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CITY OF ANOKA, MINNESOTA

CAPITAL IMPROVEMENT PLAN

2018 - 2022

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INTRODUCTION AND PURPOSE

The Capital Improvement Plan (CIP) is a flexible plan based upon long-range planning and financial projections, which schedules the major public improvements that may be incurred by the City over the next five years. Flexibility of the CIP is established through annual review and revision, if necessary. The annual review assures that the program will become a continuing part of the budgetary process and that it will be consistent with changing demands as well as changing patterns in cost and financial resources. Funds are appropriated only for the first year of the program, which is then included in the annual budget.

The CIP serves as a tool for implementing certain aspects of the City's comprehensive plan, therefore, the program describes the overall objectives of City development, the relationship between projects with respect to timing and need, and the City's fiscal capabilities.

The CIP can help assure:

A systematic approach to planning and initiating capital projects affording the opportunity to plan the location, timing and financing of needed public improvements;

The development of a realistic program of capital spending within the City's projected fiscal capability to finance such projects, avoiding sharp change in the tax levy;

The coordination of public and private improvement projects permitting adequate time for design and engineering to eliminate duplication of effort and expense;

The expenditure of public funds that are compatible with the City's adopted Comprehensive Plan;

That the public is kept informed of the proposed future projects and expenditures;

That private investors are aware of the City's long-range development program so that they may guide their development in a way that is compatible with the City's program;

Aid in achieving federal, state and/or county participation by providing the necessary planning and lead time for successful application for grants.

PROGRAM DESCRIPTIONS

In order to effectively plan for and manage the projects contained in a CIP, it is necessary to group similar activities in "Program Categories". The City of Anoka's activities are divided into five program categories which are; 1) Utilities, 2) Transportation, 3) Parks, Cemetery and Aquatics, 4) General Public Buildings, 5) Community Development. The City also includes an outline of proposed expenditures for unscheduled projects. Program categories are explained in the following sections.

UTILITIES PROGRAM

Program Description: The Utilities Program includes the municipal water, sanitary sewer, storm sewer and electric systems.

Program goal: Provide reliable, efficient and safe utility service to all parts of the city with a minimum of adverse effects on the environment.

Municipal Water System

- A. The goal of the water system is to provide water in sufficient quantities at sufficient pressure, with a high degree of reliability and safety to all parts of the City so as to satisfy the normal demands of the general public for water while at the same time providing sufficient reserves in case of fire emergency or power outages.
- B. Water quality shall meet the purity standards of the Minnesota Department of Health.

- C. Any hydrant on the system shall, under maximum condition, deliver no less than 500 gallons per minute with a residential pressure of 20 pounds per square inch.
- D. The system shall be looped to provide maximum reliability.
- E. The supply and storage system shall be designed and maintained to have maximum reliability.

Municipal Sanitary Sewer System

- A. The goal of the sanitary sewer system is to promote a healthful environment by collecting all sewage from existing and projected development in a sanitary and economic manner.
- B. Provide sewer lines of adequate size and grade to collect and transmit all discharge sewage.
- C. Prevent sewage from overflowing into the natural environment.
- D. Prevent sewage back-ups.
- E. Encourage and promote connection of all generators of sewage to the municipal system.
- F. Meet the effluent and infiltration standards of the Metropolitan Waste Control Commission.

Storm Sewer System

- A. Manage and control surface and ground water in order to protect the man-made and natural environment in a safe and efficient manner.
- B. Prevent flooding.
- C. Prevent damage to property due to erosion.
- D. Meet water quality standards established by the controlling regulatory law or authority.

Electric System

- A. Provide safe and reliable access to electrical power for current and future customers of the electric utility through proper infrastructure and facilities.
- B. Purchase electric power through its membership in the Minnesota Municipal Power Association.
- C. Manage electric power distribution to prevent brown outs and electric shortages.

TRANSPORTATION PROGRAM

Program Description: This includes streets, sidewalks, traffic signs and signals, vehicular parking facilities and street lighting.

Program goal: Provide for the safe and efficient movement of people and goods throughout the city.

Streets

- A. The goal of the street program is to provide safe, convenient, economic public streets to best facilitate the movement of vehicular traffic.
- B. Streets should be constructed with permanent surfaces, concrete curb and gutter, and with ancillary storm drainage, to standards established by the City.
- C. Streets should be of a size and load capacity consistent with their functional classifications.
- D. Timely major repair to preserve the basic capital investment in streets.

Sidewalks

- A. To provide a safe and convenient pedestrian system with incidental recreational benefits.

Signs/Signals

- A. To provide an efficient and orderly system of street and traffic signing so as to promote safe, convenient travel throughout the City.
- B. Signs and signals should be installed in conformity with the Minnesota Manual on Uniform Traffic Control Devices.
- C. Periodic surveys and studies should be made to document the effectiveness of City signing patterns.

Parking Facilities

- A. To provide such supporting facilities as will promote maximum use of public parking spaces by employers, employees, customers and visitors.

- B. Provide and maintain parking facilities for present and anticipated needs of the City of Anoka.

Street Lights

- A. Provide a system of street lighting within the City that will promote safe and convenient vehicular and pedestrian travel on City streets.
- B. Provide lighting at each street intersection within the city.
- C. Provide mid-block street lighting in conformance with the City's street lighting policy, in order to provide equitable cost efficient lighting.
- D. To continually update the system so as to provide energy and cost efficient lighting.

PARKS, CEMETERY, AQUATICS AND GOLF

Program Description: This includes community parks, neighborhood parks, open spaces, recreational structures and facilities and cemetery infrastructure.

Program goal: Provide facilities for the safe, stimulating and comprehensive leisure time activities for Anoka citizens and provide final resting places for residents of Anoka.

Neighborhood Facilities

- A. To provide convenient walking access to park sites and to develop such sites to provide optimum recreational serviceability consistent with the preservation and enhancement of pleasing aesthetic qualities.
- B. Acquire property or use rights on those neighborhoods that need convenient walking access to park facilities.
- C. Develop neighborhood park facilities to meet the needs of various user groups.
- D. Preserve and maintain existing structures and facilities in order to retain current service and safety levels.
- E. Preserve and enhance the aesthetic qualities of neighborhood parks.

Community facilities

- A. Provide park sites which serve the entire City and to provide facilities that serve community-wide needs.
- B. Acquire or maintain sites that have valuable and unique natural characteristics to preserve irreplaceable community resources.
- C. Preserve properties that have valuable historic-cultural qualities.
- D. Preserve and maintain existing structures and facilities in order to retain current service and safety levels.
- E. Construct or acquire structures and facilities necessary to meet the changing needs of the community.

Cemetery Infrastructure

- A. Provide cemetery plots sufficient to meet the demands of the residents of Anoka.
- B. Ensure safe access to the cemetery year round.
- C. Preserve and maintain current cemetery infrastructure and beauty.

Golf Course

- A. Provide 18-hole golf course for the enjoyment of residents, businesses and customers that participate in the sport of golf.
- B. Maintain and upgrade current facilities to provide a high quality golfing and community event and banquet facility.
- C. Maintain and improve current 18-hole golf course to provide customers with a quality golfing experience.

GENERAL PUBLIC BUILDINGS

Program Description: This includes buildings for governmental operations including administrative, public safety, public works, utilities and community programs.

Program goal: Provide facilities for efficient and effective operations of the city goals and objectives for Anoka residents, businesses and property owners.

Administrative Offices

- A. Provide facilities for the efficient and safe conduct of legislative and administrative functions of the City.
- B. Maintain current facilities in a state of good repair so as to maximize cost effectiveness and avoid costly repair.
- C. Upgrade facilities as necessary to provide for the efficient, safe and effective provision of City services.

Maintenance Facilities

- A. Provide facilities for the efficient and safe conduct of City maintenance functions.
- B. Maintain current facilities in a state of good repair so as to maximize cost effectiveness and avoid costly repair.
- C. Upgrade facilities as necessary to provide for the efficient, safe and effective provision of City services.
- D. Provide public services with adequate storage space for equipment to ensure longevity and maximum use of equipment.

Public Safety Facilities

- A. Provide facilities for the efficient and safe conduct of City public safety functions.
- B. Maintain current facilities in a state of good repair so as to maximize cost effectiveness and avoid costly repair.
- C. Upgrade facilities as necessary to provide for the efficient, safe and effective provision of City services.
- D. Provide police and fire station for storage of police and fire equipment and for training and meetings of police and fire fighters to ensure prompt and efficient protection of life and property.

Senior and Aquatic Center

- A. Provide community facilities which meet the social, recreational and cultural needs of youth and senior citizens.
- B. Maintain current facilities in a state of good repair so as to maximize cost effectiveness and avoid costly repair.

- C. Upgrade facilities as necessary to provide for the efficient, safe and effective provision of City services.

COMMUNITY DEVELOPMENT

Program Description: This includes development and redevelopment throughout the city.

Program goal: Develop and redevelop properties to provide employment opportunities, improve housing, improve transportation and eliminate blight.

Commuter Rail Transit Village

- A. Provide parking facilities for travelers on the North Star train.
- B. Add tax exempt properties to tax roles.
- C. Redevelop and eliminate blighted properties.

Enterprise Park

- A. Funding source for repayment of outstanding debt from development and redevelopment throughout the city.

Greens of Anoka

- A. Convert city owned land to private development.
- B. Redevelop and eliminate blighted properties.
- C. Provide alternative road for pass thru traffic off from highway 10.

Historic Rum River

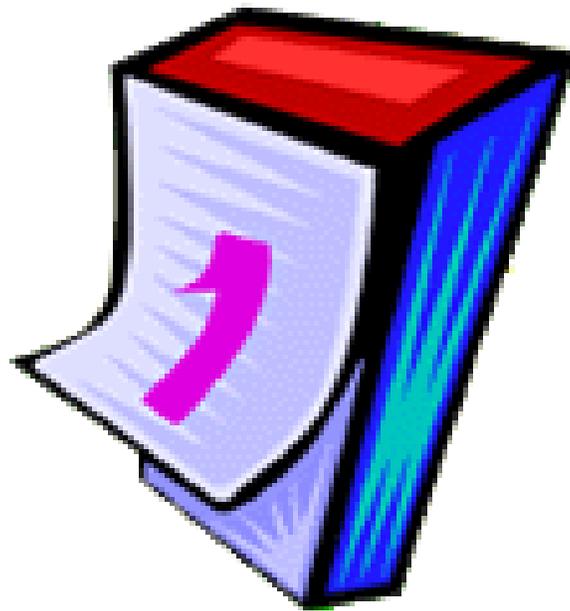
- A. Redevelop downtown to provide higher density housing.
- B. Provide public parking to service the downtown businesses.
- C. Provide additional employment opportunities downtown.

South Ferry

- A. Upgrade public infrastructure.
- B. Enhance gateway to the city through redevelopment.
- C. Redefine land use for this high traffic area.
- D. Facilitate building rehabilitation.

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FIVE YEAR SUMMARY



City of Anoka, Minnesota
Capital Improvement Plan
2018 thru 2022

PROJECTS BY YEAR

Project Name	Department	Project #	Priority	Project Cost
2018				
Boat Slide Replacement	Aquatic Center	AC16-03	n/a	70,000
Lobby Remodel	Aquatic Center	AC17-01	n/a	25,000
Signage	Cemetery	CEM17-02	3	30,000
Commuter Rail Transit Village	Community Development	CD-10-01	3	500,000
Rebuild Distribution Lines	Electric Utility	EU14-03	n/a	500,000
Construct circuits from Garfield Substation	Electric Utility	EU15-03	n/a	550,000
Champlin Mississippi Crossing	Electric Utility	EU15-04	n/a	1,000,000
CRTV Development	Engineering	EN-09-02	3	150,000
2018 Street Renewal	Engineering	EN-15-09	3	1,688,000
Green Haven Parkway Phase II	Engineering	EN-16-05	2	1,000,000
Fairoak Avenue Signal Removal Project	Engineering	EN-16-07	2	360,000
TH-47 Anoka Solution	Engineering	EN-18-01	3	120,000
Entrance Monument - E Main St	Engineering	EN18-02	4	5,000
North Street Reconstruction	Engineering	EN18-03	2	1,476,000
Greenhaven - Repaint Clubhouse Exterior	Greenhaven Golf Course	BM-GH-004	5	70,000
Cart Path	Greenhaven Golf Course	GC14-21	4	23,400
Outdoor Ceremony Site	Greenhaven Golf Course	GC17-03	5	30,000
Install Glass Doors on Grille	Greenhaven Golf Course	GC17-09	4	4,000
Install Grand Wood Doors to Entrance	Greenhaven Golf Course	GC17-10	5	8,000
East Store Expansion	Liquor Stores	LQ18-01	3	2,000,000
Riverfront Park - HRRD Construction	Parks and Recreation	PR06-26	3	140,000
Anoka Station Parks and Greenspaces	Parks and Recreation	PR06-48	4	50,000
Emerald Ash Borer, Removal of Trees	Parks and Recreation	PR09-23	1	100,000
Playground Rehab/Repair	Parks and Recreation	PR15-01	3	25,000
West Rum River Trail	Parks and Recreation	PR15-06	3	80,000
Mississippi Park Planter Beds & Sign	Parks and Recreation	PR17 - 07	n/a	35,000
Trail System Repairs	Parks and Recreation	PR17-04	n/a	55,000
Rudy Johnson Park	Parks and Recreation	PR17-08	n/a	35,000
Sunny Acres Tennis Courts	Parks and Recreation	PR18-02	3	50,000
PD Parking Expansion	Police	PD18-01	2	50,000
Southeast Trunk Storm Sewer Improvements	Storm Utility	SW-16-01	3	125,000
Main Street Bridge Repair/Maintenance	Streets	ST 15-04	3	161,600
Sign Blanket Replacement	Streets	ST 15-05	3	117,000
Sidewalk Extensions	Streets	ST 20-01	3	20,000
Well Inspection and Repair	Water Utility	WU-008	3	50,000
7th Av Watermain Lining	Water Utility	WU-027	3	61,000
Total for 2018				10,764,000
2019				
Rebuild Distribution Lines	Electric Utility	EU14-03	n/a	800,000
Construct circuits from Garfield Substation	Electric Utility	EU15-03	n/a	550,000
CRTV Development	Engineering	EN-09-02	3	150,000
2019 Street Renewal	Engineering	EN-15-03	3	1,853,640
Rum River Dam Modification Project	Engineering	EN-16-02	2	200,000

Project Name	Department	Project #	Priority	Project Cost
Green Haven Parkway Phase II	Engineering	EN-16-05	2	1,000,000
Fairoak Avenue Signal Removal Project	Engineering	EN-16-07	2	500,000
CSAH 7 / 43rd Avenue Intersection	Engineering	EN-17-02	3	550,000
TH-47 Anoka Solution	Engineering	EN-18-01	3	80,000
Entrance Monument - E Main St	Engineering	EN18-02	4	30,000
New Partitions in Banquet Rooms	Greenhaven Golf Course	GC14-02	5	49,000
Anoka Nature Preserve Park Development	Parks and Recreation	PR06-41	3	200,000
Emerald Ash Borer, Removal of Trees	Parks and Recreation	PR09-23	1	100,000
Rum River Trail Connection-4th Ave. & Pleasant St.	Parks and Recreation	PR10-01	3	191,300
Playground Rehab/Repair	Parks and Recreation	PR15-01	3	25,000
Trail System Repairs	Parks and Recreation	PR17-04	n/a	40,000
Rudy Johnson Park	Parks and Recreation	PR17-08	n/a	175,000
Mississippi Park Shoreline Restoration	Parks and Recreation	PR18-05	n/a	50,000
John Ward Bathroom Reconstruction	Parks and Recreation	PR20 - 01	3	250,000
Southeast Trunk Storm Sewer Improvements	Storm Utility	SW-16-01	3	55,000
Trunk Storm Sewer Improvements	Storm Utility	SW-16-02	3	250,000
Sign Blanket Replacement	Streets	ST 15-05	3	117,000
Sidewalk Extentions	Streets	ST 20-01	3	5,000
Water Treatment Plant # 3 Exterior Repairs	Water Utility	WU-003	3	80,000
Expansion of Water Treatment Plant 6 & 8	Water Utility	WU-024	2	1,000,000
7th Av Watermain Lining	Water Utility	WU-027	3	304,000
Total for 2019				8,604,940

2020

New ADA Wheel-Chair Lift @ City Hall	Buildings	BM-CH-018	2	30,000
Walker Parking Ramp - Joint Caulking	Buildings	BM-MB-012	3	25,000
Public Services - Exterior Painting	Buildings	BM-PW-002	2	65,000
Public Works - Fire Alarms	Buildings	BM-PW-004	4	35,000
Re-Roof Public Services Building	Buildings	BM-PW-012	2	190,000
City Hall-Main Building Reroofing	Buildings	PWBM-CH-011	3	270,000
Decorative Fence	Cemetery	CEM17-03	5	25,000
Bunker/Thurston Redevelopment	Community Development	CD-08-2	4	25,000
NCBD phase III	Community Development	CD-08-3	3	25,000
Rebuild Distribution Lines	Electric Utility	EU14-03	n/a	400,000
Rum River Dam Gate Maintenance	Engineering	EN-09-04	n/a	158,000
Rum River Dam Modification Project	Engineering	EN-16-02	2	6,120,000
Green Haven Parkway Phase II	Engineering	EN-16-05	2	500,000
Fairoak Avenue Signal Removal Project	Engineering	EN-16-07	2	7,840,000
2020 Street Renewal	Engineering	EN-16-10	3	1,746,720
2nd Avenue - Building Site #2 parking Lot	Parking	BM-009	4	54,000
Anoka Nature Preserve Park Development	Parks and Recreation	PR06-41	3	45,000
Reconstruction of Park Buildings Johnson/Sorenson	Parks and Recreation	PR06-44	5	250,000
Anoka Station Parks and Greenspaces	Parks and Recreation	PR06-48	4	150,000
Emerald Ash Borer, Removal of Trees	Parks and Recreation	PR09-23	1	100,000
Sunny Acres Park Improvement Project	Parks and Recreation	PR12-03	3	200,000
7th Avenue Trailway	Parks and Recreation	PR15-05	4	15,000
West Rum River Trail	Parks and Recreation	PR15-06	3	100,000
Rum River Trail - Riverbank Stabilization	Parks and Recreation	PR16 - 01	3	150,000
Trail System Repairs	Parks and Recreation	PR17-04	n/a	40,000
8 1/2 Av Lift Station	Sanitary Utility	SW-016	n/a	150,000
Trunk Storm Sewer Improvements	Storm Utility	SW-16-02	3	100,000
Sign Blanket Replacement	Streets	ST 15-05	3	40,000
Sidewalk Extentions	Streets	ST 20-01	3	31,400
Well Inspection and Repair	Water Utility	WU-008	3	50,000
Expansion of Water Treatment Plant 6 & 8	Water Utility	WU-024	2	4,521,000

Project Name	Department	Project #	Priority	Project Cost
Total for 2020				23,451,120
2021				
Decorative Fence	Cemetery	CEM17-03	5	125,000
2021 SRP - Swede Town	Engineering	EN-16-04	3	1,775,000
Fairoak Avenue Signal Removal Project	Engineering	EN-16-07	2	31,400,000
South Frontage Road Phase I	Engineering	EN-16-08	2	100,000
West store relocation	Liquor Stores	LQ18-02	3	2,500,000
2nd Avenue - Building Site #2 parking Lot	Parking	BM-009	4	306,800
Riverfront Park - HRRD Construction	Parks and Recreation	PR06-26	3	1,806,000
Anoka Nature Preserve Park Development	Parks and Recreation	PR06-41	3	260,000
Emerald Ash Borer, Removal of Trees	Parks and Recreation	PR09-23	1	100,000
John Ward Park Drainage Enhancement Project	Parks and Recreation	PR12-01	4	160,000
RRSN Trailway Connections	Parks and Recreation	PR15-04	3	80,000
7th Avenue Trailway	Parks and Recreation	PR15-05	4	200,000
West Rum River Trail	Parks and Recreation	PR15-06	3	560,000
Sign Blanket Replacement	Streets	ST 15-05	3	40,000
Total for 2021				39,412,800
2022				
City Hall - Tuck point exterior walls	Buildings	BM-CH-011	3	75,000
Safety Center - Masonry Cleaning	Buildings	BM-PD-001	4	25,000
2022 Street Renewal	Engineering	EN-15-06	3	1,892,075
South Frontage Road Phase I	Engineering	EN-16-08	2	250,000
TH-47 Anoka Solution	Engineering	EN-18-01	3	25,000,000
Utility Expansion/Extension @ TH-47 & BNSF	Engineering	EN-19-01	2	199,000
Riverfront Park - HRRD Construction	Parks and Recreation	PR06-26	3	1,890,000
Anoka Enterprise Park Trail connection	Parks and Recreation	PR14-01	n/a	50,000
Kings Island Improvements - Phase II	Parks and Recreation	PR14-04	4	10,000
West Rum River Trail	Parks and Recreation	PR15-06	3	560,000
Power Gate System # 1	Public Works	MP-065	2	20,000
Industrial Blvd Sewer Extension	Sanitary Utility	SW-014	3	60,000
Rum River Pedestrian Bridge Coating Project	Streets	ST 15-06	4	200,000
Well Inspection and Repair	Water Utility	WU-008	3	50,000
Reconditioning of Water Tower 2 (Industrial Park)	Water Utility	WU-036	3	1,200,000
Total for 2022				31,481,075
GRAND TOTAL				113,713,935

City of Anoka, Minnesota
Capital Improvement Plan
 2018 thru 2022

PROJECTS BY FUNDING SOURCE

Source	Project #	Priority	2018	2019	2020	2021	2022	Total
Capital Improvement fund								
City Hall - Tuck point exterior walls	BM-CH-011	3					75,000	75,000
Greenhaven - Repaint Clubhouse Exterior	BM-GH-004	5	70,000					70,000
Public Services - Exterior Painting	BM-PW-002	2			65,000			65,000
New Partitions in Banquet Rooms	GC14-02	5		49,000				49,000
Outdoor Ceremony Site	GC17-03	5	30,000					30,000
Install Grand Wood Doors to Entrance	GC17-10	5	8,000					8,000
Power Gate System # 1	MP-065	2					20,000	20,000
Riverfront Park - HRRD Construction	PR06-26	3				100,000		100,000
Reconstruction of Park Buildings Johnson/Sorenson	PR06-44	5			250,000			250,000
John Ward Bathroom Reconstruction	PR20 - 01	3		250,000				250,000
City Hall-Main Building Reroofing	PWBM-CH-011	3			270,000			270,000
Capital Improvement fund Total			108,000	299,000	585,000	100,000	95,000	1,187,000
Cemetary fund								
Signage	CEM17-02	3	30,000					30,000
Decorative Fence	CEM17-03	5			25,000	125,000		150,000
Cemetary fund Total			30,000		25,000	125,000		180,000
Electric								
Re-Roof Public Services Building	BM-PW-012	2			190,000			190,000
2019 Street Renewal	EN-15-03	3		173,935				173,935
2022 Street Renewal	EN-15-06	3					315,345	315,345
2018 Street Renewal	EN-15-09	3	238,030					238,030
2021 SRP - Swede Town	EN-16-04	3				244,545		244,545
2020 Street Renewal	EN-16-10	3			291,120			291,120
North Street Reconstruction	EN18-03	2	246,000					246,000
Rebuild Distribution Lines	EU14-03	n/a	500,000	800,000	400,000			1,700,000
Construct circuits from Garfield Substation	EU15-03	n/a	550,000	550,000				1,100,000
Champlin Mississippi Crossing	EU15-04	n/a	1,000,000					1,000,000
Electric Total			2,534,030	1,523,935	881,120	244,545	315,345	5,498,975
General Fund								
Boat Slide Replacement	AC16-03	n/a	70,000					70,000
Lobby Remodel	AC17-01	n/a	25,000					25,000
2nd Avenue - Building Site #2 parking Lot	BM-009	4			54,000	306,800		360,800
New ADA Wheel-Chair Lift @ City Hall	BM-CH-018	2			30,000			30,000
Safety Center - Masonry Cleaning	BM-PD-001	4					25,000	25,000
Public Works - Fire Alarms	BM-PW-004	4			35,000			35,000
Entrance Monument - E Main St	EN18-02	4	5,000	30,000				35,000
Install Glass Doors on Grille	GC17-09	4	4,000					4,000

Source	Project #	Priority	2018	2019	2020	2021	2022	Total
PD Parking Expansion	PD18-01	2	50,000					50,000
Emerald Ash Borer, Removal of Trees	PR09-23	1	100,000	100,000	100,000	100,000		400,000
Playground Rehab/Repair	PR15-01	3	25,000	25,000				50,000
Rum River Trail - Riverbank Stabilization	PR16 - 01	3			30,000			30,000
Mississippi Park Planter Beds & Sign	PR17 - 07	n/a	35,000					35,000
Trail System Repairs	PR17-04	n/a	55,000	40,000	40,000			135,000
Sign Blanket Replacement	ST 15-05	3	117,000	117,000	40,000	40,000		314,000
Sidewalk Extentions	ST 20-01	3	20,000	5,000	31,400			56,400
General Fund Total			506,000	317,000	360,400	446,800	25,000	1,655,200
General Obligation Bonds								
Riverfront Park - HRRD Construction	PR06-26	3				1,706,000	1,507,000	3,213,000
Anoka Nature Preserve Park Development	PR06-41	3				260,000		260,000
General Obligation Bonds Total						1,966,000	1,507,000	3,473,000
Golf Fund								
Cart Path	GC14-21	4	23,400					23,400
Golf Fund Total			23,400					23,400
Grants								
Fairoak Avenue Signal Removal Project	EN-16-07	2			7,050,000	31,400,000		38,450,000
TH-47 Anoka Solution	EN-18-01	3					25,000,000	25,000,000
Riverfront Park - HRRD Construction	PR06-26	3					233,000	233,000
Anoka Nature Preserve Park Development	PR06-41	3		20,000				20,000
Rum River Trail Connection-4th Ave. & Pleasant St.	PR10-01	3		100,000				100,000
West Rum River Trail	PR15-06	3				500,000	500,000	1,000,000
Rum River Trail - Riverbank Stabilization	PR16 - 01	3			120,000			120,000
Grants Total			100,000	7,190,000	31,900,000	25,733,000		64,923,000
Municipal State Aid								
2019 Street Renewal	EN-15-03	3		810,000				810,000
2018 Street Renewal	EN-15-09	3	261,300					261,300
2021 SRP - Swede Town	EN-16-04	3				306,200		306,200
Municipal State Aid Total			261,300	810,000		306,200		1,377,500
Outside Sources								
Rum River Dam Modification Project	EN-16-02	2		200,000	6,120,000			6,320,000
CSAH 7 / 43rd Avenue Intersection	EN-17-02	3		550,000				550,000
North Street Reconstruction	EN18-03	2	1,120,000					1,120,000
Riverfront Park - HRRD Construction	PR06-26	3					150,000	150,000
Anoka Nature Preserve Park Development	PR06-41	3		100,000				100,000
Outside Sources Total			1,120,000	850,000	6,120,000		150,000	8,240,000
Park Capital Improvement fund								
Anoka Station Parks and Greenspaces	PR06-48	4	50,000					50,000
Sunny Acres Park Improvement Project	PR12-03	3			200,000			200,000

Source	Project #	Priority	2018	2019	2020	2021	2022	Total
Anoka Enterprise Park Trail connection	PR14-01	n/a					50,000	50,000
Kings Island Improvements - Phase II	PR14-04	4					10,000	10,000
7th Avenue Trailway	PR15-05	4			15,000	200,000		215,000
West Rum River Trail	PR15-06	3	80,000		100,000	60,000	60,000	300,000
Rudy Johnson Park	PR17-08	n/a	35,000	175,000				210,000
Sunny Acres Tennis Courts	PR18-02	3	50,000					50,000
Mississippi Park Shoreline Restoration	PR18-05	n/a		50,000				50,000
Park Capital Improvement fund Total			215,000	225,000	315,000	260,000	120,000	1,135,000
Park Dedication fund								
Anoka Nature Preserve Park Development	PR06-41	3		100,000	25,000			125,000
Anoka Station Parks and Greenspaces	PR06-48	4			150,000			150,000
Rum River Trail Connection-4th Ave. & Pleasant St.	PR10-01	3		91,300				91,300
RRSN Trailway Connections	PR15-04	3				80,000		80,000
Park Dedication fund Total				191,300	175,000	80,000		446,300
Parking fund								
Walker Parking Ramp - Joint Caulking	BM-MB-012	3			25,000			25,000
Parking fund Total					25,000			25,000
Revenue Bonds								
East Store Expansion	LQ18-01	3	2,000,000					2,000,000
West store relocation	LQ18-02	3				2,500,000		2,500,000
Revenue Bonds Total			2,000,000			2,500,000		4,500,000
Sanitary Sewer Fund								
2019 Street Renewal	EN-15-03	3		181,200				181,200
2022 Street Renewal	EN-15-06	3					234,780	234,780
2018 Street Renewal	EN-15-09	3	208,170					208,170
2021 SRP - Swede Town	EN-16-04	3				158,925		158,925
2020 Street Renewal	EN-16-10	3			144,100			144,100
North Street Reconstruction	EN18-03	2	29,000					29,000
Utility Expansion/Extension @ TH-47 & BNSF	EN-19-01	2					124,000	124,000
Industrial Blvd Sewer Extension	SW-014	3					60,000	60,000
8 1/2 Av Lift Station	SW-016	n/a			150,000			150,000
Sanitary Sewer Fund Total			237,170	181,200	294,100	158,925	418,780	1,290,175
Special Assessments								
2019 Street Renewal	EN-15-03	3		386,175				386,175
2022 Street Renewal	EN-15-06	3					394,180	394,180
2018 Street Renewal	EN-15-09	3	351,665					351,665
2021 SRP - Swede Town	EN-16-04	3				369,475		369,475
2020 Street Renewal	EN-16-10	3			363,900			363,900
Special Assessments Total			351,665	386,175	363,900	369,475	394,180	1,865,395
Stormwater Utility Fund								

Source	Project #	Priority	2018	2019	2020	2021	2022	Total
Rum River Dam Gate Maintenance	EN-09-04	n/a			158,000			158,000
2019 Street Renewal	EN-15-03	3		9,650				9,650
2022 Street Renewal	EN-15-06	3					364,200	364,200
2018 Street Renewal	EN-15-09	3	294,390					294,390
2021 SRP - Swede Town	EN-16-04	3				348,365		348,365
2020 Street Renewal	EN-16-10	3			322,140			322,140
John Ward Park Drainage Enhancement Project	PR12-01	4				160,000		160,000
Southeast Trunk Storm Sewer Improvements	SW-16-01	3	125,000	55,000				180,000
Trunk Storm Sewer Improvements	SW-16-02	3		250,000	100,000			350,000
Stormwater Utility Fund Total			419,390	314,650	580,140	508,365	364,200	2,186,745

Street Renewal Fund

2019 Street Renewal	EN-15-03	3		0				0
2022 Street Renewal	EN-15-06	3					293,425	293,425
2018 Street Renewal	EN-15-09	3	77,180					77,180
2021 SRP - Swede Town	EN-16-04	3				77,975		77,975
Fairoak Avenue Signal Removal Project	EN-16-07	2	360,000	500,000	790,000			1,650,000
South Frontage Road Phase I	EN-16-08	2				100,000	250,000	350,000
2020 Street Renewal	EN-16-10	3			343,945			343,945
TH-47 Anoka Solution	EN-18-01	3	120,000	80,000				200,000
Riverfront Park - HRRD Construction	PR06-26	3	140,000					140,000
Main Street Bridge Repair/Maintenance	ST 15-04	3	161,600					161,600
Rum River Pedestrian Bridge Coating Project	ST 15-06	4					200,000	200,000
Street Renewal Fund Total			858,780	580,000	1,133,945	177,975	743,425	3,494,125

Tax Increment Funds

Bunker/Thurston Redevelopment	CD-08-2	4			25,000			25,000
NCBD phase III	CD-08-3	3			25,000			25,000
Commuter Rail Transit Village	CD-10-01	3	500,000					500,000
CRTV Development	EN-09-02	3	150,000	150,000				300,000
Green Haven Parkway Phase II	EN-16-05	2	1,000,000	1,000,000	500,000			2,500,000
Tax Increment Funds Total			1,650,000	1,150,000	550,000			3,350,000

Water Fund

2019 Street Renewal	EN-15-03	3		292,680				292,680
2022 Street Renewal	EN-15-06	3					290,145	290,145
2018 Street Renewal	EN-15-09	3	257,265					257,265
2021 SRP - Swede Town	EN-16-04	3				269,515		269,515
2020 Street Renewal	EN-16-10	3			281,515			281,515
North Street Reconstruction	EN18-03	2	81,000					81,000
Utility Expansion/Extension @ TH-47 & BNSF	EN-19-01	2					75,000	75,000
Water Treatment Plant # 3 Exterior Repairs	WU-003	3		80,000				80,000
Well Inspection and Repair	WU-008	3	50,000		50,000		50,000	150,000
Expansion of Water Treatment Plant 6 & 8	WU-024	2		1,000,000	4,521,000			5,521,000
7th Av Watermain Lining	WU-027	3	61,000	304,000				365,000
Reconditioning of Water Tower 2 (Industrial Park)	WU-036	3					1,200,000	1,200,000
Water Fund Total			449,265	1,676,680	4,852,515	269,515	1,615,145	8,863,120

PROPOSED EXPENDITURES FOR FUTURE PROJECTS



City of Anoka, Minnesota
Capital Improvement Plan
2023 thru 2027

PROJECTS BY CATEGORY

Category	Project #	Priority	2023	2024	2025	2026	2027	Total
General Public Buildings								
City Hall - Exterior Reseal	BM-CH-001	3				45,000		45,000
Public Service & Electric Building Relocation	BM-PW-011	5	7,000,000	7,000,000				14,000,000
Senior Center - Cold Roof	BM-SC-001	3	40,000					40,000
Expand & Improve Deck on NW of Clubhouse	GC17-01	5			54,000			54,000
Expand & Improve Patio Overlooking on East Side	GC17-02	5			68,000			68,000
Fitness Facility in Lower Level	GC17-07	5			80,000			80,000
Move Golf Shop to Allow Bigger Grille	GC17-08	5			100,000			100,000
Grand Upper Entrance	GC17-15	5			706,733			706,733
City Hall Rehabilitation Project	PWBM-PW-010	3	1,330,000					1,330,000
General Public Buildings Total			8,370,000	7,000,000	1,008,733	45,000		16,423,733
Parks and Recreation Facilities								
Riverfront Park - HRRD Construction	PR06-26	3	870,000		624,000			1,494,000
Rum River Pedestrian Bridge - repaint	PR06-31	3	150,000					150,000
Seal Coating Park Trails	PR06-35	3		125,000				125,000
Anoka Enterprise Park Trail connection	PR14-01	n/a	50,000					50,000
Kings Island Improvements - Phase II	PR14-04	4	160,000	150,000				310,000
West Rum River Trail	PR15-06	3	1,200,000					1,200,000
Brom Canoe Rest	PR17-06	n/a	30,000					30,000
Peninsula Point Park Pedestrian Bridge	ST 15-02	3	750,000	5,250,000				6,000,000
Parks and Recreation Facilities Total			3,210,000	5,525,000	624,000			9,359,000
Public Utilities Facilities								
Reed Av Utility Improvements	EN-15-05	n/a	115,000	607,400				722,400
Garfield Street Infrastructure Project	EN-15-08	n/a		230,000	1,426,000			1,656,000
SRP - Highland Park Neighborhood	EN-16-06	3			3,301,200			3,301,200
Plant Exterior Repairs at Wells 4&5	WU-004	3	40,000					40,000
Well Inspection and Repair	WU-008	3		50,000		50,000		100,000
Install backwash Tanks 3, 4, 5, 6, 8	WU-020	5		600,000	600,000	600,000		1,800,000
Public Utilities Facilities Total			155,000	1,487,400	5,327,200	650,000		7,619,600
Streets and Roads								
Green Haven Parkway Phase III	EN-16-11	3	20,000	725,000	2,900,000			3,645,000
Streets and Roads Total			20,000	725,000	2,900,000			3,645,000
Transportation Facilities								
HRRD Parking Facility - add 4th parking level	BM-008	n/a	500,000	2,800,000				3,300,000
Port of Anoka Modification	EN-13-05	n/a		35,000				35,000
East River Road Improvement Project	EN-15-04	4	600,000					600,000
Green Haven Parkway Phase II	EN-16-05	2	575,000	2,875,000				3,450,000
South Frontage Road Phase I	EN-16-08	2	1,750,000					1,750,000
Street Surface Improvement Project (SSIP)	ST 12-01	2		1,500,000				1,500,000

Category	Project #	Priority	2023	2024	2025	2026	2027	Total
Transportation Facilities Total			3,425,000	7,210,000				10,635,000
Unassigned								
Simulators in 3rd Floor	GC17-04	5			135,000			135,000
Fat Tire Biking Trails & Rentals	GC17-11	5			5,000			5,000
Construct Broomball Rinks	GC17-12	5			15,000			15,000
Winterize Patios for Event Viewing	GC17-13	5			30,000			30,000
4 Sheet Curling Rink	GC17-14	5			101,000			101,000
Tracked Skid Steer	MP-068	2			60,000			60,000
Zero Turn Mower 72"	PR06-18	3				12,000		12,000
New Elevated 1.5 Million Gal. Water Tower	WU-029	3	3,750,000					3,750,000
New Trunk Water Main Phase 1	WU-030	3		1,421,000				1,421,000
New Anoka Well 9	WU-032	3			1,900,000			1,900,000
Unassigned Total			3,750,000	1,421,000	2,246,000	12,000		7,429,000
Utility Infrastructure								
North St Utility Extensions	EN-18-04	4	90,000					90,000
Utility Infrastructure Total			90,000					90,000
GRAND TOTAL			19,020,000	23,368,400	12,105,933	707,000		55,201,333

IMPACTS OF PROJECTS ON FUNDING SOURCES



SUMMARY OF IMPACTS ON FUNDING SOURCES

GENERAL FUND RESERVES/CURRENT REVENUES

General fund reserves continue to be at a healthy balance of 43% of current operating expenditures. This is slightly above the recommended level of reserves in the general fund of between 25 - 40%. The council budgeted to use (\$189,550) of its' fund balance in 2017. General fund capital items will need to be included in the overall budget process and levy decisions.

Included in this document are several items for early consideration. If all of the capital items proposed are approved, the city may need to increase the levy 6.3% or \$420,000 for capital spending. This is in addition to the approximately \$100,000 additional levy needed for increased operating costs and using approximately \$50,000 of reserves for a transfer to garage for equipment.

Specific items included for 2018 are:

- Boat slide at Aquatic Center
- Remodel lobby at Aquatic Center
- Entrance monument- east main
- Glass doors for Greenhaven Grille
- Parking expansion for police
- Emerald ash borer tree removal
- Playground rehab
- Planter beds at Mississippi park
- Trail system repairs
- Sign replacement
- Sidewalk extentions
- Police radio's

General Fund Budget

	2017 PROJECTED	2017 BUDGET	2018 BUDGET	2019 BUDGET	2020 BUDGET
Levy increase			7.80%	1.50%	5.43%
Current Revenues					
CURRENT PROPERTY TAX	\$ 6,613,994	\$ 6,647,230	\$ 7,165,715	\$ 7,273,200	\$ 7,668,225
FRANCHISE FEES	947,674	976,000	966,000	966,000	966,000
LICENSE, PERMITS	480,160	403,550	425,500	415,500	405,500
INTERGOVERNMENTAL REVENUE	2,178,839	2,178,445	2,276,720	2,268,520	2,268,520
CHARGES FOR CURRENT SERVICES	1,213,249	1,035,900	1,086,550	1,093,150	1,083,050
FINES & FORFEITURES	56,664	70,750	61,500	55,000	50,000
INVESTMENT EARNINGS	43,380	45,000	50,000	55,500	60,500
OTHER REVENUES	91,150	91,150	88,650	91,150	91,150
COMMUNITY CENTER REVENUE	110,100	110,100	109,300	93,100	93,565
TRANSFERS IN	400,000	400,000	500,000	500,000	500,000
TOTAL REVENUES	12,135,209	11,958,125	12,729,935	12,811,120	13,186,510
Current Expenses					
SALARIES AND EMPLOYEE BENEFITS	7,373,445	7,087,965	7,443,120	7,521,020	7,716,485
MATERIALS AND SUPPLIES	179,987	297,300	296,550	302,480	308,530
PROFESSIONAL SERVICES	1,313,344	1,345,575	1,483,050	1,505,295	1,527,875
MAINTENANCE	1,605,826	1,699,845	1,665,245	1,735,225	1,806,255
FIRE CONTRACT	624,487	624,490	655,715	668,840	685,560
CAPITAL OUTLAY	322,500	357,500	419,000	240,000	360,400
SPECIAL USES	105,000	155,000	155,000	156,000	156,000
TOTAL EXPENDITURES	11,524,589	11,567,675	12,117,680	12,128,860	12,561,105
Other Financing Uses					
DEBT FUNDS	580,000	580,000	610,000	605,000	575,000
EQUIPMENT FUND			50,000	75,000	50,000
TOTAL FINANCING USES	580,000	580,000	660,000	680,000	625,000
TOTAL EXPENDITURES & USES	12,104,589	12,147,675	12,777,680	12,808,860	13,186,105
CHANGE IN FUND BALANCE	30,620	(189,550)	(47,745)	2,260	405
Total Fund Balance	4,601,458	4,381,288	4,553,713	4,555,973	4,556,378
% unreserved fund balance to expenditures	41.08%	39.08%	38.93%	38.32%	37.35%

IMPACTS ON FUNDING SOURCES

BUILDING CAPITAL IMPROVEMENT FUND

The capital improvement fund is the primary source for building improvements for City owned buildings. There is also land held for resale in this fund that is in the Commuter Rail Transit Village which was purchased in 2004 with Building improvement funds. The property is listed for sale. The proposed source of revenue for this fund is an annual transfer from Electric. Another source could be an annual transfer from the Sewer fund.

Completing identified projects will pay dividends with lower maintenance costs for deteriorated buildings, less operating costs with fewer buildings, freeing up tax exempt property for resale and expanding shared services with other cities.

At the end of 2016, this fund has a negative fund balance because of internal lending for projects. The negative fund balance will be eliminated with the sale of the property in the CRTV and transfers from Electric, eliminating the loan.

2018 requests are:

Repaint Clubhouse Exterior
Outdoor ceremony site at Greenhaven
Grand Wood Doors for Greenhaven entrance

CAPITAL IMPROVEMENT FUND

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Working Capital Beg Yr	(445,724)	35,442	255,051	230,011	11,905
CASH	16,837	221,935	241,544	216,504	(1,602)

SOURCES

Interest	168	3,329		4,330	(36)
Miscellaneous	20,000				
Land Sales			300,000	238,284	678,000
Grant for Demo					
Transfers In Electric	425,000	100,000	100,000	100,000	100,000
Transfers In Sewer		30,000	30,000	30,000	30,000
Transfers In General Fund					
Total Sources	<u>445,168</u>	<u>133,329</u>	<u>430,000</u>	<u>372,614</u>	<u>807,964</u>

USES

Buildings	5,070	5,720	5,720	5,720	5,720
Land/loss on sale					
police/city hall				270,000	75,000
Upgrade All Elevators					
John Ward Bathroom Recstr.			250,000		
Reconstruct Park Bldgs.				250,000	
Repair Pre-Cast Capt @ Parape					
public services building imprvr				65,000	20,000
Greenhaven bathrooms	137,900				
Greenhaven carpet	65,000				
Greenhaven partitions			49,000		
Greenhaven video	32,100				
Greenhaven - paint exterior		70,000			
Greenhaven - outdoor ceremony		30,000			
Greenhaven - Wood doors		8,000			
Maintenance facility/pound					
New Public services bldg					
New Phone system					
Fire Apparatus Floor					
internal loan payback			150,320		350,748
Total Uses	<u>240,070</u>	<u>113,720</u>	<u>455,040</u>	<u>590,720</u>	<u>451,468</u>

Net Source/(Use) 205,098 19,609 (25,040) (218,106) 356,496

Working Capital Year End (240,626) 55,051 230,011 11,905 368,401

Working Capital Balance 12/31/2022 \$361,554

IMPACTS ON FUNDING SOURCES

CEMETERY FUND

The cemetery fund is the primary source for cemetery improvements and maintenance. The sources of revenue for this fund include cemetery fees and perpetual care fees. The maximum amount allowed for this fund is \$XXXXXX, which is based on \$xxx per acre per Minnesota Statute. There is also a minimum amount required per Minnesota Statute and that is \$xxxxx

At the end of 2016, this fund has approximately \$460,000 in available fund balance. It is projected that the fund will use fund balance for capital improvements but revenues will continue to cover annual maintenance for the cemetery's.

2018 request is:

Signage

PERPETUAL CARE FUND

	2017	2018	2019	2020	2021
Cash balance	455,096	423,814	407,429	422,271	413,619
Working Capital Begin Year	459,666	428,384	411,999	426,841	418,189

REVENUES

Perpetual care charges	18,205	18,012	18,583	19,022	18,917
Cemetery Fees	62,838	58,682	60,054	60,490	61,121
Interest earnings	6,826	7,417	8,149	9,501	10,340
Miscellaneous	480	480	480	480	480
Transfers in					
Total Revenues	<u>88,350</u>	<u>84,590</u>	<u>87,266</u>	<u>89,492</u>	<u>90,858</u>

EXPENDITURES

Personal Services	71,745	48,180	49,143	50,126	51,129
Supplies	1,734	2,005	2,092	1,799	2,003
Professional Services	7,285	6,727	6,255	6,478	7,020
Maintenance	13,869	14,063	14,933	14,742	15,122
Improvements	25,000	30,000		25,000	125,000
Total Expenditures	<u>119,632</u>	<u>100,975</u>	<u>72,424</u>	<u>98,145</u>	<u>200,274</u>

Source/(Use)	(31,282)	(16,385)	14,842	(8,653)	(109,415)
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Working Capital Ending Balanc	428,384	411,999	426,841	418,189	308,773
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28 acres times \$25,000 \$700,000 maximum allowed	Working Capital Balance 12/31/2022	320,779
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SUMMARY OF IMPACTS ON FUNDING SOURCES

ELECTRIC FUND

The electric fund has unrestricted net assets of \$14 million at the end of 2016. About \$5 million of this is outstanding loans to other funds for redevelopment and land acquisitions. Another \$3 million is current outstanding receivables. The electric fund will transfer \$600,000 in 2017 to the Street Renewal fund for the additional street renewal project and \$425,000 to the Capital Improvement fund for improving property. Electric also transfers \$400,000 to the general fund to support general fund operations. In 2017 and 2018 Electric will lend \$2.6 million to TIF districts for redevelopment and improvements in those districts.

It is anticipated that approximately \$1.7 million will be spent on electric infrastructure improvements in 2017. Another \$2.5 million is expected to be spent in 2018. Net income after transfers in 2016 was \$700,000. Net income after transfers for 2017 is projected to be \$1.1 million. It is projected that the Electric fund will continue to use cash for lending purposes through 2020, at which time the cash balance will be about \$5 million.

Strategic rate adjustments will help pay for necessary infrastructure improvements along with covering operating costs and transfers.

Electric will continue to lend funds internally to pay for infrastructure or other improvements. These internal loans are beneficial for the entire city as they allow financing without the high cost of debt issuance. Internal financing also benefits the electric fund because the earnings on an internal loan are at a higher rate of return than is currently achievable thru investments. The loans are typically 10 to 20 years in length.

IMPACTS ON FUNDING SOURCES

GOLF

Golf is currently an enterprise fund for the City of Anoka. Only golf operating revenues and expenses are recorded in the enterprise funds. All clubhouse activity has been transferred to the general fund under the Event Center department.

In 2017, there is a proposed development along the golf course which will encompass part of the existing golf course property. The course will receive its share of the sale of the property which will provide a source for some course improvements and equipment purchases.

It is very difficult to project future revenue stability for the course because it is subject to weather conditions. Looking historically, the golf course operations show net losses for the last four years. If historic trends continue, the golf enterprise fund will need support from another source to cover operations and capital.

2018 improvements include a new cart path for one hole.

SUMMARY OF IMPACTS ON FUNDING SOURCES

PARK CAPITAL IMPROVEMENT FUND

The park capital improvement fund sources are derived from a multitude of sources. Historically the primary source of funding is from transfers from other funds including liquor store and general fund. Recently the water fund is also making transfers to the park capital improvement fund. Grants and other outside sources will be helpful in providing funding sources for desired park projects.

Over the last 5 years the city has invested over \$2.8 million in a variety of park improvement projects. That is equivalent to \$560,000 a year on park improvements. In 2017, improvements include the Enloe courts and playground improvements and improvements to the park trail way system. As a result of transfers from the general fund, the park capital fund will have over \$500,000 available fund balance by the end of 2017. There is a county grant for \$340,000 that is receivable in 2021 for funding of the Mississippi park trail. Planned park capital improvement projects for the near future will be smaller for a few years as a result of funding source limitations.

2018 projects include:

- Anoka station park
- West rum river trail planning
- Rudy Johnson park planning
- Sunny Acres tennis courts

PARK CAPITAL IMPRV

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Working Capital Beg Yr	563,075	628,807	496,547	408,764	153,297
<u>Sources</u>					
Interest	8,446	11,004	9,931	9,197	3,832
Intergovernmental					379,000
Intergovernmental					176,000
Intergovernmental					130,000
Property Sales	83,716	83,716	83,716	83,716	55,976
Transfer in Water	100,000	40,000	40,000	40,000	40,000
Transfer in	60,000	60,000	60,000	60,000	60,000
Total Sources	<u>252,162</u>	<u>194,720</u>	<u>193,647</u>	<u>192,913</u>	<u>844,808</u>
<u>Uses</u>					
C.I.P. Projects	6,430	1,980	6,430	1,980	1,980
Station Park (CRTV)					
River Front Park		20,000	0	100,000	
hwy 10 trail					220,000
river bridge painting					150,000
Sunny acres		50,000		200,000	
kings island channel restor.		10,000			
trailways - bikes	40,000	40,000	45,000		46,400
mississippi park		40,000	50,000		
Trail garfield to castle field				15,000	200,000
nature preserve		50,000			
Entrance monument 7th ave.	50,000				
Enloe Courts/playground	75,000				
Canoe Rest	15,000				
Rudy Johnson park		35,000	175,000		
West River Rum trail		80,000	0	100,000	60,000
Sidewalk extentions			5,000	31,400	
Total Uses	<u>186,430</u>	<u>326,980</u>	<u>281,430</u>	<u>448,380</u>	<u>678,380</u>
Net Source/(Use)	<u>65,732</u>	<u>(132,260)</u>	<u>(87,783)</u>	<u>(255,467)</u>	<u>166,428</u>
Working Capital Year End	<u><u>628,807</u></u>	<u><u>496,547</u></u>	<u><u>408,764</u></u>	<u><u>153,297</u></u>	<u><u>319,725</u></u>

Working Capital Balance 12/31/2022

\$206,537

SUMMARY OF IMPACTS ON FUNDING SOURCES

SANITARY SEWER FUND

In 2014, the city increased the sanitary sewer rates to pay for current and future infrastructure and operating needs. Staff is recommending that the sanitary sewer rates be adjusted every year into the future to meet the rising costs of disposal and operations and also the future infrastructure costs.

In 2021, staff is anticipating a need to expand the sewer capacity in the northwest quadrant of the city. The lift station is projected to cost about \$5,000,000. It will be necessary to issue revenue bonds to help pay for the additional capacity.

As a result of all the street improvement projects and the purchase of the vector truck in 2016, the sewer fund is projected to need short term funding until rates can be raised enough to cover the capital and operating expenses.

SEWER FUND

	8.50%	9.70%	7.80%	6.30%	5.90%
	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Working Capital Beginning Year	611,848	165,584	196,508	232,785	493,506
Cash Beginning Balance	427,437	1,172	32,096	68,374	329,095

SOURCES

Charges for services	2,237,945	2,416,031	2,573,126	2,709,907	2,846,073
Other	37,400	55,000	33,000	27,500	22,000
Interest	6,412	18	481	1,538	8,227
Transfer In	60,000				
Bond Issuance					5,140,000
Total Sources	<u>2,341,756</u>	<u>2,471,049</u>	<u>2,606,607</u>	<u>2,738,945</u>	<u>8,016,300</u>

USES

Personal Services	389,247	393,139	397,071	401,041	405,052
Supplies	23,886	21,411	21,920	20,950	20,650
Professional Services	98,340	94,541	93,086	95,376	147,021
Maintenance	82,296	64,142	62,261	69,720	71,970
Disposal Charges	1,425,477	1,491,132	1,543,322	1,597,338	1,653,245
Other Expense/interest					44,975
Transfer Out		30,000	90,000	30,000	30,000
Capital Outlay	25,000		60,000		
Capital Improvements	743,775	345,760	302,670	263,800	5,128,625
Bond Principal					
Total Uses	<u>2,788,021</u>	<u>2,440,125</u>	<u>2,570,329</u>	<u>2,478,224</u>	<u>7,501,538</u>
Change in available funds	(446,265)	30,924	36,278	260,721	514,763
Other changes					(250,000)
Working Capital Ending Year	165,584	196,508	232,785	493,506	758,268

Working Capital balance 12/31/2022

438,593

Rate History

2010 - \$3.06/1,000 gals or \$2.29/100 cu ft
 2014 - \$3.28/1,000 gals or \$2.45/100 cu ft
 2017 - \$3.56/1,000 gals or \$2.66/100 cu ft
2018 - \$3.90/1,000 gals or \$2.92/100 cu ft

SUMMARY OF IMPACTS ON FUNDING SOURCES

STORM SEWER FUND

Maintenance and infrastructure costs of the city's storm water systems continue to increase into the future. The city issued storm water utility bonds in 2016 to assist with cash flow for the many storm water projects in 2016 and 2017. An internal loan from Electric will be necessary to complete the storm water projects in 2018. Staff is recommending increases in the storm water utility fee for the next four years to provide funds to cover infrastructure, debt and operating costs. In addition to the annual storm water improvements in the streets, several parks needed to have drainage issues addressed.

STORM WATER FUND

	<i>14.00%</i>	<i>11.43%</i>	<i>10.26%</i>	<i>9.30%</i>	<i>8.51%</i>
	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Working Capital Beg. Year	1,103,301	370,232	878,878	600,905	443,557
CASH	834,046	100,977	609,623	331,650	174,302
SOURCES					
Charges for services	552,039	615,130	678,220	741,310	804,400
Interest	11,033	4,628	13,183	10,516	8,871
Bond Issue					
Internal loan		1,000,000			
Total Sources	<u>563,072</u>	<u>1,619,758</u>	<u>691,403</u>	<u>751,826</u>	<u>813,271</u>
USES					
Operation Expense	114,825	172,122	120,564	123,578	126,668
Street Renewal Program	255,000	255,000	255,000	255,000	310,000
Bonnell Park storm sewer					
River Outfall repair		95,000			
North Street ponding	115,000				
Turnbacks		119,000			
John Ward Park drainage					167,500
Brisbin Park	55,000	180,000			
Extra Street Renewal Projects	630,095	39,390	79,912	67,145	35,365
Trunk Storm water imprv			250,000	100,000	
Other Projects		125,000	55,000	158,000	
Intererst Expense-2016	41,221	40,600	38,900	37,200	35,500
Principal-2016	85,000	85,000	85,000	85,000	85,000
Intererst Expense-2018			35,000	33,250	31,500
Electric Loan-2018			50,000	50,000	50,000
Total Uses	<u>1,296,141</u>	<u>1,111,112</u>	<u>969,376</u>	<u>909,173</u>	<u>841,533</u>
Change in available funds	(733,069)	508,646	(277,973)	(157,347)	(28,261)
Working Capital Ending Year	370,232	878,878	600,905	443,557	415,296

<u>Rate History (per month)</u>	Working Capital Balance 12/31/2022	\$ 354,321
2003 \$1.75 per month		
2008 \$2.25 per month		
2009 \$2.45 per month		
2010 \$2.65 per month		
2013 \$2.95 per month		
2016 \$3.07 per month		
2017 \$3.50 per month		
2018 \$3.90 per month		

SUMMARY OF IMPACTS ON FUNDING SOURCES

STREET RENEWAL FUND

The city's Street Renewal fund has been put to very good use over the past several years. Investments **in street projects** total over **\$18.8 million in the last 5 years**, excluding utilities. This has been accomplished with **transfers into** the fund of **\$7.5 million in the last 5 years**. The city continues to invest in its' street renewal program with an anticipated **additional \$14.3 million invested over the next 5 years** in street renewal projects excluding the water, sewer and storm water infrastructure investments. This can only be accomplished with additional transfers into the fund or with a bond issue. Necessary transfers or a bond issue will need to total \$5 million.

The City Council is committed to improving street conditions throughout the city at an aggressive pace. Street Surface Improvement Projects (SSIP) extend the life of the existing street while improving the look and drivability of the road. SSIP projects will add an additional \$3,500,000 in expenses over the next five years.

The street renewal fund continues to generate revenues from a franchise fee and property assessments. The last increase in the property assessment rate occurred in 2017. Staff is recommending increasing and continuing the franchise fee which sunsets in December 2019. Staff is also recommending that City Council consider assessing for a portion of the SSIP projects to offset the costs associated with extending the life of the road.

STREET RENEWAL FUND

	2.80% increase 2017	2.50% increase 2018	2.50% increase 2019	10.00% 2020	2.50% increase 2021
Working Capital Beg Yr	860,696	621,086	44,662	75,372	68,324

Sources

Bond Issue

Special Assessment Revenues	809,143	848,622	819,837	790,333	785,091
Franchise fees	345,558	345,558	345,558	371,475	371,475
Intergovernmental	1,490,000	261,300	810,000		
Permits	12,875	5,856	5,856	5,856	5,856
Interest	4,303	9,316	782	1,507	1,537
Micellaneous	434,400				
Transfers In	600,000	1,500,000	400,000	1,350,000	1,000,000
Total Sources	3,696,279	2,970,652	2,382,033	2,519,171	2,163,960

Uses

Street Projects	65,970	65,970	50,970	50,970	50,970
2020 SRP				1,460,000	
2019 SRP			1,545,000		
2018 SRP		1,407,000			
2017 SRP	1,742,444				
2016 SRP	190,000				
SSIP		850,000	871,250	893,031	915,357
2017 Christian Hill	3,525,563				
Swede Town - 2021					1,550,000
So. Frontage Rd					100,000
CSAH 14/9th Ave.	640,000	45,000			
Bridge repair	56,700	161,600			
Sandberg wall	190				
Fairoak Underpass	164,598	500,000	500,000	790,400	
North Street	50,000	1,180,000			
Trunk hwy 47		120,000	80,000		
Water	(870,705)	(292,345)	(233,315)	(232,237)	(216,875)
Sewer	(743,775)	(195,760)	(127,670)	(113,800)	(128,625)
Storm Water	(885,095)	(294,390)	(334,912)	(322,145)	(345,365)
Total Uses	3,935,889	3,547,075	2,351,323	2,526,219	1,925,462

Net Source/(Use) **(239,610)** **(576,423)** 30,710 **(7,048)** 238,497

Working Capital Year End 621,086 44,662 75,372 68,324 306,822

Working Capital Balance 12/31/2022 \$53,427

SUMMARY OF IMPACTS ON FUNDING SOURCES

WATER FUND

The water fund has some major capital improvement projects within the next few years to improve water distribution and storage. Water utility rates were increased in 2016 to help offset rising operating and infrastructure needs. The next rate increase is projected to be in 2019. This will be needed to pay debt service on bonds to be issued to pay for necessary Well rehabilitations. The projected cost is about \$5.5 million.

The 2001 revenue bond was paid off in 2017. The final payment of this bond improves cash flow temporarily. Along with the well projects, infrastructure improvements are using available funds at a very rapid pace. Water rates overall, continue to be very competitive with other municipal utilities.

2018 projects include:

2018 street renewal
North street reconstruction
Well inspection and repair
7th Ave. watermain lining

WATER FUND

basic rate
9.50%

9.30%

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Working Capital Beginning Year	1,789,738	1,323,152	1,482,059	1,325,552	1,883,393
Cash Beginning Balance	1,896,230	1,204,644	1,363,551	1,207,044	1,914,885

SOURCES

Operating Revenues	1,699,119	1,690,624	1,875,163	1,866,163	1,976,125
Other	187,178 #	205,000 #	170,000	175,000 #	165,000
Interest	28,443	21,081	27,271	27,158	47,872
Transfer In			60,000		
Miscellaneous	3,357				
Bond Issuance				5,500,000	
Total Sources	<u>1,918,098</u>	<u>1,916,705</u>	<u>2,132,434</u>	<u>7,568,321</u>	<u>2,188,997</u>

USES

Personal Services	403,630	413,721	417,858	428,304	432,587
Supplies	109,748	124,028	127,312	127,471	124,624
Professional Services	336,691	311,872	316,496	324,581	379,308
Maintenance	36,694	40,832	43,960	41,762	41,433
Interest				48,125	192,500
Transfer Out	100,000	40,000	40,000	40,000	40,000
Capital Outlay	35,000	40,000	110,000	97,000	125,000
Capital Improvements	1,362,921	787,345	1,233,315	5,753,237	1,216,875
Principal Bond payment	225,000				150,000
Total Uses	<u>2,609,684</u>	<u>1,757,797</u>	<u>2,288,941</u>	<u>6,860,480</u>	<u>2,702,327</u>
Change in available funds	(691,586)	158,907	(156,507)	707,841	(513,330)
Other changes	225,000	0	0	(150,000)	0
Working Capital Ending Year	1,323,152	1,482,059	1,325,552	1,883,393	1,370,063

Working Capital Balance 12/31/2022 \$ 355,221

Rate History

1999 - \$.92/1,000 gals. or \$.69/100 cu ft
 2008 - \$1.36/1,000 gals or \$1.02/100 cu
 2009 - \$1.50/1,000 gals or \$1.12/100 cu
 2011 - \$1.64/1,000 gals or \$1.22/100 cu
 2015 - \$1.79/1,000 gals or \$1.34/100 cu
2016 - \$1.97/1,000 gals or \$1.47/100 cu

SUMMARY OF IMPACTS ON FUNDING SOURCES

TAX INCREMENT FUNDS

The city currently has four tax increment districts established for redevelopment. The HRA has three tax increment districts established for redevelopment.

The Enterprise Park TIF district continues to support the extinguishment of the existing debt in the Historic Rum River District (HRRD) with funds available from internal lending. This support is expected to last until 2033 with support diminishing as the years go by.

The HRRD will exist until 2032 at which time there should be enough funding for the final debt service payment in 2033 of \$564,435. This fund may need a general tax levy in 2026 through 2032 to help support the debt service payment requirements. The reason for a levy requirement in the future is a lack of development. Planned or proposed development did not occur in a timely manner nor in the planned value.

The Commuter Rail Transit Village (CRTV) will utilize TIF revenues to pay for the internal financing from the Electric fund for the Anoka Station ramp, and other redevelopment projects. Further development in the CRTV will require internal lending to accomplish goals of purchasing blighted properties, provide for cleanup of properties or improve infrastructure. This district could exist until 2038.

The South Ferry District will utilize TIF revenues to redevelop and pay back internal loans used to purchase and clean up properties in this district. The goals of the City Council and its' constituents is to beautify the gateway to the city. This district could exist until 2034.

The Greens of Anoka District will utilize TIF revenues to implement the Greens of Anoka plan. There are existing future revenues available for a commitment of redevelopment in this area. This district could exist until 2039.

The oldest HRA TIF district funds can be utilized city wide on scattered site redevelopment or to assist in a particular redevelopment project area. This TIF district will be decertified on December 31, 2017, however the Central Business TIF district will continue to payback a loan for fire suppression improvements, thereby extending the district existence. The newest HRA district will support redevelopment one block off of Main Street. This district could exist until 2042.

PROJECT DESCRIPTIONS

2018

Capital Improvement Plan

2018 *thru* 2022

Department Aquatic Center

City of Anoka, Minnesota

Contact

Project # **AC16-03**
 Project Name **Boat Slide Replacement**

Type Improvement

Useful Life 15 years

Category Parks and Recreation Facilities

Priority n/a

Status Active

Update flag

Description

Replace boat slide (2003 installation) with an interactive water activity for children (42" and smaller) 4 years and under.
 Aquatic play products are more expensive than playgrounds, Item has been reentered in 2018 with increased budget amount. (No purchase to be made in 2017 as originally requested for \$35,000.)

Justification

Vinyl coating is fading and starting to degrade at the water level.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
0	Construction/Maintenance	70,000					70,000
Total	Total	70,000					70,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
0	General Fund	70,000					70,000
Total	Total	70,000					70,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Aquatic Center
Contact Public Services Director
Type Unassigned
Useful Life
Category Parks and Recreation Facilities
Priority n/a
Status Active

Project # AC17-01
Project Name Lobby Remodel

Update flag

Description

Aquatic Center built in 1998. Remodel front lobby area to better serve clientele and provide better access to locker room entrances, family restroom facilities, and functionality of the service desk.

Justification

Access to lockerrooms by the public is difficult due to people congestion in the lobby oaying admission or purchasing passes. For individuals requiring family lockerroom use, they must walk behind the desk into the staff area.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	25,000					25,000
Total	25,000					25,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	25,000					25,000
Total	25,000					25,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Cemetery
Contact
Type Improvement
Useful Life 25 years
Category Unassigned
Priority 3 Important
Status Active

Project # CEM17-02
Project Name Signage

Update flag

Description

Replace existing lot/block signage and install street signage to improve peoples ability to locate their loved ones in Forest Hill Cemetery

Justification

The section/block/lot signage is only visible from one side of the cemetery blocks when facing north. It is difficult to navigate the cemetery and find love ones. Streets are named on the section maps but there are no street name blades within the cemetery. Costs include posts and manufacturing of new signs for all sections and street names/intersections

Expenditures	2018	2019	2020	2021	2022	Total
Equip/Vehicles/Furnishings	30,000					30,000
Total	30,000					30,000

Funding Sources	2018	2019	2020	2021	2022	Total
Cemetary fund	30,000					30,000
Total	30,000					30,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Community Development
Contact Community Development Man
Type Redevelopment
Useful Life 50 years
Category Community Development Acti
Priority 3 Important
Status Active

Project # CD-10-01
Project Name Commuter Rail Transit Village

Update flag

Description

Aquire, demo and prepare properties for redevelopment in CRTV.
 Dehn, 2820 5th - 2017
 Spartz, 2804 5th - 2016
 Schmidt, 521 Johnson - 2018
 Hanson, 517 Johnson - 2018
 Matros 505 Johnson - 2018

Justification

To prepare a block next to the northstar station for redevelopment and secure perimeter of lakeland tool property.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
3,720,000	Land Acquisition	500,000					500,000
Total	Total	500,000					500,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
3,720,000	Tax Increment Funds	500,000					500,000
Total	Total	500,000					500,000

Budget Impact/Other

new development would generate tax increment to pay for infrastructure including the ramp.

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Electric Utility
Contact Electric Director
Type Equipment
Useful Life
Category Public Utilities Facilities
Priority n/a
Status Active

Project # EU14-03
Project Name Rebuild Distribution Lines

Update flag

Description
 Rebuild secondary UG wires Roosevelt Street
 Rebuild secondary UG wires Sunny Way Court
 Rebuild secondary UG wires Sunny Lane, 11th to 15th Ave
 Rebuild secondary UG wires Cleveland St., 12th to 16th Ave
 Rebuild secondary UG wires E. McKinley St., 12th to 15th Ave
 Rebuild secondary UG wires 4th - 7th & Jackson to Hwy 10
 Rebuild secondary UG wires 5th - 7th & Monroe to So. St.
 Rebuild secondary UG wires N. of W. Rv Rd - Pribble to Henn. LD
 Rebuild secondary UG wires Carway Rd to Hwy 169 - Trussel-Dean
 Rebuild secondary UG wires Carway Rd to Hwy 169 - Miss. Rv - Dean

Justification
 end of life, 40 yrs old and having outages

Prior	Expenditures	2018	2019	2020	2021	2022	Total
2,000,000	Construction/Maintenance	500,000	800,000	400,000			1,700,000
Total	Total	500,000	800,000	400,000			1,700,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
2,000,000	Electric	500,000	800,000	400,000			1,700,000
Total	Total	500,000	800,000	400,000			1,700,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Electric Utility
Contact Electric Director
Type New
Useful Life 50 years
Category Public Utilities Facilities
Priority n/a
Status Active

Project # EU15-03
Project Name Construct circuits from Garfield Substation

Update flag

Description

Construct circuits out of the new Garfield substation.

Justification

2014: underground circuits 401, 402 & 403, from substation to 7th avenue - \$400,000
 104 north & south underground circuits from garfield to GRE circuits - \$420,000
 circuit #122 south from Garfield station - \$230,000
 circuit #104/122 south from Garfield - \$320,000
 corciot #122 north from Garfield - \$670,000
 construct new circuit from Garfield \$1,430,000
 Construct two new circuits each year.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
1,920,000	Construction/Maintenance	550,000	550,000				1,100,000
Total	Total	550,000	550,000				1,100,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
1,920,000	Electric	550,000	550,000				1,100,000
Total	Total	550,000	550,000				1,100,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Electric Utility
Contact Electric Director
Type Improvement
Useful Life
Category Public Utilities Facilities
Priority n/a
Status Active

Project # EU15-04
Project Name Champlin Mississippi Crossing

Update flag

Description
 Relocate existing underground and overhead wires

Justification

Expenditures	2018	2019	2020	2021	2022	Total
Redevelopment	1,000,000					1,000,000
Total	1,000,000					1,000,000

Funding Sources	2018	2019	2020	2021	2022	Total
Electric	1,000,000					1,000,000
Total	1,000,000					1,000,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 25 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-09-02
Project Name CRTV Development

Update flag

Description

Ongoing funding for the construction of improvements such as streets, water, sewer, storm sewer, lighting, traffic control (signal) and signage associated with the development of the Commuter Rail Transit Village.

Justification

Even though it is well accepted that private developers would bear the bulk of costs associated with the growth of the CRTV, it is prudent that the City have available funding for the advancement of the project in accordance with master planning.

Items that may be included in this category are upsizing of infrastructure, additional lighting for public spaces, traffic signalization, etc. Example: constructing 5th Avenue from Garfield Street to Grant Street in 2015.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
200,000	Construction/Maintenance	150,000	150,000				300,000
Total	Total	150,000	150,000				300,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
200,000	Tax Increment Funds	150,000	150,000				300,000
Total	Total	150,000	150,000				300,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-15-09
Project Name 2018 Street Renewal

Update flag

Description

Complete reconstruction of the following City streets:

Washington Street (Seventh Ave to Ninth Ave)
 South Street (Fifth Ave to E. City limits)
 Eighth Avenue (Brisbin St to South St)

Total Length = 5,650 LF

Project anticipates trunk storm replacement along on Eighth from South to Brisbin. This cost is in the Southeast Trunk Storm Sewer CIP.

Justification

Streets and underground utilities are in poor condition and are in need of reconstruction

Trunk storm sewer is budgeted under the south west area overall plan that will need to be installed with the 2018 SRP project.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	241,730					241,730
Construction/Maintenance	1,446,270					1,446,270
Total	1,688,000					1,688,000

Funding Sources	2018	2019	2020	2021	2022	Total
Electric	238,030					238,030
Municipal State Aid	261,300					261,300
Sanitary Sewer Fund	208,170					208,170
Special Assessments	351,665					351,665
Stormwater Utility Fund	294,390					294,390
Street Renewal Fund	77,180					77,180
Water Fund	257,265					257,265
Total	1,688,000					1,688,000

Budget Impact/Other

Includes 5% for construction cost increase

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type New
Useful Life 25 years
Category Transportation Facilities
Priority 2 Very Important
Status Active

Project # EN-16-05
Project Name Green Haven Parkway Phase II

Update flag

Description

Phase II of the Green Haven Parkway from Thurston Avenue to West Main Street backage road as shown in the Greens of Anoka Study and the Highway 10 Access Planning Study. Two lane section with 12' wide multi-modal trail way.
 Phase II construction will be from Garfield Street to Main Street
 Proposed 2020 Construction

Justification

This roadway will act as the north frontage road for Trunk Highway 10, taking local trips off of the Trunk Highway and will act as a "reliever" during the reconstruction of Highway 10.
 Phase II Benefits:
 - Provides a new connection between Verndale Avenue and Fair oak Avenue
 - Closes Verndale Avenue access on Highway 10
 - Provides bike and pedestrian accommodations

Expenditures	2018	2019	2020	2021	2022	Total	Future
Land Acquisition	1,000,000	1,000,000	500,000			2,500,000	3,450,000
Total	1,000,000	1,000,000	500,000			2,500,000	Total

Funding Sources	2018	2019	2020	2021	2022	Total	Future
Tax Increment Funds	1,000,000	1,000,000	500,000			2,500,000	3,450,000
Total	1,000,000	1,000,000	500,000			2,500,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type New
Useful Life 25 years
Category Transportation Facilities
Priority 2 Very Important
Status Active

Project # EN-16-07
Project Name Fairoak Avenue Signal Removal Project

Update flag

Description

Part of the overall Highway 10 Access Planning Study. Project will close the Fairoak access to Highway 10 and Highway 10 will be elevated up to maintain the neighborhood connection at Fairoak Avenue.

This project will be a combined project with South Frontage Road Phase II project.

Proposed 2021 Construction

Justification

The project will reduce crashes and improve mobility issues and will provide high benefit measures that incrementally improves safety and operations for all users of the Highway 10 corridor. The frontage road will act as the south frontage road for Trunk Highway 10, providing continuous local connection from Cutters Grove to West Main Street.

Project Benefits

- The Fairoak intersection currently causes the most delay/safety issues in the region
- Removes the signal at the root of many of the problems in this segment of Highway 10
- Closes the Fairoak access on Highway 10
- Provides local street underpass and community connectivity
- Safe bike/pedestrian crossing of Highway 10
- Provide a new local connection between Fairoak and Main Street to the south of Highway 10
- Reconfigures the Main Street interchange intersections to roundabouts
- Ties Highway 10 commercial properties to Downtown Anoka

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	360,000	500,000	6,040,000			6,900,000
Land Acquisition			1,800,000			1,800,000
Construction/Maintenance				31,400,000		31,400,000
Total	360,000	500,000	7,840,000	31,400,000		40,100,000

Funding Sources	2018	2019	2020	2021	2022	Total
Grants			7,050,000	31,400,000		38,450,000
Street Renewal Fund	360,000	500,000	790,000			1,650,000
Total	360,000	500,000	7,840,000	31,400,000		40,100,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type Improvement
Useful Life
Category Streets and Roads
Priority 3 Important
Status Active

Project # EN-18-01
Project Name TH-47 Anoka Solution

Update flag

Description

Develop Anoka's plan for TH-47 from BNSF railroad crossing to Bunker Lake Boulevard.
 Plan will include the solution for traffic mobilization and safety for the Mineral Pond and Brom & Dunham Oaks Neighborhoods.
 Project will include a left turn lane on TH-47 for the business on the southwest quadrant of Bunker Lake Boulevard and TH-47.

Justification

Mndot has studied the railroad crossing on Ferry Street and is proposing to construction an overpass at the BNSF rail road crossing on TH-47. This will affect the traffic patterns north of the tracks from the reconstruction of this at grade crossing.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	120,000	80,000				200,000
Construction/Maintenance					25,000,000	25,000,000
Total	120,000	80,000			25,000,000	25,200,000

Funding Sources	2018	2019	2020	2021	2022	Total
Grants					25,000,000	25,000,000
Street Renewal Fund	120,000	80,000				200,000
Total	120,000	80,000			25,000,000	25,200,000

Budget Impact/Other

\$12,000 per month (80 professional service hours) for 12 months
 Construction cost will be developed during the preliminary design in 2018

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 4 Less Important
Status Active

Project # EN18-02
Project Name Entrance Monument - E Main St

Update flag

Description

Install an entrance monument for people entering into the City on Main Street from the east.
 Entrance monument will be similar to the monument installed at the west end of West Main Street.

Justification

No entrance monument exists at this location and East Main Street was reconditioned in 2017 from Round Lake Blvd to 7th Avenue.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	5,000					5,000
Construction/Maintenance		30,000				30,000
Total	5,000	30,000				35,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	5,000	30,000				35,000
Total	5,000	30,000				35,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type Improvement
Useful Life
Category Streets and Roads
Priority 2 Very Important
Status Active

Project # EN18-03
Project Name North Street Reconstruction

Update flag

Description

Restruction of North Street from CSAH 7 to eastern city limits including curb & gutter.
 Replace existing watermain from CSAH 7 to Buchanan St.
 Install sanitary sewer and watermain from Buchanan Street to 8th Avenue.
 Install storm sewer along the coordior and discharge into the regional storm pond at 11th Avenue.(2017 construction)

Justification

On May 15, 2017 Anoka County turned back North Street to the city. This street was desinged at a Municipal State Aid route in the City of Anoka.
 There currently no watermain or sanitary sewer between Buchanan Street and 8th Avenue to service the parcels located on the south side of North Street.
 This will be a joint project with the City of Coon Rapids

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	55,000					55,000
Construction/Maintenance	1,421,000					1,421,000
Total	1,476,000					1,476,000

Funding Sources	2018	2019	2020	2021	2022	Total
Electric	246,000					246,000
Outside Sources	1,120,000					1,120,000
Sanitary Sewer Fund	29,000					29,000
Water Fund	81,000					81,000
Total	1,476,000					1,476,000

Budget Impact/Other

Anoka County provided a lump sum payment of \$1,120,000 for the reconstruction of North Street.

Capital Improvement Plan

2018 *thru* 2022

Department Greenhaven Golf Course

Contact Public Services Director

Type Improvement

Useful Life 12 years

Category General Public Buildings

Priority 5 Future Consideration

Status Active

City of Anoka, Minnesota

Project # BM-GH-004

Project Name Greenhaven - Repaint Clubhouse Exterior

Update flag

Description

Prep, seal and paint the building's exterior.

Justification

The exterior of the building has significant staining due to spray irrigation drift. The existing paint coat also shows extensive weathering and fading.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	70,000					70,000
Total	70,000					70,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund	70,000					70,000
Total	70,000					70,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Greenhaven Golf Course

Contact Golf Course Manager

Type Improvement

Useful Life 25 years

Category Parks and Recreation Facilities

Priority 4 Less Important

Status Active

Project # GC14-21

Project Name Cart Path

Update flag

Description

Cart Path Expansion and Repairs

Justification

2800 LF #1 green to #5 tee
 200 LF # 5 green
 80 LF #6 tee 280 LF # 6 green
 150 LF #7 tee
 750 LF #7 green to #9 tee
 170 LF #10 tee
 30 LF # 11 tee
 280 LF #7 green to #9 tee
 170 LF #13 tee
 1050 LF #13tee to #15 tee
 170 LF #16 tee
 220 LF ##16 green
 650 LF #17 tee to green
 150 LF #18 green

Paths have been broken up and deteriorated over the past several years. Many areas also show extreme ware due to the increasing number of carts used today.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
37,600	Construction/Maintenance	23,400					23,400
Total	Total	23,400					23,400

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
37,600	Golf Fund	23,400					23,400
Total	Total	23,400					23,400

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Greenhaven Golf Course

City of Anoka, Minnesota

Contact

Project # GC17-03
Project Name Outdoor Ceremony Site

Type New

Useful Life 15 yrs

Category Unassigned

Priority 5 Future Consideration

Status Active

Update flag

Description

Construct an outdoor ceremony site for weddings and wedding pictures. A permanent ceremony site with pergola, wired for sound and lighting, landscaped with perennial and annual flowering plants and shrubs will allow Green Haven to compete with other nearby wedding facilities with outdoor weddings.

Justification

The existing caterer is losing several wedding a year to facilities that have outdoor wedding sites. Couples are getting married less in churches and are searching for that one stop shop where they can have a wedding and a reception without their guests leaving the property. Although they do outdoor weddings they feel they could generate several more per year with a permanent wedding site with beautiful landscaping for pictures and the ceremony.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	30,000					30,000
Total	30,000					30,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund	30,000					30,000
Total	30,000					30,000

Budget Impact/Other

\$25,000 to \$30,000 that will be reimbursed by the caterer. The agreement would be the city will receive \$500 per outdoor wedding until the initial investment is recouped and then \$100 per outdoor wedding to pay for maintenance and upkeep.

Capital Improvement Plan

2018 *thru* 2022

Department Greenhaven Golf Course

Contact Golf Course Manager

Type Improvement

Useful Life

Category General Public Buildings

Priority 4 Less Important

Status Active

City of Anoka, Minnesota

Project # GC17-09

Project Name Install Glass Doors on Grille

Update flag

Description

Install glass doors on the grille doors so the customers could see that the grille is open for business and we could better control the noise from the bar.

Justification

This would allow some separation from the golfers and banquet guests.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	4,000					4,000
Total	4,000					4,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	4,000					4,000
Total	4,000					4,000

Budget Impact/Other

\$4,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Greenhaven Golf Course

Contact Golf Course Manager

Type Improvement

Useful Life

Category General Public Buildings

Priority 5 Future Consideration

Status Active

Project # GC17-10

Project Name Install Grand Wood Doors to Entrance

Update flag

Description

The current doors on the main level entrance are metal and glass. We could add beautiful wood & glass doors to make a more impressive entrance.

Justification

By adding a grand set of wood doors we would accomplish a goal of making the upper main entrance much more grand. The current doors, although fine, do not make a statement of grandeur.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	8,000					8,000
Total	8,000					8,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund	8,000					8,000
Total	8,000					8,000

Budget Impact/Other

\$8,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Liquor Stores
Contact Liquor Store Manager
Type Improvement
Useful Life 40 years
Category General Public Buildings
Priority 3 Important
Status Active

Project # LQ18-01
Project Name East Store Expansion

Update flag

Description

This is to expand the East Liquor Store

Justification

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	2,000,000					2,000,000
Total	2,000,000					2,000,000

Funding Sources	2018	2019	2020	2021	2022	Total
Revenue Bonds	2,000,000					2,000,000
Total	2,000,000					2,000,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation

Contact Public Works Director

City of Anoka, Minnesota

Project # PR06-26

Project Name Riverfront Park - HRRD Construction

Type Improvement

Useful Life

Category Parks and Recreation Facilities

Priority 3 Important

Status Active

Update flag x

Description

Develop the area north of City Hall into a park. Elements of this park will include a trailway connection through the park, plaza for civic gatherings, grand entrance / staircase, an amphitheater for City events, Memorial Court, historical interpretation area, fountains, open passive space, dockage, and with restrooms.

Park Dedication fees: estimated 191 units @ \$2543/unit = \$485,000.

Approximate Timeline Improvements

South entrance staircase in 2012 as part of the East Main Project

Trail and associated amenities, overall grading, and North Dockage in 2013

north end trail connection through the mill ruin area in 2014

Grand stair case/s, weir Plaza, City Hall Terrace, Memorial Court, Mill Ruin Area in 2015

Building Site / Second Avenue amenities, Amphitheater and pavilion structure in 2016

Veteran's Memorial / Military Tribute in 2020/2021

Justification

Construction of Riverfront Park is part of the Master Plan for the North Central Business District and incorporates the Riverfront Park Plaza, cultural center and major historic elements throughout the river promenade and historic Rum River regional park.

Hwy 10 Anoka Solution impacts Vet Memorial in current location. Beginning planning in 2017 and design new memorial in 2018 with construction in 2020 ahead of hwy 10 project.

Prior	Expenditures	2018	2019	2020	2021	2022	Total	Future
1,539,275	Planning/Design/Engineering	140,000			341,000	140,000	621,000	1,494,000
	Construction/Maintenance				1,465,000	1,750,000	3,215,000	
Total	Total	140,000			1,806,000	1,890,000	3,836,000	Total

Prior	Funding Sources	2018	2019	2020	2021	2022	Total	Future
1,539,275	Capital Improvement fund				100,000		100,000	1,494,000
	General Obligation Bonds				1,706,000	1,507,000	3,213,000	
	Grants					233,000	233,000	
	Outside Sources					150,000	150,000	
	Street Renewal Fund	140,000					140,000	
Total	Total	140,000			1,806,000	1,890,000	3,836,000	Total

Budget Impact/Other

annual maintenance of park area

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 4 Less Important
Status Active

Project # PR06-48
Project Name Anoka Station Parks and Greenspaces

Update flag x

Description

Designs, development and construction of park areas and public green spaces. Possible trail connection from Transit Village to downtown. Complete Rum River Trail -make connection between 4th Avenue Rum River bridge and Anoka Station regional pond. Assumes: 670 new residential units and Park Dedication fees of \$2543/unit = \$1,700,000. Assume: Development will occur evenly over a 10 year period starting in 2012.

Justification

Park improvement needed for commuter rail transit village
 Project phasing will be required. Grant funding may be available for certain phases.

Prior	Expenditures	2018	2019	2020	2021	2022	Total	Future
200,000	Planning/Design/Engineering	50,000					50,000	150,000
	Construction/Maintenance			150,000			150,000	
Total	Total	50,000		150,000			200,000	Total

Prior	Funding Sources	2018	2019	2020	2021	2022	Total	Future
200,000	Park Capital Improvement fund	50,000					50,000	150,000
	Park Dedication fund			150,000			150,000	
Total	Total	50,000		150,000			200,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life Unassigned
Category Parks and Recreation Facilities
Priority 1 Urgent
Status Active

Project # PR09-23
Project Name Emerald Ash Borer, Removal of Trees

Update flag x

Description

Removal of diseased trees. And perhaps some reforestation

Justification

It will be a requirement to remove and properly dispose of diseased ash trees within the city.
 Does not include a re-forestation plan

Expenditures	2018	2019	2020	2021	2022	Total
Redevelopment	100,000	100,000	100,000	100,000		400,000
Total	100,000	100,000	100,000	100,000		400,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	100,000	100,000	100,000	100,000		400,000
Total	100,000	100,000	100,000	100,000		400,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation

City of Anoka, Minnesota

Contact Public Services Director

Project # PR15-01

Type Improvement

Project Name Playground Rehab/Repair

Useful Life 25 years

Category Parks and Recreation Facilities

Update flag

Priority 3 Important

Status Active

Description

Replacement of timber framing with concrete curbing and replacement of fall surfacing. Enloe has pea rock and Rudy Johnso has sand - both which are substandard. Timbers at Highland park & King park are rotting which is safety hazard.

Replacing pearock & Sand with industry standard -engineered wood fiber

Rudy Johnson 2019

King Park 2018

Justification

properly maintained fall surfacing for plagrounds is essential for limiting liability incase of injury

Prior	Expenditures	2018	2019	2020	2021	2022	Total
45,000	Construction/Maintenance	25,000	25,000				50,000
Total	Total	25,000	25,000				50,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	25,000	25,000				50,000
Total	25,000	25,000				50,000

Budget Impact/Other

Engineered wood fiber requires annual top dressing to maintain appropriate fall surface. Woodtimber edging is less expensive to install but deteriorates and requires replacement every 7-10 years, concrete will not need to be replaced once installed.

Prior	Budget Items	2018	2019	2020	2021	2022	Total
60,000	Maintenance	20,000					20,000
Total	Total	20,000					20,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Project # PR15-06
Project Name West Rum River Trail

Update flag

Description
 Construct a trailway on the west side of the Rum River from the Dam south to Two Rivers Peninsula Point Park
 2016 - Complete Survey / Develop Concept Plan
 2017 - Comprehensive Planning / Refine Master Plan
 2018 - Finalize Master Plan, create phasing plan & grant applications
 2019 - Phase I Construction: Woodbury House Area
 2020 - Phase II Construction: Stone House to Woodbury House
 2021 - Phase III Construction: Dam to Stone House

Justification
 To develop the "River Walk Loop" around the Rum River

Prior	Expenditures	2018	2019	2020	2021	2022	Total	Future
75,000	Planning/Design/Engineering	80,000		100,000			180,000	1,200,000
	Construction/Maintenance				560,000	560,000	1,120,000	
Total	Total	80,000		100,000	560,000	560,000	1,300,000	Total

Prior	Funding Sources	2018	2019	2020	2021	2022	Total	Future
75,000	Grants				500,000	500,000	1,000,000	1,200,000
	Park Capital Improvement fund	80,000		100,000	60,000	60,000	300,000	
Total	Total	80,000		100,000	560,000	560,000	1,300,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation

City of Anoka, Minnesota

Contact

Project # PR17 - 07
Project Name Mississippi Park Planter Beds & Sign

Type Improvement

Useful Life

Category Unassigned

Priority n/a

Status Active

Update flag

Description

Planter beds constructed of 8x8 timbers in patio/shelter area and entrance areas

Justification

Constructed pre-1990, were not replaced when the boardwalk was replaced in 2005. Rotting timbers are dangerous and could cause injury and nesting areas for honets/wasps. Replace with anchor block.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	35,000					35,000
Total	35,000					35,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	35,000					35,000
Total	35,000					35,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director
Type Improvement
Useful Life
Category Parks and Recreation Facilities
Priority n/a
Status Active

Project # PR17-04
Project Name Trail System Repairs

Update flag

Description

Fog Seal and/or overlay sections of bituminous trails

Justification

fog sealing extends life of bituminous overlay may be required on some sections of trail where bituminous is failing
 City has several miles of bituminous trails, this will be an on going project. Some segments may need to be patched, overlaid, or replaced along with fog sealing project.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
40,000	Construction/Maintenance	55,000	40,000	40,000			135,000
Total	Total	55,000	40,000	40,000			135,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
40,000	General Fund	55,000	40,000	40,000			135,000
Total	Total	55,000	40,000	40,000			135,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Parks and Recreation
Contact Park Director
Type Improvement
Useful Life
Category Parks and Recreation Facilities
Priority n/a
Status Active

Project # PR17-08
Project Name Rudy Johnson Park

Update flag

Description

Redesign and reconstruction of Rudy Johnson Park - playground, playfield, skating rink reconfiguration

Justification

Neighborhood needs have changed. District #11 is requesting removal of playground at Washington MS campus. Study, meet with neighborhood, and redesign park & facility amenities including possible relocation of hockey skating rink, installing irrigation in playfield, replacement of playground, construct parking lot.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	35,000					35,000
Construction/Maintenance		175,000				175,000
Total	35,000	175,000				210,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Capital Improvement fund	35,000	175,000				210,000
Total	35,000	175,000				210,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director

City of Anoka, Minnesota

Type Improvement
Useful Life 20 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Project # PR18-02
Project Name Sunny Acres Tennis Courts

Update flag

Description

Crack Fill and Repair, Repaint Sunny Acres Tennis courts

Justification

Large full depth cracks are occurring at all paving joints. Cracks are large enough to catch shoes and cause injuries.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	50,000					50,000
Total	50,000					50,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Capital Improvement fund	50,000					50,000
Total	50,000					50,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Police
Contact
Type Improvement
Useful Life 25 years
Category General Public Buildings
Priority 2 Very Important
Status Active

Project # PD18-01
Project Name PD Parking Expansion

Update flag

Description

Add 15 parking spaces to the lower Police Department Parking Lot. Include associated storm water runoff upgrades.

Justification

Police Parking is to small to handle the increased number of employees added to Police. i.e. part-time security and full-time positions.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance	50,000					50,000
Total	50,000					50,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	50,000					50,000
Total	50,000					50,000

Budget Impact/Other

Budget Items	2018	2019	2020	2021	2022	Total
Maintenance	50,000					50,000
Total	50,000					50,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Storm Utility
Contact Public Services Director
Type Redevelopment
Useful Life 30 years
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # SW-16-01
Project Name Southeast Trunk Storm Sewer Improvements

Update flag

Description

2017 Brisbin Park Storm Sewer
 Install outlet storm pipe into Brishin Park for storm water relief during large rain events. The 100-year flood elevation in the park is proposed to increase 4 inches, however with the outlet the stormwater will drain out faster than it does now since there currently is no outlet. The westerly half of the park would need to be regraded to accommodate the new stormwater outlet.

2018 Trunk Storm Sewer
 The 42" RCP will be extended down 8th Avenue to complete the underground trunk infrastructure on the southeast trunk system for a cost of \$125,000. This work will result in the City being able to fill in the existing storm water pond at 8th Avenue and South Street from material generated on SRP project. This work is estimated to be \$55,000

Justification

By constructing these trunk storm sewer improvements, the 100 year flood elevation at the low area at Cross and Madison would be approximately 3 inches lower than current conditions.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
50,000	Redevelopment	125,000	55,000				180,000
Total	Total	125,000	55,000				180,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
50,000	Stormwater Utility Fund	125,000	55,000				180,000
Total	Total	125,000	55,000				180,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Streets
Contact Public Services Director
Type Improvement
Useful Life
Category Transportation Facilities
Priority 3 Important
Status Active

Project # ST 15-04
Project Name Main Street Bridge Repair/Maintenance

Update flag x

Description

The 2014 bridge inspection for Br # 5875 (Main Street) recommended the following repairs:

- Multiple minor spalls identified on the corners of the arches.
- The joint between the floorbeam and abutment still spalling.
- There is a void in the SE corner of the W approach panel.
- 3'x5" spall in sidewalk W of SW expansion joint (Trip hazard).
- The sidewalk has settled by the NW expansion joint (Trip hazard).
- The expansion joints are full of dirt and areas have separated.
- Severe deterioration of NW, NE, SW end posts at railing connection.
- Spalling and delamination of the bottom edge of deck.
- 14' of overlay delamination (5' missing) near E end of EB median.

Justification

As the bridge ages, additional maintenance will need to be complete to extend the bridges life.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
56,500	Construction/Maintenance	161,600					161,600
Total	Total	161,600					161,600

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
56,500	Street Renewal Fund	161,600					161,600
Total	Total	161,600					161,600

Budget Impact/Other

In 2016, 5% was added to \$207,000 budget for inflation.

Capital Improvement Plan

2018 *thru* 2022

Department Streets
Contact Public Services Director
Type Unassigned
Useful Life 11 years
Category Transportation Facilities
Priority 3 Important
Status Active

City of Anoka, Minnesota

Project # ST 15-05
Project Name Sign Blanket Replacement

Update flag

Description

Replacing all the signs outside of the expected life for the sign in the entire city. The city will be divided into four quadrants and expects to complete the sign blanket replacement by 2020. This will follow our Traffic Sign Maintenance Policy.

In January of 2088 the FHWA enacted new laws for agencies to develop a sign maintenance program . In June 2014 they required agencies to implement their sign management methods for regulatory and warning signs to meet the minimum level of retro-reflectivity as indicated in the MN MUTCD.

Justification

In May of 2012, the FHWA announced a proposal eliminating many of the burdensome regulations related to street signs. The final ruling of these regulations was published in the Federal Register and the effective date was June 13, 2012. This update now required state and local agencies to implement and continued use of a sign assessment or management method that is designed to maintain regulatory and warning sign retro-reflectivity at or above the established minimum levels.

Estimated 4,000 signs with a total value of \$932,000.
 50% of signs will need to be replaced in 4 years for an estimated cost of \$117,000 per year.
 Estimated cost after is \$40,000 to continue to replace signs based on a 11 year life.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
234,000	Construction/Maintenance	117,000	117,000	40,000	40,000		314,000
Total	Total	117,000	117,000	40,000	40,000		314,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
234,000	General Fund	117,000	117,000	40,000	40,000		314,000
Total	Total	117,000	117,000	40,000	40,000		314,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 thru 2022

Department Streets
Contact
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # ST 20-01
Project Name Sidewalk Extentions

Update flag

Description

Construct a sidewalk on the west side of 7th Avenue from Garfield Street to Johnson Street in 2018 to finish connection. The relocation of Comcast's cable from the GRE project is required for this sidewalk. Originally part of the Garfield Substation Area Improvement Project completed in 2015.

Construct a sidewalk on the north side of Garfield Street from 5th Avenue to 7th Avenue. This would be a 5' wide concrete sidewalk that would be located directly behind the curb.

Justification

There is a strong pedestrian movement along this section of 7th Avenue as evidenced by the wear in the grass along the west side.

This improvement will provide a safer route for pedestrians wanting to make this connection. It will also tie into the planned trailway on the westside of 7th Avenue from Garfield Street north to the northerly city limits and connecting into the Rum River Regional Trailway.

5th Avenue to 7th Avenue - 790 feet
 Johnson Street to Grant Street - 493 feet
 Grant Street to Randal Drive - 282 feet
 Randal Drive to Garfield Street - 491 feet
 TOTAL 2,056 FEET

1,266 feet @ \$25 per foot = \$31,650
 15% contingency = \$4,750
 TOTAL PROJECT COST \$36,400

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering		5,000				5,000
Construction/Maintenance	20,000		31,400			51,400
Total	20,000	5,000	31,400			56,400

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund	20,000	5,000	31,400			56,400
Total	20,000	5,000	31,400			56,400

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Water Utility
Contact Public Works Director
Type Improvement
Useful Life
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # WU-008
Project Name Well Inspection and Repair

Update flag

Description

Pull well, inspect and perform repairs need to:
 Well #4 &5 2018
 Well #7 2020
 Well #3 2022

Justification

Periodic well and pump inspections are part of a comprehensive water system. We have a scheduled rotation in which we pull, inspect and repair all of our wells over a six year period. This regular maintenance has proven valuable in keeping our water distribution performing at a highly effective level.

Prior	Expenditures	2018	2019	2020	2021	2022	Total	Future
180,000	Construction/Maintenance	50,000		50,000		50,000	150,000	200,000
Total	Total	50,000		50,000		50,000	150,000	Total

Prior	Funding Sources	2018	2019	2020	2021	2022	Total	Future
180,000	Water Fund	50,000		50,000		50,000	150,000	200,000
Total	Total	50,000		50,000		50,000	150,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Water Utility
Contact Public Services Director
Type Improvement
Useful Life 15 years
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # WU-027
Project Name 7th Av Watermain Lining

Update flag

Description

Reline the existing watermain under CSAH 7 from North Street to Grant Street.

Justification

There has been 3 watermain breaks in the past year on this section of pipe.
 1500' watermain @ \$120 LF
 5 valves @ \$600 each
 2 Hydrants @ \$1,200 each
 15 Services @ \$ 1,000 each
 12 Connect to WM @ \$1,000 each
 Temp water @ \$7,500
 Traffic control @ \$20,000
 Street patching @ \$10,000
 Mobilization @ \$27,000
 20% Contingency @ \$60,800

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering	61,000					61,000
Construction/Maintenance		304,000				304,000
Total	61,000	304,000				365,000

Funding Sources	2018	2019	2020	2021	2022	Total
Water Fund	61,000	304,000				365,000
Total	61,000	304,000				365,000

Budget Impact/Other

2019

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-15-03
Project Name 2019 Street Renewal

Update flag

Description

Complete reconstruction of the following City streets:
 6th Avenue (South to Jefferson)
 Brisbin Street (5th to 7th)
 Washington Street (5th to 6th)

Total Length = 3,510 LF

Resurface of Adams Street (5th to 6th)

Justification

Streets and underground utilities are in poor condition and are in need of reconstruction

MSA funds pay for street, storm & electric costs

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering		265,470				265,470
Construction/Maintenance		1,588,170				1,588,170
Total		1,853,640				1,853,640

Funding Sources	2018	2019	2020	2021	2022	Total
Electric		173,935				173,935
Municipal State Aid		810,000				810,000
Sanitary Sewer Fund		181,200				181,200
Special Assessments		386,175				386,175
Stormwater Utility Fund		9,650				9,650
Street Renewal Fund		0				0
Water Fund		292,680				292,680
Total		1,853,640				1,853,640

Budget Impact/Other

Includes 5% for construction cost increase

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Public Utilities Facilities
Priority 2 Very Important
Status Active

Project # EN-16-02
Project Name Rum River Dam Modification Project

Update flag

Description

Modify the dam to make it resistant to the migration of invasive aquatic species such as the Asian Carp. This may include changing the operations / configuration of the gate, mechanical flash boards (pool elevation control), maintenance platform across the dam.

The modification may include developing the capability of producing hydroelectric power from the dam.

Justification

To serve as redundant system to the Coon Rapids Dam on the Mississippi River and to protect the fisheries of the Milacs Lake basin.

Legislative bonding initiative.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
260,000	Planning/Design/Engineering		200,000				200,000
	Construction/Maintenance			6,120,000			6,120,000
Total	Total		200,000	6,120,000			6,320,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
260,000	Outside Sources		200,000	6,120,000			6,320,000
Total	Total		200,000	6,120,000			6,320,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Engineering
Contact Public Services Director
Type New
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

City of Anoka, Minnesota

Project # EN-17-02
Project Name CSAH 7 / 43rd Avenue Intersection

Update flag

Description

Construct a signalized intersection at CSAH 7 (7th Avenue) and 43rd Avenue. Note: the east leg of this intersection which is located in Andover will be called 143rd Avenue.

There is a trailway planned along the westside of 7th Avenue from the north city limits to CSAH 116 that should be build with this intersection project. The trail segment north of this intersection maybe funded with City funds. The segment south of this intersection should be funded by the developer of the commercial property.

Justification

To accommodate development in the NW quadrant of CSAH 116 and CSAH 7.
 To allow pedestrian movement along CSAH 7

Prior	Expenditures	2018	2019	2020	2021	2022	Total
7,500	Construction/Maintenance		550,000				550,000
Total	Total		550,000				550,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
7,500	Outside Sources		550,000				550,000
Total	Total		550,000				550,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Greenhaven Golf Course

Contact Golf Course Manager

Type Improvement

Useful Life 20 years

Category General Public Buildings

Priority 5 Future Consideration

Status Active

Project # GC14-02
Project Name New Partitions in Banquet Rooms

Update flag

Description

The partitions that allow us to divide the banquet rooms into smaller rooms are showing signs of wear and damage. We would replace them with newer versions that would do essentially the same thing.

Justification

The ability to tailor the size of the rooms to fit the size of the group is essential to multiple events on any given day. The partitions are showing wear and have some damage and would be replaced with newer versions that are easier to maneuver.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance		49,000				49,000
Total		49,000				49,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund		49,000				49,000
Total		49,000				49,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director

City of Anoka, Minnesota

Project # PR06-41
Project Name Anoka Nature Preserve Park Development

Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Update flag x

Description

Design and development of passive recreation opportunities within the 200 acres of the conservation easement area of the Anoka Nature Preserve. Develop a trailhead with parking, restroom facilities, and picnic shelter. Improvements within the Nature Preserve may include trail surface improvements and possible dockage.

Justification

Design and development of passive picturesque areas that could include trails, picnic areas, picnic shelters, rest rooms, and parking areas.

Construct trailhead parking lot & playground 2015
 picnic shelter / tables/ grill
 Small restroom facility

Grade Main trails and place class 7 material in 2014
 Pave trails in 2020 - 50% county funds / grants

Intall fishing pier, canoe landing and camp sites in 2019 - DNR Fishing pier grant \$20,000- total City funds \$25,000

Picnic Shelter - 2020 - \$180,000

Prior	Expenditures	2018	2019	2020	2021	2022	Total
182,000	Construction/Maintenance		200,000	45,000	260,000		505,000
Total	Total		200,000	45,000	260,000		505,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
182,000	General Obligation Bonds				260,000		260,000
	Grants			20,000			20,000
Total	Outside Sources		100,000				100,000
	Park Dedication fund		100,000	25,000			125,000
	Total		200,000	45,000	260,000		505,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation

City of Anoka, Minnesota

Contact Public Works Director

Project # PR10-01

Type New

Project Name Rum River Trail Connection-4th Ave. & Pleasant St.

Useful Life 25 years

Category Parks and Recreation Facilities

Update flag x

Priority 3 Important

Status Active

Description

Construct an 8 ft. Rum River trailway connection from Pleasant Street to just north of the railroad tracks along the west side of fourth Avenue. This will require right-of-way acquisition, a railroad crossing gate, and other safety features.

Justification

To complete the Rum River trail in this area and to eliminate crossing over Fourth Avenue twice.

Estimated Costs: Trailway & railroad crossing - \$52,800
 Right-of-way acquisition - \$28,500
 Railroad crossing gates / safety features - \$110,000
 0.285 AC permanent - assume \$100,000/AC
 0.284 AC temporary

Prior	Expenditures	2018	2019	2020	2021	2022	Total
10,000	Construction/Maintenance		191,300				191,300
Total	Total		191,300				191,300

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
10,000	Grants		100,000				100,000
	Park Dedication fund		91,300				91,300
Total	Total		191,300				191,300

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation

City of Anoka, Minnesota

Contact

Project # **PR18-05**
 Project Name **Mississippi Park Shoreline Restoration**

Type Unassigned

Useful Life

Category Unassigned

Priority n/a

Status Active

Update flag

Description

Rip Rap and boulders on shoreline eastbank of Mississippi River Community Park

Justification

This area is on a cut bank and is degrading. Rip rap placed pre-1995 was not effective (too small of rocks) to stop damage from ice and river current

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance		50,000				50,000
Total		50,000				50,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Capital Improvement fund		50,000				50,000
Total		50,000				50,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Project # PR20 - 01
Project Name John Ward Bathroom Reconstruction

Update flag

Description

John Ward Bathroom Reconstruction

Justification

Bathroom facility is subpar, no interior or security lighting, access paths too steep for current ADA.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance		250,000				250,000
Total		250,000				250,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund		250,000				250,000
Total		250,000				250,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Storm Utility
Contact Public Services Director
Type Redevelopment
Useful Life
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # SW-16-02
Project Name Trunk Storm Sewer Improvements

Update flag

Description

Trunk storm sewer improvements need to occur during the SRP project. With storm water requirements becoming more costly for the City, the City is planning for trunk storm sewer projects in addition to the storm sewer infrastructure installed on the SRP projects.

Justification

As areas of the city are completed by the SRP projects, new areas where storm sewer is limited will be completed. Additional budgeting will be required to begin these trunk storm sewer studies and projects.

2019 and 2020 SRP will be in a new areas of the City.

Expenditures	2018	2019	2020	2021	2022	Total
Redevelopment		250,000	100,000			350,000
Total		250,000	100,000			350,000

Funding Sources	2018	2019	2020	2021	2022	Total
Stormwater Utility Fund		250,000	100,000			350,000
Total		250,000	100,000			350,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Water Utility
Contact Public Works Director
Type Improvement
Useful Life 20 years
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # WU-003
Project Name Water Treatment Plant # 3 Exterior Repairs

Update flag

Description

Tuck point, replace brick, and perform structural repairs as needed on water treatment plan #3.

Justification

The face brick façade at water treatment plant number 3 is failing and is in need of repair. Many bricks are loose or missing completely. This needs to be done to reduce larger future maintenance costs and to provide for the ongoing operation of water treatment plant number 3.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance		80,000				80,000
Total		80,000				80,000

Funding Sources	2018	2019	2020	2021	2022	Total
Water Fund		80,000				80,000
Total		80,000				80,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Water Utility
Contact Public Services Director
Type Improvement
Useful Life 50 years
Category Public Utilities Facilities
Priority 2 Very Important
Status Active

City of Anoka, Minnesota

Project # WU-024
Project Name Expansion of Water Treatment Plant 6 & 8

Update flag

Description

Expand the size of Water Treatment Plant 6 & 8 and install two additional filters to double our Pumping & Treatment capacity. Increase the size of the Deep Well Pumps correspondingly to allow production of +/- 4 Million Gallons/Day.

Justification

City wells are run at near 100% capacity in June, July, and August each summer. A pump or other treatment failure would greatly reduce the City's ability to provide water for domestic use or fire protection.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance		1,000,000	4,521,000			5,521,000
Total		1,000,000	4,521,000			5,521,000

Funding Sources	2018	2019	2020	2021	2022	Total
Water Fund		1,000,000	4,521,000			5,521,000
Total		1,000,000	4,521,000			5,521,000

Budget Impact/Other

2020

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings

Contact

Type Equipment

Useful Life 20 years

Category Unassigned

Priority 2 Very Important

Status Active

Project # BM-CH-018

Project Name New ADA Wheel-Chair Lift @ City Hall

Update flag

Description

The old Wheel-Chair lift located in the Lower Level of City Hall is inadequate in both physical size and weight limitations.

Justification

Many new wheel chairs are too large to fit within the car and are too heavy for the ancient lift.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			30,000			30,000
Total			30,000			30,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund			30,000			30,000
Total			30,000			30,000

Budget Impact/Other

Budget Items	2018	2019	2020	2021	2022	Total
Equipment	30,000					30,000
Total	30,000					30,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Services Director
Type Improvement
Useful Life 15 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # BM-MB-012
Project Name Walker Parking Ramp - Joint Caulking

Update flag

Description

Prep and recaulk the ramp's deck joints with elastomeric compound.

Justification

At present the caulking is worn out or missing. This type of caulking is necessary to prevent water intrusion into the joints. When this water freezes, it will, over time, destroy the concrete deck.

Prior	Expenditures	2018	2019	2020	2021	2022	Total
15,000	Construction/Maintenance			25,000			25,000
Total	Total			25,000			25,000

Prior	Funding Sources	2018	2019	2020	2021	2022	Total
15,000	Parking fund			25,000			25,000
Total	Total			25,000			25,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Services Director
Type Improvement
Useful Life 10 years
Category General Public Buildings
Priority 2 Very Important
Status Active

Project # BM-PW-002
Project Name Public Services - Exterior Painting

Update flag

Description

Prep, tuck point, caulk, and repaint various areas on the exterior of the Public Services Building.

Justification

Any building of this size, age and construction type can be expected to require this type of action with some regularity. Keeping a professional, well ordered appearance is important at all City buildings, this one is no different. This repair could be delayed or cancelled depending on the scheduled construction of the New Public Services Building.

Expenditures	2018	2019	2020	2021	2022	Total	Future
Construction/Maintenance			65,000			65,000	65,000
Total			65,000			65,000	Total

Funding Sources	2018	2019	2020	2021	2022	Total	Future
Capital Improvement fund			65,000			65,000	65,000
Total			65,000			65,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Services Director
Type Improvement
Useful Life 20 years
Category General Public Buildings
Priority 4 Less Important
Status Active

Project # BM-PW-004
Project Name Public Works - Fire Alarms

Update flag

Description

Upgrade the building's fire alarm system to modernize and broaden coverage.

Justification

The present fire alarm system doesn't have horns or strobe lights that can be detected from all parts of the facility. Additional smoke and heat sensors should be added to decrease response time in the event of a fire. This repair could be delayed or cancelled depending on the scheduled construction of the New Public Services Building.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			35,000			35,000
Total			35,000			35,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund			35,000			35,000
Total			35,000			35,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings

Contact

Type Unassigned

Useful Life 20 years

Category Unassigned

Priority 2 Very Important

Status Active

Project # BM-PW-012
Project Name Re-Roof Public Services Building

Update flag

Description

Roof Replacement at Public Services

Justification

Many areas of the Existing Roof are damaged and in need of replacement. We continually have roof repairs don't to stop the roof leaks but the roof is worn out.

Expenditures	2018	2019	2020	2021	2022	Total
Redevelopment			190,000			190,000
Total			190,000			190,000

Funding Sources	2018	2019	2020	2021	2022	Total
Electric			190,000			190,000
Total			190,000			190,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Services Director
Type Improvement
Useful Life 25 years
Category General Public Buildings
Priority 3 Important
Status Active

Project # PWBM-CH-011
Project Name City Hall-Main Building Reroofing

Update flag

Description

Remove and replace roof on the main part of City Hall.

Justification

This built up flat roof is not well over 30 years old, and is beyond its normal life expectancy. It has been modified and patched many times over the years and each one of these sites represents an existing or potential leak.

Possible do with the renovation of City Hall Project. (project PWBM-CH-010)

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			270,000			270,000
Total			270,000			270,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund			270,000			270,000
Total			270,000			270,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Cemetery

Contact

Type Improvement

Useful Life 30 years

Category Unassigned

Priority 5 Future Consideration

Status Active

Project # CEM17-03

Project Name Decorative Fence

Update flag

Description

Upgrade chain link perimeter fence on Forest Ave from Church Street to Main Entrance
20% project cost for design / engineering

Justification

The chain link fence is uninviting and degrades the overall esthetic of the cemetery. Installation of black rail fencing and decorative stone pillars along Forest Ave would improve the appearance of cemetery (similar to Oakwood).

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			25,000			25,000
Construction/Maintenance				125,000		125,000
Total			25,000	125,000		150,000

Funding Sources	2018	2019	2020	2021	2022	Total
Cemetery fund			25,000	125,000		150,000
Total			25,000	125,000		150,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Community Development
Contact Community Development Man
Type Redevelopment
Useful Life
Category Community Development Acti
Priority 4 Less Important
Status Active

Project # CD-08-2
Project Name Bunker/Thurston Redevelopment

Update flag

Description

Redevelopment of this area.

