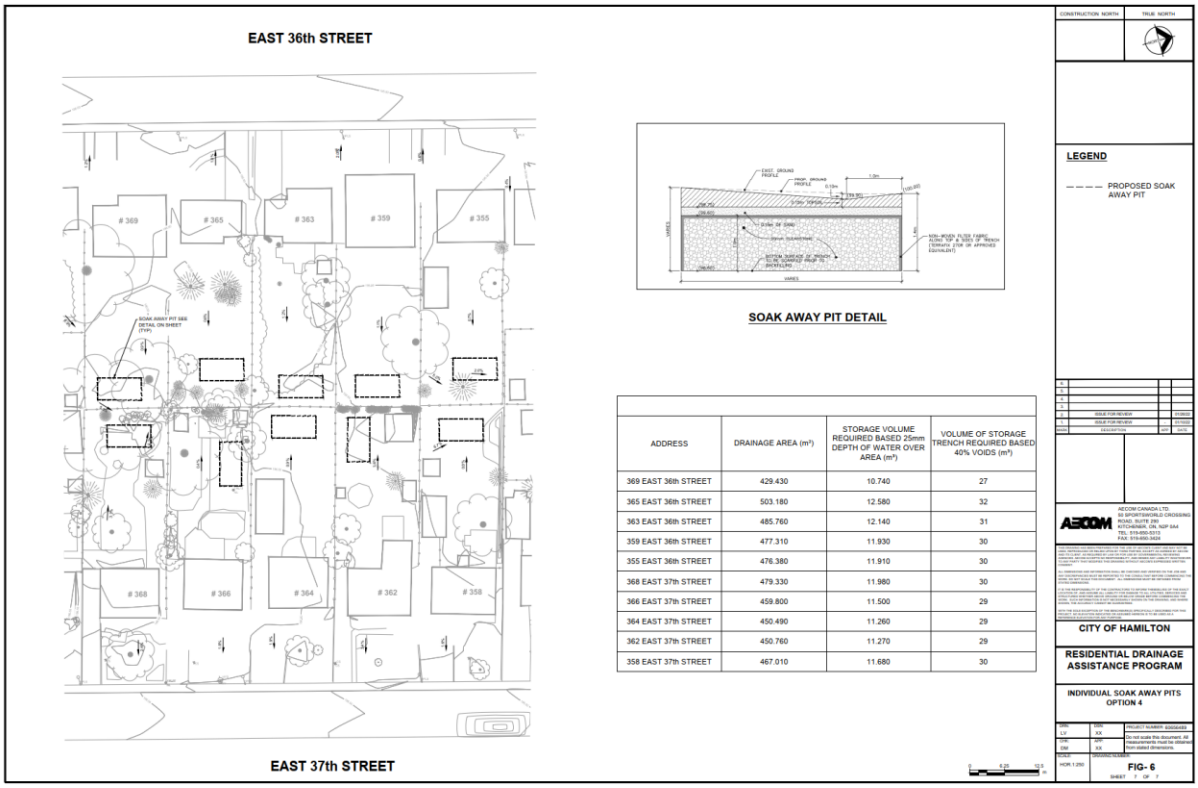
Examples of Rear Yard Catchbasin

3.2.4.Option 4

Option 4 **(Fig. 6)** would include the installation of rear yard soak away pits in each of the resident's back yards. The rear yard drainage pits would be designed to capture a volume of storm runoff equal to 25mm of water covering the rear yard. The approximate size and location of the soak away pits are described on Fig.6.

The construction of individual drainage pits would have the following benefits:

- Since the pits would be constructed on the individual resident's property, the timing of construction could be arranged by each of the residents or could be part of a City tender process;
- The pits can be placed and orientated to minimize damage existing properties (trees, building, etc);
- After construction the residents would have full use of their rear yards; and
- The drainage pits would provide for storage of stormwater underground, for most local storms, thereby decreasing the time for yards to return to normal usage



ADDRESS	DRAINAGE AREA (m²)	STORAGE VOLUME REQUIRED BASED 25mm DEPTH OF WATER OVER AREA (m³)	VOLUME OF STORAGE TRENCH REQUIRED BASED 40% VOIDS (m³)
369 EAST 36th STREET	429.430	10.740	27
365 EAST 36th STREET	503.180	12.580	32
363 EAST 36th STREET	485.760	12.140	31
359 EAST 36th STREET	477.310	11.930	30
355 EAST 36th STREET	476.380	11.910	30
368 EAST 37th STREET	479.330	11.980	30
366 EAST 37th STREET	459.800	11.500	29
364 EAST 37th STREET	450.490	11.260	29
362 EAST 37th STREET	450.760	11.270	29
358 EAST 37th STREET	467.010	11.680	30

Fig. 6 Option 4 – Individual Soak Away Pits*

*Full size drawings are included in Appendix A

3.3. Recommended Option and Costs

3.3.1. Costs

The following is a listing of the estimated costs for the construction of the options listed above. These estimated costs are to be used as a basis for comparison of the individual options. The actual costs of construction will be based on tendered values received from contractors and may differ from the above estimates.

It is anticipated that the cost for work within the municipal Right of Way will be the responsibility of the City of Hamilton. The cost of work on private property will be the responsibility of the homeowners

	City Costs	*Homeowners Cost*
Option 1	*$32,900*	*$49,000*
Option 2	$30,900	$54,300
Option3	$39,500	$48,000
Option 4		$7,000-$10,000 per home

3.3.2.Recommendation

Based on a review of the various options, the recommended option to reduce rear yard flooding and soggy rear yards is Option 4 (**Fig 6**). This option includes the installation of individual soak away pits in each of the rear yards. As noted previously, the residents will see the immediate benefit after the construction of the drainage pits.

