DEPARTMENT OF PUBLIC WORKS
STREET MAINTENANCE DIVISION

SNOW AND ICE CONTROL PLAN

"Implement processes, procedures and activities that enable the City to efficiently maintain and preserve a multi-modal transportation network that meets the needs of all motorists, pedestrians, and bicyclists."

NOVEMBER 17, 2015

SNOW AND ICE CONTROL PLAN

PURPOSE AND NEED

The purpose of this plan is to define the operational procedures and best management practices for storing and utilizing snow and ice control materials, and for performing winter maintenance activities. It defines the levels of service the City of Flint Public Works Department, Street Maintenance Division will strive to provide at our facility and on our city streets. This plan allows for and encourages improvement in operational efficiency and providing the desired levels of service to the public.

Since storms vary dramatically and occur over a variety of paved surfaces and traffic conditions, the Snow and Ice Control Plan (SIC Plan) is intended to be a base, with changes allowed as necessary. This plan was made to fit average conditions, but is able to be adapted to a wide variety of conditions that are encountered by Street Maintenance crews while working to maintain safe roads.

LEVEL OF SERVICE

Department of Public Works, Street Maintenance Division's snow and ice control operations are limited by the resources (budget, personnel, equipment and materials) available for winter maintenance. Consequently, our plan calls for "safe roads, at safe speeds", not "bare roads." This means that roads are plowed, sanded, and/or salted to allow safe travel at safe speeds, but that drivers should still expect to see snow on the roadway during a storm. Most travel takes place during the day, so the majority of the Street Maintenance Division's resources are used between 4:00 a.m. to 3:00 p.m. Motorists should anticipate reduced coverage in the evenings, along with varying road conditions and should drive accordingly.

COMMUNICATION

All snow and ice calls can be directed to the Street Maintenance Division at (810) 766-7343. The Street Maintenance Division's hours of operation are first shift from 6:30 a.m. to 3:00 p.m. Monday through Friday, and a third shift from 10:00 p.m. to 6:30 a.m. Sunday through Thursday. In the event the call is placed after business hours, a voicemail can be left and the appropriate crew will be alerted. This number can be used for citizens with medical emergencies (i.e. dialysis appointments, chemotherapy appointments, etc.) that need access from their street to major roadways. Crews will do their best to address each situation.

The City of Flint Police and 911 Departments will have a Street Maintenance Stand-by List for the winter months beginning November 23, 2015 through April 30, 2016. This list will show weekly which foreman is on call (after normal working hours) and numbers to reach them. In the event the foreman is unreachable, either department may contact Betty Wideman, Transportation Operations Manager at (810) 577-8077 or at (810) 282-5852.

During snow events in which the total event accumulation is over 4 inches, City Council members will receive daily updates that will be forwarded via email through the City Clerk explaining where snow removal activities have occurred the previous day and where they plan to complete activities that day. The city also plans to issue no parking advisories during events of this size in order to clear neighborhood streets of parked cars, which inhibit the crew's ability to plow the street. A press release will also be communicated to the public through the Public Information Officer. The Street Maintenance Division intends to work with the Legal Department, Traffic Engineering, and Police Department to develop a no parking enforcement strategy.

PRIORITY LEVELS AND OBJECTIVES

The goal of the Street Maintenance Division during winter months is to provide a safe roadway system. Below is the priority which will be given to city streets during winter weather events. The city has been divided into 6 areas, with downtown as a separate 7th area. Crews will be deployed to all 6 areas during an event where over 4 inches of snow accumulates, so that all areas of the city will be treated at the same time. Downtown will be treated separately, with crews plowing overnight or during the early morning hours prior to parked cars and heavier traffic on the streets. The department has also set priority levels and time objectives for each type of event based on total event accumulation.

Priority 1 – Major Routes
Priority 2 – Dangerous Hills, Curves and Intersections, Schools and Hospitals
Priority 3 – Act 51 Major Roadways
Priority 4 – Local Roads

During a snow event with total accumulation of 0-2 inches, salting operations begin as streets cover with snow. This operation will consist of salting entire Priority 1-3 roadways. This is dependent upon temperatures (going up or down), time of day and/or weather conditions for the next 24 hours.

