FEASIBILITY REPORT
2015 STREET RECONSTRUCTION

INTRODUCTION

The purpose of this report is to determine the feasibility of improving the following described streets by regrading, base reconstruction, necessary curb and gutter reconstruction, and resurfacing:

Darling Drive - 186 feet east of the center line of North Burlington Avenue to Grand Avenue extended
Hagge Street - Tower Street to Diagonal Road
Schaap Drive - 1st Avenue Southwest to 1st Avenue Southwest

This report has been prepared pursuant to the Council resolution of April 27, 2015. The improvement has not been petitioned for and needs to proceed as a Council initiated improvement project. See Maps A, B, and C for the location of the subject streets.

PROJECT NEED

Streets

All of the subject streets are residential streets constructed with flexible pavement (bituminous surface with either bituminous or aggregate base) and are concrete curb and guttered. All abutting land uses are residential, including multifamily, or institutional. The width and year of construction of the streets are as follows:

Darling Drive from 186' to 312' east of North Burlington Avenue (Darling Dr. W): 36 feet wide, constructed in 1987
Darling Drive from 312' east of Burlington Avenue to Grand Avenue extended (Darling Dr. E): 36 feet wide, surfaced in 1997
Hagge Street: 30 feet wide, constructed in 1972
Schaap Drive within Eckerson 1st Addition (Schaap Dr 1): 36 feet wide, surfaced in 1993
Schaap Drive within Eckerson 2nd Addition (Schaap Dr 2): 36 feet wide, initial surface placed in 1995

All of the street segments, except the easterly 354 feet of Darling Drive, have met or exceeded the 20 year design life. The easterly portion of Darling Drive failed to meet the 20 year design life by 2 years.

The composition of the exiting pavement structure of each of the street segments is as follows:

Segment	Fabric Layer	Drainable Base Layer	Edge Tile	Aggregate Base Depth	Surfacing Depth
Darling Dr. W	-	-	Yes	9 inches	2.5 inches
Darling Dr. E	Yes	-	Yes	9 inches	2.5 inches
Hagge Street	-	-	-	4 inches[1]	2.0 inches
Schaap Dr. 1	-	-	-	9 inches	2.5 inches
Schaap Dr. 2	Yes	-	-	9 inches	2.5 inches

[1]Bituminous Base

The streets' bituminous pavement no longer has the properties necessary to fulfill its function. The loss of the bituminous pavement qualities needed to sustain durable surfacing is generally due to material fatigue as well as material degradation. Fatigue develops from the accumulation of the minute deflections that occur with each wheel loading and is accelerated over time as natural factors reduce the pavement's ductility. These factors ultimately limit the usable life of the surfacing regardless of other factors or deficiencies affecting the total pavement structure. Seasonally saturated soil conditions contribute to a weakening of the subgrade and aggregate base, or in the case of Hagge Street, stripping of the binder oil from the bituminous base. The weakening of the subgrade and base reduces the load bearing capability of the total pavement structure to the point that it will no longer support normal loadings without excessive deflection or perhaps even failure. The effects of this weakening are typically recognized by surface deformation and extensive "map" or "an alligator pattern" cracking. Severe occurrences of this condition resulting from frost melt are commonly referred to as "frost boils". The results of this condition may be found throughout the length of the subject streets. On those street segments that do not include geotextile fabric beneath the aggregate base, seasonal saturation aggravates the blending of the subgrade clay soils and aggregate bases which permanently reduces the strength and function of the base. The combination of factors has deteriorated the total bituminous pavement structure of the streets to the point they no longer are able to provide an acceptable level of service. It is recommended that the existing pavement structure (base and surfacing) be removed and replaced as part of a street reconstruction in order to restore the total pavement system.

Dislocated concrete curb and gutter should be removed and replaced as necessary to maintain reasonable water flow, with any ponding water to be contained within the concrete gutter area.