3.3.2.1. Benefits

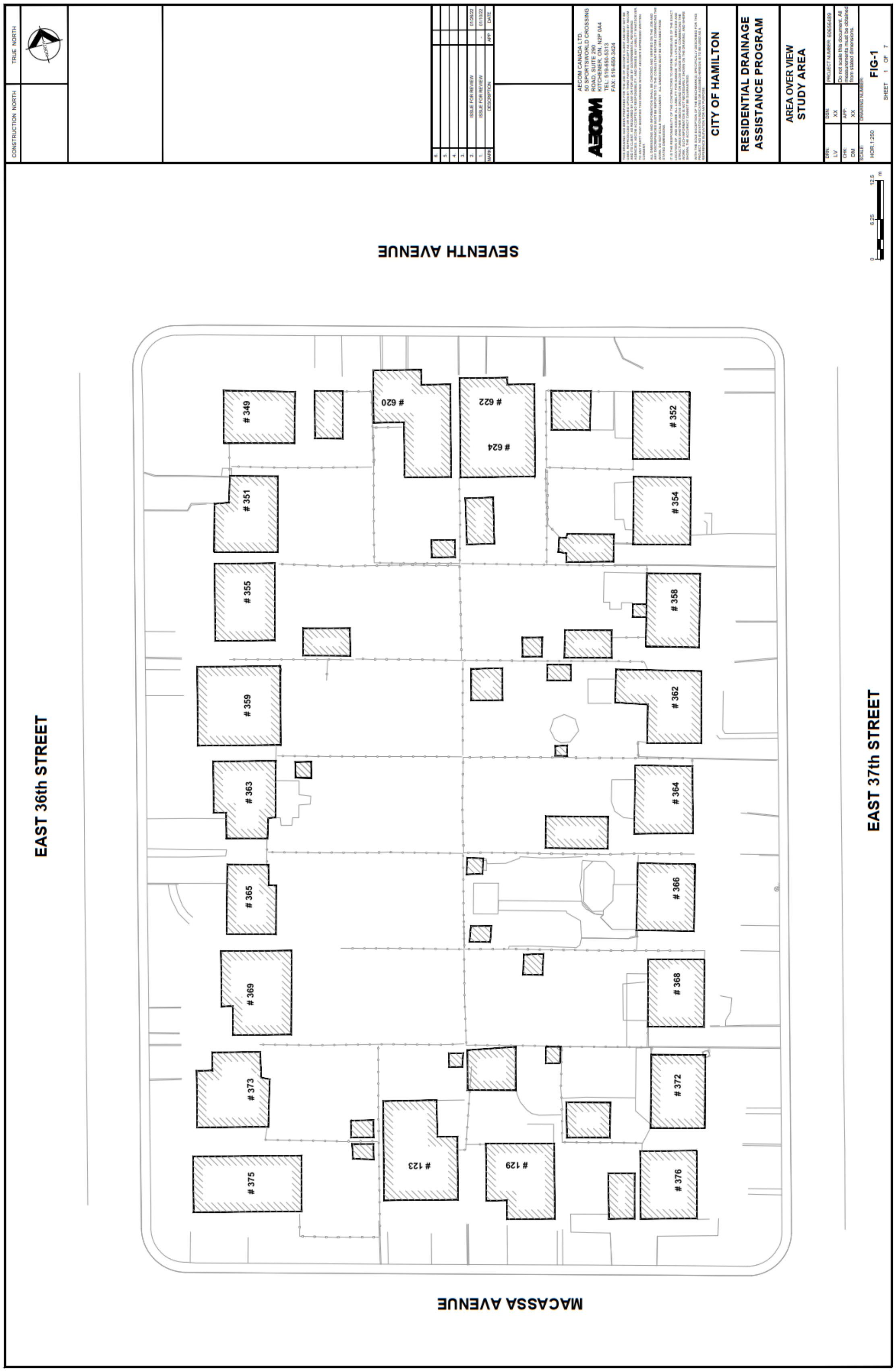
- Since the pits would be constructed on the individual resident's property, the timing of construction could be arranged by each of the residents or could be part of a City tender process;
- The soak away pits can be placed and orientated to minimize damage existing properties (trees, building, etc);
- After construction the residents would have full use of their rear yards; and
- The drainage pits would provide for storage of stormwater underground, for most local storms, thereby decreasing the time for yards to return to normal usage.