During a snow event with total accumulation of 2-4 inches, crews will begin using under-body blades to plow one lane in each direction on the Priority 1 roadways. Once this has been accomplished, crews will go back through the routes and complete the roadways. At the conclusion of the snow event, crews will deploy to Priority 2 and 3 roadways. This activity will take approximately 24 hours to complete.

During a snow event with total accumulation of 4 -8 inches, crews will begin using front plow blades and teaming trucks up in the routes to get the Priority 1 roadways cleared first. Then they will continue onto Priority 2 and 3 roadways. This work will continue throughout the duration of the storm. Once Priority Levels 1-3 have been accomplished and at the conclusion of the snow event, the crews will continue onto the Priority 4 local roads. An event this size or larger shall indicate the need to run 24-hour operations with two 12-hour shifts. This activity will take approximate 72 hours to complete all routes.

Additionally, during a snow event with total accumulation of 4-8 inches, the Department of Public Works Street Maintenance and Utilities divisions agree to work collaboratively to implement the following operational procedures to achieve increased efficiencies during snow events whereby snow accumulations total four or more inches within a 24-hour period:

1. The Utilities Division will provide supplemental snow and ice control support on an as-needed basis for the Street Maintenance Division when a snow event results in snow accumulation that totals four (4) or more inches within a 24-hour period.

2. During normal business hours, the Utilities Division will assign and immediately deploy up to a maximum four (4) Utilities employees to perform snow and ice control activities.

3. If four (4) or more Utilities employees are assigned and deployed, Utilities will in addition, assign and deploy one (1) foreman to supervise the crew of Utilities employees.

4. After normal business hours (overtime hours), Utilities Division will allow an unlimited number of Utilities employees to provide Street Maintenance supplemental snow and ice control support on an as-needed basis.

5. The Utilities Division will provide equipment (trucks, plows, loaders, etc. . .) on an as-needed basis to support Street Maintenance snow and ice control activities when total snow accumulation reaches eight (8) inches or more during a snow event. A snow event can consist of accumulating snow throughout a multi-day period.

6. If Street Maintenance uses Utilities equipment and there are open assignments, Utilities' drivers will be considered first to fill the vacancies. However, it is not required that Street Maintenance utilize Utilities' drivers in order to utilize Utilities' equipment when snow accumulations reaches 8 inches or more and Fleet Maintenance cannot provide access to at least 12 Street Maintenance snow plowing vehicles.

7. The operational procedures will be modified as required to improve efficiencies.

During a snow event with total accumulation of 8-12 inches, crews will deploy as stated above for events over 4 inches. This activity will take approximately 96 hours to complete.

During a snow event with total accumulation over 12 inches, crews will deploy as stated above for events over 4 inches. This activity will take approximately 120 hours to complete.

For the completion time given for each situation above, this time reflects a single event. Should plowing operations not be finished prior to the beginning of a new event, the timeline for maintenance operations shall be reset. Also, these times are reflective of the anticipated man power and equipment available to the Street Maintenance Division. Should this change, these times will be adjusted.

PERFORMANCE MEASUREMENT AND PROGRAM EFFECTIVENESS ASSESSMENT

Performance during and immediately following individual storm events will be periodically monitored to ensure that Street Maintenance is providing safe roads at safe speeds and performing snow and ice removal in accordance with the established priorities as listed above. To monitor performance, the following information, will be reviewed by the Transportation Operations Manager and the Director of Transportation annually to gage the effectiveness of the program:

Material usage (salt or sand/salt)
Condition of travel lanes during and after snow events
Storm data (precipitations, air temperature, road surface temperature, wind speed, etc.)
Plowing frequency
Time required to complete snow event

Overall performance during and following the winter season will be measured by monitoring material usage, labor costs, and equipment costs with respect to the number of lane miles maintained and the number of storm events addressed. Assessments will be made based upon consideration of the resources used versus the winter severity encountered.

MATERIALS AND APPLICATION PROCEDURES

The materials in this section are those that are used by the Street Maintenance Division for snow and ice control on major and local streets within the City of Flint. This section describes the general purpose of each material, the typical use that is expected under normal conditions, and the application procedure. Choice of materials will depend on experienced consideration of the following variables: pavement temperature; nature of the particular snow and ice event; forecasted storm conditions; air temperature and wind velocity; traffic volume; time of day/year; and the availability of resources.