Justification

There is a potential redevelopment project for this area yet to be identified.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			25,000			25,000
Total			25,000			25,000

Funding Sources	2018	2019	2020	2021	2022	Total
Tax Increment Funds			25,000			25,000
Total			25,000			25,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Community Development
Contact Community Development Man
Type Redevelopment
Useful Life
Category Community Development Acti
Priority 3 Important
Status Active

Project # CD-08-3
Project Name NCBD phase III

Update flag

Description
 Future redevelopment on 3rd Avenue

Justification
 Complete NCBD redevelopment by acquiring property and redeveloping 3rd Avenue between Jackson and Harrison Street.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			25,000			25,000
Total			25,000			25,000

Funding Sources	2018	2019	2020	2021	2022	Total
Tax Increment Funds			25,000			25,000
Total			25,000			25,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 20 years
Category Public Utilities Facilities
Priority n/a
Status Active

Project # EN-09-04
Project Name Rum River Dam Gate Maintenance

Update flag

Description

Tainter gate repairs & seal replacement plus equipment painting.
 In 2016, 5% was added to \$150,000 for construction cost increase

Justification

During its life to date the dam has required little or no actual repairs and its structure is basically sound. However, the control (tainter) gate has been racked approximately 4" out of plumb, probably by ice action. This gate is the determining factor in the existence of the summer time pool above the dam. Continued deferral of maintenance and repairs will lead to the gate's failure. Also, the gate and its associated equipment have not been painted since the dam was constructed in 1968. This paint is now failing and should be replaced.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			158,000			158,000
Total			158,000			158,000

Funding Sources	2018	2019	2020	2021	2022	Total
Stormwater Utility Fund			158,000			158,000
Total			158,000			158,000

Budget Impact/Other

In 2007 The Public Services Department seized an opportunity to have repairs done to the damaged ice breakers below the dam. This activity was previously laid out in ST 07-02. Expenditures and funding have been reduced to reflect the work already accomplished.

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-16-10
Project Name 2020 Street Renewal

Update flag

Description

Complete reconstruction of the following City streets:

8th Av (Harrison to TH-10)
 8 1/2 Av (Main to Jackson)
 9th Av (Main to Jackson)
 Polk St (7th to 8th)
 Bob Ehlen Dr (7th to 8th)
 Harrison St (7th to 8th)
 Jackson St (7th to 89h)
 Alley (8th Ave) (7th to 9th)

Total Length = 4,750 LF (Street Const)

The relocation of 8 1/2 Av Lift Station is a separate project that should be completed during the 2020 SRP project

Justification

Streets and underground utilities are in poor condition and are in need of reconstruction

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			178,100			178,100
Construction/Maintenance			1,568,620			1,568,620
Total			1,746,720			1,746,720

Funding Sources	2018	2019	2020	2021	2022	Total
Electric			291,120			291,120
Sanitary Sewer Fund			144,100			144,100
Special Assessments			363,900			363,900
Stormwater Utility Fund			322,140			322,140
Street Renewal Fund			343,945			343,945
Water Fund			281,515			281,515
Total			1,746,720			1,746,720

Budget Impact/Other

Includes 5% for construction cost increase

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parking
Contact Public Services Director
Type Improvement
Useful Life 25 years
Category Transportation Facilities
Priority 4 Less Important
Status Active

Project # BM-009
Project Name 2nd Avenue - Building Site #2 parking Lot

Update flag

Description

Create a parking lot on 2nd Avenue on Building Site Pad No. 2 - just north of the HRRD Parking Ramp on the east side of 2nd Avenue.
 Create 136 stalls - includes above ground infiltration basins. A 154 stall parking lot could be created if below ground infiltration containers are used at a total project cost of \$423,500

Justification

Create more downtown parking capacity

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			54,000			54,000
Construction/Maintenance				306,800		306,800
Total			54,000	306,800		360,800

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund			54,000	306,800		360,800
Total			54,000	306,800		360,800

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 5 Future Consideration
Status Active

Project # PR06-44
Project Name Reconstruction of Park Buildings Johnson/Sorenson

Update flag x

Description

Upon completion of architectural-structure review of the park buildings, Rick Sorenson park buildings and restrooms, Rudy Johnson Park building and restrooms. Remodling design and reconstruction should be conducted.

Justification

Both of these park structures need architectural professional services to replace door, glass, air flow, and electrical and mechanical improvements. To keep these structures available for public uses.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			250,000			250,000
Total			250,000			250,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund			250,000			250,000
Total			250,000			250,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type Improvement
Useful Life 15 yrs
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Project # PR12-03
Project Name Sunny Acres Park Improvement Project

Update flag

Description

Improve Sunny Acres Park by rehabilitation the pavillion and regrade softball field outfields

Justification

To maintain and revitalize Sunny Acres Park.
 Outfields require periodic leveling due to nature of ground conditions (landfill site).
 Coordinate field work with irrigation repairs, move irrigation system to city water from well

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			200,000			200,000
Total			200,000			200,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Capital Improvement fund			200,000			200,000
Total			200,000			200,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director

City of Anoka, Minnesota

Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 4 Less Important
Status Active

Project # PR15-05
Project Name 7th Avenue Trailway

Update flag

Description

Construct a 10' wide bituminous trailway from Garfield Street to Castle Field Boulevard
 4960' @ \$40/ft = \$200,000

Justification

As per City trailway plan

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering			15,000			15,000
Construction/Maintenance				200,000		200,000
Total			15,000	200,000		215,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Capital Improvement fund			15,000	200,000		215,000
Total			15,000	200,000		215,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director

City of Anoka, Minnesota

Project # PR16 - 01
Project Name Rum River Trail - Riverbank Stabilization

Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Update flag

Description

High water erosion and undercutting of bank along Rum River Trail

Justification

Trees falling into river, parrallel cracks in trail indicate undermining of river bank/trail, massive bank deterioration along 150-200' of trail. East side of river in this location is cut bank. Shoreline is on state/military affairs owned property - Rum River Regional Trail is allowed per easement. Multi-agency coordination will be required to repair shoreline. Grants may be available with assistance from ASWCD.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			150,000			150,000
Total			150,000			150,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund			30,000			30,000
Grants			120,000			120,000
Total			150,000			150,000

Budget Impact/Other

Currently working with ASWCD to determine plan and budget impact

Prior

150,000

Total

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Sanitary Utility

Contact

Type Unassigned

Useful Life

Category Unassigned

Priority n/a

Status Active

Project # SW-016
Project Name 8 1/2 Av Lift Station

Update flag

Description

Relocate the lift station that is presently in the roadway on 8 1/2 Avenue to the east boulevard during the 2020 SRP project.

Justification

8 1/2 Avenue will be reconstructed in 2020 and this will be the correct timing to relocate the lift station located in the roadway on 8 1/2 Avenue. It is presently in the center of 8 1/2 and vehicle traffic damaged the cover requiring frequent repair.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance			150,000			150,000
Total			150,000			150,000

Funding Sources	2018	2019	2020	2021	2022	Total
Sanitary Sewer Fund			150,000			150,000
Total			150,000			150,000

Budget Impact/Other

2021

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-16-04
Project Name 2021 SRP - Swede Town

Update flag

Description

Complete reconstruction of the following City streets:
 5th Avenue (Golf to Harrison)
 6th Avenue (Harrison to Jackson)
 School Street (5th to 7th)
 Van Buren St (4th to 7th)
 Alley (4th to 5th)

Total Length = 5,350 LF (Street Const)

Justification

Streets and underground utilities are in poor condition and are in need of reconstruction

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering				255,420		255,420
Construction/Maintenance				1,519,580		1,519,580
Total				1,775,000		1,775,000

Funding Sources	2018	2019	2020	2021	2022	Total
Electric				244,545		244,545
Municipal State Aid				306,200		306,200
Sanitary Sewer Fund				158,925		158,925
Special Assessments				369,475		369,475
Stormwater Utility Fund				348,365		348,365
Street Renewal Fund				77,975		77,975
Water Fund				269,515		269,515
Total				1,775,000		1,775,000

Budget Impact/Other

Includes 5% for construction cost increase

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Liquor Stores
Contact Liquor Store Manager
Type New
Useful Life 40 years
Category General Public Buildings
Priority 3 Important
Status Active

Project # LQ18-02
Project Name West store relocation

Update flag

Description
 Better Values Liquor Store West Relocation

Justification

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance				2,500,000		2,500,000
Total				2,500,000		2,500,000

Funding Sources	2018	2019	2020	2021	2022	Total
Revenue Bonds				2,500,000		2,500,000
Total				2,500,000		2,500,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type New
Useful Life 25 years
Category Transportation Facilities
Priority 2 Very Important
Status Active

Project # EN-16-08
Project Name South Frontage Road Phase I

Update flag

Description

Phase I of the the South Frontage Road from Cutters Grove Avenue to West Main Street backage road is shown in the Greens of Anoka Study and the Highway 10 Access Planning Study. Two lane section with side walk.

Phase I construction will be from Cutters Grove to Fair oak Ave.

2018 Construction

Justification

This roadway will act as the south frontage road for Trunk Highway 10, providing continuous local connection from Cutters Grove to West Main Street. This frontage road needs to be completed prior to improvements at Thurston Avenue and Highway 10.

Phase 1 Benefits

- Many travelers cut through the existing private parking lot to circulate and will help with this
- Provides a public connection from Cutters Grove to the existing frontage road
- Allows public circulation south of Highway 10 between access points

Expenditures	2018	2019	2020	2021	2022	Total	Future
Planning/Design/Engineering					250,000	250,000	1,750,000
Land Acquisition				100,000		100,000	
Total				100,000	250,000	350,000	Total

Funding Sources	2018	2019	2020	2021	2022	Total	Future
Street Renewal Fund				100,000	250,000	350,000	1,750,000
Total				100,000	250,000	350,000	Total

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Parks and Recreation
Contact Public Services Director
Type Improvement
Useful Life 25 years
Category Parks and Recreation Facilities
Priority 4 Less Important
Status Active

Project # PR12-01
Project Name John Ward Park Drainage Enhancement Project

Update flag

Description

Install an underdrain system within the low spot adjacent to the skate board area within John Ward Park. The system would have three drains of 150' long located approximately 2 feet below the surface to collect the water. City estimate \$100 dir bore, 25% engineering, 27% inflation. Piping across the park would be 800 lineal feet of 8" HDPE Horizontally Directionally Drilled at a average grade of 0.475% with two large radius pipe riser cleanouts located in the center near one of the existing light poles.
 Estimated Project Cost of \$67,500.00

Justification

To prevent additional stormwater runoff from leaching into the underlying materials.

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering				30,000		30,000
Construction/Maintenance				130,000		130,000
Total				160,000		160,000

Funding Sources	2018	2019	2020	2021	2022	Total
Stormwater Utility Fund				160,000		160,000
Total				160,000		160,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life 25 years
Category Parks and Recreation Facilities
Priority 3 Important
Status Active

Project # PR15-04
Project Name RRSN Trailway Connections

Update flag

Description

Construct an 10 ft. bituminous trailway connection heading south along CSAH 7 to CSAH 116 trailway system. From ANP to CSAH 7 along the city limits completed in 2016 with the development.

Justification

To complete trail connections to the ANP to the county trail system in Anoka.
 Approx 2000' @ \$40/ft = \$80,000

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance				80,000		80,000
Total				80,000		80,000

Funding Sources	2018	2019	2020	2021	2022	Total
Park Dedication fund				80,000		80,000
Total				80,000		80,000

Budget Impact/Other

2022

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Services Director
Type Improvement
Useful Life 20 years
Category General Public Buildings
Priority 3 Important
Status Active

Project # BM-CH-011
Project Name City Hall - Tuck point exterior walls

Update flag

Description

Tuck point - brick replacement - referbishment to exterior walls and brick.

Justification

The exterior walls of City Hall are in need of spot tuck pointing. Some brick replacement. Block needs to be replaced that have cracked and chipped of.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					75,000	75,000
Total					75,000	75,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund					75,000	75,000
Total					75,000	75,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Buildings
Contact Public Works Director
Type Improvement
Useful Life 10 years
Category General Public Buildings
Priority 4 Less Important
Status Active

Project # BM-PD-001
Project Name Safety Center - Masonry Cleaning

Update flag

Description

Clean the exterior brick to remove efflorescence. Reseal as necessary.

Justification

This facility is new, the white streaking (efflorescence) should be removed to maintain its appearance.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					25,000	25,000
Total					25,000	25,000

Funding Sources	2018	2019	2020	2021	2022	Total
General Fund					25,000	25,000
Total					25,000	25,000

Budget Impact/Other

Capital Improvement Plan
City of Anoka, Minnesota

2018 *thru* 2022

Department Engineering
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 3 Important
Status Active

Project # EN-15-06
Project Name 2022 Street Renewal

Update flag

Description
 Complete reconstruction 3,500 linear feet of City streets.

Justification
 Streets and underground utilities are in poor condition and are in need of reconstruction

Expenditures	2018	2019	2020	2021	2022	Total
Planning/Design/Engineering					272,200	272,200
Construction/Maintenance					1,619,875	1,619,875
Total					1,892,075	1,892,075

Funding Sources	2018	2019	2020	2021	2022	Total
Electric					315,345	315,345
Sanitary Sewer Fund					234,780	234,780
Special Assessments					394,180	394,180
Stormwater Utility Fund					364,200	364,200
Street Renewal Fund					293,425	293,425
Water Fund					290,145	290,145
Total					1,892,075	1,892,075

Budget Impact/Other
 Includes 5% for construction cost increase

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Engineering
Contact Public Works Director
Type Improvement
Useful Life 50 years
Category Utility Infrastructure
Priority 2 Very Important
Status Active

Project # EN-19-01
Project Name Utility Expansion/Extension @ TH-47 & BNSF

Update flag

Description

Extend City Sewer From Martin St. to the BNSF rail road crossing. Currently there are three parcels on spetic systems.
 Install City Watermain from Martin St to to wells #1 & 2 north of rail road tracks.

Justification

MNDOT is in preliminary design for the grade seperation project at the rail road crossing located on TH-47.
 The City will install a new trunk watermain along TH-47 to complete the looping of the water system. The current watermain is old and located under a building.
 In 2016, 5% was added to \$118,000 for construction cost increase

Expenditures	2018	2019	2020	2021	2022	Total
Redevelopment					199,000	199,000
Total					199,000	199,000

Funding Sources	2018	2019	2020	2021	2022	Total
Sanitary Sewer Fund					124,000	124,000
Water Fund					75,000	75,000
Total					199,000	199,000

Budget Impact/Other

Watermain 800 feet @ \$80 per foot = \$75,000
 In 2016, 5% was added to \$118,000 for construction cost increase for the sanitary sewer.

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life
Category Parks and Recreation Facilities
Priority n/a
Status Active

Project # PR14-01
Project Name Anoka Enterprise Park Trail connection

Update flag

Description

Trail that allows golf cart access from the Anoka Enterprise Business Park to Green Haven Golf Course.
 Two Sections:
 Trail Section One - trail into Green Haven Golf Course which connects to the existing golf trails - \$50,000
 Section Two McKinley Street trail connection to the City of Ramsey - \$50,000

Justification

Increase use / reveune of Green Haven Golf Course

Expenditures	2018	2019	2020	2021	2022	Total	Future
Construction/Maintenance					50,000	50,000	50,000
Total					50,000	50,000	Total

Funding Sources	2018	2019	2020	2021	2022	Total	Future
Park Capital Improvement fund					50,000	50,000	50,000
Total					50,000	50,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Parks and Recreation
Contact Public Services Director
Type New
Useful Life 30 years
Category Parks and Recreation Facilities
Priority 4 Less Important
Status Active

Project # PR14-04
Project Name Kings Island Improvements - Phase II

Update flag

Description
 Kings Island Phase II - Traill spurs, camp sites and fishing dock; could also include secondary access off Hwy 10

Justification
 Provide Recreational Opportunities

Expenditures	2018	2019	2020	2021	2022	Total	Future
Planning/Design/Engineering					10,000	10,000	310,000
Total					10,000	10,000	Total

Funding Sources	2018	2019	2020	2021	2022	Total	Future
Park Capital Improvement fund					10,000	10,000	310,000
Total					10,000	10,000	Total

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Public Works
Contact Public Services Director
Type Improvement
Useful Life 15 years
Category General Public Buildings
Priority 2 Very Important
Status Active

Project # MP-065
Project Name Power Gate System # 1

Update flag

Description

Power Gate System at Public Services Building @ 501 Pierce St.

Justification

The Power Gate Systems at Anoka Public Services Building are 40 Years old and are obsolete, parts no longer available. One gate has failed multiple times and we are loosing our ability to repair/maintain the gates. This repair could be delayed or cancelled depending on the scheduled construction of the New Public Services Building.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					20,000	20,000
Total					20,000	20,000

Funding Sources	2018	2019	2020	2021	2022	Total
Capital Improvement fund					20,000	20,000
Total					20,000	20,000

Budget Impact/Other

Budget Items	2018	2019	2020	2021	2022	Total
Equipment					20,000	20,000
Total					20,000	20,000

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Sanitary Utility
Contact Public Services Director
Type Improvement
Useful Life 30 years
Category Public Utilities Facilities
Priority 3 Important
Status Active

Project # SW-014
Project Name Industrial Blvd Sewer Extension

Update flag

Description

Install 500' of sanitary sewer east of Thurston Av along the south boulevard of Industrial Blvd.

Justification

Provide sewer services to 650 & 652 Bunker Lake Blvd.
 Currently parcels are on septic systems that were installed in the late 70's.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					60,000	60,000
Total					60,000	60,000

Funding Sources	2018	2019	2020	2021	2022	Total
Sanitary Sewer Fund					60,000	60,000
Total					60,000	60,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

City of Anoka, Minnesota

Department Streets
Contact Public Works Director
Type Improvement
Useful Life 30 years
Category Transportation Facilities
Priority 4 Less Important
Status Active

Project # ST 15-06
Project Name Rum River Pedestrian Bridge Coating Project

Update flag

Description

Paint/ Coat

Justification

All bridges should be inspected every 2 to 5 years. Maintenance cost to sandblast and paint should occur every 10 years.
 Possible MNDOT assistance

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					200,000	200,000
Total					200,000	200,000

Funding Sources	2018	2019	2020	2021	2022	Total
Street Renewal Fund					200,000	200,000
Total					200,000	200,000

Budget Impact/Other

Capital Improvement Plan

2018 *thru* 2022

Department Water Utility

City of Anoka, Minnesota

Contact

Project # WU-036
Project Name Reconditioning of Water Tower 2 (Industrial Park)

Type Unassigned

Useful Life 20 years

Category Unassigned

Priority 3 Important

Status Active

Update flag

Description

The COA 1.5 Million Gallon Water Tower (Tank # 2) at the Industrial Park is now 20+ Years Old and it is time for a Complete Reconditioning of both Inside and Out. Other necessary repairs are often identified during this process.

Justification

As a Matter of a Good Water Maint. Plan, 15 to 20 year inspections are performed to identify issues needing repair. The Paint on these Towers typically lasts 20 Years.

Expenditures	2018	2019	2020	2021	2022	Total
Construction/Maintenance					1,200,000	1,200,000
Total					1,200,000	1,200,000

Funding Sources	2018	2019	2020	2021	2022	Total
Water Fund					1,200,000	1,200,000
Total					1,200,000	1,200,000

Budget Impact/Other

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APPENDIX B:

Water Supply Plan

Local Surface Water Management Plan

Sewer Connection Policy

City Code Chpt. 38 Article III

Minnesota Rules 4715.0310

Copy of MS4 SWPPP Application



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City of Anoka Local Water Supply Plan Third Generation for 2016-2018

December 28, 2016 (Revised June 2017)

SEH File ANOKA 139052

Formerly called Water Emergency & Water Conservation Plan



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DEPARTMENT OF NATURAL RESOURCES – DIVISION OF ECOLOGICAL AND WATER RESOURCES AND METROPOLITAN COUNCIL

INTRODUCTION TO WATER SUPPLY PLANS (WSP)

Who needs to complete a Water Supply Plan

Public water suppliers serving more than 1,000 people, large private water suppliers in designated Groundwater Management Areas, and all water suppliers in the Twin Cities metropolitan area are required to prepare and submit a water supply plan.

The goal of the WSP is to help water suppliers: 1) implement long term water sustainability and conservation measures; and 2) develop critical emergency preparedness measures. Your community needs to know what measures will be implemented in case of a water crisis. A lot of emergencies can be avoided or mitigated if long term sustainability measures are implemented.

Groundwater Management Areas (GWMA)

The DNR has designated three areas of the state as Groundwater Management Areas (GWMAs) to focus groundwater management efforts in specific geographies where there is an added risk of overuse or water quality degradation. A plan directing the DNR's actions within each GWMA has been prepared. Although there are no specific additional requirements with respect to the water supply planning for communities within designated GWMAs, communities should be aware of the issues and actions planned if they are within the boundary of one of the GWMAs. The three GWMAs are the North and East Metro GWMA (Twin Cities Metro), the Bonanza Valley GWMA and the Straight River GWMA (near Park Rapids). Additional information and maps are included in the DNR webpage at <http://www.dnr.state.mn.us/gwmp/areas.html>

Benefits of completing a WSP

Completing a WSP using this template, fulfills a water supplier's statutory obligations under M.S. [M.S.103G.291](#) to complete a water supply plan. For water suppliers in the metropolitan area, the WSP will help local governmental units to fulfill their requirements under M.S. 473.859 to complete a local comprehensive plan. Additional benefits of completing WSP template:

- The standardized format allows for quicker and easier review and approval.
- Help water suppliers prepare for droughts and water emergencies.
- Create eligibility for funding requests to the Minnesota Department of Health (MDH) for the Drinking Water Revolving Fund.
- Allow water suppliers to submit requests for new wells or expanded capacity of existing wells.
- Simplify the development of county comprehensive water plans and watershed plans.
- Fulfill the contingency plan provisions required in the MDH wellhead protection and surface water protection plans.
- Fulfill the demand reduction requirements of Minnesota Statutes, section 103G.291 subd 3 and 4.

- Upon implementation, contribute to maintaining aquifer levels, reducing potential well interference and water use conflicts, and reducing the need to drill new wells or expand system capacity.
- Enable DNR to compile and analyze water use and conservation data to help guide decisions.
- Conserve Minnesota’s water resources

If your community needs assistance completing the Water Supply Plan, assistance is available from your area hydrologist or groundwater specialist, the MN Rural Waters Association circuit rider program, or in the metropolitan area from Metropolitan Council staff. Many private consultants are also available.

WSP Approval Process

10 Basic Steps for completing a 10-Year Water Supply Plan

1. Download the DNR/Metropolitan Council Water Supply Plan Template www.mndnr.gov/watersupplyplans
2. Save the document with a file name with this naming convention:
WSP_cityname_permitnumber_date.doc.
3. The template is a form that should be completed electronically.
4. Compile the required water use data (Part 1) and emergency procedures information (Part 2)
5. The Water Conservation section (Part 3) may need discussion with the water department, council, or planning commission, if your community does not already have an active water conservation program.
6. Communities in the seven-county Twin Cities metropolitan area should complete all the information discussed in Part 4. The Metropolitan Council has additional guidance information on their webpage <http://www.metrocouncil.org/Handbook/Plan-Elements/Water-Resources/Water-Supply.aspx>. All out-state water suppliers do *not* need to complete the content addressed in Part 4.
7. Use the Plan instructions and Checklist document to insure all data is complete and attachments are included. This will allow for a quicker approval process. www.mndnr.gov/watersupplyplans
8. Plans should be submitted electronically – no paper documents are required. <https://webapps11.dnr.state.mn.us/mpars/public/authentication/login>
9. DNR hydrologist will review plans (in cooperation with Metropolitan Council in Metro area) and approve the plan or make recommendations.
10. Once approved, communities should complete a Certification of Adoption form, and send a copy to the DNR.

Complete Table 1 with information about the public water supply system covered by this WSP.

Table 1. General information regarding this WSP

Requested Information	Description
DNR Water Appropriation Permit Number(s)	1976-6187
Ownership	<input checked="" type="checkbox"/> Public or <input type="checkbox"/> Private
Metropolitan Council Area	<input checked="" type="checkbox"/> Yes or <input type="checkbox"/> No (and county name)
Street Address	2015 2nd Ave
City, State, Zip	Anoka, MN 55303
Contact Person Name	Pete Klingenberg
Title	Water & Sewer Superintendent
Phone Number	763.576.2923
MDH Supplier Classification	Municipal

PART 1. WATER SUPPLY SYSTEM DESCRIPTION AND EVALUATION

The first step in any water supply analysis is to assess the current status of demand and availability. Information summarized in Part 1 can be used to develop Emergency Preparedness Procedures (Part 2) and the Water Conservation Plan (Part 3). This data is also needed to track progress for water efficiency measures.

A. Analysis of Water Demand

Complete Table 2 showing the past 10 years of water demand data.

- Some of this information may be in your Wellhead Protection Plan.
- If you do not have this information, do your best, call your engineer for assistance or if necessary leave blank.

If your customer categories are different than the ones listed in Table 2, please describe the differences below:

A column for agricultural water use was added, to highlight that no agricultural water use has occurred in Anoka. Additional columns were added to the table for Max Day per capita Demand (GPCD) and Max Day: Average Day per capita Demand (GPCD) in order to better illustrate historic max day water usage.

Anoka Local Water Supply Plan – December 2016 (Revised June 2017)

Table 2. Historic water demand (see definitions in the glossary after Part 4 of this template)

Year	Pop. Served	Total Connections	Residential Water Delivered (MG)	C/I/I Water Delivered (MG)	Agricultural Water Delivered (MG)	Water used for Non-essential	Wholesale Deliveries (MG)	Total Water Delivered (MG)	Total Water Pumped (MG)
2005	18,076	5189	387.0	376.9	0	0	0	763.90	916.32
2006	18,076	5079	423.5	416.1	0	0	0	839.60	1041.95
2007	18,076	5066	438.4	410.6	0	0	0	849.00	1077.58
2008	18,076	5199	371.0	368.2	0	0	0	739.20	969.30
2009	18,076	5,217	383.3	374.9	0	0	0	758.15	922.28
2010	17,142	5,206	456.3	251.3	0	0	0	707.55	868.19
2011	17,142	5,208	441.7	239.6	0	0	0	681.25	805.44
2012	17,142	5,191	474.5	240.2	0	0	0	737.70	898.44
2013	18,000	7,482	456.7	240.5	0	0	0	737.17	859.49
2014	18,000	7,505	414.2	216.1	0	0	0	637.25	838.92
2015	17,345	5,154	418.2	225.3	0	0	0	675.46	827.43
Avg. 2010-2015	17,462	5,892	443.6	235.5	0	0	0	738.75	849.65

Table 2 (Cont.)

Year	Water Supplier Services (MG)	Percent Unmetered/Unaccounted	Average Daily Demand (MGD)	Max. Daily Demand (MGD)	Date of Max. Demand	Residential Per Capita Demand (GPCD)	Total per capita Demand (GPCD)	Max Day per capita Demand (GPCD)	Max Day / Average Day Ratio
2005	N/A	17%	N/A	N/A	N/A	58.66	138.88	N/A	N/A
2006	N/A	19%	N/A	N/A	N/A	64.19	157.92	N/A	N/A
2007	N/A	21%	N/A	N/A	N/A	66.45	163.33	N/A	N/A
2008	N/A	24%	N/A	N/A	N/A	56.23	146.91	N/A	N/A
2009	N/A	18%	2.53	5.80	8/13/2009	58.09	139.79	334.93	2.29
2010	N/A	19%	2.38	4.50	5/29/2010	72.92	138.76	248.33	1.89
2011	N/A	15%	2.21	4.50	9/13/2011	70.59	128.73	262.22	2.04
2012	N/A	20%	2.46	4.88	9/3/2012	75.84	143.59	282.86	1.98
2013	40.00	14%	2.35	5.40	8/27/2013	72.99	137.37	299.78	2.29
2014	6.88	24%	2.30	4.98	7/24/2014	66.21	134.08	276.61	2.17
2015	32.00	18%	2.27	4.08	8/2/2015	66.84	132.24	234.94	1.79
Avg. 2010-2015	26.29	19%	2.33	4.72	--	70.90	135.80	267.46	2.03

MG – Million Gallons **MGD** – Million Gallons per Day **GPCD** – Gallons per Capita per Day -- See Glossary for definitions

Note: Population served for 2013-2015 is based on City reported data in the MPARS Water Use Reports. All other populations are based on the Metropolitan Council’s Community Profile census data for the relevant decade. Water Supplier Services (WSS) usage wasn’t recorded prior to 2013- Total Water Delivered and Percent Unmetered/Unaccounted do not take into account WSS values for these years.

Complete Table 3 by listing the top 10 water users by volume, from largest to smallest. For each user, include information about the category of use (residential, commercial, industrial, institutional, or wholesale), the amount of water used in gallons per year, the percent of total water delivered, and the status of water conservation measures.

Table 3. Large volume users

Customer	Use Category (Residential, Industrial, Commercial, Institutional, Wholesale)	Amount Used (Gallons per Year)	Percent of Total Annual Water Delivered	Implementing Water Conservation Measures? (Yes/No/Unknown)
Hoffman Engineering	Industrial	1,480,511	0.23%	No
Federal Cartridge	Industrial	982,127	0.15%	No
Anoka Rehab & Living Center	Commercial	680,200	0.11%	No
Anoka Metro Regional Treat Ctr	Commercial	652,965	0.10%	No
Rainbow Plaza Apartments	Commercial	622,703	0.10%	No
Anoka County Jail	Commercial	604,000	0.09%	No
Anoka Cty Dept of Property Mgt	Commercial	597,422	0.09%	No
Anoka Government Center	Commercial	554,000	0.09%	No
Anoka Metro Regional Treat Ctr	Commercial	527,960	0.08%	No
Cutter Gr Est/Mgmnt	Commercial	498,434	0.08%	No
Total		7,200,322	1.12%	

B. Treatment and Storage Capacity

Complete Table 4 with a description of where water is treated, the year treatment facilities were constructed, water treatment capacity, the treatment methods (i.e. chemical addition, reverse osmosis, coagulation, sedimentation, etc.) and treatment types used (i.e. fluoridation, softening, chlorination, Fe/MN removal, coagulation, etc.). Also describe the annual amount and method of disposal of treatment residuals. Add rows to the table as needed.

Table 4. Water treatment capacity and treatment processes

Treatment Site ID (Plant Name or Well ID)	Year Constructed	Rated Treatment Capacity (GPD)	Treatment Method	Treatment Type	Annual Amount of Residuals	Disposal Process for Residuals	Do You Reclaim Filter Backwash Water?
TP 3	1947	1.22 MGD	Chemical Add & Filter	FL,CL2, FE/MN Removal	0	NA	No
TP 4	1959	1.15 MGD	Chemical Add & Filter	FL,CL2, HMO (FE/MN Radium Removal)	0	NA	No
TP 5	1965	2.09 MGD	Chemical Add & Filter	FL,CL2, FE/MN Removal	0	NA	No
TP 7	1989	0.860 MGD ⁽¹⁾	Chemical Add & Filter	FL,CL2, FE/MN Removal, HMO (Radium Removal)	0	NA	No
TP 6	1974	2.88 MGD	Chemical Add & Filter	FL,CL2, FE/MN Removal, HMO (Radium Removal)	0	NA	No
Total	NA	8.23 MGD⁽¹⁾	NA	NA	0	NA	

Notes:

(1) Actual capacity of WTPs restricted to annual flow-weighted average by MDH MOA for radium compliance. Refer to 2015 Comprehensive Water Plan.

Complete Table 5 with information about storage structures. Describe the type (i.e. elevated, ground, etc.), the storage capacity of each type of structure, the year each structure was constructed, and the primary material for each structure. Add rows to the table as needed.

Table 5. Storage capacity, as of the end of the last calendar year

Structure Name	Type of Storage Structure	Year Constructed	Primary Material	Storage Capacity (Gallons)
Tower 1	Elevated storage	1953	Steel	0.50 MG
Tower 2	Elevated storage	2002	Steel	1.50 MG
Tower 3	Elevated storage	1960	Steel	0.40 MG
Total	NA	NA	NA	2.40 MG

Treatment and storage capacity versus demand

It is recommended that total storage equal or exceed the average daily demand.

Discuss the difference between current storage and treatment capacity versus the water supplier’s projected average water demand over the next 10 years (see Table 7 for projected water demand):

Existing treated water supply capacity is inadequate to meet current and projected demands due to restrictions on the use of some supply sources due to compliance with the MDH flow-weighted MOA. The City is currently working with MDH on adjustments to the flow-weighted compliance agreement, re-sampling wells for radium, and evaluating additional treated water supply sources. Current storage capacity is inadequate to meet projected demand over the next 10 years. For this reason a 1.5 MG elevated storage tank is planned to be constructed in 2020 to replace Tower 3, bringing the total storage capacity to 3.5 MG and exceeding future daily demand projections. Refer to the 2015 Water Comprehensive Plan for a more thorough discussion of alternative sites and storage styles.

C. Water Sources

Complete Table 6 by listing all types of water sources that supply water to the system, including groundwater, surface water, interconnections with other water suppliers, or others. Provide the name of each source (aquifer name, river or lake name, name of interconnecting water supplier) and the Minnesota unique well number or intake ID, as appropriate. Report the year the source was installed or established and the current capacity. Provide information about the depth of all wells. Describe the status of the source (active, inactive, emergency only, retail/wholesale interconnection) and if the source facilities have a dedicated emergency power source. Add rows to the table as needed for each installation.

Include copies of well records and maintenance summary for each well that has occurred since your last approved plan in **Appendix 1**.

Table 6. Water sources and status

Resource Type (Groundwater, Surface water, Interconnection)	Resource Name	MN Unique Well # or Intake ID	Year Installed	Rated Capacity (Gallons per Minute)	Well Depth (Feet)	Status of Normal and Emergency Operations (active, inactive, emergency only, retail/wholesale interconnection))	Does this Source have a Dedicated Emergency Power Source? (Yes or No)
Well 1 (Groundwater)	CEMS – Eau Claire–Mt. Simon	201178	1912	-	409	Inactive	No
Well 2 (Groundwater)	CMTS- Mt. Simon	201182	1918	-	427	Inactive	No
Well 3 (Groundwater)	CTCW – Tunnel City-Wonewoc	202971	1947	850	452	Active	No
Well 4 (Groundwater)	CMTS – Mt. Simon- Hinckley	201191	1959	1450	657	Active	Yes
Well 5 (Groundwater)	CTCW – Tunnel City-Wonewoc	201218	1965	800	444	Active	Yes
Well 6 (Groundwater)	CWMS - Wonewoc - Mt. Simon	224625	1974	1000	640	Active	Yes
Well 7 (Groundwater)	CMTS – Mt. Simon	453792	1989	600	490	Active	Yes
Well 8 (Groundwater)	CTCW – Tunnel City-Wonewoc	676405	2002	1000	425	Active	Yes
Andover Interconnection	Groundwater	-	-	< 500	-	Hose Connection	NA
Coon Rapids Interconnection	Groundwater	-	-	< 500	-	Hose Connection	NA
Ramsey Interconnection	Groundwater	-	-	< 500	-	Hose Connection	NA

Limits on Emergency Interconnections

Discuss any limitations on the use of the water sources (e.g. not to be operated simultaneously, limitations due to blending, aquifer recovery issues etc.) and the use of interconnections, including capacity limits or timing constraints (i.e. only 200 gallons per minute are available from the City of Prior Lake, and it is estimated to take 6 hours to establish the emergency connection). If there are no limitations, list none.

- Wells 1 and 2 are currently out of service.
- Pumping from Well 7 has restrictions due to MDH MOA for radium.
- The interconnections with neighboring communities have flow rate and duration limitations due to water demand in those communities and the length of hose required to connect. Expect 6 hours to notify, obtain permission to connect, and establish connections.

D. Future Demand Projections – Key Metropolitan Council Benchmark

Water Use Trends

Use the data in Table 2 to describe trends in 1) population served; 2) total per capita water demand; 3) average daily demand; 4) maximum daily demand. Then explain the causes for upward or downward trends. For example, over the ten years has the average daily demand trended up or down? Why is this occurring?

- 1) The population served in Anoka has generally remained steady since 2005.
- 2) Total per capita water demand peaked 2006-2008 and has decreased over the time period since then, averaging 149 GPD per capita from 2005-2009 and 133 GPD per capita 2010-2015.
- 3) Average daily demand data is limited to 2009-2015, and has varied in an inconsistent pattern over this time period, ranging from 2.2 to 2.5 MGD.
- 4) Max daily demand data is limited to 2009-2015 as well, but has varied to a slightly greater degree, from approximately 4.1 to 5.8 MGD.

Conclusions: It appears that the relatively small variations in average day and maximum day water use from year to year are based on annual variations in number of customers, weather (for non-essential uses) and variations in usage from large volume customers.

Use the water use trend information discussed above to complete Table 7 with projected annual demand for the next ten years. Communities in the seven-county Twin Cities metropolitan area must also include projections for 2030 and 2040 as part of their local comprehensive planning.

Projected demand should be consistent with trends evident in the historical data in Table 2, as discussed above. Projected demand should also reflect state demographer population projections and/or other planning projections.

Table 7. Projected annual water demand

Year	Projected Total Population	Projected Population Served	Projected Total Per Capita Water Demand (GPCD) ³	Projected Average Daily Demand (MGD)	Projected Maximum Daily Demand (MGD) ⁴
2016 ¹	17,454	17,454	145.0	2.53	5.39
2017 ¹	17,765	17,765	145.0	2.58	5.49
2018 ¹	18,077	18,077	145.0	2.62	5.58
2019 ¹	18,388	18,388	145.0	2.66	5.68
2020	18,700	18,700	145.0	2.71	5.78
2021 ²	18,830	18,830	145.0	2.73	5.82
2022 ²	18,960	18,960	145.0	2.75	5.86
2023 ²	19,090	19,090	145.0	2.77	5.90
2024 ²	19,220	19,220	145.0	2.79	5.94
2025	19,350	19,350	145.0	2.81	5.98
2030	20,000	20,000	145.0	2.90	6.18
2040	21,200	21,200	145.0	3.07	6.55

GPCD – Gallons per Capita per Day

MGD – Million Gallons per Day

Note: Population projections from Metropolitan Council Community Profile projections. Projected total per capita water demand and maximum daily demand based on City of Anoka Comprehensive Water Plan values of 145 gpcd of demand and a max to average day ratio of 2.13.

¹Value interpolated from 2015 and 2020 data.

²Value interpolated from 2020 and 2025 data.

³Total per capita demand was greater than 144 in 4 of the past 10 years, with a high of 163 gpcd. Use 145 for projections.

⁴Max Day to Average Day ratio greater than 2.13 in at least 2 of the past 10 years, with a high of 2.29. Use 2.13 for projections.

Projection Method

Describe the method used to project water demand, including assumptions for population and business growth and how water conservation and efficiency programs affect projected water demand:

New development and redevelopment is expected to drive up Anoka’s population to approximately 21,200 between 2030 and 2040. Changes in projected water system demands are determined based on planned future land use, as detailed in the Comprehensive Water Plan and the Metropolitan Council’s 2040 Community Profiles. The purpose of these water use projections for the City of Anoka is to provide a reasonable “worst case” projection of water system improvements required for financial planning purposes. The projections in the above table indicate the City’s commitment to keep overall per capita water use at 145 or lower (down from a 10 year high of 163), and the Max Day to Average Day ratio down from a high of 2.29 to 2.13. Actual implementation of system improvements will be based on actual water use and revised projections as additional data is known regarding variables such as effectiveness of water conservation programs, and proposed water needs for redevelopment and new development.

E. Resource Sustainability

Monitoring – Key DNR Benchmark

Complete Table 8 by inserting information about source water quality and quantity monitoring efforts. List should include all production wells, observation wells, and source water intakes or reservoirs. Add rows to the table as needed. Find information on groundwater level monitoring program at: http://www.dnr.state.mn.us/waters/groundwater_section/obwell/index.html

Table 8. Information about source water quality and quantity monitoring

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
202971 (Well 3)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
201191 (Well 4)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
201218 (Well 5)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
224625 (Well 6)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
453792 (Well 7)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge
676405 (Well 8)	<input checked="" type="checkbox"/> production well <input type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input checked="" type="checkbox"/> routine water utility sampling <input type="checkbox"/> other	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input checked="" type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

MN Unique Well # or Surface Water ID	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
209297 (Ob. Well)	<input type="checkbox"/> production well <input checked="" type="checkbox"/> observation well <input type="checkbox"/> source water intake <input type="checkbox"/> source water reservoir	<input type="checkbox"/> routine MDH sampling <input type="checkbox"/> routine water utility sampling <input checked="" type="checkbox"/> other	<input type="checkbox"/> continuous <input type="checkbox"/> hourly <input type="checkbox"/> daily <input checked="" type="checkbox"/> monthly <input type="checkbox"/> quarterly <input type="checkbox"/> annually	<input type="checkbox"/> SCADA <input type="checkbox"/> grab sampling <input checked="" type="checkbox"/> steel tape <input type="checkbox"/> stream gauge

Water Level Data

A water level monitoring plan that includes monitoring locations and a schedule for water level readings must be submitted as **Appendix 2**. If one does not already exist, it needs to be prepared and submitted with the WSP. Ideally, all production and observation wells are monitored at least monthly.

Complete Table 9 to summarize water level data for each well being monitored. Provide the name of the aquifer and a brief description of how much water levels vary over the season (the difference between the highest and lowest water levels measured during the year) and the long-term trends for each well. If water levels are not measured and recorded on a routine basis, then provide the static water level when each well was constructed and the most recent water level measured during the same season the well was constructed. Also include all water level data taken during any well and pump maintenance. Add rows to the table as needed.

Provide water level data graphs for each well in **Appendix 3** for the life of the well, or for as many years as water levels have been measured. See DNR website for Date Time Water Level

<http://www.dnr.state.mn.us/groundwater/hydrographs.html>

Table 9. Water level data

Unique Well Number or Well ID	Aquifer Name	Seasonal Variation (Feet)	Long-term Trend in water level data	Water level measured during well/pumping maintenance
202971 (Well 3)	CTCW – Tunnel City-Wonewoc	30 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
201191 (Well 4)	CMTS – Mt. Simon-Hinckley	100 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
201218 (Well 5)	CTCW – Tunnel City-Wonewoc	50 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
224625 (Well 6)	CWMS - Wonewoc - Mt. Simon	50 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
453792 (Well 7)	CMTS – Mt. Simon	25 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
676405 (Well 8)	CTCW – Tunnel City-Wonewoc	30 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____
209297 (Ob. Well)	CMTS – Mt. Simon	20 ft	<input type="checkbox"/> Falling <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Rising	MM/DD/YY: ____ MM/DD/YY: ____ MM/DD/YY: ____

Potential Water Supply Issues & Natural Resource Impacts – Key DNR & Metropolitan Council Benchmark

Complete Table 10 by listing the types of natural resources that are or could be impacted by permitted water withdrawals. If known, provide the name of specific resources that may be impacted. Identify what the greatest risks to the resource are and how the risks are being assessed. Identify any resource protection thresholds – formal or informal – that have been established to identify when actions should be taken to mitigate impacts. Provide information about the potential mitigation actions that may be taken, if a resource protection threshold is crossed. Add additional rows to the table as needed. See glossary at the end of the template for definitions.

Some of this baseline data should have been in your earlier water supply plans or county comprehensive water plans. When filling out this table, think of what are the water supply risks, identify the resources, determine the threshold and then determine what your community will do to mitigate the impacts.

Your DNR area hydrologist is available to assist with this table.

For communities in the seven-county Twin Cities metropolitan area, the *Master Water Supply Plan Appendix 1 (Water Supply Profiles)*, provides information about potential water supply issues and natural resource impacts for your community.

Table 10. Natural resource impacts

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
<input checked="" type="checkbox"/> River or stream	1. Mississippi River 2. Rum River 3. Elm Creek (South of Mississippi River)	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: River Gauging Stations, Wellhead Protection Plan	Declining Average River Stage (due to pumping not due to normal fluctuations)	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input checked="" type="checkbox"/> Other Review with DNR	Review management plan with DNR
<input type="checkbox"/> Calcareous fen	None listed for Anoka County per July 5, 2016 (40 SR8)	<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: _____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	NA

Anoka Local Water Supply Plan – December 2016 (Revised June 2017)

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
<input checked="" type="checkbox"/> Lake	2 Named water bodies per DNR: -Round Lake - Mill Pond 18 additional unnamed water bodies within 0.5 miles of City of Anoka	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: Wellhead Protection Plan, DNR resource monitoring	Unacceptable decline in water level caused by City well pumping	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input checked="" type="checkbox"/> Other Review with DNR and develop strategy	See Text Box below.
<input checked="" type="checkbox"/> Wetland	5 unnamed wetlands (DNR) NWI Lists 154 wetlands in City of Anoka 82 FWEW 41 FWF/SW 30 FW Pond 1 Riverine	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input checked="" type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other:	<input checked="" type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: Wellhead Protection Plan, DNR resource monitoring	Unacceptable decline in water level caused by City well pumping. No known connection between wetlands and source water aquifers.	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input checked="" type="checkbox"/> Other Review with DNR and develop strategy	See Text Box below.
<input checked="" type="checkbox"/> Trout stream	1 listed in Anoka County: Cenaiko Lake (unnamed) = 4.5 miles south of City of Anoka	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input checked="" type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input checked="" type="checkbox"/> Other: DNR resource monitoring	Highly unlikely due to distance and Mississippi River – outside applicable DWSMA boundary	<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See Text Box below.

Resource Type	Resource Name	Risk	Risk Assessed Through	Describe Resource Protection Threshold*	Mitigation Measure or Management Plan	Describe How Changes to Thresholds are Monitored
		<input type="checkbox"/> Other: _____				
<input checked="" type="checkbox"/> Aquifer	See Text Box below.	<input checked="" type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: _____	See Text Box below.	<input type="checkbox"/> Revise permit <input checked="" type="checkbox"/> Change groundwater pumping <input checked="" type="checkbox"/> Increase conservation <input type="checkbox"/> Other	See Text Box below.
<input type="checkbox"/> Endangered, threatened, or special concern species habitat, other natural resource impacts		<input type="checkbox"/> Flow/water level decline <input type="checkbox"/> Degrading water quality trends and/or MCLs exceeded <input type="checkbox"/> Impacts on endangered, threatened, or special concern species habitat or other natural resource impacts <input type="checkbox"/> Other: _____	<input type="checkbox"/> GIS analysis <input type="checkbox"/> Modeling <input type="checkbox"/> Mapping <input type="checkbox"/> Monitoring <input type="checkbox"/> Aquifer testing <input type="checkbox"/> Other: _____		<input type="checkbox"/> Revise permit <input type="checkbox"/> Change groundwater pumping <input type="checkbox"/> Increase conservation <input type="checkbox"/> Other	

* Examples of thresholds: a lower limit on acceptable flow in a river or stream; water quality outside of an accepted range; a lower limit on acceptable aquifer level decline at one or more monitoring wells; withdrawals that exceed some percent of the total amount available from a source; or a lower limit on acceptable changes to a protected habitat.

Aquifer Impacts from Municipal Pumping

The City's six active public water supply wells use the Mt. Simon, Wonewoc - Mt. Simon, Mt. Simon-Hinckley, and Tunnel City-Wonewoc aquifers. Neighboring communities use similar aquifers. Data collected from the City SCADA and DNR Ob Well system seems to indicate that temporary, localized water level drawdowns occur near each well during the summer pumping season. To date, none of this pumping has created a problem with pump settings in the City wells, nearby private wells, or natural resources. Data indicates that once the summer pumping is stopped, aquifer levels return to normal rather quickly. Based on these observations, it appears that municipal pumping from Anoka's wells does not (currently) have a large impact on the aquifer. Anoka and neighboring communities should continue to collect data in subsequent years and re-evaluate aquifer levels annually.

Wellhead Protection (WHP) and Surface Water Protection (SWP) Plans

Complete Table 11 to provide status information about WHP and SWP plans.

The emergency procedures in this plan are intended to comply with the contingency plan provisions required in the Minnesota Department of Health's (MDH) Wellhead Protection (WHP) Plan and Surface Water Protection (SWP) Plan.

Table 11. Status of Wellhead Protection and Surface Water Protection Plans

Plan Type	Status	Date Adopted	Date for Update
WHP	<input type="checkbox"/> In Process <input checked="" type="checkbox"/> Completed <input type="checkbox"/> Not Applicable	Submitted July 2001	3/3/2019 (in progress)
SWP	<input type="checkbox"/> In Process <input type="checkbox"/> Completed <input checked="" type="checkbox"/> Not Applicable		

F. Capital Improvement Plan (CIP)

Please note that any wells that received approval under a ten-year permit, but that were not built, are now expired and must submit a water appropriations permit.

Adequacy of Water Supply System

Complete Table 12 with information about the adequacy of wells and/or intakes, storage facilities, treatment facilities, and distribution systems to sustain current and projected demands. List planned capital improvements for any system components, in chronological order. Communities in the seven-county Twin Cities metropolitan area should also include information about plans through 2040.

The assessment can be the general status by category; it is not necessary to identify every single well, storage facility, treatment facility, lift station, and mile of pipe.

Please attach your latest Capital Improvement Plan as **Appendix 4**.

Table 12. Adequacy of Water Supply System

System Component	Planned action	Anticipated Construction Year	Notes
Wells/Intakes	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2018	Increase Pump Capacity Wells 6 & 8
		2035	Construct Wells #9, #10
Water Storage Facilities	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2020	Construct 1.5MG Elevated Tower, remove Tower 3
Water Treatment Facilities	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2018	WTP 6/8 Expansion
Distribution Systems (pipes, valves, etc.)	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input checked="" type="checkbox"/> Expansion/addition	2020	Construct Phase 1 Trunk Water Main
		2025	Construct Phase 2 Trunk Water Main
Pressure Zones	<input checked="" type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		
Other:	<input type="checkbox"/> No action planned - adequate <input type="checkbox"/> Repair/replacement <input type="checkbox"/> Expansion/addition		

Proposed Future Water Sources

Complete Table 13 to identify new water source installation planned over the next ten years. Add rows to the table as needed.

Table 13. Proposed future installations/sources

Source	Installation Location (approximate)	Resource Name	Proposed Pumping Capacity (gpm)	Planned Installation Year	Planned Partnerships
Groundwater	45.227284, 93.383686	CTCW – Tunnel City-Wonewoc	1,000	2017	
Surface Water	N/A				
Interconnection to another supplier	N/A				

Water Source Alternatives - Key Metropolitan Council Benchmark

Do you anticipate the need for alternative water sources in the next 10 years? Yes No

For metro communities, will you need alternative water sources by the year 2040? Yes No

If you answered yes for either question, then complete table 14. If no, insert NA.

Complete Table 14 by checking the box next to alternative approaches that your community is considering, including approximate locations (if known), the estimated amount of future demand that could be met through the approach, the estimated timeframe to implement the approach, potential partnerships, and the major benefits and challenges of the approach. Add rows to the table as needed.

For communities in the seven-county Twin Cities metropolitan area, these alternatives should include approaches the community is considering to meet projected 2040 water demand.

Table 14. Alternative water sources

Alternative Source Considered	Source and/or Installation Location (approximate)	Estimated Amount of Future Demand (%)	Timeframe to Implement (YYYY)	Potential Partners	Benefits	Challenges
<input type="checkbox"/> Groundwater	Existing Source					
<input type="checkbox"/> Surface Water	Mississippi & Rum Rivers	0	NA			Water quality, cost
<input type="checkbox"/> Reclaimed stormwater	NA					Cost
<input type="checkbox"/> Reclaimed wastewater	NA					Cost
<input type="checkbox"/> Interconnection to another supplier	NA					Same source

Part 2. Emergency Preparedness Procedures

The emergency preparedness procedures outlined in this plan are intended to comply with the contingency plan provisions required by MDH in the WHP and SWP. Water emergencies can occur as a result of vandalism, sabotage, accidental contamination, mechanical problems, power failings, drought, flooding, and other natural disasters. The purpose of emergency planning is to develop emergency response procedures and to identify actions needed to improve emergency preparedness. In the case of a municipality, these procedures should be in support of, and part of, an all-hazard emergency operations plan. Municipalities that already have written procedures dealing with water emergencies should review the following information and update existing procedures to address these water supply protection measures.

A. Federal Emergency Response Plan

Section 1433(b) of the Safe Drinking Water Act, (Public Law 107-188, Title IV- Drinking Water Security and Safety) requires community water suppliers serving over 3,300 people to prepare an Emergency Response Plan.

Do you have a federal emergency response plan? Yes No

If yes, what was the date it was certified? _____ 9/2014 _____

Complete Table 15 by inserting the noted information regarding your completed Federal Emergency Response Plan.

Table 15. Emergency Preparedness Plan contact information

Emergency Response Plan Role	Contact Person	Contact Phone Number	Contact Email
Emergency Response Lead	Pete Klingenberg	763.576.2923 Cell 612.791.7217	pklingenberg@ci.anoka.mn.us
Alternate Emergency Response Lead	Mark Anderson	763.576.2921 Cell 612.719.7219	manderson@ci.anoka.mn.us

B. Operational Contingency Plan

All utilities should have a written operational contingency plan that describes measures to be taken for water supply mainline breaks and other common system failures as well as routine maintenance.

Do you have a written operational contingency plan? Yes No

At a minimum, a water supplier should prepare and maintain an emergency contact list of contractors and suppliers.

C. Emergency Response Procedures

Water suppliers must meet the requirements of MN Rules 4720.5280 . Accordingly, the Minnesota Department of Natural Resources (DNR) requires public water suppliers serving more than 1,000 people to submit Emergency and Conservation Plans. Water emergency and conservation plans that have been approved by the DNR, under provisions of Minnesota Statute 186 and Minnesota Rules, part 6115.0770, will be considered equivalent to an approved WHP contingency plan.

Emergency Telephone List

Prepare and attach a list of emergency contacts, including the MN Duty Officer (1-800-422-0798), as **Appendix 5**. A template is available at www.mndnr.gov/watersupplyplans

The list should include key utility and community personnel, contacts in adjacent water suppliers, and appropriate local, state and federal emergency contacts. Please be sure to verify and update the contacts on the emergency telephone list and date it. Thereafter, update on a regular basis (once a year is recommended). In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the Emergency Manager for that community. Responsibilities and services for each contact should be defined.

Current Water Sources and Service Area

Quick access to concise and detailed information on water sources, water treatment, and the distribution system may be needed in an emergency. System operation and maintenance records should be maintained in secured central and back-up locations so that the records are accessible for emergency purposes. A detailed map of the system showing the treatment plants, water sources, storage facilities, supply lines, interconnections, and other information that would be useful in an emergency should also be readily available. It is critical that public water supplier representatives and emergency response personnel communicate about the response procedures and be able to easily obtain this kind of information both in electronic and hard copy formats (in case of a power outage).

Do records and maps exist? Yes No

Can staff access records and maps from a central secured location in the event of an emergency?

Yes No

Does the appropriate staff know where the materials are located?

Yes No

Procedure for Augmenting Water Supplies

Complete Tables 16 – 17 by listing all available sources of water that can be used to augment or replace existing sources in an emergency. Add rows to the tables as needed.

In the case of a municipality, this information should be contained in a notification and warning standard operating procedure maintained by the warning point for that community. Municipalities are encouraged to execute cooperative agreements for potential emergency water services and copies should be included in **Appendix 6**. Outstate Communities may consider using nearby high capacity wells (industry, golf course) as emergency water sources.

WSP should include information on any physical or chemical problems that may limit interconnections to other sources of water. Approvals from the MDH are required for interconnections or the reuse of water.

Table 16. Interconnections with other water supply systems to supply water in an emergency

Other Water Supply System Owner	Capacity (GPM & MGD)	Note Any Limitations On Use	List of services, equipment, supplies available to respond
City Of Coon Rapids	0.505 MGD, 350 GPM	Hose Connection	Staff, tools, spare parts
City Of Ramsey	2.00 MGD, 1,400 GPM	Dependent on Availability	Staff, tools, spare parts
City Of Andover	0.50 MGD, 350 GPM	Hose Connection	Staff, tools, spare parts

GPM – Gallons per minute MGD – million gallons per day

Table 17. Utilizing surface water as an alternative source

Surface Water Source Name	Capacity (GPM)	Capacity (MGD)	Treatment Needs	Note Any Limitations On Use
Rum River	N/A	N/A	Significant treatment would be required to utilize Rum River as an emergency source.	No intake, no surface water treatment facility

If not covered above, describe additional emergency measures for providing water (obtaining bottled water, or steps to obtain National Guard services, etc.)

Obtain bottled water, Fire Department and Public Works to haul water, emergency declaration to call in National Guard.

Allocation and Demand Reduction Procedures

Complete Table 18 by adding information about how decisions will be made to allocate water and reduce demand during an emergency. Provide information for each customer category, including its priority ranking, average day demand, and demand reduction potential for each customer category. Modify the customer categories as needed, and add additional lines if necessary.

Water use categories should be prioritized in a way that is consistent with Minnesota Statutes 103G.261 (#1 is highest priority) as follows:

1. Water use for human needs such as cooking, cleaning, drinking, washing and waste disposal; use for on-farm livestock watering; and use for power production that meets contingency requirements.
2. Water use involving consumption of less than 10,000 gallons per day (usually from private wells or surface water intakes)
3. Water use for agricultural irrigation and processing of agricultural products involving consumption of more than 10,000 gallons per day (usually from private high-capacity wells or surface water intakes)
4. Water use for power production above the use provided for in the contingency plan.

5. All other water use involving consumption of more than 10,000 gallons per day.
6. Nonessential uses – car washes, golf courses, etc.

Water used for human needs at hospitals, nursing homes and similar types of facilities should be designated as a high priority to be maintained in an emergency. Lower priority uses will need to address water used for human needs at other types of facilities such as hotels, office buildings, and manufacturing plants. The volume of water and other types of water uses at these facilities must be carefully considered. After reviewing the data, common sense should dictate local allocation priorities to protect domestic requirements over certain types of economic needs. Water use for lawn sprinkling, vehicle washing, golf courses, and recreation are legislatively considered non-essential.

Table 18. Water use priorities

Customer Category	Allocation Priority	Average Daily Demand (GPD)	Short-Term Emergency Demand Reduction Potential (GPD)
Residential	1	1,200,000	450,000
Institutional	2	30,000	0
Commercial	3	610,000	140,000
Industrial	4	220,000	50,000
Irrigation	5	0	0
Wholesale	NA	NA	NA
Non-Essential	6	270,000	270,000
TOTAL	NA	2,330,000	910,000

GPD – Gallons per Day

Tip: Calculating Emergency Demand Reduction Potential

The emergency demand reduction potential for all uses will typically equal the difference between maximum use (summer demand) and base use (winter demand). In extreme emergency situations, lower priority water uses must be restricted or eliminated to protect priority domestic water requirements. Emergency demand reduction potential should be based on average day demands for customer categories within each priority class. Use the tables in Part 3 on water conservation to help you determine strategies.

Complete Table 19 by selecting the triggers and actions during water supply disruption conditions.

Table 19. Emergency demand reduction conditions, triggers and actions (Select all that may apply and describe)

Emergency Triggers	Short-term Actions	Long-term Actions
<input checked="" type="checkbox"/> Contamination <input checked="" type="checkbox"/> Loss of production <input checked="" type="checkbox"/> Infrastructure failure <input checked="" type="checkbox"/> Executive order by Governor <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Supply augmentation through <u>sources listed in Table 16</u> <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Water allocation through <u>see Table 18</u> <input checked="" type="checkbox"/> Meet with large water users to discuss their contingency plan.	<input checked="" type="checkbox"/> Supply augmentation through <u>sources listed in Table 16</u> <input checked="" type="checkbox"/> Adopt (if not already) and enforce a critical water deficiency ordinance to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Water allocation through <u>see Table 18</u> <input checked="" type="checkbox"/> Meet with large water users to discuss their contingency plan.

Notification Procedures

Complete Table 20 by selecting trigger for informing customers regarding conservation requests, water use restrictions, and suspensions; notification frequencies; and partners that may assist in the notification process. Add rows to the table as needed.

Table 20. Plan to inform customers regarding conservation requests, water use restrictions, and suspensions

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
<input checked="" type="checkbox"/> Short-term demand reduction declared (< 1 year)	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input checked="" type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	Local newspaper, City Hall, if severe radio & TV
<input checked="" type="checkbox"/> Long-term Ongoing demand reduction declared	<input checked="" type="checkbox"/> Website <input type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook) <input checked="" type="checkbox"/> Direct customer mailing, <input type="checkbox"/> Press release (TV, radio, newspaper), <input type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input checked="" type="checkbox"/> Monthly <input type="checkbox"/> Annually	City Hall
<input checked="" type="checkbox"/> Governor’s critical water deficiency declared	<input checked="" type="checkbox"/> Website <input checked="" type="checkbox"/> Email list serve <input checked="" type="checkbox"/> Social media (e.g. Twitter, Facebook)	<input type="checkbox"/> Daily <input checked="" type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Annually	Local newspaper, City Hall, radio & TV

Notification Trigger(s)	Methods (select all that apply)	Update Frequency	Partners
	<input type="checkbox"/> Direct customer mailing, <input checked="" type="checkbox"/> Press release (TV, radio, newspaper), <input checked="" type="checkbox"/> Meeting with large water users (> 10% of total city use) <input type="checkbox"/> Other: _____		

Enforcement

Prior to a water emergency, municipal water suppliers must adopt regulations that restrict water use and outline the enforcement response plan. The enforcement response plan must outline how conditions will be monitored to know when enforcement actions are triggered, what enforcement tools will be used, who will be responsible for enforcement, and what timelines for corrective actions will be expected.

Affected operations, communications, and enforcement staff must then be trained to rapidly implement those provisions during emergency conditions.

Important Note:

Disregard of critical water deficiency orders, even though total appropriation remains less than permitted, is adequate grounds for immediate modification of a public water supply authority’s water use permit (2013 MN Statutes 103G.291)

Does the city have a critical water deficiency restriction/official control in place that includes provisions to restrict water use and enforce the restrictions? (This restriction may be an ordinance, rule, regulation, policy under a council directive, or other official control) Yes No

If yes, attach the official control document to this WSP as **Appendix 7**.

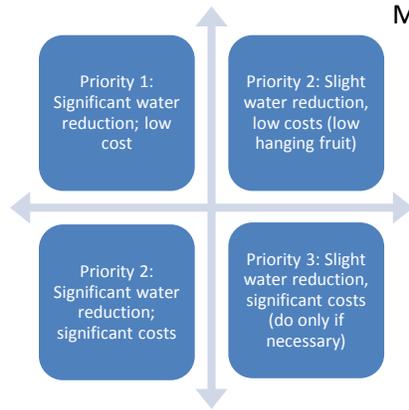
If no, the municipality must adopt such an official control within 6 months of submitting this WSP and submit it to the DNR as an amendment to this WSP.

Irrespective of whether a critical water deficiency control is in place, does the public water supply utility, city manager, mayor, or emergency manager have standing authority to implement water restrictions? Yes No

If yes, cite the regulatory authority reference: _____.

If no, who has authority to implement water use restrictions in an emergency?

PART 3. WATER CONSERVATION PLAN



Minnesotans have historically benefited from the state’s abundant water supplies, reducing the need for conservation. There are however, limits to the available supplies of water and increasing threats to the quality of our drinking water. Causes of water supply limitation may include: population increases, economic trends, uneven statewide availability of groundwater, climatic changes, and degraded water quality. Examples of threats to drinking water quality include: the presence of contaminant plumes from past land use activities, exceedances of water quality standards from natural and human sources, contaminants of emerging concern, and increasing pollutant trends from nonpoint sources.

There are many incentives for conserving water; conservation:

- reduces the potential for pumping-induced transfer of contaminants into the deeper aquifers, which can add treatment costs
- reduces the need for capital projects to expand system capacity
- reduces the likelihood of water use conflicts, like well interference, aquatic habitat loss, and declining lake levels
- conserves energy, because less energy is needed to extract, treat and distribute water (and less energy production also conserves water since water is use to produce energy)
- maintains water supplies that can then be available during times of drought

It is therefore imperative that water suppliers implement water conservation plans. The first step in water conservation is identifying opportunities for behavioral or engineering changes that could be made to reduce water use by conducting a thorough analysis of:

- Water use by customer
- Extraction, treatment, distribution and irrigation system efficiencies
- Industrial processing system efficiencies
- Regulatory and barriers to conservation
- Cultural barriers to conservation
- Water reuse opportunities

Once accurate data is compiled, water suppliers can set achievable goals for reducing water use. A successful water conservation plan follows a logical sequence of events. The plan should address both conservation on the supply side (leak detection and repairs, metering), as well as on the demand side (reductions in usage). Implementation should be conducted in phases, starting with the most obvious and lowest-cost options. In some cases one of the early steps will be reviewing regulatory constraints to water conservation, such as lawn irrigation requirements. Outside funding and grants may be available for implementation of projects. Engage water system operators and maintenance staff and customers in brainstorming opportunities to reduce water use. Ask the question: “How can I help save water?”

Progress since 2006

Is this your community’s first Water Supply Plan? Yes No

If yes, describe conservation practices that you are already implementing, such as: pricing, system improvements, education, regulation, appliance retrofitting, enforcement, etc.

If no, complete Table 21 to summarize conservation actions taken since the adoption of the 2006 water supply plan.

Table 21. Implementation of previous ten-year Conservation Plan

2006 Plan Commitments	Action Taken?
Change water rates structure to provide conservation pricing	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Water supply system improvements (e.g. leak repairs, valve replacements, etc.)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Educational efforts	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
New water conservation ordinances	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Rebate or retrofitting Program (e.g. for toilet, faucets, appliances, showerheads, dish washers, washing machines, irrigation systems, rain barrels, water softeners, etc.)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Enforcement	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Describe other: Leak Detection & Better Recording of Water Supplier Services Water Used	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

What are the results you have seen from the actions in Table 21 and how were results measured?

As shown in Table 2, Total Per Capita water use appears to be slightly decreasing recently and the Max Day/Ave Day ratio is fairly low (at average of 2.03). Unmetered/unaccounted for water use is going down slightly but is still high.

A. Triggers for Allocation and Demand Reduction Actions

Complete table 22 by checking each trigger below, as appropriate, and the actions to be taken at various levels or stages of severity. Add in additional rows to the table as needed.

Table 22. Short and long-term demand reduction conditions, triggers and actions

Objective	Triggers	Actions
Protect surface water flows	<input type="checkbox"/> Low stream flow conditions <input type="checkbox"/> Reports of declining wetland and lake levels <input type="checkbox"/> Other: _____	<input type="checkbox"/> Increase promotion of conservation measures <input type="checkbox"/> Other: _____
Short-term demand reduction (less than 1 year)	<input checked="" type="checkbox"/> Extremely high seasonal water demand (more than double winter demand) <input checked="" type="checkbox"/> Loss of treatment capacity <input checked="" type="checkbox"/> Lack of water in storage <input checked="" type="checkbox"/> State drought plan <input checked="" type="checkbox"/> Well interference <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Adopt (if not already) and enforce the critical water deficiency ordinance to restrict or prohibit lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input checked="" type="checkbox"/> Supply augmentation through <u>sources listed in Table 16</u> <input checked="" type="checkbox"/> Water allocation through <u>see Table 18</u> <input checked="" type="checkbox"/> Meet with large water users to discuss user’s contingency plan.
Long-term demand reduction (>1 year)	<input checked="" type="checkbox"/> Per capita demand increasing <input type="checkbox"/> Total demand increase (higher population or more industry)Water level in well(s) below elevation of _____ <input type="checkbox"/> Other: _____	<input checked="" type="checkbox"/> Develop a critical water deficiency ordinance that is or can be quickly adopted to penalize lawn watering, vehicle washing, golf course and park irrigation & other nonessential uses. <input type="checkbox"/> Enact a water waste ordinance that targets overwatering (causing water to flow off the landscape into streets, parking lots, or similar), watering impervious surfaces (streets, driveways or other hardscape areas), and negligence of known leaks, breaks, or malfunctions. <input checked="" type="checkbox"/> Meet with large water users to discuss user’s contingency plan. <input checked="" type="checkbox"/> Enhanced monitoring and reporting: audits, meters, billing, etc.
Governor’s “Critical Water Deficiency Order” declared	<input checked="" type="checkbox"/> Describe: Governor’s Declaration	<input checked="" type="checkbox"/> Describe: Allocation of water per Table 18

B. Conservation Objectives and Strategies – Key benchmark for DNR

This section establishes water conservation objectives and strategies for eight major areas of water use.

Objective 1: Reduce Unaccounted (Non-Revenue) Water loss to Less than 10%

The Minnesota Rural Waters Association, the Metropolitan Council and the Department of Natural Resources recommend that all water uses be metered. Metering can help identify high use locations and times, along with leaks within buildings that have multiple meters.

It is difficult to quantify specific unmetered water use such as that associated with firefighting and system flushing or system leaks. Typically, water suppliers subtract metered water use from total water pumped to calculate unaccounted or non-revenue water loss.

Is your five-year average (2005-2014) unaccounted Water Use in Table 2 higher than 10%?

Yes No

What is your leak detection monitoring schedule? (e.g. monitor 1/3rd of the city lines per year)

Annual leak detection surveys (annual expenditure of approximately \$5,000). Results to date have not detected significant leaks.

Water Audits - are intended to identify, quantify and verify water and revenue losses. The volume of unaccounted-for water should be evaluated each billing cycle. The American Water Works Association (AWWA) recommends that ten percent or less of pumped water is unaccounted-for water. Water audit procedures are available from the AWWA and MN Rural Water Association www.mrwa.com. Drinking Water Revolving Loan Funds are available for purchase of new meters when new plants are built.

What is the date of your most recent water audit? 1/2016

Frequency of water audits: yearly other (specify frequency) _____

Leak detection and survey: every year every other year periodic as needed

Year last leak detection survey completed: 2/2016

If Table 2 shows annual water losses over 10% or an increasing trend over time, describe what actions will be taken to reach the <10% loss objective and within what timeframe

Supply and billing meters are calibrated/repaired/replaced regularly, and City has been keeping more rigorous monitoring of WSS water used for the past several years. As discussed above, the annual leak detection surveys have not identified major leaks. The City will continue these efforts, however, since the City has exhausted the “easier” means to try and locate lost water, the City is now beginning to work with the numerous old, large water using industrial customers to try and locate unknown unmetered connections.

Metering -AWWA recommends that every water supplier install meters to account for all water taken into its system, along with all water distributed from its system at each customer’s point of service. An effective metering program relies upon periodic performance testing, repair, maintenance or replacement of all meters. AWWA also recommends that water suppliers conduct regular water audits to ensure accountability. Some cities install separate meters for interior and exterior water use, but some research suggests that this may not result in water conservation.

Complete Table 23 by adding the requested information regarding the number, types, testing and maintenance of customer meters.

Table 23. Information about customer meters

Customer Category	Number of Customers	Number of Metered Connections	Number of Automated Meter Readers	Meter testing intervals (years)	Average age/meter replacement schedule (years)
Residential	4479	4481	0	3	3/25-30
Irrigation meters	160	163	0	15	15/25-30
Institutional	0	0	0		
Commercial	612	638	0	15	15/25-30
Industrial	17	31	0	15	15/25-30
Public facilities	0	0	0		
Other	0	0	0		
TOTALS	5268	5313	0	NA	NA

For unmetered systems, describe any plans to install meters or replace current meters with advanced technology meters. Provide an estimate of the cost to implement the plan and the projected water savings from implementing the plan.

NA – City is metered. New meters will be installed if unmetered connections are found during the large industrial water audit process described above.

Table 24. Water source meters

	Number of Meters	Meter testing schedule (years)	Number of Automated Meter Readers	Average age/meter replacement schedule (years)
Water source (wells/intakes)	6	Yearly	All (SCADA)	15/20 (Calibrate annually)
Treatment plant	8	Yearly	All (SCADA)	15/20 (Calibrate annually)

Objective 2: Achieve Less than 75 Residential Gallons per Capita Demand (GPCD)

The 2002 average residential per capita demand in the Twin Cities Metropolitan area was 75 gallons per capita per day.

Is your average 2010-2015 residential per capita water demand in Table 2 more than 75? Yes No

What was your 2010 – 2015 five-year average residential per capita water demand? 70 g/person/day

Describe the water use trend over that timeframe:

Residential per capita water use peaked in 2012 and has dropped since that time.

Complete Table 25 by checking which strategies you will use to continue reducing residential per capita demand and project a likely timeframe for completing each checked strategy (Select all that apply and add rows for additional strategies):

Table 25. Strategies and timeframe to reduce residential per capita demand

Strategy to reduce residential per capita demand	Timeframe for completing work
<input type="checkbox"/> Revise city ordinances/codes to encourage or require water efficient landscaping.	
<input type="checkbox"/> Revise city ordinance/codes to permit water reuse options, especially for non-potable purposes like irrigation, groundwater recharge, and industrial use. Check with plumbing authority to see if internal buildings reuse is permitted	
<input type="checkbox"/> Revise ordinances to limit irrigation. Describe the restricted irrigation plan:	
<input checked="" type="checkbox"/> Revise outdoor irrigation installations codes to require high efficiency systems (e.g. those with soil moisture sensors or programmable watering areas) in new installations or system replacements.	2017 – 2018: Consider revising existing codes – but Max Day to Ave day ratio is already well below 2.6, which seems to indicate that irrigation is not a large contributor.
<input type="checkbox"/> Make water system infrastructure improvements	
<input type="checkbox"/> Offer free or reduced cost water use audits for residential customers.	
<input checked="" type="checkbox"/> Implement a notification system to inform customers when water availability conditions change.	2017 – 2018: Review effectiveness of current notification and emergency demand reduction procedures
<input type="checkbox"/> Provide rebates or incentives for installing water efficient appliances and/or fixtures indoors (e.g., low flow toilets, high efficiency dish washers and washing machines, showerhead and faucet aerators, water softeners, etc.)	NA – older housing stock will replace older fixtures with new for remodeling work
<input type="checkbox"/> Provide rebates or incentives to reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input type="checkbox"/> Identify supplemental Water Resources	
<input checked="" type="checkbox"/> Conduct audience-appropriate water conservation education and outreach.	2017 – 2018: Review existing programs
<input type="checkbox"/> Describe other plans	

Objective 3: Achieve at least a 1.5% per year water reduction for Institutional, Industrial, Commercial, and Agricultural GPCD over the next 10 years or a 15% reduction in ten years.

Complete Table 26 by checking which strategies you will used to continue reducing non-residential customer use demand and project a likely timeframe for completing each checked strategy (add rows for additional strategies).

Where possible, substitute recycled water used in one process for reuse in another. (For example, spent rinse water can often be reused in a cooling tower.) Keep in mind the true cost of water is the amount on the water bill PLUS the expenses to heat, cool, treat, pump, and dispose of/discharge the water. Don't just calculate the initial investment. Many conservation retrofits that appear to be prohibitively expensive are actually very cost-effective when amortized over the life of the equipment. Often reducing water use also saves electrical and other utility costs. Note: as of 2015, water reuse, and is not

allowed by the state plumbing code, M.R. 4715 (a variance is needed). However several state agencies are addressing this issue.

Table 26. Strategies and timeframe to reduce institutional, commercial industrial, and agricultural and non-revenue use demand

Strategy to reduce total business, industry, agricultural demand	Timeframe for completing work
<input type="checkbox"/> Conduct a facility water use audit for both indoor and outdoor use, including system components	
<input type="checkbox"/> Install enhanced meters capable of automated readings to detect spikes in consumption	
<input type="checkbox"/> Compare facility water use to related industry benchmarks, if available (e.g., meat processing, dairy, fruit and vegetable, beverage, textiles, paper/pulp, metals, technology, petroleum refining etc.)	
<input type="checkbox"/> Install water conservation fixtures and appliances or change processes to conserve water	
<input type="checkbox"/> Repair leaking system components (e.g., pipes, valves)	
<input type="checkbox"/> Investigate the reuse of reclaimed water (e.g., stormwater, wastewater effluent, process wastewater, etc.)	
<input type="checkbox"/> Reduce outdoor water use (e.g., turf replacement/reduction, rain gardens, rain barrels, smart irrigation, outdoor water use meters, etc.)	
<input checked="" type="checkbox"/> Train employees Encourage large users to look for ways how to conserve water	2017 and following: When meeting with large volume users, Anoka will inform customers of the Met Council and DNR desire to reduce water use, and will encourage these large users to implement reduction strategies.
<input checked="" type="checkbox"/> Implement a notification system to inform non-residential customers when water availability conditions change.	2017 – 2018: Review effectiveness of current notification and emergency demand reduction procedures. Discuss with large users to understand where they could reduce water use in an emergency and still operate their production process.
<input type="checkbox"/> Rainwater catchment systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, industrial processes, water features, vehicle washing facilities, cooling tower makeup, and similar uses shall be approved by the commissioner. Proposed plumbing code 4714.1702.1 http://www.dli.mn.gov/PDF/docket/4714rule.pdf	
<input checked="" type="checkbox"/> Describe other plans:	2016 and following: City of Anoka began work on trying to locate unknown unmetered connections – beginning with the many older, large water using industrial customers. This work will continue for an estimated 2 years.

Objective 4: Achieve a Decreasing Trend in Total Per Capita Demand

Include as **Appendix 8** one graph showing total per capita water demand for each customer category (i.e., residential, institutional, commercial, industrial) from 2005-2014 and add the calculated/estimated linear trend for the next 10 years.

Describe the trend for each customer category; explain the reason(s) for the trends, and where trends are increasing.

Overall per capita demand is on a decreasing trend. As discussed above, this is anticipated to be due partially due to weather, and partially due to a slowdown in usage among major C/I/I water customers, which began around 2010 (might be partially due to economic factors).

Objective 5: Reduce Peak Day Demand so that the Ratio of Average Maximum day to the Average Day is less than 2.6

Is the ratio of average 2005-2014 maximum day demand to average 2005-2014 average day demand reported in Table 2 more than 2.6? Yes No

Calculate a ten year average (2005 – 2014) of the ratio of maximum day demand to average day demand: 2.11 Note: 2009 is the earliest year that max day demand data is available

The position of the DNR has been that a peak day/average day ratio that is above 2.6 for in summer indicates that the water being used for irrigation by the residents in a community is too large and that efforts should be made to reduce the peak day use by the community.

It should be noted that by reducing the peak day use, communities can also reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells, new water towers which can be costly items.

Objective 6: Implement a Conservation Water Rate Structure and/or a Uniform Rate Structure with a Water Conservation Program

Water Conservation Program

Municipal water suppliers serving over 1,000 people are required to adopt demand reduction measures that include a conservation rate structure, or a uniform rate structure with a conservation program that achieves demand reduction. These measures must achieve demand reduction in ways that reduce water demand, water losses, peak water demands, and nonessential water uses. These measures must be approved before a community may request well construction approval from the Department of Health or before requesting an increase in water appropriations permit volume (*Minnesota Statutes*, section 103G.291, subd. 3 and 4). Rates should be adjusted on a regular basis to ensure that revenue of the system is adequate under reduced demand scenarios. If a municipal water supplier intends to use a Uniform Rate Structure, a community-wide Water Conservation Program that will achieve demand reduction must be provided.

Current Water Rates

Include a copy of the actual rate structure in **Appendix 9** or list current water rates including base/service fees and volume charges below.

Volume included in base rate or service charge: _____ gallons or X cubic feet ___ other

Frequency of billing: Monthly Bimonthly Quarterly Other: _____

Water Rate Evaluation Frequency: every year every ___ years no schedule

Date of last rate change: 1/1/2016

Table 27. Rate structures for each customer category (Select all that apply and add additional rows as needed)

Customer Category	Conservation Billing Strategies in Use *	Conservation Neutral Billing Strategies in Use **	Non-Conserving Billing Strategies in Use ***
Residential	<input checked="" type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input checked="" type="checkbox"/> Use water bill to provide comparisons <input checked="" type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform <input checked="" type="checkbox"/> Odd/even day watering	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
Commercial/ Industrial/ Institutional	<input checked="" type="checkbox"/> Monthly billing <input checked="" type="checkbox"/> Increasing block rates (volume tiered rates) <input type="checkbox"/> Seasonal rates <input type="checkbox"/> Time of use rates <input type="checkbox"/> Water bills reported in gallons <input type="checkbox"/> Individualized goal rates <input type="checkbox"/> Excess use rates <input type="checkbox"/> Drought surcharge <input checked="" type="checkbox"/> Use water bill to provide comparisons <input checked="" type="checkbox"/> Service charge not based on water volume <input type="checkbox"/> Other (describe)	<input type="checkbox"/> Uniform	<input type="checkbox"/> Service charge based on water volume <input type="checkbox"/> Declining block <input type="checkbox"/> Flat <input type="checkbox"/> Other (describe)
<input type="checkbox"/> Other			

*** Rate Structures components that may promote water conservation:**

- **Monthly billing:** is encouraged to help people see their water usage so they can consider changing behavior.
- **Increasing block rates (also known as a tiered residential rate structure):** Typically, these have at least three tiers: should have at least three tiers.
 - The first tier is for the winter average water use.

- The second tier is the year-round average use, which is lower than typical summer use. This rate should be set to cover the full cost of service.
- The third tier should be above the average annual use and should be priced high enough to encourage conservation, as should any higher tiers. For this to be effective, the difference in block rates should be significant.
- **Seasonal rate:** higher rates in summer to reduce peak demands
- **Time of Use rates:** lower rates for off peak water use
- **Bill water use in gallons:** this allows customers to compare their use to average rates
- **Individualized goal rates:** typically used for industry, business or other large water users to promote water conservation if they keep within agreed upon goals. **Excess Use rates:** if water use goes above an agreed upon amount this higher rate is charged
- **Drought surcharge:** an extra fee is charged for guaranteed water use during drought
- **Use water bill to provide comparisons:** simple graphics comparing individual use over time or compare individual use to others.
- **Service charge or base fee that does not include a water volume** – a base charge or fee to cover universal city expenses that are not customer dependent and/or to provide minimal water at a lower rate (e.g., an amount less than the average residential per capita demand for the water supplier for the last 5 years)
- **Emergency rates** -A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

****Conservation Neutral****

- **Uniform rate:** rate per unit used is the same regardless of the volume used
- **Odd/even day watering** –This approach reduces peak demand on a daily basis for system operation, but it does not reduce overall water use.

***** Non-Conserving *****

- **Service charge or base fee with water volume:** an amount of water larger than the average residential per capita demand for the water supplier for the last 5 years
- **Declining block rate:** the rate per unit used decreases as water use increases.
- **Flat rate:** one fee regardless of how much water is used (usually unmetered).

Provide justification for any conservation neutral or non-conserving rate structures. If intending to adopt a conservation rate structure, include the timeframe to do so:

N/A

Objective 7: Additional strategies to Reduce Water Use and Support Wellhead Protection Planning

Development and redevelopment projects can provide additional water conservation opportunities, such as the actions listed below. If a Uniform Rate Structure is in place, the water supplier must provide a Water Conservation Program that includes at least two of the actions listed below. Check those actions that you intent to implement within the next 10 years.

Table 28. Additional strategies to Reduce Water Use & Support Wellhead Protection

<input type="checkbox"/>	Participate in the GreenStep Cities Program, including implementation of at least one of the 20 “Best Practices” for water
<input type="checkbox"/>	Prepare a master plan for smart growth (compact urban growth that avoids sprawl)
<input type="checkbox"/>	Prepare a comprehensive open space plan (areas for parks, green spaces, natural areas)
<input type="checkbox"/>	Adopt a water use restriction ordinance (lawn irrigation, car washing, pools, etc.)
<input type="checkbox"/>	Adopt an outdoor lawn irrigation ordinance
<input type="checkbox"/>	Adopt a private well ordinance (private wells in a city must comply with water restrictions)
<input type="checkbox"/>	Implement a stormwater management program
<input type="checkbox"/>	Adopt non-zoning wetlands ordinance (can further protect wetlands beyond state/federal laws- for vernal pools, buffer areas, restrictions on filling or alterations)
<input type="checkbox"/>	Adopt a water offset program (primarily for new development or expansion)
<input type="checkbox"/>	Implement a water conservation outreach program
<input type="checkbox"/>	Hire a water conservation coordinator (part-time)
<input type="checkbox"/>	Implement a rebate program for water efficient appliances, fixtures, or outdoor water management
<input type="checkbox"/>	Other

Objective 8: Tracking Success: How will you track or measure success through the next ten years?

By far, the most important goal for the City of Anoka over the next 3 years is to locate and properly meter the source of the unmetered/unaccounted for water. Getting unaccounted for water under 10% would be a major accomplishment.

Maintaining the current low per capita water use and Max Day /Ave Day ratio will also be considered a success.

Tip: The process to monitor demand reduction and/or a rate structure includes:

- a) The DNR Hydrologist will call or visit the community the first 1-3 years after the water supply plan is completed.
- b) They will discuss what activities the community is doing to conserve water and if they feel their actions are successful. The Water Supply Plan, Part 3 tables and responses will guide the discussion. For example, they will discuss efforts to reduce unaccounted for water loss if that is a problem, or go through Tables 33, 34 and 35 to discuss new initiatives.
- c) The city representative and the hydrologist will discuss total per capita water use, residential per capita water use, and business/industry use. They will note trends.
- d) They will also discuss options for improvement and/or collect case studies of success stories to share with other communities. One option may be to change the rate structure, but there are many other paths to successful water conservation.
- e) If appropriate, they will cooperatively develop a simple work plan for the next few years, targeting a couple areas where the city might focus efforts.

A. Regulation

Complete Table 29 by selecting which regulations are used to reduce demand and improve water efficiencies. Add additional rows as needed.

Copies of adopted regulations or proposed restrictions or should be included in **Appendix 10** (a list with hyperlinks is acceptable).

Table 29. Regulations for short-term reductions in demand and long-term improvements in water efficiencies

Regulations Utilized	When is it applied (in effect)?
<input type="checkbox"/> Rainfall sensors required on landscape irrigation systems	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water efficient plumbing fixtures required	<input type="checkbox"/> New development <input type="checkbox"/> Replacement <input type="checkbox"/> Rebate Programs
<input type="checkbox"/> Critical/Emergency Water Deficiency ordinance	<input type="checkbox"/> Only during declared Emergencies
<input checked="" type="checkbox"/> Watering restriction requirements (time of day, allowable days, etc.)	<input checked="" type="checkbox"/> Odd/even <input type="checkbox"/> 2 days/week <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Water waste prohibited (for example, having a fine for irrigators spraying on the street)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Limitations on turf areas (requiring lots to have 10% - 25% of the space in natural areas)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Soil preparation requirements (after construction, requiring topsoil to be applied to promote good root growth)	<input type="checkbox"/> New Development <input type="checkbox"/> Construction Projects <input type="checkbox"/> Other
<input type="checkbox"/> Tree ratios (requiring a certain number of trees per square foot of lawn)	<input type="checkbox"/> New development <input type="checkbox"/> Shoreland/zoning <input type="checkbox"/> Other
<input type="checkbox"/> Permit to fill swimming pool and/or requiring pools to be covered (to prevent evaporation)	<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared Emergencies
<input type="checkbox"/> Ordinances that permit stormwater irrigation, reuse of water, or other alternative water use (Note: be sure to check current plumbing codes for updates)	<input type="checkbox"/> Describe

B. Retrofitting Programs

Education and incentive programs aimed at replacing inefficient plumbing fixtures and appliances can help reduce per capita water use, as well as energy costs. It is recommended that municipal water suppliers develop a long-term plan to retrofit public buildings with water efficient plumbing fixtures and appliances. Some water suppliers have developed partnerships with organizations having similar conservation goals, such as electric or gas suppliers, to develop cooperative rebate and retrofit programs.

A study by the AWWA Research Foundation (Residential End Uses of Water, 1999) found that the average indoor water use for a non-conserving home is 69.3 gallons per capita per day (gpcd). The average indoor water use in a conserving home is 45.2 gpcd and most of the decrease in water use is related to water efficient plumbing fixtures and appliances that can reduce water, sewer and energy costs. In Minnesota, certain electric and gas providers are required (Minnesota Statute 216B.241) to fund programs that will conserve energy resources and some utilities have distributed water efficient showerheads to customers to help reduce energy demands required to supply hot water.

Retrofitting Programs

Complete Table 30 by checking which water uses are targeted, the outreach methods used, the measures used to identify success, and any participating partners.

Table 30. Retrofitting programs (Select all that apply)

Water Use Targets	Outreach Methods	Partners
<input checked="" type="checkbox"/> Low flush toilets, <input checked="" type="checkbox"/> Toilet leak tablets, <input checked="" type="checkbox"/> Low flow showerheads, <input checked="" type="checkbox"/> Faucet aerators;	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input checked="" type="checkbox"/> Water conserving washing machines, <input checked="" type="checkbox"/> Dish washers, <input checked="" type="checkbox"/> Water softeners;	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization
<input checked="" type="checkbox"/> Rain gardens, <input checked="" type="checkbox"/> Rain barrels, <input checked="" type="checkbox"/> Native/drought tolerant landscaping, etc.	<input checked="" type="checkbox"/> Education about <input type="checkbox"/> Free distribution of <input type="checkbox"/> Rebate for <input type="checkbox"/> Other	<input type="checkbox"/> Gas company <input type="checkbox"/> Electric company <input type="checkbox"/> Watershed organization

Briefly discuss measures of success from the above table (e.g. number of items distributed, dollar value of rebates, gallons of water conserved, etc.):

Residential per capita water use is already low, therefore it appears that these low cost programs are adequate, and further expenditures of time and money are not required.

C. Education and Information Programs

Customer education should take place in three different circumstances. First, customers should be provided information on how to conserve water and improve water use efficiencies. Second, information should be provided at appropriate times to address peak demands. Third, emergency notices and educational materials about how to reduce water use should be available for quick distribution during an emergency.

Proposed Education Programs

Complete Table 31 by selecting which methods are used to provide water conservation and information, including the frequency of program components. Select all that apply and add additional lines as needed.

Table 31. Current and Proposed Education Programs

Education Methods	General summary of topics	#/Year	Frequency
Billing inserts or tips printed on the actual bill	General water conservation tips, info on water system	2	<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Consumer Confidence Reports	General water conservation tips, info on water system	1	<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Press releases to traditional local news outlets (e.g., newspapers, radio and TV)	Situation specific info		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input checked="" type="checkbox"/> Only during declared emergencies
Social media distribution (e.g., emails, Facebook, Twitter)	General water conservation tips, info on water system		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Paid advertisements (e.g., billboards, print media, TV, radio, web sites, etc.)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Presentations to community groups	Situation specific info		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input checked="" type="checkbox"/> Only during declared emergencies
Staff training	General water conservation tips, info on water system		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Facility tours			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Displays and exhibits			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Marketing rebate programs (e.g., indoor fixtures & appliances and outdoor practices)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community news letters	General water conservation tips, info on water system		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Direct mailings (water audit/retrofit kits, showerheads, brochures)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal

Education Methods	General summary of topics	#/Year	Frequency
			<input type="checkbox"/> Only during declared emergencies
Information kiosk at utility and public buildings			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Public service announcements	Situation specific info		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input checked="" type="checkbox"/> Only during declared emergencies
Cable TV Programs	Situation specific info		<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input checked="" type="checkbox"/> Only during declared emergencies
Demonstration projects (landscaping or plumbing)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
K-12 education programs (Project Wet, Drinking Water Institute, presentations)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community events (children’s water festivals, environmental fairs)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Community education classes			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Water week promotions			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Website (include address:) http://www.ci.anoka.mn.us/index.asp?Type=B_BASIC&SEC={8EE961A4-BB32-46A6-9CB1-AE5E7763A17A}&DE={AF75942B-5847-4153-81F7-A7EC9B8B22C2} http://www.knowtheflow.us/learn-more-2/	General water conservation tips, info on water system		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Targeted efforts (large volume users, users with large increases)			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Education Methods	General summary of topics	#/Year	Frequency
Notices of ordinances	General water conservation tips, info on water system		<input checked="" type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Emergency conservation notices		1	<input type="checkbox"/> Ongoing <input checked="" type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies
Other:			<input type="checkbox"/> Ongoing <input type="checkbox"/> Seasonal <input type="checkbox"/> Only during declared emergencies

Briefly discuss what future education and information activities your community is considering in the future:

Continue to participate and leverage the collaborative efforts of Anoka County “Know The Flow” and the Anoka County Water Resources Management Task Force

Leverage Wellhead Protection Plan update process (currently under way) to remind residents of the value of water and the benefits of water conservation.

Part 4. ITEMS FOR METROPOLITAN AREA COMMUNITIES

Minnesota Statute 473.859 requires WSPs to be completed for all local units of government in the seven-county Metropolitan Area as part of the local comprehensive planning process.



Much of the information in Parts 1-3 addresses water demand for the next 10 years. However, additional information is needed to address water demand through 2040, which will make the WSP consistent with the Metropolitan Land Use Planning Act, upon which the local comprehensive plans are based.

This Part 4 provides guidance to complete the WSP in a way that addresses plans for water supply through 2040.

A. Water Demand Projections through 2040

Complete Table 7 in Part 1D by filling in information about long-term water demand projections through 2040. Total Community Population projections should be consistent with the community's system statement, which can be found on the Metropolitan Council's website and which was sent to the community in September 2015.

Projected Average Day, Maximum Day, and Annual Water Demands may either be calculated using the method outlined in *Appendix 2* of the *2015 Master Water Supply Plan* or by a method developed by the individual water supplier.

B. Potential Water Supply Issues

Complete Table 10 in Part 1E by providing information about the potential water supply issues in your community, including those that might occur due to 2040 projected water use.

The *Master Water Supply Plan* provides information about potential issues for your community in *Appendix 1 (Water Supply Profiles)*. This resource may be useful in completing Table 10.

You may document results of local work done to evaluate impact of planned uses by attaching a feasibility assessment or providing a citation and link to where the plan is available electronically.

C. Proposed Alternative Approaches to Meet Extended Water Demand Projections

Complete Table 12 in Part 1F with information about potential water supply infrastructure impacts (such as replacements, expansions or additions to wells/intakes, water storage and treatment capacity, distribution systems, and emergency interconnections) of extended plans for development and redevelopment, in 10-year increments through 2040. It may be useful to refer to information in the community's local Land Use Plan, if available.

Complete Table 14 in Part 1F by checking each approach your community is considering to meet future demand. For each approach your community is considering, provide information about the amount of

future water demand to be met using that approach, the timeframe to implement the approach, potential partners, and current understanding of the key benefits and challenges of the approach.

As challenges are being discussed, consider the need for: evaluation of geologic conditions (mapping, aquifer tests, modeling), identification of areas where domestic wells could be impacted, measurement and analysis of water levels & pumping rates, triggers & associated actions to protect water levels, etc.

D. Value-Added Water Supply Planning Efforts (Optional)

The following information is not required to be completed as part of the local water supply plan, but completing this can help strengthen source water protection throughout the region and help Metropolitan Council and partners in the region to better support local efforts.

Source Water Protection Strategies

Does a Drinking Water Supply Management Area for a neighboring public water supplier overlap your community? Yes No

If you answered no, skip this section. If you answered yes, please complete Table 32 with information about new water demand or land use planning-related local controls that are being considered to provide additional protection in this area.

Table 32. Local controls and schedule to protect Drinking Water Supply Management Areas

Local Control	Schedule to Implement	Potential Partners
<input type="checkbox"/> None at this time		
<input type="checkbox"/> Comprehensive planning that guides development in vulnerable drinking water supply management areas		
<input type="checkbox"/> Zoning overlay		
<input checked="" type="checkbox"/> Other: Aquifer Pump Test	Winter 2016/2017	Andover, Ramsey

Technical assistance

From your community’s perspective, what are the most important topics for the Metropolitan Council to address, guided by the region’s Metropolitan Area Water Supply Advisory Committee and Technical Advisory Committee, as part of its ongoing water supply planning role?

- Coordination of state, regional and local water supply planning roles
- Regional water use goals
- Water use reporting standards
- Regional and sub-regional partnership opportunities
- Identifying and prioritizing data gaps and input for regional and sub-regional analyses
- Others: _____

GLOSSARY

Agricultural/Irrigation Water Use - Water used for crop and non-crop irrigation, livestock watering, chemigation, golf course irrigation, landscape and athletic field irrigation.

Average Daily Demand - The total water pumped during the year divided by 365 days.

Calcareous Fen - Calcareous fens are rare and distinctive wetlands dependent on a constant supply of cold groundwater. Because they are dependent on groundwater and are one of the rarest natural communities in the United States, they are a protected resource in MN. Approximately 200 have been located in Minnesota. They may not be filled, drained or otherwise degraded.

Commercial/Institutional Water Use - Water used by motels, hotels, restaurants, office buildings, commercial facilities and institutions (both civilian and military). Consider maintaining separate institutional water use records for emergency planning and allocation purposes. Water used by multi-family dwellings, apartment buildings, senior housing complexes, and mobile home parks should be reported as Residential Water Use.

Commercial/Institutional/Industrial (C/I/I) Water Sold - The sum of water delivered for commercial/institutional or industrial purposes.

Conservation Rate Structure - A rate structure that encourages conservation and may include increasing block rates, seasonal rates, time of use rates, individualized goal rates, or excess use rates. If a conservation rate is applied to multifamily dwellings, the rate structure must consider each residential unit as an individual user. A community may have a separate conservation rate that only goes into effect when the community or governor declares a drought emergency. These higher rates can help to protect the city budgets during times of significantly less water usage.

Date of Maximum Daily Demand - The date of the maximum (highest) water demand. Typically this is a day in July or August.

Declining Rate Structure - Under a declining block rate structure, a consumer pays less per additional unit of water as usage increases. This rate structure does not promote water conservation.

Distribution System - Water distribution systems consist of an interconnected series of pipes, valves, storage facilities (water tanks, water towers, reservoirs), water purification facilities, pumping stations, flushing hydrants, and components that convey drinking water and meeting fire protection needs for cities, homes, schools, hospitals, businesses, industries and other facilities.

Flat Rate Structure - Flat fee rates do not vary by customer characteristics or water usage. This rate structure does not promote water conservation.

Industrial Water Use - Water used for thermonuclear power (electric utility generation) and other industrial use such as steel, chemical and allied products, paper and allied products, mining, and petroleum refining.

Low Flow Fixtures/Appliances - Plumbing fixtures and appliances that significantly reduce the amount of water released per use are labeled “low flow”. These fixtures and appliances use just enough water to be effective, saving excess, clean drinking water that usually goes down the drain.

Maximum Daily Demand - The maximum (highest) amount of water used in one day.

Metered Residential Connections - The number of residential connections to the water system that have meters. For multifamily dwellings, report each residential unit as an individual user.

Percent Unmetered/Unaccounted For - Unaccounted for water use is the volume of water withdrawn from all sources minus the volume of water delivered. This value represents water “lost” by miscalculated water use due to inaccurate meters, water lost through leaks, or water that is used but unmetered or otherwise undocumented. Water used for public services such as hydrant flushing, ice skating rinks, and public swimming pools should be reported under the category “Water Supplier Services”.

Population Served - The number of people who are served by the community’s public water supply system. This includes the number of people in the community who are connected to the public water supply system, as well as people in neighboring communities who use water supplied by the community’s public water supply system. It should not include residents in the community who have private wells or get their water from neighboring water supply.

Residential Connections - The total number of residential connections to the water system. For multifamily dwellings, report each residential unit as an individual user.

Residential Per Capita Demand - The total residential water delivered during the year divided by the population served divided by 365 days.

Residential Water Use - Water used for normal household purposes such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and watering lawns and gardens. Should include all water delivered to single family private residences, multi-family dwellings, apartment buildings, senior housing complexes, mobile home parks, etc.

Smart Meter - Smart meters can be used by municipalities or by individual homeowners. Smart metering generally indicates the presence of one or more of the following:

- Smart irrigation water meters are controllers that look at factors such as weather, soil, slope, etc. and adjust watering time up or down based on data. Smart controllers in a typical summer will reduce water use by 30%-50%. Just changing the spray nozzle to new efficient models can reduce water use by 40%.
- Smart Meters on customer premises that measure consumption during specific time periods and communicate it to the utility, often on a daily basis.
- A communication channel that permits the utility, at a minimum, to obtain meter reads on demand, to ascertain whether water has recently been flowing through the meter and onto the

premises, and to issue commands to the meter to perform specific tasks such as disconnecting or restricting water flow.

Total Connections - The number of connections to the public water supply system.

Total Per Capita Demand - The total amount of water withdrawn from all water supply sources during the year divided by the population served divided by 365 days.

Total Water Pumped - The cumulative amount of water withdrawn from all water supply sources during the year.

Total Water Delivered - The sum of residential, commercial, industrial, institutional, water supplier services, wholesale and other water delivered.

Ultimate (Full Build-Out) - Time period representing the community's estimated total amount and location of potential development, or when the community is fully built out at the final planned density.

Unaccounted (Non-revenue) Loss - See definitions for "percent unmetered/unaccounted for loss".

Uniform Rate Structure - A uniform rate structure charges the same price-per-unit for water usage beyond the fixed customer charge, which covers some fixed costs. The rate sends a price signal to the customer because the water bill will vary by usage. Uniform rates by class charge the same price-per-unit for all customers within a customer class (e.g. residential or non-residential). This price structure is generally considered less effective in encouraging water conservation.

Water Supplier Services - Water used for public services such as hydrant flushing, ice skating rinks, public swimming pools, city park irrigation, back-flushing at water treatment facilities, and/or other uses.

Water Used for Nonessential Purposes - Water used for lawn irrigation, golf course and park irrigation, car washes, ornamental fountains, and other non-essential uses.

Wholesale Deliveries - The amount of water delivered in bulk to other public water suppliers.

Acronyms and Initialisms

AWWA – American Water Works Association

C/I/I – Commercial/Institutional/Industrial

CIP – Capital Improvement Plan

GIS – Geographic Information System

GPCD – Gallons per capita per day

GWMA – Groundwater Management Area – North and East Metro, Straight River, Bonanza,

MDH – Minnesota Department of Health

MGD – Million gallons per day

MG – Million gallons

MGL – Maximum Contaminant Level

MnTAP – Minnesota Technical Assistance Program (University of Minnesota)

MPARS – MN/DNR Permitting and Reporting System (new electronic permitting system)

MRWA – Minnesota Rural Waters Association

SWP – Source Water Protection

WHP – Wellhead Protection

APPENDICES TO BE SUBMITTED BY THE WATER SUPPLIER

Appendix 1: Well records and maintenance summaries – see Part 1C

Appendix 2: Water level monitoring plan – see Part 1E

Appendix 3: Water level graphs for each water supply well - see Part 1E

Appendix 4: Capital Improvement Plan - see Part 1E

Appendix 5: Emergency Telephone List – see Part 2C

Appendix 6: Cooperative Agreements for Emergency Services – see Part 2C

Appendix 7: Municipal Critical Water Deficiency Ordinance – see Part 2C

Appendix 8: Graph showing annual per capita water demand for each customer category during the last ten-years – see Part 3 Objective 4

Appendix 9: Water Rate Structure – see Part 3 Objective 6

Appendix 10: Adopted or proposed regulations to reduce demand or improve water efficiency – see Part 3 Objective 7

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates – see www.mndnr.gov/watersupplyplans

Appendix 1

Well Records and Maintenance Summaries

WELL MAINTENANCE WELL #3

4/2011

PULLED AND REPLACED WELL PUMP

REPLACED 8" COLUMN PIPE (100')

REPLACED STAINLESS STEEL SHAFT (110')

REPLACED 10' TAIL PIPE (10')

REPLACED FOOTVALVE

REPLACED STAINLESS SHAFT SLEVES

REPLACED RUBBER SPIDERS

REBUILT PACKING BOX

2/2011

REMOVED SAND FROM THE BOTTOM OF WELL

Anoka Well # 4 Repair & Maintenance

12/2006

Replaced Colum Pipe (260')

Replaced Shaft (260')

Replaced Couplings

Replaced Rubber Bearings

Replaced Retainer Bronze – Spider

Replaced Drawdown Tube

Sand Blast & Paint Head

New pack Box Bushing & Packing

5/2013

Remove & Reinstall Pump

Well Decompressing (11 Hours) \Repair Packing Box

Replace 1 Colum Pipe & 1 Suction Pipe

Repair Motor – New Bearing & Metalize Top Bearing Holder

Balance Motor

Anoka Well #5

9/2013

Replaced Pump Motor With A New 150 HP Submersible Pump

Well #6

4/2012

Rehab Well That Had Filled In With Sand

Replaced Motor With A Submersible Pump

Pump Tested Well

Well #7

10/2013

Replaced Drop Pipe (100')

Replaced Old Motor With A New 75 HP 2 Stage Submersible Pump

Installed A New 8" Check Valve

New Discharge Elbow

Installed New Stilling Tube (100')

Well #8

9/2007 Replaced Submersible Pump & Check Valve

4/2015

Install 110' Of 1" SCH 80 PVC Pipe For Drawdown Tube

Trout Wells

141 28th Ave South
 Waite Park, MN 56387
 320-251-5090

Email joetraut@troutwells.com
 www.troutwells.com

Invoice - Anoka well 3 - pump pull & repair

DATE: April 28, 2011

PROJECT NAME: City of Anoka well 3

JOB # 306249

	Description	Pump Repair	Unit	Unit Price	Quantity	Totals
LABOR	Mobilization & Demobilization		LS	\$ 750.00	1	\$ 750.00
	Pull Pump		HR	\$ 175.00	4	\$ 700.00
	Clean & Disassemble Pump		HR	\$ 75.00	3	\$ 225.00
	Remobilize & Demobilize		LS	\$ 750.00	1	\$ 750.00
	Reinstall Pump & Hook to System		HR	\$ 175.00	4	\$ 700.00
	Start Pump & Test Run		HR	\$ 125.00	1	\$ 125.00
	Video		EA	\$ 1,400.00	1	\$ 1,400.00
MATERIALS	New 75hp US Prem. Eff motor		LS	\$ 6,625.00	1	\$ 6,625.00
	Pump rebuild 12CLC-4 stge		LS	\$ 975.00	1	\$ 975.00
	New - 8" column		LF	\$ 45.00	100	\$ 4,500.00
	New - 1 1/2" SS shaft		LF	\$ 43.00	100	\$ 4,300.00
	New - 8" x 10' tail pipe		EACH	\$ 350.00	1	\$ 350.00
	New - 8" K&K footvalve		EACH	\$ 975.00	1	\$ 975.00
	New - 1 1/2" SS head shaft		EACH	\$ 425.00	1	\$ 425.00
	New - SS shaft sleeves		EACH	\$ 65.00	10	\$ 650.00
	New - Rubber spider inserts		EACH	\$ 25.00	10	\$ 250.00
	1 1/2" packing box rebuild		EACH	\$ 225.00	1	\$ 225.00
	Chlorinate well		LS	\$ 35.00	1	\$ 35.00
	Misc Supplies		LS	\$ 150.00	1	\$ 150.00
	New 8" spiders		EACH	\$ 95.00	10	\$ 950.00

TOTAL MATERIALS	\$ 20,410.00
TOTAL LABOR	\$ 4,650.00
INCOMING FREIGHT	\$ 475.00
TOTAL	\$ 25,535.00



MARK J TRAUT WELLS INC
 141 28TH AVE SOUTH
 WAITE PARK, MN 56387
 UNITED STATES
 (320)-251-5090

PAGE 1

INVOICE DATE 04/30/2011
 INVOICE NO 235151

S 031264
 O CITY OF ANOKA
 L 2015 FIRST AVE N
 D ANOKA, MN 55303
 T
 O

S 031264
 H CITY OF ANOKA
 I 2015 FIRST AVE N
 P ANOKA, MN 55303
 T
 O

TOTAL DUE 25,535.00

SLS1	SLS2	DUE DATE	DISC DUE DATE	ORDER NO	ORDER DATE	SHIP DATE	SHIP NO
421	366	05/10/2011	04/30/2011	00090566	04/30/2011	04/30/2011	

TERMS DESCRIPTION	CUSTOMER PO NO	SHIP VIA
NET 10		

ITEM ID	TX CL	UNITS	ORDERED	SHIPPED	UNIT PRICE	EXTENSION
12	0		1.0000	1.0000	25,060.0000	25,060.00
PUMP AND/OR TANK INSTALL RE: WELL #3 PUMP PULL & REPAIR						
90	0		1.0000	1.0000	475.0000	475.00
MISC (BULK WATER, FREIGHT, ETC) FREIGHT CHARGES						

VISIT OUR WEB SITE @ WWW.TRAUTWELLS.COM

TAXABLE	NONTAXABLE	FREIGHT	SALES TAX	MISC	TOTAL
0.00	25,535.00	0.00	0.00	0.00	25,535.00
TOTAL DUE					25,535.00

Traut Wells

141 28th Ave South
Waite Park, MN 56387
320-251-5090
Email joetraut@trautwells.com
www.trautwells.com

Invoice - Anoka well 3 - Sand Removal

DATE: 2/15/2011

PHONE # 763-576-2923

NAME: City of Anoka well 3

FAX #

ADDRESS 2015 First Ave N.