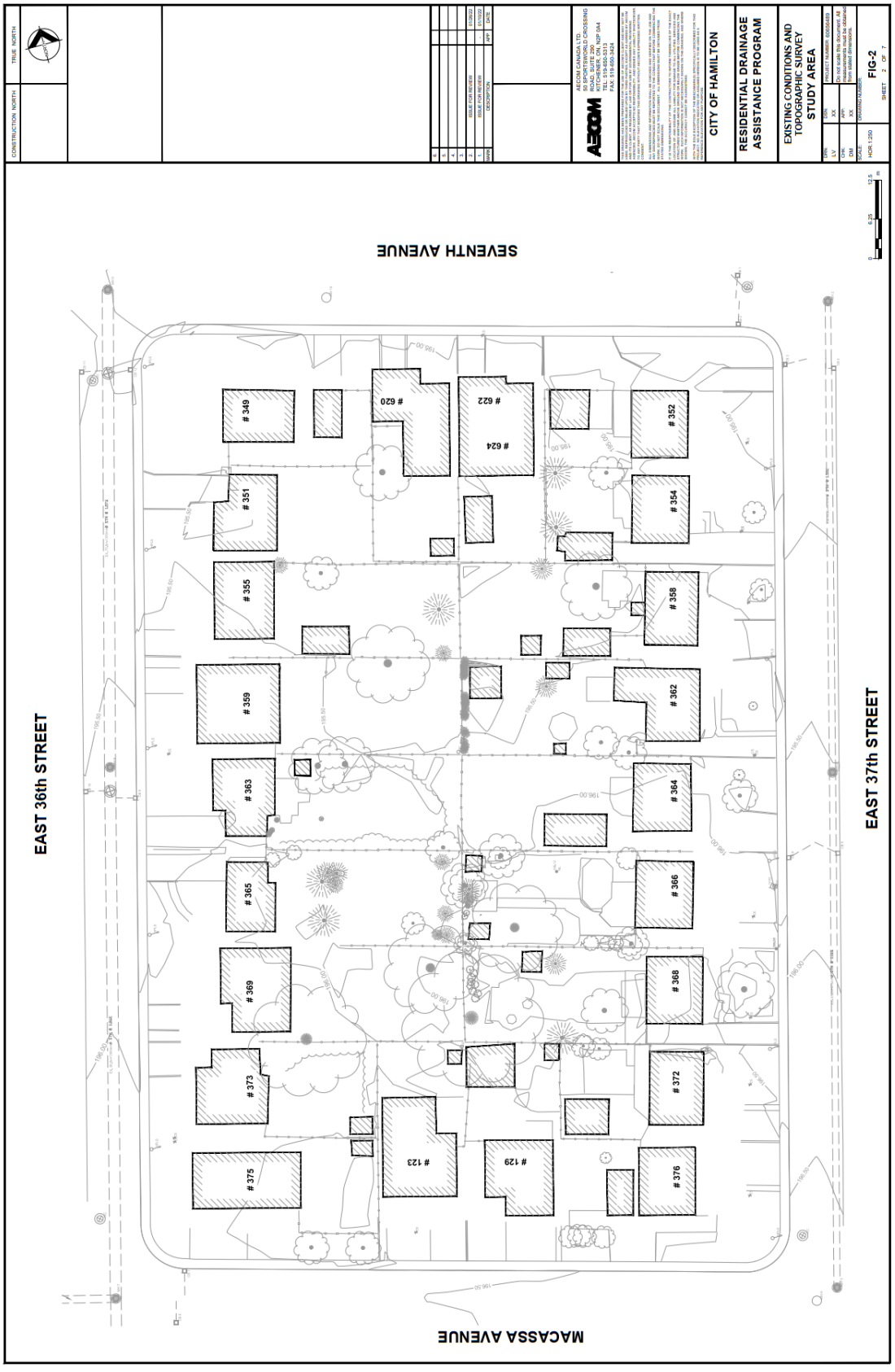
3.3.2.2. Costs

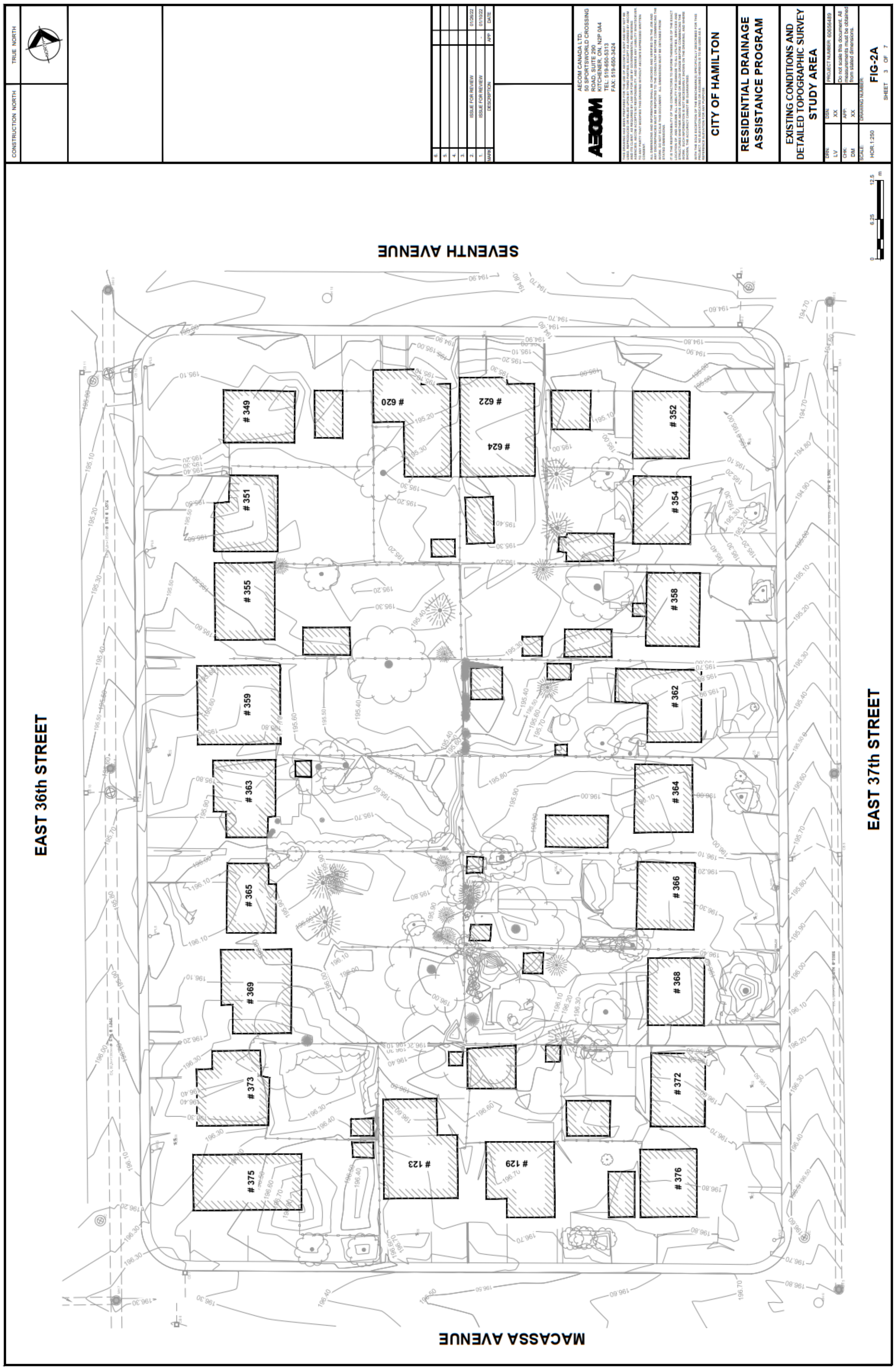
The anticipated total cost of the installation of the rear yard soak away pits is $7,000.00 to $10,000.00 per lot. The final costs for the construction of the soak away pits on an individual lot will depend on the size of the rear yards and the ability of the approved contractor to gain access to the rear yards. As noted previously, the timing and construction soak away pits can be arranged by the each of the individual residents or through a City sponsored tender.