Salt (NaCl)

Salt is the primary material used on the roadways within the City of Flint. Salt is used to prevent the bonding of snow and ice onto the pavement surface, and to melt snow and ice that cannot be removed by plowing. Unless salt is pre-wetted with a liquid having a lower working temperature than sodium chloride, the lowest working temperature is approximately 15 degrees F (Fahrenheit). The city is evaluating the effectiveness of using pre-wetted salt. Pre-wetting helps the salt adhere to the surface and go to work faster at melting snow and ice.

Application rates shall normally be selected from the attached "MDOT Winter Maintenance Application Rates: (Solids)" (Appendix A) and shall be based upon the pavement temperature, snow-ice conditions encountered, and anticipated trends. Initial applications should be normally 25% higher than the average rate indicated by the chart. Generally, salt will be used when the pavement temperatures are 15 degrees F or higher. When pavement temperatures are less than 15 degrees F and not rising, winter sand may be used when necessary for temporary traction. During cold storms, when the pavements are dry and the snow is blowing off the travel lanes, the application of salt or winter sand is to be avoided for as long as possible since it will hasten the formation of ice on the pavement.

Winter Sand

Winter sand shall consist of coarse, clean, sharp sand or other granular material. Sand is generally used to provide traction at intersections and corners during icy conditions.

When conditions warrant, salt may be mixed with sand to break the bond between the ice pack and road surface.

Sand should be generally used in the following situations:

- On hills, curves and intersections where the supervisor determines that temporary traction is necessary.
- In situations where salt cannot work fast enough (i.e. accident scenes involving excessive ice)
- When pavement temperatures are too low for salt to work properly
- When wet pavements exist on lower-volume streets and night-time temperatures may cause glazing

EQUIPMENT

The Street Maintenance Division will partner with the Fleet Maintenance Division to maintain a fleet of 15 tandem dump trucks. Fleet Maintenance will endeavor to maintain a targeted goal of 12 vehicles in operational condition at all times capable of performing snow and ice control on major and local streets.

Additional tandem dump trucks and other 1-ton dump trucks with front plows will be made available when Utilities Division performs support services alongside Street Maintenance on an as-needed basis.

Also this year, the City of Flint secured additional vehicles that are capable of performing winter maintenance operations to clear residential areas, cul-de-sacs, and dead-ends including:

Street Maintenance Division	Four 1-ton dump trucks with front plow
	Five ¾ trucks with front plows
Utilities Division	Ten 1-ton dump trucks with front plow

Street Maintenance will also have access to two front-end loaders and three trucks that have been converted with accessories that enable staff to have the option of applying liquid anti-icing/deicing materials.

MANPOWER

Street Maintenance welcomes the addition of four full-time Street Operator/Maintainer Trainees who will provide additional support services alongside the 12 Operator/Maintainers and three construction foremen permanently assigned to the Street Maintenance Division. Street Maintenance staff will be assigned to 1st and 3rd shift operations. No part-time Snow Plow Operators will be utilized this year to provide winter maintenance support services.

Instead, the Street Maintenance Division will rely on additional winter maintenance support services to be provided through a cooperative partnership with the DPW Utilities Division. The Utilities Division will provide personnel to support winter maintenance operations on an as-needed basis.

UPDATES FOR THIS WINTER SEASON

The Department of Public Works, Street Maintenance Division implemented new technology and procedures last winter. The maps used to deploy crews were combined to create 6 areas, with downtown as a separate 7th area. The Primary and Secondary Major roads were redefined based on bus routes, school locations, and traffic volumes.

To better evaluate the effectiveness of the new maps this winter season, the city will employ GPS receivers in each vehicle, which will gather data that can be reviewed after each event or at the end of the season to determine efficiencies lost or gained. Temperature gages will be purchased this season to make available the ambient air and road surface temperatures, which affects the use of salt. Snow fence will be placed in three known problematic snow drift areas, and if found effective, additional areas may be considered next season.

This plan is intended for review each season to identify our strengths and weaknesses so that adjustments can be made to improve efficiencies and our ability to provide the citizens of the City of Flint with responsive snow and ice control service.