Anoka, MN 55303

ATTN: Pete K

JOB # 30-6249

RE: City will remove sand from site

Description
Mob/Demob
Setup/ Remove equipmt for sand removal
Remove sand from bottom of well

Unit	Unit Price	QTY	Totals
LS	1,550.00	1	\$ 1,550.00
HR.	175.00	5	\$ 875.00
HR.	225.00	3	\$ 675.00

TOTAL MATERIALS	
TOTAL LABOR	\$ 3,100.00
INCOMING FREIGHT	
TOTAL	\$ 3,100.00



MARK J TRAUT WELLS INC
 141 28TH AVE SOUTH
 WAITE PARK, MN 56387
 UNITED STATES
 (320)-251-5090

PAGE 1

INVOICE DATE 02/21/2011
 INVOICE NO 233723

S 031264
 O CITY OF ANOKA
 L 2015 FIRST AVE N
 D ANOKA, MN 55303
 T
 O

S 031264
 H CITY OF ANOKA
 I 2015 FIRST AVE N
 P ANOKA, MN 55303
 T
 O

TOTAL DUE 3,100.00

SLS1	SLS2	DUE DATE	DISC DUE DATE	ORDER NO	ORDER DATE	SHIP DATE	SHIP NO
421	366	03/03/2011	02/21/2011	00089107	02/21/2011	02/21/2011	

TERMS DESCRIPTION	CUSTOMER PO NO	SHIP VIA
-------------------	----------------	----------

NET 10

ITEM ID	TX CL	UNITS	ORDERED	SHIPPED	UNIT PRICE	EXTENSION
02		0	1.0000	1.0000	3,100.0000	3,100.00

LABOR
 RE: WELL #3 SAND REMOVAL ATTN:
 PETE

VISIT OUR WEB SITE @ WWW.TRAUTWELLS.COM

TAXABLE	NONTAXABLE	FREIGHT	SALES TAX	MISC	TOTAL
0.00	3,100.00	0.00	0.00	0.00	3,100.00
TOTAL DUE					3,100.00

Appendix 2

Water Level Monitoring Plan

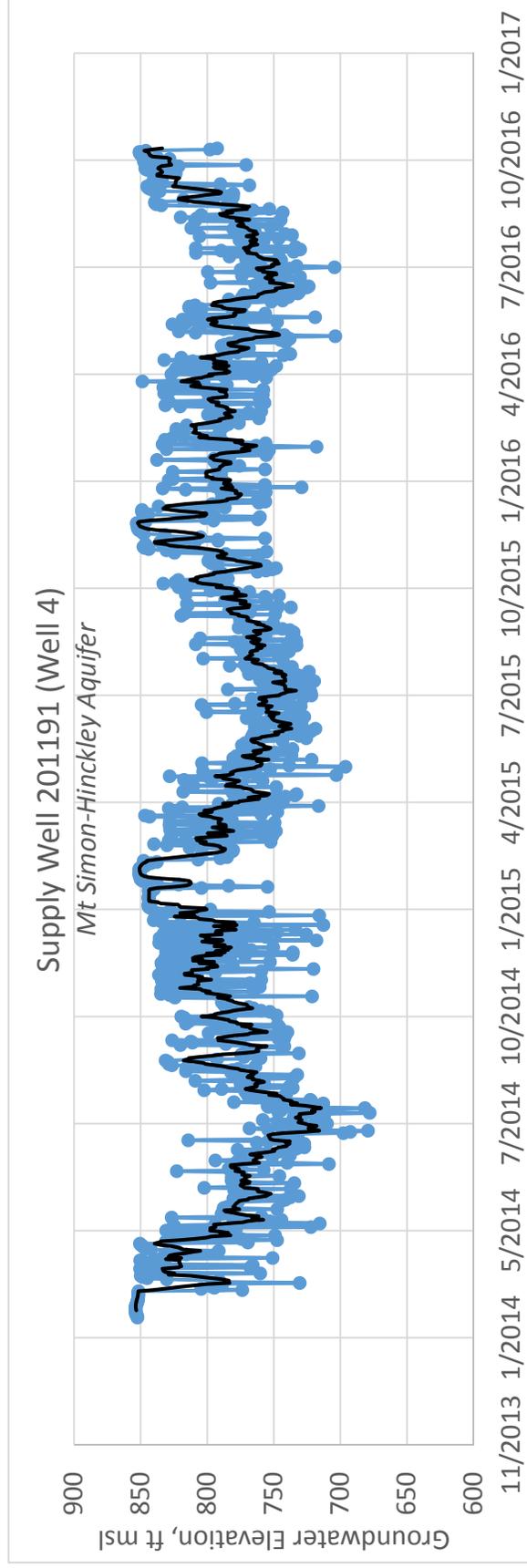
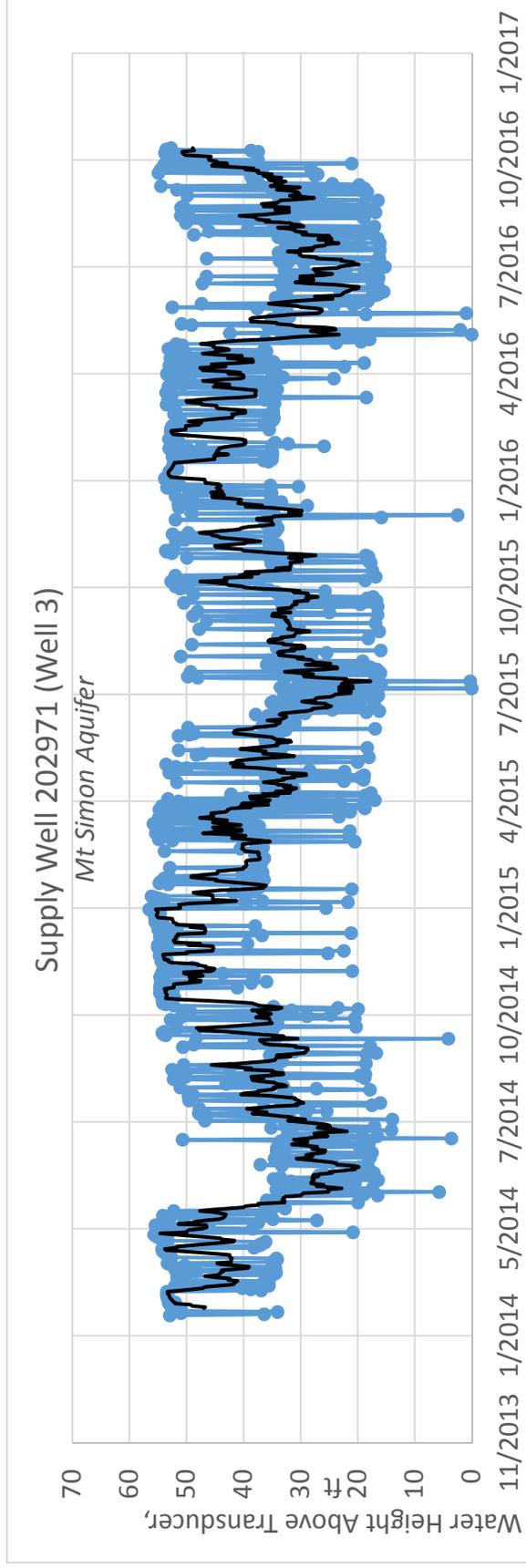
Appendix 2: Water Level Monitoring Plan

Unique Well ID	Well Name	Location (X, Y; NAD 1983, Zone 15)	Aquifer Name	Type of monitoring point	Monitoring program	Frequency of monitoring	Monitoring Method
202971	Well 3	469816, 5004487	CTCW – Tunnel City-Wonewoc	Production Well	City of Anoka	Continuous	SCADA
201191	Well 4	467904, 5005774	CMTS – Mt. Simon- Hinckley	Production Well	City of Anoka	Continuous	SCADA
201218	Well 5	467939, 5005780	CTCW – Tunnel City-Wonewoc	Production Well	City of Anoka	Continuous	SCADA
224625	Well 6	470146, 5008276	CWMS - Wonewoc - Mt. Simon	Production Well	City of Anoka	Continuous	SCADA
453792	Well 7	471272, 5007499	CMTS – Mt. Simon	Production Well	City of Anoka	Continuous	SCADA
676405	Well 8	470149, 5008324	CTCW – Tunnel City-Wonewoc	Production Well	City of Anoka	Continuous	SCADA
209297	Ob. Well	469794, 5007044	CMTS – Mt. Simon	Observation Well	MDH	Monthly	Steel Tape

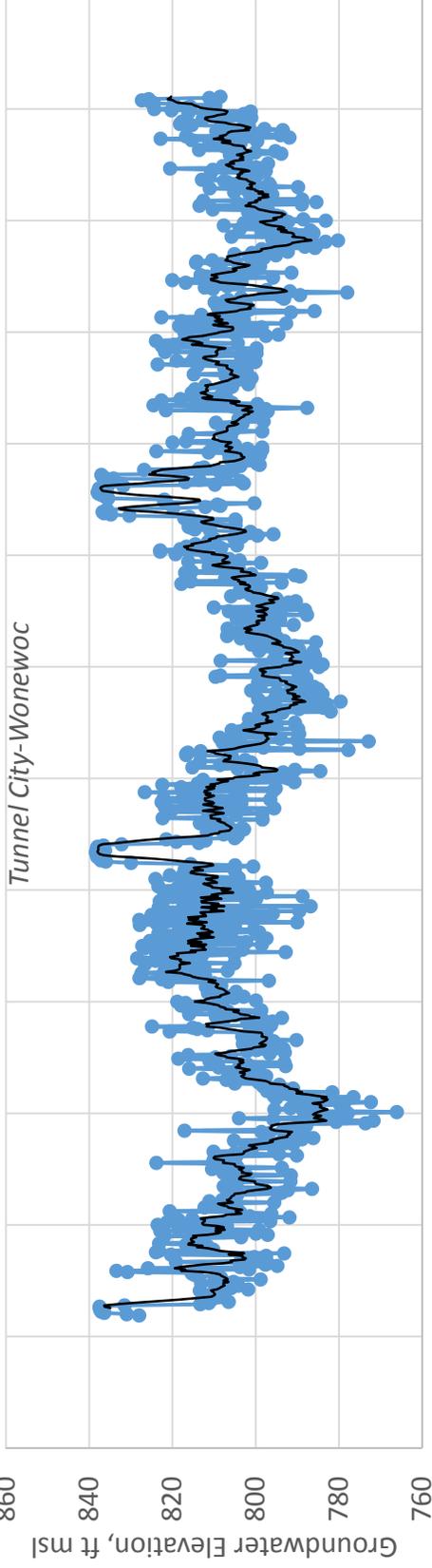
Appendix 3

Water Level Graphs for Each Water Supply Well

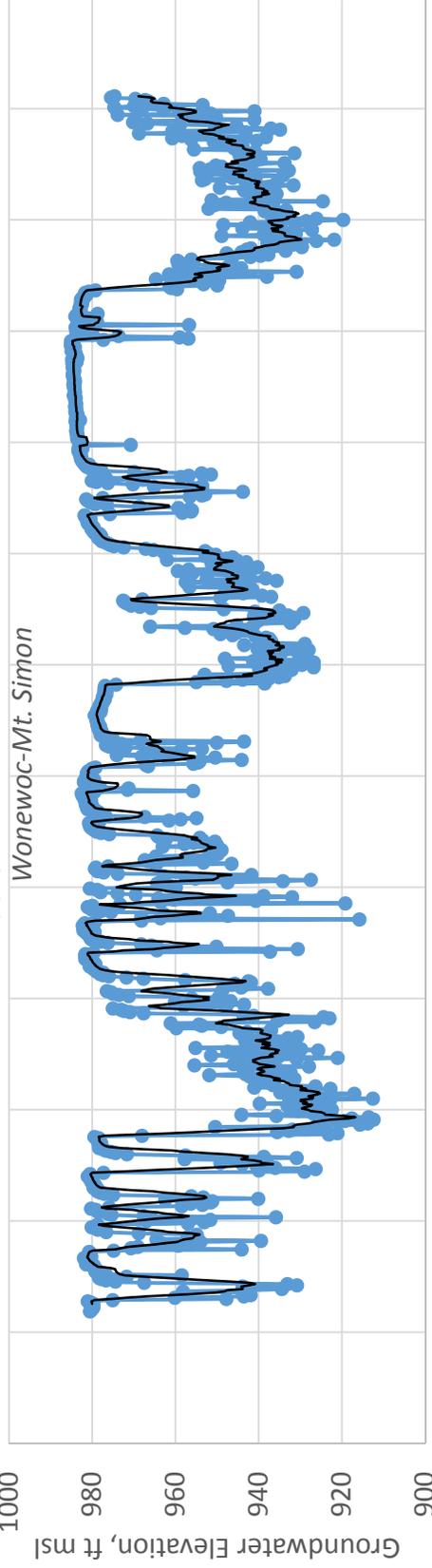
Appendix 3: Water Level Data Graphs

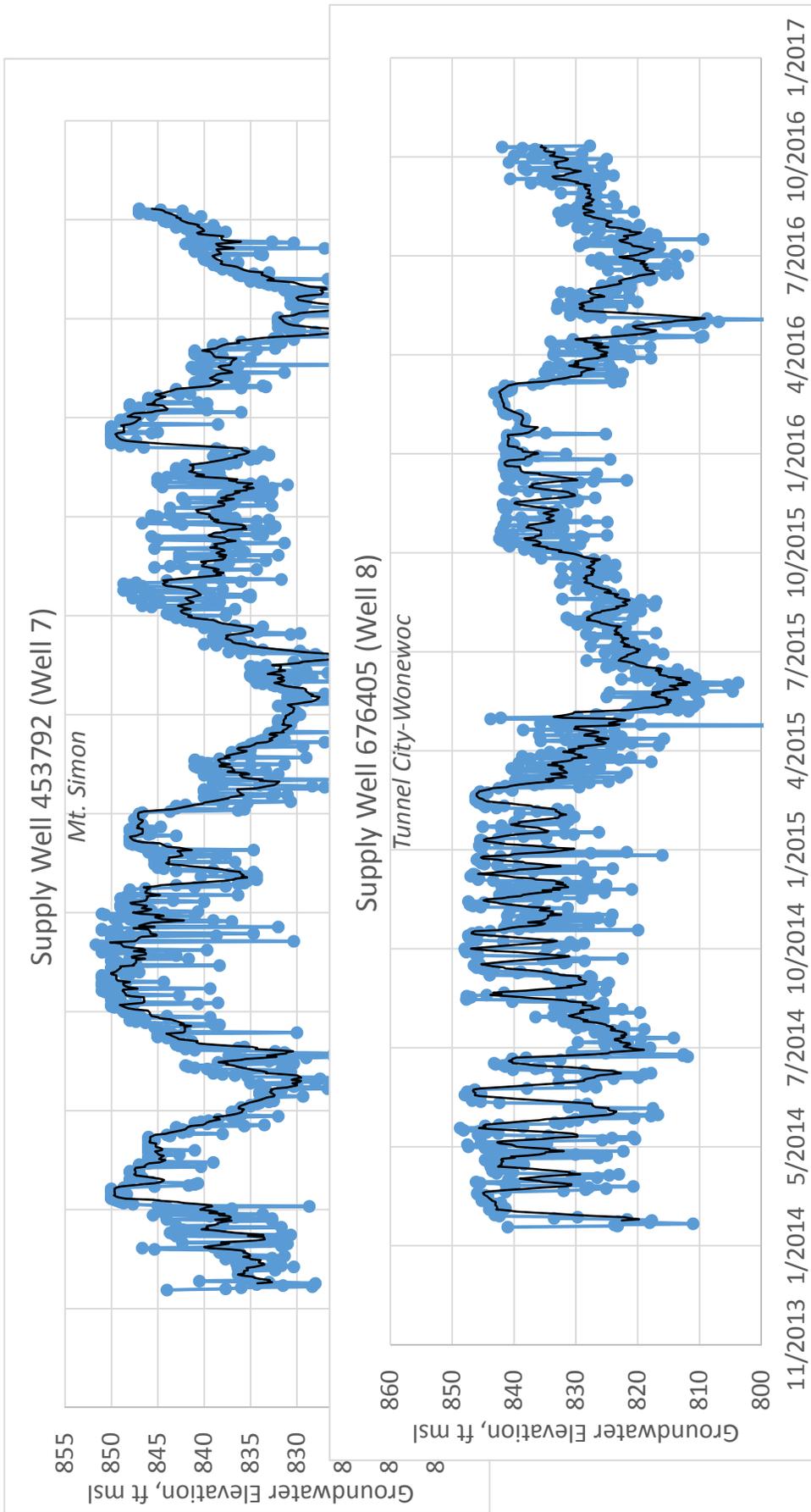


Supply Well 201218 (Well 5)



Supply Well 224625 (Well 6)





Supply Well 453792 (Well 7)

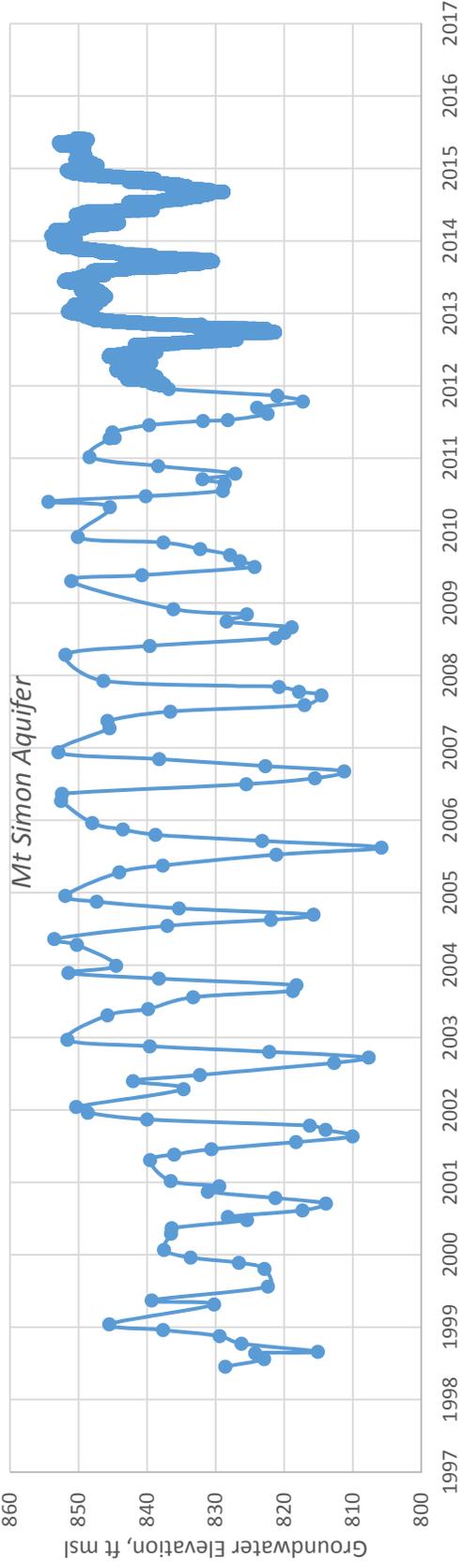
Mt. Simon

Supply Well 676405 (Well 8)

Tunnel City-Wonewoc

11/2013 1/2014 5/2014 7/2014 10/2014 1/2015 4/2015 7/2015 10/2015 1/2016 4/2016 7/2016 10/2016 1/2017

Observation Well 209297



Appendix 4

Capital Improvement Plan

REQUEST FOR COUNCIL ACTION

MEETING DATE:
September 2, 2008

AGENDA SECTION: Ordinances and Resolutions	ORIGINATING DEPT: Public Works - Engineering	ITEM NO.: 9.3
ITEM DESCRIPTION: ORD/Amending Chapter 66, Article IV, Section 66-131; Water Restrictions (2 nd Reading)		PREPARED BY: Greg Lee, P.E. Director of Public Services/ City Engineer

BACKGROUND

This is the second reading of an ordinance to Amend Chapter 66, Article IV, Section 66-131; Water Restrictions. The first reading of this ordinance was held on August 18, 2008. There were no requested amendments to the first reading.

DISCUSSION

The City's Capital Improvement Program (CIP) has a New Well and Treatment Plant scheduled in 2014, which is just beyond the official scope of the CIP. The estimated cost of this improvement is \$4,500,000. This item has been placed beyond the scope of the CIP because of the lack of available funds in the Enterprise Fund.

During recent budget discussions, staff determined that perhaps the first step that should be taken to delay or perhaps eliminate the need for an additional well and treatment plant is to promote conservation and to limit the peak water demand. This would be done by expanding the current odd/even watering policy to include a restriction that would be applied to selected portions of the day.

On August 18, 2008, the City Council adopted a policy on Water Conservation. In addition to expanding current water conservation regulations, this policy also included a method for assigning penalties for violations. The City's Code currently allows for the option to shut off the water to violating properties; however, staff believes that assigning administrative fines is a more appropriate approach. To do this, staff has submitted a proposed revision to section 66-131 of the City Code to allow for written warnings and administrative fines to be used to for water restriction violations.

FINANCIAL IMPACT

Should the City hold a second reading and adopt this ordinance, the City will incur cost associated with public notification and enforcement. This would include items such as creating message signs, printing door hangers, and administrative costs associated with processing data and collecting fines. However, the fines collected are anticipated to compensate for administrative costs.

COUNCIL ACTION REQUESTED

It is requested that the City Council hold the second reading and adopt of this ordinance.

COUNCIL ACTION: Motion by: _____ Second by: _____ Vote: _____

FOLLOW UP: _____

SUMMARY OF IMPACTS ON FUNDING SOURCES

WATER FUND

The water fund has some major capital improvement projects within the next few years to improve water distribution and storage. Water utility rates were increased in 2016. In the future it is anticipated that the city will need an additional well to keep up with demand. A new well is projected to cost about \$4.3 million. The new well is projected to be established in 2018.

In 2001 a revenue bond was issued to cover water infrastructure costs. This bond was refunded in 2009 to reduce costs. The refunded debt will be paid off in 2017. New debt will need to be issued to build and new well and to continue scheduled infrastructure improvements. Rate increases are projected for 2022 and forward.

WATER FUND

	basic rate		2017	2018	2019	2020
	9.80%	9.70%				
	2015	2016				
Working Capital Beginning Year	1,645,180	1,554,442	1,732,488	1,448,907	142,235	1,121,472
Operating Revenues	1,587,280	1,779,993	1,779,993	1,779,993	1,779,993	1,779,993
Other	333,903	260,500	305,000 #	145,000 #	145,000	145,000
Interest	24,428	23,317	30,319	28,978	3,200	28,037
Transfer In						
Miscellaneous	8,018			250,000		
Bond Issuance					4,320,000	
Total Sources	<u>1,953,629</u>	<u>2,063,810</u>	<u>2,115,312</u>	<u>2,203,971</u>	<u>6,248,193</u>	<u>1,953,030</u>
Personal Services	420,956	477,500	489,438	501,674	511,707	521,941
Supplies	117,686	121,102	135,969	142,512	144,650	146,820
Professional Services	302,073	278,170	309,892	316,176	321,705	313,243
Maintenance	43,363	82,661	80,944	79,481	70,365	73,147
Interest	16,275	12,831	3,625		77,000	154,000
Transfer Out			40,000	40,000	40,000	40,000
Capital Outlay	14,246	109,500	47,000	47,000	110,000	47,000
Capital Improvements	914,768	579,000	1,292,025	2,383,800	3,843,530	484,200
Principal Bond payment	210,000	215,000	225,000			150,000
Principal Bond payment						
Total Uses	<u>2,039,367</u>	<u>1,875,764</u>	<u>2,623,893</u>	<u>3,510,642</u>	<u>5,118,957</u>	<u>1,930,351</u>
Change in available funds	(85,738)	188,046	(508,582)	(1,306,671)	1,129,237	22,679
Other changes	(5,000)	(10,000)	225,000	0	(150,000)	0
Working Capital Ending Year	1,554,442	1,732,488	1,448,907	142,235	1,121,472	1,144,151
					\$ 566,920	

CAPITAL IMPROVEMENT PLAN

2017 thru 2021

City of Anoka, Minnesota

Department Water Utility
 Contact Public Services Director
 Type Improvement
 Useful Life 15 years
 Category Public Utilities Facilities
 Priority 3 Important
 Status Active

Project # WU-027
 Project Name 7th Av Watermain Lining

Update flag

Total Project Cost: \$365,000

Description

Reline the existing watermain under CSAH 7 from North Street to Grant Street.

Justification

There has been 3 watermain breaks in the past year on this section of pipe.
 1500' watermain @ \$120 LF
 5 valves @ \$600 each
 2 Hydrants @ \$1,200 each
 15 Services @ \$ 1,000 each
 12 Connect to WM @ \$1,000 each
 Temp water @ \$7,500
 Traffic control @ \$20,000
 Street patching @ \$10,000
 Mobilization @ \$27,000
 20% Contingency @ \$60,800

Expenditures	2017	2018	2019	2020	2021	Total
Planning/Design/Engineering	61,000					61,000
Construction/Maintenance		304,000				304,000
Total	61,000	304,000				365,000

Funding Sources	2017	2018	2019	2020	2021	Total
Water Fund	61,000	304,000				365,000
Total	61,000	304,000				365,000

Budget Impact/Other

CAPITAL IMPROVEMENT PLAN

2017 *thru* 2021

City of Anoka, Minnesota

Department Water Utility
 Contact Public Services Director
 Type Improvement
 Useful Life 10 years
 Category Public Utilities Facilities
 Priority 2 Very Important
 Status Active

Project # **WU-028**
 Project Name **Well #9 Site Selection Analysis**

Update flag

Total Project Cost: **\$30,000**

Description

Conduct Site Selection Analysis for Future Well #9

Justification

Based on our 2015 Comp Water Study the COA has an immediate need for additional water. This is based on maximum pumping limitations placed on the COA by the MDH.

Expenditures	2017	2018	2019	2020	2021	Total
Equip/Vehicles/Furnishings	30,000					30,000
Total	30,000					30,000

Funding Sources	2017	2018	2019	2020	2021	Total
Water Fund	30,000					30,000
Total	30,000					30,000

Budget Impact/Other

Appendix 5

Emergency Telephone List

*Updated List Maintained at City Hall and Public Works
Not Included in Agency Review Copy for Privacy*

Appendix 6

Cooperative Agreements for Emergency Services

Cooperative Agreements for Emergency Services between Andover and Coon Rapids

ANOKA - ANDOVER
MEMORANDUM OF UNDERSTANDING
ON
USE/PURCHASE OF ANOKA WATER

The City Council of Anoka has approved the City of Andover's request for use/purchase of water from Anoka by the way of hydrant located at the corner of 15th Avenue Court in Anoka and County Road No. 116.

- The water will be used for emergency use only, for example:
1. Andover's domestic water system failure of the well, pump or water main break. Over-taxing the in place Andover system is not considered a system failure.
 2. Andover's significant fire needs.

Andover understands that Anoka must fulfill its needs first; for example, a fire in Anoka will be a higher priority water use than a significant fire and/or domestic water emergency in Andover.

Andover has provided a hydrant of different style and color at no cost to Anoka on the South side of County Road No. 116.

Only one way water flow from Anoka to Andover will be provided.

Andover will contact the Anoka Fire Department and/or the Public Work's Directors's designee for permission to use Anoka's water.

For fire use, the amount of the water will be estimated. For domestic use, as defined above, the water will be metered.

Andover will pay for the water used at Anoka's current rate (1989 rate is 57.5 cents per 1000 gallons or .43 cents per 100 cubic feet).

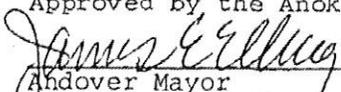
The hose, couplings, adapter, meter and back flow preventer shall be approved by Anoka and purchased by Andover. Hose with couplings shall be stored in Andover. Meter assembly shall be stored in Anoka with installation under the Anoka Water Department supervision.

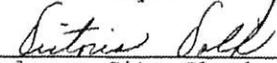
Any fire protection hydrant flow tests requiring the Anoka connection and requested by Andover shall be under the supervision of the Anoka Water Department Superintendent.

The memorandum of understanding will be reviewed every five (5) years. Any changes must be approved by the City Councils.

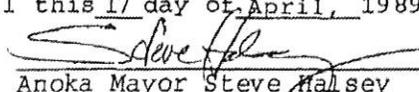
Approved by Andover City Council this 4th day of April 1989.

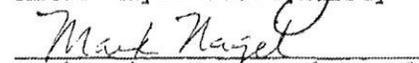
Approved by the Anoka City Council this 17 day of April, 1989.



Andover Mayor


Andover City Clerk



Anoka Mayor Steve Halsey


Anoka City Mgr. Mark Nagel

JOINT POWERS AGREEMENT BETWEEN THE
CITY OF ANOKA AND THE CITY OF RAMSEY
FOR THE SUPPLY OF MUNICIPAL WATER SERVICE
TO PORTIONS OF THE CITY OF RAMSEY

THIS AGREEMENT is entered into between the City of Anoka, Minnesota, a Charter City under the laws of the State of Minnesota ("Anoka"), and the City of Ramsey, Minnesota, a Charter City under the laws of the State of Minnesota ("Ramsey"), on the 14th day of August, 1996.

WHEREAS, both Anoka and Ramsey own and operate municipal water systems for the purpose of providing municipal water service to their citizens, and

WHEREAS, Anoka's and Ramsey's corporate boundaries are adjacent and their respective water systems are in close proximity at the West boundary of Anoka and the East boundary of Ramsey; and

WHEREAS, Anoka has reserve municipal water system capacity beyond that which is currently needed to supply its peak day demand, and Ramsey has an expanding customer base which has exhausted Ramsey's municipal water system capacity, and

WHEREAS, it would be in the best interests of both cities to cooperate in providing municipal water service to portions of Ramsey and providing Ramsey with a secondary emergency water source, by utilizing Anoka's excess capacity, and

WHEREAS, such cooperation will provide revenue to Anoka and postpone the need for Ramsey to spend substantial amounts to expand its water system capacity.

NOW, THEREFORE, Anoka and Ramsey, pursuant to the authority contained in Minnesota Statutes, Section 471.59, commonly known as the "Joint Powers Act," in order to accomplish the foregoing purposes, agree as follows:

1. CONSTRUCTION OF INTERCONNECTIONS. Anoka and Ramsey shall and have constructed two interconnections between the Anoka municipal water system and the Ramsey municipal water system, as follows:

(a) Highway 10 Connection - a permanent connection located at the Anoka/Ramsey boundary on the North side of Highway 10 which consists of water main, a manhole, a back flow preventer, water meter, and valves and fittings. The purpose of this connection is to provide a supplemental source to Ramsey and an emergency water supply to Ramsey in the event of a water main break or interruption of Ramsey's water supply.

(b) County Road #116/Thurston Avenue Connection - a connection at the Southeast corner of the intersection of County Road #116 and Thurston Avenue. This connection is temporary in nature and has been accomplished by the connection of fittings and a hose line between two fire hydrants. Water drawn at this location will be for emergency use only. The connection contains a backflow preventer and meter.

2. OWNERSHIP OF HIGHWAY 10 CONNECTION EQUIPMENT. Anoka shall own all equipment East of the metering manhole and within the corporate limits of Anoka, and shall own and maintain the meter within the metering manhole and have access to the meter. Ramsey shall own and maintain the metering manhole and all equipment West of the manhole and within the corporate limits of Ramsey. All water flow through this connection shall be from Anoka to Ramsey and the one-way flow is insured by a double check backflow preventer owned and maintained by Ramsey. All equipment has been

purchased and installed by Ramsey, and Anoka has credited Ramsey for that portion of the equipment owned by Anoka. The construction, equipment, engineering, and other costs are described in Exhibit A attached hereto, as is the portion of the cost charged to Anoka and the credit given by Anoka. Ramsey has furnished Anoka a set of reproducible "as built" drawings of the connection.

3. SALE OF WATER. Anoka shall sell, at Ramsey's option, at least one million gallons of water per day through both connections described above, provided however:

(a) Anoka may, without notice to Ramsey, reduce or eliminate the amount of water sold to Ramsey in the event of a catastrophic event or emergency circumstance which causes an extraordinary demand for water within Anoka. The existence of any such catastrophic event or emergency circumstance shall be determined in the sole discretion and judgment of Anoka.

(b) Commencing upon and after January 1, 2000, Anoka may, upon nine months' written notice, reduce or eliminate the amount of water sold to Ramsey

4. WATER CONSERVATION. Ramsey agrees, with regard to its customers drawing water from Anoka, to implement water conservation and water restriction regulations similar to those imposed by Anoka on its water customers.

5. COMPENSATION.

(a) Ramsey shall pay Anoka for water supplied pursuant to this agreement according to the following schedule:

That standard industrial rate charged by Anoka to its industrial customers from time to time (currently 85 cents per 1,000 gallons) plus an additional monthly charge, based on the high usage day of each month, in the following amounts:

\$150.00 if the high usage day of the month is less than 250,001 gallons.

IN WITNESS WHEREOF, the undersigned Cities, by action of their governing bodies, have caused this agreement to be executed in accordance with the authority of Minnesota Statutes, Section 471.59.

CITY OF RAMSEY

By: [Signature]
Mayor Date

Attest: [Signature] 8/14/96
City Clerk Date

Approved as to form:

[Signature]
City Attorney

CITY OF ANOKA

By: Peter M. Baly 8-19-96
Mayor Date

Attest: Mark Kappel 8/16/96
City Clerk Date

Approved as to form:

[Signature]
City Attorney

Appendix 7

Municipal Critical Water Deficiency Ordinance

CITY OF ANOKA

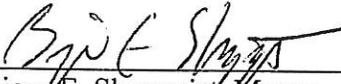
ORDINANCE NO. 2006-1272

AN ORDINANCE AMENDING CHAPTER 66; UTILITIES,
ARTICLE IV; WATER SYSTEM,
SECTION 66-131; ANNUAL ODD/EVEN WATER RESTRICTIONS
OF THE ANOKA CITY CODE.

THE COUNCIL OF THE CITY OF ANOKA ORDAINS:

Section 1. Pursuant to Minnesota Law, the Anoka City Charter and the Anoka City Code, and upon a review of a study conducted by City staff of Chapter 66; Utilities, Article IV. Water System, Section 66-131. Annual Odd/Even Water Restriction, by an affirmative vote of a majority of the Anoka City Councilmembers present, is hereby amended as shown on Exhibit A, attached hereto, with stricken text deleted and underlined text inserted into existing code.

SECTION 2: This Ordinance shall be in full force and effective upon passage and seven days after publication.


Bjorn E. Skogquist, Mayor


Amy T. Oehlers, City Clerk

Introduced: June 19, 2006
Adopted: July 6, 2006
Published: July 14, 2006
Effective: July 21, 2006

	Aye	Nay	Abstain	Absent
Skogquist	<u>X</u>	<u> </u>	<u> </u>	<u> </u>
Anderson	<u>X</u>	<u> </u>	<u> </u>	<u> </u>
Freeburg	<u>X</u>	<u> </u>	<u> </u>	<u> </u>
Rice	<u>X</u>	<u> </u>	<u> </u>	<u> </u>
Schumacher	<u>X</u>	<u> </u>	<u> </u>	<u> </u>

CHAPTER 66. UTILITIES

ARTICLE IV. Water System*

 *State law reference--Authority to regulate use of waterworks, Minn. Stats. §§ 410.33, 410.231, subd. 11.

Section 66-131. ~~Annual odd/even~~ Watering restriction(s).

- (a) Upon the determination of City staff that water restrictions are necessary to protect water reserves, or to protect the public's health, safety and/or welfare, the City staff may order the restriction or ban of watering, using City supplied water, which shall include but not be limited to the use of irrigation systems and the watering of grass, trees and shrubs.

~~The council, by resolution, may order that during anytime between The City hereby orders that between June 1 and August 31 of each year, lawn and garden sprinkling, including the use of irrigation systems and the watering of trees and shrubs, using City supplied water, shall be permitted only as follows:~~

- (1) ~~Except for hand watering, as permitted in subsection (2) of this section, properties having odd numbered mailing addresses may be watered only on odd numbered days and properties having even numbered mailing addresses may be watered only on even numbered days.~~
- (2) ~~Hand watering, either with a hose or with a container, shall be permitted at any time unless specifically restricted by further order.~~
- (b) ~~Upon the advice of the department of public works that further watering restrictions are necessary to protect water reserves, the Council, by resolution, may order the following additional restrictions, which shall take effect immediately upon publication:~~
- (1) ~~In addition to the restrictions contained in subsection (a) of this section, the Council may ban all watering with city supplied water, including or excluding hand watering by hose, between the hours of 12:00 noon and 10:00 p.m.~~
- (2) ~~The City Council may impose a total ban on watering with city supplied water upon a finding that such ban is necessary to protect the public's health, safety and/or welfare.~~
- (c) The person in whose name the account for City water is kept by the City for each property within the City shall be responsible to maintain compliance with this section on such property. Upon any violation of the restrictions imposed by subsections (a) or (b) of this section this article, the Department of Public Works may shut off water service to the subject property and service shall be restored when the standard reconnection charges as outlined in the rules and regulations of the utilities department are paid.

CITY OF ANOKA

ORDINANCE NO. 2008-1362

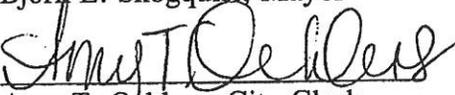
AN ORDINANCE AMENDING THE ANOKA CITY CODE,
CHAPTER 66, ARTICLE IV; WATER SYSTEM;

THE COUNCIL OF THE CITY OF ANOKA ORDAINS:

Section 1. Pursuant to Minnesota Law, the Anoka City Charter and the Anoka City Code, and upon a review of a study conducted by City staff, Chapter 22, Article VIII; Water System, is hereby amended, by an affirmative vote of a majority of the Anoka City Councilmembers present, to read as listed on Exhibit A, hereto attached, with stricken text deleted and underlined text inserted into existing code:

Section 2: This Ordinance shall be in full force and effective upon passage and seven days after publication.


Bjorn E. Skogquist, Mayor


Amy T. Oehlers, City Clerk

Introduced: August 18, 2008
Adopted: September 2, 2008
Published: September 5, 2008
Effective: September 12, 2008

	<u>Aye</u>	<u>Nay</u>	<u>Abstain</u>	<u>Absent</u>
Skogquist	<u>X</u>	_____	_____	_____
Anderson	<u>X</u>	_____	_____	_____
Freeburg	<u>X</u>	_____	_____	_____
Rice	<u>X</u>	_____	_____	_____
Weaver	<u>X</u>	_____	_____	_____

CHAPTER 66. UTILITIES

ARTICLE IV. Water System*

*State law reference--Authority to regulate use of waterworks, Minn. Stats. §§ 410.33, 410.231, subd. 11.

Section 66-131. Watering restriction(s).

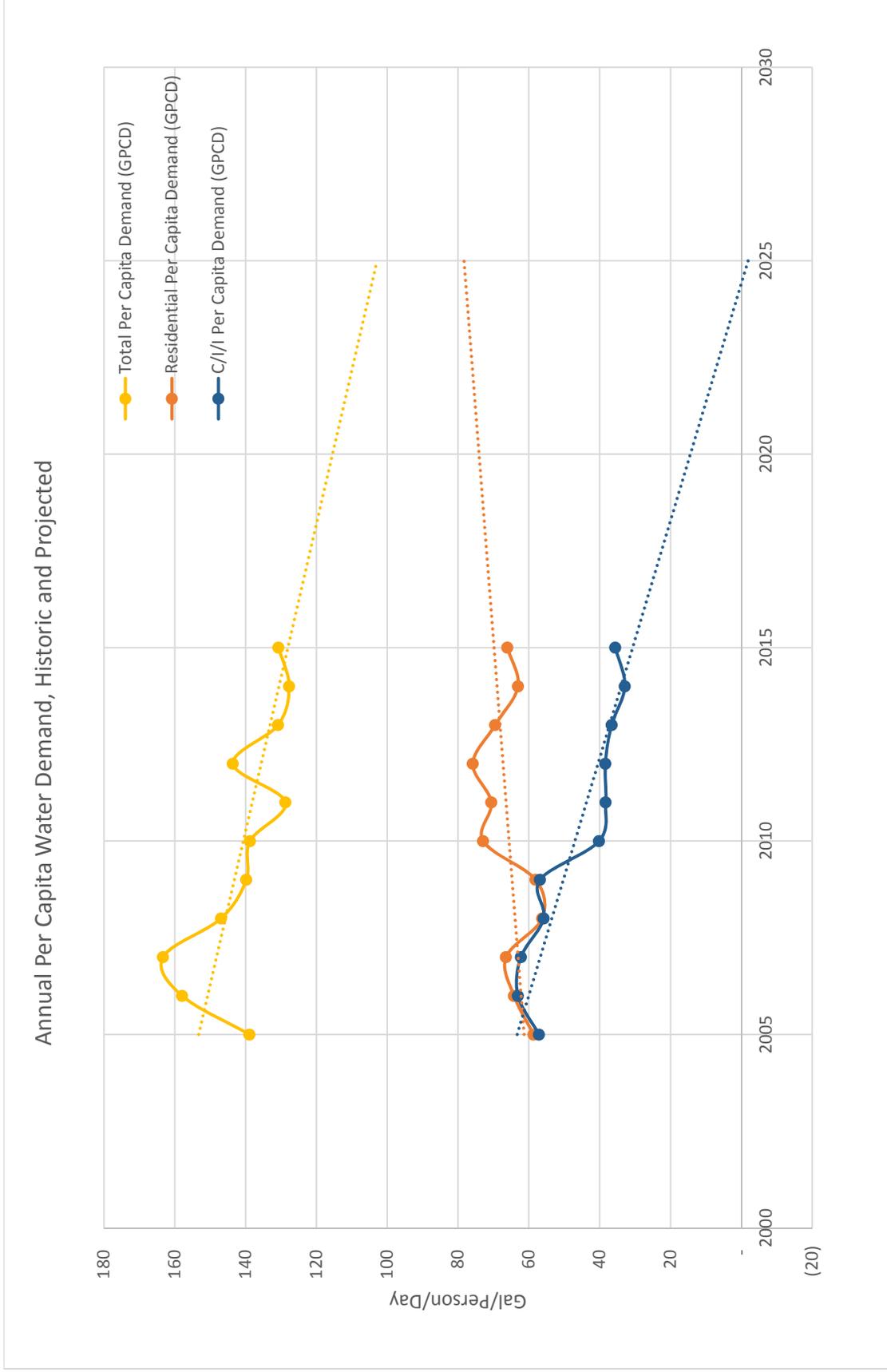
- (a) Upon the determination of City staff that water restrictions are necessary to protect water reserves, or to protect the public's health, safety and/or welfare, the City staff may order the restriction or ban of watering, using City supplied water, which shall include but not be limited to the use of irrigation systems and the watering of grass, trees and shrubs.

- (b) The person in whose name the account for City water is kept by the City for each property within the City shall be responsible to maintain compliance with this section on such property. Upon any violation of the restrictions imposed by this article, the ~~Department of Public Works~~ City may shut off water service to the subject property and service shall be restored when the standard reconnection charges as outlined in the rules and regulations of the utilities department are paid. issue written warnings and administrative fines. For cases of repeat or continued violations, the City may prosecute or terminate water service to the subject property. Service may be restored upon payment of all fines and associated service restoration fees.

Appendix 8

Graph Showing Annual Per Capita Water Demand for Each Customer Category
During the Last Ten Years

Appendix 8: Total per Capita Demand for Customer Categories



Appendix 9
Water Rate Structure

2016 Rates effective 01/01/2016

ELECTRIC

	Residential	Small Commercial	Large Commercial	
Fixed Charge	\$ 9.70	\$ 9.70	\$ 40.00	per month
Energy Charge summer	\$ 0.1110	\$ 0.1110	\$ 0.0610	per kwh
Energy Charge winter	\$ 0.0990	\$ 0.0990	\$ 0.0610	per kwh
Clean Energy add on rate	\$ 0.0175	\$ -	\$ -	per kwh
Green Energy 100kwh block	\$ 1.7500	\$ -	\$ -	per block
Demand Charge summer	\$ -	\$ -	\$ 11.40	per kw
Demand Charge winter	\$ -	\$ -	\$ 7.40	per kw
Primary ownership discount	\$ -	\$ -	\$ 0.55	per kw
Primary ownership discount	\$ -	\$ -	\$ 0.0007	per kwh
Data pulse meter	\$ -	\$ -	\$ 15.00	per month
Interruptible/Off Peak Fixed	\$ -	\$ -	\$ 46.50	per month
Off Peak rate A	\$ -	\$ -	\$ 0.0575	per kwh
Off Peak rate B	\$ -	\$ -	\$ 0.1020	per kwh
Interruptible Demand	\$ -	\$ -	\$ 3.80	per kw
Parallel Generation (under 40kw)	\$ 0.10890	\$ 0.11090	\$ 0.08720	per kwh
Simultaneous Purchase/Sale	\$ 0.05274	\$ 0.05274	\$ 0.05274	per kwh
Time of day purchase rate	\$ 0.05274	\$ 0.05274	\$ 0.05274	per kwh
Downtown street lights	\$ -	\$ 0.004	\$ 0.004	per kwh

* Energy usage (kwh sales) is subject to the purchase power adjustment (PPA). The PPA takes into account the varying prices being charged to AMU by our power supplier. When the amount AMU pays its power supplier rises, the increased cost is added to the customers energy charges. It is important to note with PPA there is no mark up for AMU, and the PPA is implemented by most utilities throughout Minnesota and the nation.

WATER

	Residential	Commercial	Industrial (over 3")	
Fixed Charge	\$ 6.25	\$ 12.50	\$ 186.95	per month
State testing fee	\$ 0.53	\$ 0.53	\$ 0.53	per month
Tier One (limits 2000/40000/200000)	\$ 1.47	\$ 1.47	\$ 1.47	per 100cf
Tier Two (limits 4000/80000/400000)	\$ 1.62	\$ 1.62	\$ 1.62	per 100cf
Tier Three all addition consumption	\$ 1.84	\$ 1.84	\$ 1.84	per 100cf

Commercial irrigation meters use same tiered rates. Up to 20,000cf - Up to 40,000cf - and over

SEWER

	Residential	Commercial	Industrial	
Fixed Charge	\$ 5.00	\$ 10.00	\$ 149.50	per month
Consumption Charge	\$ 2.45	\$ 2.45	\$ 2.45	per 100cf
Sewer only, no water	\$ 19.00	\$ 19.00	\$ 19.00	per month

* Residential sewer charges are based on average water usage billed in January, February & March. Commercial/Industrial is actual water use

2016 Rates effective 01/01/2016

Security light fee:

100watt	\$	8.50
150watt	\$	11.00
250watt	\$	14.90
400watt	\$	16.20

Recycling fee:

Apartment	\$	2.30
Residential	\$	2.90

Sales and franchise taxes:

State tax	6.8750%
Metro Transit tax	0.2500%
Hennepin County tax	0.1500%
Coon Rapids Franchise	4%
Champlin Franchise	

Ace garbage fee:

Small	\$	15.25
Medium	\$	16.75
Large	\$	17.75

Increased 11-1-2016

Republic garbage fee:

Small	\$	13.34
Medium	\$	14.37
Large	\$	15.40

Residential	\$	3.50
Small Comm w/o demand	\$	9.50
Small Comm w/demand	\$	40.00
Large Commercial	\$	140.00

Anoka Franchise included in rates

Stormwater fee per month:

Open space	\$	3.07	per acre
Single Family	\$	3.07	per lot
Townhouse/Duplex	\$	2.38	per unit
Multi Family	\$	18.41	per acre
Institutional	\$	24.54	per acre
Commercial	\$	34.74	per acre

Utility Account Deposits:

Residential

Apartment	\$	100.00
Apartment, own gas heat	\$	150.00
Water/Sewer only	\$	130.00
Electric only	\$	150.00
All services	\$	250.00
Electric only, with electric heat	\$	300.00
All services, with electric heat	\$	400.00

Deposit after bankruptcy 3x monthly average
 Deposit waived with AutoBankPay/Letter of Credit

Commercial 3x monthly average
 \$200 minimum

Deposit minimum/waived bond or bank letter
 2016 Interest on deposits 0.50%

Minimums for disconnection

Apartments	\$	50.00
House in Anoka	\$	150.00
Out of Anoka	\$	120.00

Rate change dates:

Winter rate	October 1st
Summer rate	June 1st
Taxable (electric heat)	May 1st
Non taxable	November 1st

Penalty 5% current charges

Convenience fee \$ 3.25

on non present payments

Appendix 10

Adopted or Proposed Regulations to Reduce Demand or Improve Water Efficiency

CITY OF ANOKA

ORDINANCE NO. 2008-xxxx

AN ORDINANCE AMENDING THE ANOKA CITY CODE,
CHAPTER 66, ARTICLE IV; WATER SYSTEM;

THE COUNCIL OF THE CITY OF ANOKA ORDAINS:

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Section 2: This Ordinance shall be in full force and effective upon passage and seven days after publication.

Bjorn E. Skogquist, Mayor

Amy T. Oehlers, City Clerk

Introduced: August 18, 2008
Adopted: _____
Published: _____
Effective: _____

	<u>Aye</u>	<u>Nay</u>	<u>Abstain</u>	<u>Absent</u>
Skogquist	_____	_____	_____	_____
Anderson	_____	_____	_____	_____
Freeburg	_____	_____	_____	_____
Rice	_____	_____	_____	_____
Weaver	_____	_____	_____	_____

CHAPTER 66. UTILITIES

ARTICLE IV. Water System*

*State law reference--Authority to regulate use of waterworks, Minn. Stats. §§ 410.33, 410.231, subd. 11.

Section 66-131. Watering restriction(s).

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- (b) The person in whose name the account for City water is kept by the City for each property within the City shall be responsible to maintain compliance with this section on such property. Upon any violation of the restrictions imposed by this article, the ~~Department of Public Works~~ City may shut off water service to the subject property and service shall be restored when the standard reconnection charges as outlined in the rules and regulations of the utilities department are paid. issue written warnings and administrative fines. For cases of repeat or continued violations, the City may prosecute or terminate water service to the subject property. Service may be restored upon payment of all fines and associated service restoration fees.

Appendix 11

Implementation Checklist – Summary of All the Actions that a Community is doing,
or Proposes to do, Including Estimated Implementation Dates

Appendix 11: Implementation Checklist – summary of all the actions that a community is doing, or proposes to do, including estimated implementation dates

Implementation Date	Community Action
Current-Future	The City is working with many of its older large water using industrial customers to try and locate unknown unmetered connections. Supply and billing meters are calibrated/repaired/replaced regularly.
2017	Construct Well #9
2017	Water Treatment Plant 6 & 8 Expansions
2020	Construct 1.5 MG Elevated Tower Remove Tower 3
2020	Construct Phase 1 Trunk Water Main
2025	Construct Phase 2 Trunk Water Main
2035	Construct Well #10

A scenic view of a river with a dam and autumn foliage. The water is flowing over the dam, creating a series of small cascades. The background is filled with trees in various shades of green and yellow, suggesting an autumn setting. The sky is a clear, bright blue.

City of Anoka

Local Surface Water Management Plan

July 2015

Revised May 8, 2019

Adopted: May 21, 2015

City of Anoka

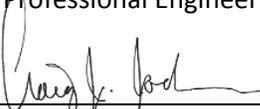
Local Surface Water Management Plan

Prepared for City of Anoka

April 2015

Revised May 8, 2019

I hereby certify that this plan, specification, or report was prepared by me under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

	23461	5/8/19
_____ CRAIG J. JOCHUM, P.E.	_____ LIC. NO.	_____ DATE

By:



3601 Thurston Avenue
Anoka, MN 55303
Phone: 763-427-5860
Fax: 763-427-0520

City of Anoka

Stormwater Management Plan

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0.0 Executive Summary

This Local Surface Water Management Plan (Plan) serves as a comprehensive planning document to guide the City of Anoka in protecting, restoring, and conserving its surface water resources. This plan was prepared to fulfill the legal requirements of the Metropolitan Surface Water Rules as well as the policies and requirements of the Lower Rum River Watershed Management Organization (LRRWMO) and other local, state, and federal agencies. The plan includes the following sections:

Section 1: Introduction – presents background information regarding the city, general watershed information, and plan purposes.

Section 2: Land and Water Resources Inventory – provides an inventory of the water resources within the city, the physical environment, and pertinent water resources data.

Sections 3 through 12: Watershed Descriptions and Recommendations – describes the general watershed area, drainage patterns, flood protection concerns, stormwater system analysis and results, and implementation recommendations for each of the major watersheds in the city.

Section 13: Goals and Policies – presents the city’s goals as they relate to water resource planning and the policies that they will implement to achieve its goals.

Section 14: Implementation – discusses the implementation components of the Plan.

Section 15: Technical Methods and Assumptions – describes the data, methods and assumptions used for the stormwater analyses.

Section 16: System Maintenance – discusses the city’s responsibilities with respect to maintenance of stormwater facilities.

Section 17: Amendments – discusses the amendment procedures for this Plan.

This Local Surface Water Management Plan was adopted by the City Council on May 21, 2015. As part of the City’s 2040 Comprehensive Plan Update, the City updated this document.

1.1 Study Area General Description and Watershed Nomenclature

The City of Anoka is bisected by the Rum River, and its southern limits are situated along the Mississippi River. Early-development occurred along the southern portion of the Rum River. The city has since expanded northward to the most recent development in the northwest corner. The city's land use plan is shown on Figure 1-1. The majority of the city is developed except for a portion located north of Bunker Lake Road.

All of the land in the City of Anoka eventually drains to the Mississippi River. The northwest corner and southernmost regions of the city are directly tributary to the Mississippi, which flows southeasterly. The downtown and remaining portions of the city are directly tributary to the Rum River, which joins the Mississippi at the southern edge of the city.

Based on drainage divides, the city has been divided into ten major watersheds. State Statutes requires "issues and corrective actions" as components of Local Surface Water Management Plans. The issues and corrective actions have been analyzed on a watershed basis, and are summarized in their respective sections. The ten major watersheds are as follows:

1. Mississippi River East
2. Mississippi River West
3. Anoka Enterprise
4. Rum River Northeast
5. Rum River Northwest
6. Rum River Southeast
7. Rum River Southwest
8. U.S. Highway 169 and 10
9. Coon Rapids Tributary
10. Rum River North

These ten watersheds are shown on Figure 1-2. Sections 3 through 12 describe the stormwater management requirements and recommended system improvements for each of these

watersheds. The ten major watersheds were subdivided into minor watersheds and subwatersheds. In most cases, watershed divides were determined using USGS quadrangle maps (10-foot contour interval), and field verified. Other watershed divides were determined using construction plans and lidar 2 foot contours. Minor watersheds in each of the major watersheds were designated according to the street or other location where the watershed outlets. For example, the Jefferson Street subwatersheds are labeled JF-1,2,3,...etc., the Porter Avenue watersheds are labeled PTR-1,2,3,... etc., and the Moore Middle School watersheds are labeled MMS-1,2,3,... etc. The City of Anoka is entirely within the jurisdiction of the Lower Rum River Watershed Management Organization (LRRWMO).

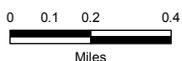
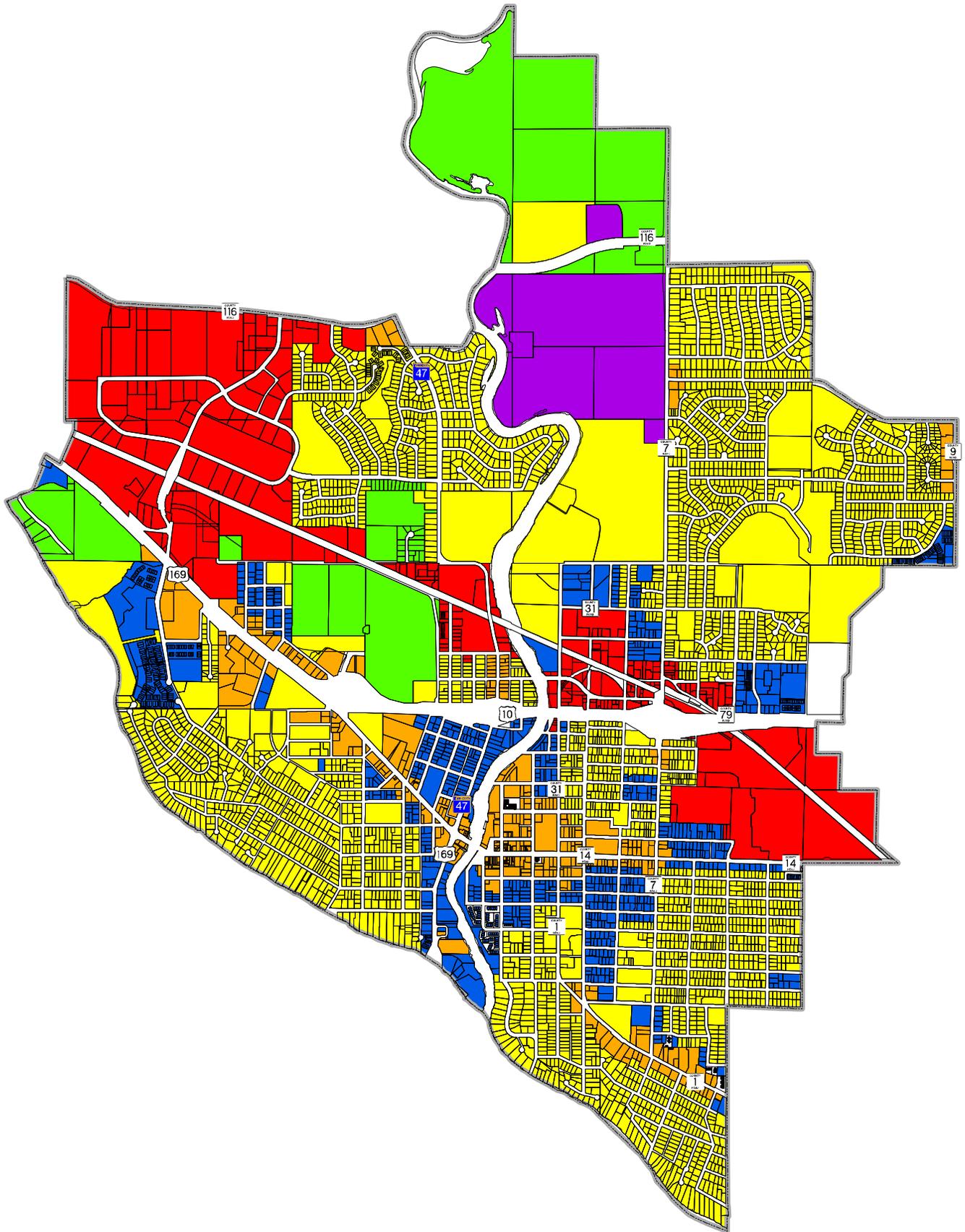
1.2 Plan Purposes

This plan provides the City of Anoka with an overall comprehensive stormwater management plan. This plan was developed to address current and future stormwater issues, especially those related to future development and redevelopment.

This plan will assist the City of Anoka in defining and implementing a comprehensive and environmentally sound system of surface water management. It is intended to be used as a tool to:

1. Plan for projects and other water management activities so as to correct existing problems and prevent foreseeable future problems from occurring.
2. Assist the city in considering water resource impacts resulting from variances to the city's long-range land use plan.
3. Enable the city to grow/redevelop in a systematic and orderly manner while protecting its vital water resources.

In order to accomplish these objectives, the plan considers a specific array of land uses within the city's legal boundary. If and when land uses change, this plan provides the means to (1) address the proposed changes; (2) determine the impact of the changes on the city's infrastructure, flooding, and natural resources; and (3) determine the actions needed within the proposed areas of land use change to prevent undesirable impacts.

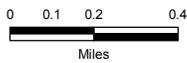
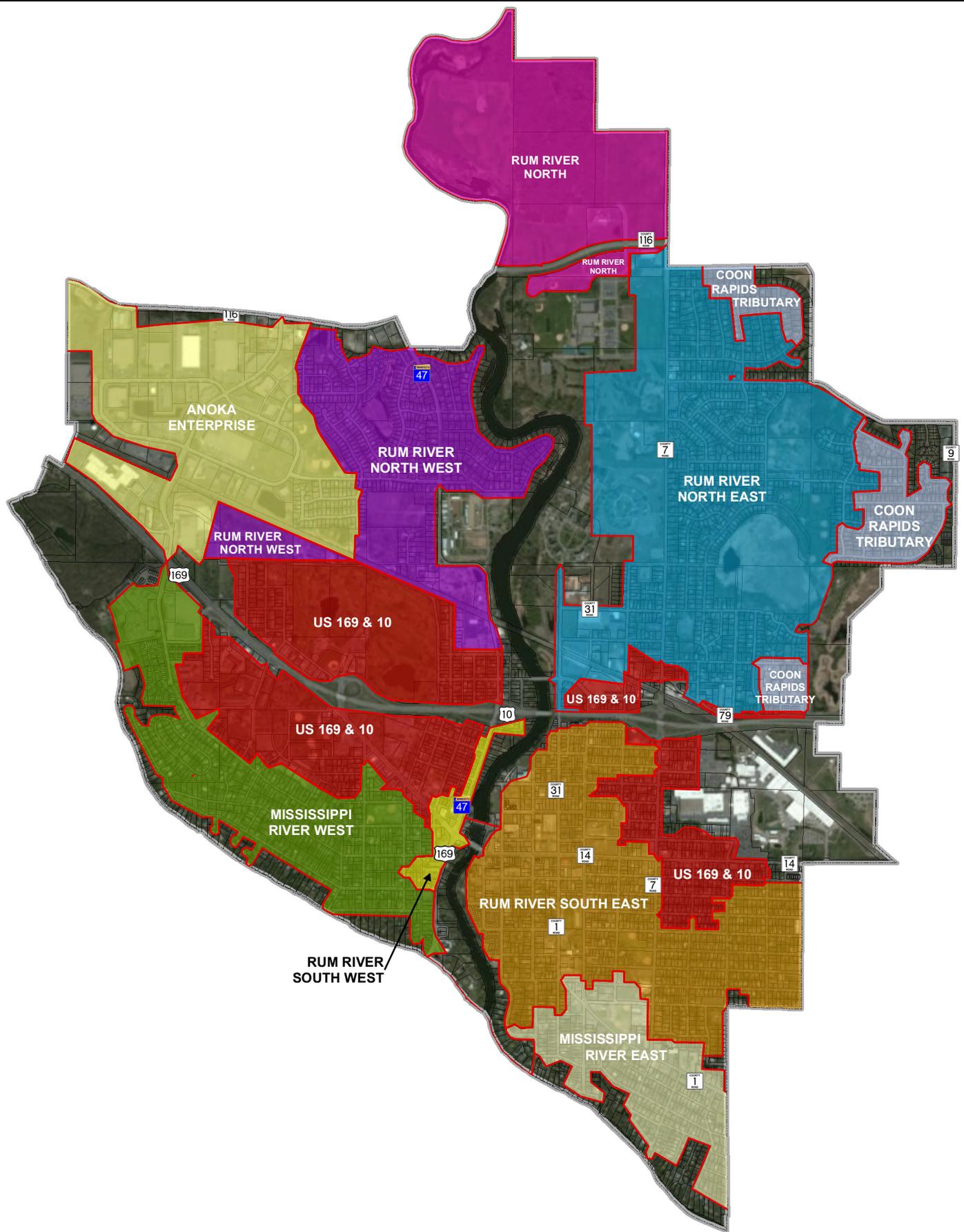


Land Use

- | | |
|---|---|
|  Agricultural/Open |  Institutional |
|  Commercial |  Multiple Family Residence |
|  Industrial |  Single Family Residential |

FIGURE 1-1

**LAND USE
CITY OF ANOKA**



Major Watersheds

- | | | |
|------------------------|----------------------|----------------------|
| Anoka Enterprise | Rum River North East | Rum River South East |
| Coon Rapids Tributary | Rum River North West | US 169 and US 10 |
| Mississippi River East | Rum River South West | |
| Mississippi River West | Rum River North | |

**FIGURE 1-2
MAJOR
WATERSHEDS
CITY OF ANOKA**

2.0 Land and Water Resources Inventory

This section provides a summary of the climate, precipitation, geology and soils information. The City of Anoka and the Twin Cities Metropolitan Area have a climate that is characterized by wide variations in temperature, ample rainfall and moderate snowfall.

2.1 Climate

The total average annual precipitation in the Twin Cities Metropolitan Area is 30.61 inches. The total average annual snowfall is 54.4 inches. Mean daily temperature, average precipitation, and average snowfall are shown in Table 2-1.

Table 2-1 Average Monthly Climate Data for Minneapolis/St. Paul, 1981 - 2010

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Daily Temperature (°F)	15.6	20.8	32.8	47.5	59.1	68.8	73.8	71.2	62.0	48.9	33.7	19.7	46.2
Average Precipitation (inches)	0.90	0.77	1.89	2.66	3.36	4.25	4.04	4.30	3.08	2.43	1.77	1.16	30.61
Average Snowfall (inches)	12.2	7.7	10.3	2.4	0.0	0.0	0.0	0.0	0.0	0.6	9.3	11.9	54.4

Source: Minnesota Climatology Working Group

2.2 Precipitation

Rainfall frequencies are often used in the design of storm sewer, conveyances, stormwater ponds, and other features that are used to convey, store, or treat stormwater. Until recently, the city relied on *Technical Paper No. 40, Rainfall Frequency Atlas of the United States, published by the U.S. Weather Bureau*. Recently, the *National Oceanic and Atmospheric Administration (NOAA) released Atlas 14, Volume 8*. The precipitation frequency estimates as presented in *NOAA Atlas 14, Volume 8* indicate that rainfalls have generally become more intense over the

recent years. The precipitation frequency estimates for the Cedar station located in Oak Grove, Minnesota are shown in Table 2-2.

Table 2-2 – Rainfall Frequency

Recurrence Intervals (years)	1-Hour Duration	24-Hour Duration
1	1.18	2.45
2	1.39	2.84
10	2.06	4.21
50	2.87	6.07
100	3.25	6.99

Source: NOAA Atlas 14, Volume 8

2.3 Topography

The topography in Anoka was shaped by several ice advances into east-central Minnesota during the last (Wisconsin) glaciation, which occurred about 10,000 years ago. A large glacial outwash deposit, called the Anoka sandplain, is the dominant geomorphic feature. It was formed largely by glacial drainage (melt-water) from the receding Grantsburg sublobe of the Des Moines glacier. The surface of the Anoka sandplain is flat to moderately undulating. Low regions of upland represent areas of till left from previous ice movements that were not buried by the outwash sand. Other features of positive relief are patches of sand dunes formed by southwesterly winds after the sandplain was abandoned by the outwash streams. Landscape features of negative relief include numerous lakes and marshes which formed as ice blocks, originally buried by the outwash sand that melted to create the depressions and are now filled with water or organic soils.

2.4 Soils

The United States Department of Agriculture, Soil Conservation Service published the Soil Survey of Anoka County in 1977. The majority of the city is occupied by the Hubbard-Nymore Association. This association is nearly level to slightly sloping and contains excessively drained

soils that are sandy throughout. Hubbard soils are black and dark grayish brown at the surface and are underlain by dark brown and yellowish brown coarse sand. Nymore soils are very dark gray and black to very dark grayish brown loamy sand underlain by dark brown loamy sand. Soils of the Hubbard-Nymore Association are well-suited to urban uses and moderately well-suited to farming and recreation. Control of wind erosion and the water table in low-lying areas is often necessary. Due to the permeable nature of the soils, it may be possible for contaminants in stormwater to be transported through the soil to the aquifers which are used for drinking water. The Drinking Source Water Protection Areas, and their corresponding vulnerability, are shown in Figure 2-4. Most of the soils within the city are Hydrologic Soil Group A or B.

2.5 Land Use

The current Land Use within the city includes residential, commercial, industrial, agricultural, and public open spaces. The city is mostly developed, with some agricultural and public open space (conservation easement) uses located within the Rum River North watershed. The existing Land Use is shown in Figure 1-1. The proposed 2030 Land Use is shown in Figure 2-1.

2.6 Watersheds and Drainage Patterns

The drainage boundaries for the City of Anoka have been delineated and ten major watersheds have been identified. In general, the surface water generally drains to the Rum River and the Rum River flows south until it converges with the Mississippi River at its southern most point. A relatively small portion of the city drains directly into the Mississippi River. The major watersheds are shown on Figure 1-2.

2.7 MnDNR Protected Waters, Wetlands and Watercourses

The Minnesota Department of Natural Resources (MnDNR) has designated certain waters of the state as public waters (Minn. Rules 6115.1060). MnDNR "Protected Waters and Wetlands" maps show public waters within the city. A MnDNR permit is required for work within designated public water.

Public waters wetlands means all types 3, 4 and 5 wetlands, as defined in United States Fish and Wildlife Service Circular 39 (USDI, 1971), that are ten or more acres in size in unincorporated areas, or 2.5 acres in incorporated areas.

Figure 2-2 shows the protected waters, wetlands, and water courses located in the city.

2.8 Other Regulated Wetlands

In addition to the MnDNR waters discussed in Section 2.7, many additional wetlands are located within the city. The National Wetland Inventory (NWI) maps, included as Figure 2-3, depicts some of these wetlands. The following three characteristics make these water bodies exclusive from the MnDNR public waters and public waters wetlands.

- First, an individual basin may be dominated by wetland habitat (Types 1, 2, 6, and 7 [USDI, 1971] not statutorily covered by MnDNR and yet is immediately adjacent to an inventoried MnDNR basin or watercourse.
- Second, an individual isolated wetland basin may be smaller than the minimum MnDNR size (2.5 or 10 acres) as discussed previously.
- Third, an individual isolated wetland basin may be dominated by habitat types (Types 1, 2, 6, and 7) not statutorily covered by MnDNR.

Excavation, filling, grading and/or development actions which may adversely affect these resources may be subject to federal permitting authority under Sections 404 and 401 of the Clean Water Act, (33 USC 125 et. seq.) and LRRWMO approval under the 1991 Wetland Conservation Act, as amended. Prior to any site disturbing activity, wetlands must be determined on a case by case basis and delineated using methodology approved by the MN Wetland Conservation Act.

The wetlands within the City of Anoka were previously classified by Barr Engineering Company using a Modified Routine Assessment Method to determine the Functions and Value. The results from the evaluation are shown on the following page in Table 2-3. The wetlands listed on Table 2-3 may not be a comprehensive list of all of the wetlands within the city.

Sensitivity levels and associated wetland standards have been developed that are based on the functions and values. Refer to Table 2-4 for the City of Anoka Wetland Management Standards.

Table 2-3 – City of Anoka Wetland Classifications

ID Number	Circular 39	National Wetlands Inventory Code (NWI)	Modified Routine Assessment ¹									Sensitivity*
			Date	Hydrology	Vegetation	Wildlife	Fisheries	Attenuation	Quality	Shore Protection	Aesthetics	
Anoka-1	TypeS	PEMC & PUBG	10/9/98	2	2	2	2	3	3	0	2	Moderate
Anoka-3	TypeS	PUBF	10/9/98	1	1	1	0	3	3	0	1	Least
Anoka-4	TypeS	PEMF, PUBF, & PEMC	10/9/98	2	3	2	0	2	3	0	3	Moderate
Anoka-S	Type3	PEMC & PSS1C	10/9/98	1	3	2	0	2	4	0	2	Moderate
Anoka-6	Types 3 & S	PEMF & PUBF	10/9/98	1	3	3	0	2	4	0	3	Moderate
Anoka-7	Type3	PSS6Cd & PEMCd	10/22/98	1	1	1	0	4	4	0	2	Least
Anoka-8	Types 3 & 6	No information available	10/22/98	1	1	1	0	2	4	0	2	Least
Anoka-9	Types 3 & 6	PEMCd	10/22/98	1	1	1	0	2	1	1	2	Least
Anoka-10	Type3	PEMC, PF01C, PEMF, PUBFx, & PEMCd	10/22/98	1	2	2	0	2	4	0	3	Moderate
Anoka-11	Types 3 & 6	PEMC	10/22/98	1	1	2	0	3	3	0	3	Least
Anoka-12	Type2	PEMCd	10/22/98	1	1	2	0	2	3	0	2	Least
Anoka-13	Types 2 & 3	PEMCd	10/22/98	1	1	1	0	3	3	0	2	Least
Anoka-14	Types 1 & 2	PEMU	10/22/98	1	1	2	0	3	3	0	2	Least
Anoka-1S	TypeS	No information available	10/9/98	1	1	1	0	3	2	0	2	Least
Anoka-16	TypeS	No information available	10/9/98	1	2	2	0	4	2	0	2	Moderate
Anoka-18	Types 2, 3 & 6	PEMC, PF01B, PEMF, & PUBF	10/22/98	2	2	3	0	3	4	3	3	Moderate
Anoka-19	TypeS	PEMC	10/20/98	1	1	1	0	2	1	0	1	Least
Anoka-20	Types 1 & 2	PSS1B	10/20/98	2	1	1	0	2	3	0	3	Least
Anoka-21	Types 2, 3 & 6	PSS6C, PEMC, PEMF, PF06C, & PSS1C	10/22/98	1	1	1	0	2	3	0	2	Least
Anoka-22	Types2, S&6	PF01Ch, PSS1C, PUBFh, PUBF, & L1UBHh	10/1S/98	1	3	3	2	4	3	3	3	Moderate
Anoka-23	TypeS	PUBG	10/9/98	1	1	1	0	3	2	2	2	Least
Anoka-24	TypeS	PUBG	10/9/98	1	1	1	0	3	2	2	2	Least
Anoka-2S	Types 2 & 7	PF01C	10/20/98	1	1	2	1	2	3	0	2	Least
Anoka-26	Types 6 & 7	PF01C	10/1S/98	3	2	2	4	1	1	3	3	Moderate
Anoka-27	TypeS	PSS1C	10/20/98	1	2	2	0	2	3	0	2	Moderate
Anoka-28	Types 3 & S	PSS1C	10/20/98	1	1	2	0	3	3	0	2	Least
Anoka-30	Type2	PEMC	10/20/98	2	1	2	0	2	3	0	2	Moderate
Anoka-32	Types 3, S&6	No information available	10/1S/98	2	3	3	3	1	3	2	3	Moderate
Anoka-33	TypeS	No information available	10/1S/98	1	1	2	2	1	2	2	2	Least
Anoka-34	TypeS	No information available	10/1S/98	1	1	2	2	1	1	2	1	Least

*See Table 2-4

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

0 = N/A	3 = High
1 = Low	4 = Exceptional
2 = Medium	

Based upon the functions and values, wetland management standards have been developed. These standards are shown below in Table 2-4.

Table 2-4 – City of Anoka Wetland Management Standards

High	Moderate	Least
Special consideration must be given to avoid altering these wetland types. Inundation must be avoided. Water chemistry due to alteration by stormwater impacts can also cause adverse impacts.	These wetlands can tolerate only moderate alterations in hydrology. They have very good wildlife habitat value and a relatively diverse plant community. They will tolerate an additional 6 inches of inundation, but will be adversely impacted by sediment and/or nutrient loading and prolonged high water levels.	These wetlands are usually so degraded that input of urban stormwater may not have adverse impacts.
Maintain the existing Storm Water Bounce or degree of water level fluctuation.	Maintain the existing Storm Water Bounce or degree of water level fluctuation. Limit the maximum addition of water to 6 inches.	No limit for Storm Water Bounce or degree of water level fluctuation.
Maintain the existing Discharge Rate .	Maintain the existing Discharge Rate .	Maintain or decrease the existing Discharge Rate .
For 1& 2 year storm events, maintain existing Inundation periods .	For 1 & 2 year storm events maintain existing Inundation periods . Limit maximum inundation to one additional day.	For 1 & 2 year storm events, maintain existing Inundation periods . Limit maximum inundation to an additional 7 days.
For 10 year storm events and greater, maintain existing Inundation periods .	For 10 year storm events and greater maintain existing Inundation periods . Limit maximum inundation to an additional 7 days.	For 10 year storm events and greater, maintain existing Inundation periods . Limit maximum inundation to an additional 21 days.
Do not change the outlet control elevation .	Do not change the outlet control elevation .	May raise outlet control elevation up to 4 feet above existing outlet elevation.
For landlocked wetlands, keep the Run-out control elevations above the delineated wetland edge.	For landlocked wetlands, keep the Run-out control elevations above the delineated wetland edge.	For landlocked wetlands, keep the Run-out control elevations above the delineated wetland edge.
<u>Recommendations</u> : If not already implemented, a preservation program should be initiated. Active protection from invasive plant species should begin. Purple Loosestrife, reed canary grass, and hybrid cattail should be eradicated from these wetlands.	<u>Recommendation</u> : These wetlands have good potential to restore native plant communities. It is well worth the effort to control invasive species (especially purple loosestrife) in these wetlands.	<u>Recommendation</u> : These wetlands could be altered to improve stormwater storage and to improve water quality and not severely impact the wetland quality.
Sedge Meadows, Open Bogs, Coniferous Bogs, Calcareous Fens, Low Prairies, Coniferous Swamps, Lowland Hardwood Swamps, Seasonally Flooded Basins.	Shrub-carrs, Alder Thickets, Fresh (Wet) Meadows, Shallow Marshes, Deep Marshes	Gravel Pits, Cultivated Hydric Soils, Dredged Material/Fill material Disposal Sites.

Note:

These management levels are based on the criteria set forth in the “Storm-water and Wetlands: Planning and Evaluations Guidelines for addressing Potential Impacts of Urban Storm-water and Snow-melt Runoff on Wetlands” prepared by the State of Minnesota Storm-Water Advisory Group, published June 1997.

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

2.9 Impaired Waters

The Rum River and the Mississippi River are both listed on the Minnesota Pollution Control’s list of impaired waters. It is required that waters that do not meet the federal water quality standards be listed. Impaired waters in the City of Anoka are listed in table 2-5 below.

Table 2-5 – Impaired Waters

Watercourse	Affected Use	Pollutant or Stressor	TMDL Status
Rum River	Aquatic Consumption	Mercury	Approved 2008
Mississippi River	Aquatic Consumption	Mercury PCB in Fish Tissue	Approved 2007 Target Completion 2020
	Aquatic Life	Nutrients	Target Completion 2018
	Aquatic Recreation	Fecal Coliform	Target Completion 2024

Both the Rum River and the Mississippi River are impaired for Mercury. Most of the mercury that impairs our lakes and rivers is delivered by the atmosphere. Mercury is carried down into our lakes and rivers by rain and snow. Once in the water, the mercury is converted by bacteria in highly organic portions of the aquatic systems into methylmercury. Zooplankton pick up the methylmercury as they filter water and feed on algae. When small fish eat the Zooplankton, the mercury builds up in their bodies. When larger fish eat the smaller fish, the mercury continues to accumulate all of the way up the food chain. Therefore, the longest living fish at the top of the food chain tend to have the highest concentrations of mercury in their bodies.

Studies indicate that human consumption of fish with high levels of mercury is linked to impaired neurological development and is particularly critical to fetuses, infants, and children. Since the mercury comes from the atmosphere, the only way to reduce the levels is by reducing at the source. Although the primary source of mercury in Minnesota comes from coal-fired electric generation plants, the following sources have also been found to introduce mercury into the atmosphere: industrial/commercial and institutional boilers, petroleum refining, ferrous mining/processing, sewage sludge incineration, cremation, and dental preparations.

The Mississippi River is also impaired for polychlorinated biphenyls (PCB) in fish tissue. PCB's are a group of chemicals that have extremely high boiling points and are practically non-flammable. Because of these properties, PCB's were used in many industrial and commercial products such as electrical components, heat transfer, and hydraulic equipment until they were banned in the late 1970's. PCB's accumulates in fish much like mercury does and has been classified as a probable human carcinogen and is listed in the top ten percent of the EPA's most toxic chemicals. Much like mercury, PCB's are nearly impossible to remove from the environment.

For both impairments, following the Minnesota Department of Health's guidelines for fish consumption is the recommended best management practice for minimizing potential adverse impacts to human health.

The Mississippi River in 2006 was listed as impaired for fecal coliform. However, in 2012, a section of the Mississippi River was delisted for fecal coliform concerns due to the water quality standard being met. This section includes the northwest city limits of Anoka to the Rum River. Areas downstream of the Rum River are still considered to be impaired for fecal coliform. Fecal coliform is commonly found in human and animal feces and is an indicator that possible pathogenic bacteria and viruses that also live in human and animal digestive systems are present in the water. Therefore, swimming in the river may pose a health risk if water is digested. The following sources may contribute to higher levels of fecal coliform: malfunctioning wastewater treatment plants, faulty on-site septic systems, domestic and wild animal manure, and stormwater runoff.

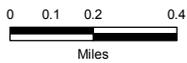
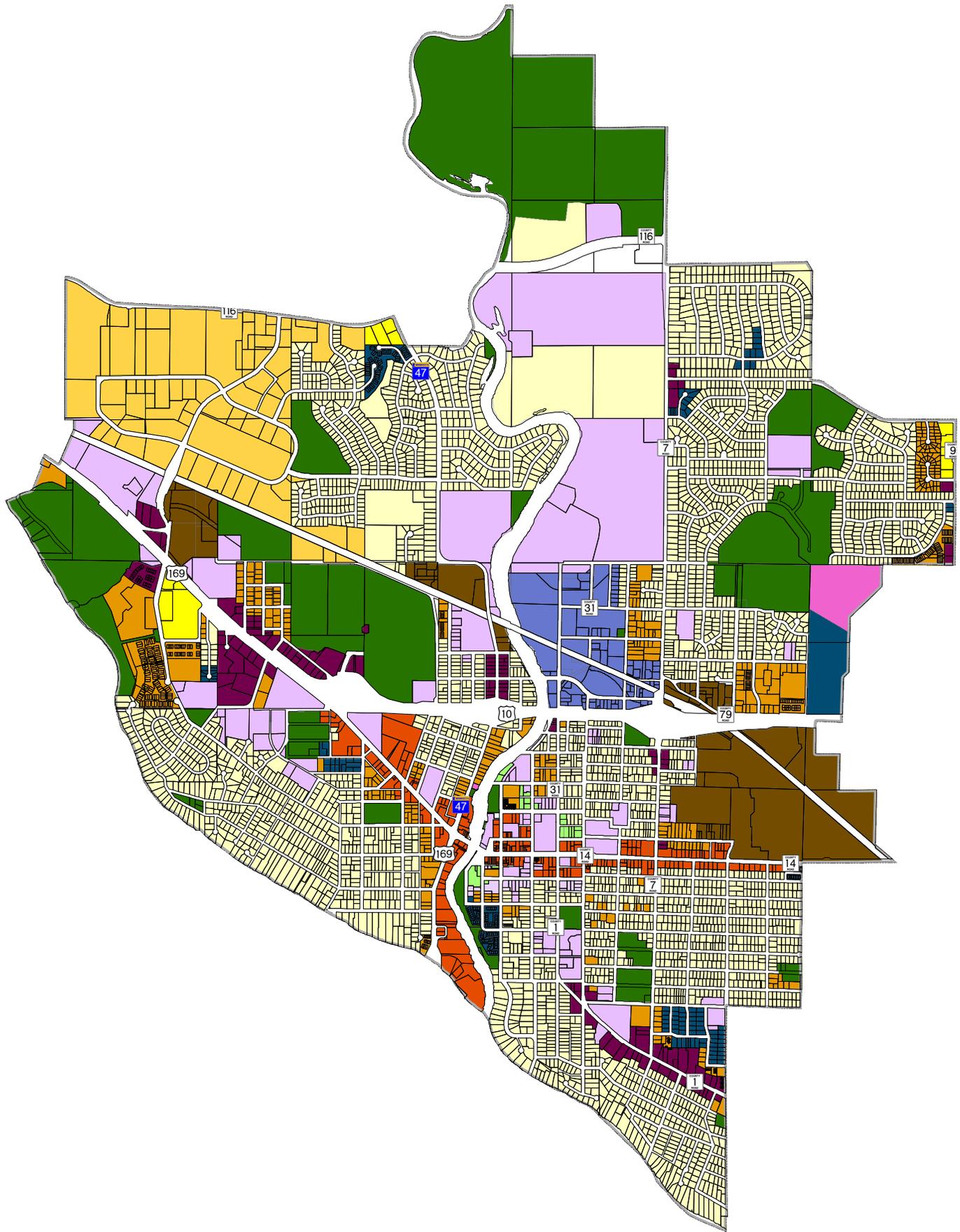
In the most recent approved 2016 impaired waters list added a nutrient impairment to the Mississippi River. Nutrient impairment occurs when there is abundant phosphorus, which is a food source for algae, in the water. Not only is algae aesthetically disagreeable, but algae can also block sunlight for aquatic plants and deplete oxygen levels for other species living in the river. Most organic material contain phosphorus, so leaves, grass clipping, fertilizer, and pet waste that enter the stormwater can contribute to nutrient impairment. Additionally, phosphorus can bind to sediment, so sediment from noncompliant construction sites or exposed stockpiles can also lead to increases in nutrient concentrations in downstream waters.

Currently, there are no TMDL requirements for the City of Anoka. There was a 2014 TMDL report for bacteria in the Upper Mississippi River Basin, but the two stream reaches in the City of Anoka,

07010206-568 and 07010206-511, were considered protection reaches. There were no TMDL requirements for areas within the protection reaches.

2.10 Scenic and Recreational Rivers

The segment of the Rum River that bisects Anoka from its northern border to Madison and Rice Streets in Anoka is designated as a scenic and recreational river and is subject to MN Rules 6105.1440-1480. The City will implement land use ordinances and all other activities consistent with the management plan as prepared by the Minnesota Department of Natural Resources. Also, because the Rum River is listed as an Outstanding Value Resource Water (ORVW), no person may cause a new or expanded discharge of any sewage, industrial waste, or other waste unless there is not a prudent and feasible alternative.

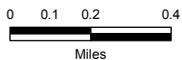


2030 Land Use

- | | | |
|--------------------------|----------------------------|------------------------------|
| General Commercial | Limited Commercial | Planning Area |
| General Industrial | Local Commercial | Shopping Center |
| High Density Residential | Medium Density Residential | Single Family Residential |
| Institutional | Mixed Use | Transit Oriented Development |
| Light Industrial | Park and Recreation | Undeveloped Space |

FIGURE 2-1

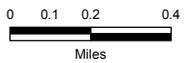
**2030 LAND USE
CITY OF ANOKA**



LEGEND

-  Protected Water
-  Ditches
-  Parcels

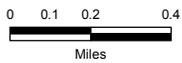
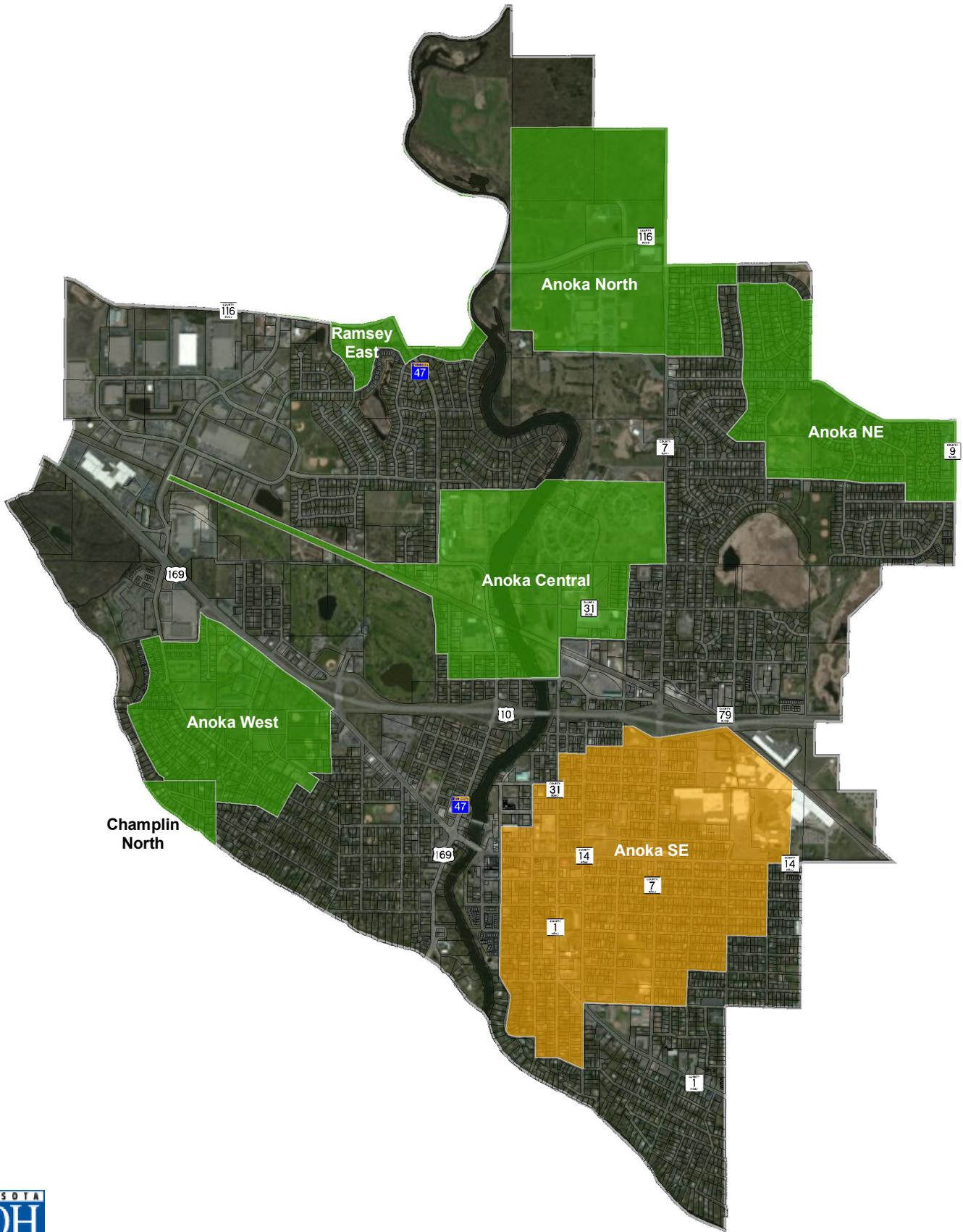
**FIGURE 2-2
PUBLIC WATERS
& DITCHES
CITY OF ANOKA**



LEGEND

- NWI System Type
- Lacustrine
- Palustrine
- Parcels

**FIGURE 2-3
NWI (WETLAND)
MAP
CITY OF ANOKA**



LEGEND

- | | | |
|----------------------------|----------|----------|
| DWSMA Vulnerability | High | Low |
| Very High | Moderate | Very Low |

**FIGURE 2-4
DWSMA
VULNERABILITY
CITY OF ANOKA**

3.0 Mississippi River East Watershed

3.1 General Watershed Description

The Mississippi River East Watershed and the subwatersheds that comprise it are shown in detail in Figure 3-1. This watershed consists of the land in the City of Anoka that drains directly to the Mississippi River on the east side of the Rum River.

The Mississippi River East Watershed includes the southernmost portion of the city. The area of this watershed is approximately 445 acres. The watershed is mostly developed, with land use consisting of single family residential, multiple family residential, and a small section of commercial land use. The city has made various stormwater related improvements within this watershed over the past decade as part of its annual street renewal program. Four water quality treatment structures have been constructed within this watershed to treat the stormwater and remove pollutants prior to discharging into the Mississippi River.

3.1.1 Drainage Patterns

This watershed drains south via storm sewers to the Mississippi River. There are eight stormwater outfalls that discharge to the Mississippi River, east of Rum River. From east to west, the eight storm sewer network minor watersheds modeled for this project are:

River Lane (RVR)

Eastwood Lane (EWD)

Kings Lane (KGS)

Oakwood Drive (OWD)

5th Avenue (5TH)

3rd Avenue (3RD)

Oakwood Lane (OWL)

Washington Street (WAS)

Each storm sewer system is named for the location of the minor watershed outlet. Subwatersheds within these minor watersheds were delineated, named and numbered according to the minor watershed. For example, the system draining to 5th Avenue is so named because the outlet for the stormwater system is on 5th Avenue. The eleven subwatersheds are numbered consecutively from the outlet.

There are no existing stormwater detention basins within this subwatershed.

3.1.2 Flood Protection Concerns

Where the storm sewer system capacity is not sufficient, surface overflow will occur via the streets to the lowest point within the watershed. For the Mississippi River East Watershed, overflow occurs toward the river. If sufficient capacity for the critical 10-year storm at these outlet points is not maintained, it is possible ponding will occur in the street and yards at this storm frequency until surface overflow occurs. It appears that flooding of homes or businesses will not occur since the surface overflow is at an elevation below the lowest structure.

3.2 Stormwater System Analysis and Results

The 10-year and 100-year event flood analyses were performed for the Mississippi River East Watershed. Table 3-1 presents watershed information and the peak runoff rates of the 10-year and 100-year critical storm events.

3.3 Implementation Considerations

When originally constructed, many of the storm sewer outfalls discharged storm water directly into the Mississippi River. Several of the outfalls have been retrofitted to provide stormwater treatment prior to discharging to the Mississippi River. One additional water quality structure and one stormwater basin are proposed. These issues are discussed in the following paragraphs.

3.3.1 Construction of Additional Stormwater Basins

The construction of a stormwater basin located in subwatershed 9th_5 would allow for smaller pipe sizes to be used while also providing treatment to the runoff before it discharges into the river. Table 3-2 lists the necessary storage for the basin.

3.3.2 Construction of Water Quality Structures

As depicted in Figure A (in Appendix A), one additional water quality structure is proposed which will reduce the amount of suspended solids and phosphorus load to the Mississippi River. Water quality structures will be designed to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

3.3.3 Storm Sewer Capacity

As shown on Figure B (Appendix A), storm sewer upgrades are proposed on South Street to provide capacity for the 10-year storm event.

Table 3-1: Results of the Mississippi River East Watershed

10-Year and 100-Year Critical Storm Events (TP-40)

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
3RD	1	2.3	47	4	10
3RD	2	1.1	42	2	3
3RD	3	5.4	51	9	18
5TH	1	4.9	100	10	20
5TH	2	1.9	38	2	5
5TH	3	6.7	36	7	17
5TH	4	8.8	38	12	27
5TH	5	4.1	38	4	10
5TH	6	2.9	30	6	12
5TH	7	3.6	0	8	15
5TH	8	2.3	60	5	9
5TH	9	7.0	45	20	34
5TH	10	5.4	38	5	13
5TH	11	6.5	33	7	14
EWD	1	38	38	4	9
KGS	1	2.0	37	2	6
KGS	2	4.5	31	4	10
KGS	3	2.9	22	1	5
KGS	4	3.3	36	3	9
KGS	5	1.5	43	2	5
KGS	6	2.2	35	2	6
KGS	7	2.1	46	3	7
KGS	8	4.4	31	3	10
KGS	9	4.1	33	3	7
KGS	10	1.3	32	1	3
KGS	11	1.4	37	2	4
KGS	12	1.2	35	1	3
KGS	13	0.7	21	0	1
KGS	14	3.1	32	3	7
KGS	15	5.4	35	5	13
KGS	16	3.2	40	4	9
KGS	17	1.7	13	0	2
KGS	18	3.3	26	2	6
KGS	19	1.9	40	2	5
KGS	20	1.6	47	3	5

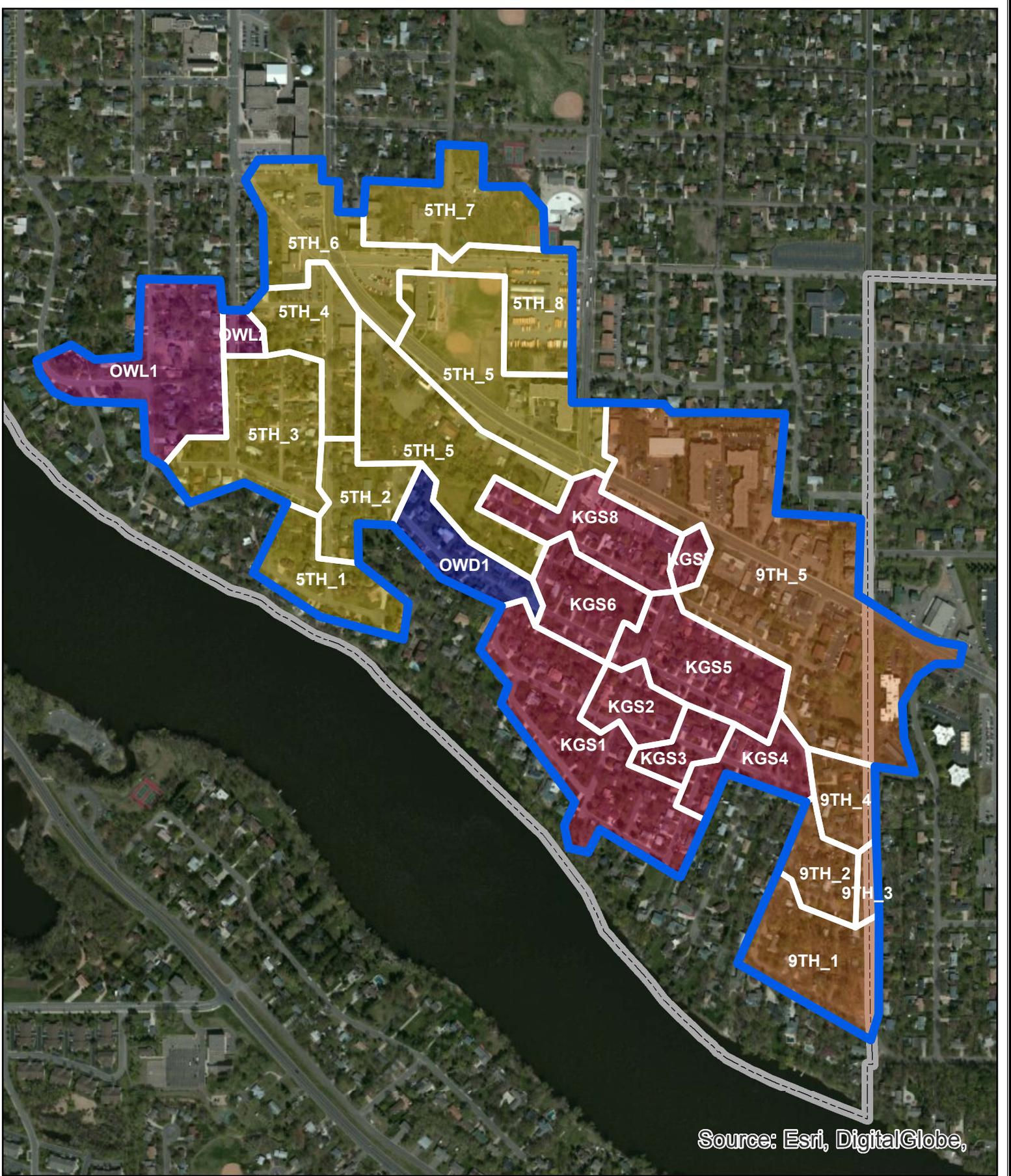
Table 3-1: Results of the Mississippi River East Watershed (continued)**10-Year and 100-Year Critical Storm Events (TP-40)**

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
KGS	21	8.3	38	8	20
KGS	22	2.2	51	4	9
KGS	23	5.3	55	12	22
KGS	24	2.5	56	6	11
KGS	25	1.0	57	2	4
KGS	26	6.3	48	11	22
KGS	27	1.9	89	10	15
KGS	28	8.1	44	11	24
KGS	29	2.2	79	10	14
KGS	30	8.8	73	34	56
KGS	31	4.9	79	21	34
OWL	1	2.4	37	3	7
OWL	2	1.9	32	1.5	4
OWL	3	5.2	28	4	14
OWD	1	1.3	31	1	3
OWD	2	2.6	38	3	7
RVR	1	8.7	38	8	20
WAS	1	6.6	28	4	13

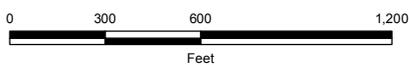
Table 3-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Mississippi River East Watershed

Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
Proposed Ponds						
9TH_5	30.8	2.0	4.8	6.8	3	12"

Source: Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe,



Hakanson
Anderson

K:\cad_eng\PROJECTS\GIS\AN409\Mississippi River East

LEGEND

- Major Watershed
- Sub Watershed
- Minor Watersheds**
- 5TH
- 9TH
- KGS
- OWB
- OWD

FIGURE 3-1
MISSISSIPPI RIVER
EAST WATERSHED
CITY OF ANOKA

4.1 General Watershed Description

The Mississippi River West Watershed includes the southern portion of the city west of the Rum River, which drains directly into the Mississippi River. This watershed is approximately 287 acres. It is made up of mostly single-family residential with small sections of multiple-family residential and commercial land use. Figure 4-1 shows the watershed and subwatershed boundaries. The city has made various stormwater related improvements within this watershed recently as part of its annual street renewal program. Two water quality treatment structures have been constructed within this watershed to treat the stormwater and remove pollutants prior to discharging into the Mississippi River.

4.1.1 Drainage Patterns

Portions of the Mississippi River West Watershed are serviced by storm sewers. Subwatersheds within this watershed were delineated and named according to the location of the minor watershed outlet. For example, the Levee Avenue subwatershed is so named because the outlet for the stormwater system is on Levee Avenue. All of the subwatersheds ultimately discharge to the Mississippi River. This watershed has two existing stormwater and remove pollutants basins in the private town home development.

There are eight stormwater outfalls that discharge to the Mississippi River, west of Rum River. From east to west, the storm sewer network minor watersheds modeled for this project are:

Mississippi West (MW)

Levee Avenue (LEV)

Shaw Avenue (SHAW)

West Lane (WEST)

Porter Avenue (PTR)

Benton Street (BEN)

Private Town Home Development (PV)

4.1.2 Flood Protection Concerns

Where the storm sewer system capacity is not sufficient, surface overflow will occur via the streets to the lowest point within the watershed. For the Mississippi River West Watershed, the water reaching the low points is conveyed via pipe to the Mississippi River. If sufficient capacity for the critical 10-year storm at these outlet points is not maintained, it is possible that ponding will occur in the streets and yards at this storm frequency until the surface overflow occurs. However, as with the Mississippi River East watershed, it appears that flooding of homes is not likely to occur as the land is sloped towards the Mississippi River and the surface overflow is at an elevation below the lowest structure.

4.2 Stormwater System Analysis and Results

The 10-year and 100-year event analyses were performed for the Mississippi River West Watershed. Table 4-1 presents watershed information and the peak runoff rates of the 10-year and 100-year flood analyses for each of the subwatersheds.

4.3 Implementation Considerations

When originally constructed, many of the storm sewer outfalls discharged storm water directly into the Mississippi River. However, two of the outfalls have been retrofitted with water quality structures to treat the stormwater and reduce pollutants prior to discharging to the Mississippi River. Three additional water quality structures are proposed within this watershed as well as one stormwater basin. These issues are discussed in the following paragraphs.

4.3.1 Construction of Additional Stormwater Basins

Currently, Sorensen Park is sufficient for stormwater storage for the 100-year event. Table 4-2 lists the necessary storage for the 100-year event. Construction of a basin at this location may reduce the recommended pipe upgrade sizes downstream while also providing water quality treatment.

4.3.2 Construction of Water Quality Structures

As depicted in Figure A (in Appendix A), three additional water quality structures are proposed which will greatly reduce the amount of suspended solids and phosphorus load to the Mississippi

River. Water quality structures will be designed to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

4.3.3 Storm Sewer Capacity

From the hydraulic model results, many of the city's storm sewer pipes cannot handle the runoff from a 10-year event. This may not be a serious problem, but more of an inconvenience since this area of the city is fortunate enough to be sloped towards the river. In the areas of steep slopes, much of the excess stormwater runoff that cannot be managed in the existing pipes, can flow downstream in the system of roads, curbs and gutters, and overflow swales. The areas where the overflow system may create problems are: (1) where the natural terrain is too flat, (2) where low areas exist and unwanted ponding occurs (i.e. at intersections and in developed parts of the city), and (3) when roads carrying the excess runoff make sharp turns.

As depicted on Figure B (Appendix A) upgrades to the storm sewer on Porter Avenue and West Lane are necessary to accommodate the 10-year storm event.

**Table 4-1: Results of the Mississippi River West Watershed
10-Year and 100-Year Critical Storm Events (TP 40)**

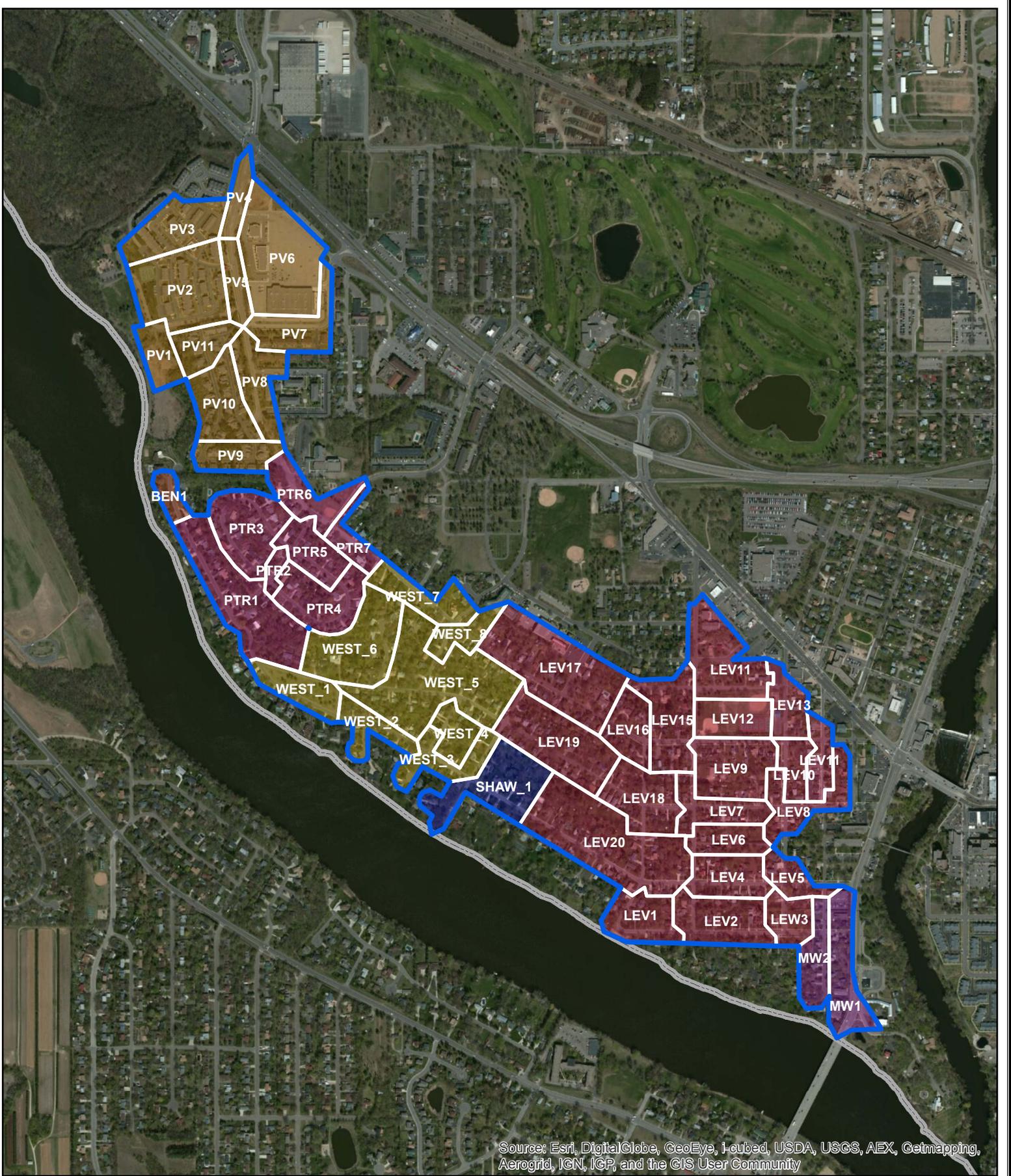
**Table 4-1: Results of the Mississippi River West Watershed (continued)
10-Year and 100-Year Critical Storm Events (TP 40)**

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
PV	9	4.0	65	12	20
SHAW	1	1.0	100	1	3
SHAW	2	10.3	38	10	24
SHAW	3	3.0	38	3	8
SHAW	4	15.4	38	15	36
SHAW	5	1.9	38	2	5
SHAW	6	4.3	38	4	10
SHAW	7	4.0	38	3	8
SHAW	8	8.3	38	5	14
WEST	1	5.4	38	6	15
WEST	2	6.0	38	7	17
WEST	3	11.1	38	11	26
LEV	15	12.1	38	12	27
LEV	16	2.5	38	3	7
LEV	16A	2.8	100	14	20
LEV	17	10.9	54	5	17
LEV	18	3.9	51	1	6
LEV	19	3.8	38	4	11
LEV	20	1.4	38	2	4
BEN	1	1.9	38	2	5
BEN	2	5.5	38	6	15
CG	1	6.9	38	7	16
MW	1	6.6	52	12	22
PTR	1	8.5	38	8	20
PTR	2	8.0	38	9	22
PTR	3A	1.7	100	9	12
PTR	3B	6.3	0	0	1
PTR	4	5.7	38	7	16
PTR	5	8.7	38	10	25
PV	1	9.4	65	27	47
PV	2	2.3	100	11	16
PV	3	10.6	85	45	69
PV	4	4.4	65	12	22
PV	5	5.0	38	5	12
PV	6	8.5	65	21	37
PV	7	7.4	63	17	31
PV	8	5.2	84	18	29

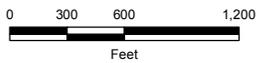
Table 4-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Mississippi River West Watershed

Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
PV3	18.7	1.6	0.8	2.4	20	36"
PV11	35.0	2.4	6.2	8.6	65	
<i>Proposed Ponds</i>						
LEV12	37.5	1.0	15.4	16.4	5	

Source: Anoka Stormwater Management Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



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Anderson

LEGEND

- Major Watershed
- Sub Watershed
- Minor Watersheds**
- BEN
- LEV
- MW
- PTR
- PV
- SHAW
- WEST

**FIGURE 4-1
MISSISSIPPI RIVER
WEST WATERSHED
CITY OF ANOKA**

5.1 General Watershed Description

Figure 5-1 shows the Anoka Enterprise Watershed and its subwatersheds. This region is located in the northwest corner of the city. It is routed to the Mississippi River through a significant storm sewer network.

This watershed includes the industrial park of the city and the Anoka-Hennepin Technical College. The 362-acre watershed includes a small area of single family residential with the remainder classified as industrial land use. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

5.1.1 Drainage Patterns

The Anoka Enterprise watershed is served by the city's stormwater system. The stormwater system is comprised of storm sewers, ditches, and basins. Anoka Enterprise watershed is made up of one minor watershed that discharges to the Mississippi River near King's Island. The minor watershed is:

Anoka Enterprise (AEP)

There are four existing basins in this watershed which can be used for stormwater treatment and detention.

5.1.2 Flood Protection Concerns

Where the storm sewer system capacity is not sufficient, surface overflow will occur via the streets to the lowest point within the subwatershed. Unlike the other Mississippi River watersheds, the Anoka Enterprise Watershed will not overflow to the river, but rather to the existing basins. There are no known problems in this watershed. Structures surrounding the basins appear to have sufficient freeboard for flood protection.

5.2 Stormwater System Analysis and Results

The 10-year and 100-year flood events were analyzed for the Anoka Enterprise Watershed. Table 5-1 presents watershed information and the peak flow rates of the 10-year and 100-year analyses for each of the subwatersheds shown on Figure 5-1.

5.3 Implementation Considerations

This region of the city provides sufficient storm sewer capacity to meet the 10-year level of service and 100-year level of protection downstream of the basins. Both the basin storage capacity and outlet sizes are adequate. The other basins will be sufficient with the existing outlet if the necessary storage in Table 5-2 is provided.

5.3.1 Construction of Water Quality Basins

The existing basins will provide sufficient water quality treatment if the necessary “dead storage” volume as stated in Table 5-2 is provided. No new basins are required although the storm sewer network should have an added water quality structure to treat the stormwater and reduce the pollutants that discharge into the river from those watersheds downstream of the water quality basins. Table 5-2 lists the necessary “dead storage” required to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

**Table 5-1: Results of the Anoka Enterprise Watershed
10-Year and 100-Year Critical Storm Events (TP 40)**

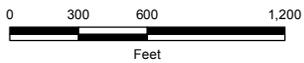
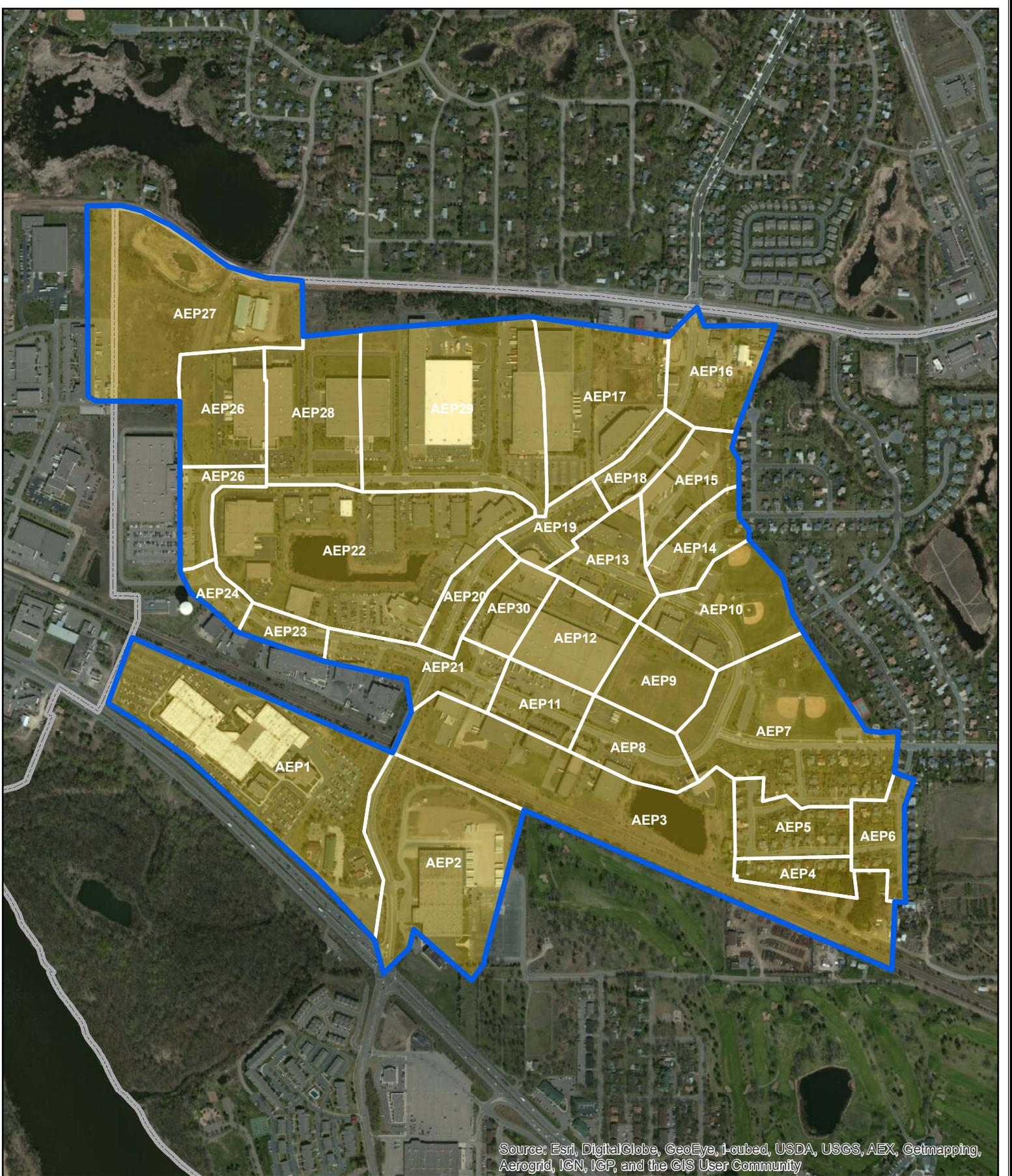
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
AEP	1	2.5	90	5	8
AEP	2	23.8	65	70	115
AEP	3	27.1	48	44	75
AEP	4	3.0	20	5	9
AEP	5	6.3	20	8	17
AEP	6	5.7	20	10	20
AEP	7	25.5	16	25	53
AEP	8	6.5	65	26	29
AEP	9	6.5	65	17	28
AEP	10	11.4	35	24	39
AEP	11	6.7	65	23	18
AEP	12	8.4	65	33	312
AEP	13	7.2	65	25	56
AEP	14	5.1	65	13	22
AEP	15	6.8	65	18	29
AEP	16	6.2	63	15	24
AEP	17	23.3	62	57	94
AEP	18	6.5	65	24	53
AEP	19	4.7	65	17	16
AEP	20	4.0	65	3	21
AEP	21	7.6	65	20	35
AEP	22	28.7	65	79	341
AEP	23	2.8	65	13	21
AEP	24	2.4	65	11	17
AEP	25	5.5	65	16	26
AEP	26	13.6	65	39	64
AEP	27	31.0	57	77	129
AEP	28	15.8	65	63	104
AEP	29	22.9	65	54	89
AEP	30	3.9	65	16	27

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

Table 5-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Anoka Enterprise Watershed

Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
AEP22	100.2	6.5	17.0	23.5	24	30" & 24"
AEP17	23.3	3.0	3.1	6.1	12	
AEP27	31.0	2.4	5.2	7.6	6	24"
AEP3	131.9	7.0	18.2	25.2	32	36"

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



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Anderson**

LEGEND

-  Major Watershed
-  Sub Watershed
-  Minor Watersheds
-  AEP

**FIGURE 5-1
ANOKA ENTERPRISE
WATERSHED
CITY OF ANOKA**

6.1 General Watershed Description

Figure 6-1 shows the Rum River Northeast minor watersheds and subwatersheds. The region is located north of U.S. Highway 169 and 10 and east of the Rum River.

The Rum River Northeast Watershed is the largest with an area of 670 acres, approximately 1 square mile. The general land uses of this watershed include single family residential and multiple family residential. This drainage basin includes the new high school and library facilities. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

6.1.1 Drainage Patterns

This entire watershed is serviced by the city's storm sewer. There are a series of basins which provide both quantity and quality control. Ultimately, surface water is conveyed via storm sewer west to the Rum River.