DESIGN

The City's Assessment Ordinance provides that residential streets shall be of "5 ton" design and that collector streets (including commercial and industrial access streets) shall be of "9 ton" design. Although the terminology "5 ton" or "9 ton" design reflects what might be considered outdated pavement design methodology, the intent of the standard is clear in defining that the pavement of residential streets should reflect the adjacent residential land use rather than being designed to

potentially serve a collector or arterial function. A residential street design would therefore typically account for traffic consisting of predominately automobiles and light trucks together with minor quantities of trucks and buses to reflect normal residential services such as garbage hauling, school busing, and deliveries. Schaap Drive and Hagge Street are subject to only such traffic and can be designed accordingly. Darling Drive is projected to gain additional through traffic upon completion of Grand Avenue. Based on a traffic study recently completed for the City, the increase in traffic warrants an additional ½" of surfacing.

It is proposed that Schaap Drive and Hagge Street be reconstructed utilizing a residential street section consisting of 3" of bituminous surfacing and 9" of aggregate base. The surfacing on Darling Drive would be increased to 3.5". It is recommended that the aggregate base include a layer of an open graded aggregate (drainable) base material. Use of the drainable base material as the bottom layer of the base together with proper edge drain tiles will allow for free drainage of that base material, intercept free water rising from below that layer, and allow for more rapid drainage of any excess moisture in the material above the drainable base. The drainable base material also provides a base layer that is less susceptible to loss of strength due to the presence of excess moisture. As evident in the Darling Drive E and Schaap Drive 2 street segments, the edge drains without the drainable base layer does not provide the drainage needed to prevent saturation and resulting weakening of the pavement structure. The depth of the drainable layer is recommended to be 4". Geotextile reinforcement fabric would also be installed in conjunction with the aggregate base. The geotextile fabric will reduce the migration of the subgrade clay into the drainable base material and reinforce the subgrade material (clay) during the spring transitional period when frost is melting out of the soil and the subgrade's bearing strength is the weakest. Due to the need to remove the existing aggregate base, it is not feasible to utilize any existing fabric on Darling Drive or Schaap Drive.

Concrete curb and gutter should be removed and replaced where it has settled or has, in other ways, been dislocated on all streets. A majority of the curb and gutter on the streets can remain in place and should be in an acceptable condition throughout the life of the reconstructed pavement.

RELATED IMPROVEMENTS

Darling Drive

The catch basins and storm sewer lead under Darling Drive located approximately 470 feet east of North Burlington Avenue have been dislocated by frost action. It is proposed that the catch basins and lead be removed and reinstalled. Reinstallation will include use of granular backfill tapered up to the roadbed to minimize the affects of frost. The estimated cost for reinstalling the catch basins and lead is $30,910, including engineering and contingencies. This work is not included in the Darling Drive Street improvement cost and would be funded from storm water utility revenue. The 2015 Storm Water Utility budget includes the estimated cost of $30,910 for the work.

Hagge Street

The existing catch basins located approximately 280 feet west of Diagonal Road are the large box structure with a large curb opening. This type of catch basin tends to be subject to failure, difficult to maintain, and subject to internal blockage due to the lack of debris screening. It is recommended

that these catch basins be removed and replaced with standard drainage structures. The estimated cost for replacing the two catch basins is $16,250 including engineering and contingencies. This work is not included in the Hagge Street improvement cost and would be funded from storm water utility revenue. The 2015 Storm Water Utility budget includes $17,490 for the work.

The sanitary sewer and water mains within Hagge Street were reconstructed in 2006 in anticipation of the street reconstruction. The 2015 Sanitary Sewer and Water Utility funds include a budget for pavement restoration associated with these projects that is not within the scope of necessary street improvements. This includes the replacement of sidewalks, driveways, and curb and gutter removed as part of the utility work. The estimated costs for the sanitary sewer and water main related restoration work, including engineering and contingencies, are $2,400 and $4,400 respectively. These costs are below the budgets of $5,260 for sanitary sewer work restoration and $31,830 for water main work restoration.

The pedestrian ramp located on the north side of Hagge Street at Diagonal Road is too steep to be compliant with the standards established for the Americans with Disabilities Act (ADA). The sidewalk along Hagge Street and Diagonal Road will need to be removed and replaced for an adequate length to achieve the appropriate slope. Removal of a tree will also be required due to the encroachment of its trunk and roots. The total estimated cost for this work is $15,925. The cost for this work is included in the total street improvement cost but is not included in the determination of the assessment rate.