MDOT WINTER MAINTENANCE APPLICATION RATES: (SOLIDS)

Recommended Treatment Parameters

AIR TEMP	PAVEMENT TEMPERATURE	WEATHER CONDITION	POUNDS PER 2 LANE MILE		ACTIONS & APPLICATION RECOMMENDED
			PRE WET SALT *	SAND	
RISING	↑ ABOVE 30°	SNOW	150	*NOT RECOMMENDED*	PLOW, TREAT HAZARDS ONLY
		FREEZING RAIN	150	*NOT RECOMMENDED*	APPLY AS NEEDED
DROPPING	↓	SNOW	150-300	*NOT RECOMMENDED*	PLOW & APPLY AS NEEDED
		FREEZING RAIN	150-300	*NOT RECOMMENDED*	APPLY AS NEEDED
RISING	↑ 25° to 30°	SNOW	150-300	*NOT RECOMMENDED*	PLOW & APPLY AS NEEDED
		FREEZING RAIN	150-300	*NOT RECOMMENDED*	APPLY AS NEEDED
DROPPING	—	SNOW	150-300	*NOT RECOMMENDED*	PLOW & APPLY AS NEEDED
	↓	FREEZING RAIN	300-350	400	APPLY AS NEEDED
RISING	↓	SNOW / FREEZING RAIN	150-300	400	PLOW & APPLY AS NEEDED
	↑ 20° to 25°	SNOW	225-300	*NOT RECOMMENDED*	PLOW & APPLY AS NEEDED
DROPPING		FREEZING RAIN	300-350	400	APPLY AS NEEDED
RISING	↓	SNOW	225-300	*NOT RECOMMENDED*	PLOW & APPLY AS NEEDED
	↑ 15° to 20°	FREEZING RAIN	300-350	500-750	APPLY AS NEEDED
DROPPING	↓	SNOW / FREEZING RAIN	350	500-750	PLOW & APPLY AS NEEDED
	BELOW 15°	SNOW	*NOT RECOMMENDED*	*NOT RECOMMENDED*	PLOW, TREAT HAZARDS AS NEEDED

FROST: 15° & RISING: TREAT BY ANTI-ICING (BRINE 20-40 GAL/LnMi) OR 15° & FALLING: PRE WET SALT @ 150#/LnMi.

WIND CONDITION: PLOW, TREAT (TROUBLE SPOTS ONLY) @ 200-400#/LnMi.

*** Note: Pre wet with 7-10 gallons of a liquid chloride product per ton of untreated salt. Rates shown account for a 25 mph truck operating speed, but also apply for trucks properly equipped with a Zero Velocity or Slurry Generator, operating up to 35 mph.**