There are three stormwater outlets that discharge directly to the Rum River; however the watershed was divided into five minor watershed because of the complexity and large area of the systems. From north to south, the storm sewer minor watersheds modeled for this project are:

38th Lane (38TH)

Bryant Avenue (BRY)

Sunny Acres Pond (SA)

Grant Street (GRT)

4th Avenue (4AV)

This watershed has four existing basins, two of which were designed as stormwater detention basins. The Anoka High School and Anoka Metro Regional Treatment Center located immediately east of the Rum River were not analyzed. Both of these facilities drain directly to the Rum River. If future improvements are made to the existing system at these facilities, water quality

treatment must be provided. Because surface overflow of these areas will drain to the river, flooding of the structures is not a concern.

6.1.2 Flood Protection Concerns

Excess water that the existing storm sewer system cannot handle flows toward the basins within this watershed. If the storage and outflow capacities of the basins in this watershed are not sufficient, the basins will overflow, which could impact existing structures adjacent to these ponding basins. Detailed survey information is required to determine the capacity of the existing basins.

6.2 Stormwater System Analysis and Results

The 10-year and 100-year events were previously analyzed for the Rum River Northeast Watershed. Table 6-1 summarizes the peak runoff rates of the 10-year and 100-year analyses for each of the subwatersheds shown on Figure 6-1.

6.3 Implementation Considerations

Existing and future drainage problems within the watershed can be resolved with a combination of increased storm sewer capacity and storage volume within the existing basins. These are discussed in the following paragraphs.

6.3.1 Construction of Additional Stormwater Basins

New stormwater detention basins are not necessary if the existing basins provide the required amounts of storage. Table 6-2 lists the stormwater storage volumes necessary for 100-year storage.

6.3.2 Construction of Water Quality Basins

The construction of additional water quality basins is not necessary within this watershed.

6.3.3 Storm Sewer Capacity

As shown in Figure B (Appendix A), storm sewer upgrades are proposed on Ninth Lane, Grant Street, Grant Circle, Garfield Street, Bryant Circle, and 7th Avenue.

Table 6-1: Results of the Rum River Northeast Watershed

10-Year and 100-Year Critical Storm Events (TP 40)

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
4AV	1	15.1	61	34	56
38 TH	1	27.3	12	52	97
38 TH	2	13.2	34	28	49
38 TH	3	13.6	21	16	32
38 TH	4	10.9	20	14	28
38 TH	5	29.6	20	27	56
38 TH	6	13.8	20	20	39
38 TH	7	13.1	14	13	26
38 TH	8	5.5	5	6	14
38 TH	9	6.3	20	9	18
BRY	1	50.8	18	58	113
BRY	2	7.8	20	12	23
BRY	3	1.3	20	3	51
BRY	4	1.8	25	4	9
BRY	5	10.8	20	15	31
BRY	6	7.9	20	14	25
BRY	7	3.7	21	7	13
BRY	8	10.4	20	29	50
BRY	9	46.4	14	106	198
BRY	10	9.9	20	12	24
BRY	11	8.1	20	10	20
BRY	12	23.1	20	27	54
BRY	13	3.7	20	6	11
BRY	14	3.5	20	7	13
BRY	15	12.4	20	13	28
BRY	16	5.7	20	14	26
GRT	1	27.5	54	29	53
GRT	2	15.4	35	25	47
GRT	3	3.1	32	7	13
GRT	4	3.3	41	15	24
GRT	5	9.0	63	17	28
SA	1	97.7	11	225	401
SA	2	48.6	20	55	112
SA	3	5.5	20	7	14
SA	4	7.3	45	13	23
SA	5	39.7	20	50	101
SA	6	17.8	37	24	46
SA	7	7.5	36	14	26

Table 6-1: Results of the Rum River Northeast Watershed (continued)**10-Year and 100-Year Critical Storm Events (TP 40)**

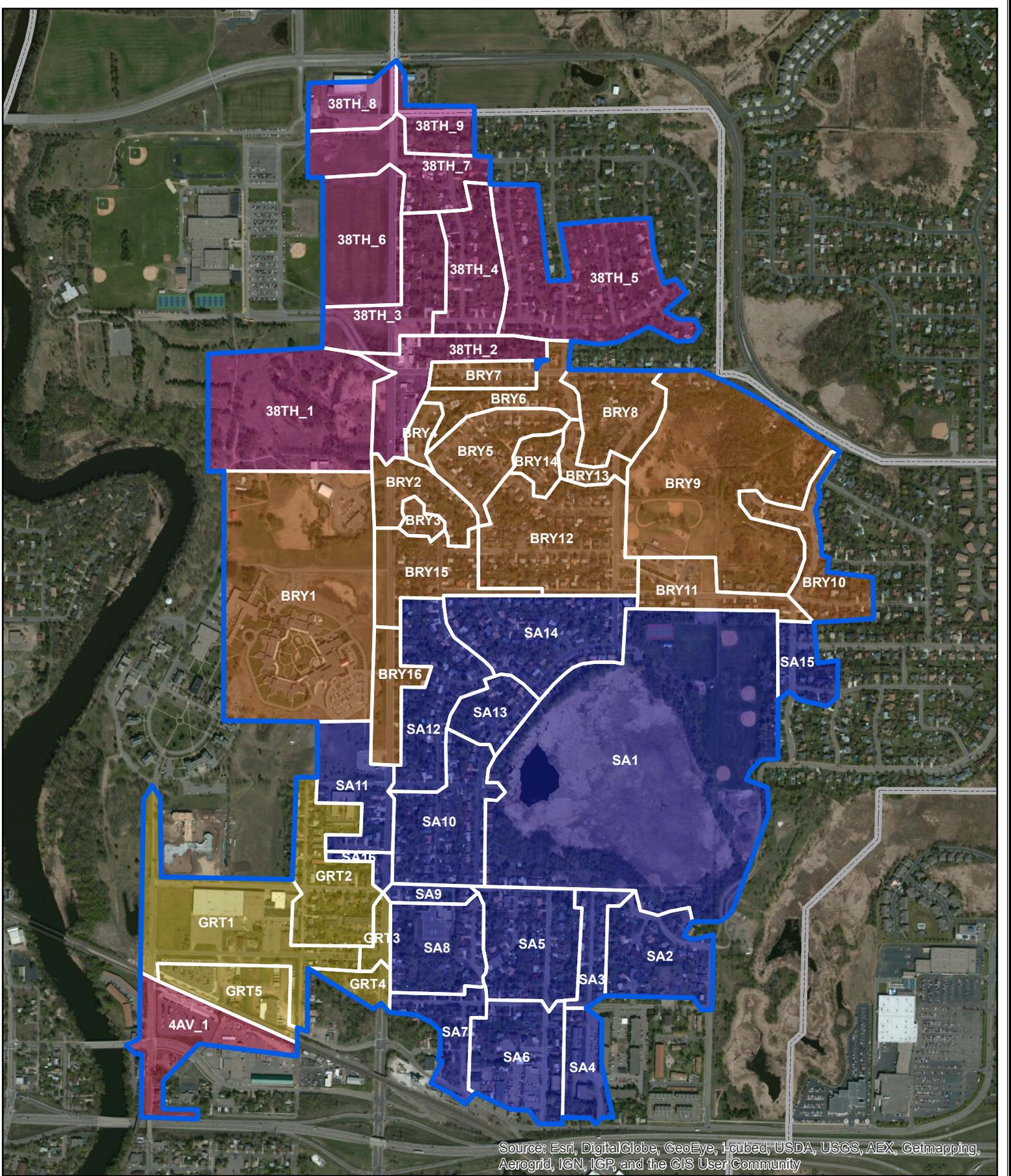
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
SA	8	11.3	20	20	40
SA	9	3.1	20	5	11
SA	10	15.0	20	16	32
SA	11	9.2	15	13	27
SA	12	15.6	20	21	42
SA	13	5.3	20	9	18
SA	14	20.2	20	22	46
SA	15	5.2	20	6	12
SA	16	2.0	21	3	7

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

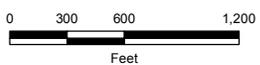
Table 6-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Rum River Northeast Watershed

Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
SA1	290.1	12.0	43.9	55.9	6	24"
38TH_1	133.2	4.8	33.0	37.8	3	
BRY9	86.3	3.0	23.8	26.8	5	
BRY1	50.8	1.8	31.7	33.5	3	
GRT1	60.4	4.0	-	4.0		

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



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LEGEND

- Major Watershed
- Sub Watershed
- 38TH
- BRY
- GRT
- 4AV
- SA

**FIGURE 6-1
RUM RIVER NORTH-
EAST WATERSHED
CITY OF ANOKA**

7.0 Rum River Northwest Watershed

7.1 General Watershed Description

The Rum River Northwest Watershed is 276 acres. Figure 7-1 shows the Rum River Northwest minor watersheds modeled for this plan. The general land uses in this watershed include single family residential, industrial, and open/agricultural. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

7.1.1 Drainage Patterns

From the industrial park limits, the runoff from the watershed flows east to the Rum River, which then flows south to the Mississippi River. The majority of the Rum River Northwest Watershed drains through storm sewer systems.

One extensive storm sewer network exists in this watershed, while the remainder is serviced by outlets which flow directly to the Rum River. Modeling was previously performed for these two minor watersheds:

McKinley Street (MK)

Rum Northwest (RNW)

The McKinley Street network includes two basins within its system.

7.1.2 Flood Protection Concerns

There are no known existing problems in this watershed. The subwatersheds that directly outfall into the river will not have any flooding problems as it appears the overflow will drain to the river. For the remaining watersheds, any excess water that the existing storm sewer system cannot handle flows toward the basins within this watershed. If the storage and outflow capacities are not sufficient, the basins will overflow, which could result in impacts to the existing structures. Detailed survey information is required to determine the capacity of the existing basins.

7.2 Stormwater System Analysis and Results

The 10-year and 100-year events were analyzed for the portions of the Rum River Northwest Watershed that are served by the city's storm sewer system. Table 7-1 summarizes the peak runoff rates of the 10-year and 100-year analyses for each of the subwatersheds shown on Figure 7-1.

7.3 Implementation Considerations

The city's existing storm sewer systems are adequate for this watershed. The necessary storage and outlet sizes were determined to provide adequate detention for the storm sewer network to function and are given in Table 7-2.

7.3.1 Construction of Water Quality Structures

Figure A (Appendix A) shows the locations where water quality structures in the storm sewer would reduce the amount of suspended solids and phosphorus load to the Rum River. As shown, six water quality structures are proposed. Water quality structures will be designed to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

7.3.2 Storm Sewer Capacity

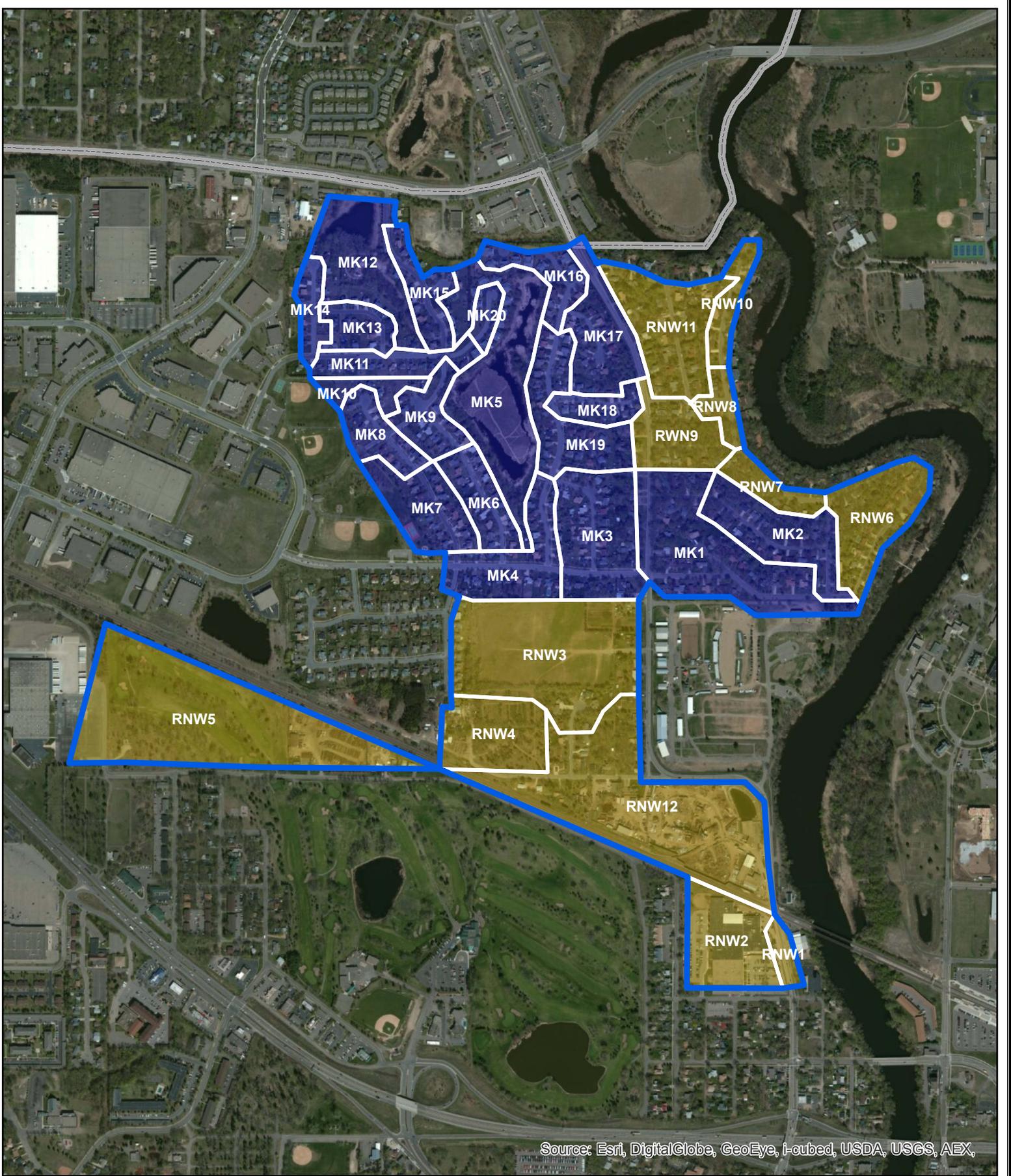
The storm sewer crossing Ferry Street from the Anoka Hennepin Learning Center to the Rum River does not provide capacity for the 10-year storm.

Table 7-1: Results of the Rum River Northwest Watershed					
10-Year and 100-Year Critical Storm Events (TP 40)					
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
MK	1	18.2	20	19	39
MK	2	9.9	20	11	22
MK	3	11.1	20	14	28
MK	4	7.4	17	10	20
MK	5	23.5	13	62	112
MK	6	4.9	20	10	20
MK	7	6.9	15	10	21
MK	8	5.3	20	11	21
MK	9	4.5	20	8	15
MK	10	2.7	20	8	17
MK	11	4.2	20	6	11
MK	12	17.4	21	66	114
MK	13	2.6	20	6	11
MK	14	3.87	20	9	17
MK	15	4.5	29	7	14
MK	16	5.6	22	8	16
MK	17	9.9	20	16	31
MK	18	3.6	20	7	14
MK	19	10.3	20	13	27
MK	20	1.8	45	6	11
RNW	1	2.2	65	9	15
RNW	2	9.3	65	23	38
RNW	3	28.2	8	86	209
RNW	4	10.0	52	28	48
RNW	5	33.0	5	37	83
RNW	6	9.7	20	13	26
RNW	7	3.6	20	6	12.5
RNW	8	3.0	20	6	11
RNW	9	7.7	20	14	27
RNW	10	4.5	20	6	13
RNW	11	11.7	20	17	34
RNW	12	34.0	51	70	120

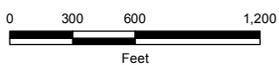
Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

Table 7-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Rum River Northwest Watershed						
Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
MK5	88.5	3.0	14.0	17.0	5	30"
MK12	22.7	1.0	3.3	4.3	5	

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX,



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LEGEND

-  Major Watershed
-  Sub Watershed
-  Minor MK
-  RNW

FIGURE 7-1
RUM RIVER NORTH-
WEST WATERSHED
CITY OF ANOKA

8.1 General Watershed Description

Figure 8-1 shows the Rum River Southeast minor watershed and its subwatersheds. This region is located south of U.S. Highway 169 and 10 and east of the Rum River and it is the oldest part of the city.

This watershed includes Moore Middle School, Washington Elementary School, the City of Anoka offices, and the downtown area. General land uses in this watershed vary from single-family residential to multiple-family residential and commercial. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

8.1.1 Drainage Patterns

The Rum River Southeast watershed is served by the city's storm sewer system. The stormwater system is complex because there are two trunk systems that carry the majority of the runoff. The Rum River Southeast watershed is made up of 12 minor watersheds. From north to south the subwatersheds are:

- Polk Street (POLK)
- Tyler Street (TY)
- Harrison Street (HAR)
- Main Street (MAIN)
- Monroe Street (MON)
- Jefferson Street (JF)
- Moore Middle School (MMS)
- Adams Street (ADAMS)
- Washington Street (WASH)
- 6th Avenue (6TH)
- 10th Avenue (10TH)
- Brisbin Street (BRIS)

8.1.2 Flood Protection Concerns

Where the storm sewer system capacity is not sufficient, surface overflow will occur via the streets to the lowest point within the subwatershed. The Rum River Southeast Watershed has some areas which will not overflow to the river. The proposed and existing storage and outflow capacities are necessary to prevent basin overflow and the flooding of existing structures. Detailed survey information is required to determine the capacity of the existing basins.

8.2 Stormwater System Analysis and Results

The 10-year and 100-year events were previously analyzed for the Rum River Southeast Watershed. Table 8-1 presents watershed information and the peak runoff rates of the 10-year and 100-year analyses for each of the subwatersheds shown on Figure 8-1.

8.3 Implementation Considerations

As a part of the surface water management planning process, the problem areas were investigated to determine possible mitigation alternatives. Two water quality structures have already been retrofitted in this watershed to treat the stormwater and remove pollutants prior to discharging into the Rum River. Additional water quality structures and storm sewer upgrades are proposed and are discussed in the following paragraphs.

8.3.1 Increased Storm Sewer Capacity Projects

Pipe carrying capacity needs to be increased in parts of this watershed to provide 10-year level of service for the city's storm sewer system. Modifications are necessary because all of the watershed does not naturally flow to the Rum River. The limited capacity could result in flooding of homes and businesses. As shown in Figure B (Appendix A), storm sewer upgrades are proposed on Tenth Avenue, Brisbin Street, Seventh Avenue, Fifth Avenue, Washington Street, Adams Street, and Harrison Street. The pipes will be analyzed in detail as the city prepares plans and specifications for street reconstruction projects within this watershed.

8.3.2 Construction of Water Quality Structures

As depicted in Figure A (in Appendix A), five additional water quality structures are proposed which will greatly reduce the amount of suspended solids and phosphorus load to the Mississippi River. Water quality structures will be designed to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

Table 8-1: Results of the Rum River Southeast Watershed**10-Year and 100-Year Critical Storm Events (TP 40)**

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
10 TH	1	11.6	51	21	45
10 TH	2	12.75	20	17	34
10 TH	3	4.94	20	8	16
10 TH	4	3.51	20	5	10
10 TH	5	2.97	20	5	11
10 TH	6	6.86	20	8	17
10 TH	7	4.78	20	7	14
10 TH	8	9.88	20	12	24
10 TH	9	5.10	20	8	15
10 TH	10	9.57	20	13	26
10 TH	11	7.17	20	9	17
ADAMS	1	3.2	20	5	11
ADAMS	2	7.6	20	12	24
6 TH	1	6.5	5	8	47
6 TH	2	11.5	20	18	35
6 TH	3	1.2	25	3	6
6 TH	4	3.6	40	9	16
6 TH	5	1.7	31	5	9
6 TH	6	1.7	20	4	9
6 TH	7	2.8	20	6	11
6 TH	8	8.4	20	12	35
6 TH	9	5.1	20	9	21
6 TH	10	4.0	20	8	16
6 TH	11	4.3	20	6	13
6 TH	12	2.9	48	7	11
6 TH	13	1.6	20	4	8
BRS	1	4.0	20	7	15
BRS	2	9.6	24	17	32
BRS	3	7.1	20	13	25
BRS	4	9.6	21	12	24
HAR	1	5.7	90	18	28
HAR	2	5.0	57	15	26
HAR	3	2.2	67	11	17
HAR	4	4.7	90	15	23
JF	1	5.1	39	9	9
JF	2	7.6	54	13	23
JF	3	6.4	37	13	24
JF	4	6.5	46	16	28

Table 8-1: Results of the Rum River Southeast Watershed (continued)

10-Year and 100-Year Critical Storm Events (TP 40)

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
JF	5	3.6	26	8	15
JF	6	7.7	20	14	27
JF	7	4.5	44	11	20
JF	8	5.9	20	10	21
MAIN	1	1.5	90	8	12
MAIN	2	3.5	90	14	21
MAIN	3	1.8	90	8	12
MAIN	4	4.3	90	16	25
MAIN	5	6.6	90	21	32
MAIN	6	2.1	68	7	11
MAIN	7	3.0	58	9	16
MAIN	8	5.4	90	19	30
MAIN	9	2.9	90	16	25
MAIN	10	4.3	90	18	27
MAIN	11	0.9	30	3	5
MAIN	12	0.9	47	3	6
MAIN	13	1.0	90	6	9
MAIN	14	0.9	90	5	8
MAIN	15	3.4	90	13	20
MAIN	16	3.7	59	13	22
MAIN	17	6.6	87	22	35
MAIN	18	4.7	71	15	24
MAIN	19	3.1	40	8	15
MAIN	20	2.9	22	6	12
MAIN	21	5.0	20	9	18
MAIN	22	4.1	20	9	18
MAIN	23	2.0	90	17	26
MAIN	24	2.7	82	12	19
MAIN	25	1.6	45	6	11
MAIN	26	5.7	76	18	28
MAIN	27	1.6	85	8	13
MAIN	28	2.5	67	10	17
MAIN	29	3.7	90	21	33
MMS	1	6.7	20	19	40
MMS	2	2.0	34	5	10
MMS	3	1.8	55	7	13
MMS	4	3.3	39	8	15
MMS	5	12.2	42	23	41

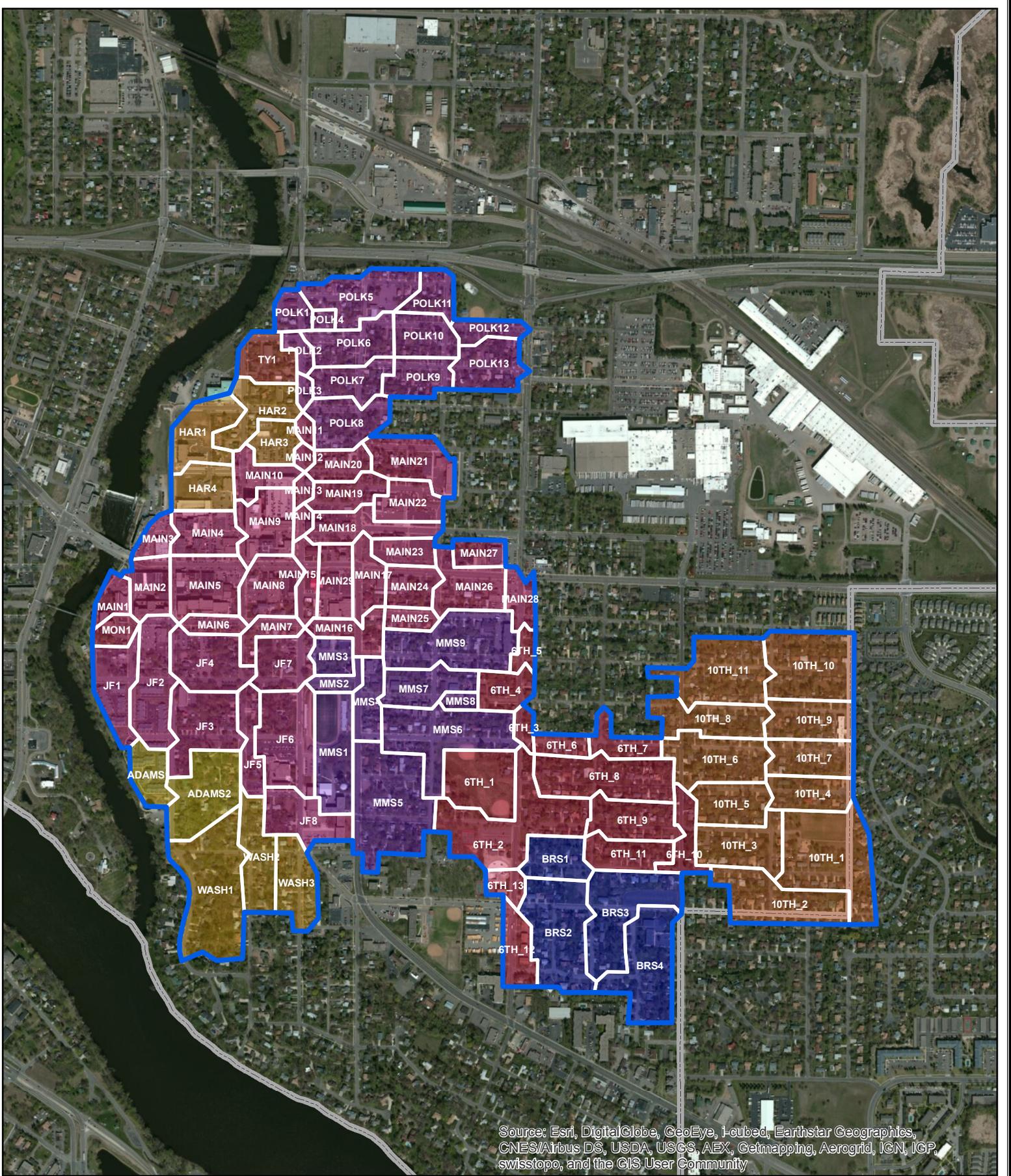
Table 8-1: Results of the Rum River Southeast Watershed (continued)**10-Year and 100-Year Critical Storm Events (TP 40)**

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
MMS	6	9.6	35	19	36
MMS	7	4.0	45	9	16
MMS	8	1.2	45	4	8
MMS	9	9.5	45	21	37
MON	1	1.8	68	8	13
POLK	1	2.3	46	12	22
POLK	2	1.5	38	5	8
POLK	3	1.0	31	3	6
POLK	4	1.0	20	3	6
POLK	5	7.3	23	15	29
POLK	6	4.4	20	8	15
POLK	7	4.0	20	9	18
POLK	8	4.9	20	8	16
POLK	9	4.0	20	7	14
POLK	10	3.8	20	7	14
POLK	11	4.3	20	8	15
POLK	12	2.7	24	7	14
POLK	13	4.5	25	11	23
TY	1	3.6	47	8	14
WASH	1	11.5	20	14	29
WASH	2	6.3	20	12	23
WASH	3	4.8	20	8	16

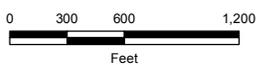
Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

Table 8-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for Rum River Southeast Watershed						
Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
6 TH _1	73.7	2.0	8.4	10.4	30	36"
BRS2	33.0	1.2	4.0	5.2	3	15"
10 TH _1	141.4	4.0	10.5	14.5	5	42"

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, I-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



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LEGEND

- | | | | |
|------------------------|-------|------|------|
| Major Watershed | 6TH | JF | POLK |
| Sub Watershed | ADAMS | MAIN | TY |
| Minor Watershed | BRS | MMS | WASH |
| 10TH | HAR | MON | |

FIGURE 8-1
**RUM RIVER SOUTH-
EAST WATERSHED**
CITY OF ANOKA

9.0 Rum River Southwest Watershed

9.1 General Watershed Description

Figure 9-1 shows the Rum River Southwest Watershed and its subwatersheds. This region is located south of U.S. 10 and west of the Rum River.

This watershed includes only a very small area and consists of single-family residential land use. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

9.1.1 Drainage Patterns

The Rum River Southwest Watershed flows east directly into the Rum River either via storm sewer or overland flow. The watershed follows the Highway 169 corridor; therefore the storm sewer network is predominately owned and maintained by Mn/DOT.

9.1.2 Flood Protection Concerns

The low point on Franklin Avenue where it intersects with the alley does not have any means of discharge according to the information provided. This could be an area of flooding and a pipe is necessary to direct flows away from the homes surrounding the low point. This is discussed in the following sections. The remainder of the watershed overflows to the river.

9.2 Stormwater System Analysis and Results

The 10-year and 100-year storm events were previously analyzed for the portions of the Rum River Southwest Watershed that are served by the city's storm sewer system. Table 9-1 presents watershed information and the peak runoff rates of the 10-year and 100-year analyses for each of the subwatersheds shown on Figure 9-1. There are no existing basins in this watershed.

9.3 Implementation Considerations

Existing and future drainage problems within the watershed can be resolved the construction of a new storm sewer. These are discussed in the following paragraphs.

9.3.1 Increased Storm Sewer Capacity Projects

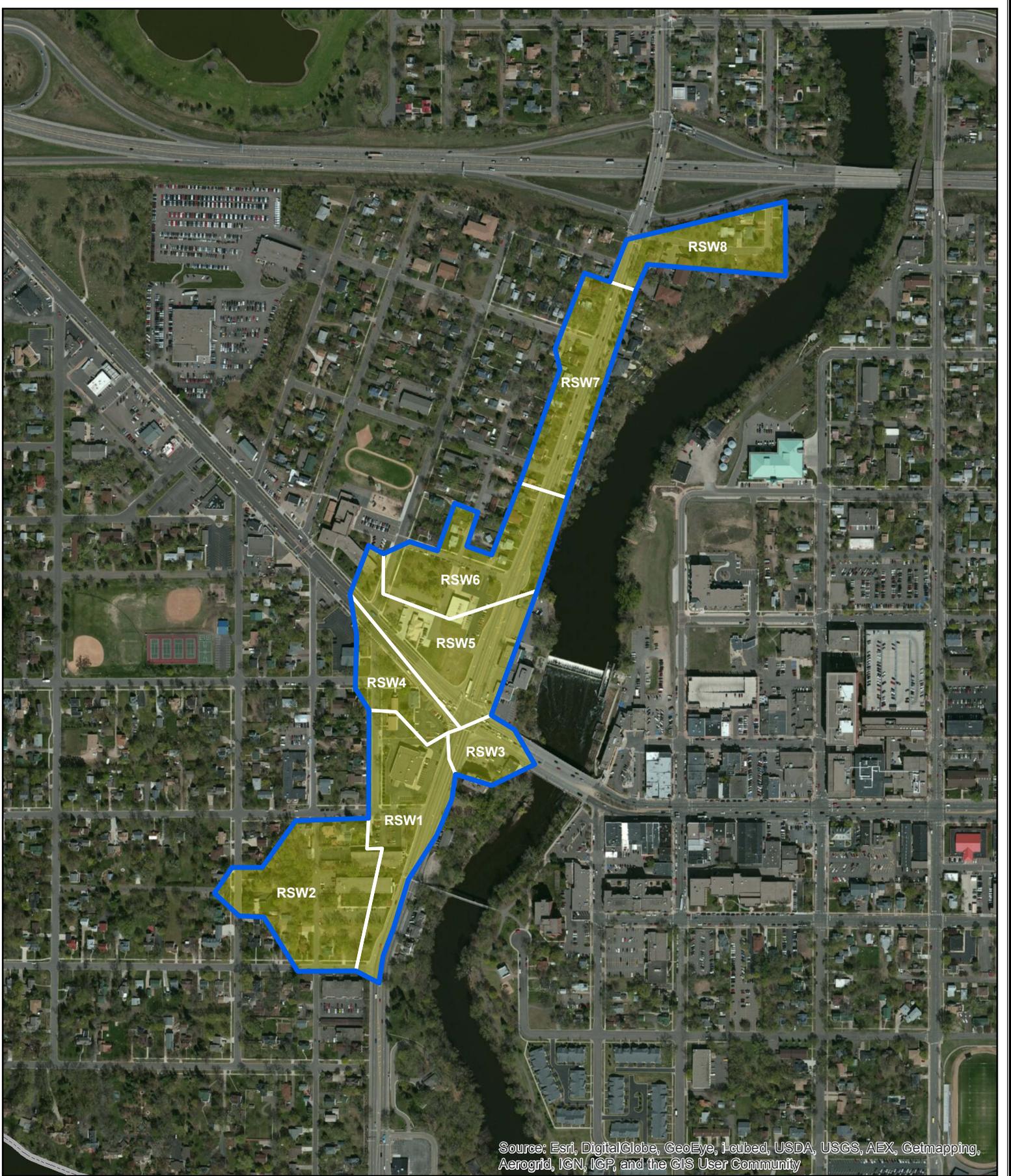
Previous analysis has indicated that the carrying capacity of the existing city storm sewer system needs to be increased on Franklin Avenue. The pipes will be analyzed in detail as the city prepares plans and specifications for street reconstruction projects within this watershed.

9.3.2 Construction of Water Quality Structures

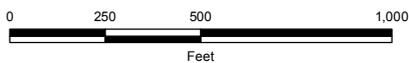
Most of the storm sewer network in this watershed is owned and maintained by Mn/DOT, and determination of water quality structures will be considered as projects are proposed.

Table 9-1: Results of the Rum River Southwest Watershed					
10-Year and 100-Year Critical Storm Events (TP 40)					
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
RSW	1	5.4	57	10	17
RSW	2	5.8	36	14	25
RSW	3	1.2	65	6	11
RSW	4	1.0	20	2	4
RSW	5	5.2	90	14	22
RSW	6	3.7	55	11	20
RSW	7	3.4	45	9	15
RSW	8	3.0	45	7	13

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, I-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



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Anderson**

LEGEND

-  Major Watershed
-  Sub Watershed
-  Minor Watershed
-  RSW

**FIGURE 9-1
RUM RIVER SOUTH-
WEST WATERSHED
CITY OF ANOKA**

10.0 U.S. Highway 169 and 10 Watershed

10.1 General Watershed Description

Figure 10-1 shows the U.S. Highway 169 and 10 minor watersheds and its subwatersheds. This region includes the areas tributary to the storm sewer network maintained by the state for Highway 169 and 10 which extends through the entire city from east to west. This watershed includes the golf course and cemeteries. General land uses in this watershed are varied, with a combination of commercial, open/agricultural, single family residential, and multiple family residential. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

10.1.1 Drainage Patterns

The U.S. Highway 169 and 10 watershed was previously analyzed only for the portions of storm sewer maintained by the City of Anoka. The state's system for the highway was not evaluated and assumed adequate. Flows at the discharge locations into the highway system are given, and the networks upstream of the discharge points were analyzed. U.S. Highway 169 and 10 watershed is made up of nine minor watersheds that are serviced by city storm sewer systems that discharge into the highway system. From east to west the minor watersheds are:

Fairoak Avenue, south of Hwy 10 (FOS)

Fairoak Avenue, north of Hwy 10 (FON)

Church Street (CH)

Golf Course (GC)

State Avenue (STA)

Branch Avenue (BRC)

Highway 169 (US169)

7th Avenue (7TH)

8th Avenue (8TH)

10.1.2 Flood Protection Concerns

This watershed also has low points that may lead to flooding during the 100-year storm event. The subwatersheds where this is a concern are FON3 (intersection of Verndale and Jerome Street) and STA7 (alley section south of Clay and east of Branch Avenue). These areas do not have an overland flow route for runoff exceeding the 10-year storm event. Pipes with 100-year capacity are necessary to direct flows away from the homes surrounding the low points.

10.2 Stormwater System Analysis and Results

The 10-year and 100-year storm events were previously analyzed for the portions of the U.S. Highway 169 and 10 Watershed that are served by the city's storm sewer system. Table 10-1 presents watershed information and the peak runoff rates of the 10-year and 100-year flood analyses for each of the subwatersheds shown on Figure 10-1.

10.3 Implementation Considerations

This region of the city requires several upgrades to the existing system as discussed below.

10.3.1 Increased Storm Sewer Capacity Projects

Pipe capacity needs to be increased in parts of this watershed to provide 10-year level of service for the city's storm sewer system. As shown on Figure B, storm sewer upgrades are proposed on Clay Street, State Avenue, Calhoun Street, Fairoak Street, Euclid Avenue, Pleasant Street, Wingfield Avenue, Branch Avenue, and Eighth Avenue. The pipes will be analyzed in detail as the city prepares plans and specifications for street reconstruction projects within this watershed.

10.3.2 Construction of Additional Stormwater Basins

The existing basins in this watershed will be sufficient if the necessary storage and outlet sizes are provided as given in Table 10-2. Further investigation of these basins is necessary to determine their actual storage capacity. Pond GC-1 is proposed to be expanded in 2015 in conjunction with the reconstruction of the streets to the east.

10.3.3 Construction of Water Quality Structures

As depicted in Figure A (in Appendix A), two water quality structures are proposed where the runoff receives no treatment prior to entering the highway system. Water quality structures will be designed to achieve an annual removal efficiency of 60% of the total phosphorus and 90% of the total suspended solids.

Table 10-1: Results of the U.S. Highway 169 and 10 Watershed

10-Year and 100-Year Critical Storm Events (TP 40)

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
7TH	1	8.6	34	12	23
7TH	2	8.2	32	15	27
7TH	3	3.3	34	8	16
7TH	4	5.3	45	18	28
7TH	5	4.1	24	8	16
7TH	6	4.6	27	10	19
7TH	7	2.0	20	5	11
7TH	8	2.0	20	5	10
7TH	9	6.3	52	17	29
7TH	10	1.0	61	5	8
8TH	1	9.8	34	15	29
8TH	2	4.8	40	10	18
8TH	3	1.5	57	5	9
8TH	4	12.2	41	18	34
8TH	5	3.2	20	6	11
8TH	6	4.5	20	9	17
8TH	7	9.3	20	14	27
8TH	8	2.0	20	4	9
BRC	1	4.3	20	5	85
BRC	2	6.8	41	17	30
BRC	3	5.1	20	9	42
BRC	4	6.9	65	26	43
BRC	5	5.2	18	5	11
BRC	6	4.2	45	9	16
CH	1	19.8	75	45	73
CH	2	19.4	7	24	53
CH	3	12.1	5	13	30
CH	4	5.9	61	14	24
CH	5	10.4	21	11	23
CH	6	4.5	20	8	16
FON	1	5.9	50	15	26
FON	2	6.6	51	14	24
FON	3	10.5	45	24	42
FON	4	5.5	23	9	18
FON	5	5.9	18	9	20
FON	6	10.8	33	40	79
FON	7	59.5	5	88	185

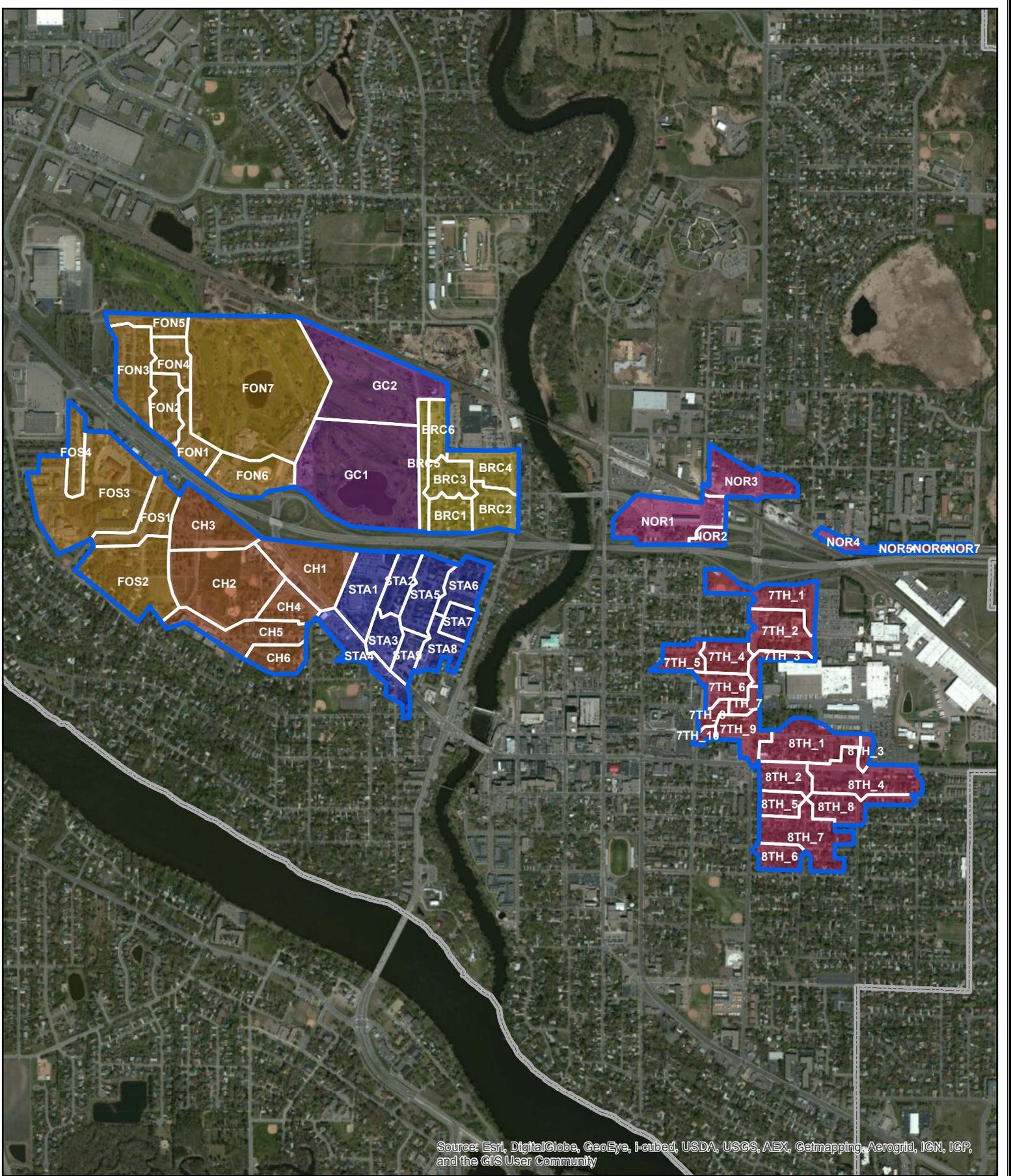
Table 10-1: Results of the U.S. Highway 169 and 10 Watershed					
10-Year and 100-Year Critical Storm Events (TP 40)					
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
FOS	1	4.7	39	11	20
FOS	2	16.4	13	24	51
FOS	3	27.9	53	56	95
FOS	4	3.5	20	5	9
GC	1	36.7	4	60	121
GC	2	25.7	5	76	188
STA	1	4.9	45	15	26
STA	2	10.3	86	30	47
STA	3	5.0	52	12	20
STA	4	9.2	75	22	35
STA	5	5.6	45	12	20
STA	6	6.1	45	13	23
STA	7	3.0	45	11	19
STA	8	5.1	45	15	25
STA	9	5.6	45	13	23
NOIR	1	13.8	61	28	47
NOIR	2	2.0	45	6	11
NOIR	3	8.3	58	20	33
NOIR	4	2.5	65	6	10
NOIR	5	1.4	45	5	8
NOIR	6	0.8	45	3	5
NOIR	7	1.2	45	4	7

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company

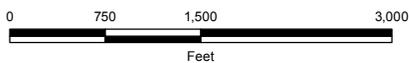
Table 10-2: Results of 100-Year Storm Event (TP 40) Basin Requirements for U.S. Highway 169 and 10 Watershed

Subwatershed	Drainage Area acres	Dead Storage acre-feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
GC1	148.7	6.0	24.0	30.0	20	44"
FOS3	30.1	3.1	4.4	7.5	14	30"
FON7	92.5	1.6	6.3	7.9	5	
<i>Proposed Ponds</i>						
8TH_1	54.2	1.2	8.0	9.2	5	
CH2	46.5	0.6	5.4	6.0	3	

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



LEGEND

- | | | | |
|-----------------|-------------------------|-----|-----|
| Major Watershed | Minor Watersheds | BRC | GC |
| Sub Watershed | 7TH | CH | NOR |
| | 8TH | FON | STA |

**FIGURE 10-1
US 169 AND US 10
WATERSHED
CITY OF ANOKA**

11.0 Coon Rapids Tributary Watershed

11.1 General Watershed Description

Figure 11-1 shows the Coon Rapids Tributary minor watersheds and subwatersheds. This watershed is comprised of the sections of Anoka which drain into the storm sewer network of the city of Coon Rapids. General land use in this watershed is single-family residential. This watershed has remained largely unchanged over the past 10 years, and therefore it was not necessary to remodel the entire watershed with this study.

11.1.1 Drainage Patterns

There are portions of Anoka which ultimately flow into Coon Rapids, but have storm sewer in the City of Anoka extending to the city border. These regions continue into the neighboring city and enter its network. These regions were evaluated only for the sections within Anoka city limits. Downstream of the city limits, the adequacy of the system is unknown. From north to south the subwatersheds are:

41st Street (41ST)

Bunker Lake Road (BL)

Coon Rapids (CR)

11.1.2 Flood Protection Concerns

This watershed consists of areas that either flow into a bordering basin or into the Coon Rapids storm sewer system. Capacity of the basin located within Coon Rapids must be evaluated for adequacy to determine if flooding is a valid concern for the structures within the area.

11.2 Stormwater System Analysis and Results

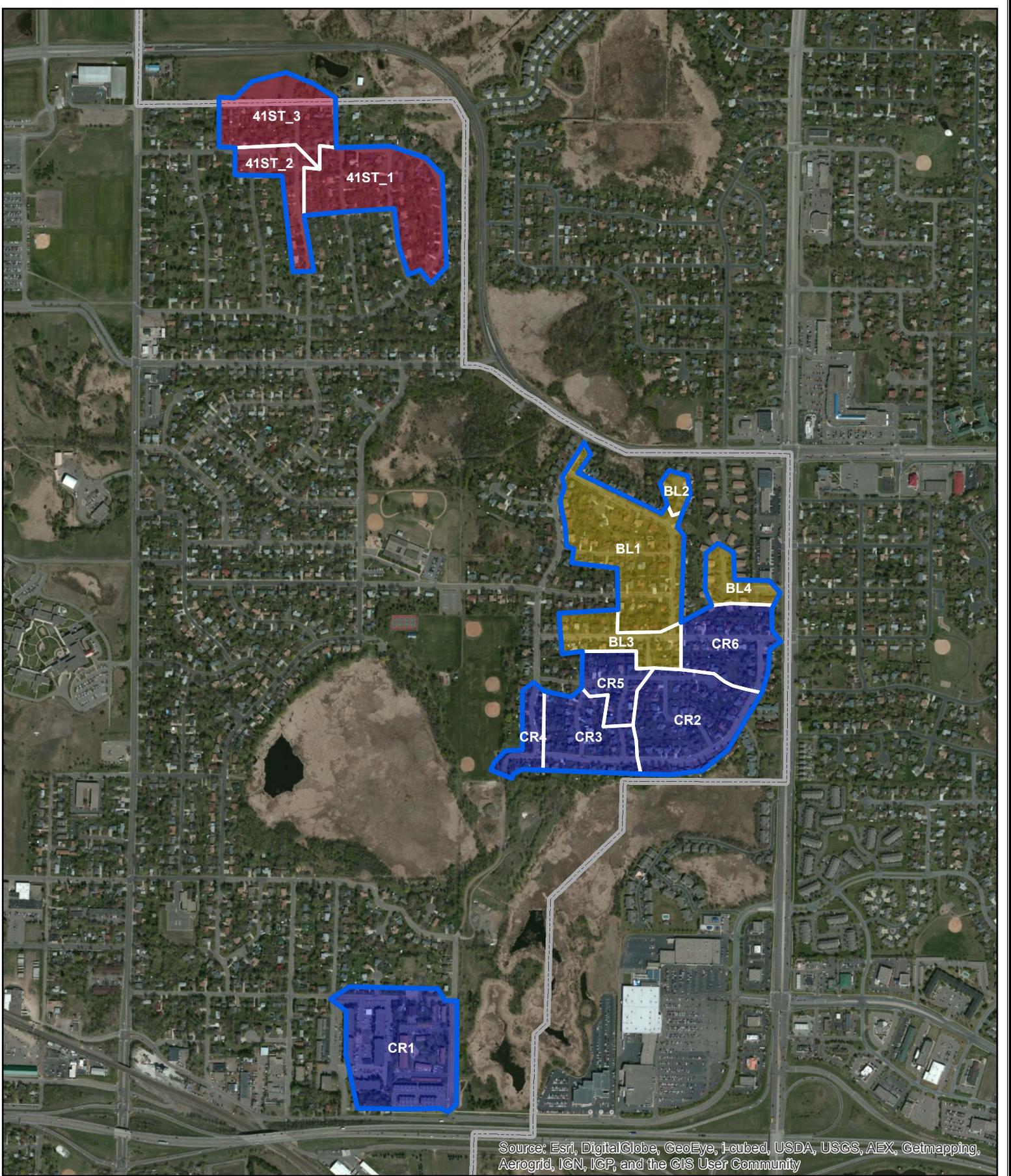
The 10-year and 100-year flood events were previously analyzed for the portions of the Coon Rapids Tributary Watershed that are served by the city's storm sewer system. Table 11-1 presents watershed information and the peak runoff rates of the 10-year and 100-year flood analyses for each of the subwatersheds shown on Figure 11-1.

11.3 Implementation Considerations

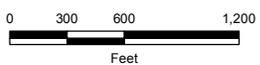
This region of the city provides sufficient storm sewer capacity to meet the 10-year level of service upstream of the Coon Rapids system.

Table 11-1: Results of the Coon Rapids Tributary Watershed					
10-Year and 100-Year Critical Storm Events (TP 40)					
Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
BL	1	18.6	20	22	45
BL	2	1.2	20	3	7
BL	3	7.1	20	9	18
BL	4	3.6	37	11	21
CR	1	20.4	40	25	46
CR	2	14.8	24	21	41
CR	3	9.7	20	19	38
CR	4	5.2	20	11	23
CR	5	5.9	20	12	25
CR	6	9.6	25	18	34
41ST	1	18.2	20	18	37
41ST	2	6.6	20	9	18
41ST	3	18.0	20	25	51

Source: City of Anoka Stormwater Plan, August 2000, Barr Engineering Company



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



LEGEND

- | | | |
|---|--|---|
|  Major Watershed |  Minor Watersheds |  BL |
|  Sub Watershed |  41ST |  CR |

**FIGURE 11-1
COON RAPIDS
TRIBUTARY
WATERSHED
CITY OF ANOKA**

12.1 General Watershed Description

Figure 12-1 shows the Rum River North Watershed and its 3 minor watersheds and subcatchments. This region includes the areas tributary to the storm sewer network maintained by Anoka County for CSAH 116 and a small portion of 7th Avenue. The watershed is bound by the Rum River on the West, the city limits to the North, 7th Avenue to the East and Anoka High School to the South.

This watershed includes the Rum River Library. General land uses in this watershed are varied, with a combination of single family residential, park and recreational, institutional and agriculture. The undeveloped portion of the watershed is guided for a shopping center.

12.2.1 Drainage Patterns

The Rum River North watershed was analyzed only for the portions of storm sewer maintained by the City of Anoka. The county's system for the county road was not evaluated and assumed adequate. The Rum River North Watershed flows west into the Rum River either via storm sewer or overland flow. This watershed has three existing stormwater basins which provide both quantity and quality control. Two of them are located in the single family residential development while the other is located on the library property. There are two existing stormwater outfalls that discharge directly to the Rum River. Because one of the outfalls belongs to the county's storm sewer system, only one outfall was modeled in this project. The outfall modeled for this project is for the Rum River Shores (RRS) single family development. The Anoka High School located immediately south of the watershed was not included in this analysis.

12.1.2 Flood Protection Concerns

There are no known problems in this watershed. The minor watersheds that directly outfall into the river will not have any flooding problems as it appears the overflow will drain to the river. Where the storm sewer capacity is not sufficient, surface overflow will occur via the streets or designed overflows to the lowest point within the watershed. The water reaching

the low points is conveyed via pipe to the Rum River.

12.2 Stormwater System Analysis and Results

The 10-year and 100-year events were analyzed for the Rum River North Watershed. Table 12-1 summarizes the peak runoff rates of the 10-year and 100-year analyses for each of the subcatchments shown on Figure 12-1.

12.3 Implementation Considerations

The city's existing storm sewer systems are adequate for this watershed. Upon development, it is assumed that three additional basins will be necessary. The necessary storage and outlet sizes were determined to provide adequate detention for the storm sewer network to function and are given in Table 12-2.

12.3.1 Construction of Water Quality Basins

Figure A shows the location of water quality basins that would greatly reduce the amount of suspended solids and phosphorous load to the Rum River. These new basins are necessary when the property east of 6th Avenue and west of 7th Avenue is developed. Table 12-2 lists the necessary "dead storage" required to achieve an annual removal efficiency of 60% of the total phosphorous and 90% of the total suspended solids. The basins will provide sufficient water quality treatment if the necessary "dead storage" volume as shown in Table 12-2 is provided.

Table 12-1: Results of the Rum River North Watershed

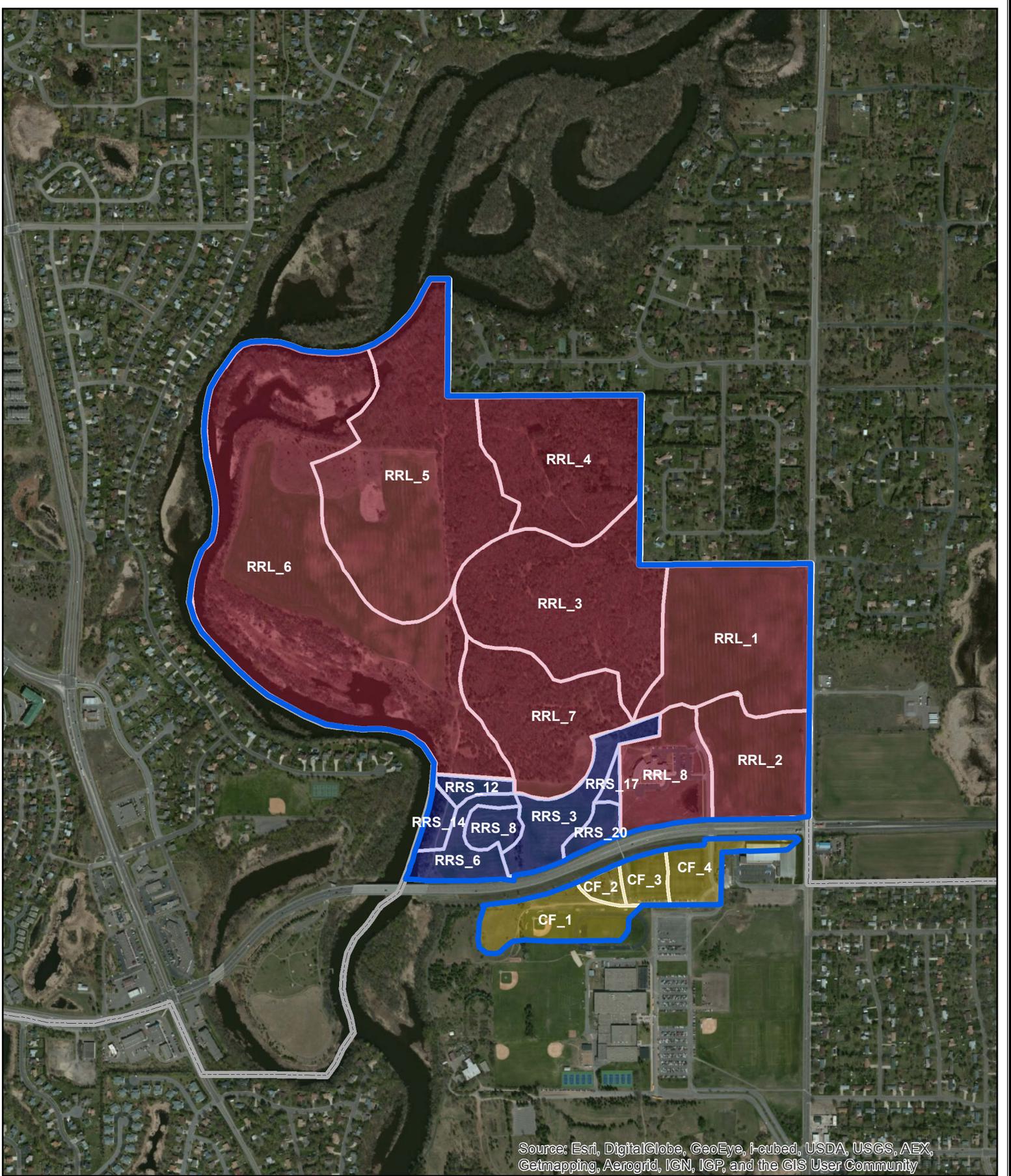
10-Year and 100-Year Critical Storm Events (TP 40)

Minor Watershed	Subwatershed	Drainage Area (acres)	Impervious Percentage	Peak Runoff Rate (cfs) 10-yr storm	Peak Runoff Rate (cfs) 100 yr storm
CF	1	2.3	4	1	1
CF	2	0.9	16	1	1
CF	3	2.6	12	1	2
CF	4	1.9	27	2	4
RRL	1	30.9	82	142	264
RRL	2	13.6	85	69	126
RRL	3	37.6	0	2	27
RRL	4	36.2	0	1	59
RRL	5	29.0	0	41	135
RRL	6	69.0	0	84	338
RRL	7	26.4	2	1	48
RRL	8	14.3	36	27	77
RRS	3	8.6	38	9	22
RRS	6	7.1	25	6	15
RS	8	2.8	38	2	6
RRS	12	1.6	8	1	2
RRS	14	0.9	11	1	3
RRS	17	1.2	14	1	2
RRS	20	1.2	11	1	2

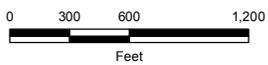
Table 12-2: Results of 100 Year Storm Event (TP 40) Basin Requirements for Rum River North Watershed

Subwatershed	Drainage Area acres	Dead Storage acre- feet	Live Storage acre-ft	Total Storage acre-ft	100yr Discharge cfs	Outlet Size
<i>Existing Basins with Improvements</i>						
RRL8	27.9	3.1	3.8	6.9	6	15"
RRS3	15.5	2.1	1.4	3.5	2	12"
RRS6	12.4	0.6	0.5	1.1	5	12"
<i>Proposed Ponds</i>						
RRL8-INF*	0	2.0	1.3	3.3	8	18"
RRL1	30.9	4.2	6.0	10.2	17	
RRL1-INF*	0	1.0	3.7	4.7	2	

* Note: Drainage area is listed as zero (0) acres as proposed infiltration basins are second device in treatment train and they received treated stormwater from upstream NURP Ponds with no additional contributing drainage area.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community



Hakanson
Anderson

LEGEND

- Major Watershed
- Sub Watershed
- RRL
- RRS
- CF

**FIGURE 12-1
RUM RIVER NORTH
WATERSHED
CITY OF ANOKA**

This section presents the goals and policies developed for the management of water resources within Anoka. Goals and policies are provided for new development and redevelopment, linear projects, flood protection, wetlands, water quality, flood plain and shoreland management, recreation, open space and wildlife management, groundwater protection, erosion and sedimentation control, public education and outreach, and illicit discharge detection and elimination. Goals propose the desired end and policies provide the means to achieve the goals. Section 14.0 provides more specific detail on how the goals and policies will be implemented.

13.1 New Development and Redevelopment

Goal: Manage new development and re-development activities to prevent / reduce flooding and achieve non-degradation of surface waters.

Policy: For new development projects with land disturbances greater than or equal to one acre, there shall be no net increase from pre-project conditions (on an average annual basis) of:

1. Stormwater discharge volume, unless precluded by site limitations
2. Stormwater discharges of Total Suspended Solids (TSS)
3. Stormwater discharges of Total Phosphorous (TP)

Policy: For redevelopment projects with land disturbances greater than or equal to one acre, there shall be a net decrease from pre-project conditions (on an average annual basis) of:

1. Stormwater discharge volume, unless precluded by site limitations.
2. Stormwater discharges of Total Suspended Solids (TSS).
3. Stormwater discharges of Total Phosphorous (TP).

Policy: Per LRRWMO requirements, a volume equal to one inch of runoff from all impervious surfaces shall be infiltrated on-site. In cases of redevelopment, this volume control requirement applies only if greater than 50% of the project area is disturbed.

Policy: For new development and redevelopment projects that disturb more than 10,000 square feet but less than one acre, the following requirements shall be enforced:

1. There shall be no net increase from pre-project conditions (on an average annual basis) of stormwater discharge volume, unless precluded by site limitations
2. There shall be no net increase in peak runoff rates for the 2-year, 10-year, and 100 year return frequency storm events.

Policy: Promote ground water recharge in areas without site limitations.

Policy: Consistent with Minnesota Rules 7050.0180, no person may cause or allow a new or expanded discharge to the Rum River unless there is not a prudent and feasible alternative because of its classification as an Outstanding Resource Value Water. Determinations about discharges that may or may not impact the Rum River are made by the MPCA and shall be addressed through the MPCA's regulatory process.

Policy: Facilitate LRRWMO review of all projects requiring a LRRWMO permit.

13.2 Linear Projects

Goal: Maintain existing runoff volume and rate characteristics unless mitigation measures are utilized to ensure no downstream impacts.

Goal: Upgrade storm sewer to provide capacity for 10 year return frequency.

Policy: Implement volume reduction strategies for new impervious surfaces such that the new surfaces cause no increase on an average annual basis of runoff volume.

Policy: Replace storm sewer that does not provide capacity for the 10 year return frequency storm event as streets are re-constructed.

Policy: Anoka will consider retrofits on existing systems prior to discharging to a surface water in areas where no treatment currently exists.

13.3 Flood Protection

Goal: Provide flood protection for the 100-year return frequency event.

Policy: The lowest floor elevation for all structures, including basements, must be at least 3 feet above the highest anticipated ground water table, 2 feet above the designated or designed 100-year flood elevation, or 1 foot above the emergency overflow, whichever is higher as per LRRWMO requirements.

Policy: Flood levels in landlocked basis shall be determined as per LRRWMO standards.

Policy: Promote the preservation and retention capacities of wetlands, streams, rivers, other conveyances and floodplain areas.

Policy: Provide a positive overflow for stormwater ponds and wetlands to the maximum extent practicable.

Policy: Trunk storm drainage systems that serve as the outlet for areas where flooding of structures or where significant flood damage is likely to occur will typically be designed to meet freeboard protection standards for the critical duration 1 percent chance flood. The design shall be based on a hydrograph method for appropriate rainfall and snowmelt events. The design shall be based on proposed ultimate land use. The design shall consider potential flood, wetland, and water quality impacts to upstream and downstream areas.

13.4 Water Quality

Goal: Manage activities within the city such that there is no net increase in sediment and nutrient loading.

Policy: Infiltration of stormwater shall be required prior to discharging stormwater to a lake, stream, or wetland and prior to discharge from the site.

Policy: Facilities shall be designed to provide annual removal efficiencies of 60% of total phosphorous and 90% of total suspended solids.

Policy: Require skimmer structures to prevent floatable materials and debris from entering surface waters.

Policy: Continue to implement a city wide street sweeping program to capture the sediment prior to entering conveyance systems.

Policy: Implement an Erosion and Sediment Control inspections program to ensure that sites are controlling erosion and sediment to the Maximum Extent Practicable.

Policy: Cooperate with the LRRWMO in water quality monitoring, modeling and planning to protect water resources.

Policy: Implement Projects identified in the City of Anoka Stormwater Retrofit Analysis, which is included as Appendix C, when possible.

13.5 Erosion and Sediment Control

Goal: Prevent sediment from entering the storm water conveyance systems and surface waters to the Maximum Extent Practicable.

Policy: Require development and redevelopment to implement construction site erosion and sediment control practices to minimize erosion and trap sediment.

Policy: Implement an Erosion and Sediment Control inspection program as required by the city's MS4 permit.

13.6 Wetland Protection

Goal: Manage activities adjacent and tributary to wetlands to maintain their function and value.

Policy: The city will require that a field wetland delineation and report detailing the findings of the delineation shall be submitted prior to development activities. Wetland delineations shall be conducted using methodology approved by the MN Wetland Conservation Act (1987 US Army Corps of Engineers Wetland Delineation Manual, along with any regional supplements, or other methodology approved by WCA in the future).

Policy: The city will continue to cooperate with the LRRWMO in administering the Wetland Conservation Act to ensure no net loss of functions and values.

Policy: Areas within 16.5 feet of a wetland boundary must be protected from land grading and other disturbances by a temporary wetland buffer during construction.

Policy: The city will require, through future development proposals, that a permanent upland wetland buffer 16.5 feet in width from the wetland edge be provided. The buffer shall not be

mowed or fertilized and the construction of structures, retaining walls, and septic systems shall be prohibited within the buffer, consistent with LRRWMO requirements.

Policy: The city will require the permanent wetland buffer to be within a drainage and utility easement.

Policy: A performance surety shall be collected to ensure the proper execution of wetland protection measures.

Policy: The city requires that stormwater runoff be pre-treated prior to discharge to wetlands for new development proposals. Stormwater discharge must comply with LRRWMO standards.

Policy: Consider retrofits in existing systems to provide pre-treatment prior to discharging to wetlands where no treatment currently exists for redevelopment projects.

13.7 Floodplain Management

Goal: Manage activities within the floodplain in accordance with the city's ordinance and state and federal regulations.

Policy: The city shall prohibit encroachment into the floodway that will reduce storage capacity unless the storage volume is mitigated.

Policy: The city shall manage the land use within the 100-year flood level as designated by this plan or the National Flood Insurance Program Flood Insurance Rate Maps (FIRM).

13.8 Shoreland Management

Goal: Manage activities within the shoreland districts to preserve the functions and values of the resource.

Policy: The city will manage activities within the shoreland overlay district in accordance with the city ordinances.

13.9 Recreation, Open Space and Wildlife Management

Goal: Protect and restore natural areas for recreation and wildlife habitat.

Policy: The city shall seek opportunities for integration of recreation open space and wildlife management facilities in conjunction with possible future water resource capital improvement projects.

Policy: The city shall encourage protection and/or preservation of wetlands and uplands that provide habitat for game fish spawning and wildlife, especially in the residential development areas.

13.10 Groundwater Protection

Goal: Manage surface water in a manner that prevents contamination in groundwater and promotes groundwater recharge.

Policy: The evaluation and control of development in groundwater recharge areas shall be protected from potential sources of contamination in accordance with Minnesota Statutes section 103H.001 and the city ordinances.

Policy: The disposal of any solid or liquid wastes shall be controlled as necessary to ensure that the underground waters of the watershed are maintained within the range of natural background quality.

Policy: Cooperate with the Anoka County Health Department in ensuring that abandoned wells are properly sealed according to the Minnesota Department of Health Well Code.

13.11 Maintenance of Stormwater Systems

Goal: Maintain the design capacity and treatment effectiveness of stormwater conveyances and BMP's through inspections and maintenance.

Policy: The city shall maintain public water quality structures, sedimentation ponds and regional detention basins.

Policy: Maintain, clean, and replace storm drainage systems as needed to preserve the initial design capacity.

Policy: For privately owned stormwater ponds, basins and treatment structures; require a maintenance agreement that is recorded against the property.

13.12 Public Education and Outreach and Public Participation

Goal: Educate the public about the impacts of stormwater discharges on receiving waters.

Policy: Implement the public education and outreach strategies outlined in the city's SWPPP.

Policy: Implement the public participation strategies outlined in the city's SWPPP.

13.13 Illicit Discharge Detection and Elimination

Goal: Eliminate or reduce illicit discharges into surface waters to the maximum extent practicable.

Policy: Implement and enforce the illicit discharge detection and elimination strategies outlined in the city's SWPPP.

Policy: Provide training opportunities to city employees to prevent or reduce pollutant runoff from municipal operations.

13.14 Stormwater Pollution Prevention Program

Goal: Continue to develop, implement and enforce a storm water pollution prevention program to reduce the discharge of pollutants to the Maximum Extent Practicable.

Policy: Develop a program which meets or exceeds the requirements as stated in the MPCA's General MS4 Permit.

Policy: Regional detention areas receiving runoff from more than one acre of surface area will comply with MS4 requirements.

To uphold the goals and policies of this Plan, the city will review all proposed developments and improvements. Approvals for BMPs relating to water quality, wetland protection, and erosion and sediment control and rate control will be required.

The city has established the following regulatory controls and criteria relating to its policies. These controls and criteria apply to the management of: wetlands, floodplains, shorelands, water quantity and quality, groundwater, soil erosion and sedimentation control and recreation, open space and wildlife and municipal operations. While these controls and criteria relate to one of the policy areas, it should be noted that they are interrelated and may serve multiple purposes.

The criteria, as a minimum, establish the degree of performance necessary to achieve improvements in water quantity and quality management. These criteria are not intended to dictate or preempt the design process, but rather provide a guide to proper development.

14.1 LRRWMO Permit Program

The city will require that all projects that disturb more than one acre of surface area, or propose wetland impacts that meet the requirements of the WCA, obtain a permit from the LRRWMO unless eligible for an exemption. If necessary, the city will enforce the permit requirements through its ordinances and mechanisms.

14.2 Water Quantity and Quality Management

The water quantity and quality management strategies are guided by requiring all projects, including redevelopment, disturbing 10,000 square feet or more to adhere to this Plan's policies and criteria for the control of surface runoff. This includes a disturbance to the land that results in a change in the topography, existing soil cover (both vegetative and non vegetative), or the existing soil topography that may result in accelerated stormwater runoff, leading to soil erosion and movement of sediment into surface waters or drainage systems. Examples of construction activity may include clearing, grading, filling and excavating.

The following order preference for stormwater quantity and quality management techniques shall be followed:

- 1st - Better site design (as defined in the Minnesota Stormwater Manual)
- 2nd - Infiltration
- 3rd - Biofiltration, filtration, wetland treatment systems, extended detention basins, or NURP ponds (in no particular order of preference)
- 4th - Hydrodynamic Separators

It is expected that a combination of techniques, used in series, will be necessary. The design of stormwater BMPs, including infiltration basins, shall be in accordance with the MN Stormwater Manual and the standards as described herein. Hydrodynamic separators will be considered when a storm water basin is not feasible. During the design and selection of hydrodynamic separators, the designer shall estimate removal efficiencies by the use of a model, such as SHSAM developed by Barr Engineering, or other similar studies or reports.

14.3 Volume Control

For all projects that disturb or alter one acre or more, including common plans of development that disturb or alter one acre or more, a volume equal to one inch of runoff from all impervious surfaces shall be retained on the site through infiltration or other volume reduction BMPs as approved by the city. In cases of redevelopment, this volume control requirement only applies if >50% of the project area is disturbed.

14.3.1 Infiltration Basin Design and Construction

Infiltration basin design and construction shall be in accordance with the MN Stormwater Manual Chapter 12-INF, Volume 2 as amended. Construction of an approved pre-treatment device or BMP shall be required prior to discharging stormwater into the infiltration basin.

Soil borings shall be conducted on the site to determine soil types, groundwater elevations, seasonally high water table elevations, and impeding layers. Infiltration rates shall be per Table 14.3.1 below or as published in the most current version of the MN Stormwater Manual, or measured on-site with a double ring infiltrometer at the elevation of the proposed BMP and adjusted appropriately to account for sediment accumulation. A maximum infiltration rate of 3 in/hr is allowed.

Table 14.1 Infiltration Rates for Hydrologic Soil Groups

Hydrologic Soil Group	Soil Textures	Corresponding Unified Soil Classification	Infiltration Rate (in/hr)
A	Gravel, sand, sandy gravel, silty gravel, loamy sand, sandy loam	GW – Well graded gravel or well-graded gravel with sand GP – Poorly graded gravel or poorly graded gravel with sand GM – Silty gravel or silty gravel with sand SW – Well graded sand or well graded sand with gravel	1.63
		SP – Poorly graded sand or poorly graded sand with gravel	0.8
B	Loam, silt loam	SM – Silty sand or silty sand with gravel	0.45
		MH – Micaceous silts, diatomaceous silts	0.3
C	Sandy clay loam	ML – Silts, very fine sands, silty or clayey fine sands	0.2
D	Clay, clay loam, silty clay loam, sandy clay, silty clay	GC – clayey gravels, clayey sandy gravels SC – clayey sands, clayey gravelly sands CL – Low plasticity clays, sandy or silty clays OL – Organic silts and clays CH – Fat clay or fat clay with sand or gravel or gravelly fat clay OH – Organic silts and clays	0.06

14.3.2 Infiltration in Drinking Water Supply Management Area (DWSMA)

Infiltration may not be suitable within a Drinking Water Supply Management Area due to elevated risk of groundwater contamination. The site designer shall verify DWSMA boundaries for each site. DWSMA boundaries are available from the Minnesota Department of Health (<http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm>). Projects within a DWSMA should refer to Minnesota Department of Health guidance entitled “Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas” (<http://www.health.state.mn.us/divs/eh/water/swp/stormwater.pdf>) to determine if infiltration techniques are appropriate.

14.3.3 Sites with Other Restrictions for Infiltration

Infiltration may also be infeasible or inappropriate for sites in the following cases:

- Physical limitations including soils or insufficient separation to the seasonally high water table
- Physical limitations of space in the case of redevelopment
- Stormwater discharges from potential stormwater hotspots, such as fueling stations, vehicle service or washing areas, vehicle fleet storage areas, auto recycling or salvage, stockpiled snow from salted roadways, construction site inputs, manufacturing sites, public works storage areas, facilities that generate or store hazardous waste materials, and others determined by the city or LRRWMO.
- Conflicts with underground utilities
- Sites with contaminated soils

14.3.4 Exceptions to On-Site Infiltration

In the cases where infiltration is infeasible or inappropriate due to the circumstances as described above, the required volume shall be treated as per the following techniques, in order of preference:

1. On site infiltration of the entire, or a portion of the required volume, in combination with methods 3, 4 or 5 as described below.
2. On site filtration of the required volume or off site infiltration of the required volume at another project site within the boundaries of the LRRWMO.

3. Other non-volume control treatment on site.
4. Contribution to a stormwater impact fund held by the LRRWMO. This fund is used for projects that offset the volume reduction that permitted projects were unable to achieve. Such projects may occur throughout the LRRWMO, but funds are favored in the city where they originated. The LRRWMO determines the contribution amount necessary per acre of impervious surface.
5. Infiltration credits from the City of Anoka may be available for purchase. Applicants would need to verify with the City of Anoka engineering department regarding credit availability. At the time of this publication, the City had an excess of 2,838 cubic feet of excess infiltration volume. The Summary of Infiltration Credits is included on Table D.1 in Appendix D.

14.4 Wet Sedimentation Basins

In situations where wet sedimentation is allowed, permanent pool volume shall be provided which is equal to or greater than the volume of stormwater runoff from a 2.5 inch storm over the entire contributing area. Facilities shall be designed to provide annual removal efficiencies of 60% of total phosphorous and 90% of total suspended solids. The permanent pool average depth shall be greater than 3 feet, with a maximum depth of 10 feet.

14.5 Peak Flow Rate Control

Post-development peak runoff rates shall not exceed the existing rates for the 2-year, 10-year, and 100 year return frequency storm events. In determining the existing condition in the case of redevelopment, the city may consider the condition immediately prior to the start of construction as well as the condition in the year 1984, which is the year that the Rum River was listed as an Outstanding Resource Value Water in Minn. R. 7050.0470.

14.6 Flood Protection

Consistent with state and federal regulations, Anoka requires that the level of flood protection along all ditches, detention basins, streams and wetlands be established based upon the 1 percent (100-year frequency) storm event utilizing NOAA Atlas 14, Volume 8 precipitation amounts. Land use within floodplains shall be regulated in accordance with city ordinances and state floodplain zoning regulations. The following freeboard values are required for the City of Anoka:

- Landlocked Basins (no outlet) 2.0 feet (Established high water)
- Non-Landlocked Basins 2.0 feet (100-year frequency)

14.7 Storm Sewer Design

Generally speaking, storm sewer shall be designed for the 10-year return frequency event. The designer shall evaluate overflow elevations to ensure flood protection standards are met for larger storms. In some circumstances, when there is not an overland overflow location, it may be necessary to design for a larger storm, such as the 100-year return frequency event.

14.8 Water Quality Monitoring Program

The city will continue to cooperate with the LRRWMO for matters including water quality monitoring, modeling, and planning to protect priority resources. The LRRWMO in cooperation with the Anoka Conservation District will continue to monitor water quality.

14.9 Floodplains and Shoreland Management

Various levels of government are involved in regulation of surface water, wetlands and floodplain. As previously discussed, the MnDNR has inventoried and classified water bodies and wetlands in the State of Minnesota. The “protected waters and wetlands” program identifies water bodies and wetlands that require DNR permits for activities like draining, filling, dredging, and diverting of water. The MnDNR Shoreland Management Program has also established a classification system for lakes greater than 10 acres in size and rivers with a drainage area two square miles or greater. Floodplain and shoreland areas are governed by the city’s Shoreland

and Floodplain Ordinances, which regulate activities adjacent to water bodies classified by the Minnesota DNR.

14.10 Recreation, Open Space and Wildlife Management

Through development review the city shall encourage protection and/or preservation of wetlands and uplands that provide habitat for fish and wildlife.

14.11 Groundwater Management

The City of Anoka contains natural characteristics that result in moderate to very high sensitivity for groundwater contamination. Infiltration practices and other structural BMPs in Drinking Water Supply Management Areas (DWSMA) will be evaluated as per the Minnesota Department of Health's guidelines entitled "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas". The DWSMA's Vulnerability, as per the Minnesota Department of Health, is depicted in Figure 2-4.

14.12 Well Abandonment

The city will develop, in cooperation with the Anoka Conservation District and Anoka County Extension, an education program relating to land use control practices and proper well abandonment procedures in accordance with Minn. Rules 4725.2700.

14.13 Anoka Dam

The City of Anoka has been the sole owner of the Anoka Dam located on the Rum River since 1935. The City of Anoka will continue to perform all regular inspections, maintenance and repairs as necessary.

14.14 Wetland Protection

Wetland protection standards, as discussed in Section 13.11, shall be applicable for all projects that disturb/alter one acre or more of land, or are part of a common plan of development or sale that disturbs/alters one acre or more of land. The following activities are exempt:

- Road reconstruction
- Utility construction/reconstruction within the road right-of-way and utility easement

- Agricultural operations > 300 feet from the Rum River and not creating impervious area
- Gardens
- Pole setting
- Emergency activities immediately necessary for the protection of life, property, or natural resources
- In circumstances in which the LRRWMO board determines that the proposed project is not likely to impair attainment of the purpose and intent of the wetland management standards

Projects exempt from wetland protection standards must still comply with any applicable local, state, or federal requirements. The LRRWMO is the local governmental unit (LGU) administering the requirements of the Wetland Conservation Act (WCA) in the City of Anoka.

14.15 Soil Erosion and Sediment Control

Although development and redevelopment is moderate within the City of Anoka, the control of erosion and sedimentation remains important to maintaining water quality in the area. Of paramount importance to the maintenance of water quality in the city is the proper enforcement of erosion and sediment controls. Enforcement will involve indirect and direct approaches.

14.15.1 Indirect Approach

The indirect approach includes incentives within the ordinance such as the requirement for a performance bond equal to the work to be performed and civil penalties.

14.15.2 Direct Approach

The direct approach involves the inspection and enforcement of the sediment control elements in the Plan to ensure compliance with the principles and standards. The inspection and enforcement will be undertaken by the city or its representative.

14.15.3 Erosion and Sediment Control Plans & SWPPPs

For applicable land disturbance activities, the applicant shall prepare and implement an erosion and sediment control plan and Storm Water Pollution Prevention Plan (SWPPP). The plans shall include the necessary erosion and sediment control practices, implementation schedule and other necessary items to conform to the General Stormwater Permit for Construction Activity (MN R100001) and city ordinances.

14.16 Implementation Program

Table 14.2 below presents the City of Anoka’s Implementation Program. The table includes the planned year of the activity and budgeted cost for each item, as well as a total for the five year period. The City of Anoka generally replaces storm sewer infrastructure and constructs water quality BMPs in conjunction with its street renewal program.

Table 14.2 City of Anoka Implementation Program

Description	2019	2020	2021	2022	2023	2019-2023 Total
2019 SSIP Infiltration Trench	\$15,000	-	-	-	-	\$15,000
2019 SRP Infiltration Trench on South Street	\$25,000	-	-	-	-	\$25,000
2020 SSIP Rain Gardens	-	\$50,000	-	-	-	\$50,000
Mississippi River Bank Stabilization	\$200,000	\$300,000	\$350,000	-	-	\$850,000
Outfall Repairs, Planning and Stabilization	\$10,000	\$95,000	-	-	-	\$105,000
Expand Pond GRT-1	-	\$150,000	-	-	-	\$150,000
Trunk storm sewer Improvements	\$40,000	\$250,000	\$150,000	-	-	\$440,000
Trunk Hwy 10 Pond and Infiltration Basin Construction	-	-	-	\$200,000	\$200,000	\$400,000
Drainage Enhancement at Pond CH 2	-	-	-	-	\$70,000	\$70,000
Survey ponds to determine treatment effectiveness	-	-	\$10,000	\$5,000	-	\$15,000
Inspection of Outfalls ponds, and water quality structures	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
Educational Program, Newsletter and Website	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$25,000
Establish No Wake Zone on Mississippi River and Implementation	\$5,000	\$5,000	\$3,000	\$3,000	\$3,000	\$19,000

Description	2019	2020	2021	2022	2023	2019-2023 Total
Street Sweeping	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$50,000
General stormwater maintenance and repairs	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$200,000
General storm sewer and catch basin repairs	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	\$100,000
Construction Site Erosion and Sediment Control Implementation	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$40,000
Post Construction Stormwater Management and Implementation	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000
Illicit Discharge Implementation	\$6,000	\$6,000	\$6,000	\$6,000	\$6,000	\$30,000

14.17 Funding Sources

The City of Anoka will fund the plans and programs herein primarily through use of its stormwater utility fund. If appropriate, the city may also consider grant monies that may be available from various other agencies, including the MPCA, the MnDNR, and BWSR and may partner with the LRRWMO to obtain the funds. Certain activities, such as construction site erosion control and post construction stormwater, may be funded by developer escrows. Improvements and BMPs on private property as a result of development and/or redevelopment will be funded by developers.

15.0 Technical Methods and Assumptions

15.1 General Overview

The need for stormwater modeling has increased as new construction changes the usage of the surrounding land. For example, replacing a stand of trees with a parking lot has a dramatic effect on runoff, greatly increasing its total volume and the rate of runoff. The potential for erosion and flooding is increased in areas downstream of construction. To prevent such damage, the runoff must be predicted before construction so that suitable steps can be taken to handle the runoff in a safe and effective manner.

HydroCAD, a hydrologic computer modeling program, was used for the watersheds modeled in this management plan. The three watersheds that were modeled are as follows: Mississippi River East Watershed, Mississippi River West Watershed, and Rum River North Watershed. Hydraulic evaluations of pipes, ditches, and other structures were performed using standard engineering procedures. The Flood Insurance Study for the Rum River and the Mississippi River was adopted by this plan and was not restudied.

To determine the critical flood levels for each subwatershed, runoff volumes from pervious and impervious areas were determined for the 24-hour, 100-year storm event.

The remaining seven watersheds which were previously modeled in detail in 2000, were not remodeled. The methodology for the seven watersheds previously modeled is discussed in Section 13.0 of the City of Anoka Stormwater Plan, August 2000, by Barr Engineering Company.

15.2 Hydrologic Model (HydroCAD)

Stormwater modeling and drainage design techniques can be divided into two basic groups:

- 1) Steady-state (constant flow) methods, such as the Rational Method as applied to storm sewer pipe networks.
- 2) Hydrograph generation and routing procedures designed to simulate the time varying nature of actual runoff.

Although HydroCAD can be used for steady-state designs, it is designed primarily as a hydrograph generation and routing program. It is based primarily on hydrology techniques developed by the Soil Conservation Service (SCS) combined with standard hydraulic calculations. For any given storm these techniques are used to generate hydrographs throughout a watershed.

15.2.1 Runoff Volumes

The volume and rate of runoff from a subwatershed are affected by the runoff curve number (CN), soil group classification and antecedent soil moisture condition.

The soil group classification used for this study is Group B. Soil Group B contains shallow, sandy loams. The antecedent soil moisture condition (AMC) is a measure of how much rain falls five days before a 24-hour storm. For this study, AMC II was used. The total 5 day antecedent rainfall, for AMC II, is 0.5-1.1" during the dormant season and 1.4 – 2.1" during the growing season. From this information a CN, which indicates the percentage of runoff from a subwatershed, can be determined. For this study, the CN's range from 69-100. With the CN and the rainfall distribution and duration information, the runoff from each subwatershed can be determined using the SCS TR-20 method.

15.2.2 Rainfall Distribution and Duration

Design storm characteristics must be determined for the model. This requires determining both the amount of precipitation and the intensity distribution of the precipitation. Atlas 14, Volume 8 as published by the National Oceanic and Atmospheric Administration (NOAA) is used to determine the amount of precipitation.

The SCS Type II rainfall intensity distribution was used for this study. The SCS Type II distribution is used for the continental U.S. east of the Sierra Nevada and Cascade Mountains in California, Oregon, and Washington. The Type II distribution is based on the generalized rainfall depth-duration frequency relationships shown in technical publications of the Weather Bureau.

15.2.3 Flood Elevations

After the hydrographs are created for each subwatershed, they are routed through storage areas (wetlands, lakes, detention ponds, etc.) and conveyance systems (storm sewers and ditches) and combined with other hydrographs at junctions with other subwatersheds. Specific characteristics

of the water body and its outlet are input into the elevation-flood storage-discharge relationship used in the routing through each water body.

The storm duration that is critical for a watershed is dependent on the watershed size and slope, the volume of storage available in the system, and the outlet capacity. The critical duration is determined by routing several different duration storms of a given frequency and determining which duration produces the greatest peak discharge or flood elevation. A small watershed with little available storage will have a critical storm of shorter duration than a large watershed with abundant storage.

The elevations reported in this plan have been derived using limited topographic information and shall not be used for the purpose of establishing flood protection standards of new or existing structures. As development/building applications are submitted, the applicants will be required to further investigate the drainage patterns to more accurately determine flood elevations using Atlas 14 precipitation amounts.

15.3 Water Quality

A combination of computer models and standards will be utilized to determine if water quality goals have been met. For determining annual removal efficiencies of 60% of total phosphorous and 90% of total suspended solids a computer model that generates average annual rainfalls and removal efficiencies, such as the P8 Urban Catchment Model by William W. Walker, Jr., Ph.D. may be utilized. Alternatively, wet sedimentation basins may be designed to NURP standards as stated in Section 13.4 of this plan and infiltration BMPs can be sized to infiltrate the first inch of runoff as discussed in Section 14.3 of this plan.

For determining removal efficiencies for hydrodynamic separators, the designer shall estimate removal efficiencies of Total Suspended Solids by the use of a model, such as SHSAM developed by Barr Engineering, or other similar studies or reports.

16.1 Maintenance of Stormwater Facilities

The City of Anoka stormwater system includes not only pipes and constructed basins, but also wetlands, ditches, swales, and other drainageways. In addition to more typical maintenance measures, maintenance of the stormwater system may also mean maintaining or restoring the ecological characteristics of the natural portions of the stormwater system. The City of Anoka recognizes that maintenance of the all of the city's stormwater facilities is an important part of stormwater management. Proper maintenance will ensure that the stormwater system provides the necessary flood control and water quality treatment.

16.2 Private Stormwater Facilities

Owners of private storm water facilities are responsible for maintaining the facilities in proper condition, consistent with the original performance design standards. Owners of private stormwater facilities must provide the city with a maintenance plan that defines who will conduct the maintenance, the type of maintenance and the maintenance intervals and will be required to record a Maintenance Agreement against the property at the office of the Anoka County Recorder.

16.3 Publicly Owned Stormwater Facilities

The City of Anoka is responsible for performing the maintenance of the stormwater facilities under city ownership. The city will conduct regular inspections of its stormwater infrastructure per MS4 Permit requirements and schedule maintenance as required. In general, the city will plan to perform maintenance on its swirl structures, hydraulic separators, and sump manholes bi-annually, unless inspections warrant an adjustment. Sediment basins will be scheduled for dredging on 15-25 years intervals.

The Minnesota Department of Transportation is responsible for maintaining road ditches and culverts along U.S. Highway 169/10. Anoka County is responsible for maintaining road ditches and culverts along C.S.A.H. 1, C.S.A.H. 18, C.S.A.H. 21, C.R. 45, C.R. 46, C.R. 53, and C.S.A.H. 66.

16.4 Street Sweeping

Street sweeping serves an important role in reducing the amount of sediment, organic matter, and solids that enter the storm sewer conveyance system and ultimately our surface waters. Sediment accumulation in the conveyance system has the potential to reduce the hydraulic capacity and increase the risk for flooding. Further, accumulation of sediment and organic matter in conveyance systems, sediment ponds and structural BMPs has a negative impact on water quality. Therefore, the city will adopt a pro-active plan to sweep streets and parking lots at least twice a year— generally once after snowmelt and again after leaf drop.

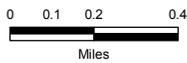
17.0 Amendments

This plan is based on information that was current at the time of plan preparation and is therefore subject to change. Changes in land use, zoning, watersheds, and drainage patterns, and revisions to governmental regulations/rules could affect all or part of this plan. As a result, the city may need to revise the plan to keep it current. The city expects that most revisions to will be minor (i.e. minor changes to the implementation program) and not require formal revision to the plan. Plan amendments, if required, will follow the procedures as outlined in Minnesota Statutes 103B.235.

APPENDIX A



WQS = Water Quality Structure



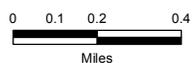
LEGEND

- Existing WQS
- Proposed WQS
- ★ Proposed Pond
- Storm Sewer
- Abandoned Pipe
- Existing Basins

FIGURE A

PROPOSED SYSTEM IMPROVEMENTS

APPENDIX B



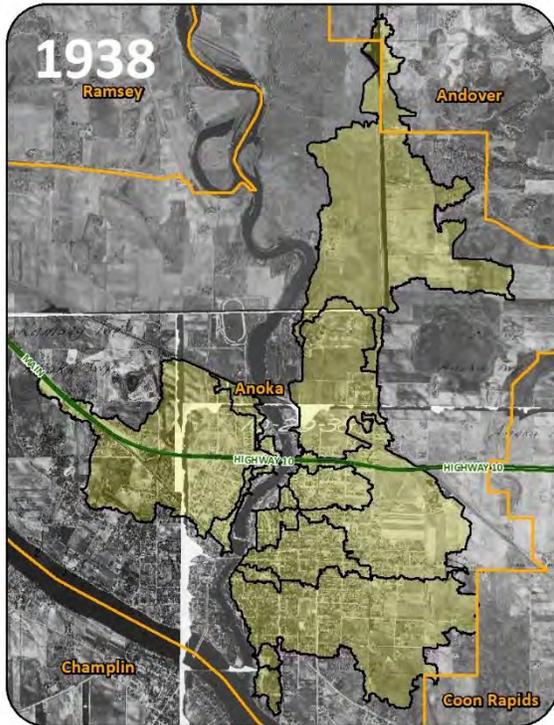
LEGEND

- Storm Sewer
- Upgrade Storm Sewer
- Proposed Storm Sewer

FIGURE B

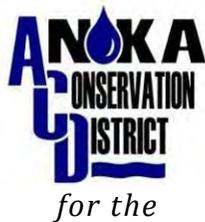
PROPOSED STORM SEWER UPGRADES

APPENDIX C



City of Anoka Stormwater Retrofit Analysis

Prepared by:



CITY OF ANOKA AND

LOWER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION

August 2016

Cover photo: Aerial images from 1938 and 2014 showing the change in land use within the subwatersheds analyzed in this report.

Disclaimer: At the time of printing, this report identifies and ranks potential BMPs for selected subwatersheds in the City of Anoka that drain to the Rum River. This list of practices is not all-inclusive and does not preclude adding additional priority BMPs in the future. An updated copy of the report shall be housed at either the Anoka Conservation District or the City of Anoka.

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Executive Summary

The City of Anoka and the Lower Rum River Watershed Management Organization (LRRWMO) contracted the Anoka Conservation District (ACD) to complete this stormwater retrofit analysis (SRA) for the purpose of identifying and ranking water quality improvement projects in selected subwatersheds that drain to the Rum River. The subwatersheds are located on the western and eastern side of the Rum River within the City of Anoka and consist of commercial, industrial, and residential land uses. Volume, total phosphorus (TP), and total suspended solids (TSS) were the target parameters analyzed.

This analysis is primarily intended to identify potential projects within the target area to improve water quality in the Rum River through stormwater retrofits. Stormwater retrofits refer to best management practices (BMPs) that are added to an already developed landscape where little open space exists. The process is investigative and creative. Stormwater retrofits can be improperly judged by the total number of projects installed or by comparing costs alone. Those approaches neglect to consider how much pollution is removed per dollar spent. In this SRA, both costs and pollutant reductions were estimated and used to calculate cost-effectiveness for each potential retrofit identified.

Water quality benefits associated with the installation of each identified project were individually modeled using the Source Loading and Management Model for Windows (WinSLAMM). WinSLAMM uses an abundance of stormwater data from the Upper-Midwest and elsewhere to quantify runoff volumes and pollutant loads from urban areas. It has detailed accounting of pollutant loading from various land uses, and allows the user to build a model “landscape”. WinSLAMM uses rainfall and temperature data from a typical year (1959 data from Minneapolis for this analysis), routing stormwater through the user’s model for each storm.

WinSLAMM estimates volume and pollutant loading based on acreage, land use, and soils information. Therefore, the volume and pollutant estimates in this report are not waste load allocations, nor does this report serve as a TMDL for the study area. The WinSLAMM model was not calibrated and was only used as an estimation tool to provide relative ranking across potential retrofit projects. Specific model inputs (e.g. pollutant probability distribution, runoff coefficient, particulate solids concentration, particle residue delivery, and street delivery files) are detailed in Appendix A – Modeling Methods.

The costs associated with project design, administration, promotion, land acquisition, opportunity costs, construction oversight, installation, and maintenance were estimated. The total costs over the assumed effective life of each project were then divided by the modeled benefits over the same time period to enable ranking by cost-effectiveness.

A variety of stormwater retrofit approaches were identified. They included:

- Bioretention,
- Hydrodynamic devices,
- Permeable Pavement,
- Iron enhanced sand filter pond benches,
- Existing stormwater pond modifications,
- New stormwater ponds, and

- Water reuse.

If all of these practices were installed, significant volume and pollutant reductions could be accomplished. However, funding limitations and landowner interest make this goal unlikely. Instead, it is recommended that projects be installed in order of cost effectiveness (pounds of pollution reduced per dollar spent). Other factors, including a project's educational value/visibility, construction timing, total cost, or non-target pollutant reduction also affect project installation decisions and need to be weighed by resource managers when selecting projects to pursue.

For each type of recommended retrofit, conceptual siting is provided in the project profiles section. The intent of these figures is to provide an understanding of the approach. If a project is selected, site-specific designs must be prepared. In addition, many of the proposed retrofits (e.g. new ponds) will require a more detailed feasibility analysis and engineered plan sets if selected. This typically occurs after committed partnerships are formed to install the project. Committed partnerships must include willing landowners, both public and private.

The 1,474-acre target study area was consolidated into four drainage networks and 17 catchments. Based on WinSLAMM model results, the total study area contributes an estimated 941 acre-feet of runoff, 299,153 pounds of TSS, and 807 pounds of TP annually.

The tables in the Project Ranking and Selection section (pages 13-18) summarize potential projects ranked by cost effectiveness with respect to either TP or TSS. Potential projects are organized from most cost effective to least based on pollutants removed.

Installation of projects in series will result in lower total treatment than the simple sum of treatment achieved by the individual projects due to treatment train effects. Reported treatment levels are dependent upon optimal site selection and sizing. More detail about each project can be found in the catchment profile pages of this report. Projects that were deemed unfeasible due to prohibitive size, number, or expense were not included in this report.

Document Organization

This document is organized into five sections, plus references and appendices. Each section is briefly discussed below.

Background

The background section provides a brief description of the landscape characteristics within the study area.

Analytical Process and Elements

The analytical process and elements section overviews the procedures that were followed when analyzing the subwatershed. It explains the processes of retrofit scoping, desktop analysis, field investigation, modeling, cost/treatment analysis, project ranking, and project selection. Refer to Appendix A – Modeling Methods for a detailed description of the modeling methods.

Project Ranking and Selection

The project ranking and selection section describes the methods and rationale for how projects were ranked. Local resource management professionals will be responsible to select and pursue projects, taking into consideration the many possible ways to prioritize projects. Several considerations in addition to project cost-effectiveness for prioritizing installation are included. Project funding opportunities may play a large role in project selection, design, and installation.

This section also ranks stormwater retrofit projects across all catchments to create a prioritized project list. The list is sorted by the amount of pollutant removed by each project over 30 years. The final cost per pound treatment value includes installation and maintenance costs over the estimated life of the project. If a practice's effective life was expected to be less than 30 years, rehabilitation or reinstallation costs were included in the cost estimate. There are many possible ways to prioritize projects, and the list provided in this report is merely a starting point.

BMP Descriptions

For each type of project included in this report, there is a description of the rationale for including that type of project, the modeling method employed, and the cost calculations used to estimate associated installation and maintenance expenses.

Catchment Profiles

The drainage areas targeted for this analysis were consolidated into 17 catchments distributed between four drainage networks and assigned unique identification numbers. For each catchment, the following information is detailed:

Drainage Network

Catchments were grouped into drainage networks based on their geographic distribution throughout the study area and drainage to a common waterbody (i.e. the Rum River). The drainage networks were used to further subdivide the report to aid with organization and clarity.

Catchment Description

Within each catchment profile is a table that summarizes basic catchment information including acres, land cover, parcels, and estimated annual pollutant and volume loads under existing conditions. Existing conditions included notable stormwater treatment practices for which information was available from the City of Anoka. Small, site-specific practices (e.g. rain-leader disconnect rain gardens) were not included in the existing conditions model. A brief description of the land cover, stormwater infrastructure, and any other important general information is also described in this section. Notable existing stormwater practices are explained and their estimated effectiveness presented.

Retrofit Recommendations

Retrofit recommendations are presented for each catchment and include a description of the proposed BMP, cost-effectiveness table including modeled volume and pollutant reductions, and an overview map showing the contributing drainage area for each BMP.

References

This section identifies various sources of information synthesized to produce the protocol used in this analysis.

Appendices

This section provides supplemental information and/or data used during the analysis.

Background

Many factors are considered when choosing which subwatersheds to analyze for stormwater retrofits. Water quality monitoring data, non-degradation report modeling, and TMDL studies are just a few of the resources available to help determine which water bodies are a priority. Stormwater retrofit analyses supported by a Local Government Unit with sufficient capacity (staff, funding, available GIS data, etc.) to greater facilitate the process also rank highly. For some communities a stormwater retrofit analysis complements their MS4 stormwater permit. The focus is always on a high priority waterbody.

The drainage areas studied for this analysis are located in the City of Anoka and discharge to the Rum River. The total area of the 17 catchments is 1,474 acres. Six of the catchments lie on the western side of the Rum River and are roughly bound by Greenhaven Road to the north and Park Street to the south. The remaining eleven catchments are on the eastern side of the Rum River. These catchments are bound roughly by Bunker Lake Boulevard to the north and East River Road to the south.

These catchments were selected for analysis because they drain to a high priority waterbody, and existing treatment in many of the catchments could be supplemented. Stormwater retrofits may provide cost-effective options for additional treatment of runoff, thereby improving water quality in the Rum River.

The catchments analyzed are urbanized. Development throughout the City of Anoka has resulted in the installation of subsurface drainage systems (i.e. stormwater infrastructure) to convey stormwater runoff, which increased due to the coverage of impervious surfaces throughout the catchments. The runoff generated within the areas targeted for this analysis is still conveyed to the Rum River, as it was historically. However, the runoff is now captured by catch basins and directed underground before being discharged to the Rum River via stormwater pipes.

Stormwater runoff from impervious surfaces can carry a variety of pollutants. While stormwater treatment to remove these pollutants is adequate in some areas, other areas were built prior to modern-day stormwater treatment technologies and requirements. The City of Anoka and LRRWMO contracted the ACD to complete this SRA for the purpose of identifying and analyzing projects to improve the quality of stormwater runoff to the Rum River. Overall subwatershed loading of TP, TSS, and stormwater volume were estimated for selected drainage areas. Proposed retrofits were modeled to estimate each practice's capability for removing pollutants and reducing volume. Finally, each project was ranked based on the estimated cost-effectiveness of the project to reduce pollutants.

Analytical Process and Elements

This stormwater retrofit analysis is a watershed management tool to identify and prioritize potential stormwater retrofit projects by performance and cost-effectiveness. This process helps maximize the value of each dollar spent. The process used for this analysis is outlined in the following pages and was modified from the Center for Watershed Protection's Urban Stormwater Retrofit Practices, Manuals 2 and 3 (Schueler & Kitchell, 2005 and Schueler et al. 2007). Locally relevant design considerations were also incorporated into the process (Technical Documents, Minnesota Stormwater Manual, 2014).

Scoping includes determining the objectives of the retrofits (volume reduction, target pollutant, etc.) and the level of treatment desired. It involves meeting with local stormwater managers, city staff and watershed management organization members to determine the issues in the subwatershed. This step also helps to define preferred retrofit treatment options and retrofit performance criteria. In order to create a manageable area to analyze in large subwatersheds, a focus area may be determined.

In this analysis, the focus areas were the contributing drainage areas to storm sewer outfalls that discharge directly into the Rum River. More specifically, outfalls with limited existing treatment were selected. Included are areas of residential, commercial, industrial, and institutional land uses. Existing stormwater infrastructure maps and topography data were used to determine drainage boundaries for the 17 catchments included in this analysis. Street reconstruction plan sets were also digitized by ACD where updated stormwater infrastructure GIS data was lacking.

The targeted pollutants for this study were TP and TSS, though volume was also estimated and reported. Volume of stormwater was tracked throughout this study because it is necessary for pollutant loading calculations and potential retrofit project considerations. Table 1 describes the target pollutants and their role in water quality degradation. Projects that effectively reduce loading of multiple target pollutants can provide greater immediate and long-term benefits.

Table 1: Target Pollutants

Target Pollutant	Description
Total Phosphorus (TP)	Phosphorus is a nutrient essential to plant growth and is commonly the factor that limits the growth of plants in surface water bodies. TP is a combination of particulate phosphorus (PP), which is bound to sediment and organic debris, and dissolved phosphorus (DP), which is in solution and readily available for plant growth (active).
Total Suspended Solids (TSS)	Very small mineral and organic particles that can be dispersed into the water column due to turbulent mixing. TSS loading can create turbid and cloudy water conditions and carry with it PP. As such, reductions in TSS will also result in TP reductions.
Volume	Higher runoff volumes and velocities can carry greater amounts of TSS to receiving water bodies. It can also exacerbate in-stream erosion, thereby increasing TSS loading. As such, reductions in volume may reduce TSS loading and, by extension, TP loading. However, in-stream erosion is not an issue in these catchments because stormwater is piped directly to the Rum River.

Desktop analysis involves computer-based scanning of the subwatershed for potential retrofit catchments and/or specific sites. This step also identifies areas that do not need to be analyzed because of existing stormwater treatment or disconnection from the target water body. Accurate GIS data are

extremely valuable in conducting the desktop retrofit analysis. Some of the most important GIS layers include: 2-foot or finer topography (Light Detection and Ranging [LiDAR] was used for this analysis), surface hydrology, soils, watershed/subwatershed boundaries, parcel boundaries, high-resolution aerial photography, and the stormwater drainage infrastructure (with invert elevations).

Field investigation is conducted after potential retrofits are identified in the desktop analysis to evaluate each site and identify additional opportunities. During the investigation, the drainage area and surface stormwater infrastructure mapping data were verified. Site constraints were assessed to determine the most feasible retrofit options as well as eliminate sites from consideration. The field investigation may have also revealed additional retrofit opportunities that could have gone unnoticed during the desktop search.

Modeling involves assessing multiple scenarios to estimate pollutant loading and potential reductions by proposed retrofits. WinSLAMM (version 10.2.0), which allows routing of multiple catchments and stormwater treatment practices, was used for this analysis. This is important for estimating treatment train effects associated with multiple BMPs in series. Furthermore, it allows for estimation of volume and pollutant loading at the outfall point to the waterbody, which is the primary point of interest in this type of study.

WinSLAMM estimates volume and pollutant loading based on acreage, land use, and soils information. Therefore, the volume and pollutant estimates in this report are not waste load allocations, nor does this report serve as a TMDL for the study area. The WinSLAMM model was not calibrated and was only used as an estimation tool to provide relative ranking across potential retrofit projects. Soils throughout the study area were predominantly sandy based on the information available in the Anoka County soil survey. Specific model inputs (e.g. pollutant probability distribution, runoff coefficient, particulate solids concentration, particle residue delivery, and street delivery files) are detailed in Appendix A – Modeling Methods.

The initial step was to create a “base” model which estimates pollutant loading from each catchment in its present-day state without taking into consideration any existing stormwater treatment. To accurately model the land uses in each catchment, drainage area delineations were completed using the watershed delineation tool in ArcSWAT. The drainage areas were then consolidated into catchments using geographic information systems (specifically, ArcGIS). Land use data (based on 2010 Metropolitan Council land use file) were used to calculate acreages of each land use type within each catchment. Each land use polygon classification was compared with 2014 aerial photography, the most recent available at the time of this analysis, and corrected if land use had changed since 2010. This process addressed recent development throughout the study area by reclassifying land use types accordingly. Soil types throughout the subwatershed were modeled as sand and silt in this analysis based on the information available in the Anoka County soil survey. Entering the acreages, land use, and soil data into WinSLAMM ultimately resulted in a model that included estimates of the acreage of each type of source area (roof, road, lawn, etc.) in each catchment.

Once the “base” model was established, an “existing conditions” model was created by incorporating notable existing stormwater treatment practices in the catchment for which data were available from the City of Anoka (Figure 1 and Figure 2). For example, street cleaning with mechanical or vacuum street sweepers, stormwater treatment ponds, hydrodynamic devices, and others were included in the “existing conditions” model if information was available.

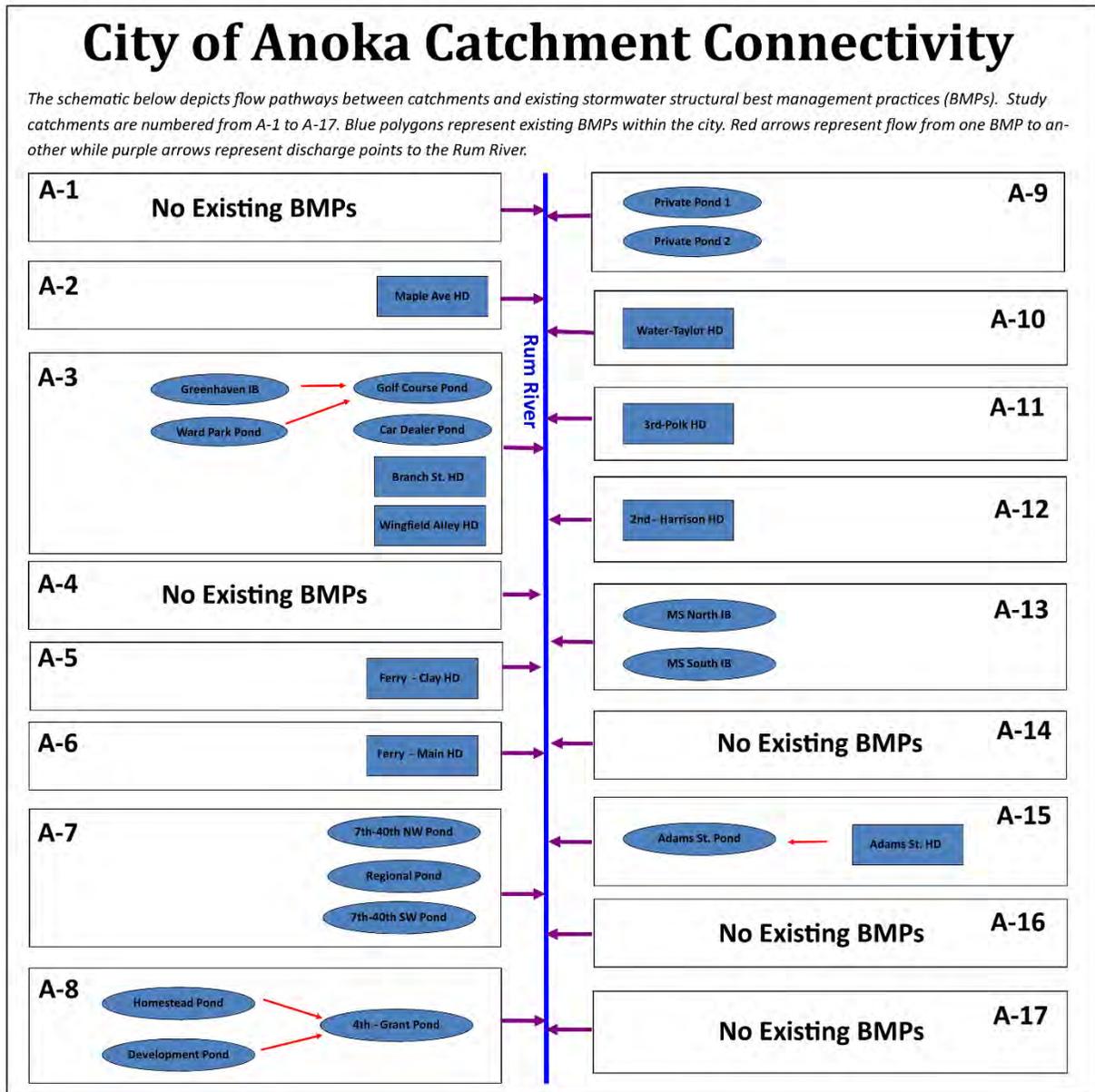


Figure 1: Schematic showing the existing BMPs in each catchment and their connectivity.

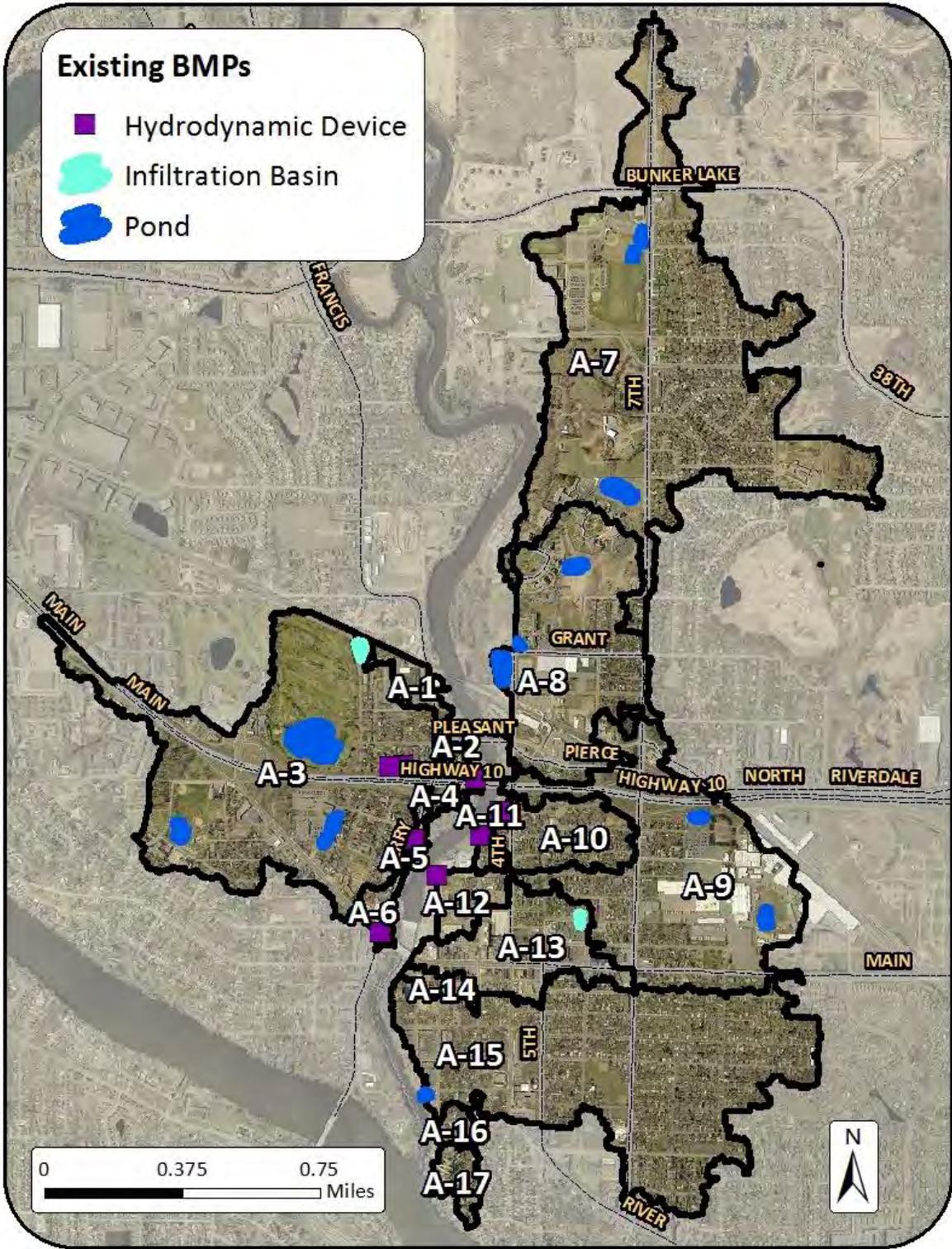


Figure 2: Study area map showing existing BMPs included in the WinSLAMM model. Street sweeping is not shown on the map but was included throughout the study area.