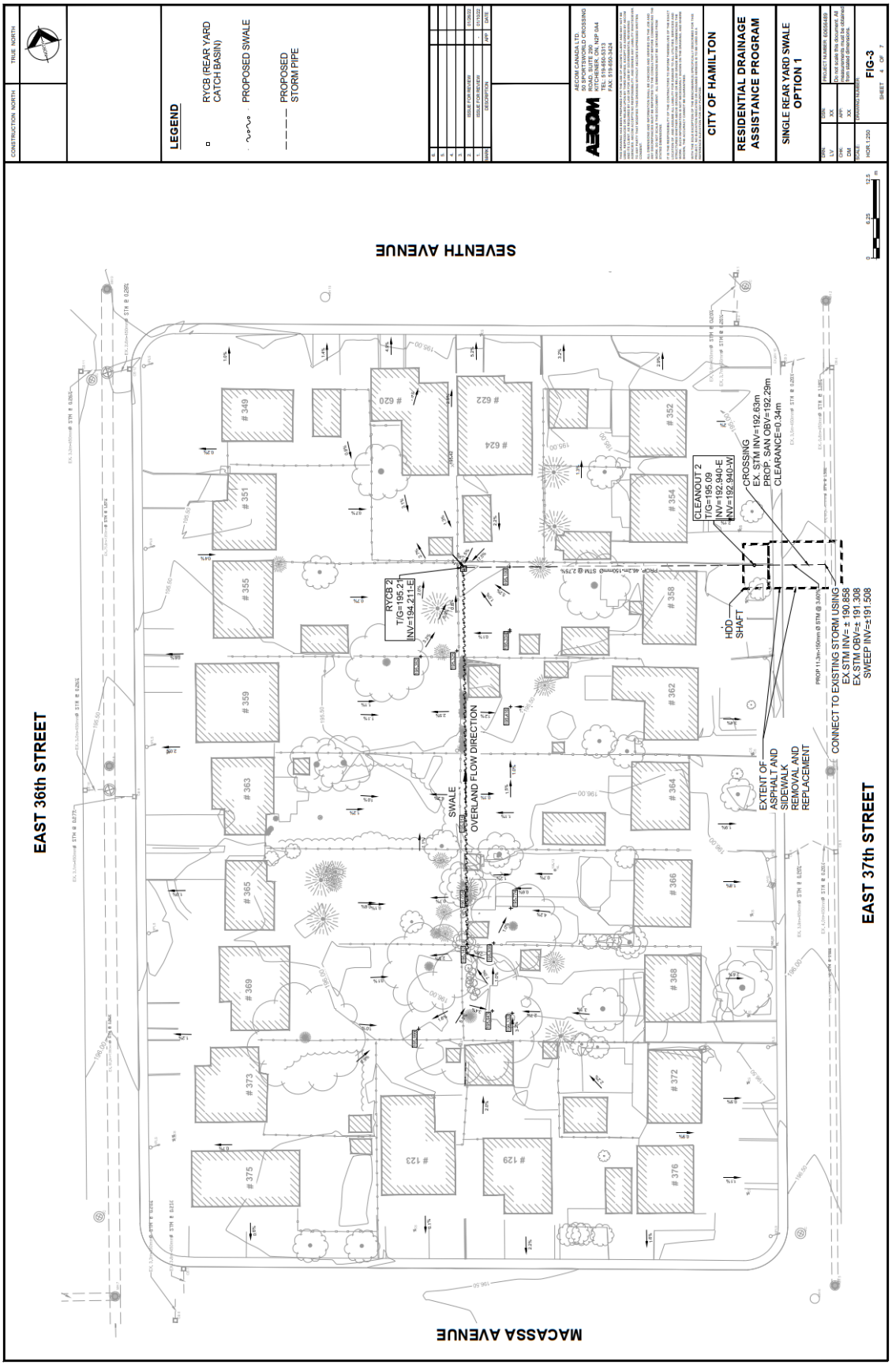
The reader should note that the cost listed is an estimate only and the final costs will vary when the residents or the City of Hamilton tenders this work.