Updated October 2013

CITY OF FLINT
SNOW REMOVAL
MAP #1

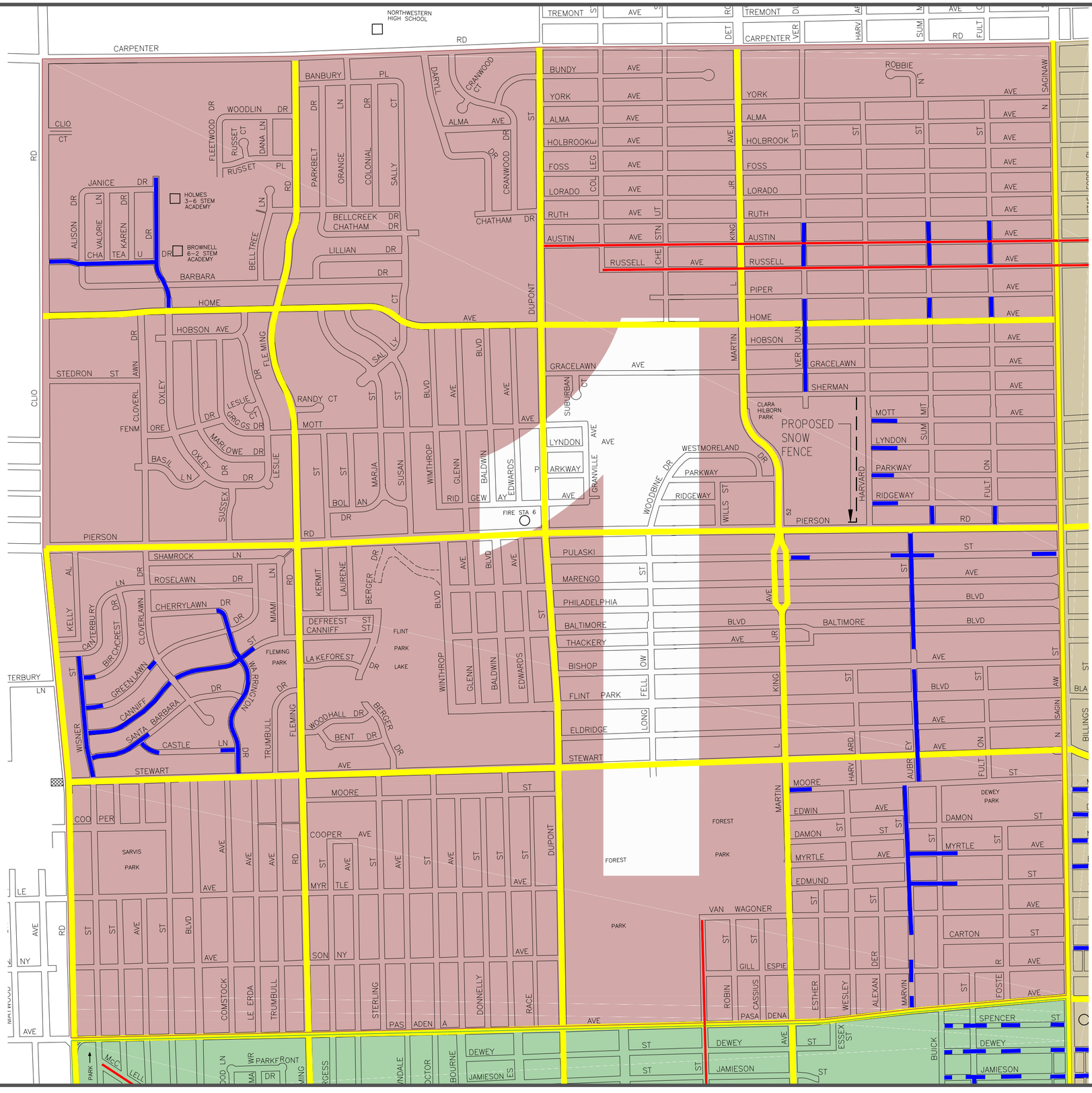
N

LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3



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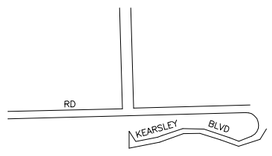
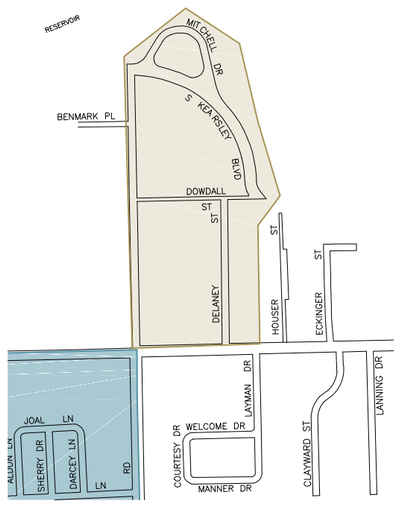
CITY OF FLINT
SNOW REMOVAL
MAP #2





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LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3