Finally, each proposed stormwater retrofit practice was added individually to the “existing conditions” model and pollutant reductions were estimated. Because neither a detailed design of each practice nor in-depth site investigation was completed, a generalized design for each practice was used. Whenever possible, site-specific parameters were included. Design parameters were modified to obtain various levels of treatment. It is worth noting that each practice was modeled individually, and the benefits of projects may not be additive, especially if serving the same area (i.e. treatment train effects). Reported treatment levels are dependent upon optimal site selection and sizing. Additional information on the WinSLAMM models can be found in Appendix A – Modeling Methods.

Cost estimating is essential for the comparison and ranking of projects, development of work plans, and pursuit of grants and other funds. All estimates were developed using 2016 dollars. Costs throughout this report were estimated using a multitude of sources. Costs were derived from The Center for Watershed Protection’s Urban Subwatershed Restoration Manuals (Schueler & Kitchell, 2005 and Schueler et al. 2007) and recent installation costs and cost estimates provided to the ACD by personal contacts. Cost estimates were annualized costs that incorporated the elements listed below over a 30-year period.

Project promotion and administration includes local staff efforts to reach out to landowners, administer related grants, and complete necessary administrative tasks.

Design includes site surveying, engineering, and construction oversight.

Land or easement acquisition cover the cost of purchasing property or the cost of obtaining necessary utility and access easements from landowners.

Construction calculations are project specific and may include all or some of the following; grading, erosion control, vegetation management, structures, mobilization, traffic control, equipment, soil disposal, and rock or other materials.

Maintenance includes annual inspections and minor site remediation such as vegetation management, structural outlet repair and cleaning, and washout repair.

In cases where promotion to landowners is important, such as rain gardens, those costs were included as well. In cases where multiple, similar projects are proposed in the same locality, promotion and administration costs were estimated using a non-linear relationship that accounted for savings with scale. Design assistance from an engineer is assumed for practices in-line with the stormwater conveyance system, involving complex stormwater treatment interactions, or posing a risk for upstream flooding. It should be understood that no site-specific construction investigations were done as part of this stormwater retrofit analysis, and therefore cost estimates account for only general site considerations. Detailed feasibility analyses may be necessary for some projects.

Project ranking is essential to identify which projects could be pursued to achieve water quality goals. Project ranking tables are presented based on cost per pound of TP and per 1,000 pounds of TSS removed.

Project selection involves considerations other than project ranking, including but not limited to total cost, treatment train effects, social acceptability, and political feasibility.

Project Ranking and Selection

The intent of this analysis is to provide the information necessary to enable local natural resource managers to successfully secure funding for the most cost-effective projects to achieve water quality goals. This analysis ranks potential projects by cost-effectiveness to facilitate project selection. There are many possible ways to prioritize projects, and the list provided in this report is merely a starting point. Local resource management professionals will be responsible to select projects to pursue. Several considerations in addition to project cost-effectiveness for prioritizing installation are included.

Project Ranking

If all identified practices were installed (Figure 3), significant pollution reduction could be accomplished. However, funding limitations and landowner interest will likely be limiting factors for implementation. The tables on the following pages rank all modeled projects by cost-effectiveness.

Projects were ranked in two ways:

- 1) Cost per pound of total phosphorus removed (Table 2, Table 3, and Table 4) and
- 2) Cost per 1,000 pounds of total suspended solids removed (Table 5, Table 6, and Table 7).

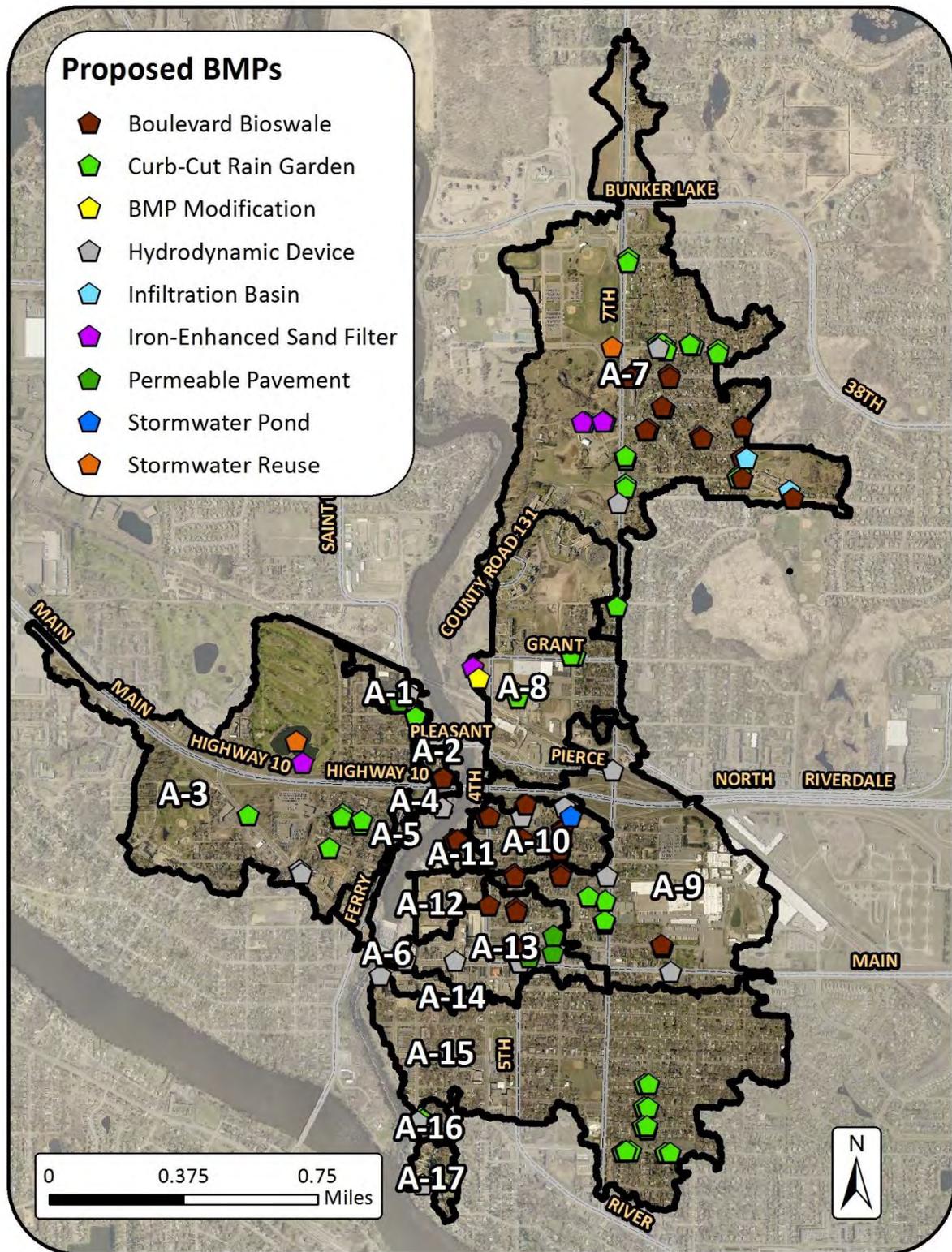


Figure 3: Study area map showing the proposed retrofits included in this report.

Table 2: Cost-effectiveness of retrofits with respect to TP reduction. Projects ranked 1 – 16 are shown on this table. TSS and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/lb-TP/year (30-year) ¹
1	7-H1	73	New Pond	7th Ave.	A-7	111.6	54,558	0.9	\$802,138.00	\$5,500.00	\$289.00
2	7-D	69	Infiltration Basin	Colfax Ave. and Blackoaks Ln.	A-7	9.6	3,256	8.1	\$118,796.00	\$225.00	\$436.00
3	7-H2	74	New Pond	7th Ave.	A-7	31.5	13,452	0.4	\$360,484.00	\$1,800.00	\$439.00
4	7-E	70	Infiltration Basin	Sunny Ln.	A-7	1.7	676	1.8	\$22,796.00	\$225.00	\$579.00
5	10-C	97	Infiltration Basin	5th Ave. and Polk St.	A-10	2.6	808	2.1	\$43,796.00	\$225.00	\$648.00
6	7-I1	75	IESF Bench	7th Ave.	A-7	26.6	0	0	\$580,991.00	\$4,591.00	\$902.00
7	16-A	128	Curb-Cut Rain Garden	Washington St.	A-16	0.5-1.0	157-315	0.4-0.8	\$8,982-\$17,234	\$225-\$450	\$1,024-\$1,049
8	1-A	38	Curb-Cut Rain Garden	Ferry St. and Front Ave.	A-1	0.5	187	0.5	\$8,982.00	\$225.00	\$1,049.00
9	3-A	48	Curb-Cut Rain Garden	Various locations in catchment	A-3	0.5-3.5	157-1,089	0.4-2.7	\$15,844-\$65,356	\$225-\$1,575	\$1,072-\$1,506
10	7-A	66	Curb-Cut Rain Garden	Various locations in catchment	A-7	0.5-8.1	153-2,539	0.4-6.2	\$15,844-\$147,876	\$225-\$3,825	\$1,081-\$1,506
11	9-A	87	Curb-Cut Rain Garden	Various locations in catchment	A-9	0.5-2.0	155-623	0.4-1.5	\$15,844-\$40,600	\$225-\$900	\$1,127-\$1,506
12	8-B	81	Pond Modification	4th Ave. and Grant St.	A-8	10.5	6,443	0	\$330,840-\$690,840	\$1,300.00	\$1,174-\$2,317
13	15-A	125	Curb-Cut Rain Garden	Various locations in catchment	A-15	0.4-4.4	135-1,343	0.4-3.7	\$15,844-\$90,112	\$225-\$2,250	\$1,194-\$1,883
14	3-D	51	IESF Bench	Green Haven Golf Course Pond	A-3	10.4	0	0	\$282,955.00	\$3,214.00	\$1,216.00
15	3-E	52	Stomwater Reuse	Green Haven Golf Course Pond	A-3	18.2	3,409	46.4	\$608,760.00	\$3,000.00	\$1,280.00
16	8-A	80	Curb-Cut Rain Garden	Various locations in catchment	A-8	0.7-0.8	190-301	0.7-1.1	\$17,234.00	\$450.00	\$1,281-\$1,464

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TP Reduction)]

Table 3: Cost-effectiveness of retrofits with respect to TP reduction. Projects ranked 17 – 31 are shown on this table. TSS and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/lb-TP/year (30-year) ¹
17	8-C	82	IESF Bench	4th Ave. and Grant St.	A-8	7.2	0	0	\$282,955.00	\$1,607.00	\$1,534.00
18	7-I2	76	IESF Bench	7th Ave.	A-7	7.2	0	0	\$305,875.00	\$1,837.00	\$1,669.00
19	7-G	72	Stomwater Reuse	38th Ave. and 7th Ave.	A-7	17.5	5,987	18.7	\$958,760.00	\$3,000.00	\$1,998.00
20	10-E	99	New Pond	Rudy Johnson Park	A-10	4	1,712	0.1	\$239,925.00	\$300.00	\$2,074.00
21	9-E	91	Boulevard Bioswale	Various locations in catchment	A-9	0.2	112	0.2	\$8,526.00	\$225.00	\$2,131.00
22	13-D	112	Hydrodynamic Device	5th Ave. and Main St.	A-13	1.4	644	0	\$109,752.00	\$630.00	\$3,063.00
23	2-A	44	Boulevard Bioswale	Maple Ave.	A-2	0.2	55	0.1	\$8,526.00	\$225.00	\$3,140.00
24	7-F	71	Boulevard Bioswale	Various locations in catchment	A-7	0.2	61	0.1	\$8,526.00	\$225.00	\$3,264.00
25	10-D	98	Boulevard Bioswale	Various locations in catchment	A-10	0.1	52	0.1	\$8,526.00	\$225.00	\$3,427.00
26	11-A	102	Boulevard Bioswale	3rd Ave.	A-11	0.1	49	0.1	\$8,526.00	\$225.00	\$3,523.00
27	7-B	67	Hydrodynamic Device	38th Ln. and 8th Ave.	A-7	1.2	491	0	\$109,752.00	\$630.00	\$3,574.00
27	9-B	88	Hydrodynamic Device	7th Ave. and Pierce St.	A-9	1.2	686	0	\$109,752.00	\$630.00	\$3,574.00
29	9-D	90	Hydrodynamic Device	Main St. and 8 1/2 Ave.	A-9	1.1	777	0	\$109,752.00	\$630.00	\$3,899.00
30	3-C	50	Hydrodynamic Device	Main St. and State Ave.	A-3	0.6	302	0	\$55,752.00	\$630.00	\$4,147.00
31	1-B	39	Hydrodynamic Device	Ferry St.	A-1	1	584	0	\$109,752.00	\$630.00	\$4,288.00
31	9-C	89	Hydrodynamic Device	7th Ave. and Harrison St.	A-9	1	407	0	\$109,752.00	\$630.00	\$4,288.00

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TP Reduction)]

Table 4: Cost-effectiveness of retrofits with respect to TP reduction. Projects ranked 33 – 48 are shown on this table. TSS and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/lb-TP/year (30-year) ¹
33	13-C	111	Hydrodynamic Device	Main St. and 5th Ave.	A-13	0.9	427	0	\$109,752.00	\$630.00	\$4,765.00
34	13-A	109	Hydrodynamic Device	Main St. and 1st Ave.	A-13	0.5	272	0	\$55,752.00	\$630.00	\$4,977.00
34	13-B	110	Hydrodynamic Device	Main St. and 3rd Ave.	A-13	0.5	285	0	\$55,752.00	\$630.00	\$4,977.00
34	3-B	49	Hydrodynamic Device	Main St. and State Ave.	A-3	0.5	280	0	\$55,752.00	\$630.00	\$4,977.00
37	13-H	116	Boulevard Bioswale	Various locations in catchment	A-13	0.1	22	0.1	\$8,526.00	\$225.00	\$5,092.00
38	4-A	55	Hydrodynamic Device	Maple Ln.	A-4	0.3	113	0	\$28,752.00	\$630.00	\$5,295.00
39	14-A	121	Hydrodynamic Device	Parking lot off 1st Ave.	A-14	0.8	385	0	\$109,752.00	\$630.00	\$5,361.00
39	7-C	68	Hydrodynamic Device	7th Ave.	A-7	0.8	383	0	\$109,752.00	\$630.00	\$5,361.00
41	17-A	133	Hydrodynamic Device	Oakwood Dr.	A-17	0.6	244	0	\$109,752.00	\$630.00	\$7,147.00
42	10-A	95	Hydrodynamic Device	6th Ave. and Taylor St.	A-10	0.5	211	0	\$109,752.00	\$630.00	\$8,577.00
43	10-B	96	Hydrodynamic Device	5th Ave. and Taylor St.	A-10	0.5	195	0	\$109,752.00	\$630.00	\$8,577.00
44	16-B	129	Hydrodynamic Device	Oakwood Dr. and Washington St.	A-16	0.4	163	0	\$109,752.00	\$630.00	\$10,721.00
45	13-F	114	Permeable Pavement	St. Stephen's Catholic School	A-13	1.6	562	1.6	\$282,796.00	\$20,925.00	\$18,970.00
46	13-E	113	Permeable Pavement	St. Stephen's Catholic Church	A-13	0.9	320	0.9	\$162,796.00	\$11,925.00	\$19,279.00
47	13-G	115	Permeable Pavement	St. Stephen's Catholic School	A-13	1.9	672	1.9	\$343,796.00	\$25,500.00	\$19,453.00
48	1-C	40	Permeable Pavement	Anoka-Hennepin Education Center	A-1	2.9	1,325	3.5	\$552,656.00	\$41,165.00	\$20,547.00

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TP Reduction)]

Table 5: Cost-effectiveness of retrofits with respect to TSS reduction. Projects ranked 1 – 16 are shown on this table. TP and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/ 1,000lb-TSS/year (30-year) ¹
1	7-H1	73	New Pond	7th Ave.	A-7	111.6	54,558	0.9	\$802,138.00	\$5,500.00	\$591.00
2	7-H2	74	New Pond	7th Ave.	A-7	31.5	13,452	0.4	\$360,484.00	\$1,800.00	\$1,027.00
3	7-D	69	Infiltration Basin	Colfax Ave. and Blackoaks Ln.	A-7	9.6	3,256	8.1	\$118,796.00	\$225.00	\$1,285.00
4	7-E	70	Infiltration Basin	Sunny Ln.	A-7	1.7	676	1.8	\$22,796.00	\$225.00	\$1,457.00
5	8-B	81	Pond Modification	4th Ave. and Grant St.	A-8	10.5	6,443	0	\$330,840-\$690,840	\$1,300.00	\$1,913-\$3,776
6	10-C	97	Infiltration Basin	5th Ave. and Polk St.	A-10	2.6	808	2.1	\$43,796.00	\$225.00	\$2,085.00
7	1-A	38	Curb-Cut Rain Garden	Ferry St. and Front Ave.	A-1	0.5	187	0.5	\$8,982.00	\$225.00	\$2,804.00
8	16-A	128	Curb-Cut Rain Garden	Washington St.	A-16	0.5-1.0	157-315	0.4-0.8	\$8,982-\$17,234	\$225-\$450	\$3,252-\$3,340
9	8-A	80	Curb-Cut Rain Garden	Various locations in catchment	A-8	0.7-0.8	190-301	0.7-1.1	\$17,234.00	\$450.00	\$3,404-\$5,392
10	3-A	48	Curb-Cut Rain Garden	Various locations in catchment	A-3	0.5-3.5	157-1,089	0.4-2.7	\$15,844-\$65,356	\$225-\$1,575	\$3,447-\$4,797
11	7-A	66	Curb-Cut Rain Garden	Various locations in catchment	A-7	0.5-8.1	153-2,539	0.4-6.2	\$15,844-\$147,876	\$225-\$3,825	\$3,448-\$4,922
12	9-A	87	Curb-Cut Rain Garden	Various locations in catchment	A-9	0.5-2.0	155-623	0.4-1.5	\$15,844-\$40,600	\$225-\$900	\$3,617-\$4,859
13	15-A	125	Curb-Cut Rain Garden	Various locations in catchment	A-15	0.4-4.4	135-1,343	0.4-3.7	\$15,844-\$90,112	\$225-\$2,250	\$3,912-\$5,579
14	9-E	91	Boulevard Bioswale	Various locations in catchment	A-9	0.2	112	0.2	\$8,526.00	\$225.00	\$4,561.00
15	10-E	99	New Pond	Rudy Johnson Park	A-10	4	1,712	0.1	\$239,925.00	\$300.00	\$4,847.00
16	9-D	90	Hydrodynamic Device	Main St. and 8 1/2 Ave.	A-9	1.1	777	0	\$109,752.00	\$630.00	\$5,519.00

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TSS Reduction/1,000)]

Table 6: Cost-effectiveness of retrofits with respect to TSS reduction. Projects ranked 17 – 32 are shown on this table. TP and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/1,000lb-TSS/year (30-year) ¹
17	7-G	72	Stomwater Reuse	38th Ave. and 7th Ave.	A-7	17.5	5,987	18.7	\$958,760.00	\$3,000.00	\$5,839.00
18	9-B	88	Hydrodynamic Device	7th Ave. and Pierce St.	A-9	1.2	686	0	\$109,752.00	\$630.00	\$6,251.00
19	13-D	112	Hydrodynamic Device	5th Ave. and Main St.	A-13	1.4	644	0	\$109,752.00	\$630.00	\$6,659.00
20	3-E	52	Stomwater Reuse	Green Haven Golf Course Pond	A-3	18.2	3,409	46.4	\$608,760.00	\$3,000.00	\$6,833.00
21	1-B	39	Hydrodynamic Device	Ferry St.	A-1	1	584	0	\$109,752.00	\$630.00	\$7,343.00
22	3-C	50	Hydrodynamic Device	Main St. and State Ave.	A-3	0.6	302	0	\$55,752.00	\$630.00	\$8,240.00
23	7-F	71	Boulevard Bioswale	Various locations in catchment	A-7	0.2	61	0.1	\$8,526.00	\$225.00	\$8,352.00
24	13-B	110	Hydrodynamic Device	Main St. and 3rd Ave.	A-13	0.5	285	0	\$55,752.00	\$630.00	\$8,731.00
25	7-B	67	Hydrodynamic Device	38th Ln. and 8th Ave.	A-7	1.2	491	0	\$109,752.00	\$630.00	\$8,734.00
26	3-B	49	Hydrodynamic Device	Main St. and State Ave.	A-3	0.5	280	0	\$55,752.00	\$630.00	\$8,887.00
27	13-A	109	Hydrodynamic Device	Main St. and 1st Ave.	A-13	0.5	272	0	\$55,752.00	\$630.00	\$9,149.00
28	2-A	44	Boulevard Bioswale	Maple Ave.	A-2	0.2	55	0.1	\$8,526.00	\$225.00	\$9,202.00
29	10-D	98	Boulevard Bioswale	Various locations in catchment	A-10	0.1	52	0.1	\$8,526.00	\$225.00	\$9,853.00
30	13-C	111	Hydrodynamic Device	Main St. and 5th Ave.	A-13	0.9	427	0	\$109,752.00	\$630.00	\$10,043.00
31	11-A	102	Boulevard Bioswale	3rd Ave.	A-11	0.1	49	0.1	\$8,526.00	\$225.00	\$10,342.00
32	9-C	89	Hydrodynamic Device	7th Ave. and Harrison St.	A-9	1	407	0	\$109,752.00	\$630.00	\$10,537.00

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TSS Reduction/1,000)]

Table 7: Cost-effectiveness of retrofits with respect to TSS reduction. Projects ranked 33 – 48 are shown on this table. TP and volume reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/1,000lb-TSS/year (30-year) ¹
33	14-A	121	Hydrodynamic Device	Parking lot off 1st Ave.	A-14	0.8	385	0	\$109,752.00	\$630.00	\$11,139.00
34	7-C	68	Hydrodynamic Device	7th Ave.	A-7	0.8	383	0	\$109,752.00	\$630.00	\$11,197.00
35	4-A	55	Hydrodynamic Device	Maple Ln.	A-4	0.3	113	0	\$28,752.00	\$630.00	\$14,057.00
36	17-A	133	Hydrodynamic Device	Oakwood Dr.	A-17	0.6	244	0	\$109,752.00	\$630.00	\$17,575.00
37	10-A	95	Hydrodynamic Device	6th Ave. and Taylor St.	A-10	0.5	211	0	\$109,752.00	\$630.00	\$20,324.00
38	10-B	96	Hydrodynamic Device	5th Ave. and Taylor St.	A-10	0.5	195	0	\$109,752.00	\$630.00	\$21,992.00
39	13-H	116	Boulevard Bioswale	Various locations in catchment	A-13	0.1	22	0.1	\$8,526.00	\$225.00	\$23,072.00
40	16-B	129	Hydrodynamic Device	Oakwood Dr. and Washington St.	A-16	0.4	163	0	\$109,752.00	\$630.00	\$26,309.00
41	1-C	40	Permeable Pavement	Anoka-Hennepin Education Center	A-1	2.9	1,325	3.5	\$552,656.00	\$41,165.00	\$44,971.00
42	13-F	114	Permeable Pavement	St. Stephen's Catholic School	A-13	1.6	562	1.6	\$282,796.00	\$20,925.00	\$54,006.00
43	13-E	113	Permeable Pavement	St. Stephen's Catholic Church	A-13	0.9	320	0.9	\$162,796.00	\$11,925.00	\$54,224.00
44	13-G	115	Permeable Pavement	St. Stephen's Catholic School	A-13	1.9	672	1.9	\$343,796.00	\$25,500.00	\$55,000.00
48	3-D	51	IESF Bench	Green Haven Golf Course Pond	A-3	10.4	0	0	\$282,955.00	\$3,214.00	N/A
48	7-11	75	IESF Bench	7th Ave.	A-7	26.6	0	0	\$580,991.00	\$4,591.00	N/A
48	7-12	76	IESF Bench	7th Ave.	A-7	7.2	0	0	\$305,875.00	\$1,837.00	N/A
48	8-C	82	IESF Bench	4th Ave. and Grant St.	A-8	7.2	0	0	\$282,955.00	\$1,607.00	N/A

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual TSS Reduction/1,000)]

Project Selection

The combination of projects selected for pursuit could strive to achieve TSS and TP reductions in the most cost-effective manner possible. Several other factors affecting project installation decisions should be weighed by resource managers when selecting projects to pursue. These factors include but are not limited to the following:

- Total project costs
- Cumulative treatment
- Availability of funding
- Economies of scale
- Landowner willingness
- Project combinations with treatment train effects
- Non-target pollutant reductions
- Timing coordination with other projects to achieve cost savings
- Stakeholder input
- Number of parcels (landowners) involved
- Project visibility
- Educational value
- Long-term impacts on property values and public infrastructure

BMP Descriptions

BMP types proposed throughout the target areas are detailed in this section. This was done to reduce duplicative reporting. For each BMP type, the method of modeling, assumptions made, and cost estimate considerations are described.

BMPs were proposed for a specific site within the research area. Each of these projects, including site location, size, and estimated cost and pollutant reduction potential are noted in detail in the Catchment Profiles section. Project types included in the following sections are:

- Bioretention
 - Curb-cut Rain Garden
 - Boulevard Bioswale
 - Infiltration Basin
- Hydrodynamic Device
- Permeable Pavement
- Iron-Enhanced Sand Filter Pond Bench
- Modification to an Existing Pond
- New Stormwater Pond
- Stormwater Reuse

Bioretention

Bioretention is a BMP that uses soil and vegetation to treat stormwater runoff from roads, driveways, roof tops, and other impervious surfaces. Differing levels of volume and/or pollutant reductions can be achieved depending on the type of bioretention selected.

Bioretention can function as either filtration (biofiltration) or infiltration (bioinfiltration). Biofiltration BMPs are designed with a buried perforated drain tile that allows water in the basin to discharge to the stormwater drainage system after having been filtered through the soil. Bioinfiltration BMPs have no underdrain, ensuring that all water that enters the basins will either infiltrate into the soil or be evapotranspired into the air. Bioinfiltration provides 100% retention and treatment of captured stormwater, whereas biofiltration basins provide excellent removal of particulate contaminants but limited removal of dissolved contaminants, such as DP (Table 8).

Table 8: Matrix describing curb-cut rain garden efficacy for pollutant removal based on type.

Curb-cut Rain Garden Type	TSS Removal	PP Removal	DP Removal	Volume Reduction	Size of Area Treated	Site Selection and Design Notes
Bioinfiltration	High	High	High	High	High	Optimal sites are low enough in the landscape to capture most of the watershed but high enough to ensure adequate separation from the water table for treatment purposes. Higher soil infiltration rates allow for deeper basins and may eliminate the need for underdrains.
Biofiltration	High	Moderate	Low	Low	High	

The treatment efficacy of a particular bioretention project depends on many factors, including but not limited to the pollutant of concern, the quality of water entering the project, the intensity and duration of storm events, project size, position of the project in the landscape, existing downstream treatment, soil and vegetation characteristics, and project type (i.e. bioinfiltration or biofiltration). Optimally, new bioretention will capture water that would otherwise discharge into a priority waterbody untreated.

The volume and pollutant removal potential of each bioretention practice was estimated using WinSLAMM. In order to calculate cost-benefit, the cost of each project had to be estimated. To fully estimate the cost of project installation, labor costs for project outreach and promotion, project design, project administration, and project maintenance over the anticipated life of the practice were considered in addition to actual construction costs. If multiple projects were installed, cost savings could be achieved on the administration and promotion costs (and possibly the construction costs for a large and competitive bid).

Please note infiltration examples included in this section would require site specific investigations to verify soils are appropriate for infiltration.

Curb-cut Rain Gardens

Curb-cut rain gardens capture stormwater that is in roadside gutters and redirects it into shallow roadside basins. These curb-cut rain gardens can provide treatment for impervious surface runoff from one to many properties and can be located anywhere sufficient space is available. Because curb-cut rain gardens capture water that is already part of the stormwater drainage system, they are more likely to provide higher benefits. Generally, curb-cut rain gardens were proposed in areas without sufficient existing stormwater treatment and located immediately up-gradient of a catch basin serving a large drainage area. Bioinfiltration was solely proposed (as opposed to biofiltration) as the available soil information suggested infiltration rates could be sufficient to allow complete draw-down within 24-48 hours following a storm event (Figure 4).



Figure 4: Rain garden before/after and during a rainfall event

All curb-cut rain gardens were presumed to have a 12" ponding depth, pretreatment, mulch, and perennial ornamental and native plants. The useful life of the project was assumed to be 30 years and so all costs are amortized over that time period. Additional costs were included for rehabilitation of the gardens at years 10 and 20. Annual maintenance was assumed to be completed by the landowner of the property at which the rain garden could be installed.

Boulevard Bioswale

One option for retrofitting a stormwater BMP within an existing boulevard is a bioswale. This practice is similar to the curb-cut rain garden in its orientation and size. Bioswales typically range from 5-30' in length, house a rich native plant community, and are installed between the existing sidewalk and roadway curb (Figure 5). Unlike rain gardens, these practices are typically much shallower (1-3" in depth) and have a curb-cut inlet and outlet (Figure 5). Although many rain gardens have outlets in the form of underdrains or risers, the bioswale outlet allows for a nearly continuous flow of

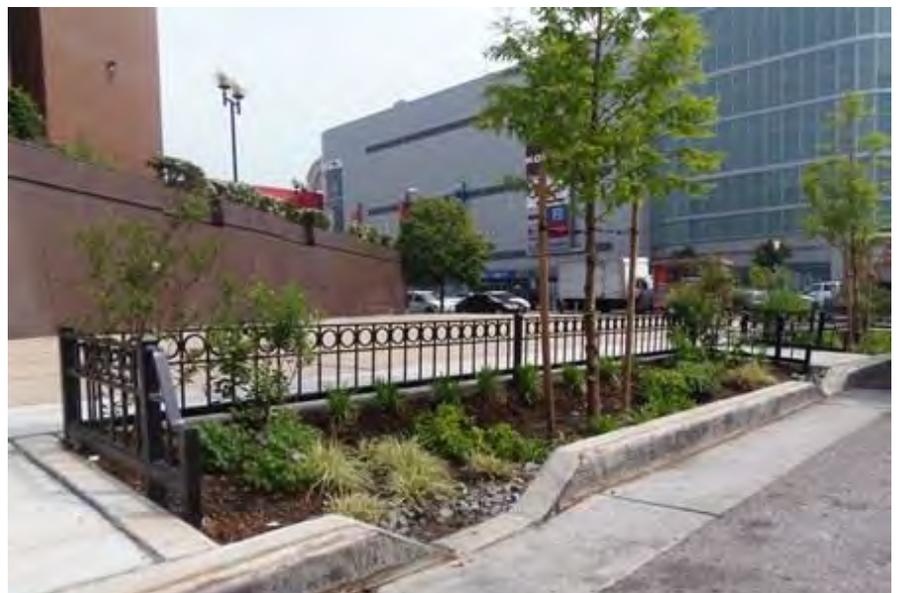


Figure 5: Right-of-way bioswale installed in New York City (NYC Environmental Protection, 2013)

stormwater through the practice. Although some infiltration does occur, the primary form of treatment is the settling of pollutants as stormwater flows through the dense plant community.

This practice was modeled to estimate the pollutant reduction capacity for TSS, TP, and stormwater volume in medium density residential drainage areas ranging from 0.25 to 4 acres (Table 9). A 20' long (parallel to roadway), 4' wide (perpendicular to roadway), and 3" deep bioswale was modeled with an infiltration rate of 2.5"/hour. No underdrain was modeled with this practice as they are designed to be flow-through systems with limited ponding ($\leq 3''$). Additional model inputs are noted in Appendix A – Modeling Methods.

Table 9: WinSLAMM model results for the boulevard bioswale with a 2.5"/hour infiltration rate.

Drainage Area (acres)	<i>Standard Boulevard Bioswale</i>					
	TP Removal		TSS Removal		Volume Removal	
	lbs-TP	%	lbs-TSS	%	ac-ft	%
0.25	0.07	33.3%	43	38.0%	0.058	21.9%
0.5	0.09	23.7%	61	28.3%	0.067	12.6%
1	0.08	13.0%	53	15.6%	0.074	7.0%
2	0.07	8.0%	45	9.8%	0.082	3.8%
3	0.08	6.8%	47	8.6%	0.087	2.7%
4	0.08	6.2%	48	8.0%	0.09	2.1%

Infiltration Basin

Infiltration basins function identically to the curb-cut rain gardens previously described in this bioretention section. However, these basins are proposed in locations where a large amount of space is available. This presents an opportunity to construct a large-scale (i.e. > 500 sq.-ft.) infiltration basin. This allows stormwater runoff to fill the basin and be filtered by the soil and vegetation.

Probable project cost includes installation of the project as well as promotion, administrative, and design costs, all in 2016 dollars. A reduced construction cost (i.e. \$15 to \$20 per ft.²) relative to other bioretention practices was proposed for the infiltration basin because of assumed cost savings with a larger project. Furthermore, the large open spaces available at each of the proposed project locations could allow the basins to be constructed without retaining walls, which would result in a significant cost savings. Maintenance was assumed to be completed by city public works crews. Maintenance costs were also included for rehabilitation of the basin every 10 years for the life of the project.

Hydrodynamic Devices

In heavily urbanized settings stormwater is immediately intercepted along roadway catch basins and conveyed rapidly via storm sewer pipes to its destination. Once stormwater is intercepted by catch basins, it can be very difficult to supply treatment without large end-of-pipe projects such as regional ponds. One of the possible solutions is the hydrodynamic device (Figure 6). These are installed in-line with the existing storm sewer network and can provide treatment for up to 10-15 acres of upland drainage. This practice applies some form of filtration, settling, or hydrodynamic separation to remove coarse sediment, litter, oil, and grease. These devices are particularly useful in small but highly urbanized drainage areas and can be used as pretreatment for other downstream stormwater BMPs.

Each device's pollutant removal potential was estimated using WinSLAMM. Devices were sized based on upstream drainage area to ensure peak flow does not exceed each device's design guidelines. For this analysis, Downstream Defender devices were modeled based on available information and to maintain continuity across other SRAs. Devices were proposed along particular storm sewer lines and often just upstream of intersections with another, larger line. Model results assume the device is receiving input from all nearby catch basins noted.

In order to calculate the cost-benefit, the cost of each project had to be estimated. To fully estimate the cost of project installation, labor costs for project outreach, promotion, design, administration, and maintenance over the anticipated life of the practice were considered in addition to actual construction costs. Load reduction estimates for these projects are noted in the Catchment Profiles section.

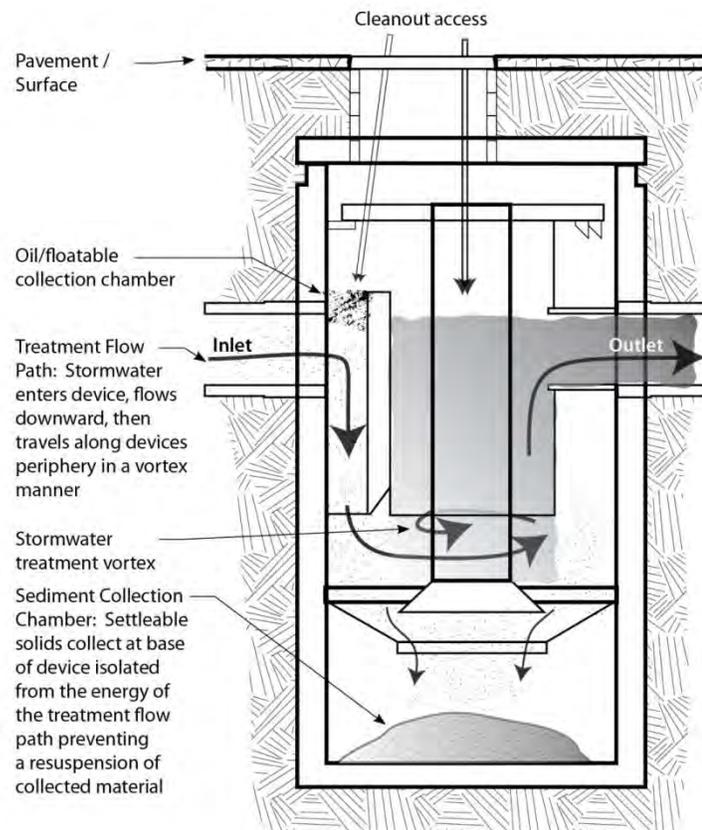
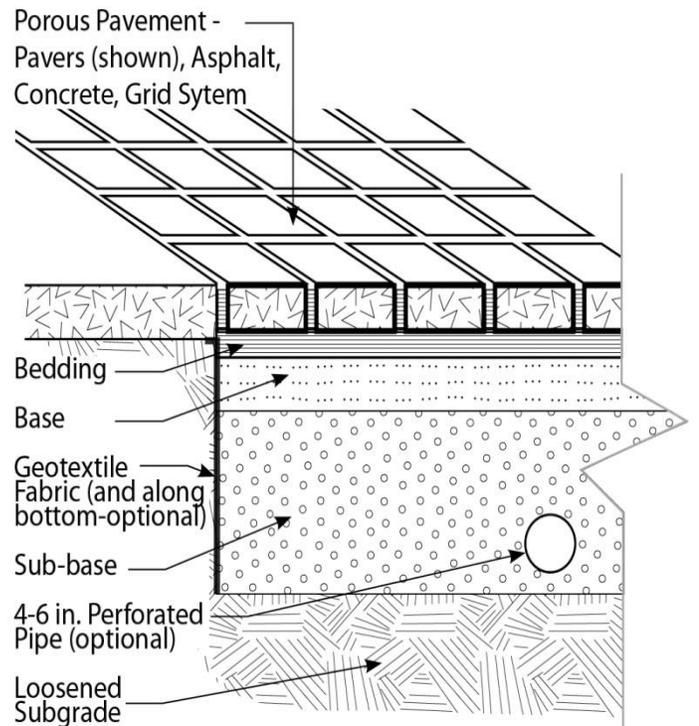


Figure 6: Schematic of a typical hydrodynamic device

Permeable Pavement

Relatively flat, low traffic areas provide a suitable location for diverting stormwater runoff from impervious surfaces to porous pavement. Void space between concrete pavers or within permeable asphalt and concrete allow water to percolate through the surface to an underlying layer(s) of coarse aggregate rock (Figure 7). This aggregate can act as a reservoir providing water quality and quantity benefits by filtering the stormwater and creating storage. From here water can either be stored temporarily or can infiltrate into the ground to recharge local groundwater aquifers. Many designs include permeable geotextile fabric to separate the un-compacted soil subgrade from the coarse aggregate and to facilitate infiltration. If soils don't allow for infiltration, a liner can be installed with an underdrain attached to nearby storm sewers or additional stormwater BMPs. This still allows for filtration through the pavement and aggregate, and reduces peak discharge from the site.

This practice is ideally suited for small drainage areas flowing to low traffic pavement surfaces (Figure 8). For a residential property, roof runoff can be diverted via rain leaders to a permeable driveway. On a commercial property, parking spaces within a large parking lot could be converted to permeable pavement to capture runoff from the parking lot, sidewalks, and any buildings on the property. On a residential roadway, parking spaces on either side of the street could be converted to permeable pavement. In this case the practice could treat not just the roadway but multiple properties along the street. Permeable pavement can be used for many



Graphic adapted from the Charles River Watershed Association - Information Sheet

Figure 7: Schematic of typical permeable pavement surface and subgrade.



Figure 8: Photo comparing conventional and permeable asphalt

other scenarios in areas where soil type, seasonal water table, and frost line allow for groundwater recharge.

The capacity for this practice is completely dependent on the reservoir size within the aggregate and whether or not infiltration can occur on the site. In most cases the permeable pavement treats stormwater received from just the surface itself and adjacent impervious surfaces. A general design guideline used in this analysis is a ratio between the permeable pavement surface area and the area of the impervious surface draining to the practice of 1:2. Other than reservoir capacity, this ratio also depends on the infiltration rate (in the case that the BMP allows for infiltration) or drainage time (if an underdrain is installed) and how well the practice is maintained as clogging can greatly decrease the ability of the practice to capture runoff.

The pollutant removal potential of permeable pavement was estimated using WinSLAMM. A detailed account of the methodologies used is included in Appendix A – Modeling Methods. In order to calculate cost-benefit, the cost of each project had to be estimated. To fully estimate the cost of project installation, labor costs for project outreach, promotion, design, administration, and maintenance over the anticipated life of the practice were considered in addition to actual construction costs. Load reduction estimates for these projects are noted in the Catchment Profiles section.

Iron-Enhanced Sand Filter Pond Bench

Wet retention ponds, although very effective in treating stormwater for suspended sediment and nutrients bound to sediment, have shown a limited ability at retaining dissolved species of nutrients. This is most notable for phosphorus, which easily adsorbs to sediment when in particulate form. Median values for pollutant removal percentage by wet retention ponds are 84% for TSS and 50% for TP (MN Stormwater Manual). For the case of phosphorus, dissolved species typically constitute 40-50% of TP in urban stream systems, but only 34% (median efficiency; Weiss et al., 2005) of dissolved phosphorus is treated by the pond. Thus, a majority of the phosphorus escaping wet retention ponds is in dissolved form. This has important effects downstream as dissolved phosphorus is a readily available nutrient for algal uptake in waterbodies and can be a main cause for nutrient eutrophication.

To address this deficiency, researchers at the University of Minnesota developed a method to augment phosphorus retention within a sand filter. They've named this technology the "Iron Enhanced Sand Filter" (IESF; Figure 9). Locally, this practice has also been identified as the "Minnesota Filter." IESFs rely on the properties of iron to bind dissolved phosphorus as it passes through an iron rich medium. Depending on topographic characteristics of the installation sites, IESFs can rely on gravitational flow and natural water level fluctuation, or water pumping to hydrate the IESF. IESFs must be designed to prevent anoxic conditions in the filter medium because such conditions will release the bound phosphorus. Because IESFs are intended to remove dissolved phosphorus and not organic phosphorus, they are typically constructed just downstream of stormwater ponds, minimizing the amount of suspended solids that could compromise their efficacy and drastically increase maintenance. As an alternative to an IESF, a ferric-chloride injection system could be installed to bind dissolved phosphorus into a flocculent, which would settle in the bottom of the new pond.

Figure 9 shows an IESF that is installed at an elevation slightly above the normal water level of the pond so that following a storm event the increase in depth of the pond would be first diverted to the IESF. The filter would have drain tile installed along the base of the trench and would outlet downstream of the current pond outlet. Large storm events that overwhelm the IESF's capacity would exit the pond via the existing outlet.

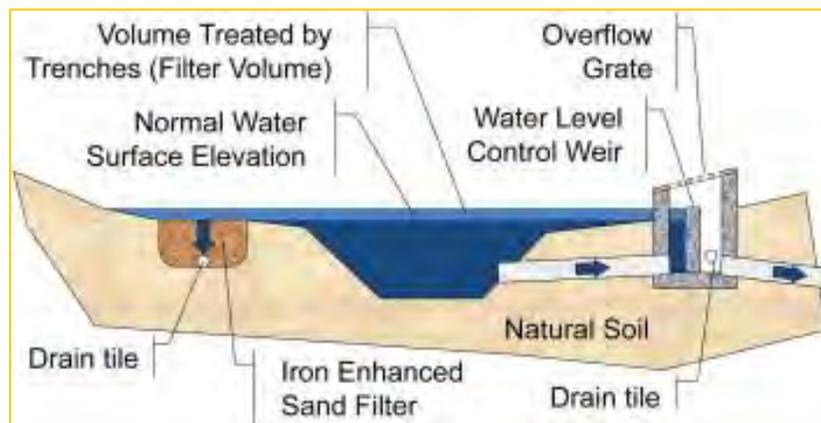


Figure 9: Iron Enhanced Sand Filter Concept (Erickson & Gulliver, 2010)

Benefits for stormwater ponds were modeled utilizing WinSLAMM. After selecting an optimal pond configuration in terms of cost-benefit, or by using the existing pond configuration if no updates are needed, modeling for an IESF was also completed in WinSLAMM. WinSLAMM is able to calculate flow through constructed features such as rain gardens with underdrains, soil amendments, and controlled

overflow elevations. An IESF works much the same way. Storm event based discharge volumes and phosphorus concentrations estimated by WinSLAMM at the pond outlet were entered into WinSLAMM as inputs into the IESF. Various iterations of IESFs were modeled to identify an optimal treatment level compared to construction costs and space available. A detailed account of the methodologies used is included in Appendix A – Modeling Methods.

To account for the DP treated by the IESF, an additional 80% DP removal was assumed for each IESF in addition to any removal by the pond. This value is based on laboratory and field tests performed by the University of Minnesota (Erickson & Gulliver, 2010) and assumes only removal of DP species within the device. Load reduction estimates for these projects are noted in the Catchment Profiles sections.

In order to calculate cost-benefit, the cost of each project had to be estimated. IESF projects were assumed to involve some excavation and disposal of soil, land acquisition (if necessary), erosion control, and vegetation management. Additionally, project engineering, promotion, administration, construction oversight, and long-term maintenance had to be considered in order to capture the true cost of the effort. Annual maintenance costs were estimated to be \$10,000 per acre of IESF based on information received from local, private consulting firms. Additional costs associated with specific projects are listed in Appendix B – Project Cost Estimates.

Modification to an Existing Pond

Developments prior to enactment of contemporary stormwater rules often included wet detention ponds which were frequently designed purely for flood control based on the land use, impervious cover, soils, and topography of the time. Changes to stormwater rules since the early 1970's have altered the way ponds are designed.

Enactment of the National Pollution Discharge Elimination System (NPDES) in 1972 followed by research conducted by the Environmental Protection Agency in the early 1980's as part of the Nationwide Urban Runoff Program (NURP) set standards by which stormwater best management practices should be designed. Municipal Separate Storm Sewer System (MS4) guidelines issued in 1990 (affecting cities with more than 100,000 residents) and 1999 (for cities with less than 100,000 residents) required municipalities to obtain an NPDES permit and develop a plan for managing their stormwater.

Listed below are five strategies which exist for retrofitting a stormwater pond to increase pollutant retention (modified from *Urban Stormwater Retrofit Practices*):

- Excavate pond bottom to increase permanent pool storage
- Raise the embankment to increase flood pool storage
- Widen pond area to increase both permanent and flood pool storage
- Modify the riser
- Update pool geometry or add pretreatment (e.g. forebay)

These strategies can be employed separately or together to improve BMP effectiveness. Each strategy is limited by cost-effectiveness and constraints of space on the current site. Pond retrofits are preferable to most new BMPs as additional land usually does not need to be purchased, stormwater easements already exist, maintenance issues change little following project completion, and construction costs are greatly cheaper. There can also be a positive effect on reducing the rate of overflow from the pond, thereby reducing the risk for erosion (and thus further pollutant generation) downstream.

For this analysis, all existing ponds were modeled in the water quality model WinSLAMM to estimate their effectiveness based on best available information for pond characteristics and land use and soils. One proposed modification, excavating the pond bottom to increase storage, often has a very wide range in expected cost due to the nature of the excavated soil. If the soil has been contaminated and requires landfilling, the cost for disposal can quickly lead to a doubling in project cost. For this reason, projects which include the excavation of ponds have been priced based on the following criteria:

- Management Level 1: Dredged pond soil is suitable for use or reuse on properties with a residential or recreational use
- Management Level 2: Dredged pond soil is suitable for use or reuse on properties with an industrial use
- Management Level 3: Dredged pond soil is considered significantly contaminated and must be managed specifically for the contaminants present

Costs within each of these levels can even range widely, but were estimated to be \$20/cu-yd., \$35/cu-yd., and \$50/cu-yd. for levels 1, 2, and 3, respectively. Additional costs associated with specific projects are listed in Appendix B – Project Cost Estimates.

New Stormwater Pond

If properly designed, wet retention ponds have controlled outflows to manage discharge rates and are sized to achieve predefined water quality goals. Wet retention ponds treat stormwater through a variety of processes, but primarily through sedimentation. Ponds are most often designed to contain a permanent pool storage depth; it is this permanent pool of water that separates the practice from most other stormwater BMPs, including detention ponds (Figure 10).

Wet retention pond depth generally ranges from 3-8' deep. If ponds are less than 3' deep, winds can increase mixing through the full water depth and re-suspend sediments, thereby increasing turbidity. Scour may also occur during rain events following dry periods. If more than 8' deep, thermal stratification can occur

creating a layer of low dissolved oxygen near the sediment that can release bound phosphorus. Above the permanent pool depth is the flood depth, which provides water quality treatment directly following storm events. Separating the permanent pool depth and the flood depth is the primary outlet control, which is often designed to control outflow rate. Configurations for the outlet control may include a V-notch or circular weir, multiple orifices, or a multiple-stage weir. Each of these can be configured within a skimmer structure or trash rack to provide additional treatment for larger, floatable items. Above the flood depth is the emergency control structure, which is available to bypass water from the largest rainfall events, such as the 100-year precipitation event. Ponds also often include a pretreatment practice, either a forebay or sedimentation basin adjacent to the pond or storm sewer sumps, hydrodynamic devices, or other basins upstream of the practice.

Outside of sedimentation, other important processes occurring in ponds are nutrient assimilation and evapotranspiration by plants. The addition of shoreline plants to pond designs has increased greatly since the 1980's because of the positive effects these plants were found to have for both water quality purposes and increasing terrestrial and aquatic wildlife habitat. The ability of the pond to regulate discharge rates should also be noted. This can reduce downstream in-channel erosion, thereby decreasing TSS and TP loading from within the channel.

With the multitude of considerations for these practices, ponds must be designed by professional engineers. This report provides a rudimentary description of ponding opportunities and cost estimates for project planning purposes. Ponds proposed in this analysis are designed and simulated within the water quality model WinSLAMM, which takes into account upland pollutant loading, pond bathymetry, and outlet control device(s) to estimate stormwater volume, TSS, and TP retention capacity. The model was run with and without the identified project and the difference in pollutant loading was calculated.

In order to calculate cost-benefit, the cost of each project had to be estimated. All new stormwater ponds were assumed to involve excavation and disposal of soil, installation of inlet and outlet control structures and emergency overflow, land acquisition, erosion control, and vegetation management.

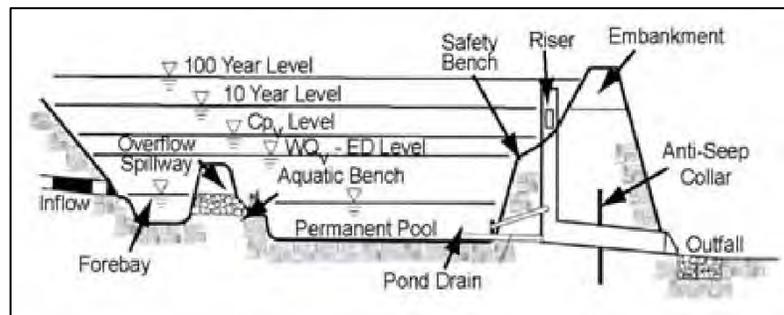


Figure 10: Schematic of a stormwater retention pond.

Additionally, project engineering, promotion, administration, construction oversight, and long-term maintenance (including annual inspections and removal of accumulated sediment/debris from the pretreatment area) had to be considered in order to capture the true cost of the effort. Complete pond dredging is not included in the long-term maintenance cost because project life is estimated to be 30 years. Load reduction estimates for these projects are noted in the Catchment Profiles section. Additional costs associated with specific projects are listed in Appendix B – Project Cost Estimates.

Stormwater Reuse

Some of the major water resource issues today include improving stormwater treatment (quantity and quality), increasing groundwater recharge, and decreasing public water usage. Stormwater reuse is a powerful BMP strategy that can be applied to address each of these on a scale ranging from a single property to an entire neighborhood. Stormwater reuse allows for the utilization of stormwater to supplement potable sources, in applications that do not require water to be at a standard set for consumption. An example of this might be using captured stormwater to irrigate a golf course or recreational fields.

Benefits from this practice are twofold. First, stormwater runoff is given multiple opportunities for treatment. Treatment through settling, filtering, or hydrodynamic separation at the BMP site provides initial treatment of particulates, litter, and other debris. Application of the stormwater as irrigation allows for infiltration through the soil layer and treatment of the dissolved load of pollutants that may have remained. The second benefit is the reduced usage of potable water. As there is no need for highly treated water when irrigating a lawn, the stress placed on water treatment facilities and the water distribution network can be reduced.

The concept for this practice at its smallest scale is that of a rain barrel on a residential property. Runoff from the impervious roof is captured by gutters and diverted to the rain barrel until it is needed for watering the lawn or garden. At a larger scale, runoff from roofs, driveways, sidewalks, and roadways is diverted to roadway catch basins and to the storm sewer network. A cistern or similar containment unit holds water from storm sewers until it is needed for irrigation. These structures can vary in size from tens of gallons to hundreds of thousands of gallons. Stormwater detention and retention ponds are also popular choices as construction and maintenance costs are often much cheaper than underground cisterns.

These practices often require significant capital investment as updates to the local stormwater infrastructure may be needed. Large cisterns, whether made of concrete or plastic, can require high transportation and installation costs. Additional infrastructure may also be necessary, including a foundation to sustain the weight of the cistern (whether above or below ground), pump, and conveyance system. A detailed maintenance plan is also necessary even if other forms of pretreatment (e.g. hydrodynamic device, baffle, etc.) are installed. Lastly, during dry periods potable water may still be needed to supplement stormwater when the containment unit is empty.

The pollutant removal potential of stormwater reuse devices was estimated using the stormwater model WinSLAMM. In order to calculate cost-benefit, the cost of each project had to be estimated. To fully estimate the cost of project installation, labor costs for project outreach, promotion, design, administration, and maintenance over the anticipated life of the practice were considered in addition to actual construction costs. Costs for projects are listed in detail in Appendix B – Project Cost Estimates. Load reduction estimates for these projects are noted in the Catchment Profiles section.

Catchment Profiles

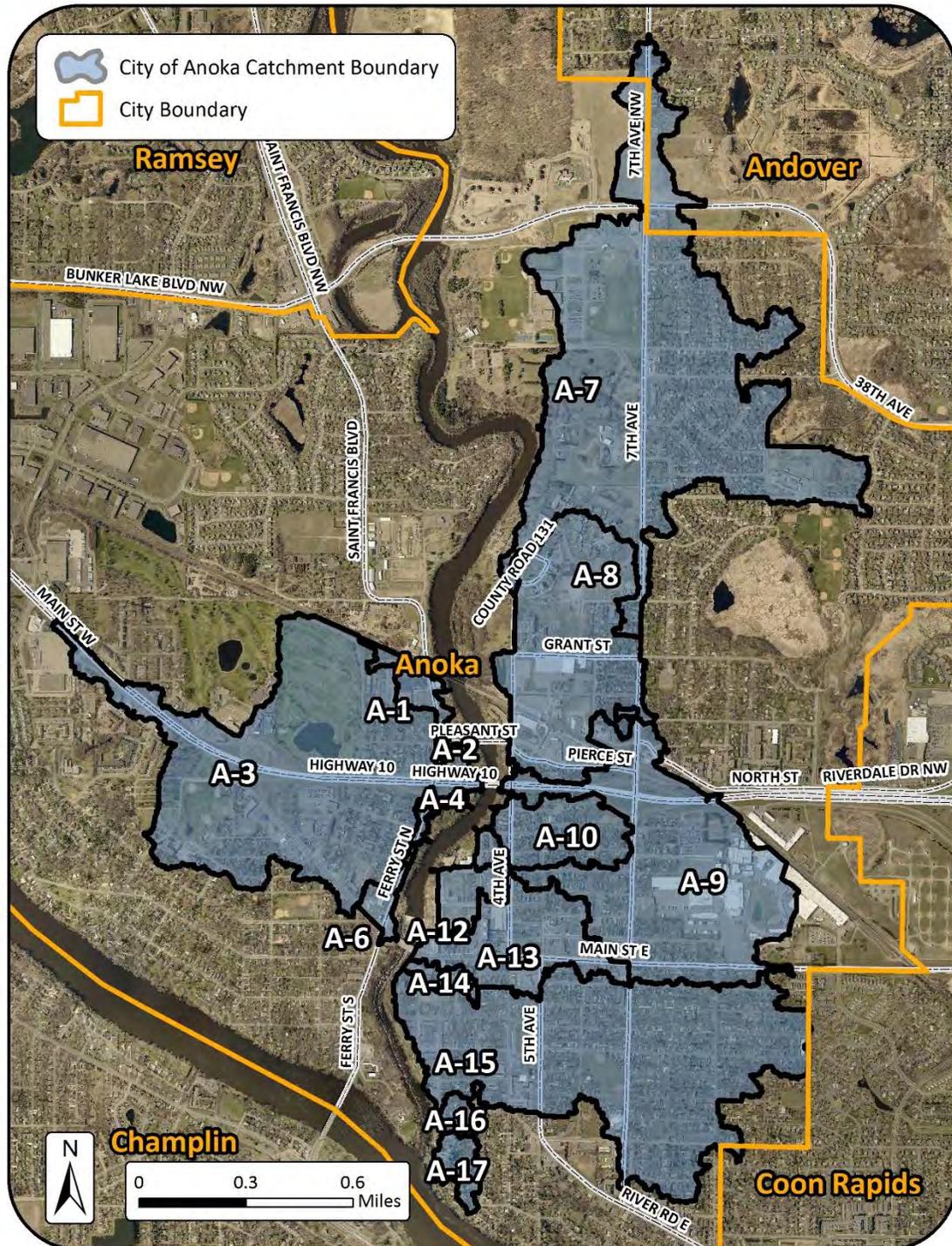


Figure 11: The 1,469-acre drainage area was divided into 17 catchments for this analysis. Catchment profiles on the following pages provide additional information.

Western Drainage Network

Catchment ID	Page
A-1	35
A-2	41
A-3	45
A-4	53
A-5	56
A-6	59

Existing Network Summary	
Acres	313.2
Dominant Land Cover	Residential
Volume (ac-ft/yr)	208.0
TP (lb/yr)	151.3
TSS (lb/yr)	50,263



DRAINAGE NETWORK SUMMARY

The western drainage network includes all areas of the City of Anoka draining to the western shores of the Rum River south of the Burlington Northern railroad tracks to approximately Main St. Six catchments lie within this drainage network, each with their own outfall to the Rum River. These outfalls are located at (from north to south) Ferry Street 200' south of the Burlington Northern railroad tracks (Catchment A-1), Maple Avenue (A-2), US-10 (A-3), Maple Lane (A-4), Clay Street (A-5), and Main St. (A-6).

Catchment size varies greatly, from just over two acres to up to 280 acres. Notable areas of the drainage network include the US-10 and US-169 highway corridors, the public golf course, Ward Park, and commercial properties along Main St. and US-169.

EXISTING STORMWATER TREATMENT

Stormwater runoff generated across the network is, for the most part, quickly intercepted within either municipal, county, or MNDOT storm sewer and conveyed to one of six stormwater outfalls to the Rum River. Nine stormwater treatment devices exist throughout the network which treat stormwater prior to discharge into the Rum River. Most of these treat relatively small drainage areas (<15 acres). Exceptions to this include Ward Park pond, which treats 25 acres of residential streets and parkland, and the Green Haven Golf Course pond, which treats 177 acres of golf course, US-10, parkland, commercial, and residential land uses. Both of these ponds are in Catchment A-3. Additional detail on these ponds and other stormwater BMPs are provided in the Catchment Profiles.

Catchment A-1

Existing Catchment Summary	
Acres	14.8
Dominant Land Cover	Institutional
Parcels	25
Volume (ac-ft/yr)	12.4
TP (lb/yr)	10.4
TSS (lb/yr)	4,826



CATCHMENT DESCRIPTION
 This catchment drains nearly 15 acres of public-institutional and industrial land uses along Ferry Street between the Burlington Northern railroad tracks and Highway 10. The catchment is highly impervious, predominantly due to the Anoka-Hennepin Education Service Center building and parking lot comprising about 50% of the geographical area of the catchment.

Stormwater generated in Catchment A-1 is directed to a storm sewer network beginning under the parking lot of the Anoka-Hennepin Education Service Center and flowing east to an outfall to the Rum River east of the A1 Recycling Center.

EXISTING STORMWATER TREATMENT
 No existing treatment exists in this catchment beyond street cleaning provided by the City of Anoka two times per year. Present-day stormwater pollutant loading and treatment is summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	1			
	BMP Types	Street Cleaning			
	TP (lb/yr)	11.1	0.7	6%	10.4
	TSS (lb/yr)	5,278	452	9%	4,826
	Volume (acre-feet/yr)	12.4	0.0	0%	12.4

PROPOSED RETROFITS OVERVIEW
 As no existing treatment exists in this catchment, in-line treatment along the main storm sewer line was proposed in a hydrodynamic device installed along Ferry St. within the road right-of-way. This unit could treat up to 14.8 acres of the predominantly impervious catchment.

To help reduce peak flows to the storm sewer network (and a potential hydrodynamic device installed along the network), permeable pavement was also proposed for the eastern parking lot of the Anoka-

Hennepin Education Service Center. A rain garden was also proposed to be along Ferry Street to also reduce peak flows as well as to capture TSS and TP.

Project ID: 1-A

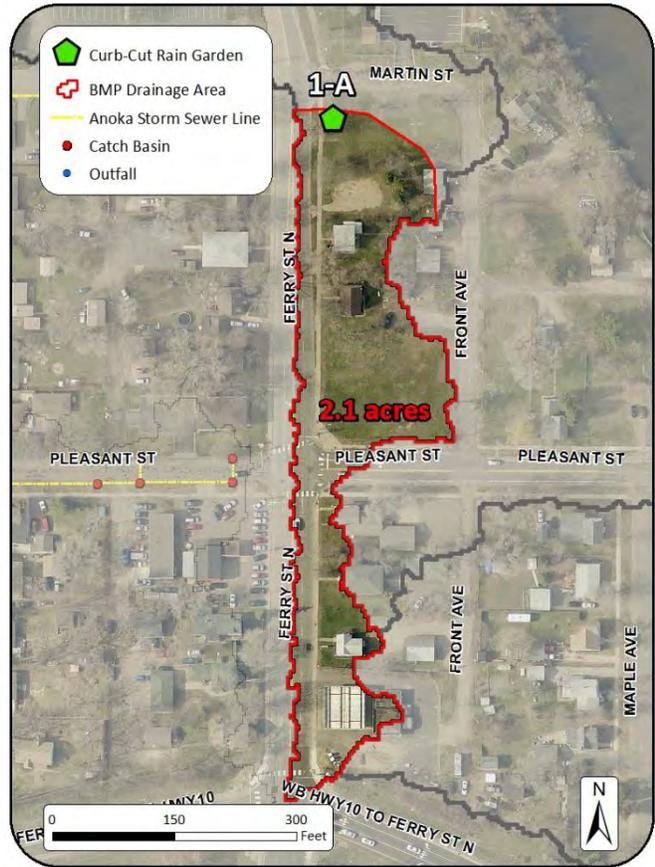
Ferry St. & Front Ave. Curb-Cut Rain Garden

Drainage Area – 2.1 acres

Location – On Ferry Street at Front Avenue

Property Ownership – Public (City of Anoka)

Site Specific Information – One location was identified along Ferry Street on public property for a curb-cut rain garden. This retrofit could treat stormwater pollutants originating from Ferry Street and from surrounding residential properties.



Curb-Cut Rain Garden			
		Cost/Removal Analysis	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	250 sq-ft	
	TP (lb/yr)	0.5	4.8%
	TSS (lb/yr)	187	3.9%
	Volume (acre-feet/yr)	0.5	3.9%
Cost	Administration & Promotion Costs*	\$1,606	
	Design & Construction Costs**	\$7,376	
	Total Estimated Project Cost (2016)	\$8,982	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$1,049	
	30-yr Average Cost/1,000lb-TSS	\$2,804	
	30-yr Average Cost/ac-ft Vol.	\$1,090	

*Indirect Cost: (10 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)

**Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 1-B

Ferry Street Hydrodynamic Device

Drainage Area – 14.8 acres

Location – Ferry Street

Property Ownership – Public

Site Specific Information – A hydrodynamic device could be installed on Ferry Street at the outlet of the catchment. A device at this location would be able to accept and treat runoff from the entire catchment.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10	ft diameter
	TP (lb/yr)	1.0		9.6%
	TSS (lb/yr)	584		12.1%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$4,288	
	30-yr Average Cost/1,000lb-TSS		\$7,343	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 1-C

Anoka-Hennepin Education Center Permeable Pavement

Drainage Area – 3.8 acres
Location – Eastern parking lot of the Anoka-Hennepin Education Service Center
Property Ownership – Public
Site Specific Information – Permeable pavement is proposed for the eastern parking lot of the Anoka-Hennepin Education Services Center. This practice allows the treatment of a large surface area with minimal impact on the usable space. In order to treat the 3.8-acre drainage area, 54,886 sq.-ft. of permeable pavement is proposed.



Permeable Pavement			
		Cost/Removal Analysis	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMP	54,886 sq-ft	
	TP (lb/yr)	2.9	27.9%
	TSS (lb/yr)	1,325	27.5%
	Volume (acre-feet/yr)	3.5	28.2%
Cost	Administration & Promotion Costs*	\$2,920	
	Design & Construction Costs**	\$549,736	
	Total Estimated Project Cost (2016)	\$552,656	
	Annual O&M***	\$41,165	
Efficiency	30-yr Average Cost/lb-TP	\$20,547	
	30-yr Average Cost/1,000lb-TSS	\$44,971	
	30-yr Average Cost/ac-ft Vol.	\$17,044	

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$10/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

***(\$0.75/sq-ft for routine maintenance)

Catchment A-2

Existing Catchment Summary	
Acres	3.7
Dominant Land Cover	Residential
Parcels	16
Volume (acre-feet/yr)	2.0
TP (lb/yr)	2.1
TSS (lb/yr)	678



CATCHMENT DESCRIPTION

Catchment 2 is bounded by residences on Polk Street NE, 39th Avenue NE, Johnson Street NE, and the railroad tracks. 37th Avenue NE bisects the catchment from east to west. The catchment is comprised primarily of single family residential properties. There are a few multi-family homes and one commercial property.

All stormwater runoff generated in this catchment flows overland to the south and is collected by catch basins. The stormwater is then conveyed east to the Rum River.

EXISTING STORMWATER TREATMENT

As part of a roadway reconstruction project in 2015, a subsurface treatment system was installed along the Maple Avenue storm sewer network just upstream of the outfall to the Rum River. This subsurface treatment system consists of a St. Anthony Falls Laboratory (SAFL) Baffle installed within a manhole. In addition to this structural stormwater treatment, the City of Anoka conducts street cleaning two times per year. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	2.5	0.4	16%	2.1
	TSS (lb/yr)	881	203	23%	678
	Volume (acre-feet/yr)	2.0	0.0	0%	2.0

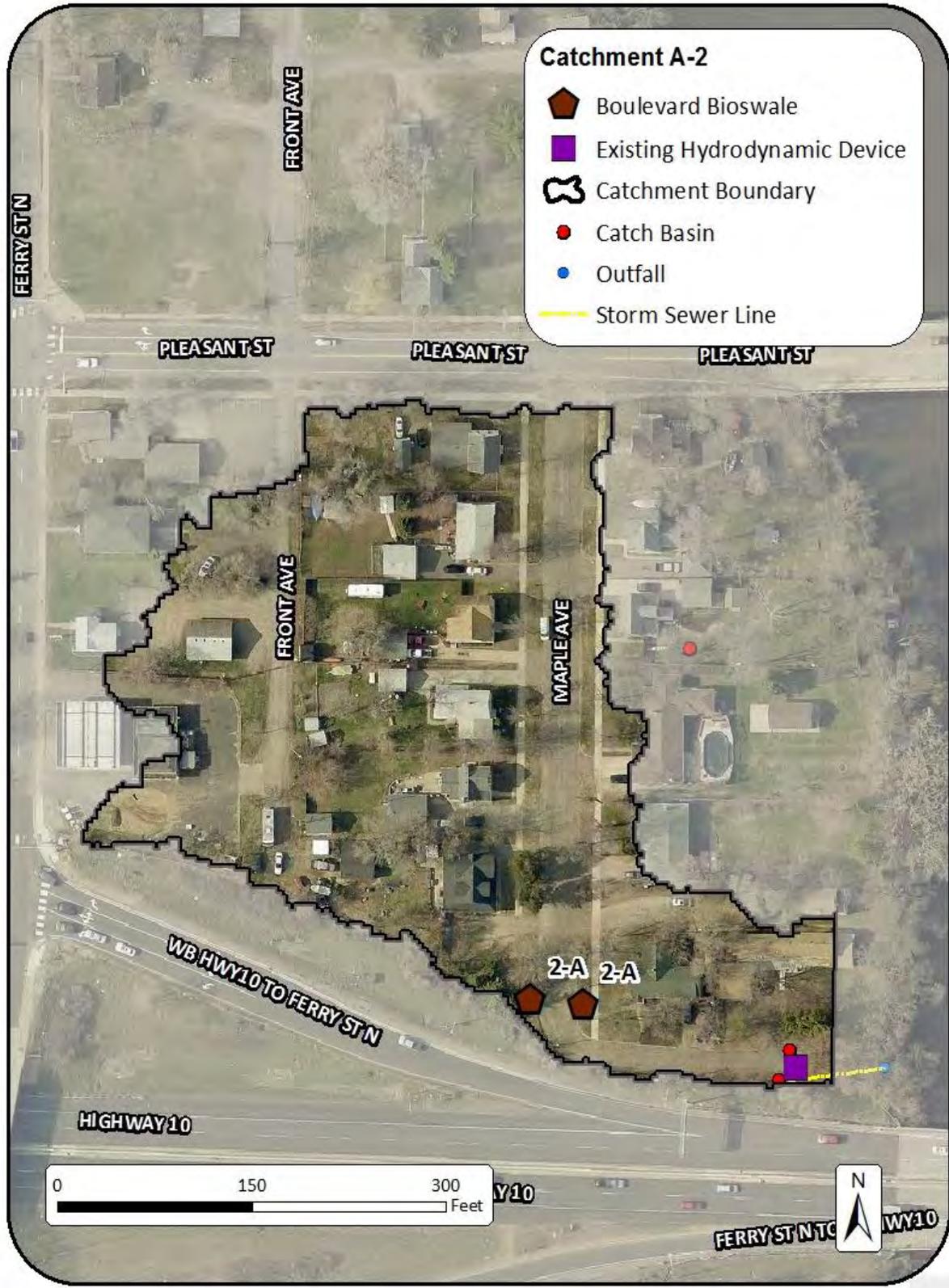
PROPOSED RETROFITS OVERVIEW

Two bioswales are proposed to supplement the treatment provided by the baffle. Infiltration rates should be sufficient enough to support infiltration practices considering the sandy Hubbard soils throughout the area.

RETROFITS CONSIDERED BUT REJECTED

Due to the small size of this catchment and its existing treatment no other retrofits were considered besides small bioretention practices.

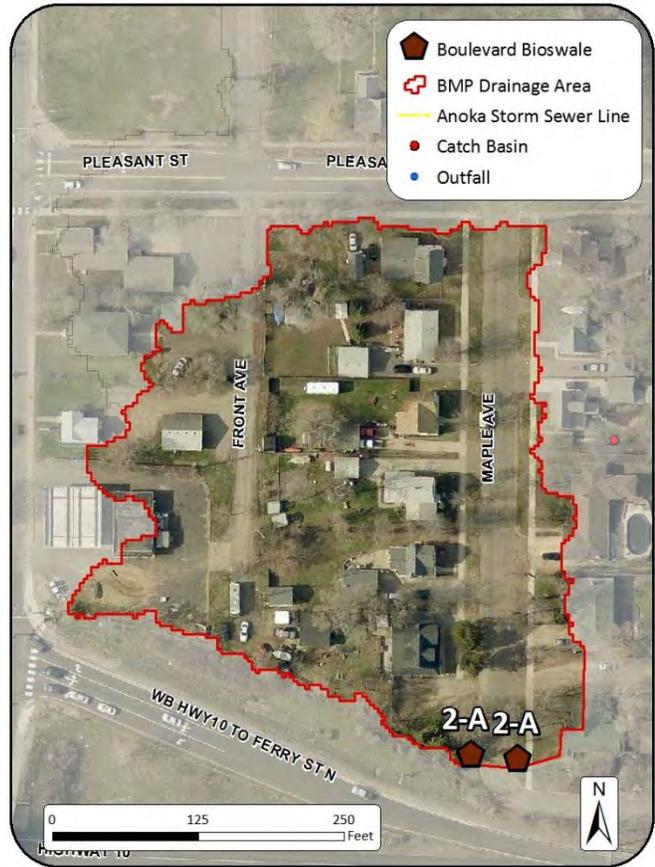
RETROFIT RECOMMENDATIONS



Project ID: 2-A

Maple Avenue Boulevard Bioswale

Drainage Area – 0.5 acre
Location – At southern end of Maple Avenue
Property Ownership – Public
Site Specific Information – Bioswales are proposed for installation along Maple Avenue to reduce sediment and phosphorus loads. The existing sidewalks along Maple Ave. make boulevard bioswales a viable option. Locations for up to two bioswales are sited, where they will serve to treat runoff from the streets and the surrounding private properties. The table below shows the estimated cost and pollutant removal amounts based on treatment of the 0.5-acre drainage area.



Boulevard Bioswale			
		2.5"/hr Infiltr. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.2	7.7%
	TSS (lb/yr)	55	8.2%
	Volume (acre-feet/yr)	0.1	6.5%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$3,140	
	30-yr Average Cost/1,000lb-TSS	\$9,202	
	30-yr Average Cost/ac-ft Vol.	\$3,859	

*Indirect Cost: (50 hours at \$73/hour)

**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Catchment A-3

Existing Catchment Summary	
Acres	286.1
Dominant Land Cover	Residential
Parcels	322
Volume (acre-feet/yr)	179.9
TP (lb/yr)	127.4
TSS (lb/yr)	40,532

CATCHMENT DESCRIPTION

Catchment A-3 contains all of Highway 10 and most of Main Street in the City of Anoka research area west of the Rum River. Highway 10 bisects the catchment from east to west. Within the catchment north of Highway 10 is the public golf course, east of the clubhouse, the Anoka-Hennepin Education Center western parking lot, and approximately 25 acres of single-family residential housing. On the south side of this catchment is parkland, large commercial lots, Franklin Elementary School, and additional single-family residential housing.



Stormwater generated within this catchment flows through various municipal storm sewer networks to a state line running east below Highway 10. This network discharges into the Rum River through a 60" diameter pipe just south of Highway 10.

EXISTING STORMWATER TREATMENT

Five existing structural BMPs are installed on city-owned property throughout the catchment. On the south side of Ward Park is a depression acting as a pond. Stormwater along Western Street and Forest Avenue is directed towards this depression and overflow appears to only occur overland through the park. A second retention pond is located in the southeastern corner of the golf course. This pond treats 202 acres of the Green Haven Golf Course, Highway 10, Ward Park, and commercial properties along Main Street.

The three remaining city-owned structural BMPs were installed as part of a roadway reconstruction project in 2015. On the northern edge of the catchment, State Avenue was shortened by about 250' south of Greenhaven Road, creating a dead end. In place of the roadway, a swale was installed that treats runoff from State Avenue and Greenhaven Road. This swale discharges west into the Green Haven Golf Course, and likely only during very large storm events due to its ponding depth and small contributing drainage area.

Two SAFL Baffles were also installed in new manholes as part of the 2015 reconstruction projects. These are located along storm sewer lines under Branch Avenue and the alleyway between Wingfield Avenue and Branch Avenue.

A single privately-owned BMP was modeled as part of this analysis. This is a large pond located on the Main Motor Sales Company property adjacent to State Avenue. This pond currently only treats runoff from the Main Motors property and discharges to the municipal storm sewer line running north to Highway 10.

Lastly, street cleaning is provided by the City of Anoka two times per year. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	<i>Existing Conditions</i>	Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	7			
	BMP Types	3 Ponds, 1 Infiltration Basin, 2 HDs, Street Cleaning			
	TP (lb/yr)	228.5	101.1	44%	127.4
	TSS (lb/yr)	88,416	47,884	54%	40,532
	Volume (acre-feet/yr)	181.0	0.0	0%	179.9

PROPOSED RETROFITS OVERVIEW

A variety of new stormwater treatment practices were proposed to supplement the existing treatment systems as well as to provide new opportunities to land uses that currently discharge untreated to the Rum River. Two BMPs were proposed at the golf course pond. The first project is an IESF bench along the golf course pond. If installed, this device could increase the retention of phosphorus from over 200 acres in the catchment. Secondly, stormwater reuse may also be an option for the golf course pond through using stormwater (in lieu of potable drinking water) to irrigate the grass on the course.

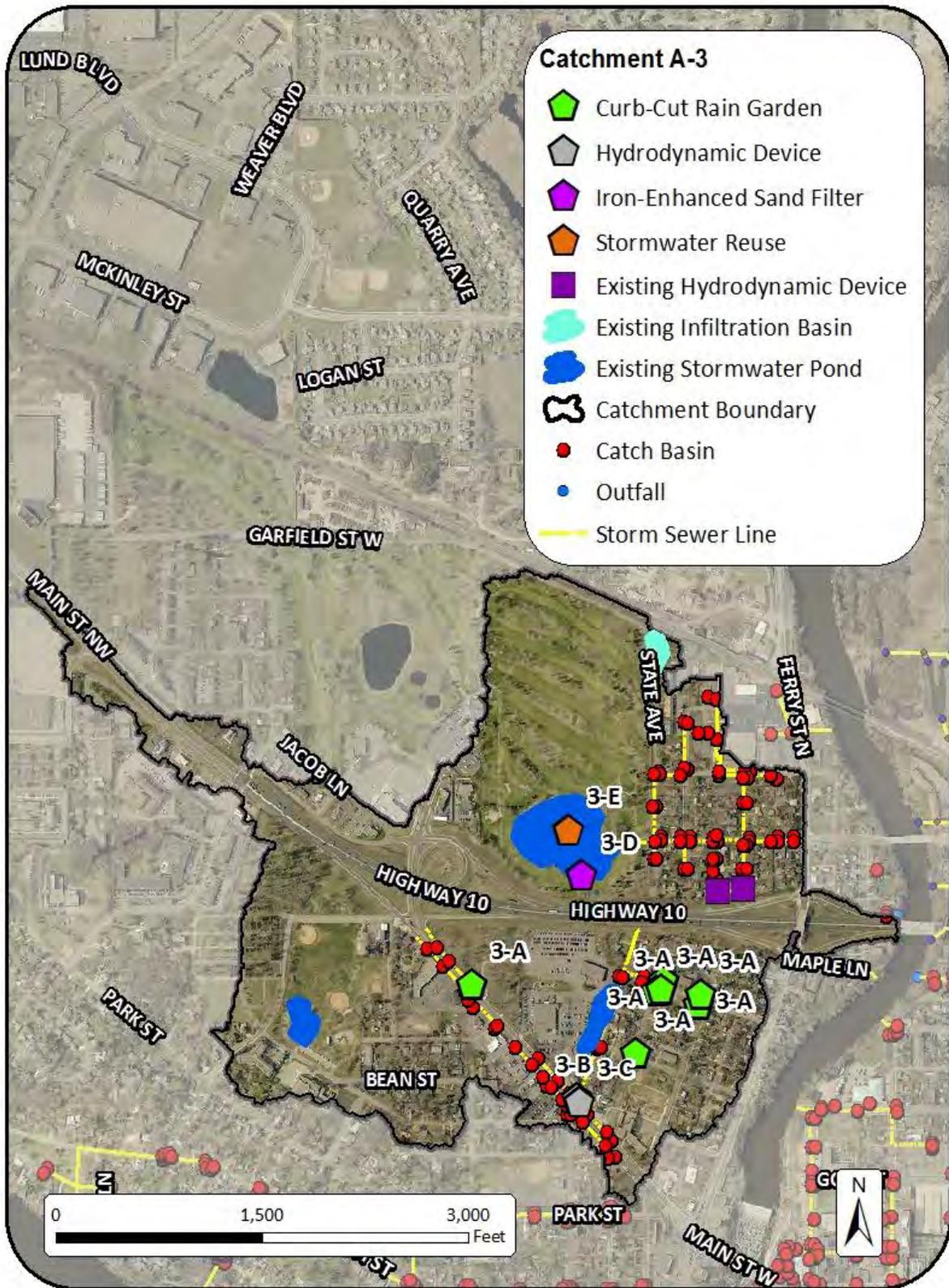
Two hydrodynamic devices are proposed to treat runoff generated along Main Street before it reaches the State Avenue line.

Bioretention practices were also explored throughout the catchment due to sandy soils found throughout the area. Up to seven curb-cut rain gardens were proposed for the residential and commercial areas south of Highway 10.

RETROFITS CONSIDERED BUT REJECTED

Curb-cut rain garden and boulevard bioswales were considered for the single-family residential housing area east of the golf course but were not proposed as drainage areas to the bioretention basins would be quite small due to the large number of catch basins throughout the area. Additionally, two hydrodynamic devices were proposed to be installed south of the Main St – Highway 10 interchange to treat storm sewer lines along Main Street. However, due to the number of retention ponds in the catchment, with modeling these hydrodynamic devices proved to be ineffective.

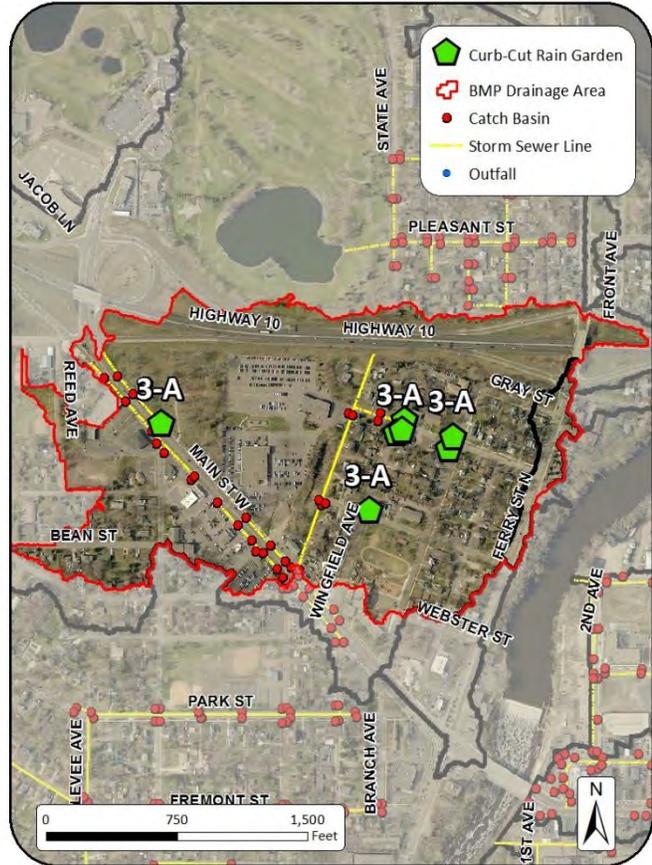
RETROFIT RECOMMENDATIONS



Project ID: 3-A

Curb-Cut Rain Gardens

Drainage Area – 1.5 - 10.5 acres
Location – Various locations throughout catchment
Property Ownership – Private
Site Specific Information – Single-family lots and a cemetery in the catchment provide various locations for curb-cut rain gardens to treat stormwater pollutants originating from private properties. Considering typical private landowner participation rates, scenarios with one, three, and seven rain gardens were analyzed to treat the contributing drainage areas.



Curb-Cut Rain Garden							
Cost/Removal Analysis		New Treatment	% Reduction	New Treatment	% Reduction	New Treatment	% Reduction
Treatment	Number of BMPs	1		3		7	
	Total Size of BMPs	250	sq-ft	750	sq-ft	1,750	sq-ft
	TP (lb/yr)	0.5	0.4%	1.5	1.2%	3.5	2.7%
	TSS (lb/yr)	157	0.4%	468	1.2%	1,089	2.7%
	Volume (acre-feet/yr)	0.4	0.2%	1.1	0.6%	2.7	1.5%
Cost	Administration & Promotion Costs*	\$8,468		\$10,220		\$13,724	
	Design & Construction Costs**	\$7,376		\$22,128		\$51,632	
	Total Estimated Project Cost (2016)	\$15,844		\$32,348		\$65,356	
	Annual O&M***	\$225		\$675		\$1,575	
Efficiency	30-yr Average Cost/lb-TP	\$1,506		\$1,169		\$1,072	
	30-yr Average Cost/1,000lb-TSS	\$4,797		\$3,746		\$3,447	
	30-yr Average Cost/ac-ft Vol.	\$2,052		\$1,558		\$1,410	

*Indirect Cost: (104 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)
 **Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)
 ***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 3-B

Main St. & State Ave.
Hydrodynamic Device

Drainage Area – 5.0 acres
Location – Northwestern corner of the Main Street and State Avenue intersection
Property Ownership – Public
Site Specific Information – A hydrodynamic device could be installed on Main Street and would accept runoff from areas primarily west of Main St. and the surrounding land uses. It could provide treatment to stormwater prior to discharging into the State Avenue stormwater pipe.



Hydrodynamic Device			
	Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	8 ft diameter	
	TP (lb/yr)	0.5	0.4%
	TSS (lb/yr)	280	0.7%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$54,000	
	Total Estimated Project Cost (2016)	\$55,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$4,977	
	30-yr Average Cost/1,000lb-TSS	\$8,887	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 3-C

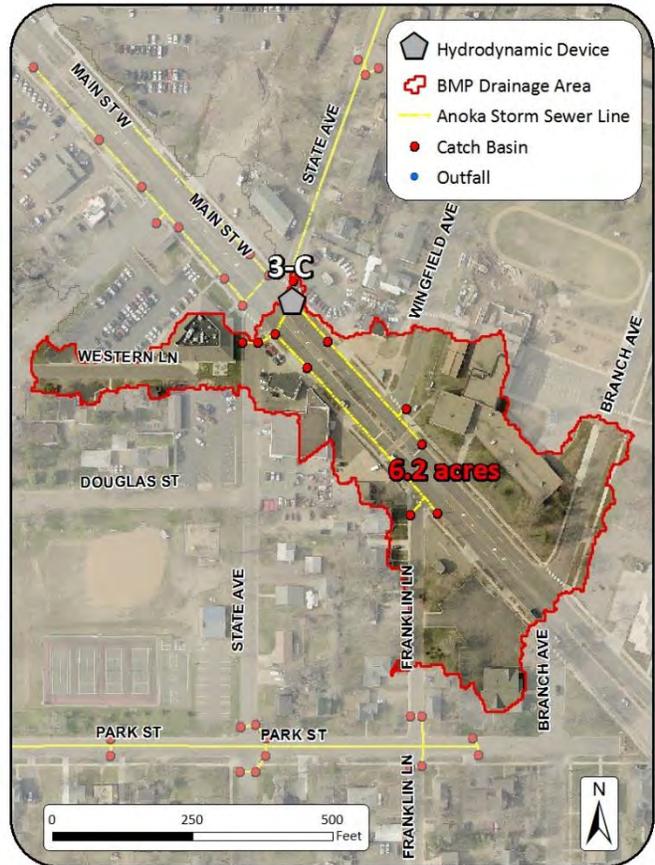
Main St. & State Ave.
Hydrodynamic Device

Drainage Area - 6.2 acres

Location – Northeastern corner of the Main Street and State Avenue intersection

Property Ownership – Public

Site Specific Information – A hydrodynamic device could be installed on Main Street and would accept runoff from the southern portion of Main Street and the surrounding land uses. It could provide stormwater treatment prior to discharging into the State Avenue stormwater pipe.



Hydrodynamic Device			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	8 ft diameter	
	TP (lb/yr)	0.6	0.5%
	TSS (lb/yr)	302	0.7%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$54,000	
	Total Estimated Project Cost (2016)	\$55,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$4,147	
	30-yr Average Cost/1,000lb-TSS	\$8,240	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 3-D

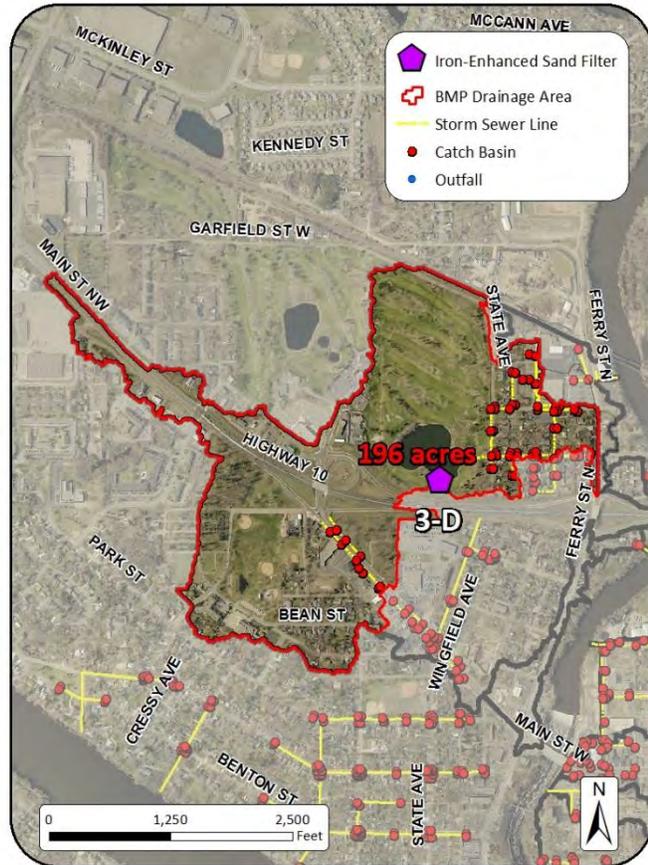
Golf Course Pond IESF Bench

Drainage Area – 196.0 acres

Location – South side of Green Haven Golf Course pond

Property Ownership – Public (City of Anoka)

Site Specific Information – An IESF bench is proposed as an improvement to the existing pond Green Haven Golf Course Pond. The pond currently provides treatment through retention and settling. However, the addition of an IESF will increase removal of dissolved phosphorus. The project is proposed on the south shore of the Green Haven Golf Course Pond. The IESF was sized to 14,000 sq.-ft. based on available space between the existing pond and the roadway.



IESF Bench			
		New Treatment	% Reduction
Cost/Removal Analysis			
Treatment	Number of BMPs	1	
	Total Size of BMPs	14,000	sq-ft
	TP (lb/yr)	10.4	8.2%
	TSS (lb/yr)	0	0.0%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$5,475	
	Design & Construction Costs**	\$277,480	
	Total Estimated Project Cost (2016)	\$282,955	
	Annual O&M***	\$3,214	
Efficiency	30-yr Average Cost/lb-TP	\$1,216	
	30-yr Average Cost/1,000lb-TSS	N/A	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: 75 hours at \$73/hour

**Direct Cost: See Appendix B for detailed cost information

***\$10,000/acre for IESF

Project ID: 3-E

Golf Course Pond Stormwater Reuse

Drainage Area – 196.0 acres
Location – Green Haven Golf Course
Property Ownership – Public (City of Anoka)
Site Specific Information – A stormwater reuse project was proposed for the Green Haven Golf Course Pond. The golf course could reuse the runoff captured in this pond to irrigate approximately 20-acres of the golf course. The pond currently provides storage for approximately 8.5 million gallons of water, and this system could use 500,000 gallons per week. This practice could provide water quality treatment as well as water conservation benefits.



Stormwater Reuse			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	500,000	gallons
	TP (lb/yr)	18.2	14.3%
	TSS (lb/yr)	3,409	8.4%
	Volume (acre-feet/yr)	46.4	25.8%
Cost	Administration & Promotion Costs*	\$8,760	
	Design & Construction Costs**	\$600,000	
	Total Estimated Project Cost (2016)	\$608,760	
	Annual O&M***	\$3,000	
Efficiency	30-yr Average Cost/lb-TP	\$1,280	
	30-yr Average Cost/1,000lb-TSS	\$6,833	
	30-yr Average Cost/ac-ft Vol.	\$503	

*120 hours at \$73/hour

**See Appendix B for detailed cost information

***Includes cleaning of unit and disposal of sediment/debris

Catchment A-4

Existing Catchment Summary	
Acres	2.2
Dominant Land Cover	Residential
Parcels	11
Volume (acre-feet/yr)	1.3
TP (lb/yr)	1.7
TSS (lb/yr)	573



CATCHMENT DESCRIPTION

This is the smallest catchment in this analysis, totaling just over two acres. The catchment consists only of drainage to two catch basins at the southeast corner of Maple Lane. The catch basins drain east and discharge directly to the Rum River.

EXISTING STORMWATER TREATMENT

No treatment currently exists in this catchment other than street cleaning, which is conducted two times per year. Present-day stormwater pollutant loading and treatment is summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	1			
	BMP Types	Street Cleaning			
	TP (lb/yr)	1.8	0.1	6%	1.7
	TSS (lb/yr)	618	45	7%	573
	Volume (acre-feet/yr)	1.3	0.0	0%	1.3

PROPOSED RETROFITS OVERVIEW

A single hydrodynamic device was proposed to treat drainage from the entire catchment.

RETROFITS CONSIDERED BUT REJECTED

Curb-cut rain gardens were considered in this catchment but were not proposed due to the steep slopes on the 2-3 properties with sufficient drainage areas to warrant a rain garden.

RETROFIT RECOMMENDATIONS



Project ID: 4-A

Maple Lane Hydrodynamic Device

Drainage Area – 2.2 acres
Location – Maple Lane
Property Ownership – Public
Site Specific Information – A hydrodynamic device could be installed on Maple Lane to accept runoff from the entire catchment. This device could provide treatment before the water discharges into the Rum River.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		6 ft diameter	
	TP (lb/yr)	0.3		17.6%
	TSS (lb/yr)	113		19.7%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$27,000
	Total Estimated Project Cost (2016)			\$28,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$5,295	
	30-yr Average Cost/1,000lb-TSS		\$14,057	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$18,000 for materials) + (\$9,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Catchment A-5

Existing Catchment Summary	
Acres	3.7
Dominant Land Cover	Residential
Parcels	21
Volume (acre-feet/yr)	3.1
TP (lb/yr)	3.2
TSS (lb/yr)	1,051

CATCHMENT DESCRIPTION

This catchment consists primarily of paved surfaces, specifically the Ferry Street/Highway 169 corridor between Highway 10 and Calhoun Street. Overland runoff generated in the catchment is intercepted quickly in catch basins along Ferry Street and discharges into the Rum River from an outfall located just south of Clay Street.



EXISTING STORMWATER TREATMENT

A hydrodynamic device was installed along Ferry Street by the Minnesota Department of Transportation during a recent reconstruction of Ferry Street/Highway 169. As installed, this device treats the entire catchment.

Street cleaning was only included for the very small amount of municipal roadway located within this catchment. The largest roadway, Ferry Street/Highway 169, is a state-owned highway and was not modeled with municipal street cleaning.

Present-day stormwater pollutant loading and treatment is summarized in the table below.

	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	3.8	0.6	16%	3.2
	TSS (lb/yr)	1,293	242	19%	1,051
	Volume (acre-feet/yr)	3.1	0.0	0%	3.1

PROPOSED RETROFITS OVERVIEW

No stormwater retrofits were proposed in this catchment.

RETROFITS CONSIDERED BUT REJECTED

Curb-cut rain gardens and boulevard bioswales were considered along Ferry Street but were not proposed due to (1) the lack of boulevard to accommodate a bioswale and (2) the increased cost to divert water through a sidewalk and into a curb-cut rain garden makes the practice cost-prohibitive.

Therefore, the map below was included solely to provide additional detail of the catchment boundary, associated land uses, and streets.

RETROFIT RECOMMENDATIONS



Catchment A-6

Existing Catchment Summary	
Acres	8.7
Dominant Land Cover	Commercial
Parcels	28
Volume (acre-feet/yr)	9.3
TP (lb/yr)	6.5
TSS (lb/yr)	2,603



CATCHMENT DESCRIPTION

Catchment A-6 contains nearly 9 acres of heavily impervious area. The catchment is dominated by commercial properties and the Ferry Street/Highway 169 and Main Street roadways. Runoff generated in this area flows to a storm sewer below Ferry Street/Highway 169 and discharges into the Rum River just north of Main Street.

EXISTING STORMWATER TREATMENT

A hydrodynamic device was installed by the Minnesota Department of Transportation during a recent reconstruction of Ferry Street/Highway 169. The device is located along the Main Street storm sewer line just east of its intersection with Ferry Street/Highway 169 and treats the entire catchment.

Street cleaning was only included for the small amount of municipal roadways located within this catchment. The largest roadway, Ferry Street/Highway 169, is a state-owned highway and was not modeled with municipal street cleaning.

Present-day stormwater pollutant loading and treatment is summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	7.7	1.2	16%	6.5
	TSS (lb/yr)	3,178	575	18%	2,603
	Volume (acre-feet/yr)	9.3	0.0	0%	9.3

PROPOSED RETROFITS OVERVIEW

No stormwater retrofits were proposed in this catchment.

RETROFITS CONSIDERED BUT REJECTED

Curb-cut rain gardens and boulevard bioswales were considered along Ferry Street but were not proposed due to (1) the lack of boulevard to accommodate a bioswale and (2) the increased cost to divert water through a sidewalk and into a curb-cut rain garden makes that practice cost-prohibitive. Permeable pavement was also considered for many of the private parking lots in the catchment but was not considered cost effective due to their small size.

Therefore, the map below was included solely to provide additional detail of the catchment boundary, associated land uses, and streets.

RETROFIT RECOMMENDATIONS



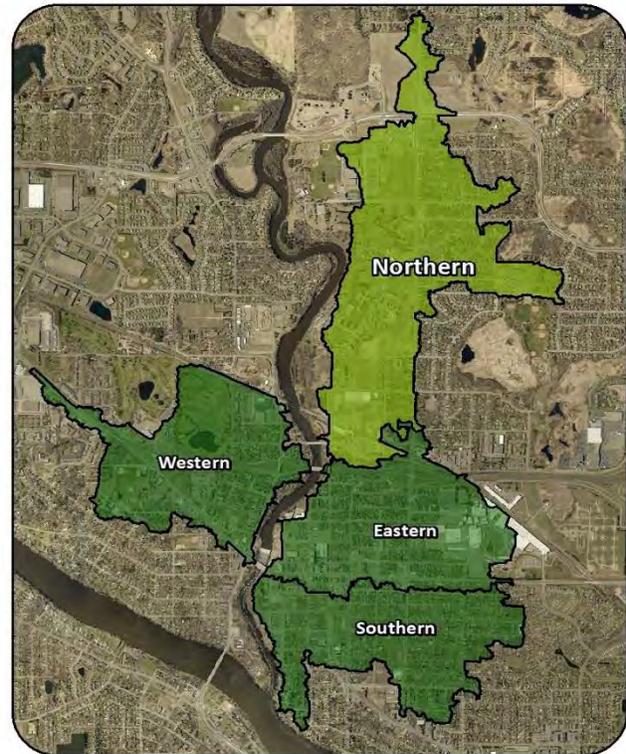
Northern Drainage Network

Catchment ID	Page
A-7	63
A-8	77

Existing Network Summary	
Acres	525.5
Dominant Land Cover	Residential
Volume (ac-ft/yr)	319.6
TP (lb/yr)	266.2
TSS (lb/yr)	99,514

DRAINAGE NETWORK SUMMARY

This network comprises most of the research area north of Highway 10 and east of the Rum River. The network is split into two catchments, each with a respective outfall to the Rum River. The northern outfall is located west of the 7th Avenue – Bryant Street intersection (Catchment A-7). The southern outfall is located west of the 4th Avenue – Grant Street intersection (A-8). This network includes many of the new developments in the city, as well as the Anoka High School and the Anoka Metro Regional Treatment Center. Land use in this network is primarily residential with small lots east of 7th Avenue and commercial or public properties with large campuses west of 7th Avenue.



EXISTING STORMWATER TREATMENT

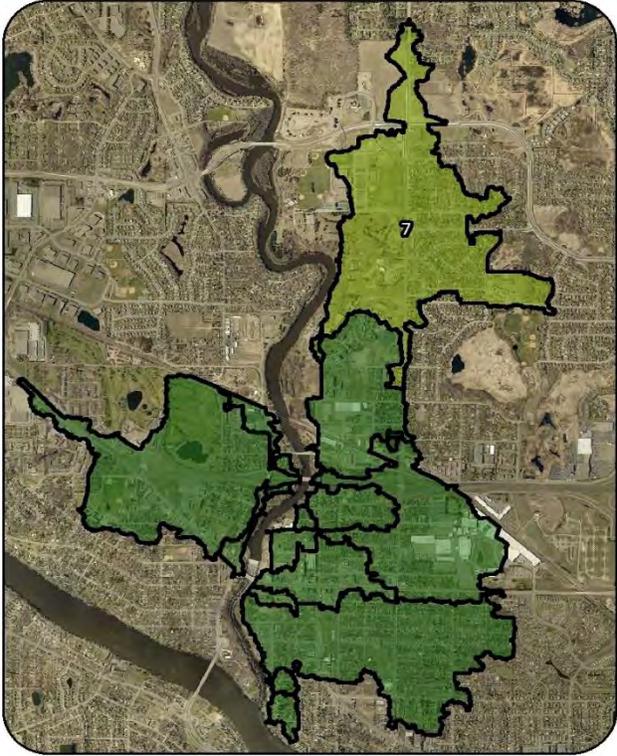
Six stormwater retention ponds are located across the two catchments in this drainage network. Five of these only treat runoff from the properties they were built upon and some adjoining properties. The sixth, a large, city-owned regional pond west of the 4th Avenue and Grant Street intersection treats 147 acres of commercial and residential properties in its catchment. Street cleaning is also conducted by the City of Anoka two times annually.

Catchment A-7

Existing Catchment Summary	
Acres	378.3
Dominant Land Cover	Residential
Parcels	448
Volume (acre-feet/yr)	213.6
TP (lb/yr)	207.4
TSS (lb/yr)	76,598

CATCHMENT DESCRIPTION

Catchment A-7 is the northernmost and largest catchment in this analysis. It spans from 145th Lane in the north to Garfield Street in the south and includes 378 acres of residential, commercial, and public properties. All stormwater runoff generated within this catchment drains to a single outfall to the Rum River located west of the MNDOT Truck Station at the intersection of 7th Avenue and Bryant Avenue.



The area within this catchment is not the only area that drains to the Bryant Avenue stormwater outfall. The area draining to this pipe is actually much larger, an additional 1,600 acres, and includes properties from the Cities of Anoka, Andover, and Coon Rapids. This additional area includes drainage to wetlands along Bunker Lake Boulevard., Riverdale Drive (west of the Riverdale Crossing Shopping Center), and south of Sunny Acres Park. The additional acreage was not included within this analysis as (1) much of the area was outside of the City of Anoka, and (2) stakeholders determined project dollars were better used when dedicated to protecting the Rum River, as opposed to the upstream wetlands. All areas included within this catchment are “downstream” (or do not drain to) of these wetland complexes.

EXISTING STORMWATER TREATMENT

This catchment has three ponds that provide treatment. The ponds are located on the Anoka Ice Arena, Anoka High School baseball field, and the Anoka Metro Regional Treatment Center. These ponds treat only the properties they were installed upon. The other catchment-wide stormwater treatment is street cleaning provided by the City of Anoka two times per year. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	<i>Existing Conditions</i>	Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	4			
	BMP Types	3 Ponds, Street Cleaning			
	TP (lb/yr)	233.6	26.2	11%	207.4
	TSS (lb/yr)	90,369	13,771	15%	76,598
	Volume (acre-feet/yr)	214.6	0.9	0%	213.6

PROPOSED RETROFITS OVERVIEW

Due to the prevalence of sandy, Hubbard soils throughout the residential areas of the catchment, infiltration practices were pursued. Up to 15 curb-cut rain gardens and 14 boulevard bioswales were proposed across the catchment. Campus retrofit opportunities at Wilson Elementary School are proposed which would divert stormwater runoff from paved surfaces to two large infiltration basins. The Anoka High School property was flagged as a location for stormwater reuse. Stormwater from the large paved surfaces at the school, including building roofs, sidewalks, and parking areas, could be diverted to a holding structure to be later used to irrigate the soccer and baseball fields on the property.

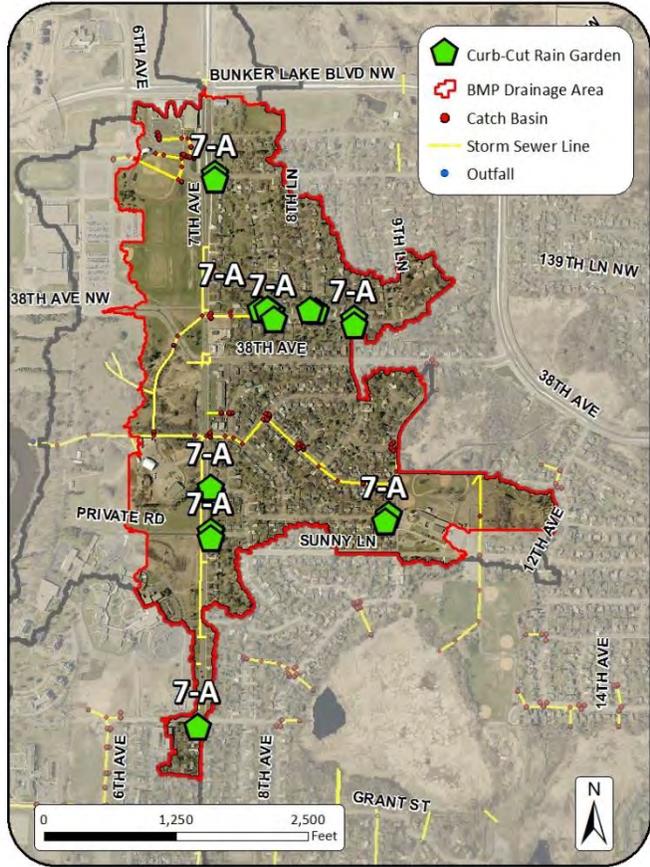
Hydrodynamic devices were proposed in two locations. The first would be located along 38th Lane between 7th Avenue and 8th Avenue. The second would be located along 7th Avenue east of the Anoka Metro Treatment Center.

Catchment-wide treatment was proposed through the installation of a new pond west of 7th Avenue. This pond could be installed on currently undeveloped, state-owned land. This pond was modeled once with a smaller drainage, accepting water from just the eastern portion of the catchment and modeled with a larger drainage, runoff from almost the entire 378-acre drainage area. To help promote phosphorus retention, an IESF bench could also be included with this pond.

Project ID: 7-A

Curb-Cut Rain Gardens

Drainage Area – 1.5 – 25.5 acres
Location – Various locations throughout catchment
Property Ownership – Private
Site Specific Information – Single-family lots in the catchment provide various locations for curb-cut rain gardens to treat stormwater pollutants originating from private properties and streets. Considering typical landowner participation rates, scenarios with one, ten, and seventeen rain gardens were analyzed to treat the drainage area.



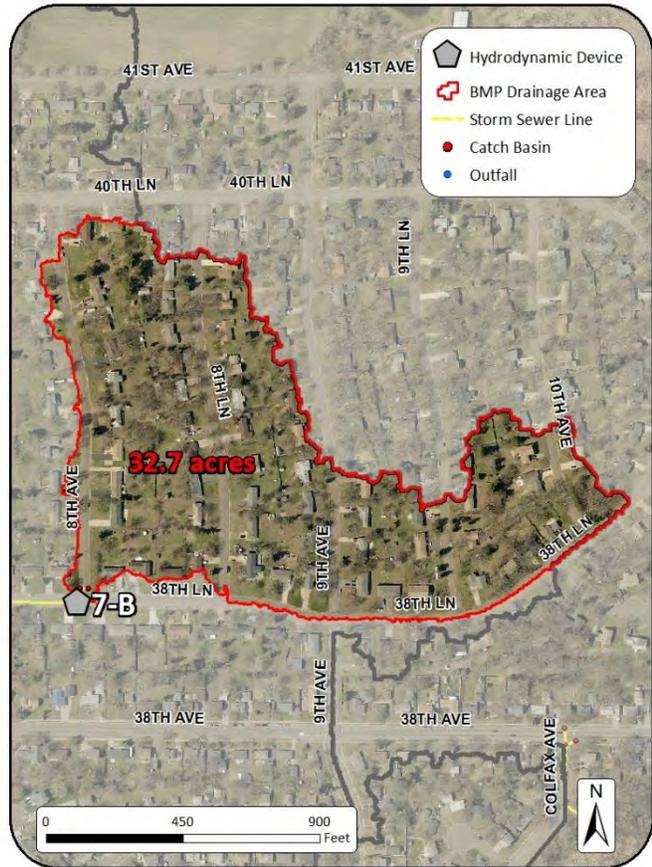
Curb-Cut Rain Garden							
Cost/Removal Analysis		New Treatment	% Reduction	New Treatment	% Reduction	New Treatment	% Reduction
Treatment	Number of BMPs	1		10		17	
	Total Size of BMPs	250	sq-ft	2,500	sq-ft	4,250	sq-ft
	TP (lb/yr)	0.5	0.2%	4.6	2.2%	8.1	3.9%
	TSS (lb/yr)	153	0.2%	1,454	1.9%	2,539	3.3%
	Volume (acre-feet/yr)	0.4	0.2%	3.5	1.7%	6.2	2.9%
Cost	Administration & Promotion Costs*	\$8,468		\$16,352		\$22,484	
	Design & Construction Costs**	\$7,376		\$73,760		\$125,392	
	Total Estimated Project Cost (2016)	\$15,844		\$90,112		\$147,876	
	Annual O&M***	\$225		\$2,250		\$3,825	
Efficiency	30-yr Average Cost/lb-TP	\$1,506		\$1,142		\$1,081	
	30-yr Average Cost/1,000lb-TSS	\$4,922		\$3,613		\$3,448	
	30-yr Average Cost/ac-ft Vol.	\$1,931		\$1,486		\$1,407	

*Indirect Cost: (104 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)
 **Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)
 ***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 7-B

38th LN. & 8th Ave.
Hydrodynamic Device

Drainage Area – 32.7 acres
Location – 38th Lane at 8th Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device could be installed on 38th Lane to accept runoff from residential properties and streets in the northeast portion of the catchment.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10 ft diameter	
	TP (lb/yr)	1.2		0.6%
	TSS (lb/yr)	491		0.6%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$3,574	
	30-yr Average Cost/1,000lb-TSS		\$8,734	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 7-C

7th Avenue
Hydrodynamic Device

Drainage Area – 14.5 acres
Location – 7th Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device could be installed on 7th Avenue between Hull Road and Sunny Lane. This device would accept runoff from residential properties and from 7th Avenue.



Hydrodynamic Device

Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	10 ft diameter	
	TP (lb/yr)	0.8	0.4%
	TSS (lb/yr)	383	0.5%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$108,000	
	Total Estimated Project Cost (2016)	\$109,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$5,361	
	30-yr Average Cost/1,000lb-TSS	\$11,197	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)
 **Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)
 ***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 7-D

Colfax Ave. & Blackoaks Ln. Infiltration Basin

Drainage Area – 22.2 acres

Location – NW side of Wilson Elementary School

Property Ownership – Public

Site Specific Information – An infiltration basin is proposed for the northwest corner of Wilson Elementary School where open space is available between baseball fields and a walking path. This project would involve “daylighting” the storm sewer line to the north (line runs east-west) and directing it to the proposed infiltration basin. The feasibility of this project is dependent on further soil testing to determine the infiltration capacity in this area (e.g. soil composition and separation from the water table) and further examination of the wetland complex to the south to determine the frequency with which that complex contributes flood water to the storm sewer line that would discharge to the proposed basin.



Infiltration Basin			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Ponding Depth of BMP	1 foot	
	Total Size of BMP	5,000 sq-ft	
	TP (lb/yr)	9.6	5%
	TSS (lb/yr)	3,256	4%
	Volume (acre-feet/yr)	8.1	4%
Cost	Administration & Promotion Costs*	\$2,920	
	Design & Construction Costs**	\$115,876	
	Total Estimated Project Cost (2016)	\$118,796	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$436	
	30-yr Average Cost/1,000lb-TSS	\$1,285	
	30-yr Average Cost/ac-ft Vol.	\$515	

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$20/sq-ft for materials and labor) + (12 hours at \$73/hour for design) + \$15,000 for construction costs relating to daylighting stormwater pipe

***(\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 7-E

Sunny Lane Infiltration Basin

Drainage Area – 2.7 acres
Location – SE side of Wilson Elementary School
Property Ownership – Public
Site Specific Information –An infiltration basin is proposed for the southeast corner of Wilson Elementary School adjacent to the main school parking lot. Open space is available between the parking lot and the road for the installation of this practice. This basin would accept stormwater from the elementary school property and Sunny Lane. A rain garden at this location would require an inlet that allows runoff to pass under the existing sidewalk.