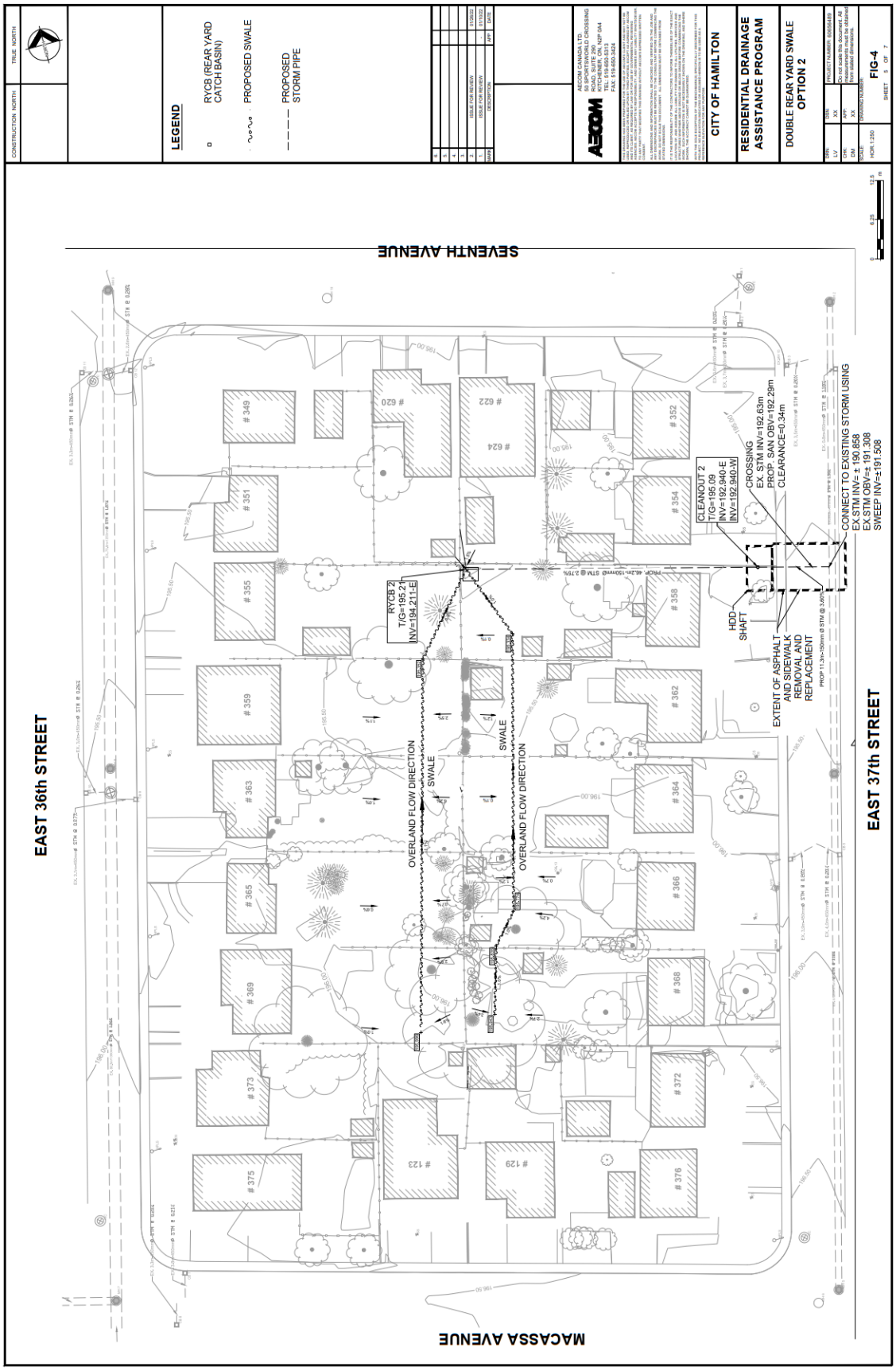
Appendix A

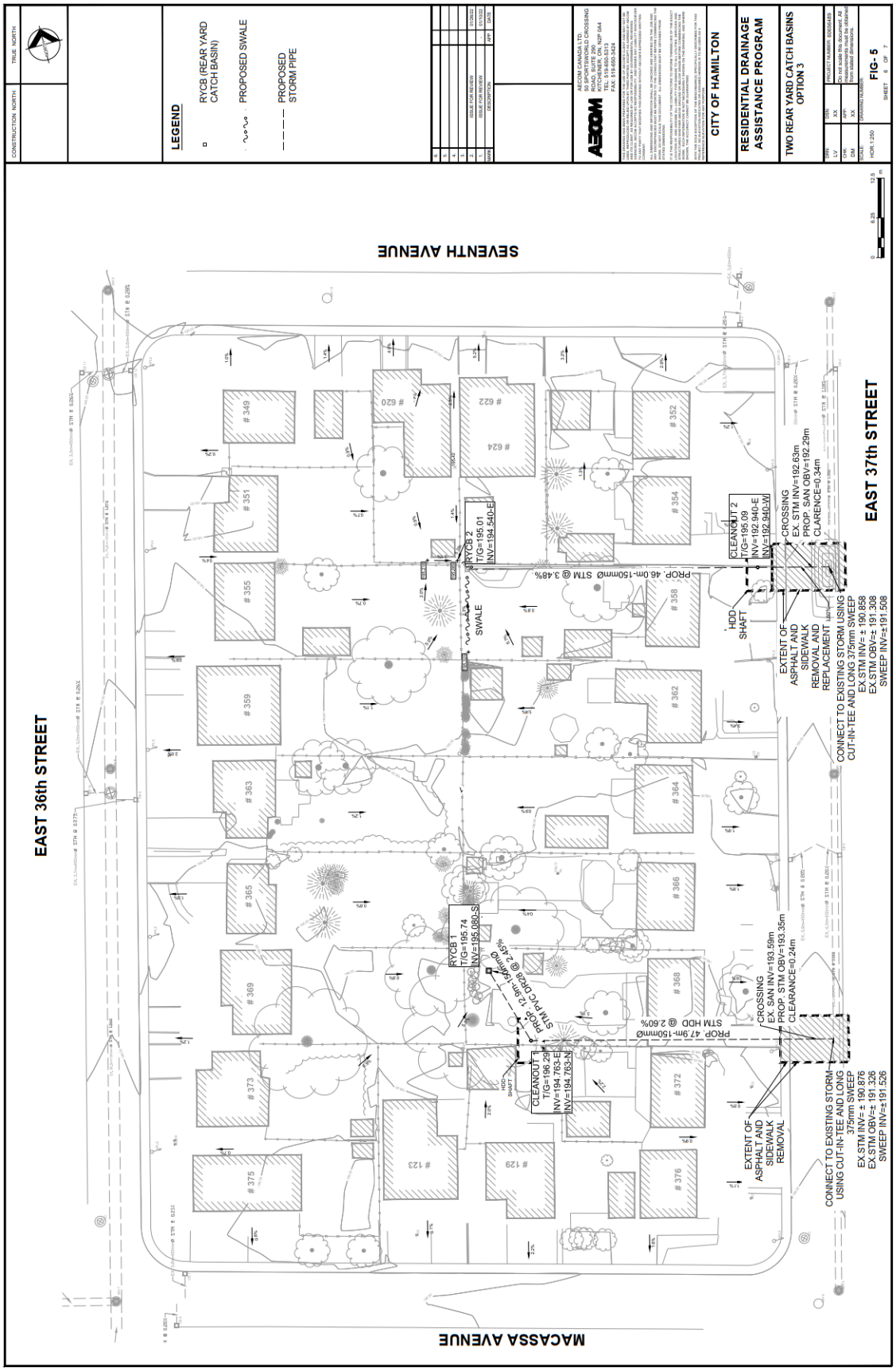

SEVENTH AVENUE
MACASSA AVENUE
EAST 36th STREET
EAST 37th STREET
349
351
355
359
363
365
369
373
375
620
622
624
123
129
352
354
358
362
364
366
368
372
376
CONSTRUCTION NORTH
TRUE NORTH
AECOM
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
AREA OVER VIEW STUDY AREA
FIG-1