Schaap Drive

The existing pedestrian ramps on Schaap Drive at each of its intersection of 1st Avenue SW do not comply with the specifics of current Americans with Disabilities Act (ADA) standards although the ramps do include tactile warning (truncated dome) panels. The lip between the street gutter and the ramp is steeper and/or higher than permitted under the ADA standards. Many of the truncated domes on the composite panels have been sheared off and therefore the panels should also be replaced with cast iron panels which have been found to be the only reasonably durable type of panels. The total estimated cost for this work is $19,250. The cost for this work is included in the total street improvement cost but is not included in the determination of the assessment rate.

COSTS AND FINANCE

In general, the distribution of assessable costs for the project is proposed as outlined in the City's Assessment Ordinance.

City share will include all costs for reconstruction of the center 24 feet of pavement with the costs for reconstructing the remaining width of pavement and for curb and gutter reconstruction being assessed to the benefitted properties. Side yard lot allowances and intersecting public right-of-way frontages are also a city share of the project.

The following provides the estimated costs, city share, assessments receivable, and assessment rates for the street improvements:

Darling Drive

City share for non-assessable costs[1]	$94,557.03	
City share of assessable costs	$0.00	
Total city share	$94,557.03	(84.8%)
Assessments receivable	$16,892.97	(15.2%)
TOTAL COST	$111,450.00	

The estimated base assessment rate is **$25.68/ft**
The estimated reduced assessment rate is **$23.11/ft**

[1] City share for non-assessable costs includes $79,150.00 for the center 24 feet, $900.00 for salvaging aggregate base material, $5,476.93 for lot allowances, $513.54 for the frontages of public right-of-way, $6,750 for additional pavement depth and $1,767 for reduced assessments rates.

Hagge

City share for non-assessable costs[1]	$173,997.24	
City share of assessable costs	$0.00	
Total city share	$173,997.24	(88.7%)
Assessments receivable	$22,252.76	(11.3%)
TOTAL COST	$196,250.00	

The estimated assessment rate is **$15.06/ft**

[1] City share for non-assessable costs includes $149,700.00 for the center 24 feet, $2,875 for salvaging aggregate base material, $4,539.68 for lot allowances, $15,925 for replacing pedestrian ramps and $957.63 for the frontages of public right-of-way.

Schaap Drive

City share for non-assessable costs[1]	$176,872.14	
City share of assessable costs	$0.00	
Total city share	$176,872.14	(77.3%)
Assessments receivable	$51,927.86	(22.7%)
TOTAL COST	$228,800.00	

The estimated assessment rate is **$27.02/ft**

[1] City share for non-assessable costs includes $151,400.00 for the center 24 feet, $3,250 for salvaging aggregate base material, $2,972.10 for lot allowances, and $19,250 for replacing pedestrian ramps.

Total Improvement

The following provides the estimated costs, city share, assessments receivable, and assessment rates for the street and alley improvements:

City share for non-assessable costs	$445,426.41	
City share of assessable costs	$0.00	
Total city share	$445,426.41	(83.0%)
Assessments receivable	$ 91,073.59	(17.0%)
TOTAL COST	$ 536,500.00	

Subject to the manner in which projects are combined for funding, it is proposed that the 2015 street reconstruction project be initially financed by PIR bonding with 401 Construction Fund reserves being temporarily utilized until bond proceeds are received. Revenues from special assessments levied as a result of the project along with the annual special tax levy required to recover the city share of the project would be utilized for bond repayment.

PIR bonding will require that 20% of the total combined improvement project costs be specially assessed. Depending on how the projects are combined for funding, the Darling Drive and/or Hagge Street improvements may need to be permanently funded from 401 Construction Fund reserves with only the special assessments levied for the corresponding improvements being available to replace the reserves. Projects that might be combined include the improvement Shady Lane and the improvement of Grand Avenue. These improvement projects are being addressed in separate reports. Should the improvement of Shady Lane be ordered, that improvement project and all the street improvement projects addressed in this report could be financed with PIR bonding. The Hagge Street improvement would need to be permanently financed with 401 Construction Fund reserves should the three street improvements addressed in this report be ordered but the improvement of Shady Lane is not ordered. The Hagge Street and/or the Darling Drive improvement projects would need to be permanently financed with 401 Construction Fund reserves should either or both of those improvements be ordered ahead but neither the improvement of Shady Lane nor the improvement of Schaap Drive be ordered. The potential to combine with the improvement of Grand Avenue can not be evaluated until that study report is complete. Possible combinations include:

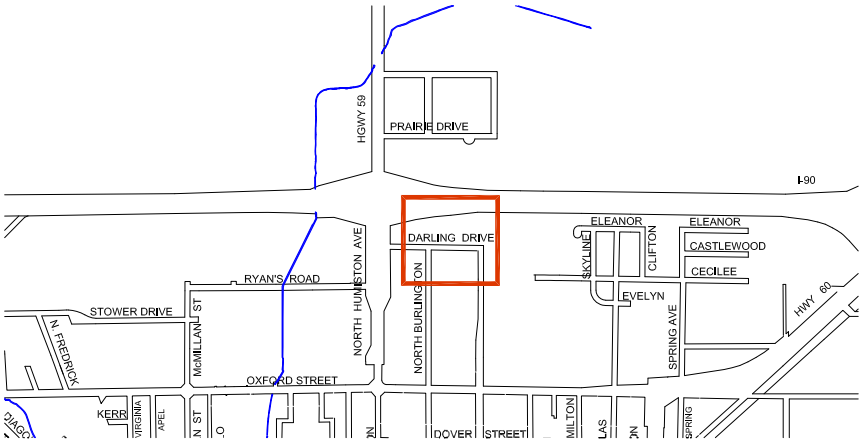
Darling Dr.	Hagge St.	Schaap Dr.	Shady Lane
Bond	Bond	Bond	Bond
Bond	401	Bond	*Not Ordered*
401	401	*Not Ordered*	*Not Ordered*

CONTRACT COMBINATION WITH OTHER IMPROVEMENTS

In addition to completion of the related work previously identified, it is recommended that this project be combined with any other similar bituminous work approved to be undertaken in 2015.