Infiltration Basin				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Ponding Depth of BMP		1 foot	
	Total Size of BMP		700	sq-ft
	TP (lb/yr)	1.7		1%
	TSS (lb/yr)	676		1%
	Volume (acre-feet/yr)	1.8		1%
Cost	Administration & Promotion Costs*			\$2,920
	Design & Construction Costs**			\$19,876
	Total Estimated Project Cost (2016)			\$22,796
	Annual O&M***			\$225
Efficiency	30-yr Average Cost/lb-TP		\$579	
	30-yr Average Cost/1,000lb-TSS		\$1,457	
	30-yr Average Cost/ac-ft Vol.		\$547	

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$20/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

+ \$5,000 for rain garden inlet under existing sidewalk

***(\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 7-F

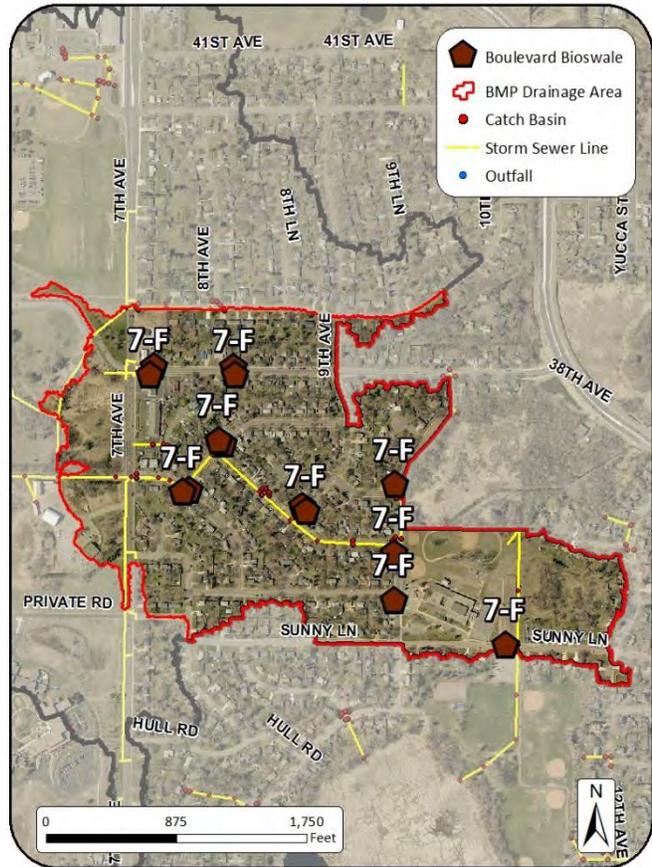
Boulevard Bioswales

Drainage Area – 0.5 acre

Location – Various locations in SE portion of catchment

Property Ownership – Public

Site Specific Information – Bioswales are proposed for installation in various locations in the southeast portion of the catchment to accept runoff from residential and commercial properties. Locations for up to 14 bioswales are sited within the catchment. The table below shows the estimated cost and pollutant removal based on treatment of a 0.5-acre contributing drainage area.



Boulevard Bioswale			
		2.5"/hr Infiltr. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.2	0.1%
	TSS (lb/yr)	61	0.1%
	Volume (acre-feet/yr)	0.1	0.1%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$3,264	
	30-yr Average Cost/1,000lb-TSS	\$8,352	
	30-yr Average Cost/ac-ft Vol.	\$3,704	

*Indirect Cost: (50 hours at \$73/hour)

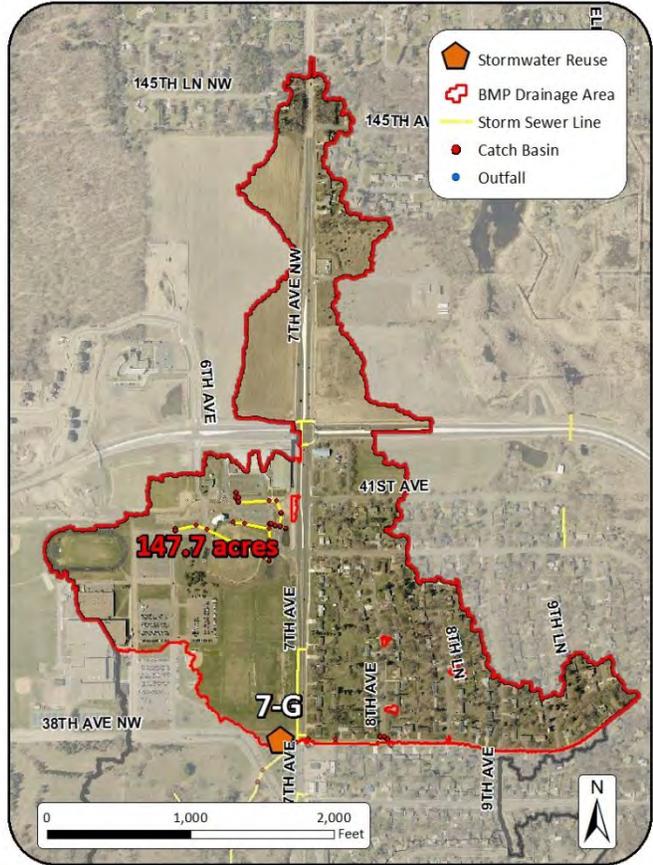
**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Project ID: 7-G

38th Ave. & 7th Ave.
Stormwater Reuse

Drainage Area – 147.7 acres
Location –Interchange of 38th Avenue NW and 7th Avenue
Property Ownership – Public
Site Specific Information – A water reuse system has been proposed for the southeastern corner of Anoka High School. An irrigation system could reuse the rainfall captured in this system which would provide water quality treatment as well as water conservation benefits. The proposed 500,000-gallon cistern would capture water from the northern portion of the catchment. The captured water could then be reused on approximately 20 acres of sports fields at Anoka High School.



Stormwater Reuse			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	500,000	gallons
	TP (lb/yr)	17.5	8.4%
	TSS (lb/yr)	5,987	7.8%
	Volume (acre-feet/yr)	18.7	8.8%
Cost	Administration & Promotion Costs*	\$8,760	
	Design & Construction Costs**	\$950,000	
	Total Estimated Project Cost (2016)	\$958,760	
	Annual O&M***	\$3,000	
Efficiency	30-yr Average Cost/lb-TP	\$1,998	
	30-yr Average Cost/1,000lb-TSS	\$5,839	
	30-yr Average Cost/ac-ft Vol.	\$1,869	

*120 hours at \$73/hour
 **See Appendix B for detailed cost information
 ***Includes cleaning of unit and disposal of sediment/debris

Project ID: 7-H1

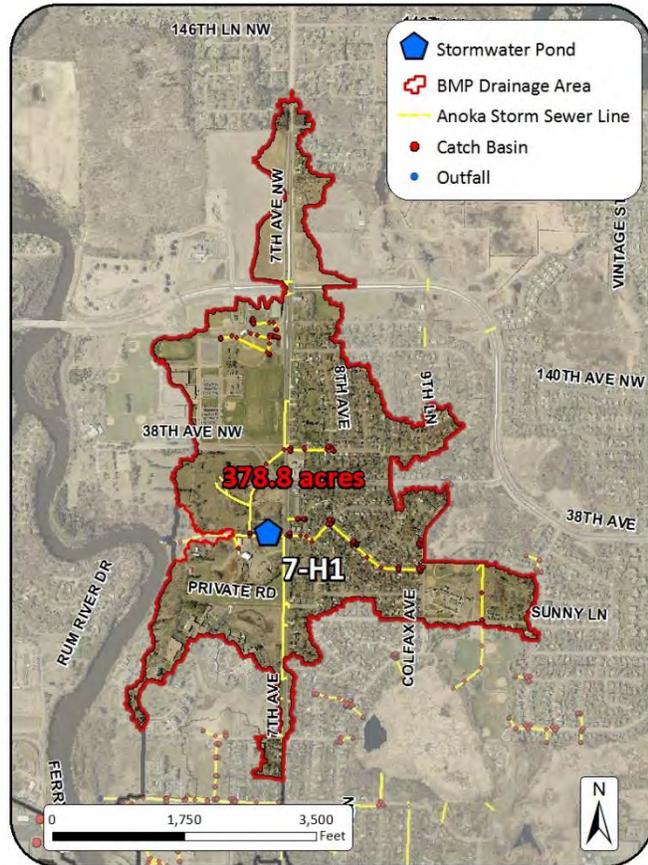
7th Avenue.
New Pond

Drainage Area – 378.8 acres

Location –West side of 7th Avenue

Property Ownership – Public (State of Minnesota)

Site Specific Information – A new pond is proposed for public property on the western side of 7th Avenue. One proposed scenario would be for the installation of a large pond that would accept water from almost the entire catchment. Currently, water from the catchment flows through a large storm sewer line and then into the Rum River. The proposed pond would receive water from the storm sewer line, providing additional treatment to the whole catchment.



New Pond				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		5.5	acres
	TP (lb/yr)	111.6		53.8%
	TSS (lb/yr)	54,558		71.2%
	Volume (acre-feet/yr)	0.9		0.4%
Cost	Administration & Promotion Costs*			\$7,300
	Design & Construction Costs**			\$794,838
	Total Estimated Project Cost (2015)			\$802,138
	Annual O&M***			\$5,500
Efficiency	30-yr Average Cost/lb-TP		\$289	
	30-yr Average Cost/1,000lb-TSS		\$591	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: 100 hours at \$73/hour

**Direct Cost: See Appendix B for detailed cost information

***\$1,000/acre - Annual inspection and sediment/debris removal from pretreatment area

Project ID: 7-H2

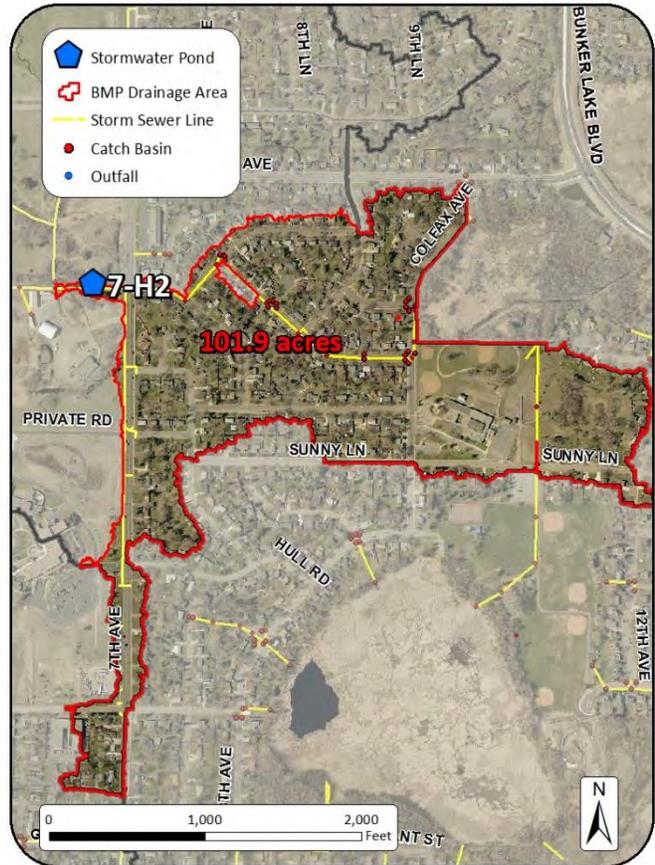
7th Avenue. New Pond

Drainage Area – 101.9 acres

Location – West side of 7th Avenue

Property Ownership – Public (State of Minnesota)

Site Specific Information – A new pond is proposed for public property on the western side of 7th Avenue. This scenario includes a smaller pond that would accept water from the eastern portion of the catchment and provide additional treatment to water from approximately a quarter of the catchment.



New Pond				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		1.8 acres	
	TP (lb/yr)		31.5	15.2%
	TSS (lb/yr)		13,452	17.6%
	Volume (acre-feet/yr)		0.4	0.2%
Cost	Administration & Promotion Costs*		\$7,300	
	Design & Construction Costs**		\$353,184	
	Total Estimated Project Cost (2015)		\$360,484	
	Annual O&M***		\$1,800	
Efficiency	30-yr Average Cost/lb-TP		\$439	
	30-yr Average Cost/1,000lb-TSS		\$1,027	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: 100 hours at \$73/hour

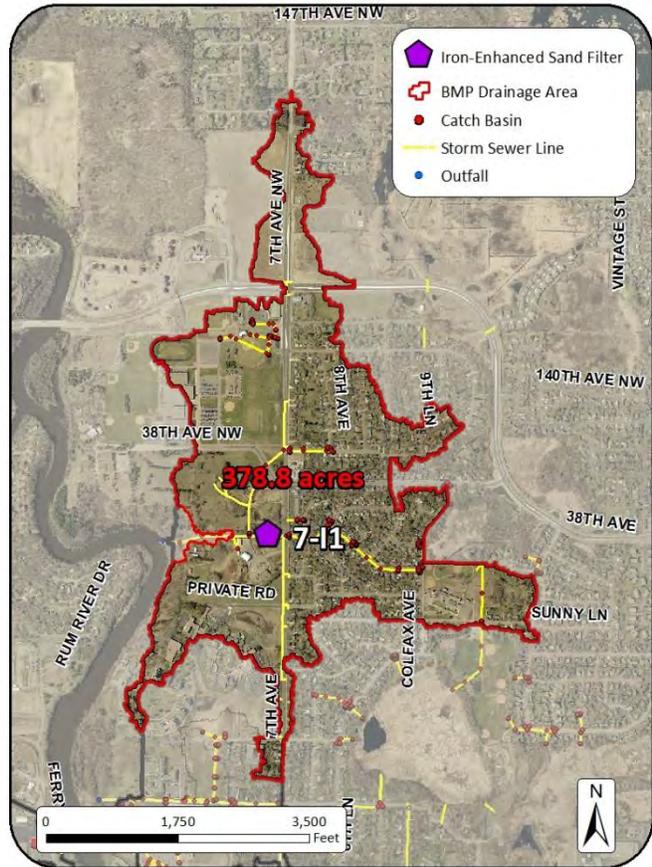
**Direct Cost: See Appendix B for detailed cost information

***\$1,000/acre - Annual inspection and sediment/debris removal from pretreatment area

Project ID: 7-I1

7th Avenue.
IESF Bench

Drainage Area – 378.8 acres
Location –West side of 7th Avenue
Property Ownership – Public (State of Minnesota)
Site Specific Information – An IESF bench is proposed as an improvement to the proposed pond with the larger drainage area (i.e. Project ID 7-H1). The pond would provide treatment through retention and settling. However, the addition of an IESF will increase removal of dissolved phosphorus. The IESF was sized to 20,000 sq.-ft. based on available space and the proposed size of the new pond.



IESF Bench				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		20,000 sq-ft	
	TP (lb/yr)		26.6	12.8%
	TSS (lb/yr)		0	0.0%
	Volume (acre-feet/yr)		0.0	0.0%
Cost	Administration & Promotion Costs*		\$5,475	
	Design & Construction Costs**		\$575,516	
	Total Estimated Project Cost (2016)		\$580,991	
	Annual O&M***		\$4,591	
Efficiency	30-yr Average Cost/lb-TP		\$902	
	30-yr Average Cost/1,000lb-TSS		N/A	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: 75 hours at \$73/hour
 **Direct Cost: See Appendix B for detailed cost information
 ***\$10,000/acre for IESF

Project ID: 7-I2

7th Avenue.
IESF Bench

Drainage Area – 101.9 acres

Location –West side of 7th Avenue

Property Ownership – Public (State of Minnesota)

Site Specific Information – An IESF bench is proposed as an improvement to the proposed pond with the smaller drainage area (i.e. Project ID 7-H2). The pond would provide treatment through retention and settling. However, the addition of an IESF will increase removal of dissolved phosphorus. The IESF was sized to 8,000 sq.-ft. based on available space and the proposed size of the new pond.



IESF Bench				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		8,000	sq-ft
	TP (lb/yr)		7.2	3.5%
	TSS (lb/yr)		0	0.0%
	Volume (acre-feet/yr)		0.0	0.0%
Cost	Administration & Promotion Costs*			\$5,475
	Design & Construction Costs**			\$300,400
	Total Estimated Project Cost (2016)			\$305,875
	Annual O&M***			\$1,837
Efficiency	30-yr Average Cost/lb-TP		\$1,669	
	30-yr Average Cost/1,000lb-TSS		N/A	
	30-yr Average Cost/ac-ft Vol.		N/A	

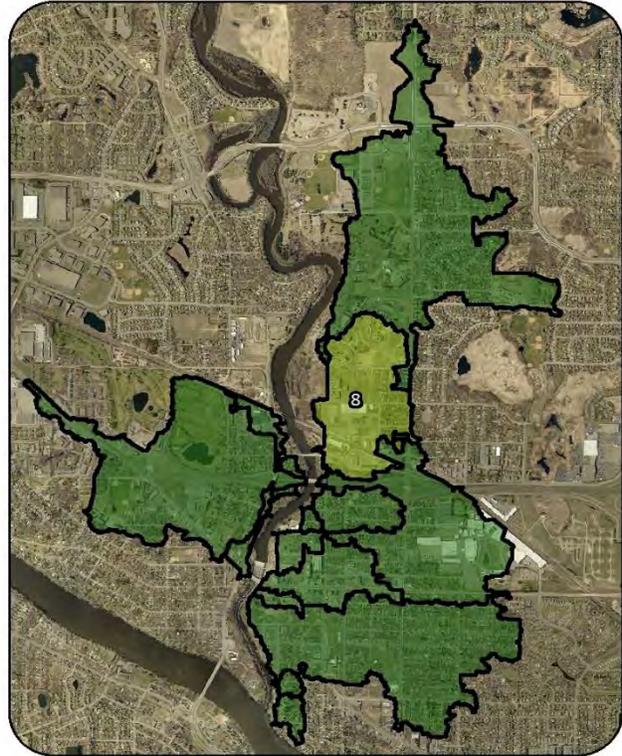
*Indirect Cost: 75 hours at \$73/hour

**Direct Cost: See Appendix B for detailed cost information

***\$10,000/acre for IESF

Catchment A-8

Existing Catchment Summary	
Acres	147.0
Dominant Land Cover	Residential
Parcels	163
Volume (acre-feet/yr)	106.0
TP (lb/yr)	58.8
TSS (lb/yr)	22,916



CATCHMENT DESCRIPTION

The southern of the two catchments in the northern drainage network is Catchment A-8. This catchment is bounded by the Anoka Metro Regional Treatment Center and county offices to the north, 7th Avenue to the east, and US-10 to the south. Runoff generated within the catchment flows through municipal storm sewer lines to a retention pond west of the 4th Avenue and Grant Street intersection. This pond treats the entire 147-acre catchment, and discharges directly into the Rum River 300 ft. west of the pond.

EXISTING STORMWATER TREATMENT

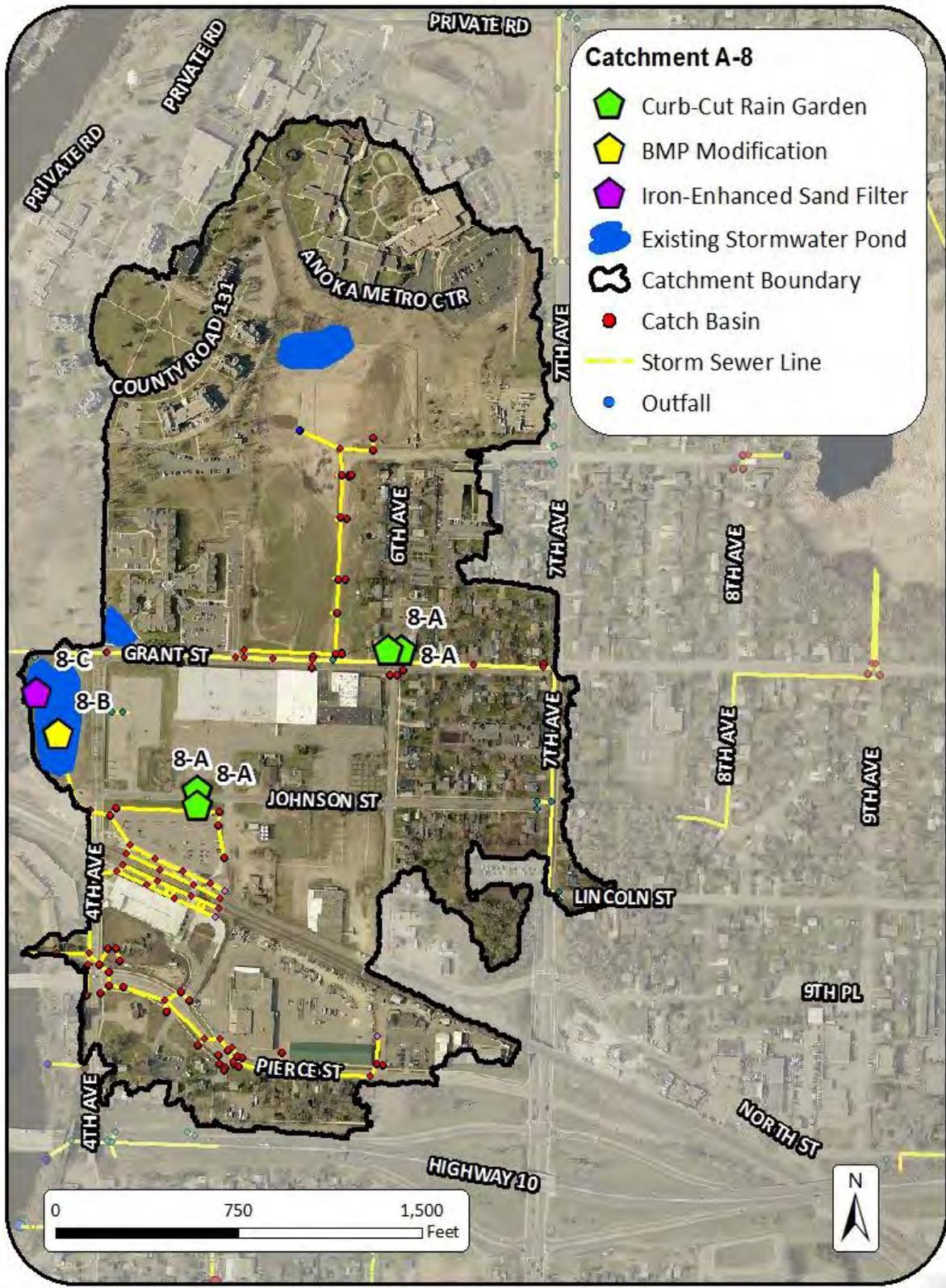
Most stormwater treatment in this catchment is supplied by the 4th Avenue and Grant Street. municipal retention pond. Upstream of this pond are two other retention ponds. The first is located on a City of Anoka development property on Garfield Street. The second pond is located on the Volunteers of America’s Homestead of Anoka apartment complex. Each of these ponds treats only the property it was installed upon. Outside of the 4th Avenue and Grant Street retention pond, the only other catchment-wide treatment is provided by the City of Anoka in the form of street cleaning two times per year. Present-day stormwater pollutant loading and treatment are summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	4			
	BMP Types	3 Ponds, Street Cleaning			
	TP (lb/yr)	101.5	42.7	42%	58.8
	TSS (lb/yr)	48,067	25,151	52%	22,916
	Volume (acre-feet/yr)	107.0	1.1	1%	106.0

PROPOSED RETROFITS OVERVIEW

Proposed stormwater retrofit practices were focused on improving treatment within the catchments largest existing structure, the 4th Avenue and Grant Street municipal retention pond. The first proposed practice looks to modify the pond by increasing its storage capacity. This would be done to improve

treatment of the existing landscape and to better prepare the pond for accommodating runoff from future development. The second practice would add an IESF bench along the western banks of the pond, increasing TP retention through the pond system. Upstream of the regional municipal pond, up to four curb-cut rain garden were proposed. These were proposed to supplement treatment provided by the pond in residential and commercial areas with soils that are conducive to infiltration practices.



Project ID: 8-A

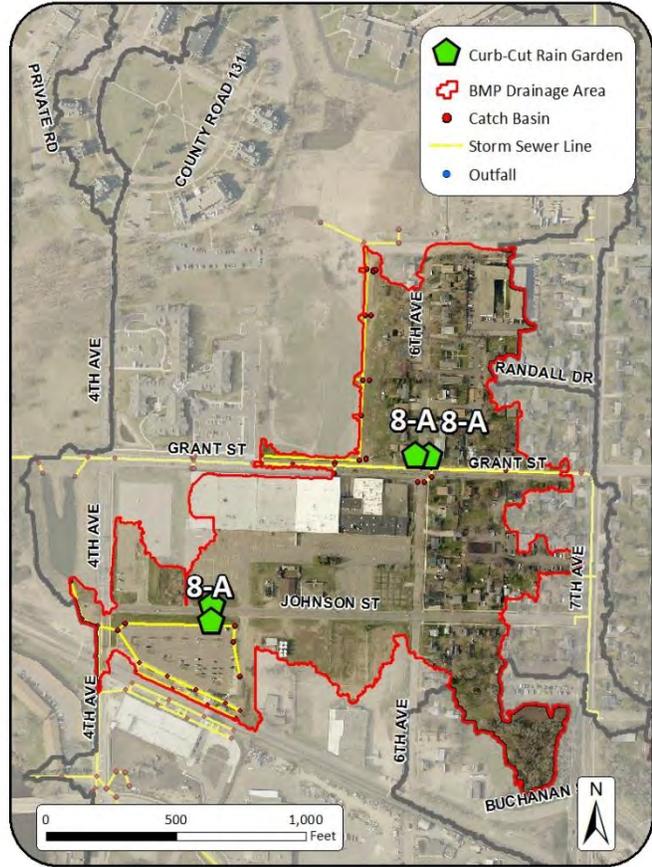
Curb-Cut Rain Gardens

Drainage Area – 1.5 – 6.0 acres

Location – Various locations throughout catchment

Property Ownership – Private

Site Specific Information – Various locations for curb-cut rain gardens are proposed on residential and light industrial properties to treat stormwater pollutants. Considering private landowner participation rates, scenarios were run with two rain gardens placed on light industrial properties and two placed on residential properties.



Curb Cut Rain Garden					
Cost/Removal Analysis		New Treatment		% Reduction	
Treatment	Number of BMPs	2		2	
	Land Use	LI		MDRNA	
	Total Size of BMPs	500 sq-ft		500 sq-ft	
	TP (lb/yr)	0.8	1.4%	0.7	1.2%
	TSS (lb/yr)	301	1.3%	190	0.8%
	Volume (acre-feet/yr)	1.1	1.0%	0.7	0.7%
Cost	Administration & Promotion Costs*	\$2,482		\$2,482	
	Design & Construction Costs**	\$14,752		\$14,752	
	Total Estimated Project Cost (2016)	\$17,234		\$17,234	
	Annual O&M***	\$450		\$450	
Efficiency	30-yr Average Cost/lb-TP	\$1,281		\$1,464	
	30-yr Average Cost/1,000lb-TSS	\$3,404		\$5,392	
	30-yr Average Cost/ac-ft Vol.	\$931		\$1,394	

*Indirect Cost: (10 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)

**Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 8-B

4th Ave. & Grant St. Pond Modification

Drainage Area – 147.1 acres
Location – 4th Ave. and Grant St.
Property Ownership – Public
Site Specific Information – A modification is proposed for the pond at 4th Avenue and Grant Street. This pond currently treats water from the entire catchment. Excavating 12,000 cubic yards of material would increase the size of the pond and improve the treatment efficiency. The price of the pond modification is shown below with three different management levels based on the contamination level of the excavated soil.



BMP Modification									
Cost/Removal Analysis		New Treatment		% Reduction		New Treatment		% Reduction	
Treatment	Pond Management Level	1		2		3			
	Amount of Soil Excavated	12,000 cu-yards		12,000 cu-yards		12,000 cu-yards			
	TP (lb/yr)	10.5	17.9%	10.5	17.9%	10.5	17.9%		
	TSS (lb/yr)	6,443	28.1%	6,443	28.1%	6,443	28.1%		
	Volume (acre-feet/yr)	0.0	0.0%	0.0	0.0%	0.0	0.0%		
Cost	Administration & Promotion Costs*	\$5,840		\$5,840		\$5,840			
	Design & Construction Costs**	\$325,000		\$505,000		\$685,000			
	Total Estimated Project Cost (2016)	\$330,840		\$510,840		\$690,840			
	Annual O&M***	\$1,300		\$1,300		\$1,300			
Efficiency	30-yr Average Cost/lb-TP	\$1,174		\$1,746		\$2,317			
	30-yr Average Cost/1,000lb-TSS	\$1,913		\$2,845		\$3,776			
	30-yr Average Cost/ac-ft Vol.	N/A		N/A		N/A			

*Indirect Cost: 80 hours at \$73/hour

**Direct Cost: See Appendix B for detailed cost information

***\$1,000/acre of pond surface area - Annual inspection and sediment/debris removal from pretreatment area

Project ID: 8-C

4th Ave. & Grant St.
IESF Bench

Drainage Area – 147.1 acres
Location – 4th Ave. and Grant St.
Property Ownership – Public
Site Specific Information – An IESF bench is proposed as an improvement to the existing pond at 4th Avenue and Grant Street. The pond provides treatment through retention and settling. However, the addition of an IESF Pond Bench will increase removal of dissolved phosphorus. The IESF was sized to 7,000 sq.-ft. based on available space and the size of the existing pond.



IESF Bench				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		7,000 sq-ft	
	TP (lb/yr)	7.2	12.2%	
	TSS (lb/yr)	0	0.0%	
	Volume (acre-feet/yr)	0.0	0.0%	
Cost	Administration & Promotion Costs*		\$5,475	
	Design & Construction Costs**		\$277,480	
	Total Estimated Project Cost (2016)		\$282,955	
	Annual O&M***		\$1,607	
Efficiency	30-yr Average Cost/lb-TP		\$1,534	
	30-yr Average Cost/1,000lb-TSS		N/A	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: 75 hours at \$73/hour
 **Direct Cost: See Appendix B for detailed cost information
 ***\$10,000/acre for IESF

Eastern Drainage Network

Catchment ID	Page
A-9	84
A-10	92
A-11	100
A-12	103
A-13	106

Existing Network Summary	
Acres	327.1
Dominant Land Cover	Residential
Volume (ac-ft/yr)	265.5
TP (lb/yr)	247
TSS (lb/yr)	104,999

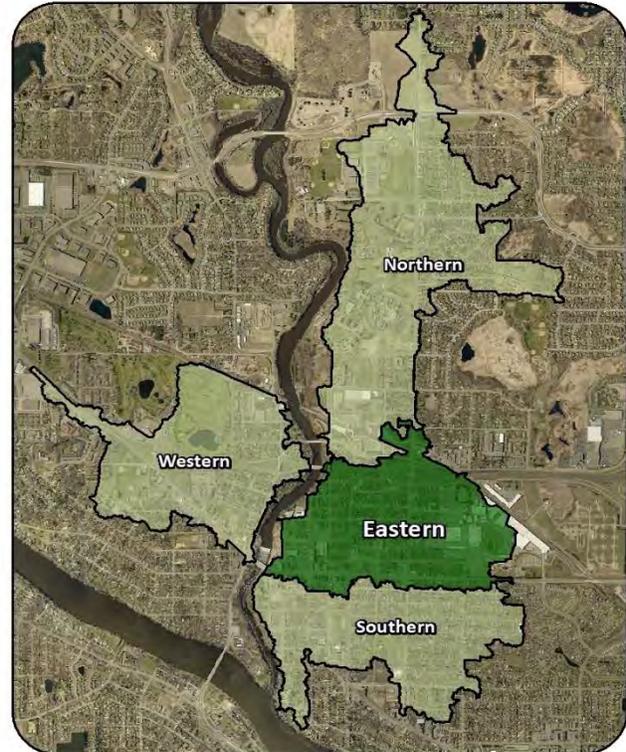
DRAINAGE NETWORK SUMMARY

The eastern drainage network includes all areas draining to the Rum River between US-10 and Main Street. The network has five major outfalls to the Rum River. Each of these outfalls has an upstream drainage area which was identified as a catchment and provided with a unique catchment name. These include (from north to south) US-10 (Catchment A-9), Taylor Street (A-10), Polk Street (A-11), Harrison Street (A-12), and Main Street (A-13).

EXISTING STORMWATER TREATMENT

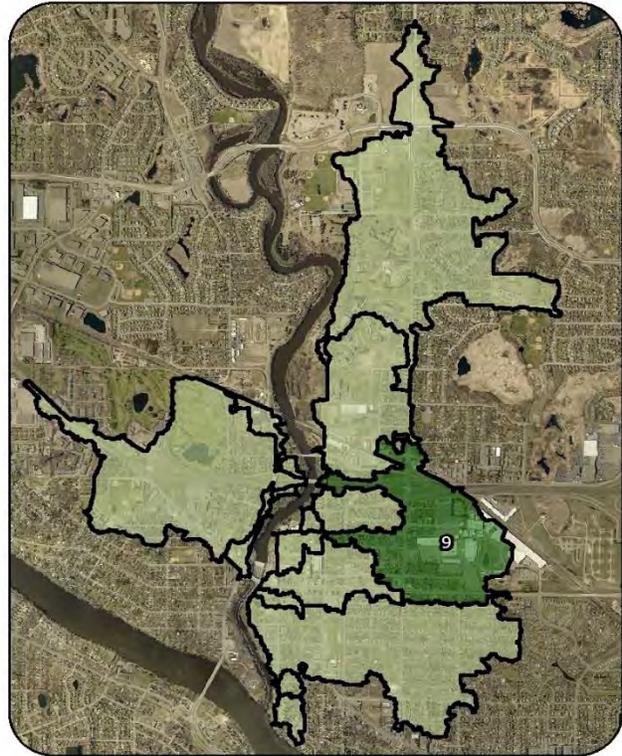
Existing treatment in this network is comprised primarily of subsurface treatment systems at the three smaller outfalls to the Rum River on Taylor Street, Polk Street, and Harrison Street. Each of these were installed during recent roadway projects. On the larger industrial properties in Catchment A-9 are stormwater retention ponds which provide treatment to portions of the industrial buildings and parking lots.

Street cleaning is also conducted by the City of Anoka two times monthly in the downtown region (A-12 and A-13) and two times annually in the rest of the drainage area.



Catchment A-9

Existing Catchment Summary	
Acres	196.7
Dominant Land Cover	Industrial
Parcels	332
Volume (acre-feet/yr)	165.8
TP (lb/yr)	165.3
TSS (lb/yr)	72,929



CATCHMENT DESCRIPTION

Catchment A-9 is characterized by all of the geographic area flowing to storm sewer pipes along the US-10 highway corridor. This includes runoff from municipal and county storm sewer pipes from as far south as Main Street. The catchment includes the large industrial facilities for companies such as Pentair and the Federal Cartridge Corporation, commercial properties along Main Street and 7th Avenue, and residential properties on and adjacent to 7th Avenue between Main Street and Lincoln Street.

EXISTING STORMWATER TREATMENT

Only two structural BMPs were identified in this analysis for Catchment A-9, and both are located on industrial parcels in the eastern portion of the catchment. The first (the southern pond) treats nearly 20 acres of the Pentair property. The second (the northern pond) treats primarily parking lot runoff from the Federal Cartridge Corporation. The only form of catchment-wide treatment is provided by the City of Anoka in the form street cleaning two times annually. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	3			
	BMP Types	2 Ponds, Street Cleaning			
	TP (lb/yr)	181.9	16.6	9%	165.3
	TSS (lb/yr)	85,163	12,234	14%	72,929
	Volume (acre-feet/yr)	166.0	0.2	0%	165.8

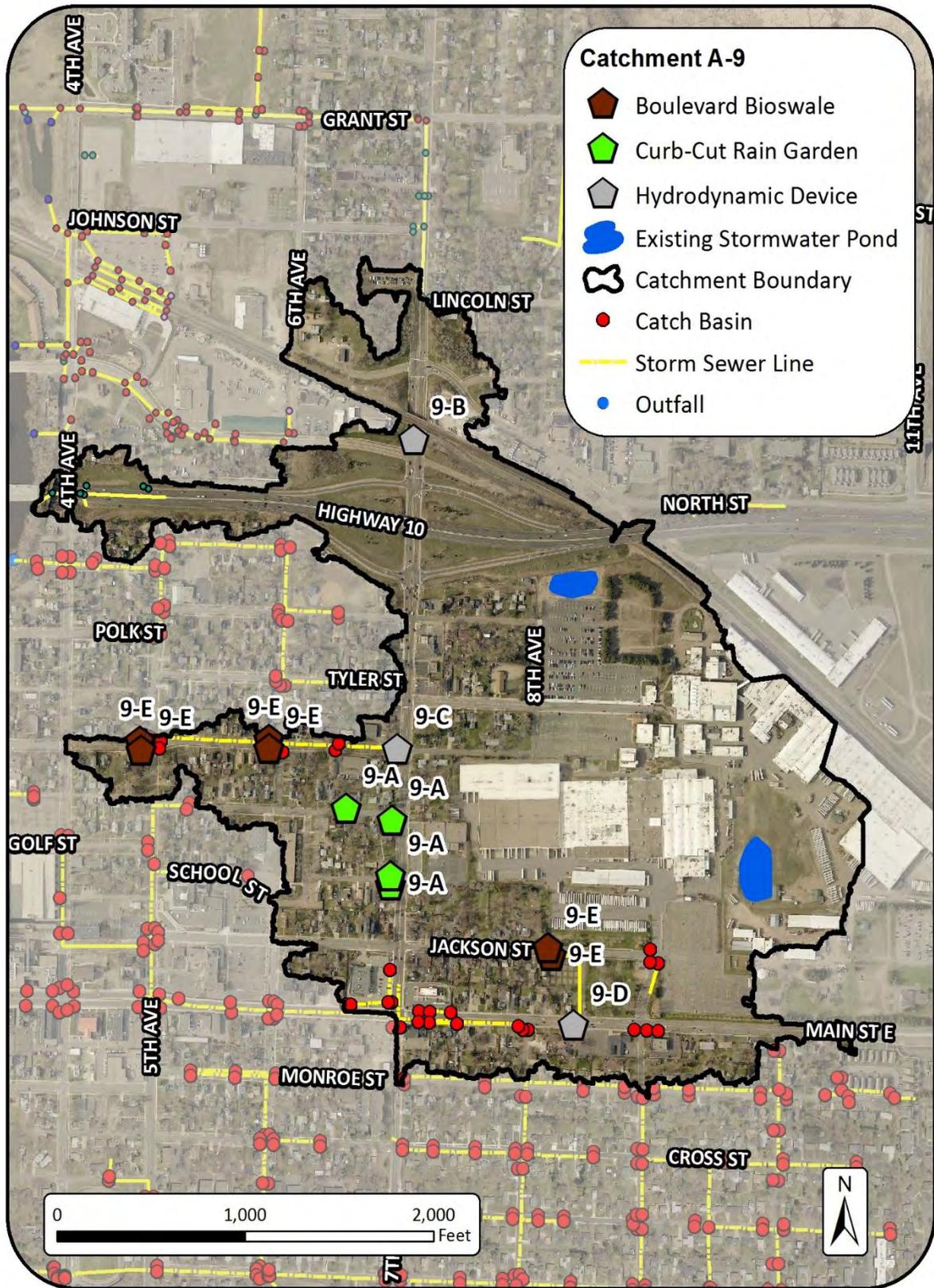
PROPOSED RETROFITS OVERVIEW

Surface and subsurface BMPs were proposed to treat stormwater prior to reaching the Rum River. These practices could include three hydrodynamic devices, curb-cut rain gardens, boulevard bioswales, and an infiltration basin. The curb-cut rain gardens, boulevard bioswales, and the infiltration basin were all proposed in residential neighborhoods with sandy soils favoring infiltration practices. Hydrodynamic

devices were proposed along or adjacent to major roadways (specifically 7th Avenue and Main Street) to treat commercial and highway runoff.

RETROFITS CONSIDERED BUT REJECTED

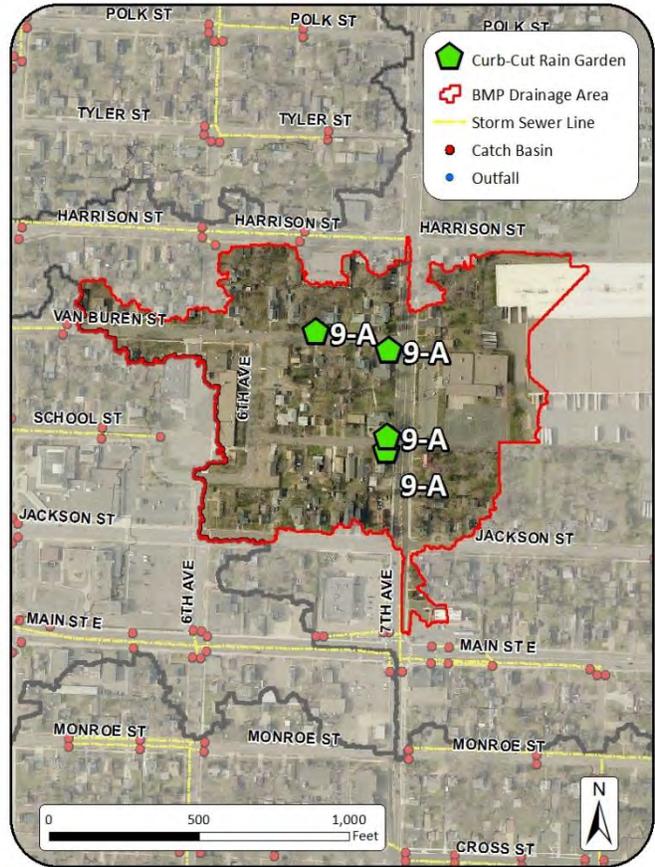
Large, regional treatment was explored in and along the US-10 corridor. This included diverting and/or “daylighting” stormwater into large open spaces along the interstate, specifically within the US-10 – 7th Avenue interchange and Rudy Johnson Park south of the interstate. Practices were deemed infeasible as there was not enough room within the open spaces of the corridor to daylight deep county and state storm sewer pipes.



Project ID: 9-A

Curb-Cut Rain Gardens

Drainage Area – 1.5-6.0 acres
Location – Various locations in residential areas of catchment
Property Ownership – Public
Site Specific Information-Various locations for curb-cut rain gardens are proposed in residential areas to treat stormwater pollutants originating from streets and single-family residences. Considering typical landowner participation rates, scenarios with one, two, and four rain gardens were analyzed.



Curb-Cut Rain Garden									
Cost/Removal Analysis		New Treatment		% Reduction		New Treatment		% Reduction	
Treatment	Number of BMPs	1		2		4			
	Total Size of BMPs	250 sq-ft		500 sq-ft		1,000 sq-ft			
	TP (lb/yr)	0.5	0.3%	1.0	0.6%	2.0	1.2%		
	TSS (lb/yr)	155	0.2%	313	0.4%	623	0.9%		
	Volume (acre-feet/yr)	0.4	0.2%	0.8	0.5%	1.5	0.9%		
Cost	Administration & Promotion Costs*	\$8,468		\$9,344		\$11,096			
	Design & Construction Costs**	\$7,376		\$14,752		\$29,504			
	Total Estimated Project Cost (2016)	\$15,844		\$24,096		\$40,600			
	Annual O&M***	\$225		\$450		\$900			
Efficiency	30-yr Average Cost/lb-TP	\$1,506		\$1,253		\$1,127			
	30-yr Average Cost/1,000lb-TSS	\$4,859		\$4,004		\$3,617			
	30-yr Average Cost/ac-ft Vol.	\$1,931		\$1,605		\$1,465			

*Indirect Cost: (104 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)
 **Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)
 ***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 9-B

7th Ave. & Pierce St.
Hydrodynamic Device

Drainage Area – 13.1 acres
Location – 7th Avenue and Pierce Street
Property Ownership – Public
Site Specific Information-A hydrodynamic device is proposed for the 7th Avenue and Highway 10 interchange. The device would accept runoff from the northern section of the catchment, which includes residential, industrial, freeway, and open land uses.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10	ft diameter
	TP (lb/yr)	1.2		0.7%
	TSS (lb/yr)	686		0.9%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$3,574	
	30-yr Average Cost/1,000lb-TSS		\$6,251	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

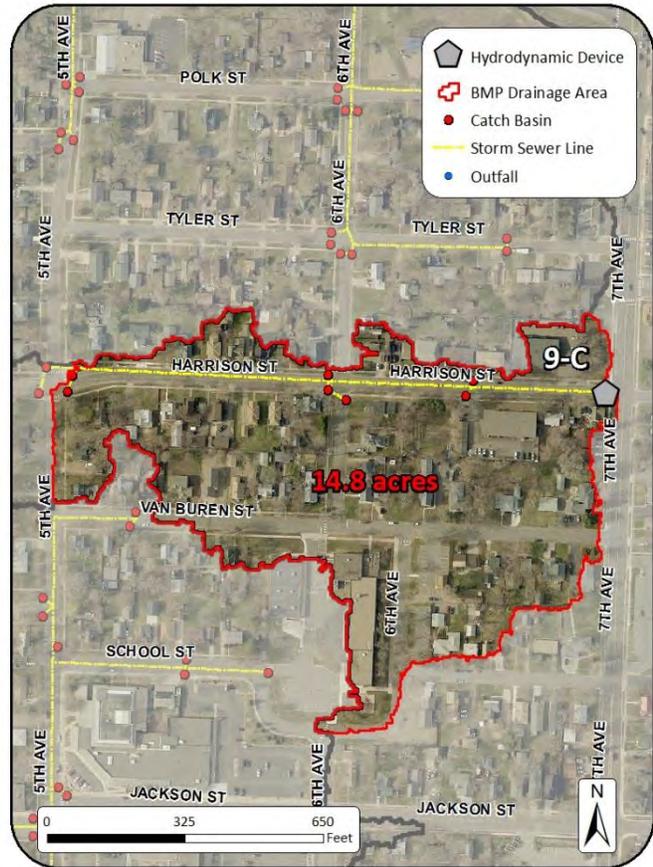
**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 9-C

7th Ave. & Harrison St.
Hydrodynamic Device

Drainage Area – 14.8 acres
Location – 7th Avenue and Harrison Street
Property Ownership – Public
Site Specific Information-A hydrodynamic device is proposed for the intersection of 7th Avenue and Harrison Street. The device would accept runoff from the western section of the catchment, which is composed of residential properties.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10	ft diameter
	TP (lb/yr)	1.0		0.6%
	TSS (lb/yr)	407		0.6%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$4,288	
	30-yr Average Cost/1,000lb-TSS		\$10,537	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 9-D

Main St. & 8 1/2 Ave.
Hydrodynamic Device

Drainage Area – 51.0 acres
Location – Main Street and 8 ½ Avenue
Property Ownership – Public
Site Specific Information-A hydrodynamic device is proposed for the intersection of Main Street and 8 ½ Avenue. The device would accept runoff from light industrial and residential areas in the eastern portion of the catchment.



Hydrodynamic Device			
		New Treatment	% Reduction
Cost/Removal Analysis			
Treatment	Number of BMPs	1	
	Total Size of BMPs	10 ft diameter	
	TP (lb/yr)	1.1	0.7%
	TSS (lb/yr)	777	1.1%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$108,000	
	Total Estimated Project Cost (2016)	\$109,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$3,899	
	30-yr Average Cost/1,000lb-TSS	\$5,519	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

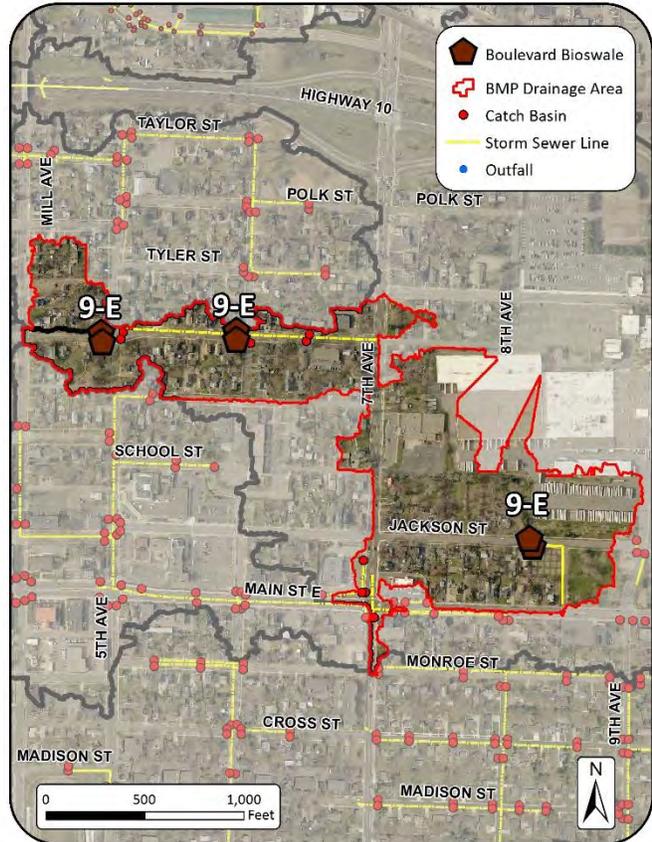
**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 9-E

Boulevard Bioswales

Drainage Area – 0.5 acre
Location – Throughout catchment
Property Ownership – Public
Site Specific Information – Bioswales are proposed for installation throughout the catchment. Locations for up to six bioswales are sited, where they will serve to treat runoff from residential properties. The table below shows the estimated cost and pollutant removal amounts based on treatment of a 0.5-acre drainage area.



Boulevard Bioswale			
<i>Cost/Removal Analysis</i>		2.5"/hr Infiltr. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.2	0.1%
	TSS (lb/yr)	112	0.2%
	Volume (acre-feet/yr)	0.2	0.1%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$2,131	
	30-yr Average Cost/1,000lb-TSS	\$4,561	
	30-yr Average Cost/ac-ft Vol.	\$2,482	

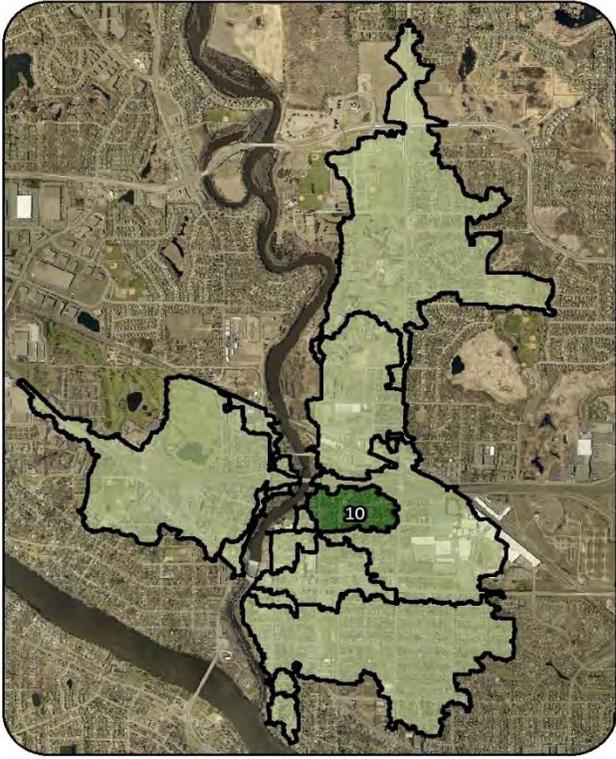
*Indirect Cost: (50 hours at \$73/hour)

**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Catchment A-10

Existing Catchment Summary	
Acres	42.0
Dominant Land Cover	Residential
Parcels	150
Volume (acre-feet/yr)	20.4
TP (lb/yr)	21.9
TSS (lb/yr)	7,209



CATCHMENT DESCRIPTION

Catchment A-10 includes portions of the City of Anoka south of US-10, west of 7th Avenue, and north of Harrison Street. All area within the catchment drains to a single outfall located west of the Water Avenue and Taylor Street intersection. Land use in the catchment is predominantly single family residential, with parcels of parkland (Rudy Johnson Park), institutional, and multi-family residential housing.

EXISTING STORMWATER TREATMENT

Runoff generated within the catchment is quickly intercepted in the city storm sewer network and routed to a single subsurface treatment device installed at the intersection of Water Avenue and Taylor Street. This device provides treatment to virtually the entire 42-acre catchment. Stormwater leaving this device is discharge into the Rum River directly west of the device location. In addition to this hydrodynamic device, street cleaning is performed two times per year by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

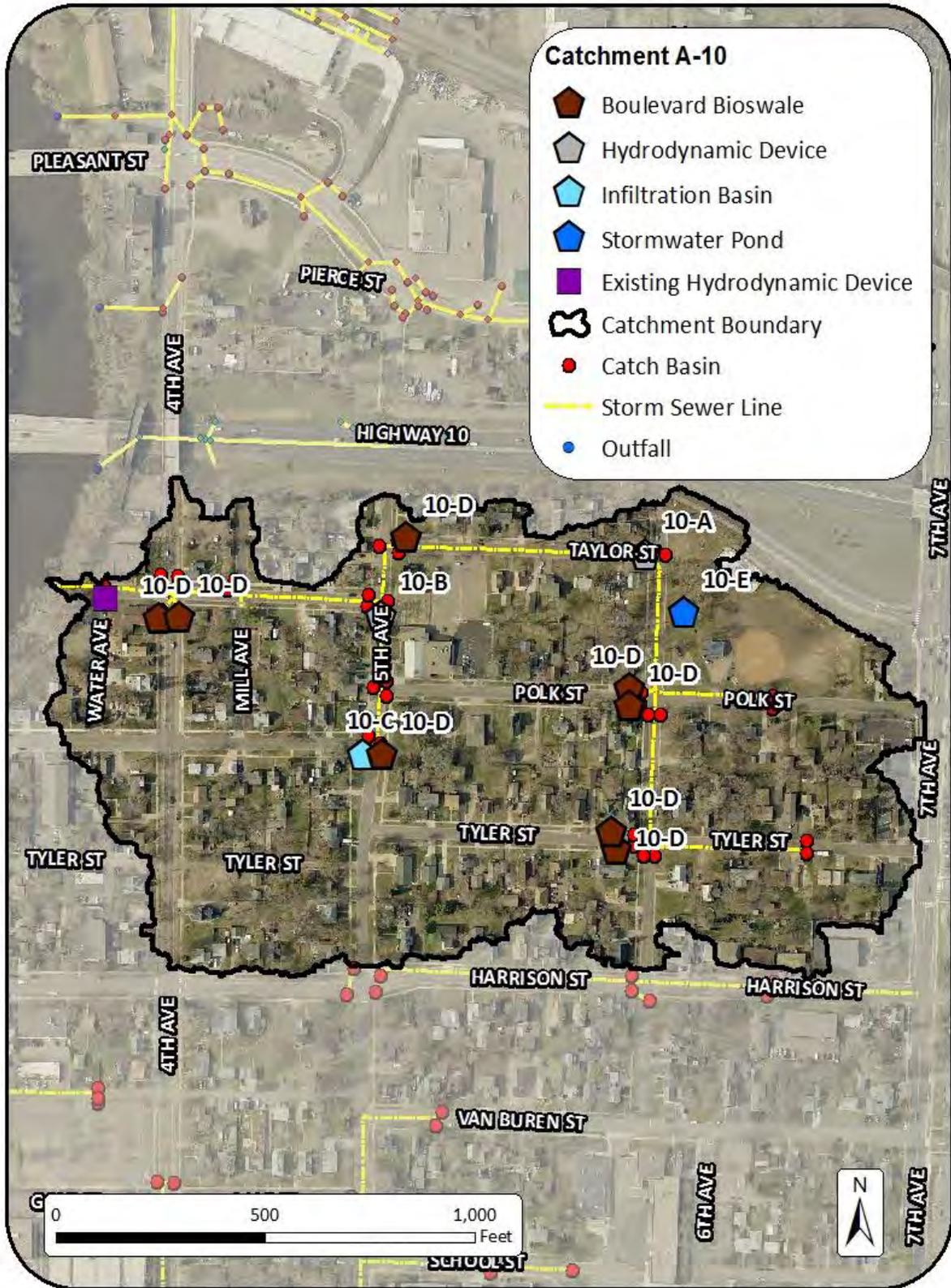
<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	25.0	3.1	12%	21.9
	TSS (lb/yr)	8,604	1,395	16%	7,209
	Volume (acre-feet/yr)	20.4	0.0	0%	20.4

PROPOSED RETROFITS OVERVIEW

Retrofits proposed in Catchment A-10 would supplement treatment already provided by the hydrodynamic device located near the outfall to the Rum River. Most proposed practices look to infiltrate water at the surface, thereby reducing the peak discharge at the hydrodynamic device downstream and increasing pollutant retention. These practices include up to 8 boulevard bioswales, and an infiltration basin. There is also a new pond proposed in Rudy Johnson Park. Additional

subsurface hydrodynamic devices were also proposed to reduce the pollutant load to the downstream device and increase catchment-wide pollutant retention.

RETROFIT RECOMMENDATIONS



Project ID: 10-A

6th Ave. & Taylor St.
Hydrodynamic Device

Drainage Area – 17.5 acres
Location – 6th Avenue and Taylor Street
Property Ownership – Public
Site Specific Information-A hydrodynamic device is proposed for the intersection of 6th Avenue and Taylor Street. The device would accept runoff from the eastern section of the catchment, which is composed of a park, residential properties and institutional land uses.



Hydrodynamic Device			
		New Treatment	% Reduction
Cost/Removal Analysis			
Treatment	Number of BMPs	1	
	Total Size of BMPs	10 ft diameter	
	TP (lb/yr)	0.5	2.3%
	TSS (lb/yr)	211	2.9%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$108,000	
	Total Estimated Project Cost (2016)	\$109,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$8,577	
	30-yr Average Cost/1,000lb-TSS	\$20,324	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

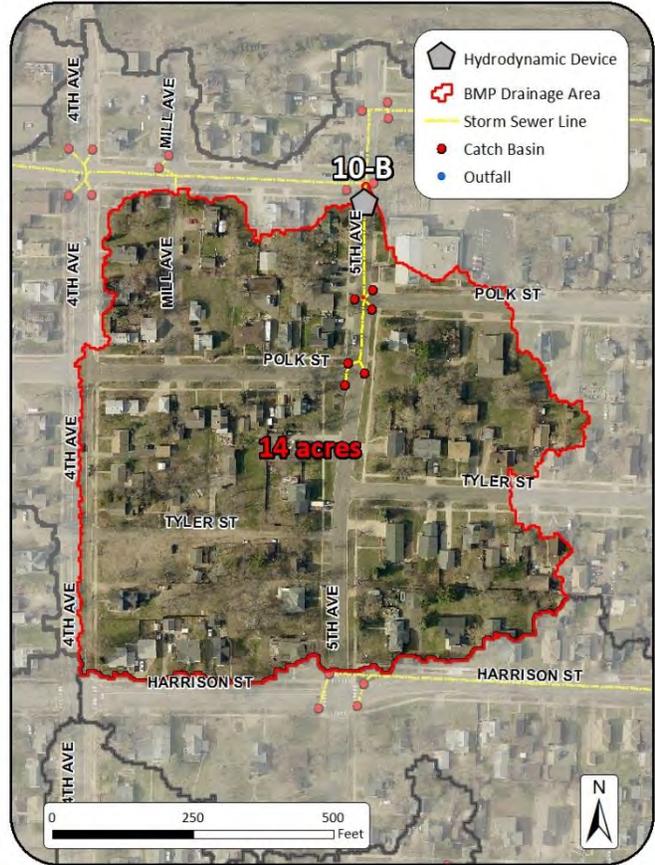
**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 10-B

5th Ave. & Taylor St.
Hydrodynamic Device

Drainage Area – 14.0 acres
Location – 5th Avenue and Taylor Street
Property Ownership – Public
Site Specific Information-A hydrodynamic device is proposed for the intersection of 5th Avenue and Taylor Street. The device would accept runoff from predominately residential land uses.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10	ft diameter
	TP (lb/yr)		0.5	2.3%
	TSS (lb/yr)		195	2.7%
	Volume (acre-feet/yr)		0.0	0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP			\$8,577
	30-yr Average Cost/1,000lb-TSS			\$21,992
	30-yr Average Cost/ac-ft Vol.			N/A

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 10-C

5th Ave. & Polk St.
Infiltration Basin

Drainage Area – 5.9 acres
Location – 5th Avenue and Polk Street
Property Ownership – Public
Site Specific Information – An infiltration basin is proposed for the southwest corner of the 5th Avenue and Polk Street intersection. Open space is available between the parking lot and the road for the installation of this practice. This basin would accept stormwater from residential properties.



Infiltration Basin				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Ponding Depth of BMP		1 foot	
	Total Size of BMP		2,000	sq-ft
	TP (lb/yr)		2.6	12%
	TSS (lb/yr)		808	11%
	Volume (acre-feet/yr)		2.1	10%
Cost	Administration & Promotion Costs*		\$2,920	
	Design & Construction Costs**		\$40,876	
	Total Estimated Project Cost (2016)		\$43,796	
	Annual O&M***		\$225	
Efficiency	30-yr Average Cost/lb-TP		\$648	
	30-yr Average Cost/1,000lb-TSS		\$2,085	
	30-yr Average Cost/ac-ft Vol.		\$803	

*Indirect Cost: 40 hours at \$73/hour

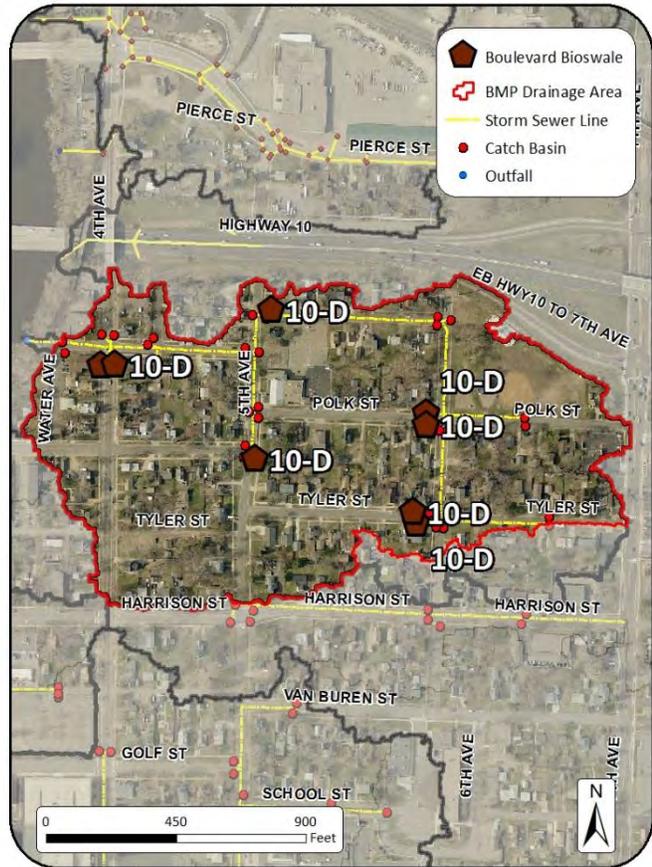
**Direct Cost: (\$20/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

***(\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 10-D

Boulevard Bioswales

Drainage Area – 0.5 acre
Location – Throughout catchment
Property Ownership – Public
Site Specific Information – Bioswales are proposed for installation throughout the catchment. Locations for up to eight bioswales are sited, where they will serve to treat runoff from residential properties. The table below shows the estimated cost and pollutant removal amounts based on treatment of a 0.5-acre drainage area.



Boulevard Bioswale			
<i>Cost/Removal Analysis</i>		2.5"/hr Infil. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.1	0.7%
	TSS (lb/yr)	52	0.7%
	Volume (acre-feet/yr)	0.1	0.6%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$3,427	
	30-yr Average Cost/1,000lb-TSS	\$9,853	
	30-yr Average Cost/ac-ft Vol.	\$4,302	

*Indirect Cost: (50 hours at \$73/hour)

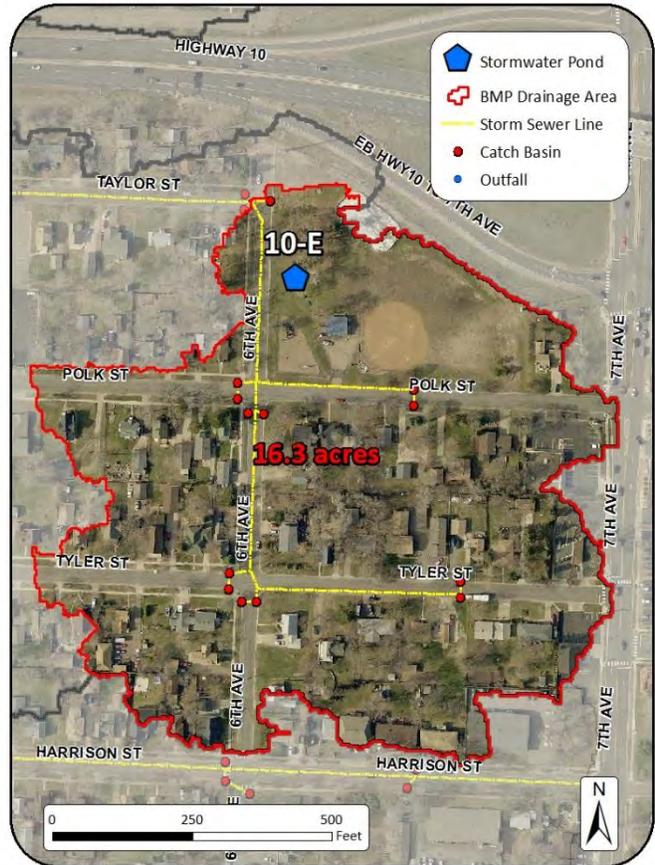
**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Project ID: 10-E

Rudy Johnson Park
New Pond

Drainage Area – 16.3 acre
Location – 6th Avenue and Taylor Street
Property Ownership – Public
Site Specific Information – A new pond is proposed for the northwest corner of Rudy Johnson Park. The pond would accept runoff from primarily residential properties. It will provide additional treatment to the catchment by allowing TSS and TP to settle out. The storm sewer line that runs north-south along 6th Ave. could be redirected into the proposed pond.



New Pond			
<i>Cost/Removal Analysis</i>		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	0.3 acres	
	TP (lb/yr)	4.0	18.3%
	TSS (lb/yr)	1,712	23.7%
	Volume (acre-feet/yr)	0.1	0.3%
Cost	Administration & Promotion Costs*	\$7,300	
	Design & Construction Costs**	\$232,625	
	Total Estimated Project Cost (2016)	\$239,925	
	Annual O&M***	\$300	
Efficiency	30-yr Average Cost/lb-TP	\$2,074	
	30-yr Average Cost/1,000lb-TSS	\$4,847	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: 100 hours at \$73/hour

**Direct Cost: See Appendix B for detailed cost information

***\$1,000/acre - Annual inspection and sediment/debris removal from pretreatment area

Catchment A-11

Existing Catchment Summary	
Acres	4.9
Dominant Land Cover	Residential
Parcels	22
Volume (acre-feet/yr)	2.8
TP (lb/yr)	2.5
TSS (lb/yr)	806

CATCHMENT DESCRIPTION

Catchment A-11 is the smallest catchment east of the Rum River, and includes all of the geographic area draining to the Polk Street outfall. This outfall only receives water draining to the storm sewer network at this intersection. Land use in the catchment is only residential, but includes both single family homes and multifamily units.



EXISTING STORMWATER TREATMENT

A single hydrodynamic device treats most of this catchment, and is located at the intersection of Polk Street and 3rd Avenue. In addition to this hydrodynamic device, street cleaning is performed two times per year by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	3.1	0.6	19%	2.5
	TSS (lb/yr)	1,084	278	26%	806
	Volume (acre-feet/yr)	2.8	0.0	0%	2.8

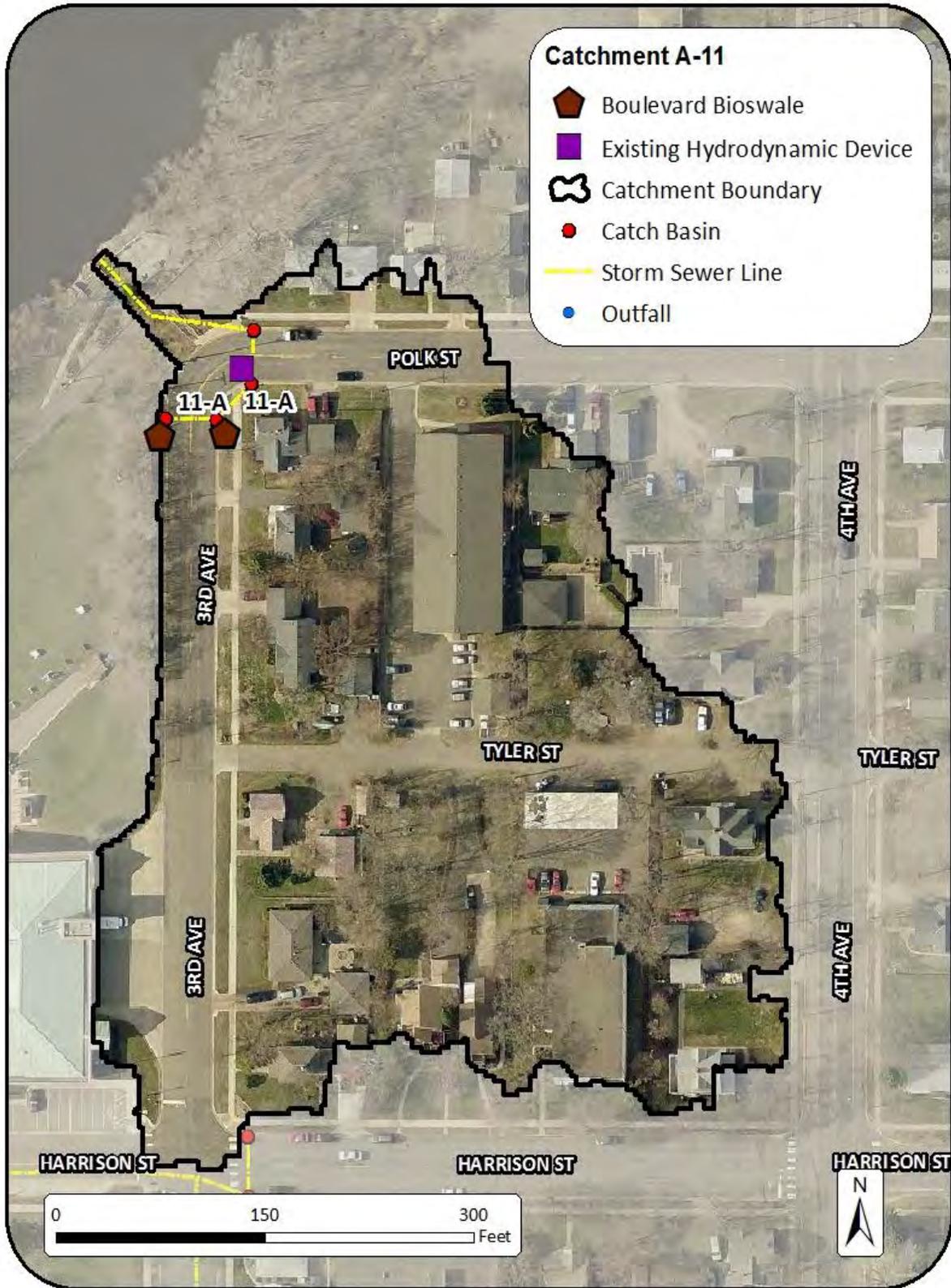
PROPOSED RETROFITS OVERVIEW

Two boulevard bioswales were proposed along 3rd Avenue to increase pollutant retention upstream of the hydrodynamic device.

RETROFITS CONSIDERED BUT REJECTED

Additional bioretention opportunities were explored throughout the catchment but drainage areas to the practices were too small to warrant the installation costs.

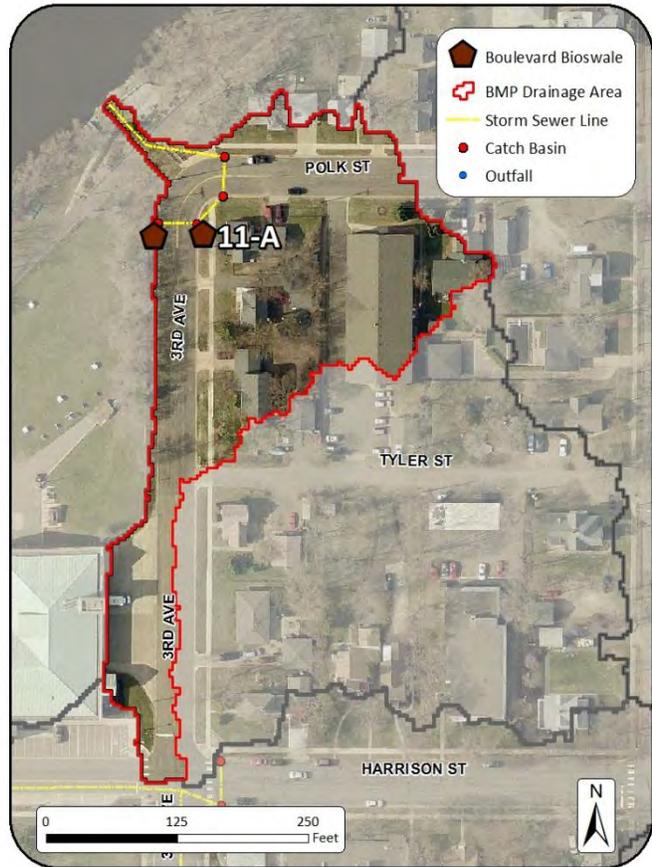
RETROFIT RECOMMENDATIONS



Project ID: 11-A

3rd Avenue
Boulevard Bioswales

Drainage Area – 0.5 acres
Location – 3rd Avenue
Property Ownership – Public
Site Specific Information – Bioswales are proposed for installation, preferably at the northern end of 3rd Avenue. Locations for two bioswales are sited, where they will serve to treat runoff from residential properties. The table below shows the estimated cost and pollutant removal amounts based on treatment of a 0.5-acre drainage area.



Boulevard Bioswale			
		2.5"/hr Infil. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.1	5.8%
	TSS (lb/yr)	49	6.1%
	Volume (acre-feet/yr)	0.1	4.9%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$3,523	
	30-yr Average Cost/1,000lb-TSS	\$10,342	
	30-yr Average Cost/ac-ft Vol.	\$3,717	

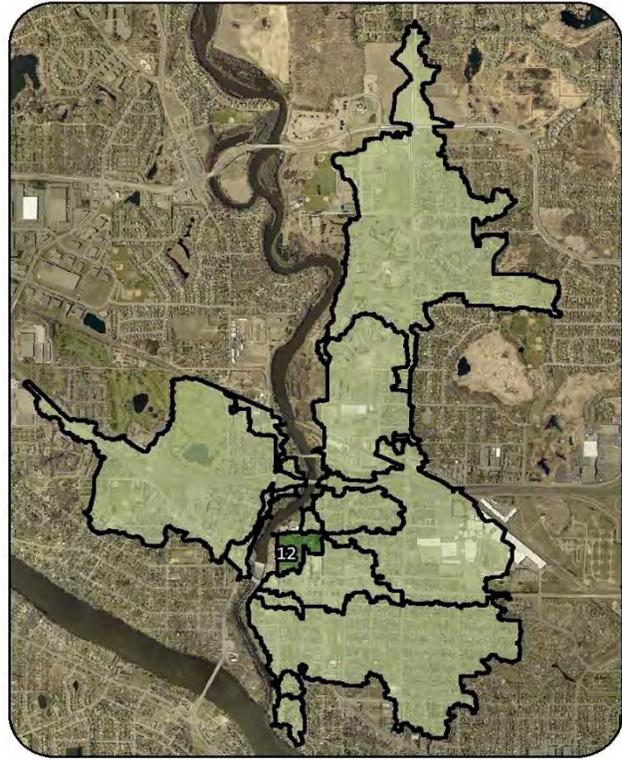
*Indirect Cost: (50 hours at \$73/hour)

**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Catchment A-12

Existing Catchment Summary	
Acres	17.6
Dominant Land Cover	Commercial
Parcels	145
Volume (acre-feet/yr)	12.4
TP (lb/yr)	9.0
TSS (lb/yr)	3,427



CATCHMENT DESCRIPTION

Catchment A-12 includes portions of Harrison Street, Golf Street, 2nd Avenue, and 3rd Avenue in downtown Anoka. Stormwater runoff generated on the commercial, institutional, and multi-family residential properties of the catchment is quickly intercepted by municipal storm sewers and directed to a subsurface treatment device west of the intersection of 2nd Avenue and Harrison Street. Once stormwater leaves this device it is almost immediately discharged to the Rum River.

EXISTING STORMWATER TREATMENT

The hydrodynamic device located just west of the 2nd Avenue and Harrison Street intersection was installed during a recent roadway reconstruction and treats the entire 17.6-acre catchment. The only other form of stormwater treatment in the catchment is street cleaning, provided by the City of Anoka two times per month. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	2			
	BMP Types	1 Hydrodynamic Device, Street Cleaning			
	TP (lb/yr)	11.4	2.4	21%	9.0
	TSS (lb/yr)	4,694	1,267	27%	3,427
	Volume (acre-feet/yr)	12.4	0.0	0%	12.4

PROPOSED RETROFITS OVERVIEW

No retrofits were proposed in this catchment.

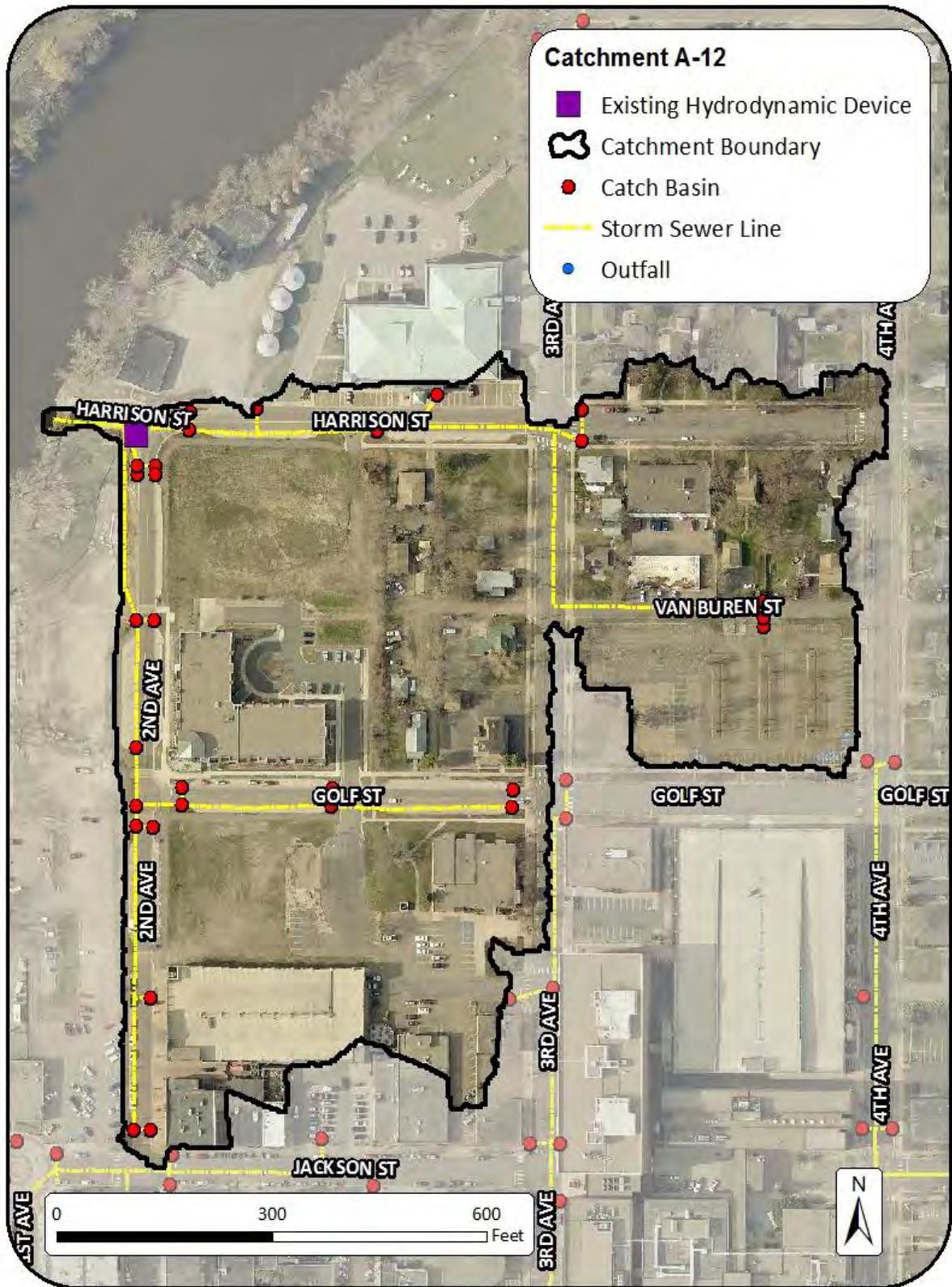
RETROFITS CONSIDERED BUT REJECTED

Permeable pavement was considered for the county-owned property between 3rd Avenue and 4th Avenue north of Golf Street. The practice was removed from consideration during conversations with City officials as the County intends to use this parking lot for future building development, not as its current use for street-level parking.

Bioretention practices, including curb-cut rain gardens and boulevard bioswales, were considered to supplement treatment provided by the hydrodynamic device and to reduce peak flows. These were not proposed as a retrofit option as the number of surface catch basins meant that drainage areas to each basin were too small to make the project cost-effective.

Therefore, the map below was included solely to provide additional detail of the catchment boundary, associated land uses, and streets.

RETROFIT RECOMMENDATIONS

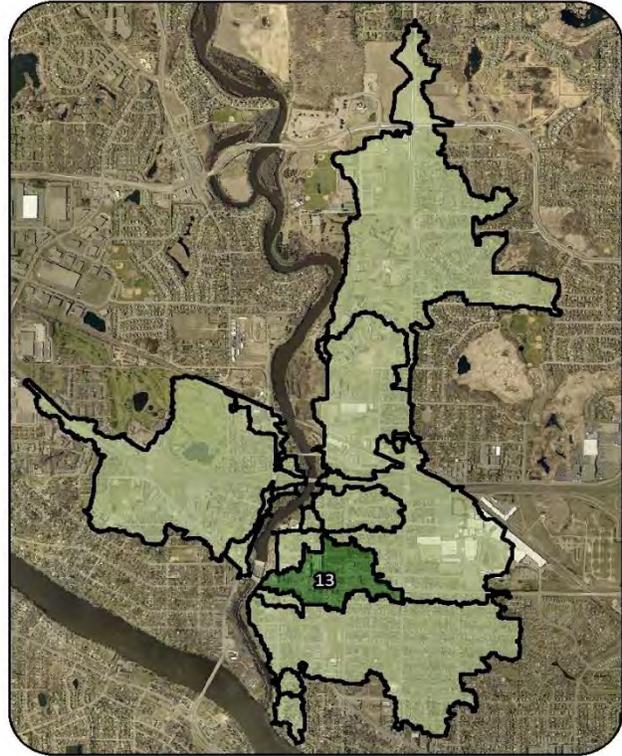


Catchment A-13

Existing Catchment Summary	
Acres	65.8
Dominant Land Cover	Commercial
Parcels	214
Volume (acre-feet/yr)	6.3
TP (lb/yr)	4.3
TSS (lb/yr)	1,971

CATCHMENT DESCRIPTION

Catchment A-13 is the southernmost catchment in the eastern drainage network. It includes most of downtown Anoka, and is the most heavily-paved catchment in this analysis. Land use in the catchment is predominantly commercial and institutional. Publically-owned properties in this catchment include both the Anoka County Government Center and portions of the Anoka City Hall.



EXISTING STORMWATER TREATMENT

Stormwater runoff generated within the catchment flows to municipal and county storm sewers, eventually discharging into the Rum River south of Main Street. No catchment-wide treatment is available besides street cleaning, performed by the City of Anoka two times per month. Two small infiltration basins are located on the Anoka Middle School property, but only treat runoff from the school buildings and parking lot. Present-day stormwater pollutant loading and treatment is summarized in the table below.

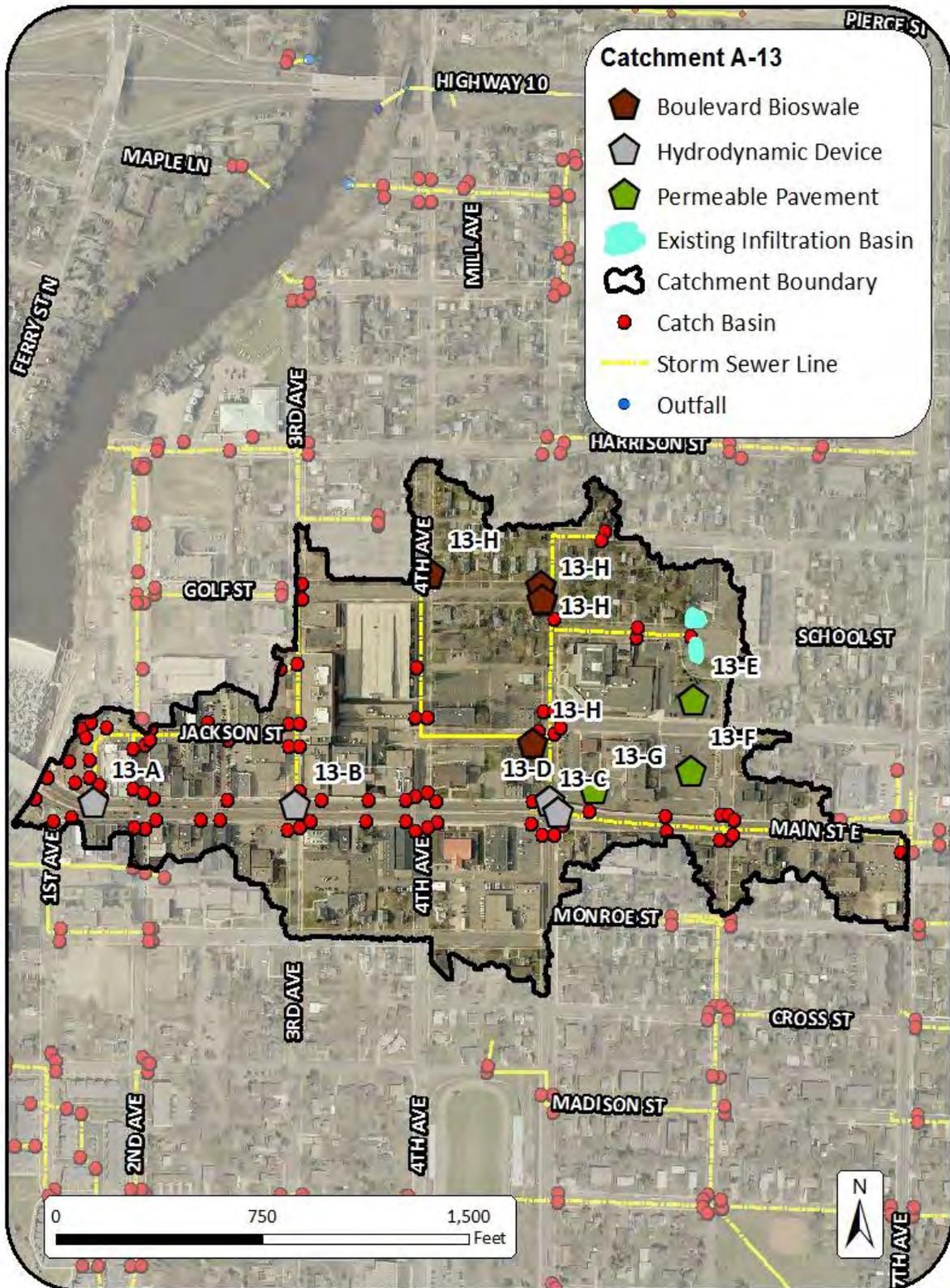
	Existing Conditions	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	3			
	BMP Types	2 Infiltration Basins, Street Cleaning			
	TP (lb/yr)	54.5	6.2	11%	48.3
	TSS (lb/yr)	24,065	3,437	14%	20,628
	Volume (acre-feet/yr)	65.3	1.2	2%	64.1

PROPOSED RETROFITS OVERVIEW

Four hydrodynamic devices were proposed to treat storm sewer lines along Main Street, 5th Avenue, 3rd Avenue, and the Anoka City Hall. These devices were proposed in locations with drainage areas less than 10 acres to reduce resuspension from high peak flows. Bioretention practices were also proposed in the form of boulevard bioswales (up to four).

Permeable pavement was also proposed on three parking lots on the St. Steven's Church and School properties. This practice would look to increase volume, TSS, and TP retention prior to discharge into the Rum River.

RETROFIT RECOMMENDATIONS



Project ID: 13-A
 Main St. & 1st Ave.
 Hydrodynamic Device

Drainage Area – 4.6 acres
Location – Main Street and 1st Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device could be installed at the intersection of Main Street and 1st Avenue. This device would accept runoff from the commercial properties and would provide additional treatment just before the catchment discharges into the Rum River.



Hydrodynamic Device			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	8 ft diameter	
	TP (lb/yr)	0.5	1.0%
	TSS (lb/yr)	272	1.3%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*	\$1,752	
	Design & Construction Costs**	\$54,000	
	Total Estimated Project Cost (2016)	\$55,752	
	Annual O&M***	\$630	
Efficiency	30-yr Average Cost/lb-TP	\$4,977	
	30-yr Average Cost/1,000lb-TSS	\$9,149	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 13-B

Main St. & 3rd Ave.
Hydrodynamic Device

Drainage Area – 6.4 acres
Location – Main Street and 3rd Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed at the intersection of Main Street and 3rd Avenue. This device would accept runoff from the Anoka County Government Center.



Hydrodynamic Device			
	Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1
	Total Size of BMPs		8 ft diameter
	TP (lb/yr)	0.5	1.0%
	TSS (lb/yr)	285	1.4%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*		\$1,752
	Design & Construction Costs**		\$54,000
	Total Estimated Project Cost (2016)		\$55,752
	Annual O&M***		\$630
Efficiency	30-yr Average Cost/lb-TP		\$4,977
	30-yr Average Cost/1,000lb-TSS		\$8,731
	30-yr Average Cost/ac-ft Vol.		N/A

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 13-C

Main St. & 5th Ave.
Hydrodynamic Device

Drainage Area – 9.9 acres
Location – Main Street and 5th Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed for Main Street at 5th Avenue to accept runoff from the eastern portion of the catchment. This portion of the catchment is composed of a school property, residential properties, and commercial properties.



Hydrodynamic Device			
		Cost/Removal Analysis	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	10 ft diameter	
	TP (lb/yr)	0.9	1.9%
	TSS (lb/yr)	427	2.1%
	Volume (acre-feet/yr)	0.0	0.0%
Cost	Administration & Promotion Costs*		\$1,752
	Design & Construction Costs**		\$108,000
	Total Estimated Project Cost (2016)		\$109,752
	Annual O&M***		\$630
Efficiency	30-yr Average Cost/lb-TP	\$4,765	
	30-yr Average Cost/1,000lb-TSS	\$10,043	
	30-yr Average Cost/ac-ft Vol.	N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 13-D

5th Ave. & Main St. Hydrodynamic Device

Drainage Area – 25.1 acres
Location – 5th Avenue and Main Street
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed for 5th Avenue at Main Street to accept runoff from the northern portion of the catchment. This portion of the catchment is composed of a school property, residential properties, and commercial properties.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10 ft diameter	
	TP (lb/yr)	1.4		2.9%
	TSS (lb/yr)	644		3.1%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*		\$1,752	
	Design & Construction Costs**		\$108,000	
	Total Estimated Project Cost (2016)		\$109,752	
	Annual O&M***		\$630	
Efficiency	30-yr Average Cost/lb-TP		\$3,063	
	30-yr Average Cost/1,000lb-TSS		\$6,659	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$36,000 for materials) + (\$18,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Project ID: 13-E

St. Stephen's Catholic Church.
Permeable Pavement

Drainage Area – 1.1 acres
Location – Jackson Street and School Street
Property Ownership – Private
Site Specific Information – Permeable pavement is proposed for the parking lot of St. Stephen's Catholic Church. This could be a favorable option as permeable pavement allows for the treatment of a large surface area with minimal impact on the usable space. In order to treat the 1.1-acre drainage area, 15,900 sq.-ft. of permeable pavement is proposed.



Permeable Pavement				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMP		15,900	sq-ft
	TP (lb/yr)	0.9		8.7%
	TSS (lb/yr)	320		6.6%
	Volume (acre-feet/yr)	0.9		7.3%
Cost	Administration & Promotion Costs*			\$2,920
	Design & Construction Costs**			\$159,876
	Total Estimated Project Cost (2016)			\$162,796
	Annual O&M***			\$11,925
Efficiency	30-yr Average Cost/lb-TP		\$19,279	
	30-yr Average Cost/1,000lb-TSS		\$54,224	
	30-yr Average Cost/ac-ft Vol.		\$19,279	

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$10/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

***(\$0.75/sq-ft for routine maintenance)

Project ID: 13-F

St. Stephen's Catholic School Permeable Pavement

Drainage Area – 1.9 acres
Location – Jackson Street and 6th Avenue
Property Ownership – Private
Site Specific Information – Permeable pavement is proposed for the eastern parking lot of St. Stephen's Catholic School. This could be a favorable option as permeable pavement allows for the treatment of a large surface area with minimal impact on the usable space. In order to treat the 1.9-acre drainage area, 27,900 sq.-ft. of permeable pavement is proposed.



Permeable Pavement				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMP		27,900 sq-ft	
	TP (lb/yr)		1.6	15.4%
	TSS (lb/yr)		562	11.6%
	Volume (acre-feet/yr)		1.6	12.9%
Cost	Administration & Promotion Costs*			\$2,920
	Design & Construction Costs**			\$279,876
	Total Estimated Project Cost (2016)			\$282,796
	Annual O&M***			\$20,925
Efficiency	30-yr Average Cost/lb-TP			\$18,970
	30-yr Average Cost/1,000lb-TSS			\$54,006
	30-yr Average Cost/ac-ft Vol.			\$18,970

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$10/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

***(\$0.75/sq-ft for routine maintenance)

Project ID: 13-G

St. Stephen's Catholic School Permeable Pavement

Drainage Area – 2.3 acres
Location – Jackson Street and 6th Avenue
Property Ownership – Private
Site Specific Information – Permeable pavement is proposed for the western parking lot of St. Stephen's Catholic School. This could be a favorable option as permeable pavement allows for the treatment of a large surface area with minimal impact on the usable space. In order to treat the 2.3-acre drainage area, 34,000 sq.-ft. of permeable pavement is proposed.



Permeable Pavement			
Cost/Removal Analysis		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMP	34,000	sq-ft
	TP (lb/yr)	1.9	18.3%
	TSS (lb/yr)	672	13.9%
	Volume (acre-feet/yr)	1.9	15.3%
Cost	Administration & Promotion Costs*	\$2,920	
	Design & Construction Costs**	\$340,876	
	Total Estimated Project Cost (2016)	\$343,796	
	Annual O&M***	\$25,500	
Efficiency	30-yr Average Cost/lb-TP	\$19,453	
	30-yr Average Cost/1,000lb-TSS	\$55,000	
	30-yr Average Cost/ac-ft Vol.	\$19,453	

*Indirect Cost: 40 hours at \$73/hour

**Direct Cost: (\$10/sq-ft for materials and labor) + (12 hours at \$73/hour for design)

***(\$0.75/sq-ft for routine maintenance)

Project ID: 13-H

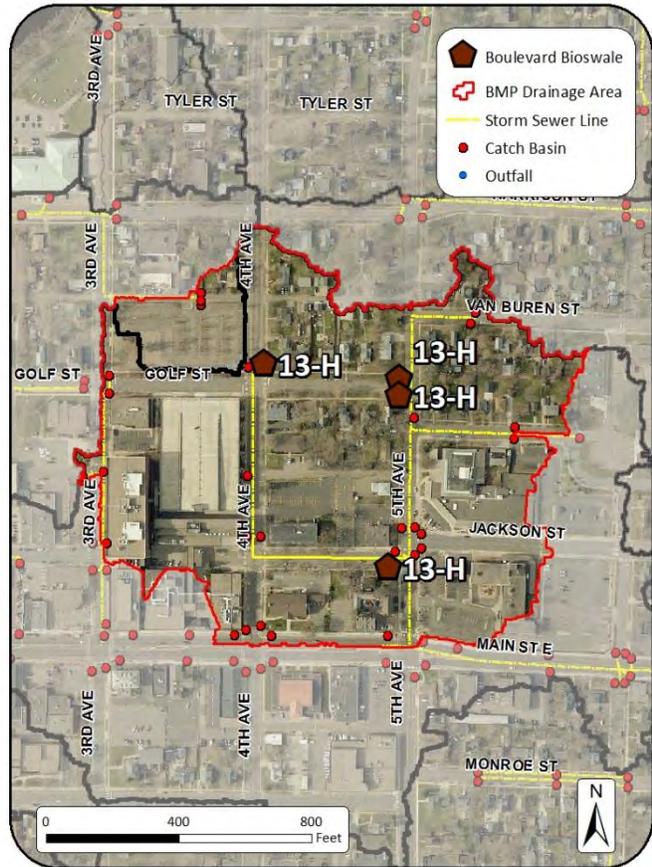
Boulevard Bioswales

Drainage Area – 0.5 acres

Location – Various locations throughout catchment

Property Ownership – Public

Site Specific Information – Boulevard bioswales are proposed for installation, preferably in the northern portion of the catchment. Locations for up to four bioswales are sited, where they will serve to treat runoff primarily from residential properties. The table below shows the estimated cost and pollutant removal amounts based on treatment of a 0.5-acre drainage area.



Boulevard Bioswale			
		2.5"/hr Infiltr. Rate	
		New Treatment	% Reduction
Treatment	Number of BMPs	1	
	Total Size of BMPs	80 sq-ft	
	TP (lb/yr)	0.1	1.0%
	TSS (lb/yr)	22	0.5%
	Volume (acre-feet/yr)	0.1	0.8%
Cost	Administration & Promotion Costs*	\$3,650	
	Design & Construction Costs**	\$4,876	
	Total Estimated Project Cost (2016)	\$8,526	
	Annual O&M***	\$225	
Efficiency	30-yr Average Cost/lb-TP	\$5,092	
	30-yr Average Cost/1,000lb-TSS	\$23,072	
	30-yr Average Cost/ac-ft Vol.	\$5,092	

*Indirect Cost: (50 hours at \$73/hour)

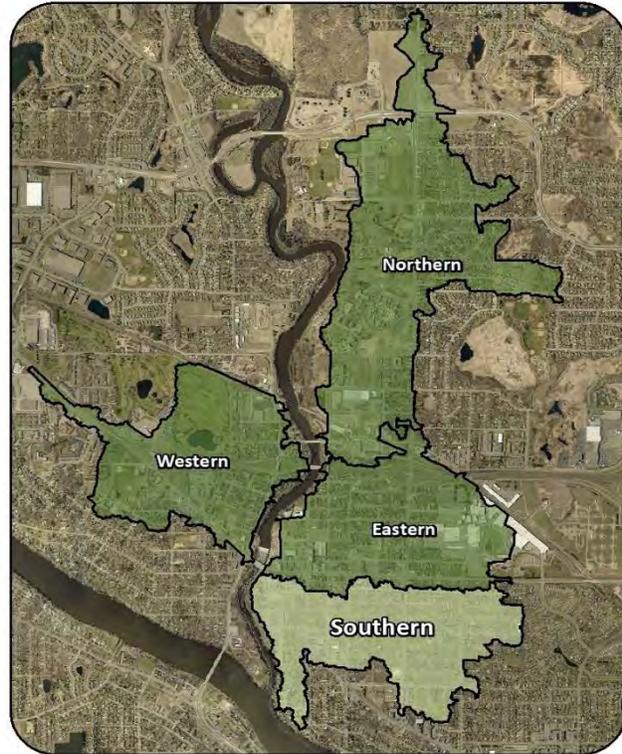
**Direct Cost: (\$50/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for 10-year rehabilitation)+ (\$75/year for routine maintenance)

Southern Drainage Network

Catchment ID	Page
A-14	118
A-15	122
A-16	126
A-17	130

Existing Network Summary	
Acres	302.7
Dominant Land Cover	Residential
Volume (ac-ft/yr)	148.2
TP (lb/yr)	142.9
TSS (lb/yr)	44,377



DRAINAGE NETWORK SUMMARY

The southern drainage network consists of catchments A-14, A-15, A-16, and A-17. These catchments comprise all areas in the City of Anoka draining to the Rum River south of Main Street. The four Rum River outfalls are located west of 1st Avenue about 200' south of Main Street (A-14) and at Adam's Street (A-15), Washington Street (A-16), and Oakwood Drive (A-17). The southern drainage network is predominantly residential housing unlike the other three drainage networks, which have a much larger variety of land uses.

EXISTING STORMWATER TREATMENT

The only form of network-wide treatment is street cleaning performed by the City of Anoka twice monthly in Catchment A-14 and two times annually in Catchment A-15, A-16, and A-17. Only two other forms of treatment exist in the network. The first is a treatment system in Catchment A-15 at 2nd Avenue and Adams Street which includes a series of sedimentation chambers as well as a retention pond.

Catchment A-14

Existing Catchment Summary	
Acres	7.8
Dominant Land Cover	Commercial
Parcels	45
Volume (acre-feet/yr)	8.3
TP (lb/yr)	6.4
TSS (lb/yr)	2,636

CATCHMENT DESCRIPTION

Catchment A-14 includes areas of downtown Anoka south of Main Street along 1st Avenue, 2nd Avenue, 3rd Avenue, and Monroe Street. The catchment includes all geographic area draining to an outfall along the Rum River about 200' south of Main Street. Stormwater runoff is primarily overland east of 2nd Avenue, but is then collected through a series of municipal storm sewer pipes, and discharged at the Rum River outfall west of 1st Avenue.



EXISTING STORMWATER TREATMENT

No stormwater treatment exists in this catchment besides street cleaning, conducted two times per month by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	1			
	BMP Types	Street Cleaning			
	TP (lb/yr)	7.2	0.8	11%	6.4
	TSS (lb/yr)	3,108	472	15%	2,636
	Volume (acre-feet/yr)	8.3	0.0	0%	8.3

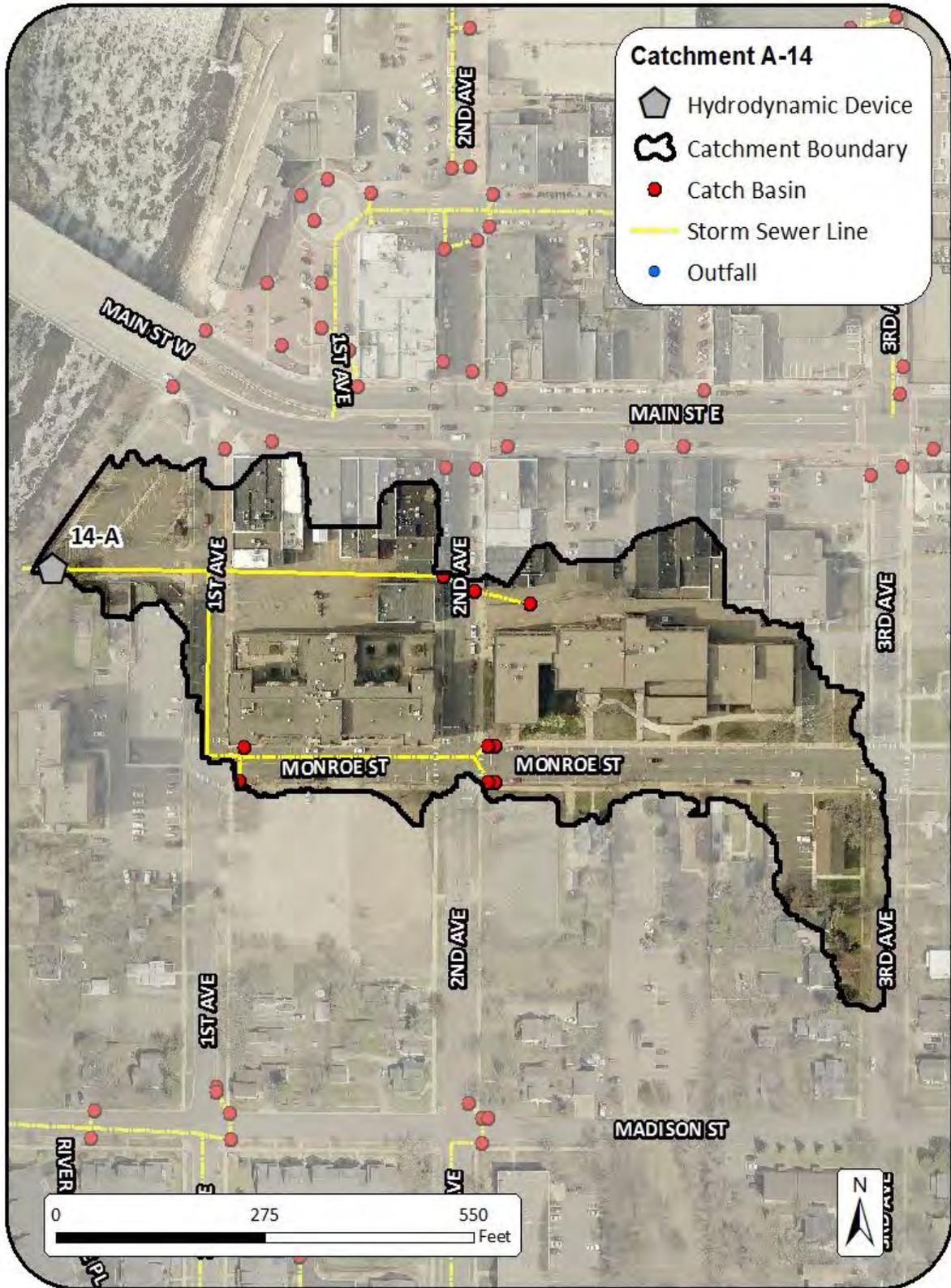
PROPOSED RETROFITS OVERVIEW

A single hydrodynamic device was proposed upstream of the outfall to the Rum River. If properly designed and installed, this structure should be able to treat nearly all of the surficial area of this catchment.

RETROFITS CONSIDERED BUT REJECTED

Bioretention practices, specifically boulevard bioswales, were considered but were not proposed as insufficient space exists within boulevards of this catchment to accommodate a practice. Due to the limited space, subsurface practices were instead proposed.

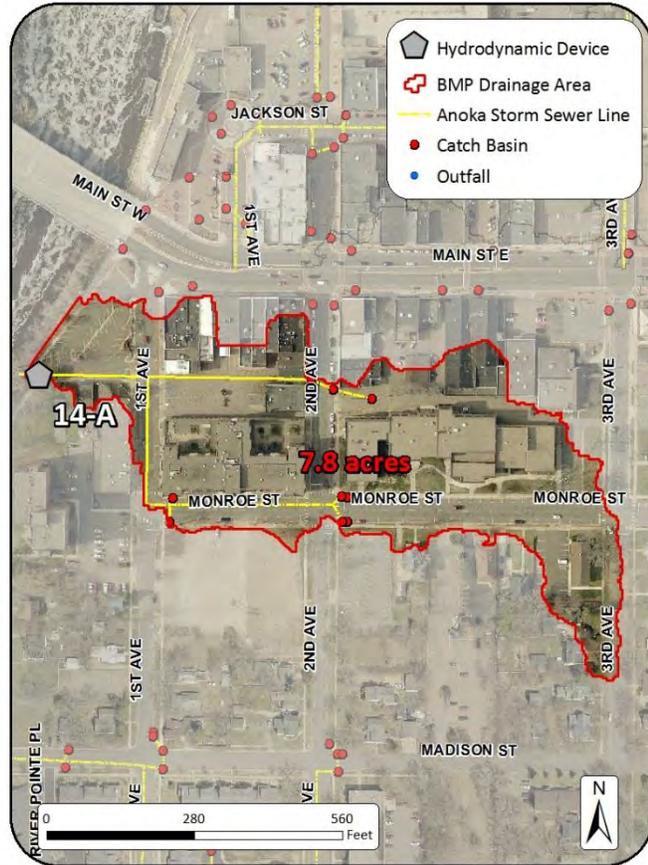
RETROFIT RECOMMENDATIONS



Project ID: 14-A

1st Avenue.
Hydrodynamic Device

Drainage Area – 7.8 acres
Location – Parking lot off 1st Avenue
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed for the parking lot west of 1st Avenue and south of Main Street. This device would accept and treat runoff from the entire catchment.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10 ft diameter	
	TP (lb/yr)	0.8		12.5%
	TSS (lb/yr)	385		14.6%
	Volume (acre-feet/yr)	0.0		0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$5,361	
	30-yr Average Cost/1,000lb-TSS		\$11,139	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Catchment A-15

Existing Catchment Summary	
Acres	275.9
Dominant Land Cover	Residential
Parcels	845
Volume (acre-feet/yr)	131.8
TP (lb/yr)	125.3
TSS (lb/yr)	38,609

CATCHMENT DESCRIPTION

Catchment A-15 is the largest catchment in the southern drainage network, extending from the Coon Rapids municipal boundary in the east to the Rum River in the west and from Main Street in the north to Southview Road in the south. The catchment is predominantly single-family residential, but includes larger publically-owned parcels such as the Anoka High School football field, Middle School for the Arts, and Aquatic Center and privately owned multifamily developments.



Stormwater runoff generated within the catchment is collected quickly from street catch basins and conveyed to the Rum River. The catchment includes areas of downtown Anoka south of Main St. along 1st Avenue, 2nd Avenue, 3rd Avenue, and Monroe Street. The catchment includes all geographic areas draining to an outfall along the Rum River about 200' south of Main Street. Stormwater runoff is primarily overland east of 2nd Avenue, but is then collected through a series of municipal storm sewer pipes, and discharged at the Rum River outfall west of 1st Avenue.

EXISTING STORMWATER TREATMENT

Stormwater runoff generated within the catchment is collected quickly from roadway catch basins and conveyed to a stormwater treatment system on Adams Street west of 2nd Avenue. Upon entering the system stormwater is first passed through a grit chamber, which is a series of baffles and trash racks acting as sedimentation cells. Once through this structure stormwater is discharged into a retention pond, which subsequently outlets into the Rum River. The only other form of stormwater treatment in this catchment is street cleaning, conducted two times per year by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	<i>Existing Conditions</i>	Base Loading	Treatment	Net Treatment %	Existing Loading
Treatment	Number of BMPs	5			
	BMP Types	3 Hydrodynamic Devices, 1 Pond, Street Cleaning			
	TP (lb/yr)	163.3	38.0	23%	125.3
	TSS (lb/yr)	54,890	16,281	30%	38,609
	Volume (acre-feet/yr)	134.6	2.8	2%	131.8

PROPOSED RETROFITS OVERVIEW

Infiltration practices were pursued in areas outside of the Drinking Water Supply Management Areas. Up to ten curb-cut rain gardens were proposed in the residential neighborhood east of 5th Avenue and south of Jefferson Street. This neighborhood was chosen due to its sandy soils, relatively small slopes, and older infrastructure. Recent roadway improvements to the north increased the density of catch basins, which can make curb-cut rain garden projects less beneficial by decreasing potential drainage areas.

A pair of hydrodynamic devices were proposed along tertiary storm sewer lines on 5th Avenue and Jefferson Street. Drainage areas to each of these devices were kept below ten acres to limit peak stormwater volume discharge to each device as high flows can promote the resuspension of accumulated sediment.