CONSTRUCTION NORTH
TRUE NORTH
ISSUED FOR REVIEW
ISSUED FOR REVIEW
DESCRIPTION
AECOM CANADA LTD.
55 SPORTSWORLD CROSSING
ROAD EAST
KITCHENER, ON N2P 0A4
TEL: 519-650-5313
FAX: 519-650-5334
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
EXISTING CONDITIONS AND TOPOGRAPHIC SURVEY STUDY AREA
PROJECT NUMBER: 60644659
FIG-2
SHEET 2 OF 7
HOR.1:250
SEVENTH AVENUE
EAST 36th STREET
EAST 37th STREET
MACASSA AVENUE
349
620
622
624
352
351
354
355
358
359
362
363
364
365
366
369
368
373
372
375
123
129
376

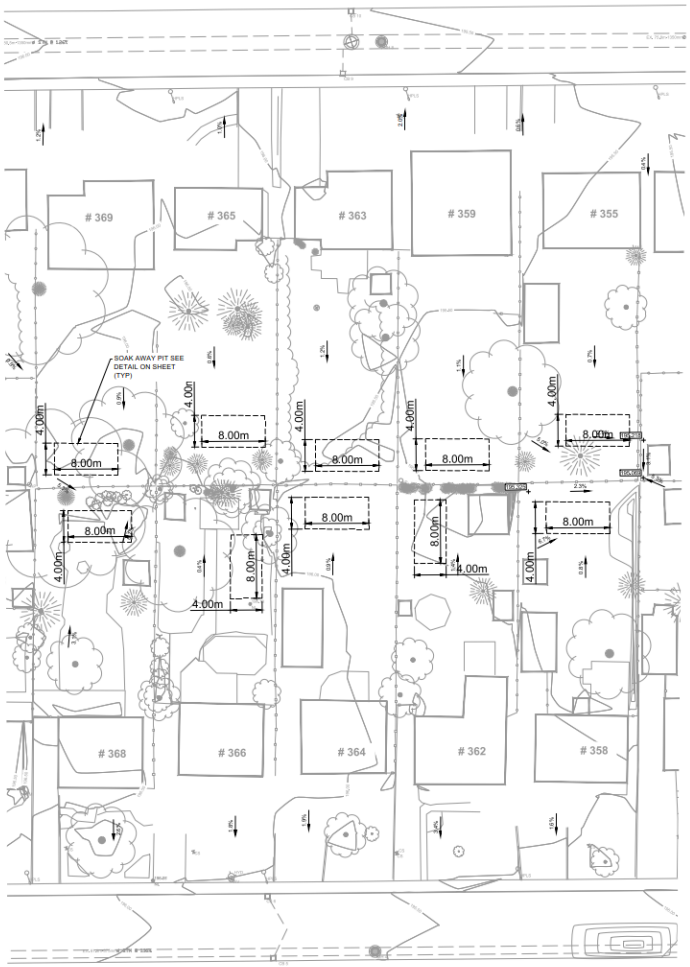

CONSTRUCTION NORTH
TRUE NORTH
ISSUE FOR REVIEW
ISSUE FOR REVIEW
DESCRIPTION
AECOM CANADA LTD.
50 SPORTSWORLD CROSSING ROAD, SUITE 290
KITCHENER, ON, N2P 0A4
TEL: 519-650-5313
FAX: 519-650-3424
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
EXISTING CONDITIONS AND DETAILED TOPOGRAPHIC SURVEY STUDY AREA
FIG-2A
SHEET 3 OF 7
SEVENTH AVENUE
MACASSA AVENUE
EAST 36th STREET
EAST 37th STREET
349
351
355
359
363
365
369
373
375
620
622
624
123
129
352
354
358
362
364
366
368
372
376


CONSTRUCTION NORTH
TRUE NORTH
LEGEND
RYCB (REAR YARD CATCH BASIN)
PROPOSED SWALE
PROPOSED STORM PIPE
ISSUE FOR REVIEW
ISSUE FOR REVIEW
AECOM CANADA LTD.
300 SPORTSWORLD CROSSING ROAD, SUITE 290
KITCHENER, ON N2P 0A4
TEL 519-650-5313
FAX 519-650-3324
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
SINGLE REAR YARD SWALE OPTION 1
PROJECT NUMBER 60606489
FIG-3
SHEET 4 OF 7
HOR.1:250
SEVENTH AVENUE
MACASSA AVENUE
EAST 36th STREET
EAST 37th STREET
CLEANOUT 2
T/G=195.09
INV=192.940-E
INV=192.940-W
CROSSING
EX. STM INV=192.63m
PROP. SAN OBV=192.29m
CLEARANCE=0.34m
RYCB 2
T/G=195.24
INV=194.211-E
HDD SHAFT
SWALE
OVERLAND FLOW DIRECTION
EXTENT OF ASPHALT AND SIDEWALK REMOVAL AND REPLACEMENT
CONNECT TO EXISTING STORM USING
EX.STM INV= ± 190.858
EX.STM OBV=± 191.308
SWEEP INV=±191.508

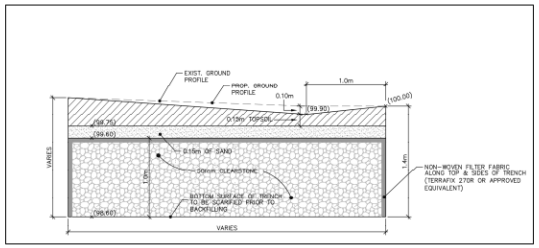

CONSTRUCTION NORTH
TRUE NORTH
LEGEND
RYCB (REAR YARD CATCH BASIN)
PROPOSED SWALE
PROPOSED STORM PIPE
ISSUE FOR REVIEW
AECOM CANADA LTD.
55 SPORTSWORLD CROSSING ROAD, SUITE 200 KITCHENER, ON N2P 0A4
TEL: 519-650-5313
FAX: 519-650-3424
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
DOUBLE REAR YARD SWALE OPTION 2
FIG-4
SEVENTH AVENUE
EAST 36th STREET
EAST 37th STREET
MACASSA AVENUE
RYCB 2
T/G=195.21
INV=194.211-E
OVERLAND FLOW DIRECTION
SWALE
CLEANOUT 2
T/G=195.09
INV=192.940-E
INV=192.940-W
CROSSING
EX. STM INV=192.63m
PROP. SAN OBV=192.29m
CLEARANCE=0.34m
HDD SHAFT
EXTENT OF ASPHALT AND SIDEWALK REMOVAL AND REPLACEMENT
CONNECT TO EXISTING STORM USING
EX.STM INV=± 190.858
EX.STM OBV=± 191.308
SWEEP INV=±191.508


