Agenda
City Council Work Session
City of Edina, Minnesota
Community Room, City Hall

Wednesday, August 3, 2022
5:30 PM

I. Call To Order

II. Roll Call

III. Flood Risk Reduction Strategy

IV. Clean Water Strategy

V. Adjournment

The City of Edina wants all residents to be comfortable being part of the public process. If you need assistance in the way of hearing amplification, an interpreter, large-print documents or something else, please call 952-927-8861 72 hours in advance of the meeting.

CITY OF EDINA

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Edina, MN 55424
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Date: August 3, 2022

Agenda Item #: III.

To: Mayor and City Council

Item Type: Other

From: Ross Bintner P.E., Engineering Services Manager

Item Activity: Discussion, Information

Subject: Flood Risk Reduction Strategy

ACTION REQUESTED:
No Action Requested

Staff will present a report about the Flood Risk Reduction Strategy.

INTRODUCTION:
See attached report for Flood Risk Reduction Strategy, a review of two years of implementation since the adoption by Council.

ATTACHMENTS:

Staff Report
FRRS Appendix H notes
Flood Project Map
Staff Presentation

STAFF REPORT

Date: August 3, 2022

To: CITY COUNCIL

From: Ross Bintner P.E., Engineering Services Manager

Subject: Flood Risk Reduction Strategy – Report

Information / Background:

On April 7, 2020 the City Council considered and approved the Flood Risk Reduction Strategy and ordered a major amendment to the Water Resources Management Plan. The purpose of this report is to provide an update to the first two years of implementation of the Flood Risk Reduction Strategy, present staff recommendations for the 2023-2028 Capital Improvement Plan (CIP) and preview the major amendment to the WRMP.

This report will provide a high-level review of implementation for the Flood Risk Reduction Strategy, provide specific recent examples of progress and outcomes in the four areas of work, and preview next steps in Council policy setting that support the strategy to comprehensively reduce the risk of flooding throughout the community

Review of implementation

A major amendment to Water Resources Management Plan is forthcoming in the next month and includes new assessments of risk, options for capital improvement, and program descriptions and policy for the flood service of the surface water utility. The review will begin with a Council presentation and request by staff to submit the major amendment for agency review. The draft plan's concepts for flood infrastructure and risk assessments for flood areas and flow paths have informed our work small and large, from specific residential permits to the staff capital improvement recommendations. CIP recommendations for the next major flood infrastructure projects will be discussed in greater detail in the sections below.

Progress in four areas of work

The Flood Risk Reduction Strategy (FRRS) detailed four areas of work for flood risk reduction in the City organization. Below is a list and context for specific recent examples of progress and outcomes. Also attached are notes on Appendix H of the FRRS, a prioritization exercise by the FRRS task force that include summary of high priority work completed or forthcoming.

Infrastructure

Much of the recent focus in the Engineering group has been with the design, permitting, public engagement, approval, and construction of the Morningside Flood Infrastructure Project (MFIP), the first major neighborhood scale-flood infrastructure project. The group has also incorporated minor pipe changes into the recon process, such as the Melody Lake A & B project.

Three quick wins practiced by the MFIP are recommended to go citywide: #1 2D modeling and visualization of flood flow as part of the upcoming WRMP and model updates, and as a priority in the next CIP, #2 optimization and smart infrastructure for key flood storage and pumping system components, and #3 flood flow optimization where relatively minor overflow grading and pipe constraints projects can provide flood exposure reduction either paired with storage optimization, or where minimal tradeoffs occur.

Another infrastructure area of work seeing progress is the addition of staff resources in the utility and streets group of the Public Works budget. These groups work supports street sweeping and other storm and sanitary maintenance and operations to better maintain our existing storm system and controlling the source of clogs and backups.

Regulation

In late 2021, the Planning Commission and Council set an ordinance limiting the impervious for the residential single-family zone to 50% and removed variance requirements for redevelopment of regional flood affected properties. Staff plans to propose a clean-up to expand the removal of variance requirements to local flood affected properties in the next year.

Regulation of low floor, low opening, and the awareness of specific flood exposure areas affect commercial, multiuse, and multifamily development. This awareness and the low floor low opening policy in the WRMP allow developers and the city to reduce existing and future flood exposure. Specific recent examples have been noted in the engineering development review for a variety of proposed and active redevelopment projects. (Examples include 4040 70th, Lifetime Living, 7001 France, and The Fred apartments)

Permit volume for review is steady over the past two years. Engineering typically reviews about 200-300 permits per year for grading, erosion and sediment controls, stormwater and drainage. The majority of the permit volume is single family rebuilds, additions, and landscaping with few major commercial or grading permits making up the remainder.

Each of these permit reviews can reduce flood exposure and vulnerability citywide. Change in city flood exposure model information is immediately transferred to decisions at the site level as redevelopment is undertaken. While we still do not model and regulate to a probable future flood elevation, we use freeboard standards to add a future factor of safety to the low opening and low floor elevations of redeveloped and new structures.