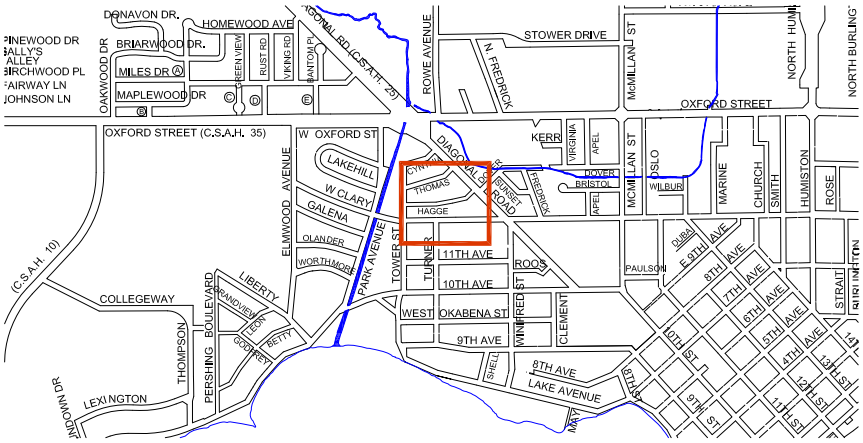
CONCLUSION

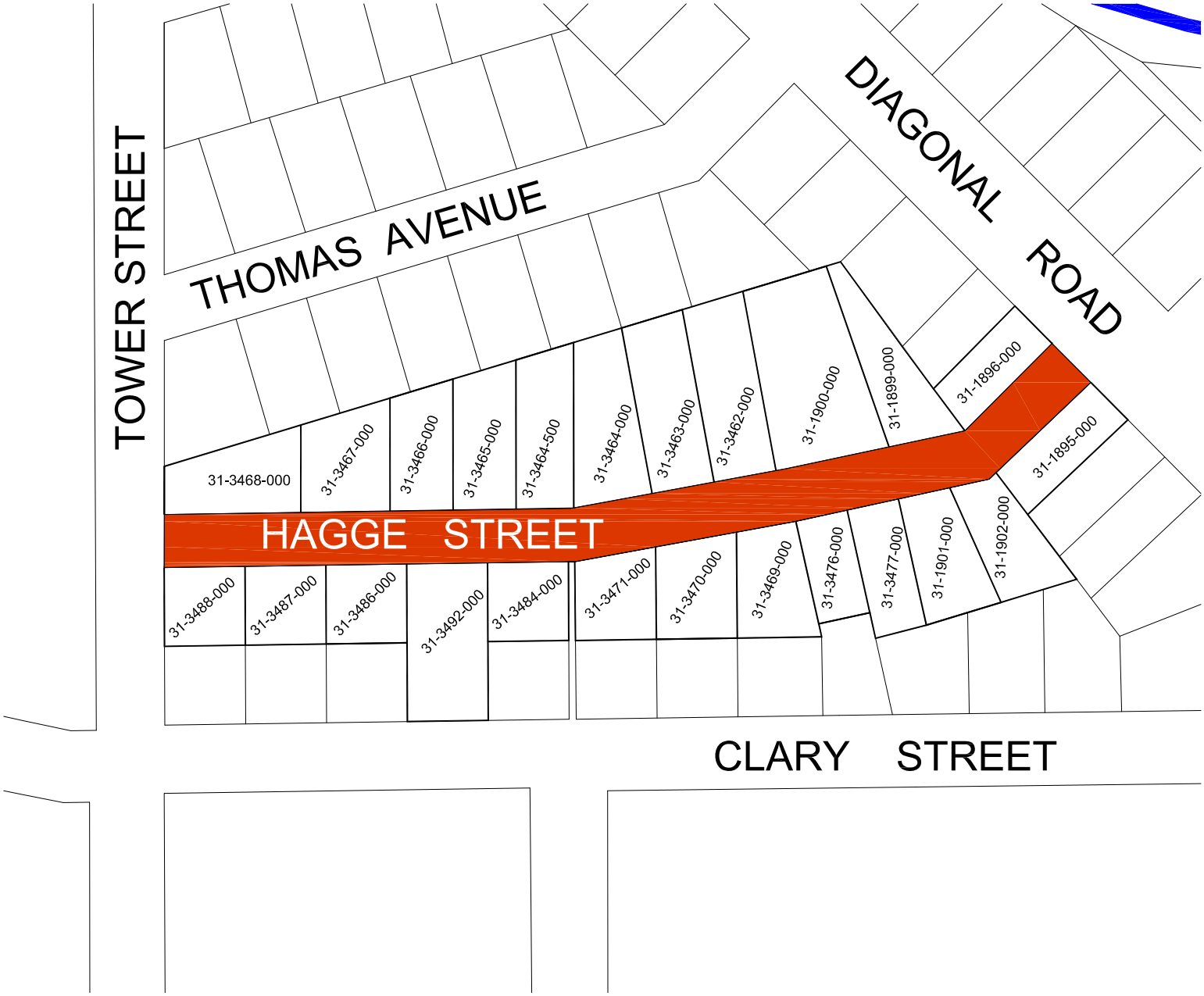
The proposed reconstruction of the subject streets is a feasible way and cost effective means of re-establishing the necessary integrity of the streets and alleys with an all season hard surfaced pavement.