CONSTRUCTION NORTH
TRUE NORTH
LEGEND
RYCB (REAR YARD CATCH BASIN)
PROPOSED SWALE
PROPOSED STORM PIPE
ISSUE FOR REVIEW
ISSUE FOR REVIEW
DESCRIPTION
AECOM CANADA LTD.
ROAD, SUITE 200
KITCHENER, ON N2P 0A4
TEL 519-650-5313
FAX 519-650-3424
CITY OF HAMILTON
RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM
TWO REAR YARD CATCH BASINS OPTION 3
PROJECT NUMBER: 60664469
Do not scale this document. All measurements must be obtained from figures.
FIG- 5
SHEET 6 OF 7
EAST 36th STREET
EAST 37th STREET
SEVENTH AVENUE
MACASSA AVENUE
RYCB 1
T/G=195.74
INV=195.080-S
RYCB 2
T/G=195.01
INV=194.540-E
CLEANOUT 1
T/G=196.29
INV=194.763-E
INV=194.763-N
CLEANOUT 2
T/G=195.09
INV=193.940-E
INV=192.940-W
PROP. 46.0m-150mmØ STM @ 3.48%
PROP. 47.9m-150mmØ STM @ 2.60%
STM PVC DR28 @ 2.45%
HDD SHAFT
EXTENT OF ASPHALT AND SIDEWALK REMOVAL
CROSSING
EX. SAN INV=193.59m
PROP. STM OBV=193.35m
CLEARANCE=0.24m
CONNECT TO EXISTING STORM USING CUT-IN-TEE AND LONG 375mm SWEEP
EX.STM INV=± 190.876
EX.STM OBV=± 191.326
SWEEP INV=±191.526
CROSSING
EX. STM INV=192.63m
PROP. SAN OBV=192.29m
CLARENCE=0.34m
CONNECT TO EXISTING STORM USING CUT-IN-TEE AND LONG 375mm SWEEP
EX.STM INV=± 190.858
EX.STM OBV=± 191.308
SWEEP INV=±191.508

EAST 36th STREET



EAST 37th STREET



SOAK AWAY PIT DETAIL

ADDRESS	DRAINAGE AREA (m²)	STORAGE VOLUME REQUIRED BASED 25mm DEPTH OF WATER OVER AREA (m³)	VOLUME OF STORAGE TRENCH REQUIRED BASED 40% VOIDS (m³)
369 EAST 36th STREET	429.430	10.740	27
365 EAST 36th STREET	503.180	12.580	32
363 EAST 36th STREET	485.760	12.140	31
359 EAST 36th STREET	477.310	11.930	30
355 EAST 36th STREET	476.380	11.910	30
368 EAST 37th STREET	479.330	11.980	30
366 EAST 37th STREET	459.800	11.500	29
364 EAST 37th STREET	450.490	11.260	29
362 EAST 37th STREET	450.760	11.270	29
358 EAST 37th STREET	467.010	11.680	30

0 6.25 12.5 m

CONSTRUCTION NORTH | TRUE NORTH

LEGEND

PROPOSED SOAK AWAY PIT

NO.	DESCRIPTION	APP	DATE
6.			
5.			
4.			
3.			
2.	ISSUE FOR REVIEW		01/26/22
1.	ISSUE FOR REVIEW		01/10/22

AECOM CANADA LTD.
50 SPORTSWORLD CROSSING ROAD, SUITE 290
KITCHENER, ON, N2P 0A4
TEL: 519-650-5313
FAX: 519-650-3424

CITY OF HAMILTON

RESIDENTIAL DRAINAGE ASSISTANCE PROGRAM

INDIVIDUAL SOAK AWAY PITS OPTION 4

DRN:	DSN:	PROJECT NUMBER: 60656489
LV	XX	
CHK:	APP:	Do not scale this document. All measurements must be obtained from stated dimensions.
DM	XX	

SCALE: HOR.1:250

DRAWING NUMBER: **FIG- 6**

SHEET 7 OF 7

City of Hamilton
Rear Yard Flooding Review

May 25 2022

East 37th Street, Seventh Ave., East 36th Street and Macassa Ave.

Option 1

Swale Along Property line

Public Work

The work within the Roadway Right of Way will include:

- Removal and replacement of asphalt and granular roadbase, curbs and sidewalks
- Excavation and backfill of sewer for connection to the exisitng storm sewer
- Connection of storm sewer lateral to the existing storm sewer
- Supply and installation of the storm sewer lateral to the property line
- Restoration of all damaged areas during construction
- Traffic Control
- All work and materials to meet the specifications of the City of Hamilton

Removal			**Qnty**	**Total**
Excavator	Hr	$250.00	5.0	$1,250.00
Truck	Hr	$100.00	5.0	$500.00
Loader	Hr	$175.00	5.0	$875.00
Compactor	Hr	$150.00	5.0	$750.00
Labor	Hr	$75.00	5.0	$375.00
Foreman	Hr	$100.00	5.0	$500.00
Pick up	Hr	$50.00	5.0	$250.00
		Sub total		**$4,500.00**
Replacement				
Excavator	Hr	$250.00	8.0	$2,000.00
Truck	Hr	$100.00	8.0	$800.00
Loader	Hr	$175.00	8.0	$1,400.00
Compactor	Hr	$150.00	8.0	$1,200.00
Labor	Hr	$75.00	8.0	$600.00
Foreman	Hr	$100.00	8.0	$800.00
Pick up	Hr	$50.00	8.0	$400.00
Traffic Control	LS	$100.00	8.0	$800.00
		Sub total		**$8,000.00**
Pipe and Connection	LS	$2,000.00	2.0	$4,000.00
Sewer	M	$250.00	20.0	$5,000.00
Curb	m	$100.00	10.0	$1,000.00
SW	m2	$100.00	20.0	$2,000.00
Granular	t	$80.00	67.2	$5,376.00
Asphalt	t	$300.00	10.0	$3,000.00
		Sub total		**$20,376.00**
		Total		**$32,876.00**