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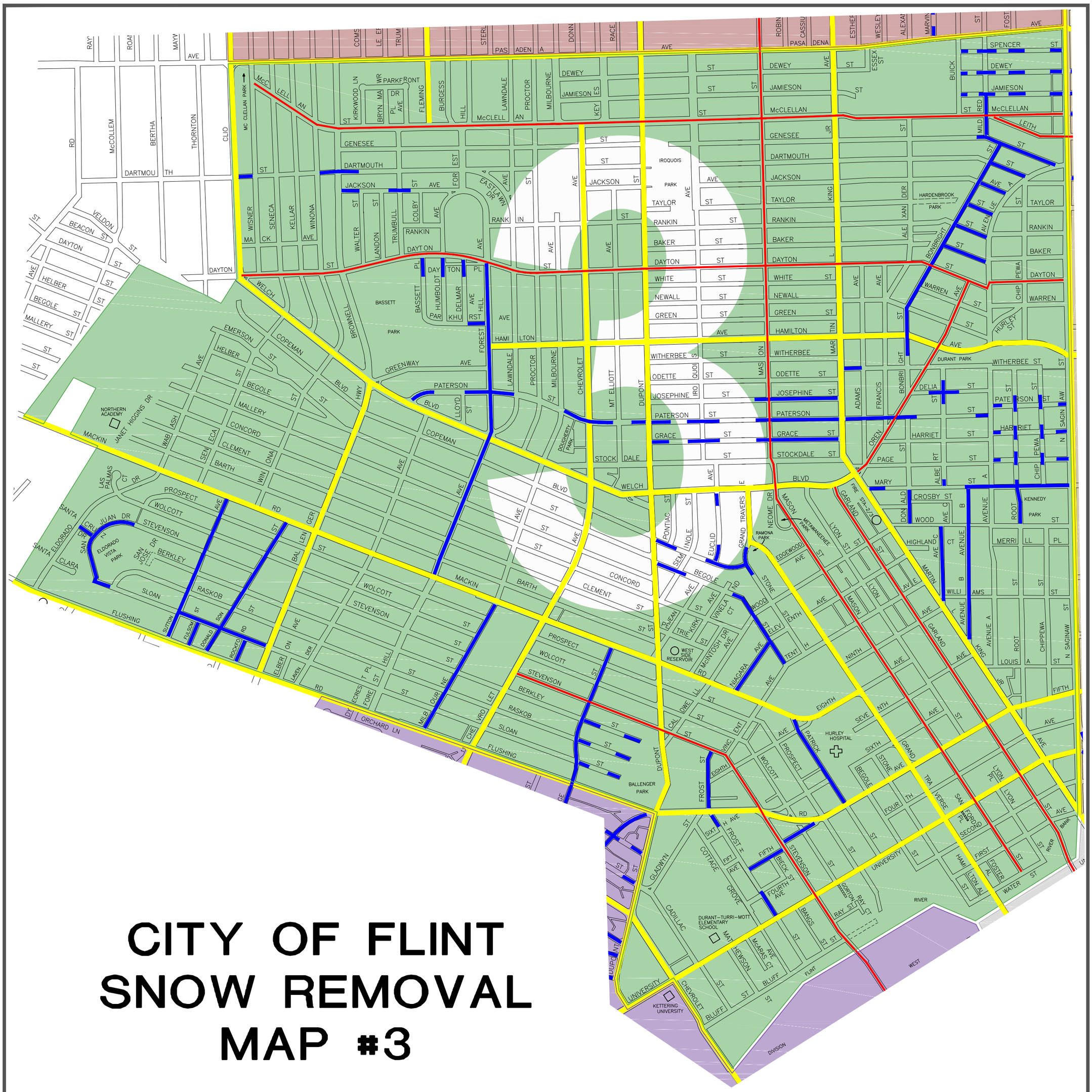
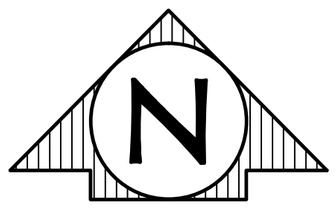
CITY OF FLINT
SNOW REMOVAL
MAP #3





LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3

CITY OF FLINT
SNOW REMOVAL
MAP #4

LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3

PROPOSED SNOW FENCE

POTTER ELEMENTARY SCHOOL

LONGWAY PARK

FIRE STA 10

FIRE STA 5

MOTT COMMUNITY COLLEGE

PIERCE ELEM SCHOOL

PIERCE PARK & GOLF COURSE

ST MARY SCHOOL

DELAWARE PARK

BROADWAY PARK

KEARSLEY PARK

BURROUGHS PARK

WOODLAWN PARK

POLK PARK

WHALEY PARK

AVONDALE CEMETERY

AVENTINE CEMETERY

PITKIN

AC ROCHESTER DIVISION EAST

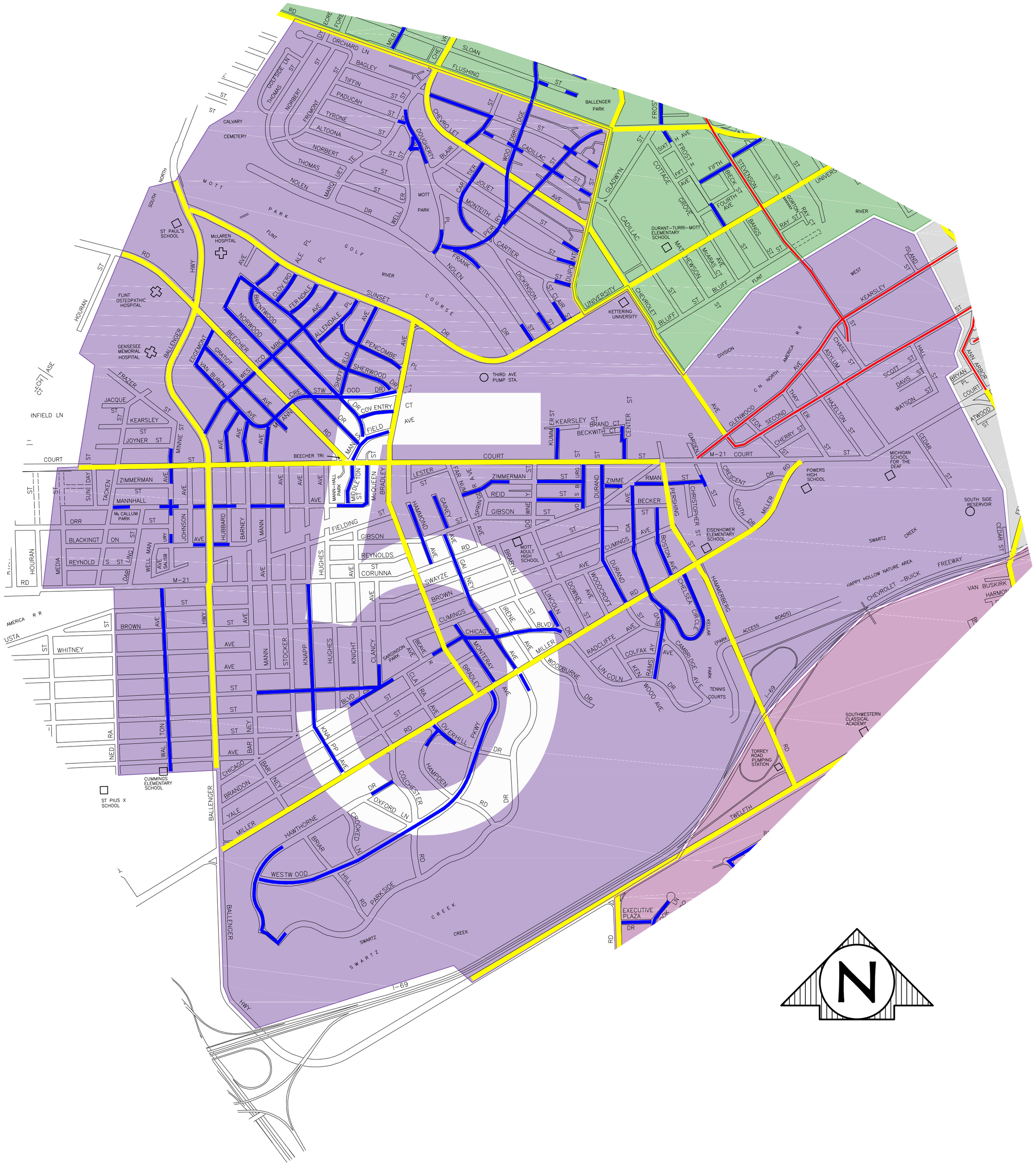
A C ROCHESTER

C N NORTH AMERICA R R

M-54

I-475

I-69



CITY OF FLINT
SNOW REMOVAL
MAP #5

CITY OF FLINT
SNOW REMOVAL
MAP #6

N

LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3

PROPOSED SNOW FENCE

STREET MAINTENANCE DIVISION CONSTRUCT LEAN-TO

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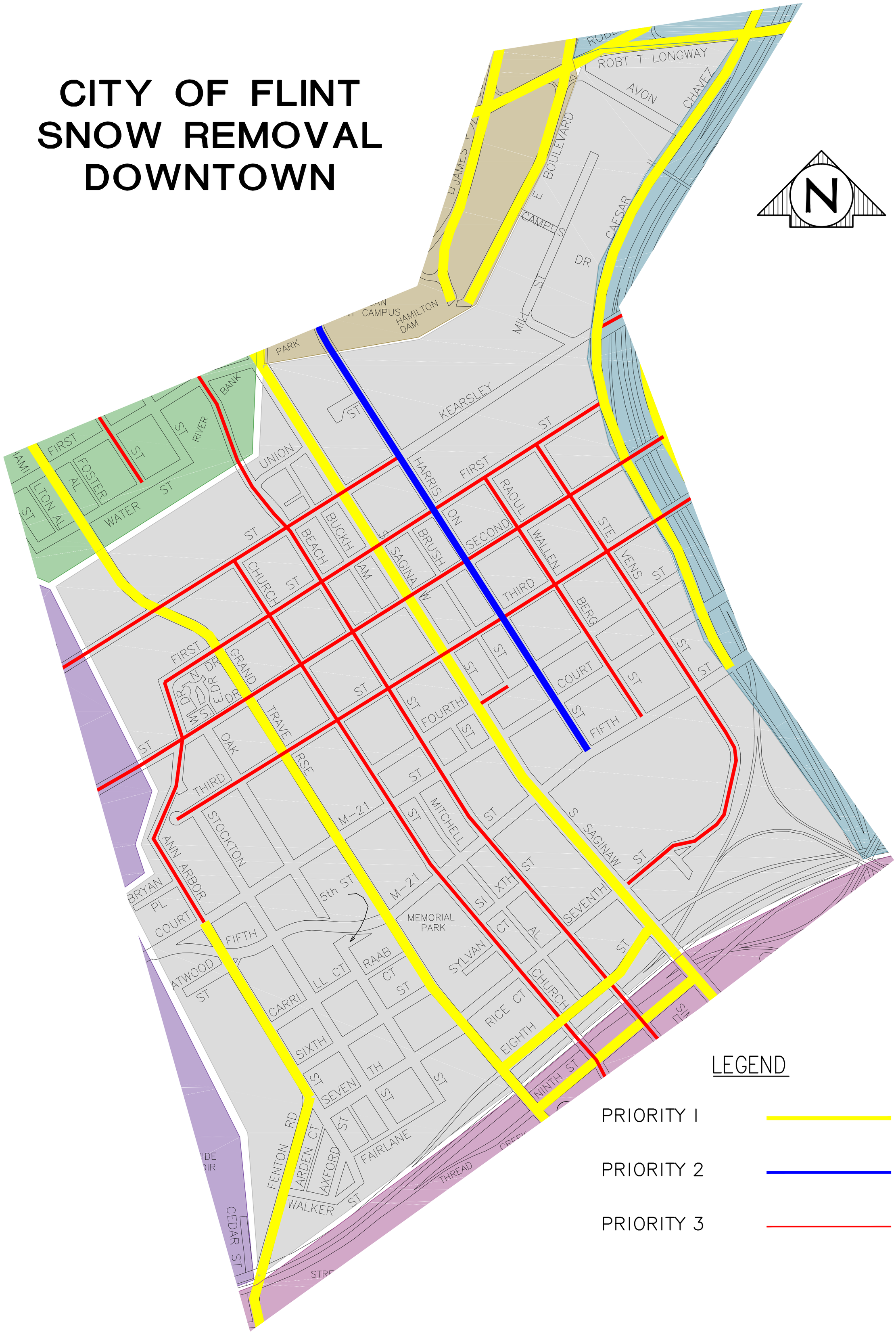
CITY OF FLINT
SNOW REMOVAL
DOWNTOWN



LEGEND

PRIORITY 1

PRIORITY 2

PRIORITY 3

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