RETROFITS CONSIDERED BUT REJECTED

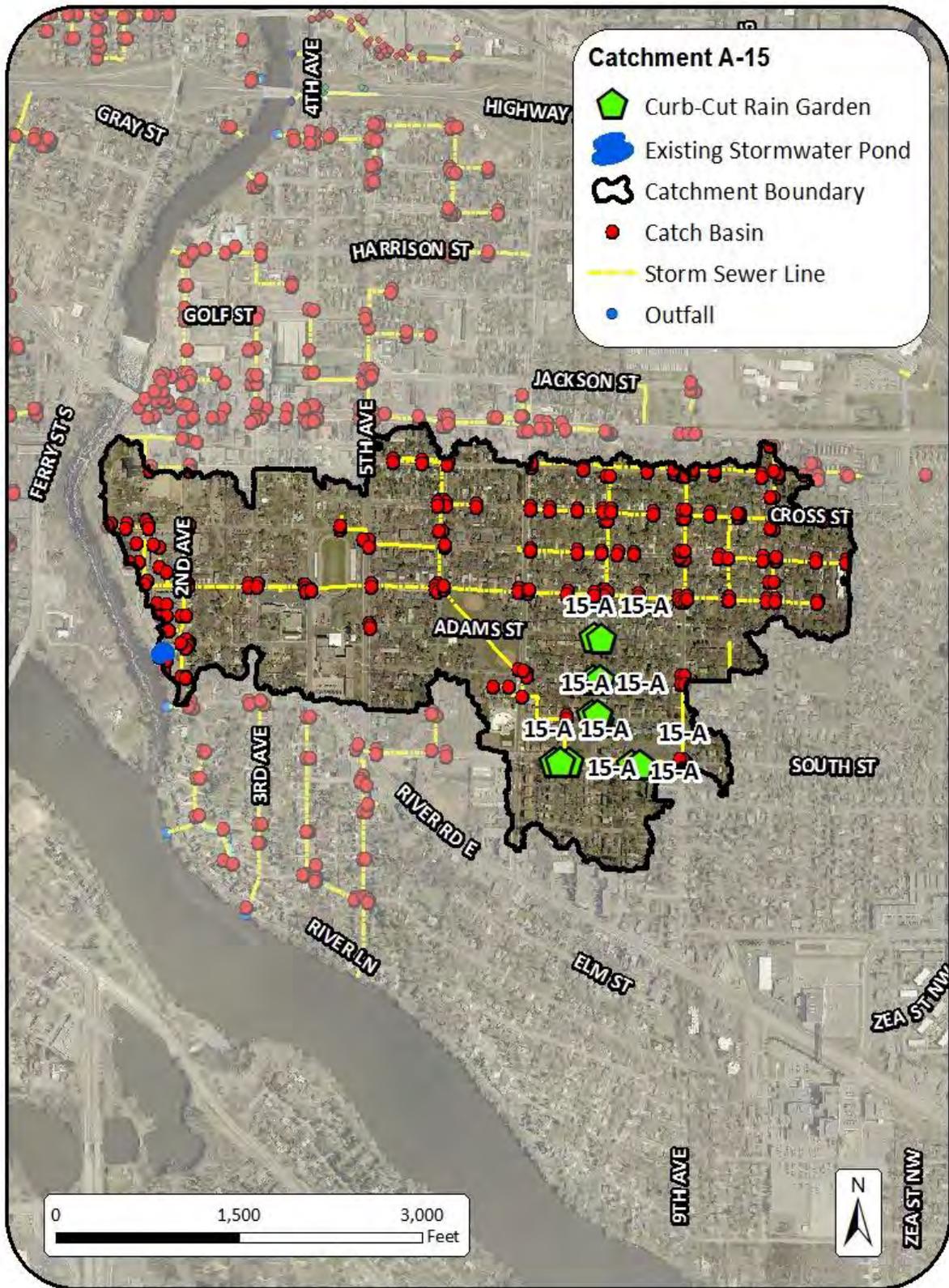
Permeable pavement opportunities sited at public, school, and church properties throughout the Adams Street catchment were removed due to the risk of contamination to local groundwater resources. The Minnesota Department of Health Wellhead Protection Area (WHPA) throughout most of the Adams Street catchment has a high risk for aquifer vulnerability. Because long-term paved parking areas can be sources for heavy metals, hydrocarbons, and road salt this location was removed as a potential area for an infiltration practice such as permeable pavement.

Similarly, underground infiltration practices located at two city-owned properties (the baseball fields west of 7th Avenue and north of Brisbin Street, and the open green space east of 7th Avenue and north of South Street) were removed from consideration because of their location relative to the WHPA within an area of high groundwater vulnerability.

A pair of hydrodynamic devices were also proposed along tertiary storm sewer lines on 5th Avenue and Jefferson Street. Drainage areas to each of these devices were kept below ten acres to limit peak stormwater volume discharge to each device as high flows can promote the resuspension of accumulated sediment. However, after modeling these devices showed to remove minimal TP and TSS.

Lastly, a stormwater reuse practice on the high school football field was also excluded from consideration as increased infiltration at this site from repurposed stormwater would likely require filtering and tertiary treatment that would deem the practice cost-prohibitive. Because this practice also lies within the Emergency Response Area (area where time of travel for infiltrated water from the ground surface to the aquifer is within 1 year) the installation of any infiltration practice is not recommended.

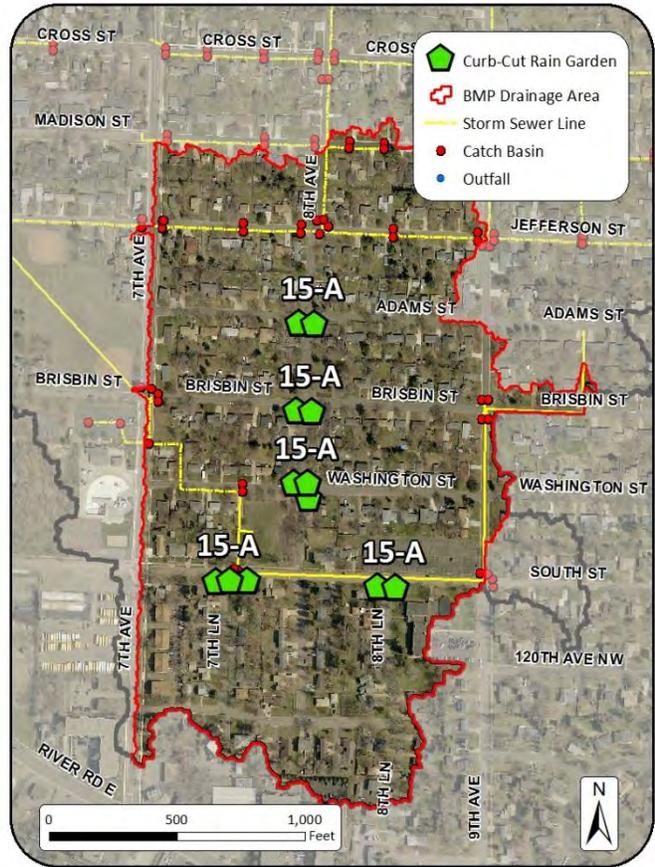
RETROFIT RECOMMENDATIONS



Project ID: 15-A

Curb-Cut Rain Gardens

Drainage Area – 1.5 – 15 acres
Location – Various locations in southeastern portion of catchment
Property Ownership – Private
Site Specific Information – Single-family lots in the catchment provide various locations for curb-cut rain gardens to treat stormwater pollutants originating from private property. Considering typical landowner participation rates, scenarios with one, five, and ten rain gardens were analyzed to treat the drainage area.



Curb-Cut Rain Garden									
<i>Cost/Removal Analysis</i>		New Treatment		% Reduction		New Treatment		% Reduction	
Treatment	Number of BMPs	1		5		10			
	Total Size of BMPs	250	sq-ft	1,250	sq-ft	2,500	sq-ft		
	TP (lb/yr)	0.4	0.4%	2.2	1.8%	4.4	3.5%		
	TSS (lb/yr)	135	0.3%	671	1.7%	1,343	3.5%		
	Volume (acre-feet/yr)	0.4	0.3%	1.9	1.4%	3.7	2.8%		
Cost	Administration & Promotion Costs*	\$8,468		\$11,972		\$16,352			
	Design & Construction Costs**	\$7,376		\$36,880		\$73,760			
	Total Estimated Project Cost (2016)	\$15,844		\$48,852		\$90,112			
	Annual O&M***	\$225		\$1,125		\$2,250			
Efficiency	30-yr Average Cost/lb-TP	\$1,883		\$1,252		\$1,194			
	30-yr Average Cost/1,000lb-TSS	\$5,579		\$4,103		\$3,912			
	30-yr Average Cost/ac-ft Vol.	\$1,931		\$1,480		\$1,413			

*Indirect Cost: (104 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)
 **Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)
 ***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Catchment A-16

Existing Catchment Summary	
Acres	6.7
Dominant Land Cover	Residential
Parcels	19
Volume (acre-feet/yr)	2.8
TP (lb/yr)	3.8
TSS (lb/yr)	1,066

CATCHMENT DESCRIPTION

Catchment A-16 is defined by all of the geographical area draining stormwater to the Washington Street outfall. This outfall collects stormwater from a single storm sewer line located at the intersection of Oakwood Drive and Washington Street and discharges it into the Rum River 150' west of the intersection. This catchment is the smallest in the southern network and provides drainage from less than 20 single family residential properties. Soils within the historic Rum River floodplain (along and west of Oakwood Drive) are sandy loams, while soils east of Oakwood Drive are predominantly coarse and sandy.



EXISTING STORMWATER TREATMENT

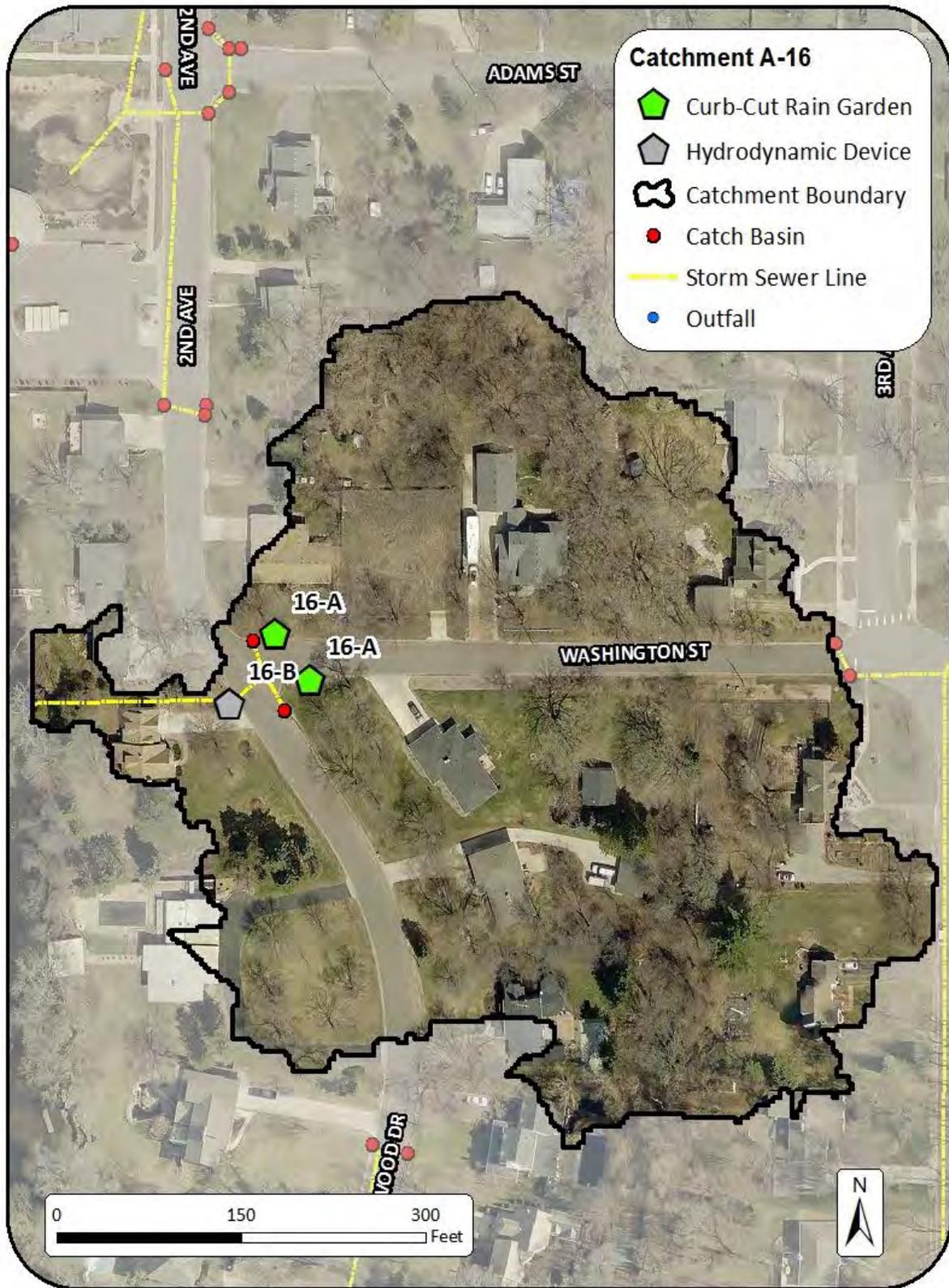
The only form of stormwater treatment in this catchment is street cleaning, conducted two times per year by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

	<i>Existing Conditions</i>	Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	1			
	BMP Types	Street Cleaning			
	TP (lb/yr)	4.1	0.3	7%	3.8
	TSS (lb/yr)	1,208	142	12%	1,066
	Volume (acre-feet/yr)	2.8	0.0	0%	2.8

PROPOSED RETROFITS OVERVIEW

A hydrodynamic device and a pair of curb-cut rain gardens are proposed to provide treatment to stormwater prior to discharge to the Rum River. The curb-cut rain gardens are proposed just upstream of catch basins to maximize drainage area to each basin. The hydrodynamic device should be installed such that it treats all catch basins at the Oakwood Drive and Washington Street intersection.

RETROFIT RECOMMENDATIONS



Project ID: 16-A

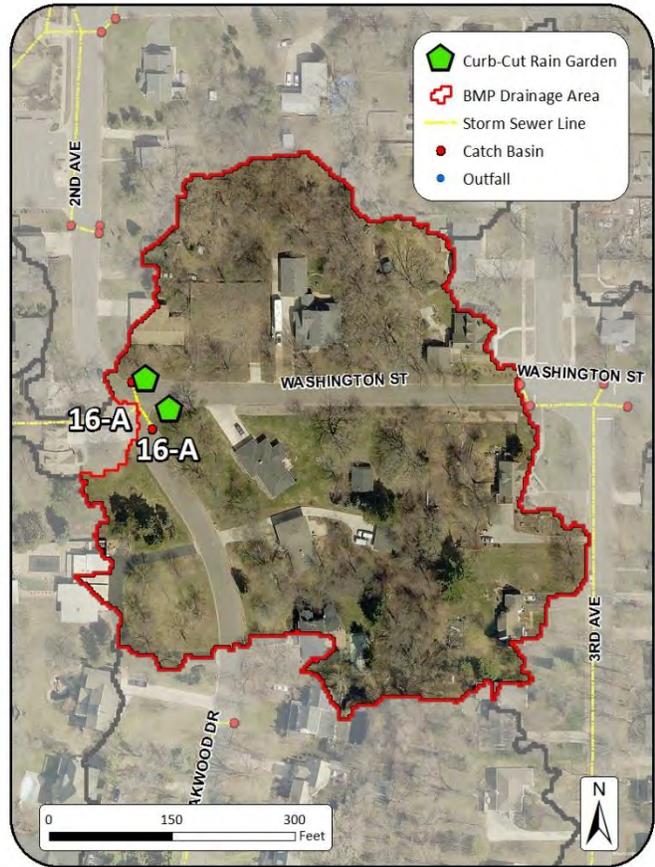
Washington St. Curb-Cut Rain Gardens

Drainage Area – 1.5 – 3 acres

Location – Washington Street and Oakwood Drive

Property Ownership – Private

Site Specific Information – Single-family lots in the catchment provide locations for curb-cut rain gardens to treat stormwater pollutants originating from private property. Preferably the rain gardens would be placed on private properties at the western end of Washington Street at Oakwood Drive in order to treat a larger drainage area. Considering typical landowner participation rates, scenarios with one and two rain gardens were analyzed to treat the drainage area.



Curb Cut Rain Garden					
Cost/Removal Analysis		New Treatment		% Reduction	
Treatment	Number of BMPs	1		2	
	Total Size of BMPs	250 sq-ft		500 sq-ft	
	TP (lb/yr)	0.5	13.2%	1.0	26.3%
	TSS (lb/yr)	157	14.7%	315	29.5%
	Volume (acre-feet/yr)	0.4	13.9%	0.8	27.8%
Cost	Administration & Promotion Costs*	\$1,606		\$2,482	
	Design & Construction Costs**	\$7,376		\$14,752	
	Total Estimated Project Cost (2016)	\$8,982		\$17,234	
	Annual O&M***	\$225		\$450	
Efficiency	30-yr Average Cost/lb-TP	\$1,049		\$1,024	
	30-yr Average Cost/1,000lb-TSS	\$3,340		\$3,252	
	30-yr Average Cost/ac-ft Vol.	\$1,369		\$1,339	

*Indirect Cost: (10 hours at \$73/hour base cost) + (12 hours/BMP at \$73/hour)

**Direct Cost: (\$26/sq-ft for materials and labor) + (12 hours/BMP at \$73/hour for design)

***Per BMP: (\$150/year for rehabilitations at years 10 and 20) + (\$75/year for routine maintenance)

Project ID: 16-B

Oakwood Dr. & Washington St.
Hydrodynamic Device

Drainage Area – 6.3 acres
Location –Oakwood Drive and Washington Street
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed for Oakwood Drive at Washington Street. A device at this location would capture and treat runoff from almost the entire catchment. The catchment is composed of all residential properties.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10 ft diameter	
	TP (lb/yr)	0.4	10.5%	
	TSS (lb/yr)	163	15.3%	
	Volume (acre-feet/yr)	0.0	0.0%	
Cost	Administration & Promotion Costs*	\$1,752		
	Design & Construction Costs**	\$108,000		
	Total Estimated Project Cost (2016)	\$109,752		
	Annual O&M***	\$630		
Efficiency	30-yr Average Cost/lb-TP	\$10,721		
	30-yr Average Cost/1,000lb-TSS	\$26,309		
	30-yr Average Cost/ac-ft Vol.	N/A		

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

Catchment A-17

Existing Catchment Summary	
Acres	12.5
Dominant Land Cover	Residential
Parcels	32
Volume (acre-feet/yr)	5.3
TP (lb/yr)	7.4
TSS (lb/yr)	2,066



CATCHMENT DESCRIPTION

Catchment A-17 is the southernmost catchment in this analysis. Stormwater generated within the catchment drains to municipal storm sewer lines along Oakwood Drive and Oakwood Lane and is conveyed to an outfall which discharges near the confluence of the Rum River with the Mississippi River. Land use within the catchment is solely single family residential. Soils transition from coarse and sandy Hubbard soils in the east to silty loam Becker soils in the west.

EXISTING STORMWATER TREATMENT

The only existing BMP in this catchment is street cleaning, which is conducted two times per year by the City of Anoka. Present-day stormwater pollutant loading and treatment is summarized in the table below.

<i>Existing Conditions</i>		Base Loading	Treatment	Net Treatment %	Existing Loading
<i>Treatment</i>	Number of BMPs	1			
	BMP Types	Street Cleaning			
	TP (lb/yr)	8.0	0.6	8%	7.4
	TSS (lb/yr)	2,334	268	11%	2,066
	Volume (acre-feet/yr)	5.3	0.0	0%	5.3

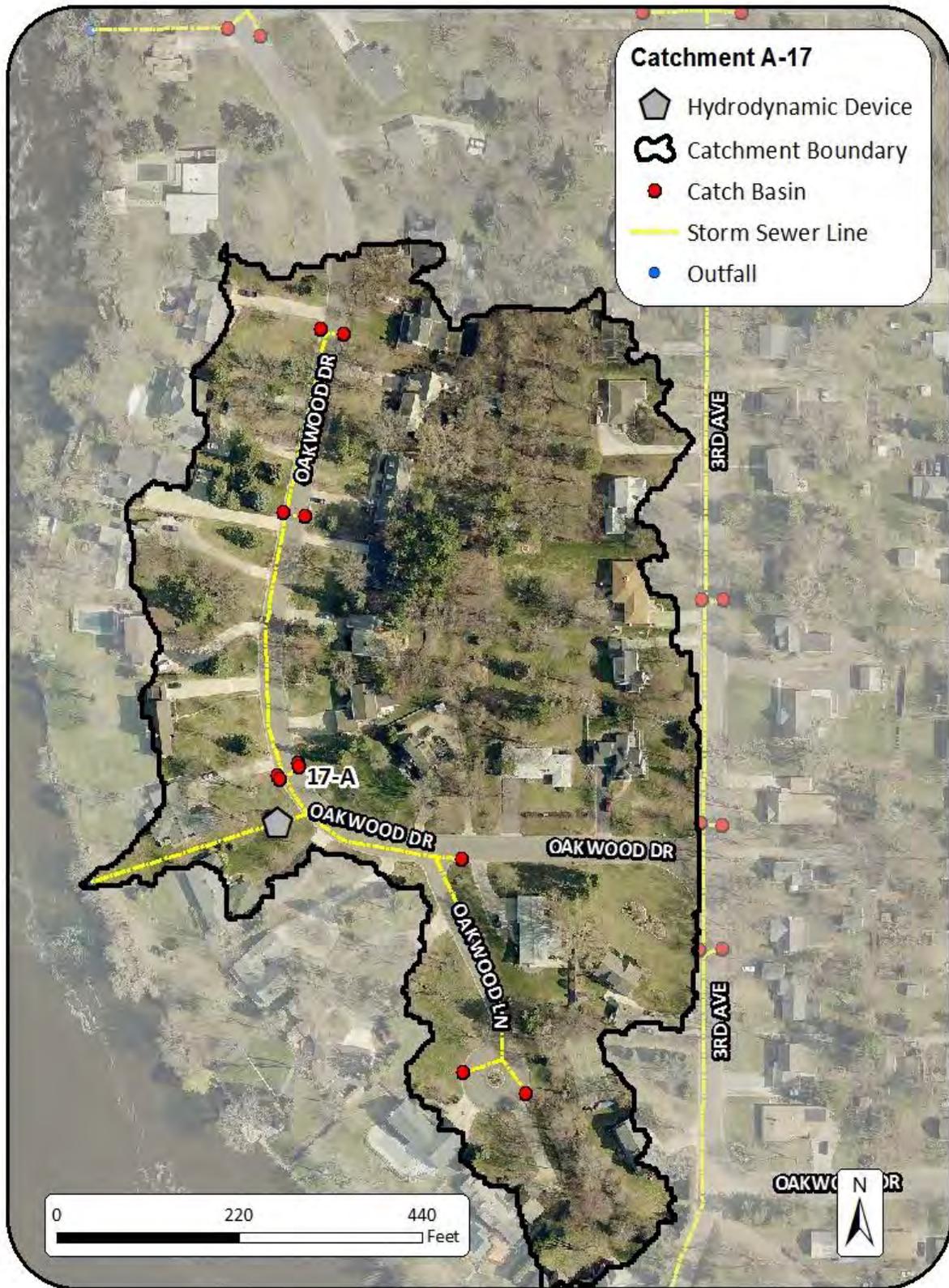
PROPOSED RETROFITS OVERVIEW

A single hydrodynamic device was proposed along the Oakwood Drive storm sewer line. Installation of this device should try to include drainage from each of the catch basins within Catchment A-17 along Oakwood Drive.

RETROFITS CONSIDERED BUT REJECTED

Bioretention basins, specifically curb-cut rain gardens, were considered in this catchment but were not proposed as the drainage area to each basin was not enough to offset the cost of installation, making the practice cost-prohibitive.

RETROFIT RECOMMENDATIONS



Project ID: 17-A

Oakwood Drive Hydrodynamic Device

Drainage Area – 11.9 acres
Location –Oakwood Drive and Oakwood Lane
Property Ownership – Public
Site Specific Information – A hydrodynamic device is proposed for Oakwood Drive. A device at this location would capture and treat runoff from almost the entire catchment. The catchment is composed of all residential properties.



Hydrodynamic Device				
		Cost/Removal Analysis	New Treatment	% Reduction
Treatment	Number of BMPs		1	
	Total Size of BMPs		10 ft diameter	
	TP (lb/yr)		0.6	8.1%
	TSS (lb/yr)		244	11.8%
	Volume (acre-feet/yr)		0.0	0.0%
Cost	Administration & Promotion Costs*			\$1,752
	Design & Construction Costs**			\$108,000
	Total Estimated Project Cost (2016)			\$109,752
	Annual O&M***			\$630
Efficiency	30-yr Average Cost/lb-TP		\$7,147	
	30-yr Average Cost/1,000lb-TSS		\$17,575	
	30-yr Average Cost/ac-ft Vol.		N/A	

*Indirect Cost: (24 hours at \$73/hour)

**Direct Cost: (\$72,000 for materials) + (\$36,000 for labor and installation costs)

***Per BMP: (3 cleanings/year)*(3 hours/cleaning)*(\$70/hour)

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- Weiss, P.T., J.S. Gulliver, A.J. Erickson. 2005. *The Cost and Effectiveness of Stormwater Management Practices*. Minnesota Department of Transportation.

Appendix A – Modeling Methods

The following sections include WinSLAMM model details for each type of best management practice modeled for this analysis.

WinSLAMM

Pollutant and volume reductions were estimated using the stormwater model Source Load and Management Model for Windows (WinSLAMM). WinSLAMM uses an abundance of stormwater data from the Upper-Midwest and elsewhere to quantify runoff volumes and pollutant loads from urban areas. It has detailed accounting of pollutant loading from various land uses, and allows the user to build a model “landscape”. WinSLAMM uses rainfall and temperature data from a typical year (1959 data from Minneapolis for this analysis), routing stormwater through the user’s model for each storm. WinSLAMM version 10.2.0 was used for this analysis to estimate volume and pollutant loading and reductions. Additional inputs for WinSLAMM are provided in Table 10.

Table 10: General WinSLAMM Model Inputs (i.e. Current File Data)

Parameter	File/Method
Land use acreage	ArcMap, Metropolitan Council 2010 Land Use
Precipitation/Temperature Data	Minneapolis 1959 – best approximation of a typical year
Winter season	Included in model. Winter dates are 11-4 to 3-13.
Pollutant probability distribution	WI_GEO01.ppd
Runoff coefficient file	WI_SL06 Dec06.rsv
Particulate solids concentration file	WI_AVG01.psc
Particle residue delivery file	WI_DLV01.prr
Street delivery files	WI files for each land use

Existing Conditions

Existing stormwater BMPs were included in the WinSLAMM model for which information was available from the state (MNDOT), county (Anoka County), and the City of Anoka. The practices listed below were included in the existing conditions model.

Infiltration Basin

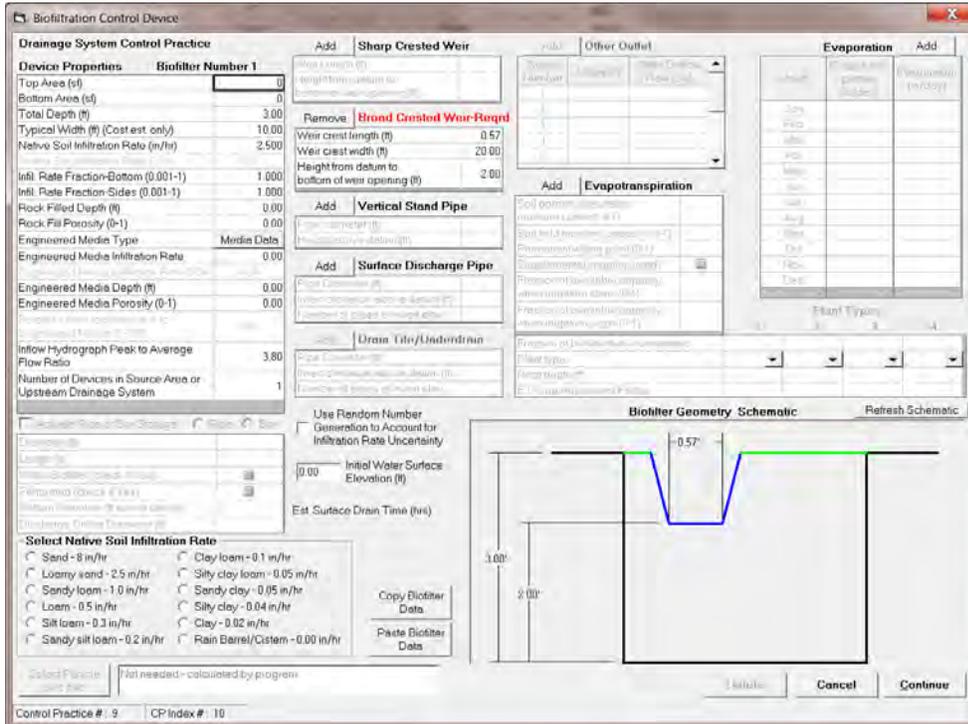


Figure 12: Infiltration Basin at Greenhaven Road in A-3 (WinSLAMM).

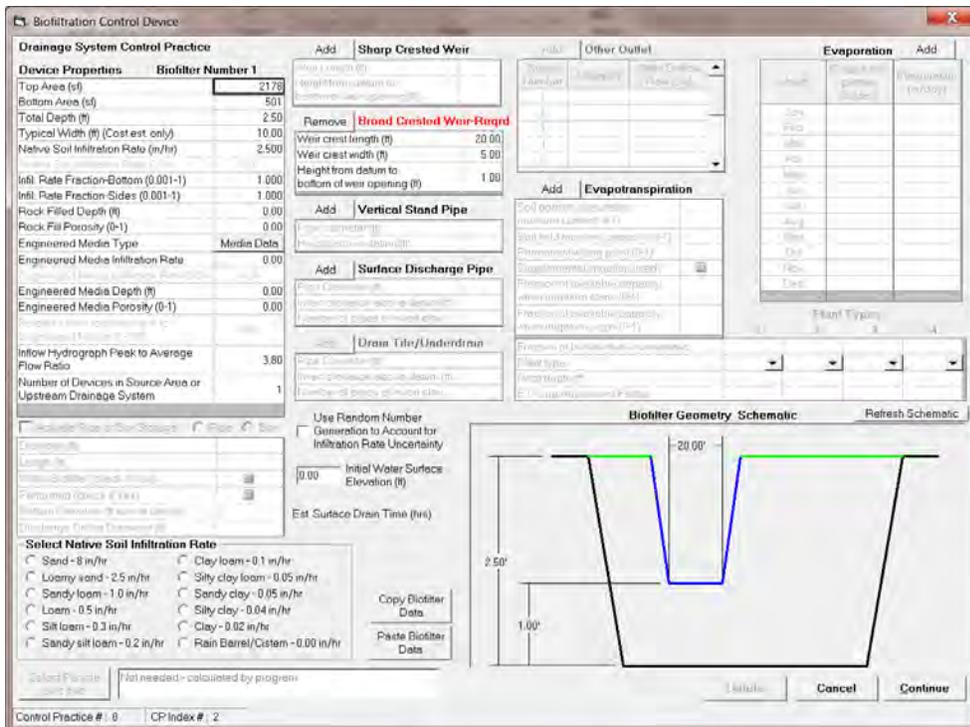


Figure 13: Infiltration Basin at Anoka Middle School for the Arts (Northern Basin) in A-13 (WinSLAMM).

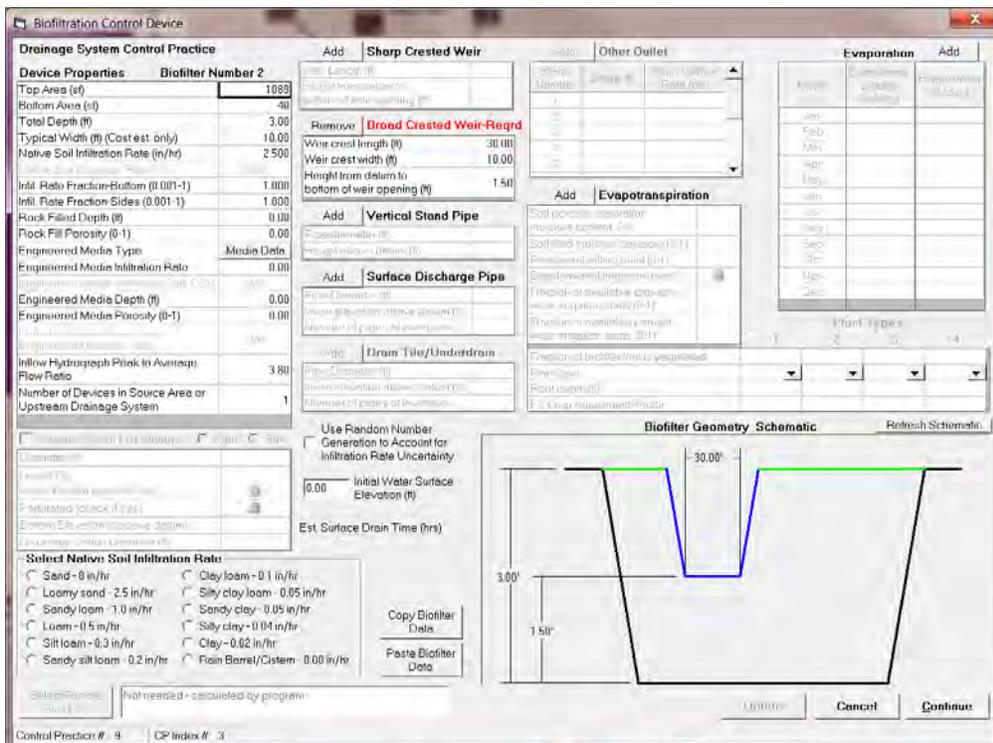


Figure 14: Infiltration Basin at Anoka Middle School for the Arts (Southern Basin) in A-13 (WinSLAMM).

Hydrodynamic Device

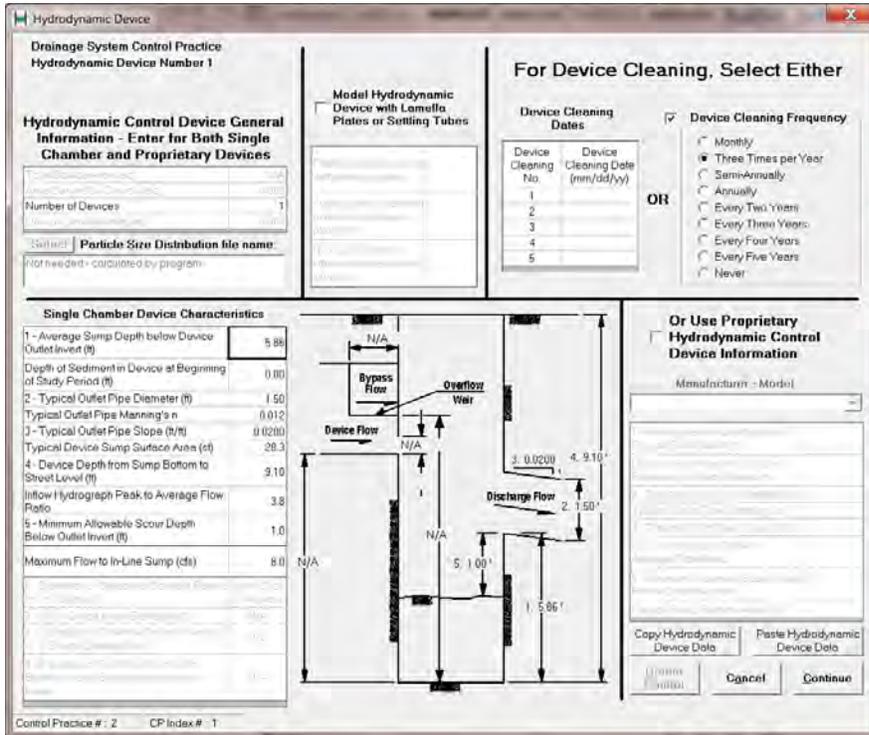


Figure 15: Hydrodynamic Device at Maple Avenue in A-2 (WinSLAMM).

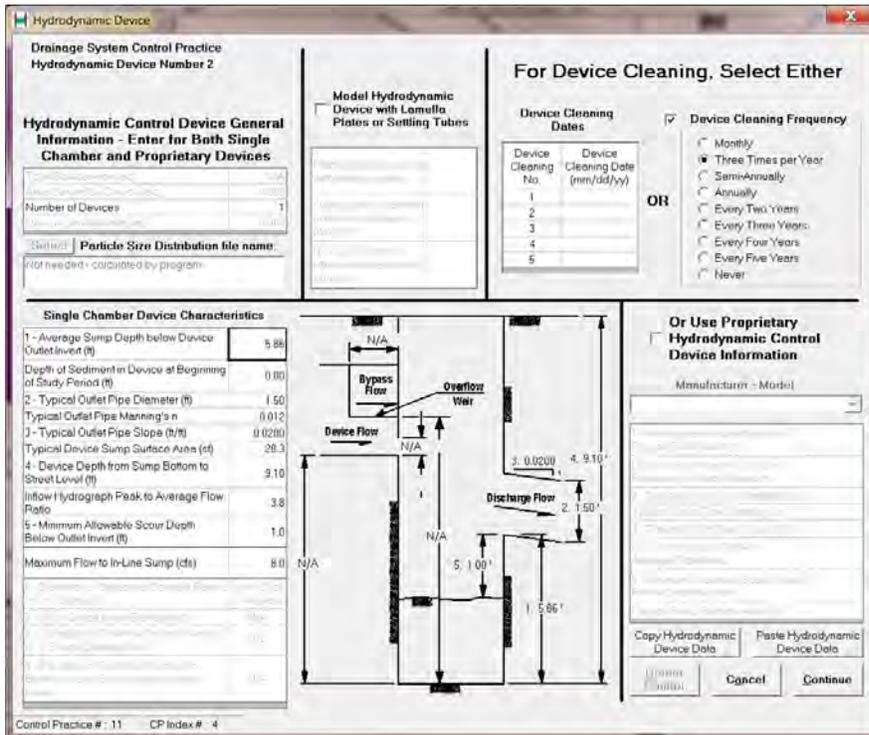


Figure 16: Hydrodynamic Device at Branch Avenue in A-3 (WinSLAMM).

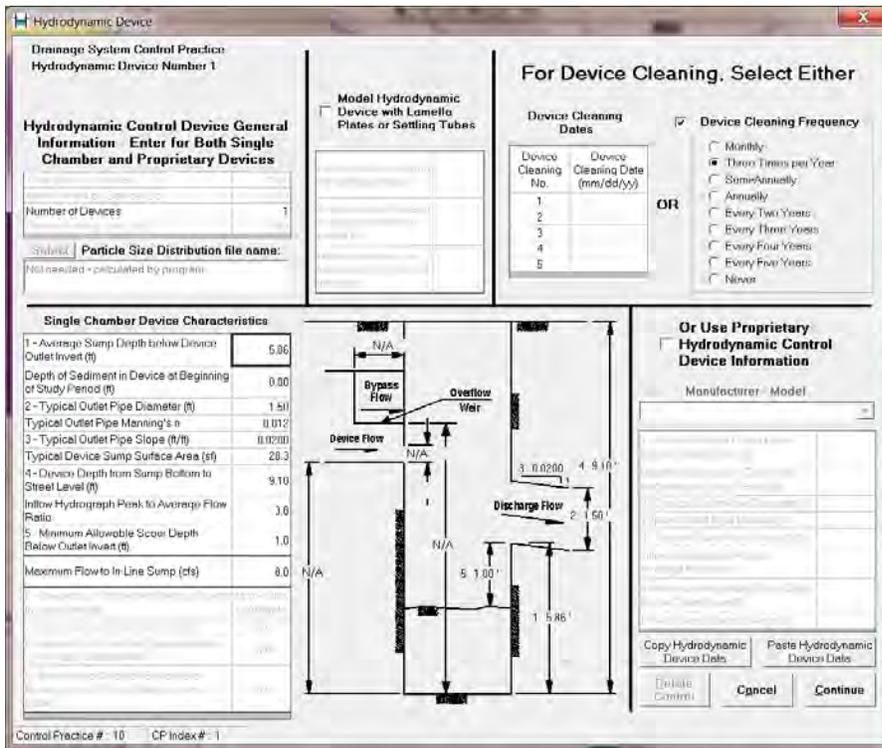


Figure 17: Hydrodynamic Device at Wingfield Alley in A-3 (WinSLAMM).

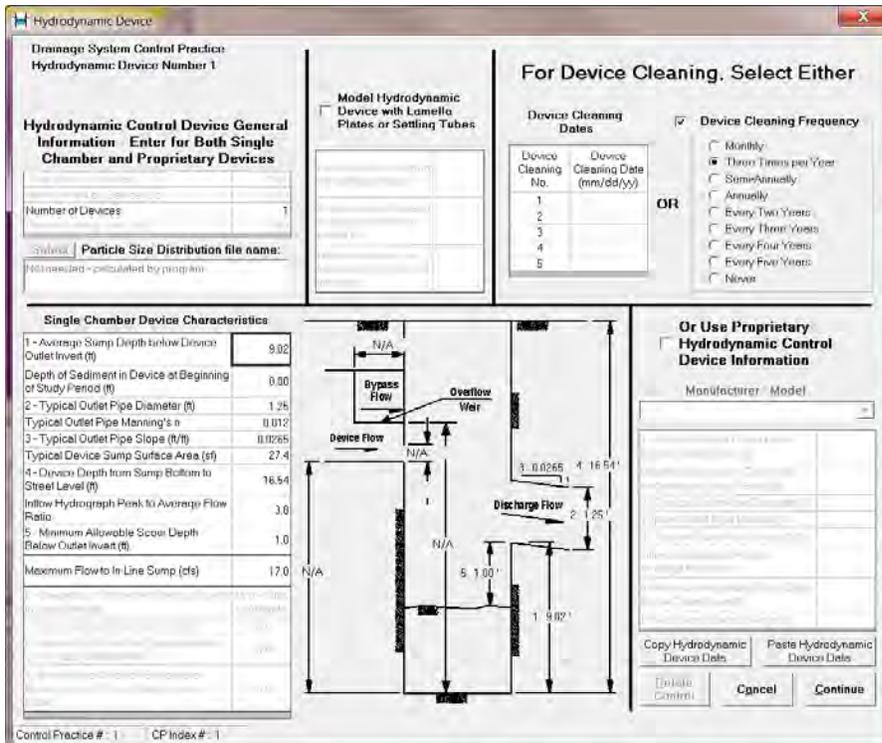


Figure 18: Hydrodynamic Device at Ferry Street in A-5 (WinSLAMM).

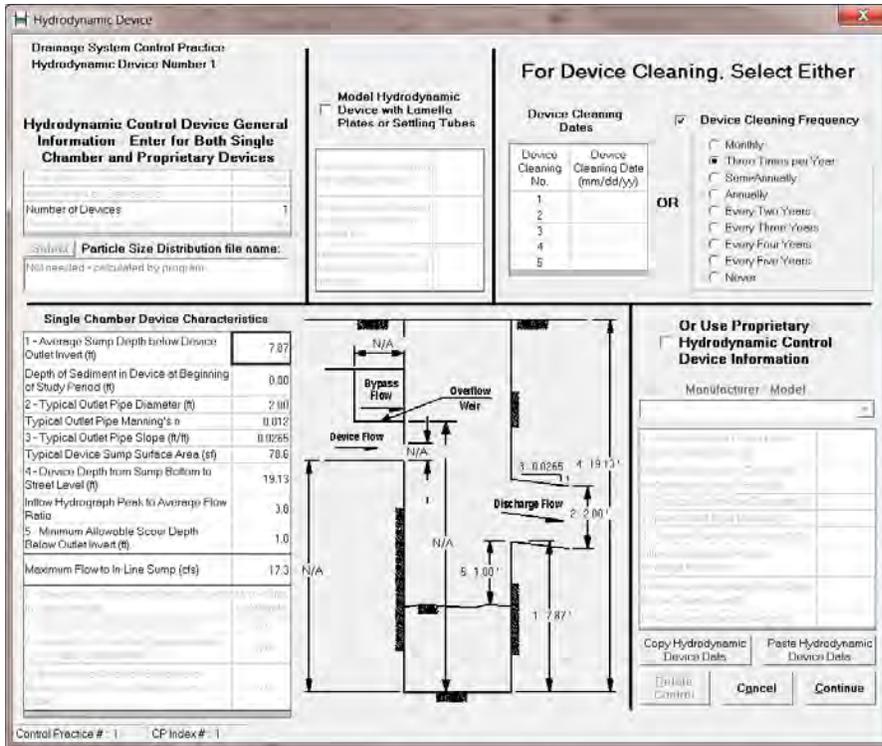


Figure 19: Hydrodynamic Device at Main Street in A-6 (WinSLAMM).

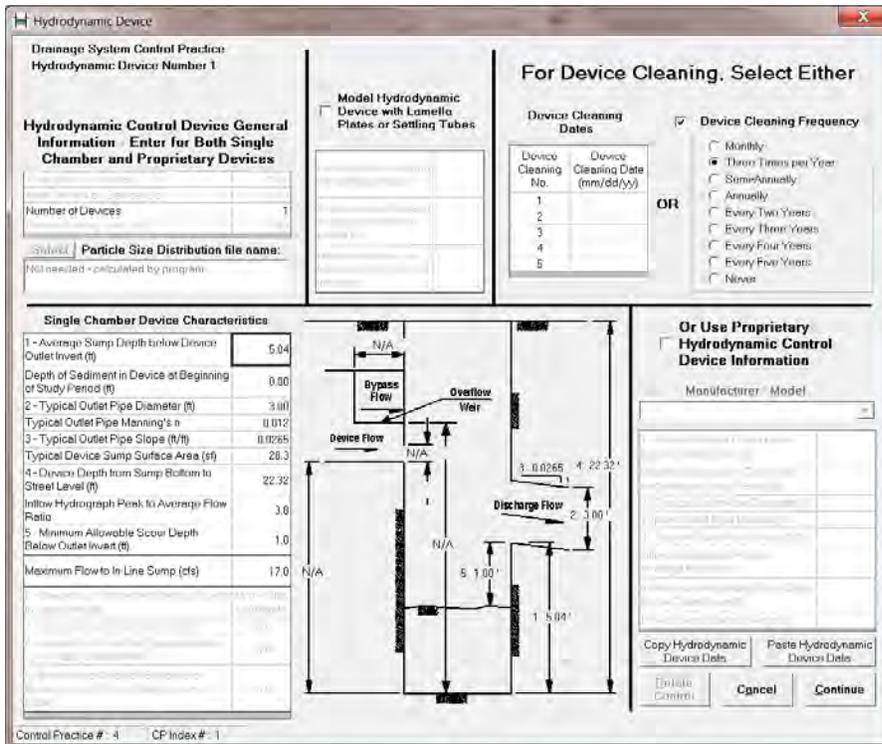


Figure 20: Hydrodynamic Device at Water Avenue and Taylor Street in A-10 (WinSLAMM).

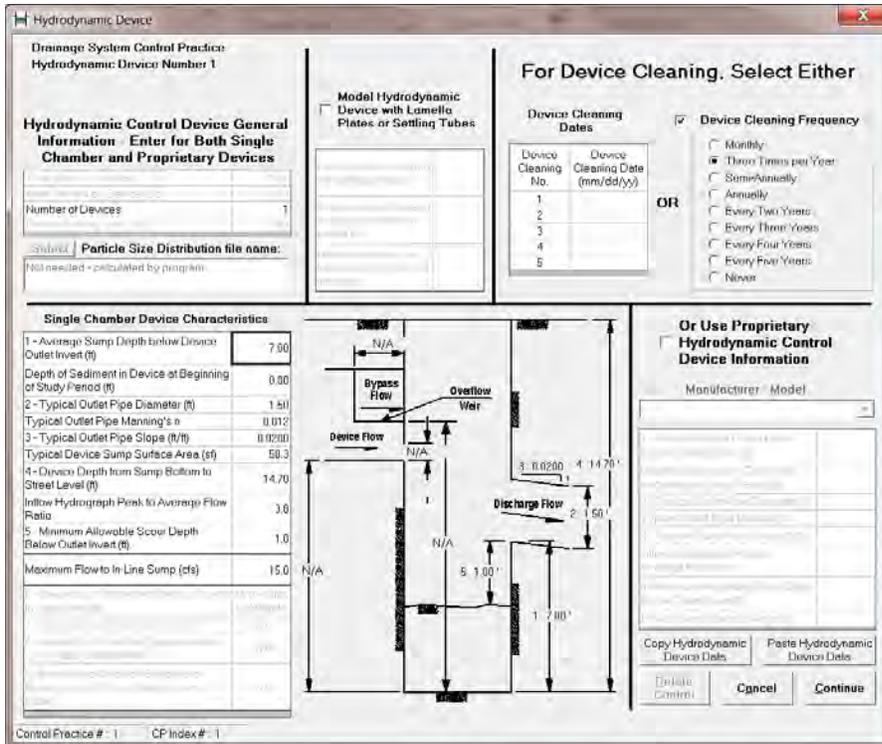


Figure 21: Hydrodynamic Device at Polk Street and 3rd Avenue in A-11 (WinSLAMM).

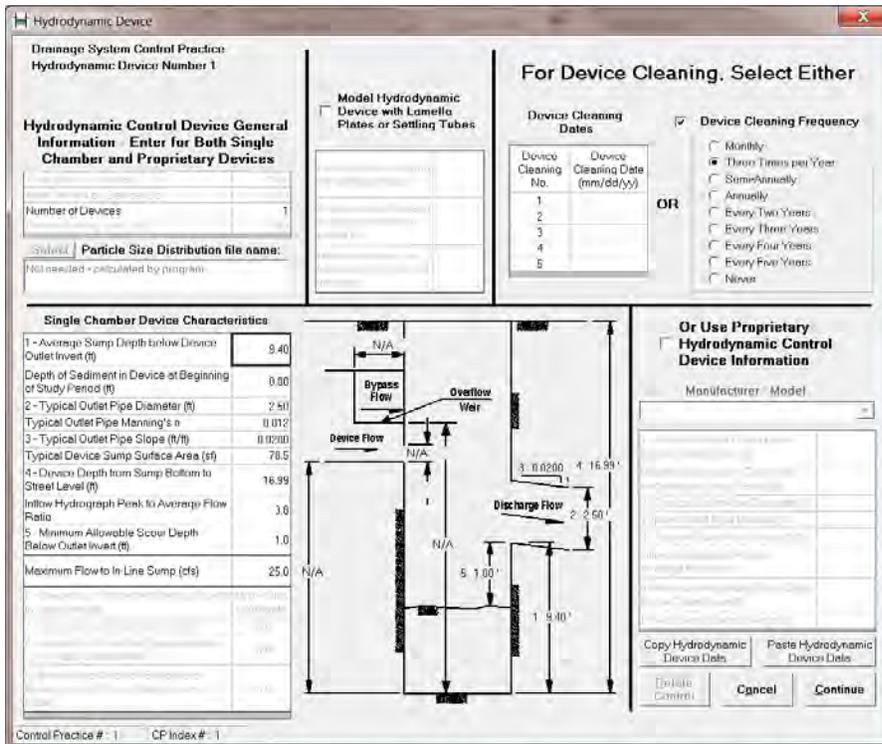


Figure 22: Hydrodynamic Device at Harrison Street and 2nd Avenue in A-12 (WinSLAMM).

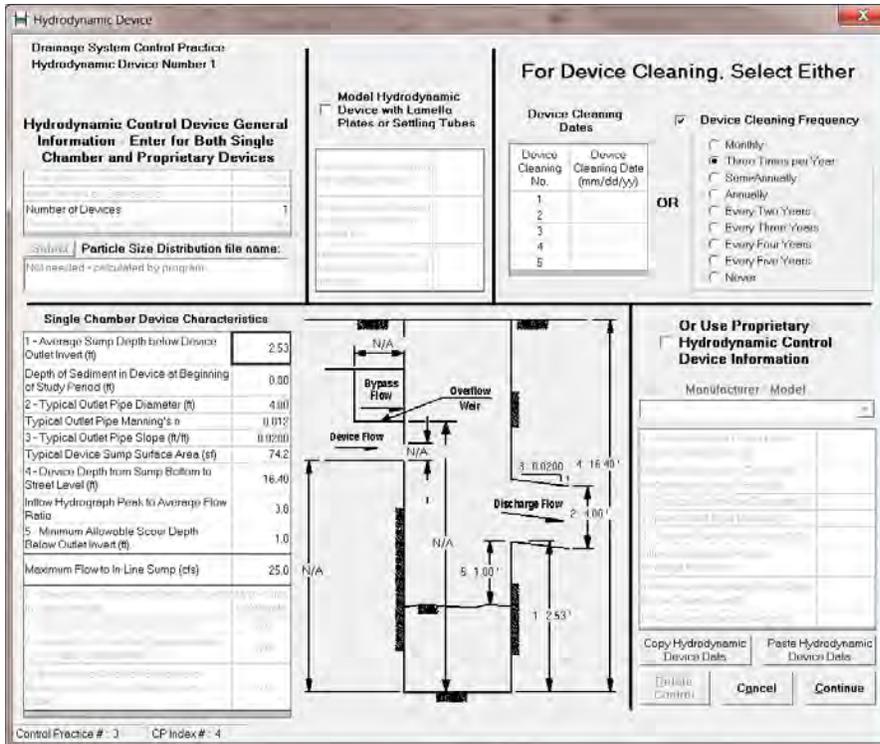


Figure 23: Hydrodynamic Device (1 of 3) at Adams Street and 2nd Avenue in A-15 (WinSLAMM).

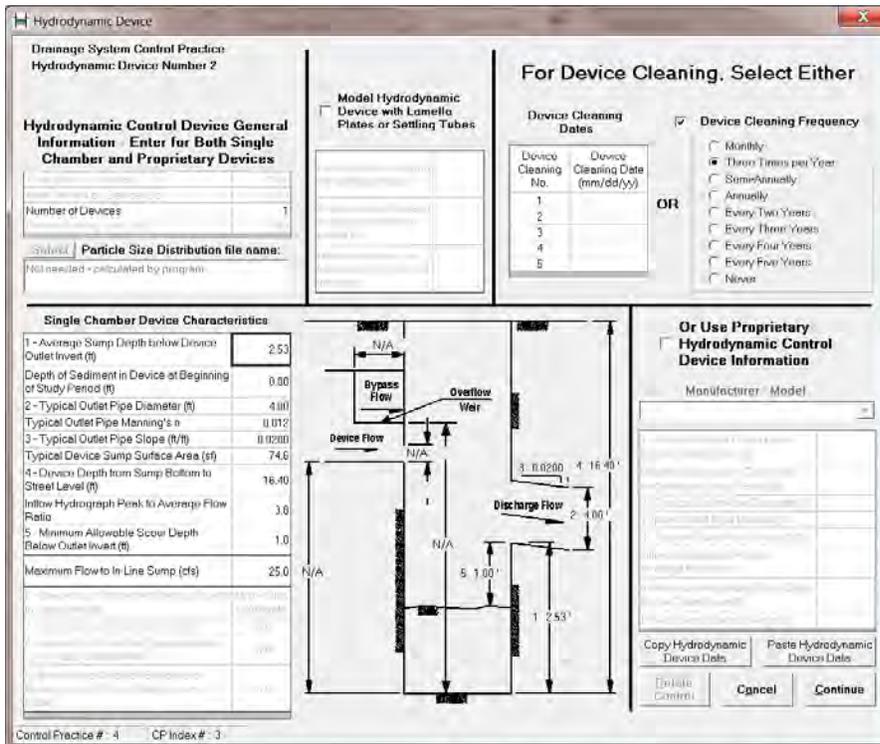


Figure 24: Hydrodynamic Device (2 of 3) at Adams Street and 2nd Avenue in A-15 (WinSLAMM).

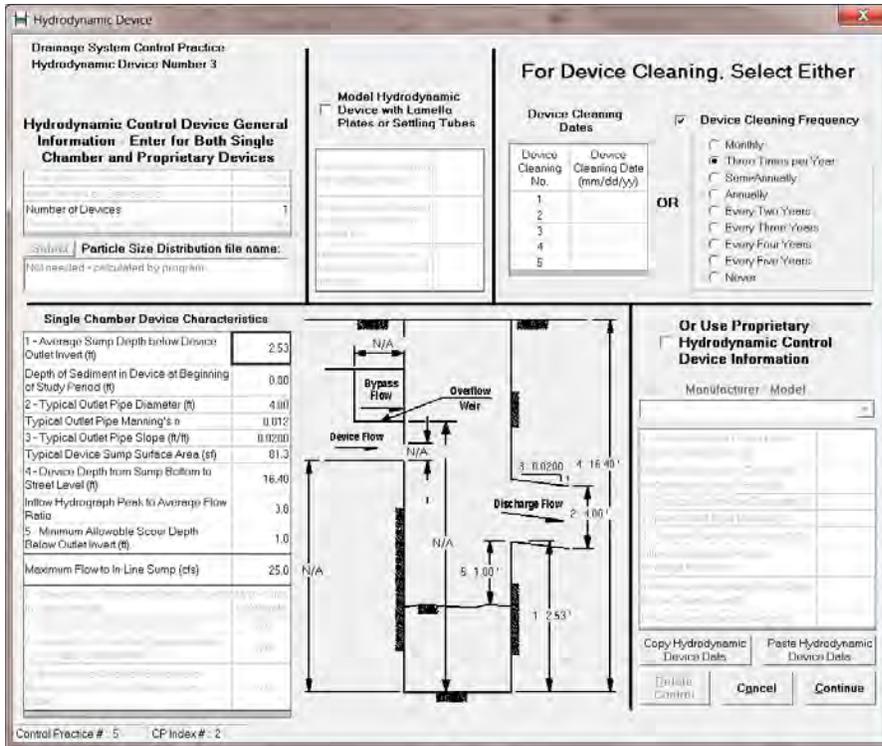


Figure 25: Hydrodynamic Device (3 of 3) at Adams Street and 2nd Avenue in A-15 (WinSLAMM).

Ponds

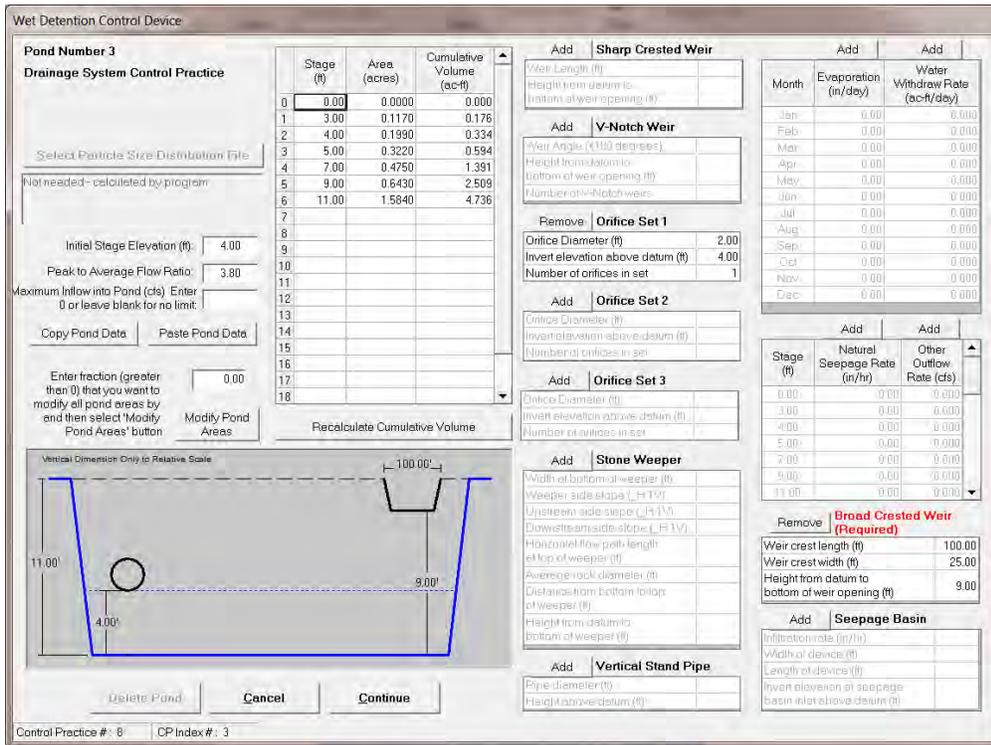


Figure 26: Stormwater Pond at Car Dealership in A-3 (WinSLAMM).

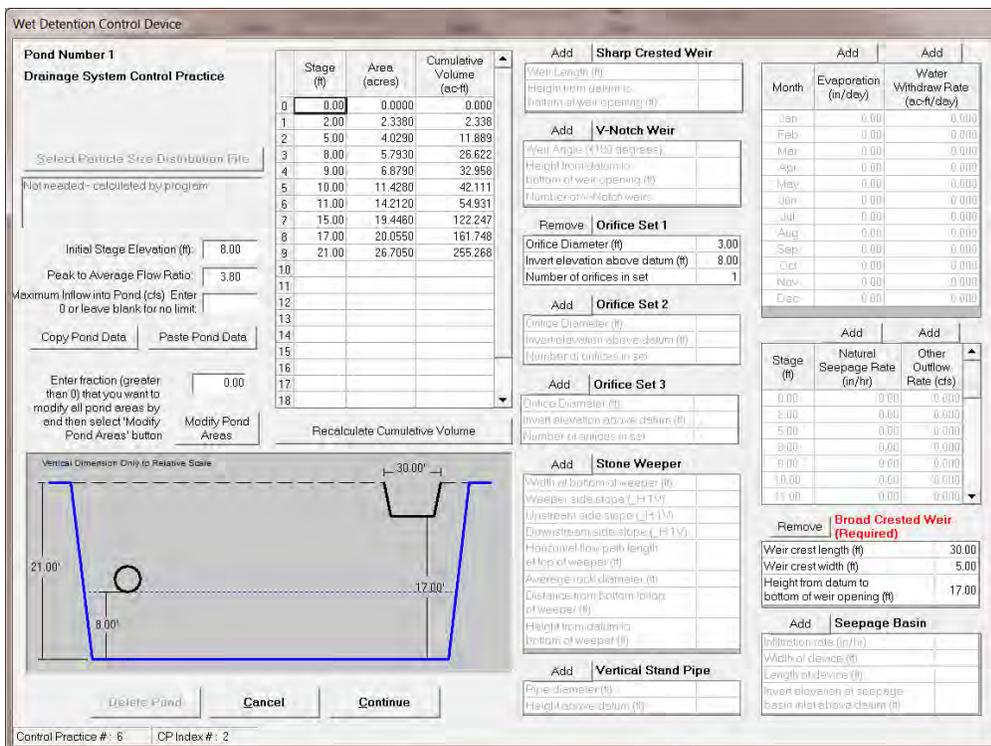


Figure 27: Stormwater Pond at Green Haven Golf Course in A-3 (WinSLAMM).

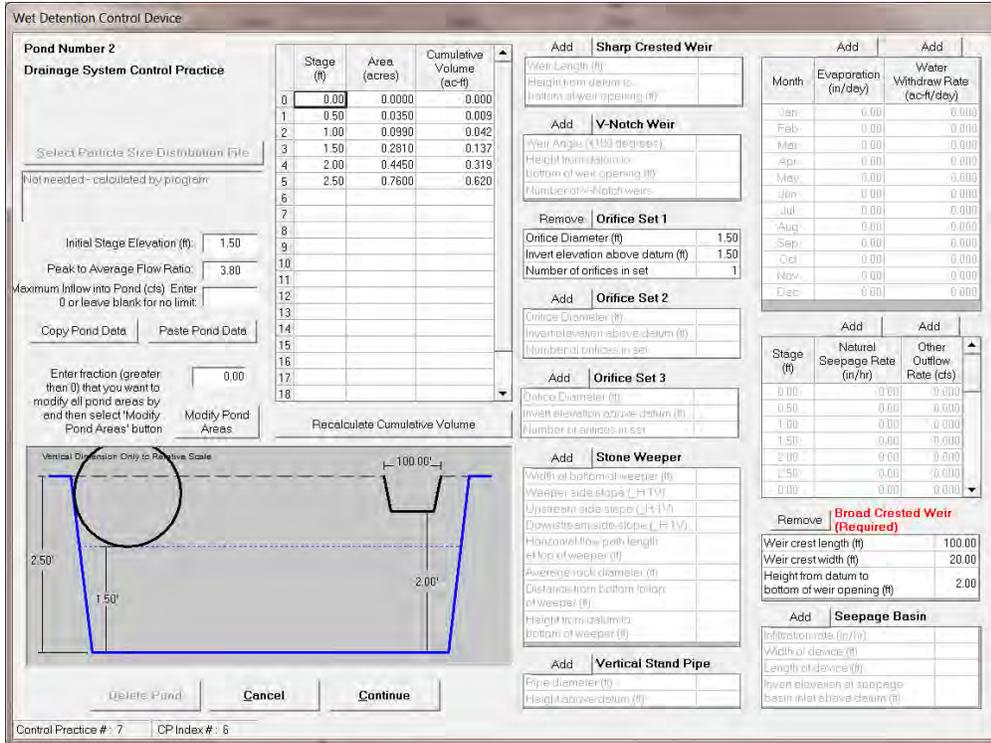


Figure 28: Stormwater Pond at Ward Park in A-3 (WinSLAMM).

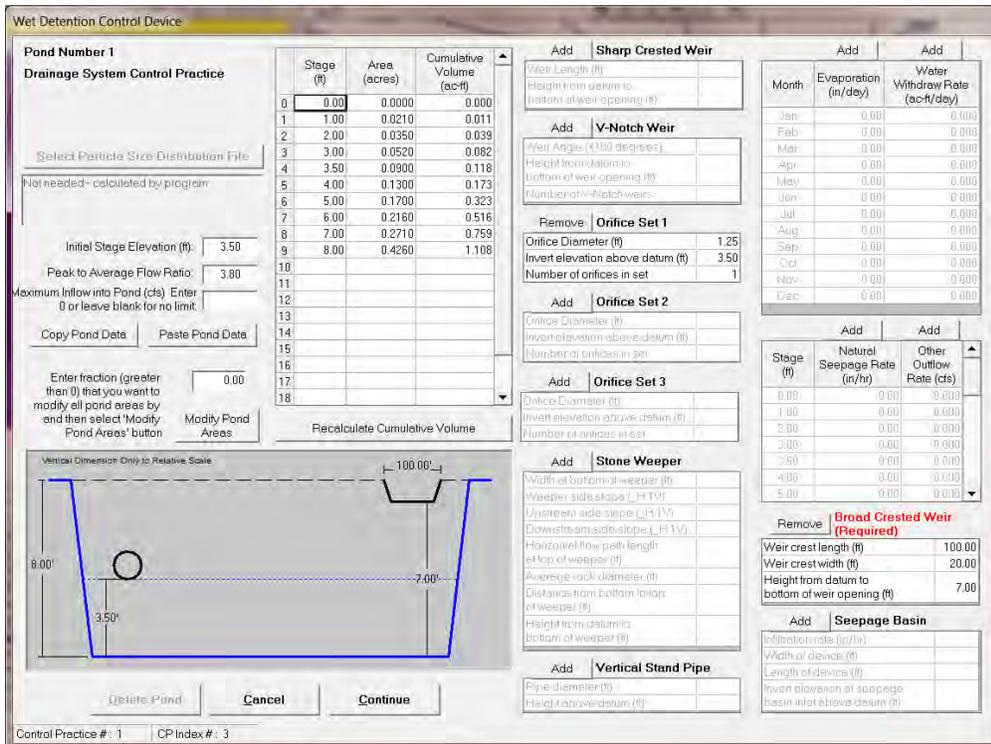


Figure 29: Stormwater Pond at 7th Avenue (NW) in A-7 (WinSLAMM).

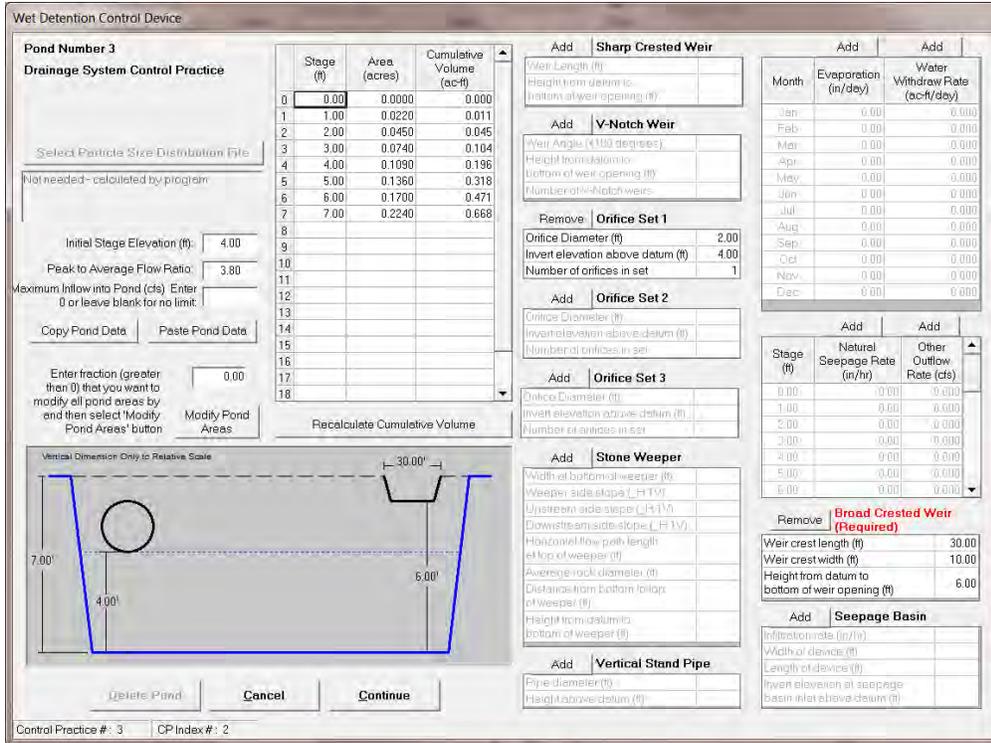


Figure 30: Stormwater Pond at 7th Avenue (SW) in A-7 (WinSLAMM).

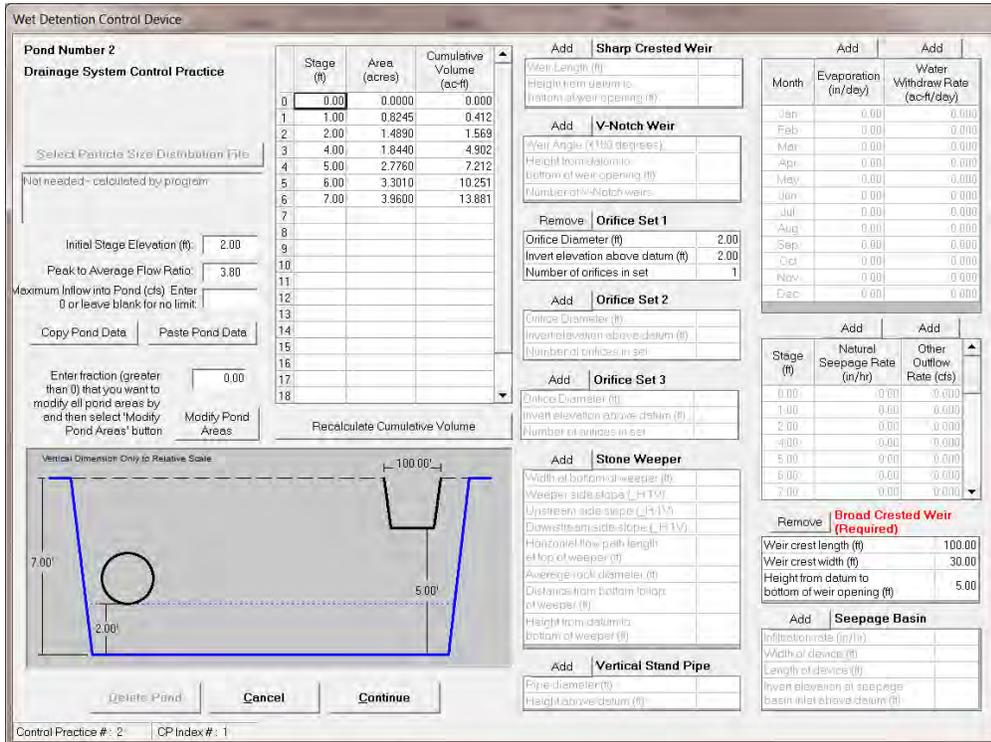


Figure 31: Stormwater Pond at Anoka Regional Treatment Center in A-7 (WinSLAMM).

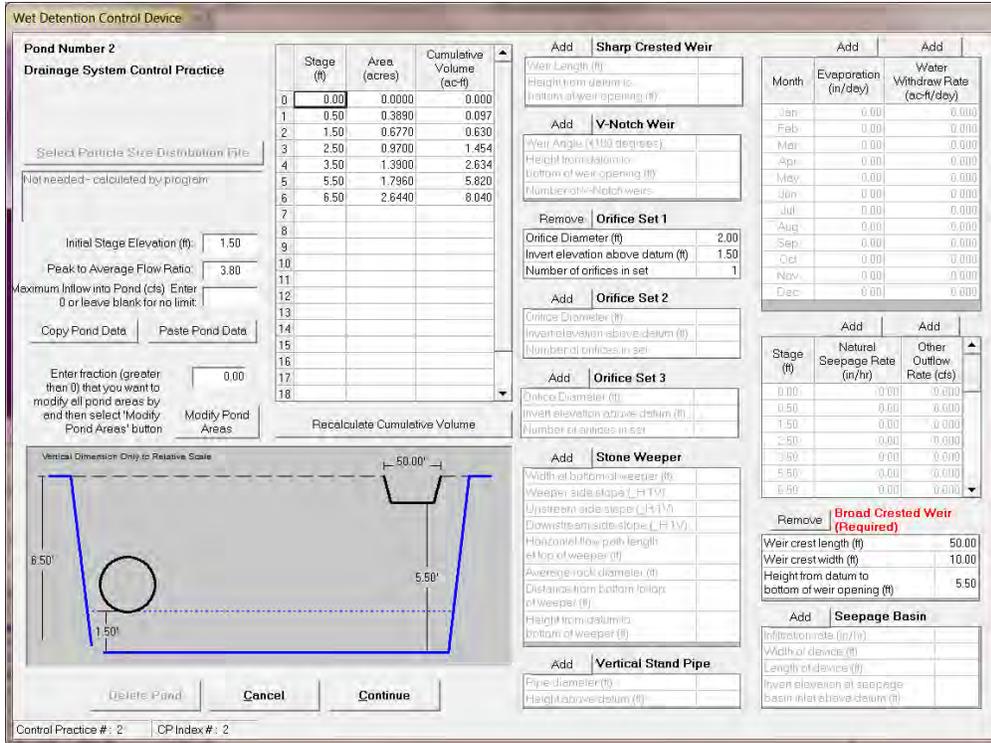


Figure 32: Stormwater Pond at Anoka Development in A-8 (WinSLAMM).

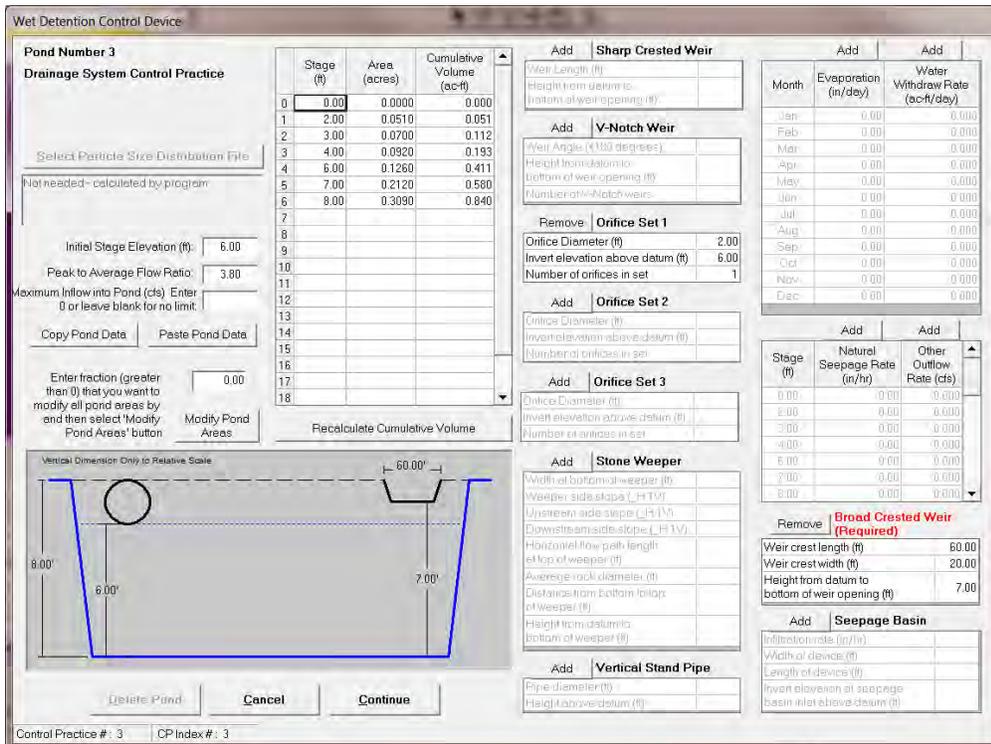


Figure 33: Stormwater Pond at The Homestead at Anoka in A-8 (WinSLAMM).

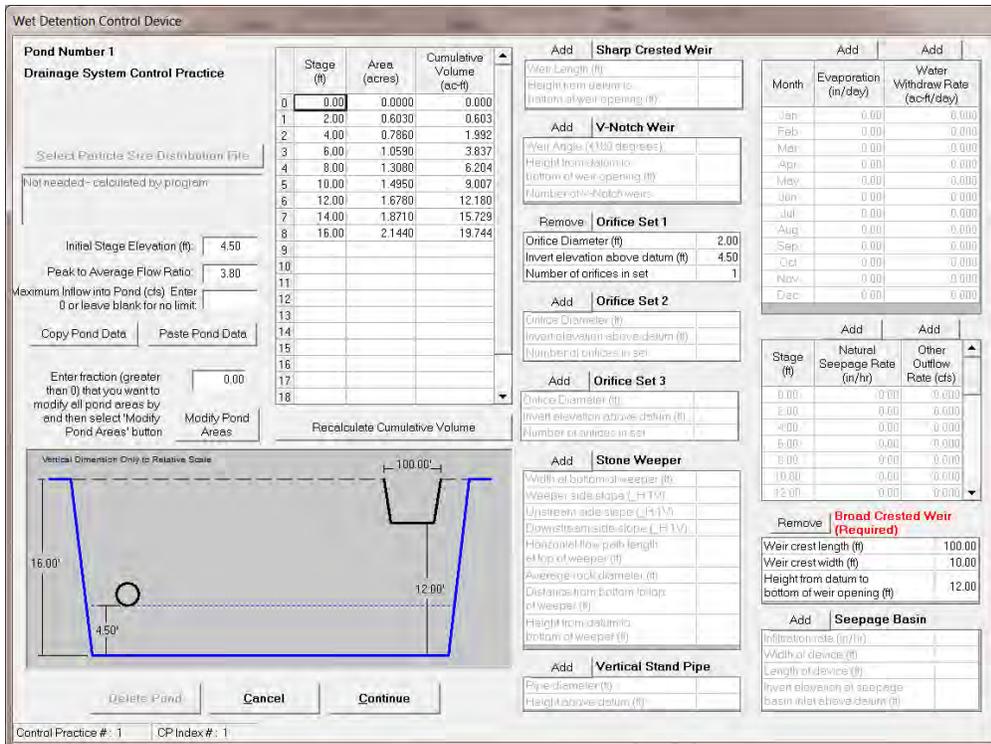


Figure 34: Stormwater Pond at 4th Avenue and Grant Street in A-8 (WinSLAMM).

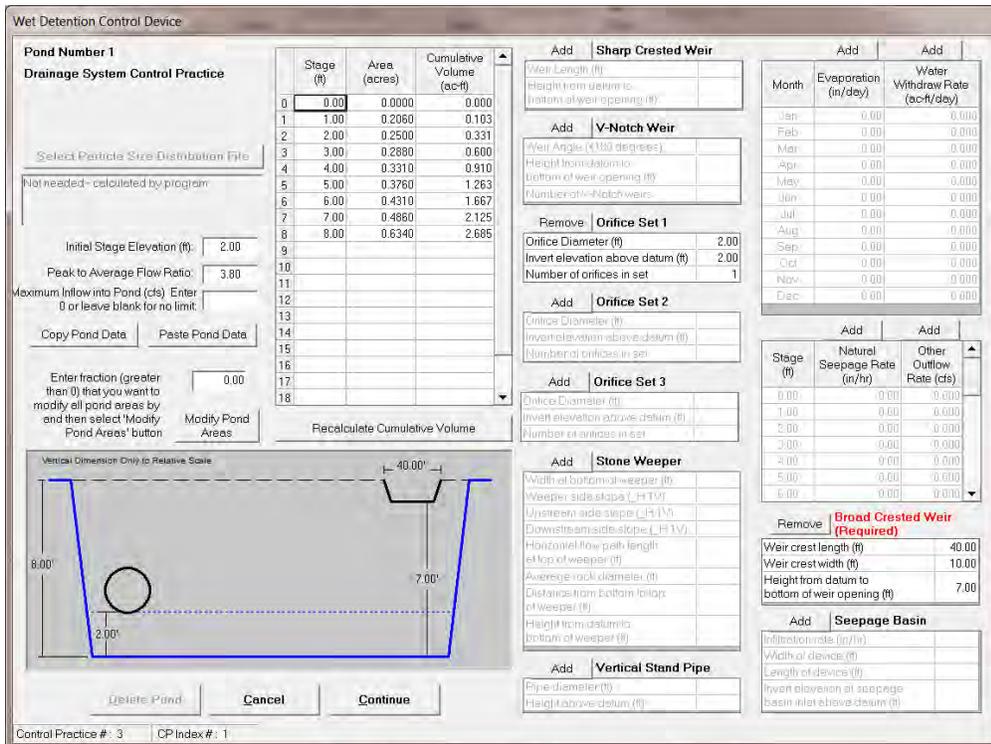


Figure 35: Stormwater Pond at Federal Cartridge Corporation parking lot in A-9 (WinSLAMM).

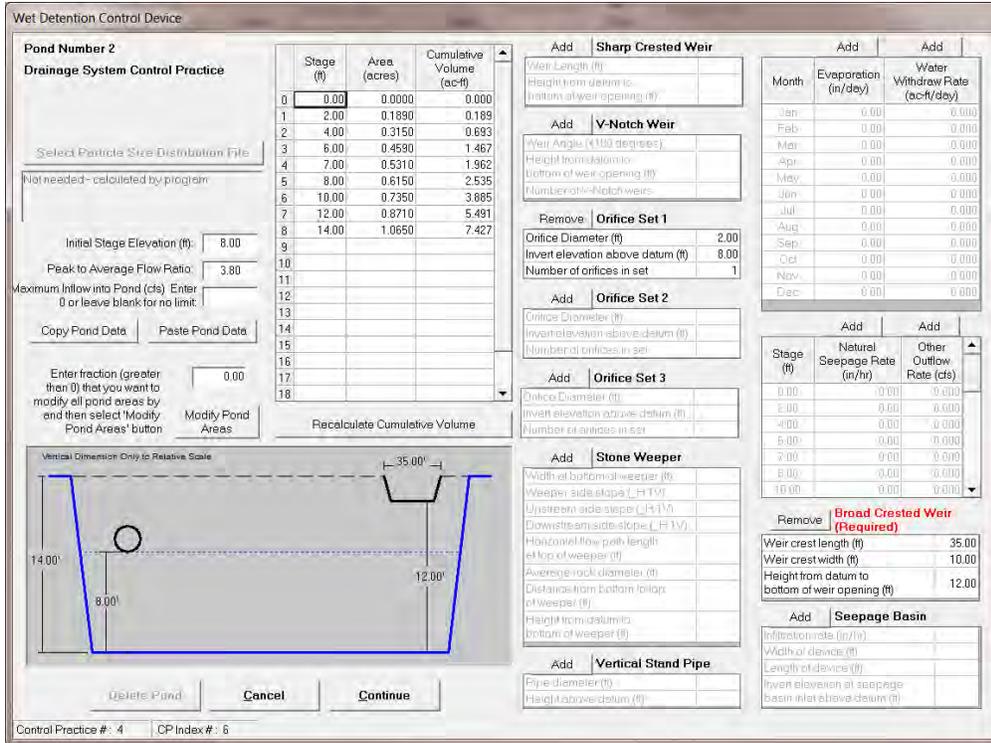


Figure 36: Stormwater Pond at Pentair Property in A-9 (WinSLAMM).

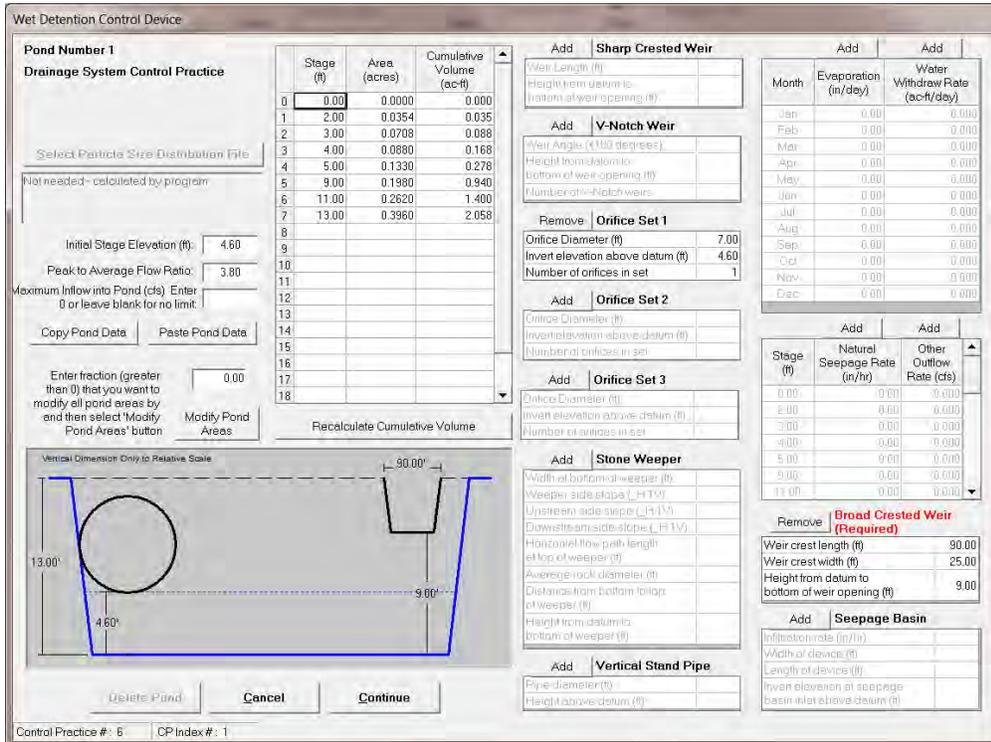


Figure 37: Stormwater Pond at Adams Street and 2nd Avenue in A-15 (WinSLAMM).

Street Cleaning

Street Cleaning Control Device

Land Use: Medium Density Res. No Alleys Total Area: 0.157 acres
 Source Area: Streets 1

First Source Area Control Practice

Select Street Cleaning Dates OR Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

7 Passes per Week
 5 Passes per Week
 4 Passes per Week
 3 Passes per Week
 2 Passes per Week
 One Pass per Week
 One Pass Every Two Weeks
 One Pass Every Four Weeks
 One Pass Every Eight Weeks
 One Pass Every Twelve Weeks
 Two Passes per Year (Spring and Fall)
 One Pass Each Spring

Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59

Final cleaning period ending date (MM/DD/YY):

Selected Particle Size Distribution file name:
 Not needed - calculated by program

Type of Street Cleaner:
 Mechanical Broom Cleaner
 Vacuum Assisted Cleaner

Street Cleaner Productivity:
 1. Coefficients based on street texture, parking density and parking controls
 2. Other (specify equation coefficients)
 Equation coefficient M (slope, M<1) 0.44
 Equation coefficient B (intercept, B>1) 245

Parking Densities:
 1. None
 2. Light
 3. Medium
 4. Extensive (short term)
 5. Extensive (long term)

Are Parking Controls Imposed?
 Yes No

Copy Cleaning Data Paste Cleaning Data Delete Control Cancel Edits Clear Continue

Control Practice #: 2 Land Use #: 1 Source Area #: 37

Figure 38: Street cleaning parameters used in A-1 to A-11 and in A-15 to A-17 (WinSLAMM).

Street Cleaning Control Device

Land Use: Multi Family Residential Total Area: 0.060 acres
 Source Area: Streets 1

First Source Area Control Practice

Select Street Cleaning Dates OR Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

7 Passes per Week
 5 Passes per Week
 4 Passes per Week
 3 Passes per Week
 2 Passes per Week
 One Pass per Week
 One Pass Every Two Weeks
 One Pass Every Four Weeks
 One Pass Every Eight Weeks
 One Pass Every Twelve Weeks
 Two Passes per Year (Spring and Fall)
 One Pass Each Spring

Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59

Final cleaning period ending date (MM/DD/YY):

Selected Particle Size Distribution file name:
 Not needed - calculated by program

Type of Street Cleaner:
 Mechanical Broom Cleaner
 Vacuum Assisted Cleaner

Street Cleaner Productivity:
 1. Coefficients based on street texture, parking density and parking controls
 2. Other (specify equation coefficients)
 Equation coefficient M (slope, M<1) 0.44
 Equation coefficient B (intercept, B>1) 245

Parking Densities:
 1. None
 2. Light
 3. Medium
 4. Extensive (short term)
 5. Extensive (long term)

Are Parking Controls Imposed?
 Yes No

Copy Cleaning Data Paste Cleaning Data Delete Control Cancel Edits Clear Continue

Control Practice #: 67 Land Use #: 24 Source Area #: 37

Figure 39: Street cleaning parameters used in A-12 to A-14 (WinSLAMM).

Proposed Conditions

Curb-Cut Rain Garden

Curb-cut rain gardens were modeled as drainage area control practices within WinSLAMM. Each was modeled without an underdrain based on available soil information. If based on soil tests it is determined that an underdrain would be necessary, then estimated reductions for volume, TP, and TSS will be lower.

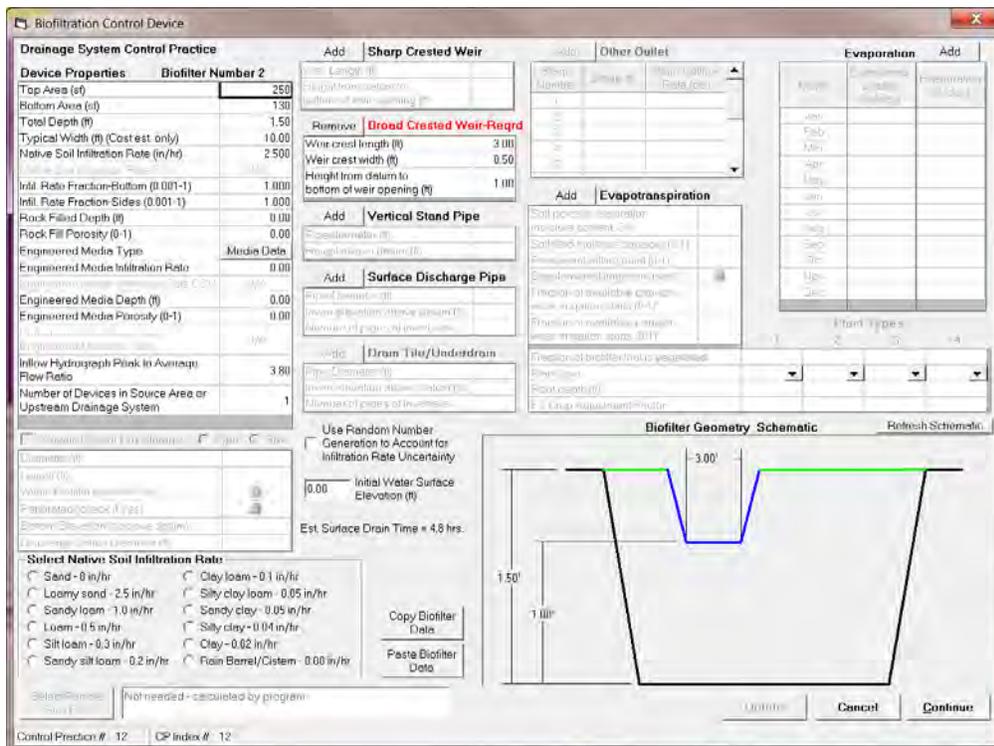


Figure 40: Curb-cut Rain Garden (WinSLAMM)

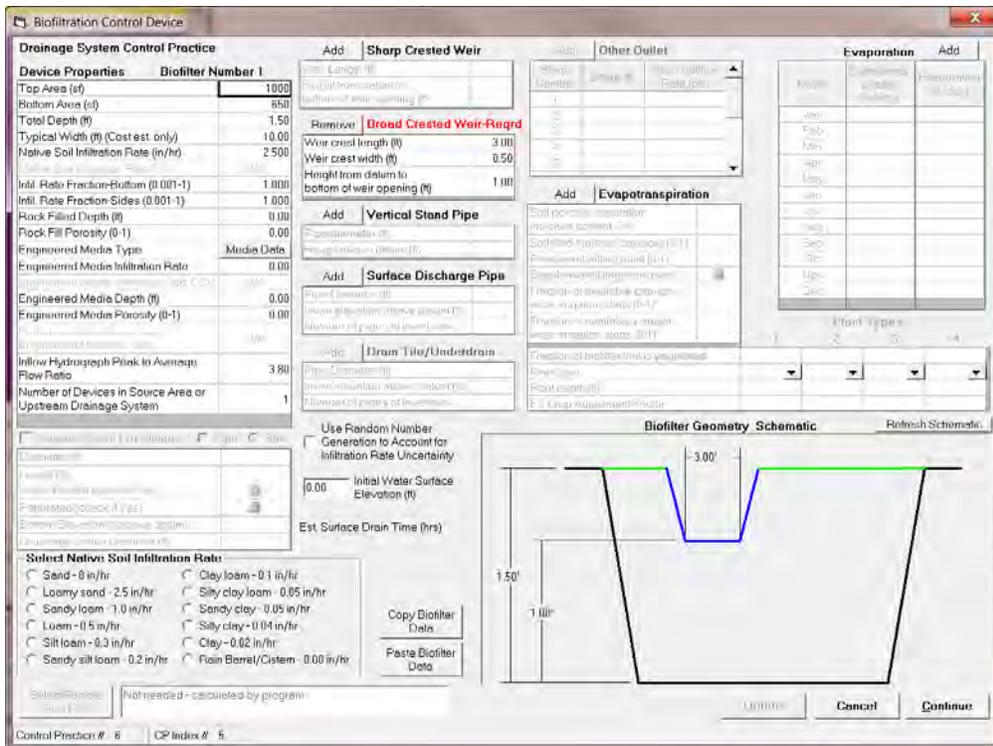


Figure 43: Infiltration Basin (1,000 sq.-ft.) in A-9 (WinSLAMM).

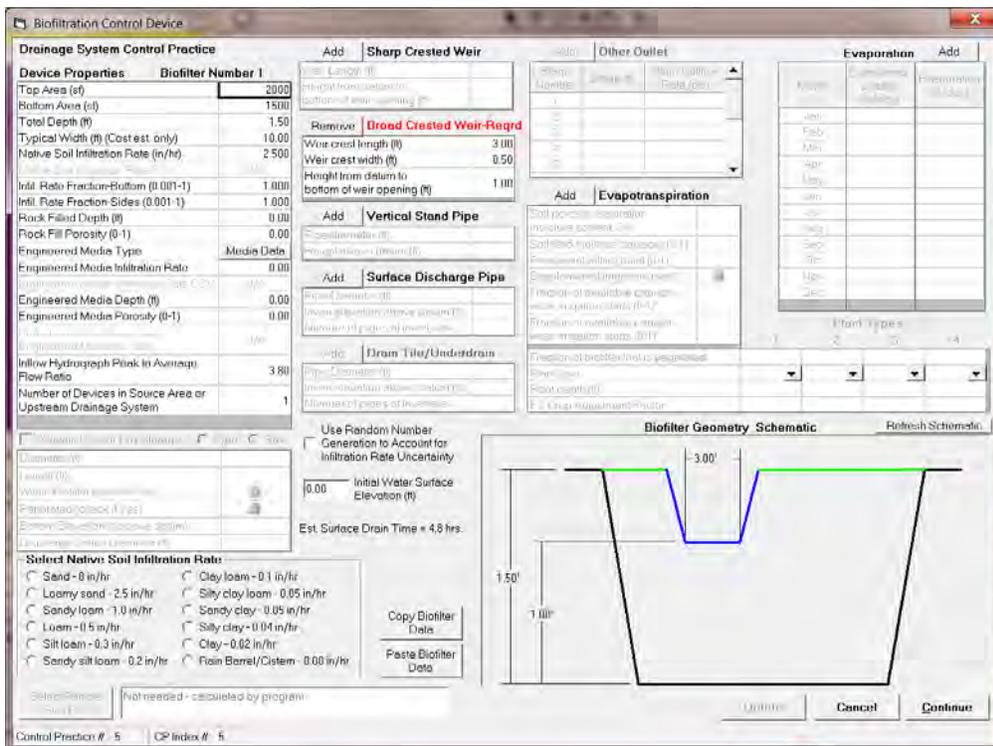


Figure 44: Infiltration Basin (2,000 sq.-ft.) in A-10 (WinSLAMM).

Hydrodynamic Device

Table 11: Hydrodynamic Device Sizing Criteria

Drainage Area (acres)	Peak Q (cfs)	Hydrodynamic Device Diameter (ft)
1	1.97	4
2	3.90	6
3	5.83	6
4	7.77	6
5	9.72	8
6	11.68	8
7	13.65	8
≥8	15.63	10

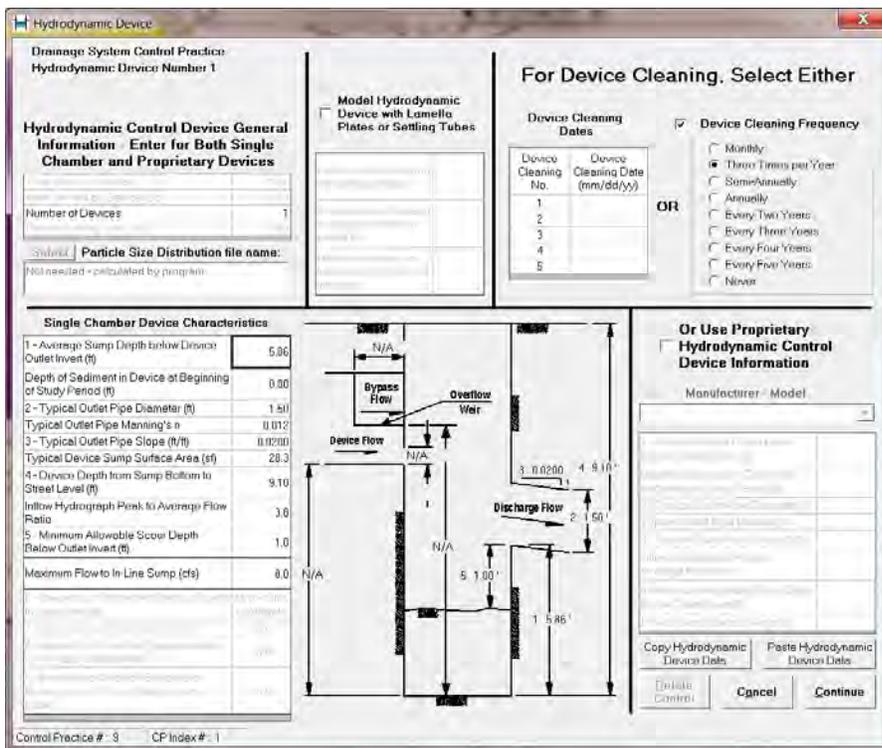


Figure 45: Hydrodynamic Device - 6' diameter (WinSLAMM).

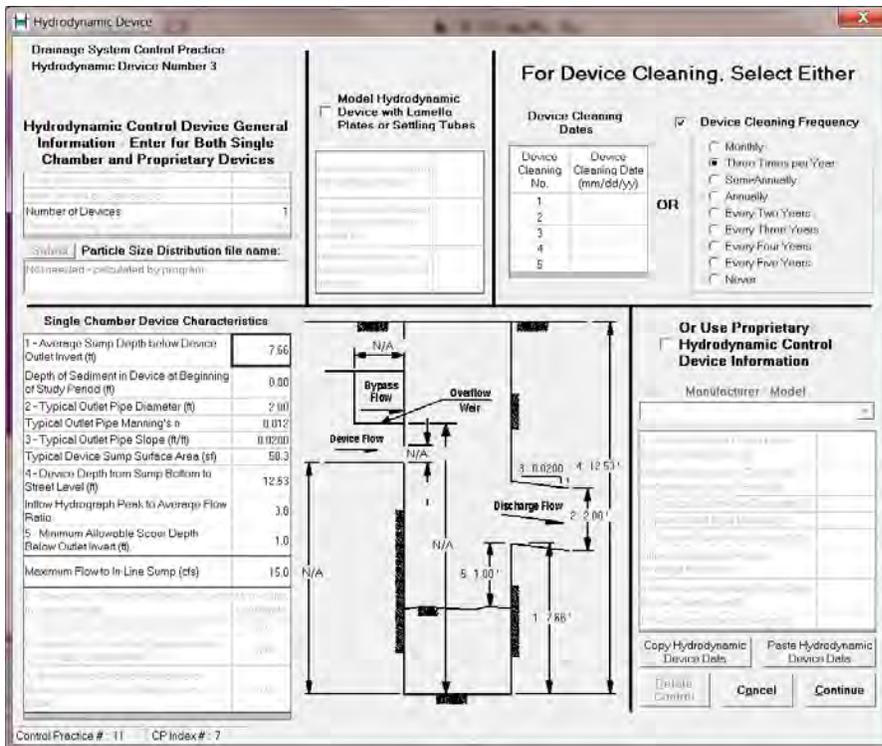


Figure 46: Hydrodynamic Device - 8' diameter (WinSLAMM).

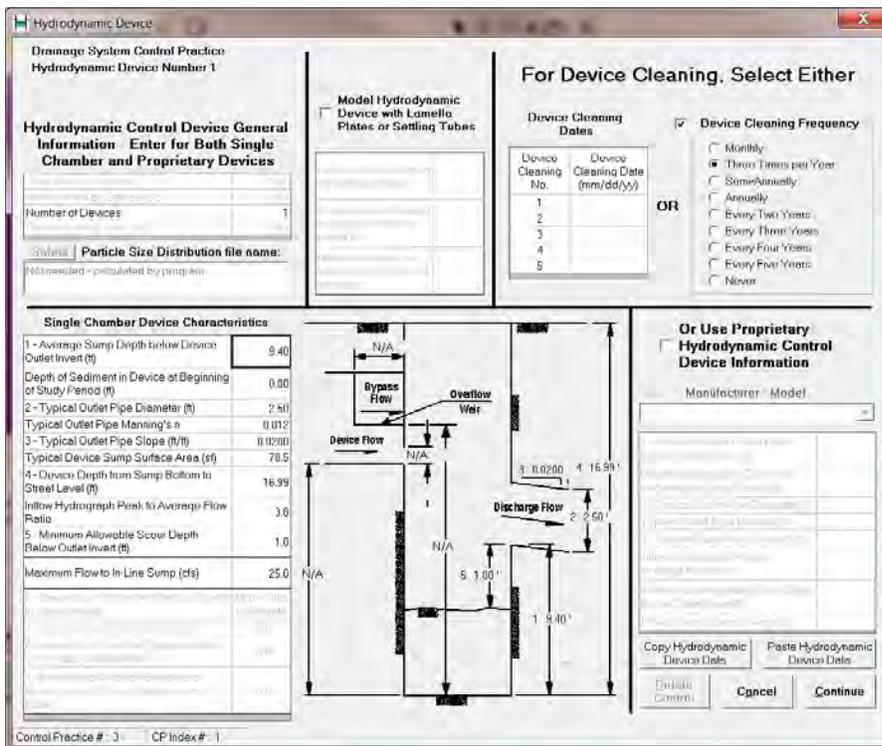


Figure 47: Hydrodynamic Device - 10' diameter (WinSLAMM).

Ponds

Ponds were proposed in the landscape where sufficient drainage area could sustain a permanent pool of water. Ponds were proposed following guidance from the Minnesota Pollution Control Agency, in which depths are equal to or less than 8-10' to prohibit stratification and at least 1,800 cu-ft. of pond storage is available for each acre of drainage area.

Figure 48: Stormwater Pond (Larger Drainage) at A-7(WinSLAMM).

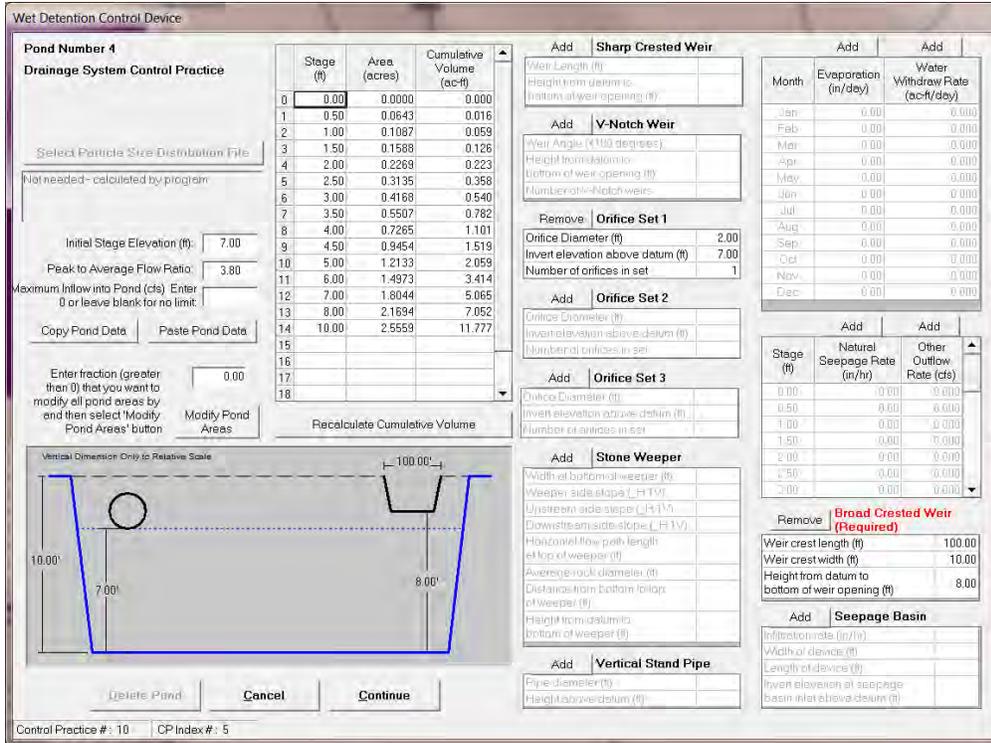


Figure 49: Stormwater Pond (Smaller Drainage) at A-7 (WinSLAMM).

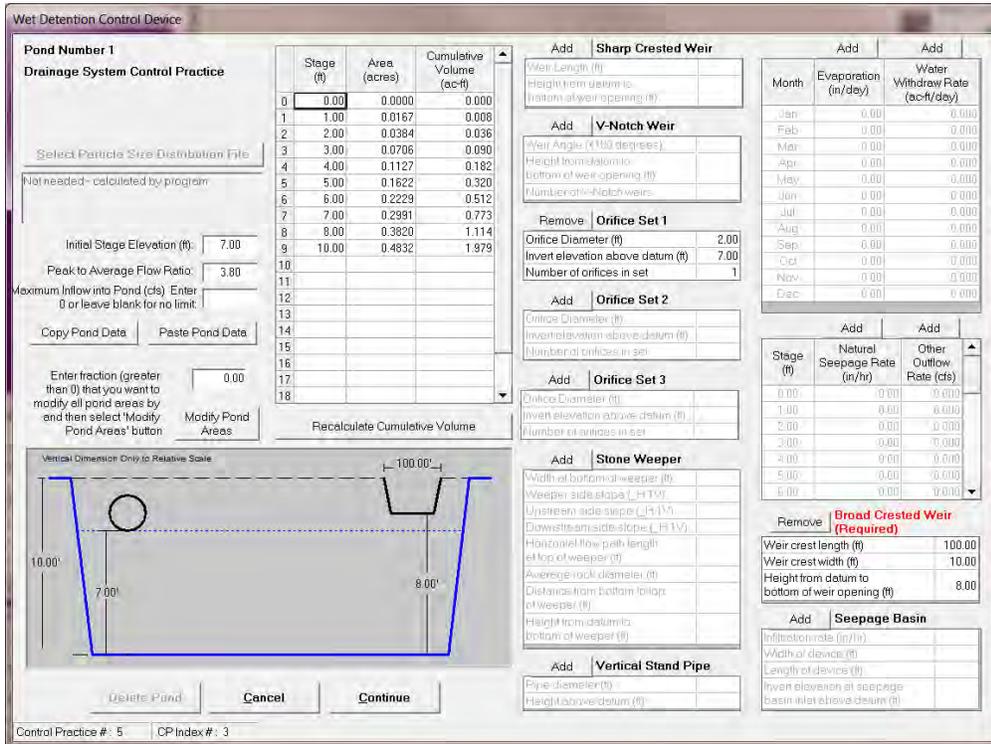


Figure 50: Stormwater Pond at Rudy Johnson Park at A-10 (WinSLAMM).

Iron Enhanced Sand Filter

Wet ponds, by design, allow for sediments and other bound pollutants to drop out of suspension. This practice, though, often allows dissolved pollutants to advect through the system untreated. Iron-enhanced sand filters (IESF) can be retrofitted to or installed with wet ponds to treat this dissolved load.

During a storm event, the pond increases from its permanent-pond stage to its flood stage. The IESF is designed to accept input from the wet pond during storm events, allowing for infiltration of water through its iron rich media, where dissolved pollutants (particularly dissolved phosphorus (DP)) adsorb to the iron filings. DP is then retained within the media while the stormwater can seep into an underdrain. Lastly, the underdrain discharges downstream of the wet pond. IESFs can be installed without ponds, although it is recommended that some form of pretreatment is available to remove sediment, which can deposit within the pore space of the filter and clog the practice over time.

There is currently no drainage practice input for these features in WinSLAMM. As they behave similarly to a bioretention cell, they can be modeled as such. But, as they often operate in tandem with stormwater ponds, estimating when and how much water and pollutants they will receive can be problematic. WinSLAMM was utilized to estimate what percentage of the stormflow could be treated by the filter. Stormflow input into the practice is most dependent upon the volume which can be passed through the system's underdrains. Stormflow treated by the device is a function of total area, depth, infiltration rate, and engineered media characteristics.

Field tests of installed sand trenches conducted by the University of Minnesota concluded that a sand media mixed with 5% iron filings is capable of retaining 80% (or more) of the DP load of stormwater flowing through the media (Erickson and Gulliver, 2010). Thus, DP retention by the IESF can be estimated by the equation,

$$P_{RET} = 0.8 * [P_{IN}] * q_S$$

where P_{RET} is the DP load removed by the IESF, $[P_{IN}]$ is the concentration of the DP input, and q_S is the volume of stormflow passing through the IESF. q_S is a function of the storm event duration and intensity, stormwater pond storage (if in-line with a pond), and IESF storage volume (bottom area, top area, and depth). The 0.8 multiplier assumes the IESF removes 80% of the DP load.

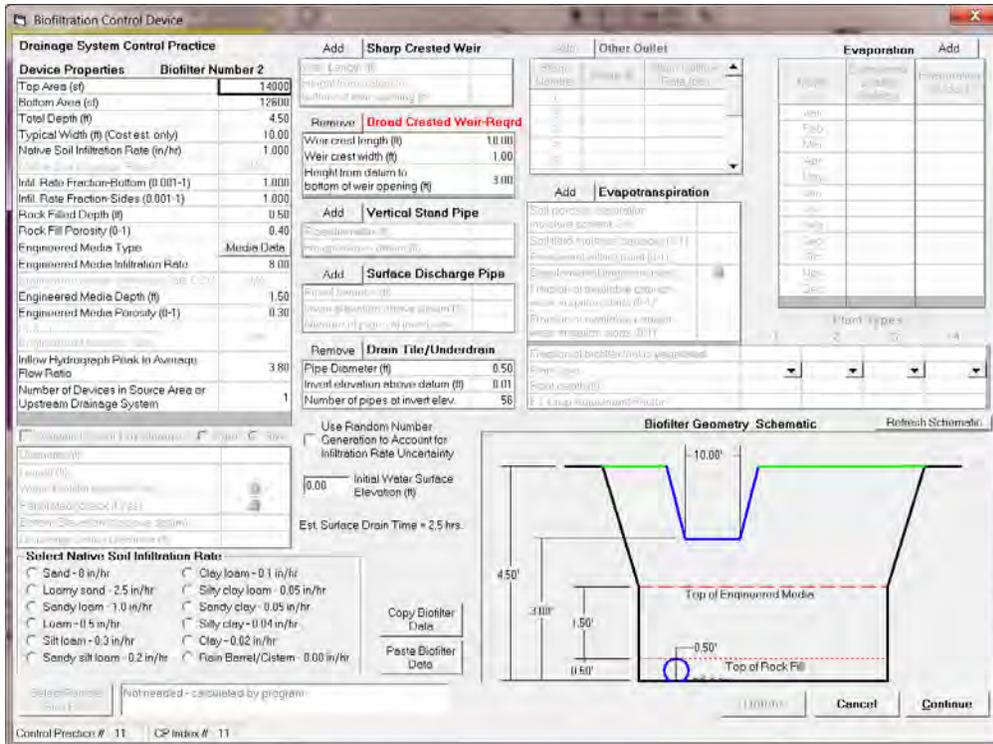


Figure 51: Iron Enhanced Sand Filter Pond Bench at Golf Course Pond in A-3 (WinSLAMM).