Private Side

Excavation and Receiving Pits

Pits	ea	$2,000.00	2	$4,000.00
Installation of Pipe	m	$250.00	40	$10,000.00
Rear Yard CB	ea	$2,000.00	1	$2,000.00
Removal of Fencing	m	$50.00	75	$3,750.00
Removal of Trees	ea	$5,000.00	2	$10,000.00
Restoration	m2	$20.00	375	$7,500.00
Fence Replacement	m	$50.00	75	$3,750.00
Driveway replacement	ea	$8,000.00	1	$8,000.00
				$49,000.00
		Total		**$81,876.00**

City of Hamilton
Rear Yard Flooding Review

May 25 2022

East 37th Street, Seventh Ave., East 36th Street and Macassa Ave.

Option 2

Two swales in Rear yards

Public Work

The work within the Roadway Right of Way will include:

- Removal and replacement of asphalt and granular roadbase, curbs and sidewalks
- Excavation and backfill of sewer for connection to the exisitng storm sewer
- Connection of storm sewer lateral to the existing storm sewer
- Supply and installation of the storm sewer lateral to the property line
- Restoration of all damaged areas during construction
- Traffic Control
- All work and materials to meet the specifications of the City of Hamilton

Removal			**Qnty**	**Total**
Excavator	Hr	$250.00	5.0	$1,250.00
Truck	Hr	$100.00	5.0	$500.00
Loader	Hr	$175.00	5.0	$875.00
Compactor	Hr	$150.00	5.0	$750.00
Labor	Hr	$75.00	5.0	$375.00
Foreman	Hr	$100.00	5.0	$500.00
Pick up	Hr	$50.00	5.0	$250.00
		Sub total		**$4,500.00**
Replacement				
Excavator	Hr	$250.00	8.0	$2,000.00
Truck	Hr	$100.00	8.0	$800.00
Loader	Hr	$175.00	8.0	$1,400.00
Compactor	Hr	$150.00	8.0	$1,200.00
Labor	Hr	$75.00	8.0	$600.00
Foreman	Hr	$100.00	8.0	$800.00
Pick up	Hr	$50.00	8.0	$400.00
Traffic Control	LS	$100.00	8.0	$800.00
		Sub total		**$8,000.00**
Pipe and Connection	LS	$2,000.00	2.0	$4,000.00
Sewer	M	$150.00	20.0	$3,000.00
Curb	m	$100.00	10.0	$1,000.00
SW	m2	$100.00	20.0	$2,000.00
Granular	t	$80.00	67.2	$5,376.00
Asphalt	t	$300.00	10.0	$3,000.00
		Sub total		$18,376.00
		Total		**$30,876.00**

Private Side

Excavation and Receiving Pits

Pits	ea	$2,000.00	2	$4,000.00
Installation of Pipe	m	$250.00	40	$10,000.00
Rear Yard CB	ea	$2,000.00	1	$2,000.00
Removal of Fencing	m	$20.00	75	$1,500.00
Removal of Trees	ea	$5,000.00	2	$10,000.00
Regrade	m2	$20.00	850	$17,000.00
Fence Replacement	m	$50.00	75	$3,750.00
Driveway replacement	ea	$6,000.00	1	$6,000.00
				$54,250.00
		Total		**$85,126.00**

City of Hamilton
Rear Yard Flooding Review

May 25 2022

East 37th Street, Seventh Ave., East 36th Street and Macassa Ave.

Option 3

Two Rear yard CB

The work within the Roadway Right of Way will include:

- Removal and replacement of asphalt and granular roadbase, curbs and sidewalks
- Excavation and backfill of sewer for connection to the exisitng storm sewer
- Connection of storm sewer lateral to the existing storm sewer
- Supply and installation of the storm sewer lateral to the property line
- Restoration of all damaged areas during construction
- Traffic Control
- All work and materials to meet the specifications of the City of Hamilton

Public Work

Removal			**Qnty**	**Total**
Excavator	Hr	$250.00	5.0	$1,250.00
Truck	Hr	$100.00	5.0	$500.00
Loader	Hr	$175.00	5.0	$875.00
Compactor	Hr	$150.00	5.0	$750.00
Labor	Hr	$75.00	5.0	$375.00
Foreman	Hr	$100.00	5.0	$500.00
Pick up	Hr	$50.00	5.0	$250.00
		Sub total		$4,500.00
Replacement				
Excavator	Hr	$250.00	8.0	$2,000.00
Truck	Hr	$100.00	8.0	$800.00
Loader	Hr	$175.00	8.0	$1,400.00
Compactor	Hr	$150.00	8.0	$1,200.00
Labor	Hr	$75.00	8.0	$600.00
Foreman	Hr	$100.00	8.0	$800.00
Pick up	Hr	$50.00	8.0	$400.00
Traffic Control	LS	$100.00	8.0	$800.00
		Sub total		**$8,000.00**
Pipe and Connection	LS	$2,000.00	2.0	$4,000.00
Sewer	M	$150.00	20.0	$3,000.00
Curb	m	$100.00	10.0	$1,000.00
SW	m2	$100.00	20.0	$2,000.00
Granular	t	$80.00	134.4	$10,752.00
Asphalt	t	$300.00	20.0	$6,000.00
		Sub total		**$26,752.00**
		Total		**$39,252.00**

Private Side

Excavation and receiving pits				
Pits	ea	$2,000.00	4	$8,000.00
Installation of Pipe	m	$250.00	70	$17,500.00
Rear Yard CB	ea	$2,000.00	2	$4,000.00
Swale	m	$100.00	15	$1,500.00
Restoration	m2	$40.00	15	$600.00
Restaration Driveway	ea	$8,000.00	2	$16,000.00
				$47,600.00
		Total		**$86,852.00**