PROPOSED IMPROVEMENT

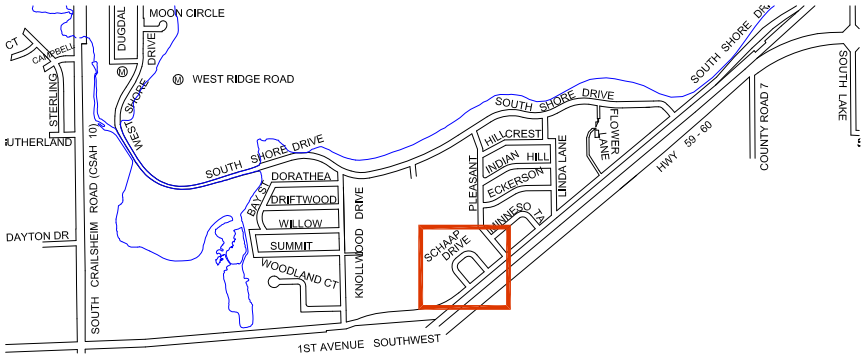
MAP A

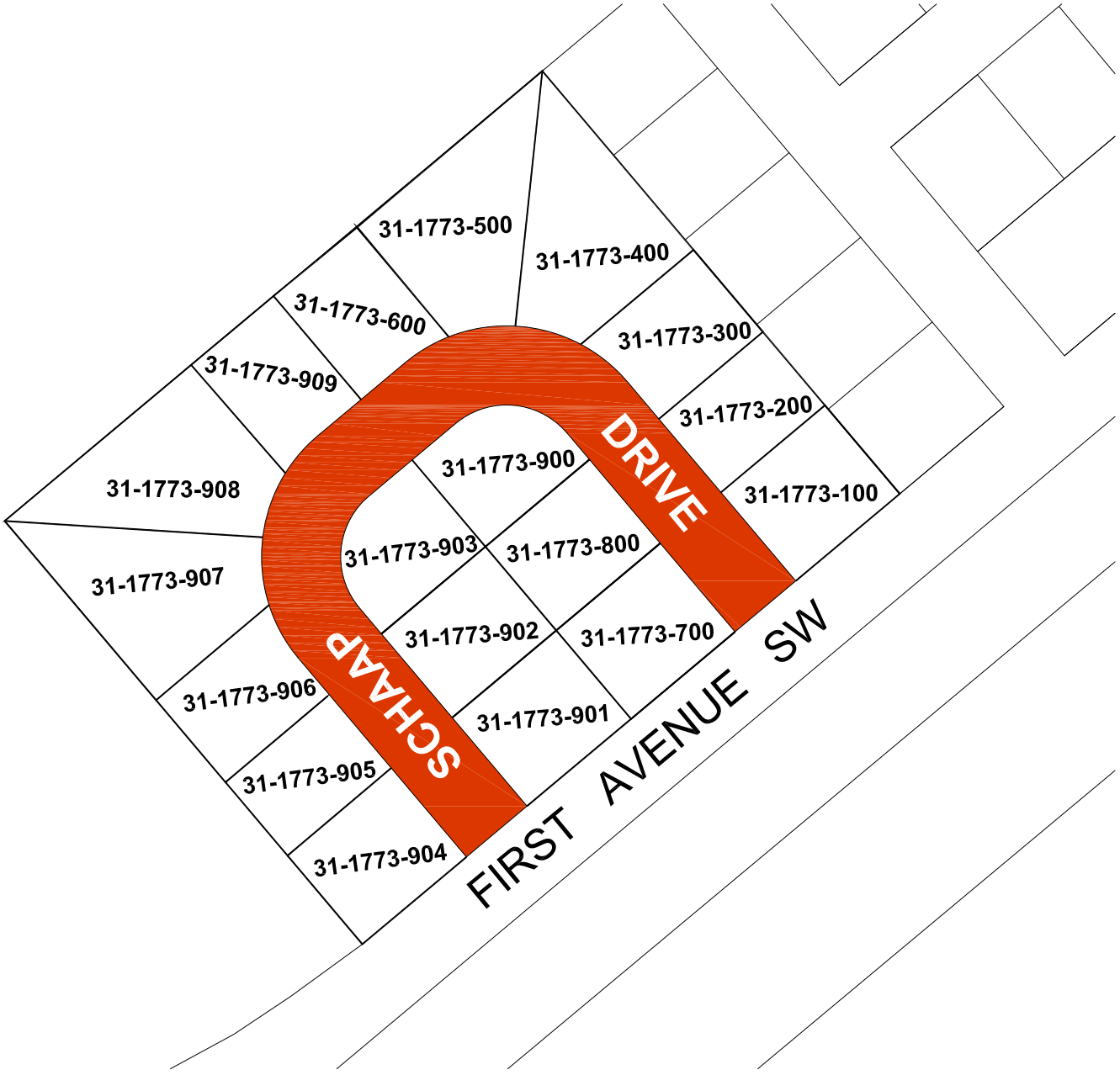




PROPOSED IMPROVEMENT

MAP B





PROPOSED IMPROVEMENT

MAP C