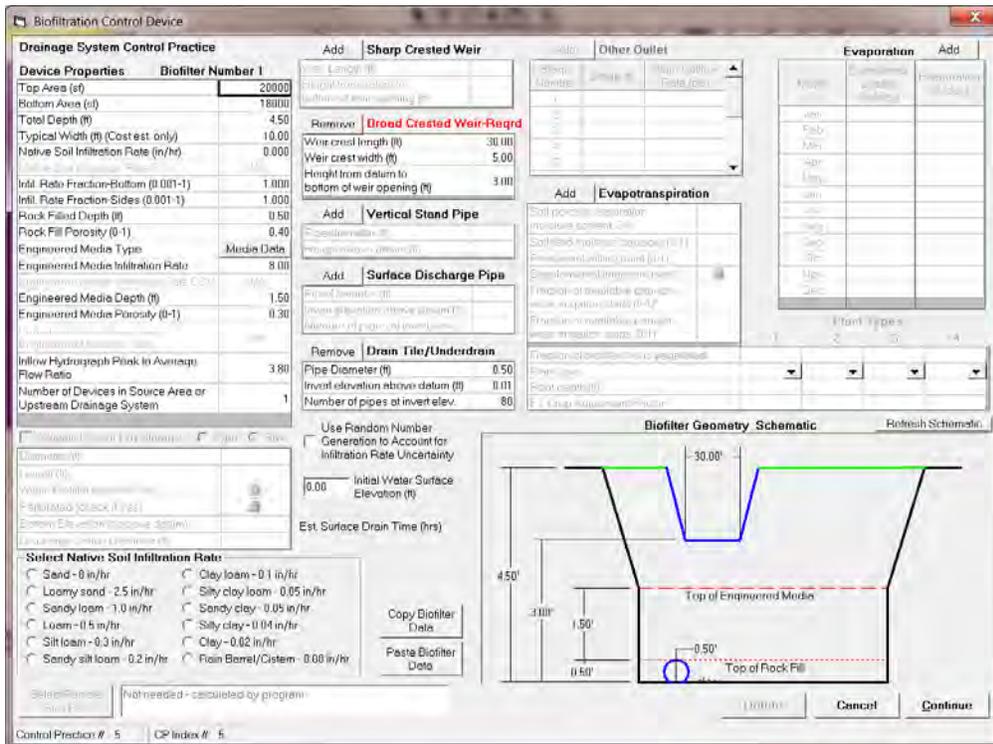


Figure 52: Iron Enhanced Sand Filter Pond Bench at proposed larger drainage pond in A-7 (WinSLAMM).

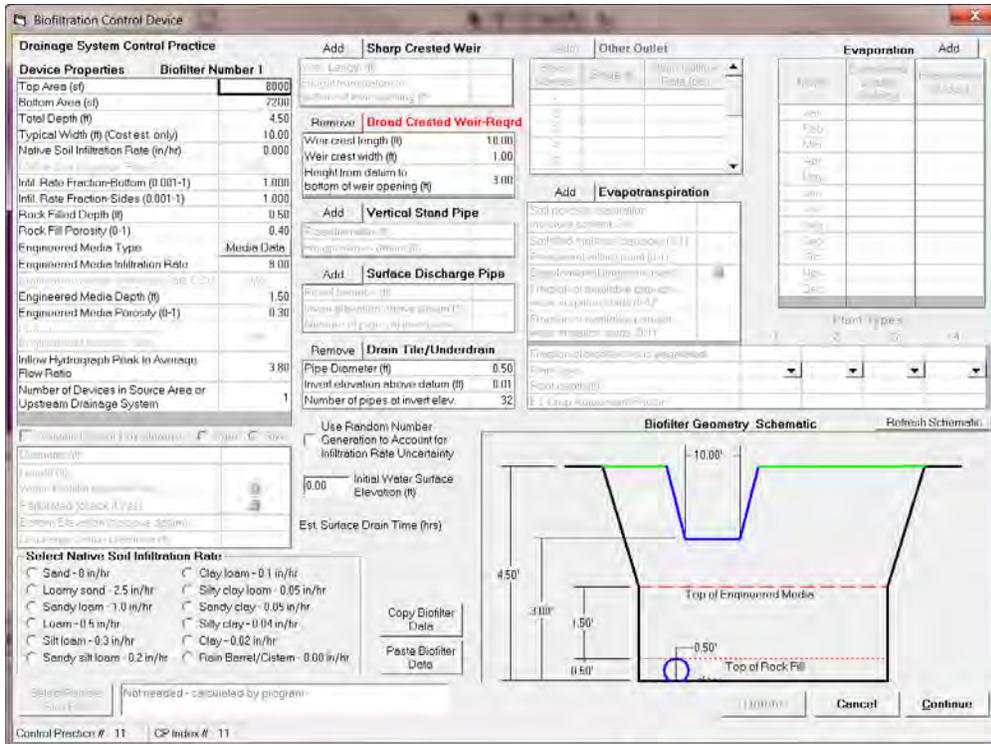


Figure 53: Iron Enhanced Sand Filter Pond Bench at the proposed smaller drainage pond in A-7 (WinSLAMM).

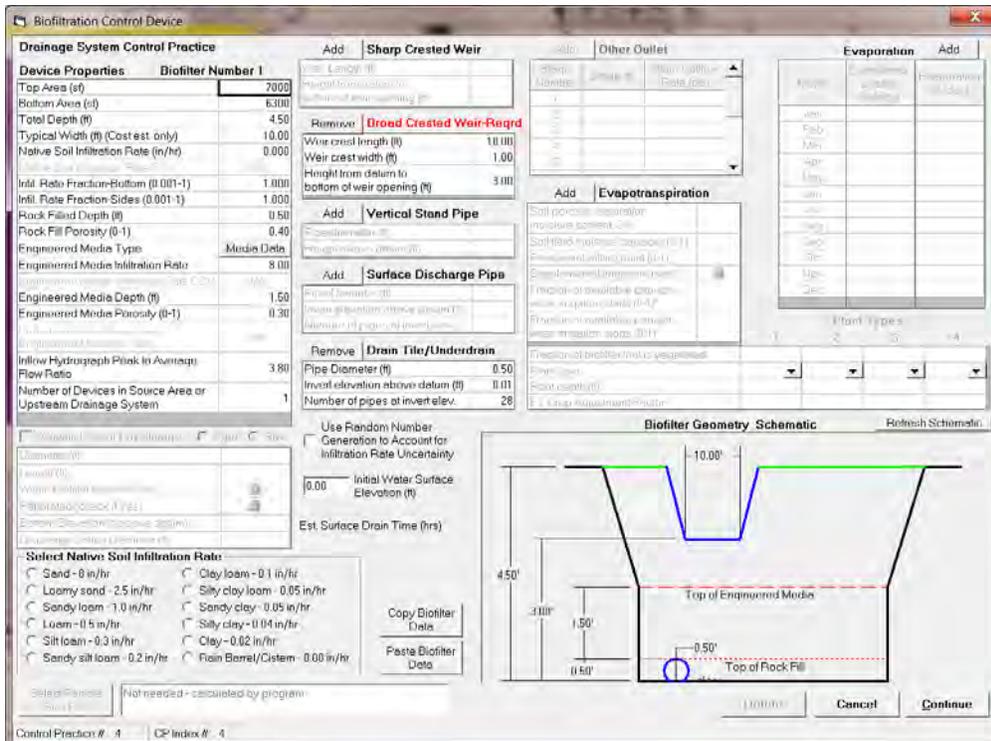


Figure 54: Iron Enhanced Sand Filter Pond Bench at 4th Avenue and Grant Street Pond in A-8 (WinSLAMM).

Permeable Pavement

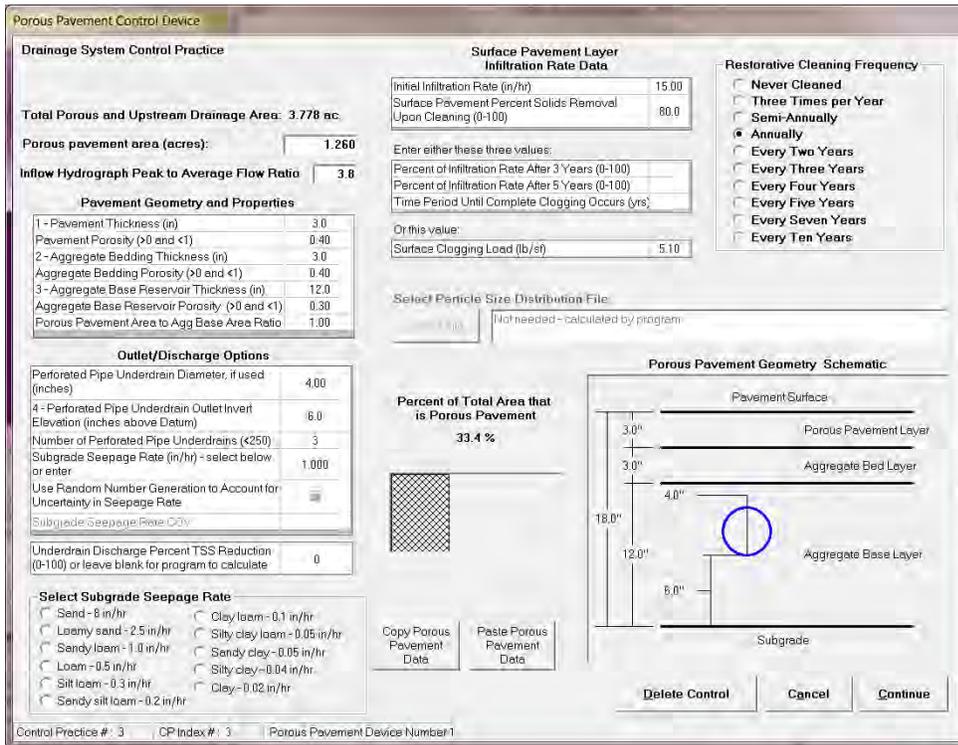


Figure 55: Permeable Pavement in A-1 (WinSLAMM).

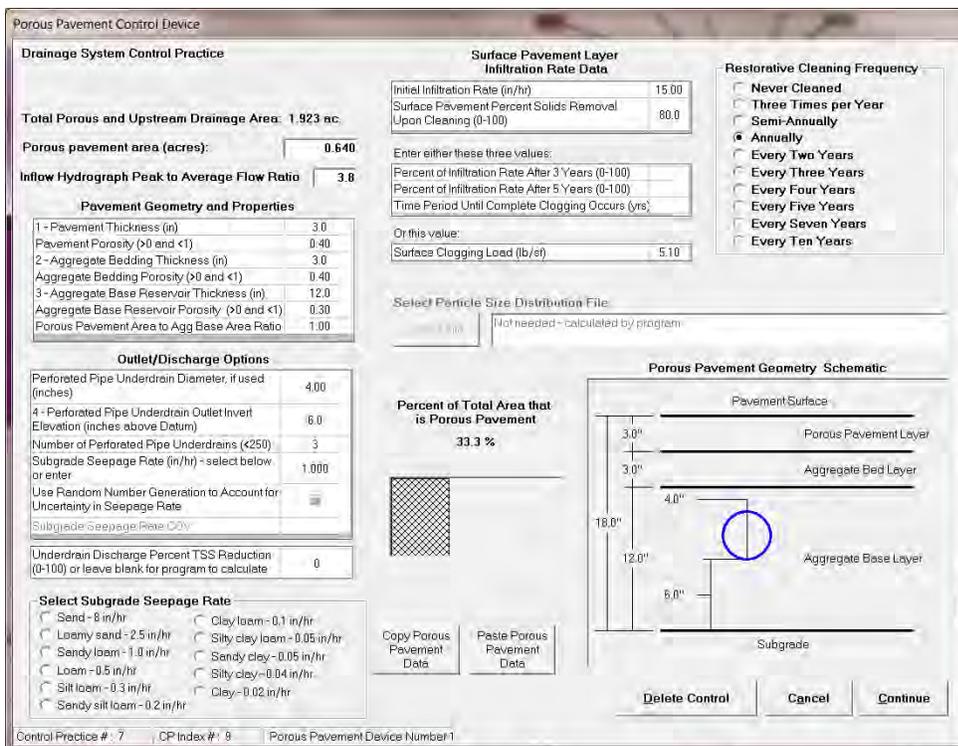


Figure 56: Permeable Pavement at St. Stephen’s Catholic School eastern parking lot in A-13 (WinSLAMM).

Porous Pavement Control Device

Drainage System Control Practice

Total Porous and Upstream Drainage Area: **1.095 ac.**

Porous pavement area (acres): **0.365**

Inflow Hydrograph Peak to Average Flow Ratio: **3.8**

Pavement Geometry and Properties

1 - Pavement Thickness (in)	3.0
Pavement Porosity (>0 and <1)	0.40
2 - Aggregate Bedding Thickness (in)	3.0
Aggregate Bedding Porosity (>0 and <1)	0.40
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	4.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	6.0
Number of Perforated Pipe Underdrains (x250)	3
Subgrade Seepage Rate (in/hr) - select below or enter	1.000
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	
Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

<input type="checkbox"/> Sand - 8 in/hr	<input type="checkbox"/> Clay loam - 0.1 in/hr
<input type="checkbox"/> Loamy sand - 2.5 in/hr	<input type="checkbox"/> Silty clay loam - 0.05 in/hr
<input type="checkbox"/> Sandy loam - 1.0 in/hr	<input type="checkbox"/> Sandy clay - 0.05 in/hr
<input type="checkbox"/> Loam - 0.5 in/hr	<input type="checkbox"/> Silty clay - 0.04 in/hr
<input type="checkbox"/> Silt loam - 0.3 in/hr	<input type="checkbox"/> Clay - 0.02 in/hr
<input type="checkbox"/> Sandy silt loam - 0.2 in/hr	

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	15.00
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	80.0

Enter either these three values:

Percent of Infiltration Rate After 3 Years (0-100)	
Percent of Infiltration Rate After 5 Years (0-100)	
Time Period Until Complete Clogging Occurs (yrs)	

Or this value:

Surface Clogging Load (lb/sf)	5.10
-------------------------------	------

Select Particle Size Distribution File: (Not needed - calculated by program)

Restorative Cleaning Frequency

- Never Cleaned
- Three Times per Year
- Semi-Annually
- Annually
- Every Two Years
- Every Three Years
- Every Four Years
- Every Five Years
- Every Seven Years
- Every Ten Years

Porous Pavement Geometry Schematic

Percent of Total Area that is Porous Pavement: **33.3 %**

Buttons: Copy Porous Pavement Data, Paste Porous Pavement Data, Delete Control, Cancel, Continue

Control Practice #: 7 | CP Index #: 5 | Porous Pavement Device Number: 1

Figure 57: Permeable Pavement at St. Stephen’s Catholic Church Parking Lot in A-13 (WinSLAMM).

Porous Pavement Control Device

Drainage System Control Practice

Total Porous and Upstream Drainage Area: **2.331 ac.**

Porous pavement area (acres): **0.780**

Inflow Hydrograph Peak to Average Flow Ratio: **3.8**

Pavement Geometry and Properties

1 - Pavement Thickness (in)	3.0
Pavement Porosity (>0 and <1)	0.40
2 - Aggregate Bedding Thickness (in)	3.0
Aggregate Bedding Porosity (>0 and <1)	0.40
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	4.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	6.0
Number of Perforated Pipe Underdrains (x250)	3
Subgrade Seepage Rate (in/hr) - select below or enter	1.000
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	
Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

<input type="checkbox"/> Sand - 8 in/hr	<input type="checkbox"/> Clay loam - 0.1 in/hr
<input type="checkbox"/> Loamy sand - 2.5 in/hr	<input type="checkbox"/> Silty clay loam - 0.05 in/hr
<input type="checkbox"/> Sandy loam - 1.0 in/hr	<input type="checkbox"/> Sandy clay - 0.05 in/hr
<input type="checkbox"/> Loam - 0.5 in/hr	<input type="checkbox"/> Silty clay - 0.04 in/hr
<input type="checkbox"/> Silt loam - 0.3 in/hr	<input type="checkbox"/> Clay - 0.02 in/hr
<input type="checkbox"/> Sandy silt loam - 0.2 in/hr	

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	15.00
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	80.0

Enter either these three values:

Percent of Infiltration Rate After 3 Years (0-100)	
Percent of Infiltration Rate After 5 Years (0-100)	
Time Period Until Complete Clogging Occurs (yrs)	

Or this value:

Surface Clogging Load (lb/sf)	5.10
-------------------------------	------

Select Particle Size Distribution File: (Not needed - calculated by program)

Restorative Cleaning Frequency

- Never Cleaned
- Three Times per Year
- Semi-Annually
- Annually
- Every Two Years
- Every Three Years
- Every Four Years
- Every Five Years
- Every Seven Years
- Every Ten Years

Porous Pavement Geometry Schematic

Percent of Total Area that is Porous Pavement: **33.5 %**

Buttons: Copy Porous Pavement Data, Paste Porous Pavement Data, Delete Control, Cancel, Continue

Control Practice #: 7 | CP Index #: 6 | Porous Pavement Device Number: 1

Figure 58: Permeable Pavement at St. Stephen’s Catholic School western parking lot in A-13 (WinSLAMM).

Stormwater Reuse

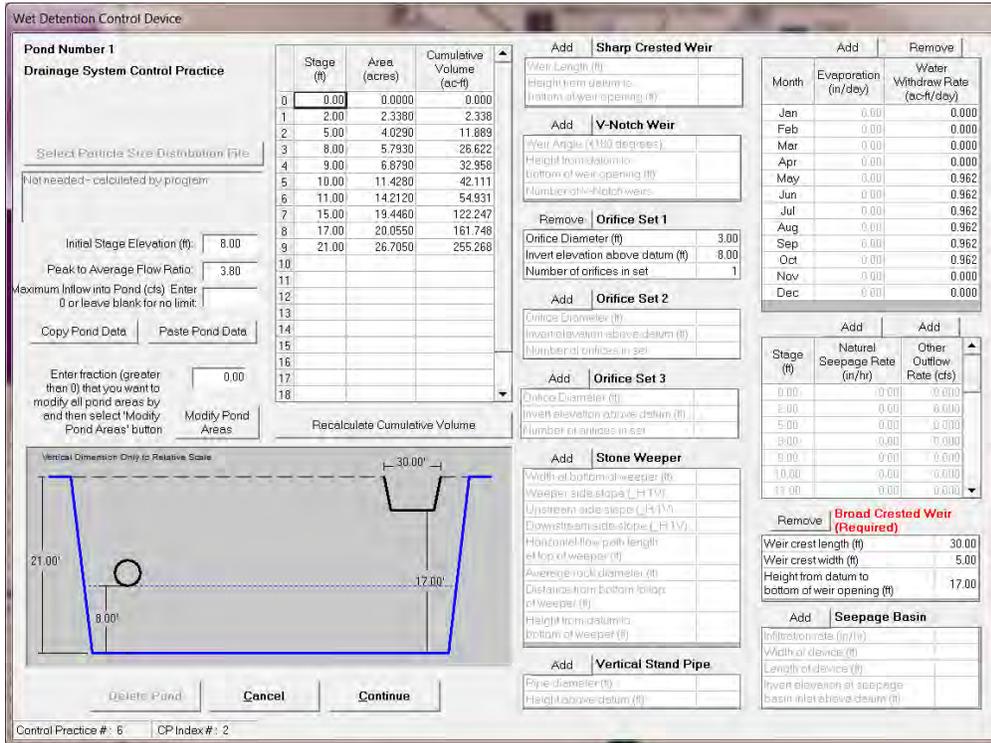


Figure 59: Stormwater Reuse at Green Haven Golf Course Pond in A-3 (WinSLAMM).

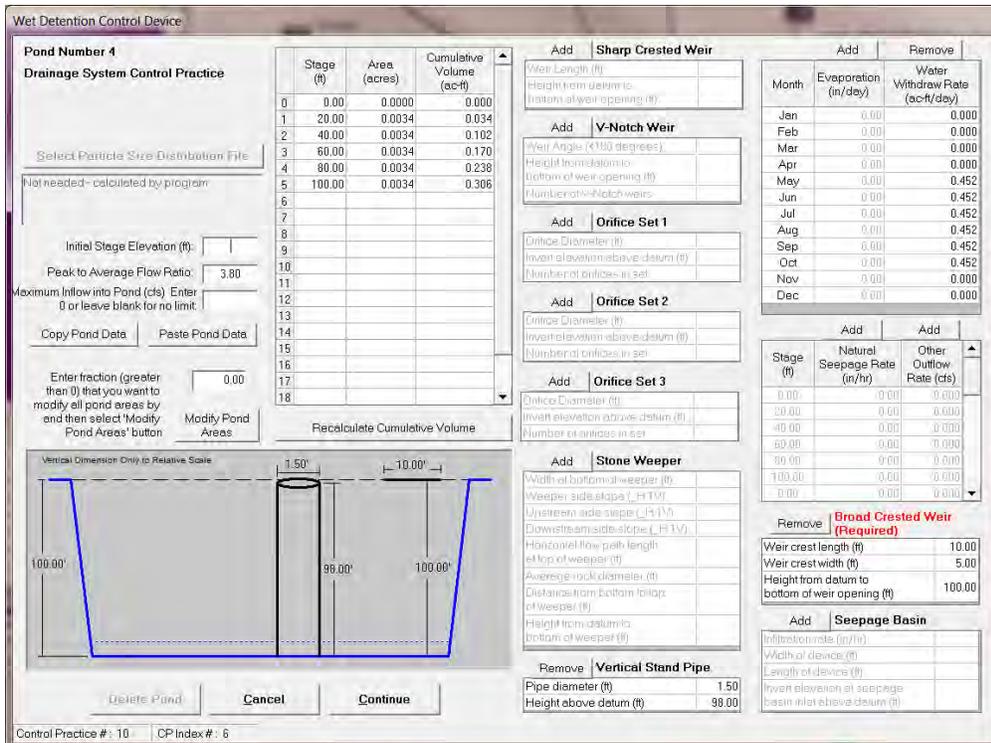


Figure 60: Stormwater Reuse in A-7 (WinSLAMM).

Boulevard Bioswale

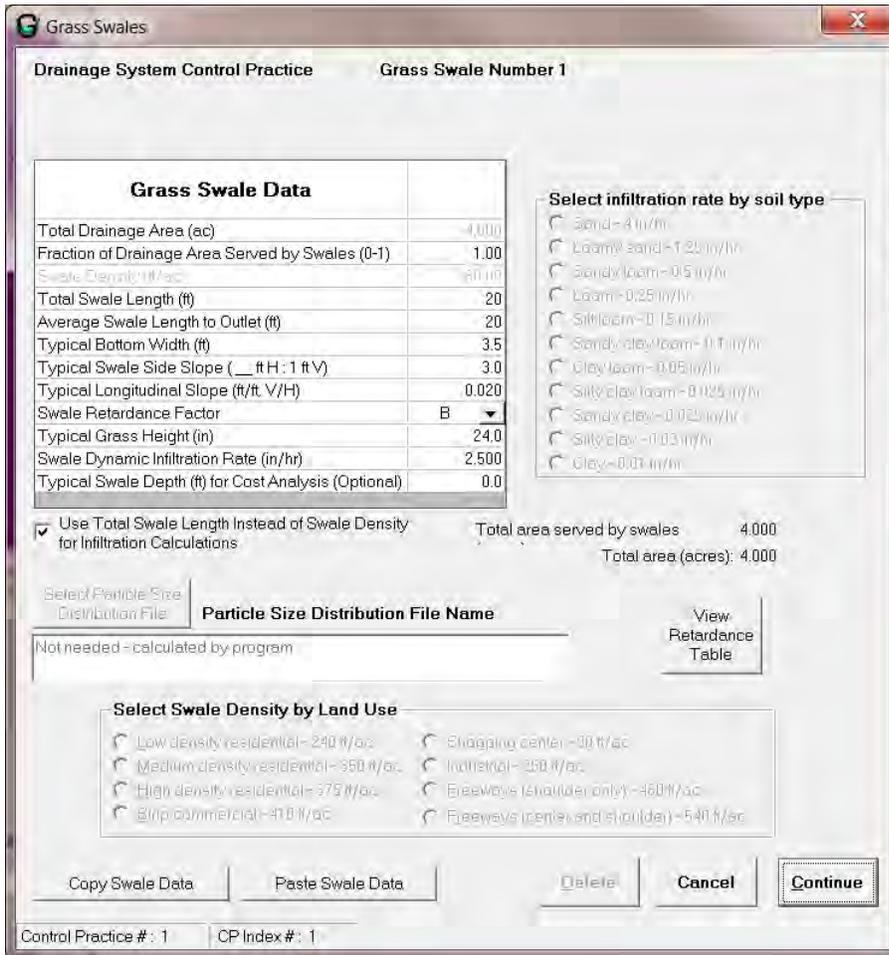


Figure 61: Boulevard Bioswale – not site specific (WinSLAMM).

Appendix B – Project Cost Estimates

Introduction

The ‘Cost Estimates’ section on page 10 explains the elements of cost that were considered and the amounts and assumptions that were used. In addition, each project type concludes with budget assumptions listed in the footnotes. This appendix is a compilation of tables that shows in greater detail the calculations made and quantities used to arrive at the cost estimates for practices where the information provided elsewhere in the document is insufficient to reconstruct the budget. This section includes ponds, iron enhanced sand filters, and stormwater reuse.

Ponds

Table 12: Catchment A-7 – New Pond (Smaller Drainage)

Activity	Units	Unit Price	Quantity	Unit Price
Design	Each	\$ 25,000.00	1	\$ 25,000.00
Mobilization	Each	\$ 10,000.00	1	\$ 10,000.00
Site Prep	Each	\$ 10,000.00	1	\$ 10,000.00
Excavation	cu-yards	\$ 12.50	11,455	\$ 143,183.75
Outlet Control Structure	Each	\$ 10,000.00	1	\$ 10,000.00
Existing Infrastructure Retrofit	Each	\$ 50,000.00	1	\$ 50,000.00
Site Restoration/Revegetation	Each	\$ 5,000.00	1	\$ 5,000.00
Property Purchase		\$ 100,000.00	1	\$ 100,000.00
Total for project =				\$ 353,183.75

Table 13: Catchment A-7 – New Pond (Larger Drainage)

Activity	Units	Unit Price	Quantity	Unit Price
Design	Each	\$ 25,000.00	1	\$ 25,000.00
Mobilization	Each	\$ 10,000.00	1	\$ 10,000.00
Site Prep	Each	\$ 10,000.00	1	\$ 10,000.00
Excavation	cu-yards	\$ 12.50	46,787	\$ 584,837.50
Outlet Control Structure	Each	\$ 10,000.00	1	\$ 10,000.00
Existing Infrastructure Retrofit	Each	\$ 50,000.00	1	\$ 50,000.00
Site Restoration/Revegetation	Each	\$ 5,000.00	1	\$ 5,000.00
Property Purchase		\$ 100,000.00	1	\$ 100,000.00
Total for project =				\$ 794,837.50

Table 14: Catchment A-8 – Pond Modification at 4th Avenue and Grant Street Pond

Activity	Units	Unit Price	Quantity	Unit Price
Feasibility Study and Project Design	Each	\$ 15,000.00	1	\$ 15,000.00
Mobilization	Each	\$ 10,000.00	1	\$ 10,000.00
Site Prep	Each	\$ 10,000.00	1	\$ 10,000.00
Brush Removal	Each	\$ 15,000.00	1	\$ 15,000.00
Sediment Testing	Each	\$ 10,000.00	1	\$ 10,000.00
Existing Infrastructure Retrofit	Each	\$ 5,000.00	1	\$ 5,000.00
Outlet Control Structure	Each	\$ 10,000.00	1	\$ 10,000.00
Site Restoration	Each	\$ 10,000.00	1	\$ 10,000.00
Project Total Before Excavation =				\$ 85,000.00

Activity	Management Levels		
	1	2	3
Soil To Excavate (cu-yds)	12,000	12,000	12,000
Cost To Excavate (\$/cu-yd)	\$20	\$35	\$50
Cost To Excavate (Total \$)	\$240,000	\$420,000	\$600,000
Other Construction Costs (\$)	\$85,000	\$85,000	\$85,000
Total Project Cost (\$)	\$325,000	\$505,000	\$685,000

Table 15: Catchment A-10 – New Pond at Rudy Johnson Park

Activity	Units	Unit Price	Quantity	Unit Price
Design	Each	\$ 25,000.00	1	\$ 25,000.00
Mobilization	Each	\$ 10,000.00	1	\$ 10,000.00
Site Prep	Each	\$ 10,000.00	1	\$ 10,000.00
Excavation	cu-yards	\$ 12.50	1,810	\$ 22,625.00
Outlet Control Structure	Each	\$ 10,000.00	1	\$ 10,000.00
Existing Infrastructure Retrofit	Each	\$ 50,000.00	1	\$ 50,000.00
Site Restoration/Revegetation	Each	\$ 5,000.00	1	\$ 5,000.00
Property Purchase		\$ 100,000.00	1	\$ 100,000.00
Total for project =				\$ 232,625.00

Iron Enhanced Sand Filters

Table 16: Catchment A-3 – IESF Pond Bench at Green Haven Golf Course Pond

Activity	Units	Unit Price	Quantity	Unit Price
Design/Bidding/Construction Oversight	Each	\$ 40,000.00	1	\$ 40,000.00
Mobilization	Each	\$ 20,000.00	1	\$ 20,000.00
Land Acquisition (owned by City of Anoka)	acres	\$ -	0	\$ -
Clearing, Removal of Existing Infrastructure, and Pond Dewatering	Each	\$ 12,000.00	1	\$ 12,000.00
Common Excavation & Disposal	cu-yards	\$ 40.00	2,074	\$ 82,960.00
IESF Materials and Installation	sq-ft	\$ 17.00	14,000	\$ 238,000.00
Outlet/Inlet Control Structures	Each	\$ 30,000.00	1	\$ 30,000.00
Site Restoration	Each	\$ 15,000.00	1	\$ 15,000.00
Total for project =				\$ 437,960.00

Table 17: Catchment A-7 – IESF Pond Bench (Smaller Drainage Pond)

Activity	Units	Unit Price	Quantity	Unit Price
Design/Bidding/Construction Oversight	Each	\$ 40,000.00	1	\$ 40,000.00
Mobilization	Each	\$ 20,000.00	1	\$ 20,000.00
Land Acquisition (owned by State of Minnesota)	acres	\$ -	0	\$ -
Clearing, Removal of Existing Infrastructure, and Pond Dewatering	Each	\$ 12,000.00	1	\$ 12,000.00
Common Excavation & Disposal	cu-yards	\$ 40.00	1,185	\$ 47,400.00
IESF Materials and Installation	sq-ft	\$ 17.00	8,000	\$ 136,000.00
Outlet/Inlet Control Structures	Each	\$ 30,000.00	1	\$ 30,000.00
Site Restoration	Each	\$ 15,000.00	1	\$ 15,000.00
Total for project =				\$ 300,400.00

Table 18: Catchment A-7 – IESF Pond Bench (Larger Drainage Pond)

Activity	Units	Unit Price	Quantity	Unit Price
Design/Bidding/Construction Oversight	Each	\$ 40,000.00	1	\$ 40,000.00
Mobilization	Each	\$ 20,000.00	1	\$ 20,000.00
Land Acquisition (owned by State of Minnesota)	acres	\$ -	0	\$ -
Clearing, Removal of Existing Infrastructure, and Pond Dewatering	Each	\$ 12,000.00	1	\$ 12,000.00
Common Excavation & Disposal	cu-yards	\$ 40.00	2,963	\$ 118,516.00
IESF Materials and Installation	sq-ft	\$ 17.00	20,000	\$ 340,000.00
Outlet/Inlet Control Structures	Each	\$ 30,000.00	1	\$ 30,000.00
Site Restoration	Each	\$ 15,000.00	1	\$ 15,000.00
Total for project =				\$ 575,516.00

Table 19: Catchment A-8 – IESF at 4th Avenue and Grant Street.

Activity	Units	Unit Price	Quantity	Unit Price
Design/Bidding/Construction Oversight	Each	\$ 40,000.00	1	\$ 40,000.00
Mobilization	Each	\$ 20,000.00	1	\$ 20,000.00
Land Acquisition (owned by City of Anoka)	acres	\$ -	0	\$ -
Clearing, Removal of Existing Infrastructure, and Pond Dewatering	Each	\$ 12,000.00	1	\$ 12,000.00
Common Excavation & Disposal	cu-yards	\$ 40.00	1,037	\$ 41,480.00
IESF Materials and Installation	sq-ft	\$ 17.00	7,000	\$ 119,000.00
Outlet/Inlet Control Structures	Each	\$ 30,000.00	1	\$ 30,000.00
Site Restoration	Each	\$ 15,000.00	1	\$ 15,000.00
Total for project =				\$ 277,480.00

Stormwater Reuse

Table 20: Catchment A-3 –Stormwater Reuse at Green Haven Golf Course Pond

Activity	Price
Project Planning	\$ 30,000.00
Easement	\$ 45,000.00
Design, Surveying and Permitting	\$ 85,000.00
Construction Oversight	\$ 30,000.00
Monitoring	\$ 20,000.00
Construction	\$ 390,000.00
Total for project = \$ 600,000.00	

Table 21: Catchment A-7– Stormwater Reuse System

Activity	Price
Project Planning	\$ 30,000.00
Easements	\$ 75,000.00
Design, Surveying and Permitting	\$ 85,000.00
Construction Oversight	\$ 40,000.00
Monitoring	\$ 20,000.00
Cisterns	\$ 250,000.00
Construction	\$ 450,000.00
Total for project = \$ 950,000.00	

Appendix C – Volume Reduction Ranking Tables

Introduction

Volume reduction was not identified as a primary reduction target during the scoping phase of this project. This section is intended to serve as a quick reference if questions related to volume reduction arise. Projects are ranked based on cost per acre-foot of volume reduced.

Table 22: Cost-effectiveness of retrofits with respect to volume reduction. Projects 1 - 16. TP and TSS reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/ ac-ft Vol./year (30-year) ¹
1	3-E	52	Stomwater Reuse	Green Haven Golf Course Pond	A-3	18.2	3,409	46.4	\$608,760.00	\$3,000.00	\$503.00
2	7-D	69	Infiltration Basin	Colfax Ave. and Blackoaks Ln.	A-7	9.6	3,256	8.1	\$118,796.00	\$225.00	\$515.00
3	7-E	70	Infiltration Basin	Sunny Ln.	A-7	1.7	676	1.8	\$22,796.00	\$225.00	\$547.00
4	10-C	97	Infiltration Basin	5th Ave. and Polk St.	A-10	2.6	808	2.1	\$43,796.00	\$225.00	\$803.00
5	8-A	80	Curb-Cut Rain Garden	Various locations in catchment	A-8	0.7-0.8	190-301	0.7-1.1	\$17,234.00	\$450.00	\$931-\$1,394
6	1-A	38	Curb-Cut Rain Garden	Ferry St. and Front Ave.	A-1	0.5	187	0.5	\$8,982.00	\$225.00	\$1,090.00
7	16-A	128	Curb-Cut Rain Garden	Washington St.	A-16	0.5-1.0	157-315	0.4-0.8	\$8,982-\$17,234	\$225-\$450	\$1,339-\$1,369
8	7-A	66	Curb-Cut Rain Garden	Various locations in catchment	A-7	0.5-8.1	153-2,539	0.4-6.2	\$15,844-\$147,876	\$225-\$3,825	\$1,407-\$1,931
9	3-A	48	Curb-Cut Rain Garden	Various locations in catchment	A-3	0.5-3.5	157-1,089	0.4-2.7	\$15,844-\$65,356	\$225-\$1,575	\$1,410-\$2,052
10	15-A	125	Curb-Cut Rain Garden	Various locations in catchment	A-15	0.4-4.4	135-1,343	0.4-3.7	\$15,844-\$90,112	\$225-\$2,250	\$1,413-\$1,931
11	9-A	87	Curb-Cut Rain Garden	Various locations in catchment	A-9	0.5-2.0	155-623	0.4-1.5	\$15,844-\$40,600	\$225-\$900	\$1,465-\$1,931
12	7-G	72	Stomwater Reuse	38th Ave. and 7th Ave.	A-7	17.5	5,987	18.7	\$958,760.00	\$3,000.00	\$1,869.00
13	9-E	91	Boulevard Bioswale	Various locations in catchment	A-9	0.2	112	0.2	\$8,526.00	\$225.00	\$2,482.00
14	7-F	71	Boulevard Bioswale	Various locations in catchment	A-7	0.2	61	0.1	\$8,526.00	\$225.00	\$3,704.00
15	11-A	102	Boulevard Bioswale	3rd Ave.	A-11	0.1	49	0.1	\$8,526.00	\$225.00	\$3,717.00
16	2-A	44	Boulevard Bioswale	Maple Ave.	A-2	0.2	55	0.1	\$8,526.00	\$225.00	\$3,859.00

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual Volume Reduction)]

Table 23: Cost-effectiveness of retrofits with respect to volume reduction. Projects 17 - 32. TP and TSS reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/ ac-ft Vol./year (30-year) ¹
17	10-D	98	Boulevard Bioswale	Various locations in catchment	A-10	0.1	52	0.1	\$8,526.00	\$225.00	\$4,302.00
18	13-H	116	Boulevard Bioswale	Various locations in catchment	A-13	0.1	22	0.1	\$8,526.00	\$225.00	\$5,092.00
19	1-C	40	Permeable Pavement	Anoka-Hennepin Education Center	A-1	2.9	1,325	3.5	\$552,656.00	\$41,165.00	\$17,044.00
20	13-F	114	Permeable Pavement	St. Stephen's Catholic School	A-13	1.6	562	1.6	\$282,796.00	\$20,925.00	\$18,970.00
21	13-E	113	Permeable Pavement	St. Stephen's Catholic Church	A-13	0.9	320	0.9	\$162,796.00	\$11,925.00	\$19,279.00
22	13-G	115	Permeable Pavement	St. Stephen's Catholic School	A-13	1.9	672	1.9	\$343,796.00	\$25,500.00	\$19,453.00
48	1-B	39	Hydrodynamic Device	Ferry St.	A-1	1	584	0	\$109,752.00	\$630.00	N/A
48	3-B	49	Hydrodynamic Device	Main St. and State Ave.	A-3	0.5	280	0	\$55,752.00	\$630.00	N/A
48	3-C	50	Hydrodynamic Device	Main St. and State Ave.	A-3	0.6	302	0	\$55,752.00	\$630.00	N/A
48	3-D	51	IESF Bench	Green Haven Golf Course Pond	A-3	10.4	0	0	\$282,955.00	\$3,214.00	N/A
48	4-A	55	Hydrodynamic Device	Maple Ln.	A-4	0.3	113	0	\$28,752.00	\$630.00	N/A
48	7-B	67	Hydrodynamic Device	38th Ln. and 8th Ave.	A-7	1.2	491	0	\$109,752.00	\$630.00	N/A
48	7-C	68	Hydrodynamic Device	7th Ave.	A-7	0.8	383	0	\$109,752.00	\$630.00	N/A
48	7-H1	73	New Pond	7th Ave.	A-7	111.6	54,558	0.9	\$802,138.00	\$5,500.00	N/A
48	7-H2	74	New Pond	7th Ave.	A-7	31.5	13,452	0.4	\$360,484.00	\$1,800.00	N/A
48	7-I1	75	IESF Bench	7th Ave.	A-7	26.6	0	0	\$580,991.00	\$4,591.00	N/A

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual Volume Reduction)]

Table 24: Cost-effectiveness of retrofits with respect to volume reduction. Projects 33 – 48. TP and TSS reductions are also shown. For more information on each project refer to either the Catchment Profile or BMP Descriptions pages in this report. Volume and pollutant reduction benefits cannot be summed with other projects that provide treatment for the same source area.

Project Rank	Project ID	Page Number	Retrofit Type	Retrofit Location	Catchment	TP Reduction (lb/yr)	TSS Reduction (lb/yr)	Volume Reduction (ac-ft/yr)	Probable Project Cost	Estimated Annual Operations & Maintenance	Estimated cost/ ac-ft Vol./year (30-year) ¹
48	7-I2	76	IESF Bench	7th Ave.	A-7	7.2	0	0	\$305,875.00	\$1,837.00	N/A
48	8-B	81	Pond Modification	4th Ave. and Grant St.	A-8	10.5	6,443	0	\$330,840-\$690,840	\$1,300.00	N/A
48	8-C	82	IESF Bench	4th Ave. and Grant St.	A-8	7.2	0	0	\$282,955.00	\$1,607.00	N/A
48	9-B	88	Hydrodynamic Device	7th Ave. and Pierce St.	A-9	1.2	686	0	\$109,752.00	\$630.00	N/A
48	9-C	89	Hydrodynamic Device	7th Ave. and Harrison St.	A-9	1	407	0	\$109,752.00	\$630.00	N/A
48	9-D	90	Hydrodynamic Device	Main St. and 8 1/2 Ave.	A-9	1.1	777	0	\$109,752.00	\$630.00	N/A
48	10-A	95	Hydrodynamic Device	6th Ave. and Taylor St.	A-10	0.5	211	0	\$109,752.00	\$630.00	N/A
48	10-B	96	Hydrodynamic Device	5th Ave. and Taylor St.	A-10	0.5	195	0	\$109,752.00	\$630.00	N/A
48	10-E	99	New Pond	Rudy Johnson Park	A-10	4	1,712	0.1	\$239,925.00	\$300.00	N/A
48	13-A	109	Hydrodynamic Device	Main St. and 1st Ave.	A-13	0.5	272	0	\$55,752.00	\$630.00	N/A
48	13-B	110	Hydrodynamic Device	Main St. and 3rd Ave.	A-13	0.5	285	0	\$55,752.00	\$630.00	N/A
48	13-C	111	Hydrodynamic Device	Main St. and 5th Ave.	A-13	0.9	427	0	\$109,752.00	\$630.00	N/A
48	13-D	112	Hydrodynamic Device	5th Ave. and Main St.	A-13	1.4	644	0	\$109,752.00	\$630.00	N/A
48	14-A	121	Hydrodynamic Device	Parking lot off 1st Ave.	A-14	0.8	385	0	\$109,752.00	\$630.00	N/A
48	16-B	129	Hydrodynamic Device	Oakwood Dr. and Washington St.	A-16	0.4	163	0	\$109,752.00	\$630.00	N/A
48	17-A	133	Hydrodynamic Device	Oakwood Dr.	A-17	0.6	244	0	\$109,752.00	\$630.00	N/A

¹ [(Probable Project Cost) + 30*(Annual O&M)] / [30*(Annual Volume Reduction)]

Appendix D – Soil Information

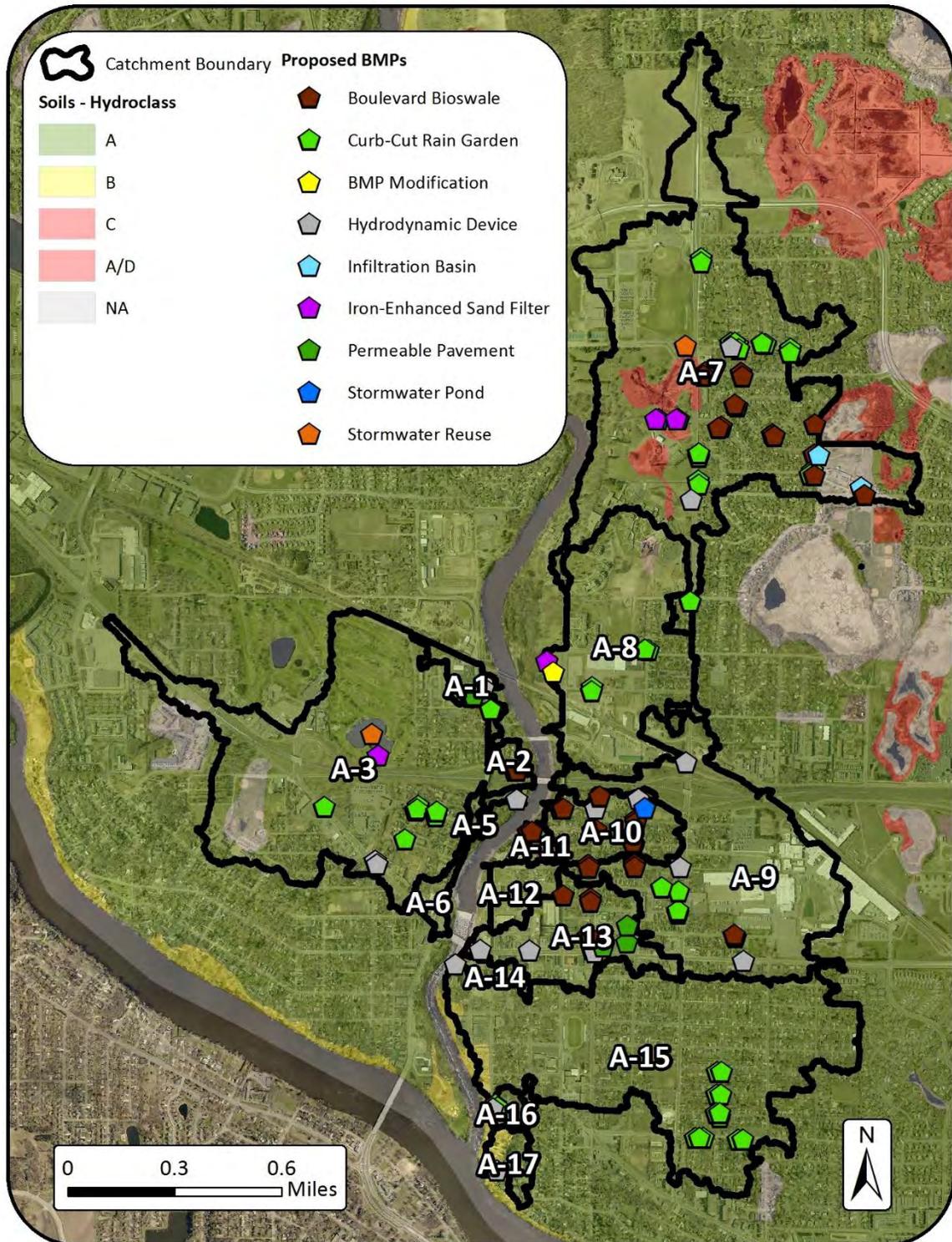


Figure 62: Soil hydroclass and proposed retrofit locations in the City of Anoka.

Appendix E – Wellhead Protection Areas

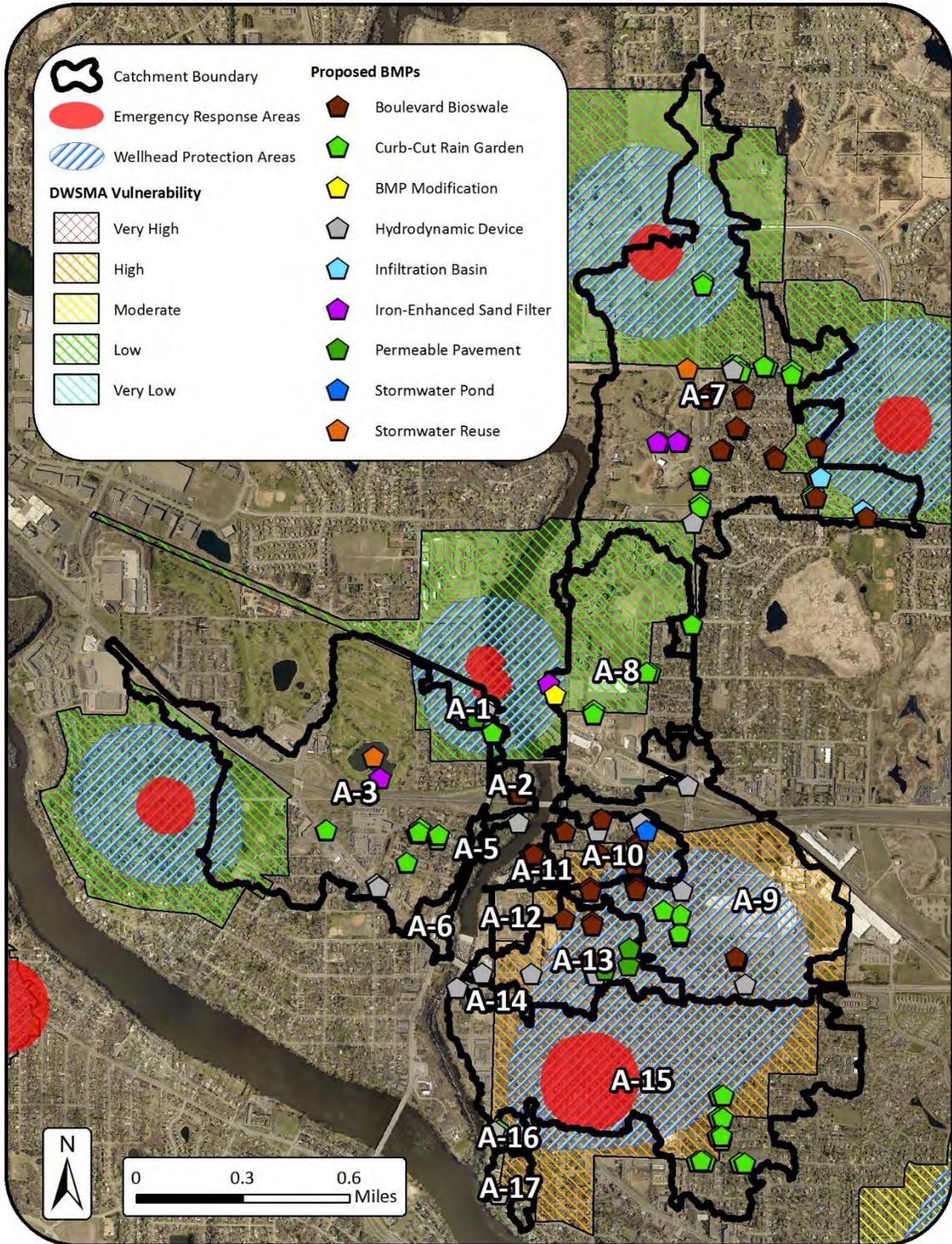


Figure 63: Wellhead protection areas and proposed retrofit locations in the City of Anoka.

APPENDIX D

LOWER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION
ANDOVER - ANOKA - RAMSEY
2015 First Avenue • Anoka, MN 55303

January 18, 2019

Mr. Ben Nelson
City of Anoka
2015 First Avenue
Anoka, MN 55303

Subject: LRRWMO Permit #2018-22 ~ Anoka Infiltration Credits ~ Anoka

Dear Mr. Nelson,

The LRRWMO, at its January 17, 2019 meeting, addressed the permit indicated above.

The Board has taken action to authorize the creation of excess volume retention credits as detailed in the enclosed Barr Engineering memorandum dated January 16, 2019.

If you have any questions regarding this process, please contact Mr. Obermeyer of Barr Engineering.

Sincerely,



Todd Haas
Chair

Attachments: Approved Permit 18-22
Barr Engineering Memo

cc: LRRWMO
Bob Obermeyer, Barr Engineering

Lower Rum River Watershed Management Organization ("LRRWMO")

Andover—Anoka—Ramsey
2015 First Avenue • Anoka, MN 55303

PERMIT APPLICATION

Permit # <u>18-22</u>

The \$100.00 application fee and the \$700.00 escrow deposit must accompany this permit application. Applications for projects involving wetlands and/or involving a Wetland Replacement Plans must include an additional \$75 application fee plus an escrow deposit as determined in accordance with Attachment D.

Permits are to be processed at the same time as the site plan, preliminary plat or other city land use or building application submitted to the city in which the work or project is located.

The permit and supporting documentation must be submitted to the LRRWMO by the **THIRD THURSDAY OF THE MONTH TO BE ON THE FOLLOWING REGULARLY SCHEDULED MONTHLY LRRWMO MEETING AGENDA. A PERMIT NUMBER WILL NOT BE ASSIGNED UNTIL CITY AUTHORIZATION IS RECEIVED.**

Project Name: Anoka Infiltration Credits

Address/Location: Multipliable Project Locations within City Limits

Project Description/Purpose: Infiltration Credits for Volume Control/Retention

Ben Nelson	
Name of Applicant (Site Owner or Property Owner)	
<u>2015 First Avenue</u>	
Address	
<u>Anoka, MN 55303</u>	
City, State, Zip	
<u>763-576-2980</u>	
Phone	Fax
<u>bnelson@ci.anoka.mn.us</u>	
Email	

Ben Nelson	City of Anoka
Applicant's Contact	Organization Name
<u>2015 First Avenue</u>	
Address	
<u>Anoka, MN 55303</u>	
City, State, Zip	
<u>763-576-2980</u>	
Phone	Fax
<u>bnelson@ci.anoka.mn.us</u>	
Email	

Submittal Requirements

Complete applications are to be submitted as per attachments A (Permit Requirements), B (Office Procedure), C (LRRWMO Permit Standards). Projects involving wetlands and/or involving a Wetland Replacement Plan have special notice requirements and require submittal of four copies (4) and an electronic copy of all wetland-related submittal materials.

PROJECT SUBMITTALS (check all that apply):

- | |
|--|
| <input type="checkbox"/> GRADING PLAN: Including existing and proposed contours and boundaries of all wetlands and surface waters. |
| <input type="checkbox"/> STORM SEWER/ DRAINAGE PLAN: Including all permanent drainage features and all permanent water quality features. |
| <input type="checkbox"/> STORM DRAINAGE CALCULATIONS: Design computations as required by the LRRWMO (see attachment C). |
| <input type="checkbox"/> EROSION CONTROL PLAN: Including all temporary measures proposed to retain all sediment on site. |
| <input type="checkbox"/> MITIGATION PLAN*/WETLAND DETERMINATION: Quality level of mitigated wetland(s) shall be determined by the LRRWMO. |
| <input type="checkbox"/> REQUEST FOR EXEMPTION UNDER THE WETLAND CONSERVATION ACT (WCA) |
| <input checked="" type="checkbox"/> OTHER <u>Memo</u> |

**NOTE: Four copies of permit submittals are required for projects involving wetland replacement plans.*

Lower Rum River Watershed Management Organization ("LRRWMO")

Andover—Anoka—Ramsey
2015 First Avenue • Anoka, MN 55303

START OF PROJECT: n/a

EST. COMPLETION DATE: n/a

APPROVAL DATE: 1/17/19

By signing this Permit Application, the undersigned consents and agrees on behalf of the Applicant that:

1. The permit application fee is non-refundable. Escrow deposits will be held by the LRRWMO until the project has been completed and all conditions of issuance of the permit are satisfied. The Applicant is responsible for all expenses incurred by the LRRWMO in the processing, administration and enforcement of the permit application and permit. The escrow deposit will be used to reimburse the LRRWMO for all expenses incurred by the LRRWMO in processing, administering and enforcing the permit application and permit, including engineering, legal and other consultant costs. If such expenses exceed the escrow deposit, the LRRWMO will bill the Applicant or Permittee for such excess amount and payment will be due within twenty (20) days of mailing the invoice. Timely payment of such invoices is a condition of all permits and work may be stopped on the project for failure to make payments when due.
2. The undersigned, its agents, principal, assigns and/or representatives (hereinafter "Permittee") shall abide by all the standard conditions and special terms and conditions of the LRRWMO.
3. Any work that violates the terms of the permit may result in the LRRWMO or the City in which the work is being done immediately causing the work on the project relating to the permit to cease and desist. All work on the project shall cease until the permit conditions are met and approved by the LRRWMO and/or the City in which the work is being done.
4. The Permittee agrees to be bound by the terms of the LRRWMO permit requirements, final permit, standard conditions, and special conditions required by the LRRWMO for approval of the permit. The undersigned has the authority to bind the permit holder, the owner of the property and/or any entity performing work on the property pursuant to the terms of LRRWMO permit, and shall be responsible for complying with terms of the LRRWMO permit.

"I certify that I have thoroughly read and understand the above information."

	12-21-2018		
Signature of property owner or designated Agent (no agent without a letter of authority)	Date	Signature of applicant if different from property owner	Date

Ben Nelson	
Print Signer's name	Print Signer's name

Application Acknowledged by City: 	Anoka	12-21-2018
Name of City Official	City	Date

SIGNATURE OF LRRWMO CHAIRMAN: ** 

****NOTE: Subject to conditions recommended by Bob Obermeyer, Barr Engineering (see attached)**

PERMIT IS NOT VALID IF PROJECT HAS NOT STARTED WITHIN ONE YEAR FROM DATE OF APPROVAL

Lower Rum River Watershed Management Organization

Andover–Anoka–Ramsey
2015 First Avenue; Anoka, MN 55303

To: Lower Rum River Water Management Organization
From: Barr Engineering Company
Date: Revised January 16, 2019
Re: Permit #2018-22: Anoka Infiltration Credits: Anoka

A LRRWMO permit application has been received for the review and comment of the City of Anoka's plan to create a bank for volume retention credits for compliance with LRRWMO requirements. The Kwik Trip project, Permit #2018-15, because of the fuel distribution proposed, the Minnesota Pollution Control Agency and LRRWMO criteria prohibits on-site volume retention by infiltration. The City of Anoka (City) has identified, in correspondence dated December 21, 2018, four projects that did not require a permit from the LRRWMO however on-site basins for stormwater management were constructed. Permits from the LRRWMO were not required for these projects since three were road reconstruction that did not trigger the one acre increase in impervious area and the other was a parking lot mill and overlay that does not require a permit. The constructed on-site basins therefore have excess retention volume available for banking. These sites are; 1) Tyler Street Alley, 2) City Hall North Parking Lot, 3) Sunny Acres Park and 4) State Avenue Reconstruction Project. The City is requesting that the volume credits be banked and used for future projects where volume retention because of site constraints cannot be provided on-site. This is similar to the commitment made by the City of Ramsey for projects in the Town Center that were located within a Drinking Water Supply Management Area (DWSMA) and would provide the volume retention required for these projects with a future municipal project. Anoka's December 21st submittal and e-mail correspondence dated January 16, 2019 from Hakanson Anderson identifies that approximately 10,933 cubic-feet of excess volume retention would be available for banking.

If acceptable to the LRRWMO and prior to establishment of these credits, it is recommended that as-built plans for these areas including documentation showing the basins are functioning as approved are provided to the LRRWMO.

LOWER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION
ANDOVER - ANOKA - RAMSEY
2015 First Avenue • Anoka, MN 55303

January 18, 2019

Mr. Steven Lowe slowe@kwiktrip.com
Kwik Trip, Inc.
1626 Oak Street
La Crosse, WI 54603-2308

Subject: LRRWMO Permit #2018-15 ~ Kwik Trip 1017 ~ Anoka

Dear Mr. Lowe,

The LRRWMO, at its January 17, 2019 meeting, addressed the permit indicated above.

The Board has taken action to approve the referenced permit application, subject to the seven (7) conditions, as detailed in the attached Barr Engineering memorandum dated January 10, 2019.

If you have any questions regarding this process, please contact Mr. Obermeyer of Barr Engineering.

Sincerely,



Todd Haas
Chair

Attachment: Approved Permit Application 18-15
Barr Engineering Memo 1/10/19

cc: Joseph Radach, Carlson McCain jradach@carlsonmccain.com
Ben Nelson, City of Anoka
LRRWMO

Lower Rum River Watershed Management Organization ("LRRWMO")

Andover—Anoka—Ramsey
2015 First Avenue • Anoka, MN 55303

START OF PROJECT: 7/22/2019

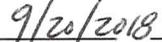
EST. COMPLETION DATE: 11/29/2019

APPROVAL DATE: 1/17/2019

By signing this Permit Application, the undersigned consents and agrees on behalf of the Applicant that:

1. The permit application fee is non-refundable. Escrow deposits will be held by the LRRWMO until the project has been completed and all conditions of issuance of the permit are satisfied. The Applicant is responsible for all expenses incurred by the LRRWMO in the processing, administration and enforcement of the permit application and permit. The escrow deposit will be used to reimburse the LRRWMO for all expenses incurred by the LRRWMO in processing, administering and enforcing the permit application and permit, including engineering, legal and other consultant costs. If such expenses exceed the escrow deposit, the LRRWMO will bill the Applicant or Permittee for such excess amount and payment will be due within twenty (20) days of mailing the invoice. Timely payment of such invoices is a condition of all permits and work may be stopped on the project for failure to make payments when due.
2. The undersigned, its agents, principal, assigns and/or representatives (hereinafter "Permittee") shall abide by all the standard conditions and special terms and conditions of the LRRWMO.
3. Any work that violates the terms of the permit may result in the LRRWMO or the City in which the work is being done immediately causing the work on the project relating to the permit to cease and desist. All work on the project shall cease until the permit conditions are met and approved by the LRRWMO and/or the City in which the work is being done.
4. The Permittee agrees to be bound by the terms of the LRRWMO permit requirements, final permit, standard conditions, and special conditions required by the LRRWMO for approval of the permit. The undersigned has the authority to bind the permit holder, the owner of the property and/or any entity performing work on the property pursuant to the terms of LRRWMO permit, and shall be responsible for complying with terms of the LRRWMO permit.

"I certify that I have thoroughly read and understand the above information."

	<u>9/20/2018</u>		Date
Signature of property owner or designated Agent (no agent without a letter of authority)	Date	Signature of applicant if different from property owner	Date

<u>STEVEN I. LOWE</u>	<u>Anoka</u>
Print Signer's name	Print Signer's name

Application Acknowledged by City:  Anoka 9/28/18
Name of City Official City Date

SIGNATURE OF LRRWMO CHAIRMAN: ** 

****NOTE: Subject to conditions recommended by Bob Obermeyer, Barr Engineering (see attached)**

PERMIT IS NOT VALID IF PROJECT HAS NOT STARTED WITHIN ONE YEAR FROM DATE OF APPROVAL

Lower Rum River Watershed Management Organization

Andover–Anoka–Ramsey
2015 First Avenue; Anoka, MN 55303

To: Lower Rum River Water Management Organization
From: Barr Engineering Company
Date: January 10, 2019
Re: Permit #2018-15: Kwik Trip: Anoka



We have received plans and a LRRWMO permit application for the construction of a Kwik Trip convenience store, car wash, and fueling station to be located in the northwest corner of 7th avenue and Buchanan Street in Anoka. The 4.1 acre site is currently undeveloped.

Because of the fuel distribution proposed, the Minnesota Pollution Control Agency and LRRWMO criteria prohibits on-site volume retention by infiltration. The City of Anoka (City) has stated, in correspondence dated December 21, 2018, that four constructed volume retention areas on projects approved by the LRRWMO once constructed have excess retention volume available. These site are; 1) Tyler Street Alley, 2) City Hall North Parking Lot, 3) Sunny Acres Park and 4) State Avenue Reconstruction Project. The City is requesting that the additional volume credits be banked and used for this and future projects where volume retention because of site constraints cannot be provided on-site. This is similar to the commitment made by the City of Ramsey for projects in the Town Center that were located within a Drinking Water Supply Management Area (DWSMA). Ramsey committed to provide the volume retention required for these projects with a future municipal project. Anoka's December 21st submittal identifies that approximately 3,795 cubic-feet of excess volume retention would be available for banking. Permit #2018-22 would establish this bank if approved by the LRRWMO.

For the Kwik Trip project, a volume retention required from 1-inch of runoff from the 2.23 acres (97,139 square feet) of proposed site impervious area is 8,095 cubic feet. An on-site lined stormwater basin is to be constructed to provide water quality management and rate control. The results of a P8 model indicates that the basin will provide an annual removal efficiency of 60% for total phosphorous and 90.5% annual removal efficiency of total suspended solids, complying with LRRWMO criteria.

The following table summarizes the existing and proposed discharges from the site the 2, 10, and 100-year frequency storm events leaving the site:

Frequency	Existing Discharge c.f.s.	Proposed Discharge c.f.s
2-Year	<1.0	<1.0
10-Year	1.0	<1.0
100-Year	5.6	2.6

The HydroCAD model shows the calculated 100-year frequency flood elevation of the proposed on-site basin as 870.6 M.S.L. The plans show the proposed finish floor elevation of the store as 876.0 M.S.L. and the car wash as 875.3 M.S.L. The required 2 feet of separation between the flood elevation of a basin and the finished floor elevation of riparian structures is met.

Silt fence at the limits of construction and a rock construction entrance are shown to be installed for erosion control during construction.

It is our recommendation that the LRRWMO approve of the permit for this project subject to the following conditions:

1. Erosion control measures need to be installed prior to the commencement of construction.
2. Upon completion of construction and restoration of disturbed areas, the permit applicant is responsible for the removal of all erosion control measures installed throughout the construction site.
3. To minimize the potential of material from leaving the site and being tracked onto the roadway, a rock filter dike being a minimum of two feet in height and having side slopes of 4:1 must be constructed at the entryway onto the site. The rock filter dike will provide an erosion control facility and also enable construction traffic to enter the site.
4. Street sweeping must be undertaken and completed on an as needed basis.
5. Compliance with the storm water management requirements of the Lower Rum River Watershed Management Organization are to be administered for this project by the City of Anoka.
6. The city of Anoka must provide documentation to the LRRWMO that the retention volume of 8,095 cubic feet required of this project to comply with LRRWMO criteria has been provided within two years (2021) of the issuance of this permit.
7. In all cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using, or damaging of any property, rights or interests of any other person or persons, or of any publicly owned lands or improvements or interests, the permittee; before proceeding; shall obtain the written consent of all persons, agencies, or authorities concerned, and shall acquire all necessary property rights and interest.



SEWER CONNECTION POLICY

Purpose

This policy sets forth the guidelines for properties that are replacing or repairing existing subsurface sewage treatment systems (SSTS).

Connection to City Sewer Required

Connection to the city sanitary service is required in the following circumstances when the cost of connection to the city sanitary service does not exceed 150% of the cost of installation of a new SSTS:

- When a residence is expanded to include new kitchen facilities, bathroom(s), and/or bedroom(s).
- When an SSTS is being replaced.
- When an SSTS is failing.
- When there is an immediate threat to health, safety and welfare from a failing SSTS.
- When a commercial property has a failing SSTS, unless connection is premature due to city plans or the need for a city project.

Determination of Connection

The City Public Services Department in consultation with the person authorized by the City to administer and enforce SSTS regulations shall determine the feasibility and need for connection to the city sanitary system. The decision shall be recorded in writing and shall be mailed to the property owner.

Appeal of Decision

The decision of staff can be appealed to the City Council.

Financial Assistance

Financial Assistance for connecting to the city sewer system is available in accordance with the Utility Service Repair Assessment Policy.

CHAPTER 38; ENVIRONMENTAL

ARTICLE III. Subsurface Sewage Treatment Systems (SSTS)*

*State law references--Individual sewage treatment systems, Minn. Stats. § 115.55 et seq.; local ordinances regulating individual sewage treatment systems, Minn. Stats. § 115.55, subd. 2.

Section 38-91. Purpose, Applicability, and Structure.

- (a) Purpose: The purpose and intent of this article is to establish standards for the design, location, construction, operation, and maintenance of Subsurface Sewage Treatment Systems. For the purposes of this Article, “Subsurface Sewage Treatment System” or “System”(both of which referred to interchangeably herein as “SSTS”) means a sewage treatment system, or part thereof, that uses subsurface soil treatment and disposal, or a holding tank, serving a dwelling, other establishment, or a group thereof.
- (b) Applicability. This ordinance shall apply to those sites or facilities that are licensed, permitted or otherwise regulated by City Ordinance. The sewer provisions of this ordinance shall also apply to any premises in the City that are not served by a sewage treatment system permitted by the Minnesota Pollution Control Agency.
- (c) Authority. This ordinance is adopted pursuant to the authorization and requirements contained in Minnesota Statutes Chapters 145.A.05; 115.55, and Minnesota Rules Chapter 7082.

Section 38-92. General Provisions.

- (a) Treatment Required. All sewage generated, in unsewered areas, shall be treated and dispersed by an approved SSTS or a system permitted by the Minnesota Pollution Control Agency.
- (b) Administrative Policy and Procedures. The provisions of Chapter 1, Article II of the City Code apply to the administration and enforcement of this Article, unless otherwise expressly provided for in this Article.
- (c) Administration. This Article shall be administered by the Anoka City Building Inspections Department, or its designee. The term “Department,” where used in this ordinance shall mean the Anoka City Building Inspections Department and/or its designee.
- (d) Compliance. No person shall cause or permit the location, construction, alteration, extension, conversion, operation or maintenance of an SSTS, except in full compliance with the provisions of this Article.
- (e) Conditions. Violations of any condition imposed by the City on a license, permit or variance, shall be subject to the penalty provisions set forth in this Article.
- (f) Site Evaluation, System Design, Construction, Inspection, and Servicing. Site evaluation, and System design, construction, inspection and System services shall be performed by Minnesota Pollution Control Agency licensed SSTS businesses or qualified employees of local governments, or persons exempt from licensing pursuant to Minnesota Rules 7083.0700. For lots platted after April 1, 1996, a design shall evaluate and locate space for a second soil treatment area.
- (g) Inspection. No part of an SSTS shall be covered until it has been inspected and approved by the Department. If any part of the System is covered before being inspected and approved as herein provided, it shall be uncovered upon the direction of the Department. The Department shall cause such inspections as are necessary to determine compliance with this Article. It shall be the responsibility of the permittee to notify the Department that the System is ready for inspection. If

the integrity of the System is threatened by adverse weather if left open, and the Department is unable to conduct an inspection, the permittee may, after receiving permission from the Department, document compliance with this Article by photographic means that show said compliance and submit that evidence to the Department prior to final approval being sought.

- (h) Compliance Inspection Required. An SSTS compliance inspection is required:
 - (1) For a new or replacement SSTS.
 - (2) When altering an existing structure to add a bedroom.
 - (3) When a parcel having an existing System undergoes development, subdivision or split.
- (i) Imminent Public Health and Safety Threat; Failing System; and Surface Discharge.
 - (1) An SSTS which poses an imminent threat to public health and safety shall be immediately abated according to instructions by the Department and be brought into compliance with this Article in accordance with a schedule established by the Department, which schedule shall not exceed ten (10) months.
 - (2) A failing System, or an SSTS that is not protective of the groundwater, shall be brought into compliance within twenty-four (24) months after receiving notice from the Department.
 - (3) An SSTS discharging raw or partially treated wastewater to ground surface or surface water is prohibited unless permitted under the National Pollution Discharge Elimination System (NPDES).
- (j) Conflict Resolution. For SSTS systems regulated under this Article, conflicts and other technical disputes over new construction, replacement and existing Systems will be managed in accordance with Anoka City Code.
- (k) Septic Tank Maintenance. The owner of a sewage (septic) tank, or tanks, shall regularly, but not less frequently than every three (3) years (unless approved by the Department due to limited use), inspect the tank(s) and measure the accumulations of sludge and scum. If the System is pumped, measurement is not needed. The owner shall remove and sanitarily dispose of septage whenever the top of the sludge layer is less than twelve (12) inches below the bottom of the outlet baffle or the bottom of the scum layer is less than three (3) inches above the outlet baffle. Removal of septage shall include complete removal of sludge and scum.
- (l) Non-Complying Systems. Existing Systems which are non-complying, but not an imminent health or safety threat, failing, or discharging to surface, may continue in use so long as the use is not changed or expanded. If the use changes or is expanded, the non-complying elements of the existing System must be brought into compliance.
- (m) Non-Complying Work. New SSTS construction that is non-compliant, or other work on a System that is non-complying, must be brought into compliance with this Article in accordance with a schedule established by the Department, which schedule shall not exceed seven (7) days unless the Department finds extenuating circumstances.
- (n) Change in Use. A Certificate of Compliance may be voided if, subsequent to the issuance of the certificate, the use of the premises or condition of the System has been changed or altered.
- (o) Setback Reduction. Where conditions prevent the construction, necessary alteration and/or repair of an SSTS on an existing developed parcel of real property, the Department may reduce property line and building setbacks and System sizing requirements, provided said reduction does not endanger or unreasonably infringe on adjacent properties and with the concurrence of the affected properties.

- (p) Floodplain. An SSTS shall not be located in a floodway or floodplain. Location within the flood fringe is permitted provided that the design complies with this Article and all of the rules and statutes incorporated by reference.
- (q) Class V Injection Wells. All owners of new or replacement SSTS that are considered to be Class V injection wells, as defined in the Code of Federal Regulations, title 40, part 144, are required by the Federal Government to submit SSTS inventory information to the Environmental Protection Agency (EPA).

Section 38-93. Standards adopted.

- (a) Minnesota Rules Adopted. Minnesota Rules, Chapters 7080 and 7081 that are in effect on the date of passage of this Article, related to SSTS, are hereby adopted by reference and made a part of this ordinance as if fully set forth herein.
- (b) Rules Amended. The rules adopted in Section 38-93(a) are amended as follows:
 - 1. Compliance Inspection – 15 Percent Vertical Separation Reduction. Minnesota Rules 7080.1500 Subp. 4D is amended to allow fifteen (15) percent reduction of vertical separation (separation distance no less than 30.6 inches) which may be determined to be compliant for existing Systems to account for settling and variable interpretation of soil characteristics.
- (c) Holding Tanks. Holding tanks may be allowed for the following applications: as replacement to a failing existing System, an SSTS that poses an imminent threat to public health and safety, or for an existing lot in which an SSTS cannot feasibly be installed and the Department finds extenuating circumstances.
- (d) System Abandonment. An SSTS, or component thereof, that is no longer intended to be used, must be abandoned in accordance with the adopted standards of this Article.

Section 38-94. Permits.

- (a) Permit Required. No person shall cause or allow the location, construction, alteration, extension, conversion, or modification of any SSTS without first obtaining a permit for such work from the Department. No person shall construct, alter, extend, convert, or modify any structure that is or will utilize an SSTS without first obtaining a permit.
 - (1) All work performed on an SSTS shall be done by an appropriately licensed business, qualified employees or persons exempt from licensing. Permit applications shall be submitted by the person doing the SSTS construction, repairs and maintenance on forms provided by the Department, and accompanied by required site and design date, and permit fees.
 - (2) Permits shall only be issued to the person doing the SSTS construction, repairs and/or maintenance.
 - (3) Permit applications for new and replacement SSTS shall include a management plan for the owner that includes a schedule for septic tank maintenance.
 - (4) A permit is not required for minor repairs or replacement of damaged or deteriorated components that do not alter the original function, change the treatment capacity, change the location of System components, or otherwise change the original System's design, layout or function.
- (b) Operating permit. An operating permit shall be required of all owners of new holding tanks, Type IV and V systems; MSTs and other SSTS that the Department has determined requires operational oversight.

- (1) Application. Application for an operating permit shall be made on a form provided by the Department.
- (2) Holding Tanks. The owner of holding tanks installed after the effective date of this Article shall provide the Department with a copy of a contract with a licensed sewage maintenance business for monitoring and removal of holding tank contents.

State law reference--Time limits to approve or deny written requests relating to septic system, MS. § 15.99.

Section 38-95. Violations and penalties.

- (a) Misdemeanor. Any person who fails to comply with the provisions of this Article may be charged with a misdemeanor, and upon conviction thereof, be subject to the penalties for such an offense as provided by law. Each day during or on which a violation occurs or continues shall constitute a separate offense.
- (b) Injunctive Relief. In the event of a violation or a threat of a violation of this Article, the Department may institute appropriate actions or proceedings to include injunctive relief to prevent, restrain, correct, or abate such violations or threatened violations; and the City attorney may institute a civil action.
- (c) Civil Action. In the event of a violation of this ordinance, the City may institute appropriate actions or proceedings to include injunctive relief to prevent, restrain, correct, or abate such violations, or threatened violations, and the City attorney may institute such action.

State law reference--Licensing of septic tank contractors, Minn. Stats. § 115.56.

Section 38-96. Fees.

Fees for permits required under this section shall be according to a fee schedule adopted by ordinance of the City Council.

Section 38-97. Unlawful Discharges.

- (a) Discharge of human and animal wastes. It shall be unlawful for any person to place, deposit, or permit to be deposited in any unsanitary manner on public or private property within the city, or in any area under the jurisdiction of the city, any human or animal excrement, garbage, or objectionable waste.
- (b) Discharges to natural outlets. It shall be unlawful to discharge to any natural outlet within the city, or in any area under the jurisdiction of the city, any wastewater or other polluted waters.

Section 38-98. Required Connection to Public Sewer.

- (a) Connection to sewer system required. The owner of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the city and abutting any street, alley, or right-of-way in which there is now located or may in the future be located a public sanitary sewer of the city, is hereby required, at the owner's expense, to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of this Article within one year after the date of due notice to do so.
 1. At such time as a public sewer becomes available to a property served by a nonconforming private sewage treatment system, a direct connection shall be made to the public sewer within thirty (30) days.
 2. At such time as a public sewer becomes available to a property served by a conforming

private sewage treatment system, a direct connection shall be made to the public sewer when a replacement private sewer system is required or upon site development.

3. Failure to connect to public system. If such connection is not made pursuant to this Article, the city shall enter into a contract with a licensed contractor to have the connection made, and the cost shall be assessed to the property taxes, unless authorized by the City Council to do otherwise.
- (b) Private systems permitted. Where a public sewer is not available under Section 38-97 (c) of this Article, the building sewer shall be connected to a private sewage treatment system as regulated by this Article and the State Plumbing code.

State law reference--Inspections, Minn. Stats. § 115.55, subd. 5.

Section 38-99 through 38-129. Reserved.

4715.0310 USE OF PUBLIC SEWER AND WATER SYSTEMS REQUIRED.

If a public sewer is accessible in a street or alley to a building or premises and the connection is feasible, liquid wastes from any plumbing system in that building must be discharged into the public sewer unless otherwise prohibited by this code or a local ordinance.

If a public water supply system is accessible, the water distribution system must be connected to it unless otherwise permitted by the administrative authority. A water well taken out of service because a person is connecting to a public water supply must either be maintained for a use such as irrigation, or sealed and abandoned in accordance with the Minnesota Water Well Construction Code. (Minnesota Rules, chapter 4725)

If either a public sewer or water supply system or both are not available, an individual water supply or sewage disposal system, or both, conforming to the published standards of the administrative authority must be provided.

Every building must have its own independent connection with a public or private sewer, except that a group of buildings may be connected to one or more manholes which are constructed on the premises, and connected to a public or private sewer. These manholes must conform to the standards set by the local sewer authority.

Statutory Authority: *MS s 16B.61; 326.37 to 326.45; 326B.106; 326B.43 to 326B.49*

History: *9 SR 1557; 15 SR 76; L 2007 c 140 art 4 s 61; art 6 s 15; art 13 s 4*

Published Electronically: *May 14, 2012*



Minnesota Pollution Control Agency

520 Lafayette Road North
St. Paul, MN 55155-4194

MS4 SWPPP Application for Reauthorization

for the NPDES/SDS General Small Municipal Separate Storm Sewer System (MS4) Permit MNR040000 reissued with an effective date of August 1, 2013
Stormwater Pollution Prevention Program (SWPPP) Document

Doc Type: Permit Application

Instructions: This application is for authorization to discharge stormwater associated with Municipal Separate Storm Sewer Systems (MS4s) under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit Program. **No fee** is required with the submittal of this application. Please refer to "Example" for detailed instructions found on the Minnesota Pollution Control Agency (MPCA) MS4 website at <http://www.pca.state.mn.us/ms4>.

Submittal: This MS4 SWPPP Application for Reauthorization form must be submitted electronically via e-mail to the MPCA at ms4permitprogram.pca@state.mn.us from the person that is duly authorized to certify this form. All questions with an asterisk (*) are required fields. All applications will be returned if required fields are not completed.

Questions: Contact Claudia Hochstein at 651-757-2881 or claudia.hochstein@state.mn.us, Dan Miller at 651-757-2246 or daniel.miller@state.mn.us, or call toll-free at 800-657-3864.

General Contact Information (*Required fields)

MS4 Owner (with ownership or operational responsibility, or control of the MS4)

*MS4 permittee name: City of Anoka *County: Anoka
(city, county, municipality, government agency or other entity)
*Mailing address: 2015 First Avenue North
*City: Anoka *State: MN *Zip code: 55303
*Phone (including area code): 763-576-2781 *E-mail: glee@ci.anoka.mn.us

MS4 General contact (with Stormwater Pollution Prevention Program [SWPPP] implementation responsibility)

*Last name: Lee *First name: Greg
(department head, MS4 coordinator, consultant, etc.)
*Title: Public Services Director
*Mailing address: 2015 First Avenue North
*City: Anoka *State: MN *Zip code: 55303
*Phone (including area code): 763-576-2781 *E-mail: glee@ci.anoka.mn.us

Preparer information (complete if SWPPP application is prepared by a party other than MS4 General contact)

Last name: Nelson First name: Shane
(department head, MS4 coordinator, consultant, etc.)
Title: Water Resource Engineer
Mailing address: 3601 Thurston Ave
City: Anoka State: MN Zip code: 55303
Phone (including area code): 763-852-0479 E-mail: shanen@haa-inc.com

Verification

1. I seek to continue discharging stormwater associated with a small MS4 after the effective date of this Permit, and shall submit this MS4 SWPPP Application for Reauthorization form, in accordance with the schedule in Appendix A, Table 1, with the SWPPP document completed in accordance with the Permit (Part II.D.). Yes
2. I have read and understand the NPDES/SDS MS4 General Permit and certify that we intend to comply with all requirements of the Permit. Yes

Certification (All fields are required)

- Yes - I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted.

I certify that based on my inquiry of the person, or persons, who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of civil and criminal penalties.

This certification is required by Minn. Stat. §§ 7001.0070 and 7001.0540. The authorized person with overall, MS4 legal responsibility must certify the application (principal executive officer or a ranking elected official).

By typing my name in the following box, I certify the above statements to be true and correct, to the best of my knowledge, and that this information can be used for the purpose of processing my application.

Name: Greg Lee
(This document has been electronically signed)

Title: Public Services Director Date (mm/dd/yyyy): 11/27/2013

Mailing address: 2015 First Avenue North

City: Anoka State: MN Zip code: 55303

Phone (including area code): 763-576-2781 E-mail: glee@ci.anoka.mn.us

Note: *The application will not be processed without certification.*

Stormwater Pollution Prevention Program Document

I. Partnerships: (Part II.D.1)

- A. List the **regulated small MS4(s)** with which you have established a partnership in order to satisfy one or more requirements of this Permit. Indicate which Minimum Control Measure (MCM) requirements or other program components that each partnership helps to accomplish (List all that apply). Check the box below if you currently have no established partnerships with other regulated MS4s. If you have more than five partnerships, hit the tab key after the last line to generate a new row.

No partnerships with regulated small MS4s

Name and description of partnership	MCM/Other permit requirements involved

- B. If you have additional information that you would like to communicate about your partnerships with other regulated small MS4(s), provide it in the space below, or include an attachment to the SWPPP Document, with the following file naming convention: *MS4NameHere_Partnerships*.

II. Description of Regulatory Mechanisms: (Part II.D.2)

Illicit discharges

- A. Do you have a regulatory mechanism(s) that effectively prohibits non-stormwater discharges into your small MS4, except those non-stormwater discharges authorized under the Permit (Part III.D.3.b.)? Yes No

1. If **yes**:

- a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

Ordinance Contract language
 Policy/Standards Permits
 Rules

Other, explain: The City has several ordinance provisions which effectively prohibit illicit discharges. In addition, the City has developed a Standard Operating Procedure for responding to suspected illicit discharges.

- b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

Citation:

Anoka City Code; Chapter 38; Environmental; Article II. Nuisances

Anoka City Code; Chapter 38; Environmental; Article III. Individual Septic Treatment System

Anoka City Code; Chapter 66; Utilities; Article III. Solid Waste Collection and Disposal

Direct link:

Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_IDDEreg*.

2. If **no**:

Describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date

permit coverage is extended, this permit requirement is met:

Although the City has existing ordinance provisions which may be used to prohibit illicit discharges, we are currently reviewing all of our stormwater related ordinances and will prepare revised ordinances for consideration and adoption in 2014. Concurrent with this SWPPP Document, the City has also been in the process of updating its Local Surface Water Management Plan, which is on a 10-year recurring schedule. Revisions to all stormwater related sections of the City Code will be written concurrently such that they can properly reference other sections as desired.

Construction site stormwater runoff control

A. Do you have a regulatory mechanism(s) that establishes requirements for erosion and sediment controls and waste controls? Yes No

1. If **yes**:

a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

- Ordinance Contract language
 Policy/Standards Permits
 Rules
 Other, explain: _____

b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

Citation:

Anoka City Code; Chapter 38; Environmental; Article V. Surface Water Management

Direct link:

Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_CSWreg.*

B. Is your regulatory mechanism at least as stringent as the MPCA general permit to Discharge Stormwater Associated with Construction Activity (as of the effective date of the MS4 Permit)? Yes No

If you answered **yes** to the above question, proceed to C.

If you answered **no** to either of the above permit requirements listed in A. or B., describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

We will revise our ordinances to be at least as stringent as the MPCA CSW program within 12 months of permit coverage.

C. Answer **yes** or **no** to indicate whether your regulatory mechanism(s) requires owners and operators of construction activity to develop site plans that incorporate the following erosion and sediment controls and waste controls as described in the Permit (Part III.D.4.a.(1)-(8)), and as listed below:

- | | |
|--|---|
| 1. Best Management Practices (BMPs) to minimize erosion. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 2. BMPs to minimize the discharge of sediment and other pollutants. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 3. BMPs for dewatering activities. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 4. Site inspections and records of rainfall events | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 5. BMP maintenance | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 6. Management of solid and hazardous wastes on each project site. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 7. Final stabilization upon the completion of construction activity, including the use of perennial vegetative cover on all exposed soils or other equivalent means. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| 8. Criteria for the use of temporary sediment basins. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

Draft amended ordinance consistent with permit requirements within 6 months of permit coverage.

Distribute for internal staff review, revise as necessary, within 7 months of permit coverage.

Review draft ordinance with Planning Commission (2 meetings anticipated) within 9 months of permit coverage.

First reading and public hearing with City Council within 10 months of permit coverage.

Address comments and provide to City Council for approval within 12 months of permit coverage.

Post-construction stormwater management

A. Do you have a regulatory mechanism(s) to address post-construction stormwater management activities?

Yes No

1. If **yes**:

a. Check which *type* of regulatory mechanism(s) your organization has (check all that apply):

- Ordinance Contract language
 Policy/Standards Permits
 Rules
 Other, explain: _____

b. Provide either a direct link to the mechanism selected above or attach it as an electronic document to this form; or if your regulatory mechanism is either an Ordinance or a Rule, you may provide a citation:

Citation:

Anoka City Code; Chapter 38; Environmental; Article V. Surface Water Management

Direct link:

Check here if attaching an electronic copy of your regulatory mechanism, with the following file naming convention: *MS4NameHere_PostCSWreg*.

B. Answer **yes** or **no** below to indicate whether you have a regulatory mechanism(s) in place that meets the following requirements as described in the Permit (Part III.D.5.a.):

1. **Site plan review:** Requirements that owners and/or operators of construction activity submit site plans with post-construction stormwater management BMPs to the permittee for review and approval, prior to start of construction activity. Yes No
2. **Conditions for post construction stormwater management:** Requires the use of any combination of BMPs, with highest preference given to Green Infrastructure techniques and practices (e.g., infiltration, evapotranspiration, reuse/harvesting, conservation design, urban forestry, green roofs, etc.), necessary to meet the following conditions on the site of a construction activity to the Maximum Extent Practicable (MEP):
 - a. For new development projects – no net increase from pre-project conditions (on an annual average basis) of: Yes No
 - 1) Stormwater discharge volume, unless precluded by the stormwater management limitations in the Permit (Part III.D.5.a(3)(a)).
 - 2) Stormwater discharges of Total Suspended Solids (TSS).
 - 3) Stormwater discharges of Total Phosphorus (TP).
 - b. For redevelopment projects – a net reduction from pre-project conditions (on an annual average basis) of: Yes No
 - 1) Stormwater discharge volume, unless precluded by the stormwater management limitations in the Permit (Part III.D.5.a(3)(a)).
 - 2) Stormwater discharges of TSS.
 - 3) Stormwater discharges of TP.
3. **Stormwater management limitations and exceptions:**
 - a. Limitations Yes No
 - 1) Prohibit the use of infiltration techniques to achieve the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)) when the infiltration structural stormwater BMP will receive discharges from, or be constructed in areas:
 - a) Where industrial facilities are not authorized to infiltrate industrial stormwater under an NPDES/SDS Industrial Stormwater Permit issued by the MPCA.
 - b) Where vehicle fueling and maintenance occur.
 - c) With less than three (3) feet of separation distance from the bottom of the infiltration system to the elevation of the seasonally saturated soils or the top of bedrock.
 - d) Where high levels of contaminants in soil or groundwater will be mobilized by the infiltrating stormwater.

- 2) Restrict the use of infiltration techniques to achieve the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)), without higher engineering review, sufficient to provide a functioning treatment system and prevent adverse impacts to groundwater, when the infiltration device will be constructed in areas:
- a) With predominately Hydrologic Soil Group D (clay) soils.
 - b) Within 1,000 feet up-gradient, or 100 feet down-gradient of active karst features.
 - c) Within a Drinking Water Supply Management Area (DWSMA) as defined in Minn. R. 4720.5100, subp. 13.
 - d) Where soil infiltration rates are more than 8.3 inches per hour.
- 3) For linear projects where the lack of right-of-way precludes the installation of volume control practices that meet the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)), the permittee's regulatory mechanism(s) may allow exceptions as described in the Permit (Part III.D.5.a(3)(b)). The permittee's regulatory mechanism(s) shall ensure that a reasonable attempt be made to obtain right-of-way during the project planning process.
4. **Mitigation provisions:** The permittee's regulatory mechanism(s) shall ensure that any stormwater discharges of TSS and/or TP not addressed on the site of the original construction activity are addressed through mitigation and, at a minimum, shall ensure the following requirements are met:
- a. Mitigation project areas are selected in the following order of preference:
 - 1) Locations that yield benefits to the same receiving water that receives runoff from the original construction activity.
 - 2) Locations within the same Minnesota Department of Natural Resource (DNR) catchment area as the original construction activity.
 - 3) Locations in the next adjacent DNR catchment area up-stream
 - 4) Locations anywhere within the permittee's jurisdiction.
 - b. Mitigation projects must involve the creation of new structural stormwater BMPs or the retrofit of existing structural stormwater BMPs, or the use of a properly designed regional structural stormwater BMP.
 - c. Routine maintenance of structural stormwater BMPs already required by this permit cannot be used to meet mitigation requirements of this part.
 - d. Mitigation projects shall be completed within 24 months after the start of the original construction activity.
 - e. The permittee shall determine, and document, who will be responsible for long-term maintenance on all mitigation projects of this part.
 - f. If the permittee receives payment from the owner and/or operator of a construction activity for mitigation purposes in lieu of the owner or operator of that construction activity meeting the conditions for post-construction stormwater management in Part III.D.5.a(2), the permittee shall apply any such payment received to a public stormwater project, and all projects must be in compliance with Part III.D.5.a(4)(a)-(e).
5. **Long-term maintenance of structural stormwater BMPs:** The permittee's regulatory mechanism(s) shall provide for the establishment of legal mechanisms between the permittee and owners or operators responsible for the long-term maintenance of structural stormwater BMPs not owned or operated by the permittee, that have been implemented to meet the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)). This only includes structural stormwater BMPs constructed after the effective date of this permit and that are directly connected to the permittee's MS4, and that are in the permittee's jurisdiction. The legal mechanism shall include provisions that, at a minimum:
- a. Allow the permittee to conduct inspections of structural stormwater BMPs not owned or operated by the permittee, perform necessary maintenance, and assess costs for those structural stormwater BMPs when the permittee determines that the owner and/or operator of that structural stormwater BMP has not conducted maintenance.
 - b. Include conditions that are designed to preserve the permittee's right to ensure maintenance responsibility, for structural stormwater BMPs not owned or operated by the permittee, when those responsibilities are legally transferred to another party.
 - c. Include conditions that are designed to protect/preserve structural stormwater BMPs and site features that are implemented to comply with the Permit (Part III.D.5.a(2)). If site configurations or structural stormwater BMPs change, causing decreased structural stormwater BMP effectiveness, new or improved structural stormwater BMPs must be implemented to ensure the conditions for post-construction stormwater management in the Permit (Part III.D.5.a(2)) continue to be met.

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within twelve (12) months of the date permit coverage is extended, these permit requirements are met:

Draft amended ordinance consistent with permit requirements within 6 months of permit coverage.

Distribute for internal staff review, revise as necessary, within 7 months of permit coverage.

Review draft ordinance with Planning Commission (2 meetings anticipated) within 9 months of permit coverage.

First reading and public hearing with City Council within 10 months of permit coverage.

Address comments and provide to City Council for approval within 12 months of permit coverage

III. Enforcement Response Procedures (ERPs): (Part II.D.3)

- A. Do you have existing ERPs that satisfy the requirements of the Permit (Part III.B.)? Yes No
1. If **yes**, attach them to this form as an electronic document, with the following file naming convention: *MS4NameHere_ERPs*.
 2. If **no**, describe the tasks and corresponding schedules that will be taken to assure that, with twelve (12) months of the date permit coverage is extended, these permit requirements are met:
Meet with appropriate City departments to discuss current procedures and identify gaps, if any. Document Enforcement Response Procedures in writing within 12 months of permit coverage.
- B. Describe your ERPs:

IV. Storm Sewer System Map and Inventory: (Part II.D.4.)

- A. Describe how you manage your storm sewer system map and inventory:
The storm sewer map is in electronic (GIS) form. When new projects are constructed, the map is updated if needed to reflect any changes to the system.
- B. Answer **yes** or **no** to indicate whether your storm sewer system map addresses the following requirements from the Permit (Part III.C.1.a-d), as listed below:
1. The permittee's entire small MS4 as a goal, but at a minimum, all pipes 12 inches or greater in diameter, including stormwater flow direction in those pipes. Yes No
 2. Outfalls, including a unique identification (ID) number assigned by the permittee, and an associated geographic coordinate. Yes No
 3. Structural stormwater BMPs that are part of the permittee's small MS4. Yes No
 4. All receiving waters. Yes No
- If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:
- C. Answer **yes** or **no** to indicate whether you have completed the requirements of 2009 Minnesota Session Law, Ch. 172. Sec. 28: with the following inventories, according to the specifications of the Permit (Part III.C.2.a.-b.), including:
1. All ponds within the permittee's jurisdiction that are constructed and operated for purposes of water quality treatment, stormwater detention, and flood control, and that are used for the collection of stormwater via constructed conveyances. Yes No
 2. All wetlands and lakes, within the permittee's jurisdiction, that collect stormwater via constructed conveyances. Yes No
- D. Answer **yes** or **no** to indicate whether you have completed the following information for each feature inventoried.
1. A unique identification (ID) number assigned by the permittee. Yes No
 2. A geographic coordinate. Yes No
 3. Type of feature (e.g., pond, wetland, or lake). This may be determined by using best professional judgment. Yes No

If you have answered **yes** to all above requirements, and you have already submitted the Pond Inventory Form to the MPCA, then you do not need to resubmit the inventory form below.

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

Complete inventory within 12 months as required

- E. Answer **yes** or **no** to indicate if you are attaching your pond, wetland and lake inventory to the MPCA Yes No on the form provided on the MPCA website at: <http://www.pca.state.mn.us/ms4>, according to the specifications of Permit (Part III.C.2.b.(1)-(3)). Attach with the following file naming convention: *MS4NameHere_inventory*.

If you answered **no**, the inventory form must be submitted to the MPCA MS4 Permit Program within 12 months of the date permit coverage is extended.

V. Minimum Control Measures (MCMs) (Part II.D.5)

A. MCM1: Public education and outreach

- The Permit requires that, within 12 months of the date permit coverage is extended, existing permittees revise their education and outreach program that focuses on illicit discharge recognition and reporting, as well as other specifically selected stormwater-related issue(s) of high priority to the permittee during this permit term. Describe your **current** educational program, including **any high-priority topics included**:

The City of Anoka primarily educates the public via the stormwater page on the City website, handouts available at City hall, and newspaper articles. We currently focus on urban BMP's including: Keeping yard waste and trash out of the storm sewer system, illicit discharge detection and reporting, picking up pet waste, proper irrigation of lawn, testing soil for proper fertilizer application, and soil erosion.

- List the categories of BMPs that address your public education and outreach program, including the distribution of educational materials and a program implementation plan. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the U.S. Environmental Protection Agency's (EPA) *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>).

If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Distribute flyers and brochures	Number of flyers and brochures distributed annually.
Stormwater Web Page	Number of times viewed annually.
Newsletter articles	Number of articles published annually.
BMP categories to be implemented	Measurable goals and timeframes
Review and revise program if necessary to focus on high priority topics	Number of topics identified and number of education materials developed. Within 12 months of permit coverage.

- Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

Public Services Director

B. MCM2: Public participation and involvement

- The Permit (Part III.D.2.a.) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement a public participation/involvement program to solicit public input on the SWPPP. Describe your current program:

A meeting is held every year to solicit public comment on our SWPPP.

- List the categories of BMPs that address your public participation/involvement program, including solicitation and documentation of public input on the SWPPP. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Annual public meeting	Number of interested parties that provide comments, annually.
Public Notice	Separate Public Notice in local paper 30 days in advance of meeting.
BMP categories to be implemented	Measurable goals and timeframes
Public Notice	Revise to use same public noticing requirements as other agenda items within 12 months of permit coverage.

- Do you have a process for receiving and documenting citizen input? Yes No
 If you answered **no** to the above permit requirement, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, this permit requirement is met:

- Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:
Public Services Director

C. MCM 3: Illicit discharge detection and elimination

- The Permit (Part III.D.3.) requires that, within 12 months of the date permit coverage is extended, existing permittees revise their current program as necessary, and continue to implement and enforce a program to detect and eliminate illicit discharges into the small MS4. Describe your current program:
Our current program utilizes dry weather inspections to look for illicit discharges. If an illicit discharge is suspected, further investigation and tracking is performed. During inspections, staff is on the lookout for unusual colors and odors, foamy or soapy looking surface waters, sheens, and discharges during dry weather periods.
- Does your Illicit Discharge Detection and Elimination Program meet the following requirements, as found in the Permit (Part III.D.3.c.-g.)?
 - Incorporation of illicit discharge detection into all inspection and maintenance activities conducted under the Permit (Part III.D.6.e.-f.) Where feasible, illicit discharge inspections shall be conducted during dry-weather conditions (e.g., periods of 72 or more hours of no precipitation). Yes No
 - Detecting and tracking the source of illicit discharges using visual inspections. The permittee may also include use of mobile cameras, collecting and analyzing water samples, and/or other detailed procedures that may be effective investigative tools. Yes No
 - Training of all field staff, in accordance with the requirements of the Permit (Part III.D.6.g.(2)), in illicit discharge recognition (including conditions which could cause illicit discharges), and reporting illicit discharges for further investigation. Yes No
 - Identification of priority areas likely to have illicit discharges, including at a minimum, evaluating land use associated with business/industrial activities, areas where illicit discharges have been identified in the past, and areas with storage of large quantities of significant materials that could result in an illicit discharge. Yes No

- e. Procedures for the timely response to known, suspected, and reported illicit discharges. Yes No
- f. Procedures for investigating, locating, and eliminating the source of illicit discharges. Yes No
- g. Procedures for responding to spills, including emergency response procedures to prevent spills from entering the small MS4. The procedures shall also include the immediate notification of the Minnesota Department of Public Safety Duty Officer, if the source of the illicit discharge is a spill or leak as defined in Minn. Stat. § 115.061. Yes No
- h. When the source of the illicit discharge is found, the permittee shall use the ERPs required by the Permit (Part III.B.) to eliminate the illicit discharge and require any needed corrective action(s). Yes No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

Incorporate training for all field staff and convert Standard Operating Procedure into an Enforcement Response Procedure within 12 months of permit coverage.

3. List the categories of BMPs that address your illicit discharge, detection and elimination program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>).

If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Storm Sewer Map	Percentage of storm sewer and treatment BMPs mapped. Available for tracking an illicit discharge if discovered. Update annually as necessary to keep current.
Regulatory Control Program	Review our ordinance annually and as potential illicit discharges are investigated to ensure that it continues to address the permit requirements.
Inspections	Annual outfall inspections to ensure that no illicit discharges are present. If discharges are found during dry weather, or if any other indicators are observed, tracking of suspected illicit discharge to identify and further investigate the source.
Training	Engineering staff and consultants are trained in spotting and handling illicit discharges. Continuing education on an annual basis.
Education	We have developed an illicit discharge flyer that is available at City hall.
BMP categories to be implemented	Measurable goals and timeframes
Regulatory Control Program	Revise ordinances in conjunction with all other ordinance revisions within 12 months of permit coverage.

4. Do you have procedures for record-keeping within your Illicit Discharge Detection and Elimination (IDDE) program as specified within the Permit (Part III.D.3.h.)? Yes No

If you answered **no**, indicate how you will develop procedures for record-keeping of your Illicit Discharge, Detection and Elimination Program, within 12 months of the date permit coverage is extended:

5. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

Public Services Director

D. MCM 4: Construction site stormwater runoff control

1. The Permit (Part III.D.4) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement and enforce a construction site stormwater runoff control program. Describe your current program:

A Land Disturbance and Erosion Control Plan (LDECP) is required for all sites that disturb 10,000 square feet or more. City staff reviews all LDECP's to ensure that proper erosion and sediment controls are proposed. All sites greater than 1 acre also require a permit and review from the Lower Rum River WMO. Before the land disturbance can begin a security must be posted with the City. During construction, sites are inspected to ensure conformance with City code and the permit.

2. Does your program address the following BMPs for construction stormwater erosion and sediment control as required in the Permit (Part III.D.4.b.):
- a. Have you established written procedures for site plan reviews that you conduct prior to the start of construction activity? Yes No
 - b. Does the site plan review procedure include notification to owners and operators proposing construction activity that they need to apply for and obtain coverage under the MPCA's general permit to *Discharge Stormwater Associated with Construction Activity No. MN R100001*? Yes No
 - c. Does your program include written procedures for receipt and consideration of reports of noncompliance or other stormwater related information on construction activity submitted by the public to the permittee? Yes No
 - d. Have you included written procedures for the following aspects of site inspections to determine compliance with your regulatory mechanism(s):
 - 1) Does your program include procedures for identifying priority sites for inspection? Yes No
 - 2) Does your program identify a frequency at which you will conduct construction site inspections? Yes No
 - 3) Does your program identify the names of individual(s) or position titles of those responsible for conducting construction site inspections? Yes No
 - 4) Does your program include a checklist or other written means to document construction site inspections when determining compliance? Yes No
 - e. Does your program document and retain construction project name, location, total acreage to be disturbed, and owner/operator information? Yes No
 - f. Does your program document stormwater-related comments and/or supporting information used to determine project approval or denial? Yes No
 - g. Does your program retain construction site inspection checklists or other written materials used to document site inspections? Yes No

If you answered **no** to any of the above permit requirements, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met.

We will compile our current inspection practices and develop written procedures for priority sites for inspection. In general, the priority sites will be all sites that are in close proximity to a surface waters, and/or are directly connected by the storm sewer system to a surface water, or has high potential for soil erosion. Our written procedures will include inspection frequency, name or title of individuals responsible for completing inspections, and checklists (electronic or paper) to be utilized when performing inspections. As a goal, we will compile our existing procedures within 6 months such that the revised program will be complete within 12 months of permit coverage.

3. List the categories of BMPs that address your construction site stormwater runoff control program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Land Disturbance Permit Program	Review and process all complete permits within 30 days of receipt.
Inspections	Most major projects within the City have a resident inspector on-site and are inspected daily and within 24 hours of a ½" or greater rain.
Ordinance	Chapter 38 of the City Code includes the provisions for the Erosion and Sediment Control Program. Review annually to ensure that it continues to address City's needs.
Education	We have developed a flyer that is available at City hall. Review annually and update if necessary.

BMP categories to be implemented	Measurable goals and timeframes
Written Program	Update our existing program to meet the MPCA General Permit requirements and capture in written form within 12 months of permit coverage.
Ordinance	Review ordinance within 6 months of permit coverage and revise within 12 months of permit coverage.
Checklist	Develop a checklist for site reviews and site inspections within 12 months of permit coverage.

4. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

Public Services Director

E. MCM 5: Post-construction stormwater management

1. The Permit (Part III.D.5.) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement and enforce a post-construction stormwater management program. Describe your current program:

We have a Surface Water Management ordinance that requires permanent stormwater facilities for new development and re-development. In addition, we have our Local Surface Water Management Plan which guides our decisions as they relate to permanent stormwater facilities. The City collects a stormwater utility fee which provides a funding source for ensuring long term operation of all City owned BMPs.

2. Have you established written procedures for site plan reviews that you will conduct prior to the start of construction activity? Yes No
3. Answer **yes** or **no** to indicate whether you have the following listed procedures for documentation of post-construction stormwater management according to the specifications of Permit (Part III.D.5.c.):
- a. Any supporting documentation that you use to determine compliance with the Permit (Part III.D.5.a), including the project name, location, owner and operator of the construction activity, any checklists used for conducting site plan reviews, and any calculations used to determine compliance? Yes No
- b. All supporting documentation associated with mitigation projects that you authorize? Yes No
- c. Payments received and used in accordance with Permit (Part III.D.5.a.(4)(f))? Yes No
- d. All legal mechanisms drafted in accordance with the Permit (Part III.D.5.a.(5)), including date(s) of the agreement(s) and names of all responsible parties involved? Yes No

If you answered **no** to any of the above permit requirements, describe the steps that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met.

Since Anoka is mostly developed, there may not be many locations where traditional mitigation or fee-in-lieu projects could be developed. Therefore, it will be necessary to thoroughly review the possible program structure and feasibility prior to implementing. Due to the potential challenges, it will be necessary to begin studying mitigation and fee-in-lieu programs within 2 months of permit coverage, such that a program can be developed within 12 months of permit coverage. A standard Maintenance Agreement will be developed and our program will be revised to include all permit requirements within 12 months of permit coverage.

4. List the categories of BMPs that address your post-construction stormwater management program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. Refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>). **If you have more than five categories**, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Ordinance	Chapter 38 of the City Code includes provisions for permanent stormwater management.
Local Surface Water Management Plan	Serves as a guide document in reviewing site plans, revise

	every 10 years.
Site Plan Review	All projects and calculations are reviewed within 30 days to ensure that proposed permanent stormwater BMPs meet City Code and Local Surface Water Management Plan requirements.
Security	A security is required to ensure that private site developers construct permanent facilities in accordance with approved plans and specifications. Security is required before project can begin.
Inspections	At least one inspection preformed during construction to ensure that permanent stormwater facilities are constructed in accordance with approved plans and specifications.
As-Built Plans	As-Built plans must be submitted at the end of the project to certify as-built conditions. Required prior to releasing security.
Available Resources	Utilize available resources such as the MN Stormwater Manual to ensure that proposed designs conform to best practices, as projects are proposed.
BMP categories to be implemented	Measurable goals and timeframes
Ordinance Revisions	Update ordinances within 12 months of permit coverage to meet current permit requirements.
Mitigation and Fee-in-lieu provisions	Consider possible mitigation and fee-in-lieu programs within 12 months of permit coverage to provide alternatives to sites with restrictions.
Permanent Maintenance Provisions	Require developers to enter into a Maintenance Agreement consistent with permit requirements for all new projects to ensure long term maintenance of BMP's, within 12 months of permit coverage.

5. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

Public Services Director

F. MCM 6: Pollution prevention/good housekeeping for municipal operations

1. The Permit (Part III.D.6.) requires that, within 12 months of the date permit coverage is extended, existing permittees shall revise their current program, as necessary, and continue to implement an operations and maintenance program that prevents or reduces the discharge of pollutants from the permittee owned/operated facilities and operations to the small MS4. Describe your current program:

We routinely inspect, maintain and repair our stormwater infrastructure to ensure that it continues to operate properly. Our structural pollution control devices are inspected annually and maintenance performed if needed. In addition, we complete our pond and outfall inspections annually and schedule any necessary repairs or maintenance. We sweep the streets using a regenerative vacuum sweeper in the spring of each year to prevent the sediment and organic matter from entering our stormwater system and surface waters. Our grounds and landscaping staff implement best management practices in their daily duties to reduce the water quality impacts to the MEP. Our fleet and building maintenance staff take care in the storage and use of significant materials to minimize the possibility of spills and washing into our stormwater system.

2. Do you have a facilities inventory as outlined in the Permit (Part III.D.6.a.)? Yes No
3. If you answered **no** to the above permit requirement in question 2, describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, this permit requirement is met:

We will complete our facilities inventory within 12 months of permit coverage.

4. List the categories of BMPs that address your pollution prevention/good housekeeping for municipal operations program. Use the first table for categories of BMPs that you have established and the second table for categories of BMPs that you plan to implement over the course of the permit term.

Include the measurable goals with appropriate timeframes that each BMP category will be implemented and completed. In

addition, provide interim milestones and the frequency of action in which the permittee will implement and/or maintain the BMPs. For an explanation of measurable goals, refer to the EPA's *Measurable Goals Guidance for Phase II Small MS4s* (<http://www.epa.gov/npdes/pubs/measurablegoals.pdf>).

If you have more than five categories, hit the tab key after the last line to generate a new row.

Established BMP categories	Measurable goals and timeframes
Municipal Operations Training Program	Provide annual training to City grounds and maintenance staff, fleet and building maintenance staff, street maintenance staff and storm sewer maintenance staff.
Street Sweeping	Sweep streets at least once annually and more often in priority areas.
Inspections of Structural Pollution Control Devices	Perform inspections and cleaning on an annual basis as needed.
Inspection of ponds and outfalls	Inspections conducted each year to look for proper operation as well as illicit discharges.
Inspection of exposed stockpiles and material storage handling areas	Conduct annual inspections.
Inspection Follow Up	Each year, review inspection results and determine whether repair, replacement or maintenance measures are necessary.
Record Keeping	The City currently utilizes a GIS tracking system for outfall and pond inspections, updated annually as inspections are performed.
BMP categories to be implemented	Measurable goals and timeframes
Facilities Inventory	Complete within 12 months of permit coverage.

5. Does discharge from your MS4 affect a Source Water Protection Area (Permit Part III.D.6.c.)? Yes No
- a. If **no**, continue to 6.
- b. If **yes**, the Minnesota Department of Health (MDH) is in the process of mapping the following items. Maps are available at <http://www.health.state.mn.us/divs/eh/water/swp/maps/index.htm>. Is a map including the following items available for your MS4:
- 1) Wells and source waters for drinking water supply management areas identified as vulnerable under Minn. R. 4720.5205, 4720.5210, and 4720.5330? Yes No
- 2) Source water protection areas for surface intakes identified in the source water assessments conducted by or for the Minnesota Department of Health under the federal Safe Drinking Water Act, U.S.C. §§ 300j – 13? Yes No
- c. Have you developed and implemented BMPs to protect any of the above drinking water sources? Yes No
6. Have you developed procedures and a schedule for the purpose of determining the TSS and TP treatment effectiveness of all permittee owned/operated ponds constructed and used for the collection and treatment of stormwater, according to the Permit (Part III.D.6.d.)? Yes No
7. Do you have inspection procedures that meet the requirements of the Permit (Part III.D.6.e.(1)-(3)) for structural stormwater BMPs, ponds and outfalls, and stockpile, storage and material handling areas? Yes No
8. Have you developed and implemented a stormwater management training program commensurate with each employee's job duties that:
- a. Addresses the importance of protecting water quality? Yes No
- b. Covers the requirements of the permit relevant to the duties of the employee? Yes No
- c. Includes a schedule that establishes initial training for new and/or seasonal employees and recurring training intervals for existing employees to address changes in procedures, Yes No

practices, techniques, or requirements?

9. Do you keep documentation of inspections, maintenance, and training as required by the Permit (Part III.D.6.h.(1)-(5))? Yes No

If you answered **no** to any of the above permit requirements listed in **Questions 5 – 9**, then describe the tasks and corresponding schedules that will be taken to assure that, within 12 months of the date permit coverage is extended, these permit requirements are met:

We will update our inspection frequency for stockpiles to quarterly as required by the permit within 12 months of permit coverage We will update our training program to include a schedule for new and/or seasonal employees and ensure that it encompasses all current permit requirements within 12 months of permit coverage.

10. Provide the name or the position title of the individual(s) who is responsible for implementing and/or coordinating this MCM:

Public Services Director

VI. Compliance Schedule for an Approved Total Maximum Daily Load (TMDL) with an Applicable Waste Load Allocation (WLA) (Part II.D.6.)

- A. Do you have an approved TMDL with a Waste Load Allocation (WLA) prior to the effective date of the Permit? Yes No

1. If **no**, continue to section VII.
2. If **yes**, fill out and attach the MS4 Permit TMDL Attachment Spreadsheet with the following naming convention: *MS4NameHere_TMDL*.

This form is found on the MPCA MS4 website: <http://www.pca.state.mn.us/ms4>.

VII. Alum or Ferric Chloride Phosphorus Treatment Systems (Part II.D.7.)

- A. Do you own and/or operate any Alum or Ferric Chloride Phosphorus Treatment Systems which are regulated by this Permit (Part III.F.)? Yes No

1. If **no**, this section requires no further information.
2. If **yes**, you own and/or operate an Alum or Ferric Chloride Phosphorus Treatment System within your small MS4, then you must submit the Alum or Ferric Chloride Phosphorus Treatment Systems Form supplement to this document, with the following naming convention: *MS4NameHere_TreatmentSystem*.

This form is found on the MPCA MS4 website: <http://www.pca.state.mn.us/ms4>.

VIII. Add any Additional Comments to Describe Your Program