Outreach and Engagement

In addition to the outreach and engagement of the MFIP and other infrastructure project, the residential permitting and variance applications puts engineering and building group inspectors in contact with residents and business owners with specific drainage issues and concerns. The FRRS has provide a common language and oriented staff technical support to help build community capacity to solve problems and reduce risk. Engineering staff is not tracking specific numbers for in-person outreach.

More 'retail' outreach is also available in the form of the interactive flood risk mapping, flood fact sheets, and more available on the Edina Flood Resource website. Total views, uses and downloads for 2020 and 2021 are provided below. In the future we hope to track view and downloads on a per-resource basis.

Resource	2020 View/downloads	2021 View/downloads
Flood Resource Page	2473	1267
GIS Flood Risk Map	2100	1021
Water Resource GIS Map	1654	1751

Individual resources include (links from flood resource site); Overview of Actions for Flood-Resilient Homes (PDF), Flood Insurance Fact Sheet (PDF), Emergency Plan/Kit (PDF), Home Drainage Basics (PDF), Sump Pumps (PDF), Sanitary Backflow Prevention (PDF), Sewage Ejector Pump (PDF), Dry Floodproofing (PDF), Wet Floodproofing (PDF), Pumping Guidance (PDF), Rain Gardens (PDF), Shoreline Restoration (PDF), Floodproofing Accessory Structures and Yards (PDF), Reducing Flood Risk as a Renter or Condo Owner (PDF), Sandbag Fact Sheet (PDF).

Emergency Services

The Emergency Services area of work has seen the least movement in the last two years, but we note the following developments and ideas for 2023. The City recently hired a Risk and Safety Coordinator.

Water Resource Manager Jessica Wilson holds a Certified Floodplain Manager certificate and has participated in the National Association of Floodplain Managers conference. The following ideas for the 2023 workplan came from the conference; a critical facilities review, blue-sky flood preparedness planning, and a substantial damage plan.

The Comprehensive plan envisions a sanitary and stormwater project to "comprehensively assess risk jointly between the sanitary and stormwater utility using an international risk framework. This could best be done as a citywide project including Engineering, Public Works, Public Safety and Human Resources.

The work four areas (described above) of infrastructure, regulation, outreach and engagement, and emergency services lead to actions at many levels of the community. The City's leadership role helps reduce

potential flood exposure, informs actions to make structures and people less vulnerable, thereby reducing overall community flood risk.

Next Steps

In the next several months Council will review the 2023-2028 Capital Improvement Plan (CIP.) Below are context, priority considerations, and an ordered list of project for flood risk reduction. Staff also prepared and attached a flood project area heat map to demonstrate the relative amount of flood damage per neighborhood that these project areas target.

Staff separated flood reduction projects into three classifications.

> Standalone (where most of the opportunity is in city park, undeveloped right of way, school district or neighboring private property. The project often include focus on creating or managing flood storage)
>
> Reconstruction (Where most of the opportunity would occur when a neighborhood or municipal state aid street is up for reconstruction. The project includes focus on increased flow capacity, or storage or storage in the right of way. Notes include estimate of future recon date)
>
> Citywide (Where the opportunity requires relatively little impact, is in an undeveloped right of way, or compared to the scope of benefits, is of a type of technology or practice that can be applied citywide on specific issue types with relatively little capital costs)

Staff used the following considerations to prioritize this list:

> First priority - Value: Recommended for projects that include three methods or technologies mentioned above that were demonstrated in MFIP as high value (most flood risk reduction for least capital cost.)
>
> Second priority – Recon/Efficiency: Recommended for projects that are best synchronized with a neighborhood street reconstruction.
>
> Third priority – Opportunity: Recommended for projects that are standalone in nature and can keep the pace of projects going when recon projects are not aligned with flood needs.

Major Flood Infrastructure Projects

Project Area	Approximate Project Year(s) / Recon Units (if applicable)	Concept Level or Best Guess Estimate
Morningside	2022 Under Construction, Recon	$14M
(Nine Mile area) Flood storage optimization and adaptive level control system	2024-25 Citywide, value	$3M
Citywide CIP Pipe constraints and overflow grading project	2026 Citywide, value	$3M
(Minnehaha area) Flood storage optimization	2026-27	$3M

and adaptive level control system	Citywide, value	
Concord Flood Infrastructure Project	2028, Standalone, opportunity	$11M
Chowen and 60th Flood Project	Horizon, Recon (60th Street)	$2M
Arden & 50th Flood Infrastructure Project	Horizon, Recon (50th Street)(overlay in 2025 or future recon)	$5-15M
France Avenue Crossing of Minnehaha Creek	Horizon, Recon (France Ave) or Standalone	$7M
Lake Cornelia and Normandale Park Flood Infrastructure Projects	Horizon, Recon (neighborhoods, or Valley View Rd)	$16M

Horizon (2029+) projects are not listed in the CIP. Finance staff are reviewing the Utility Rate Study and will provide more information to estimate rate impacts at various pace-of-implementation scenarios. Note that the remaining recon areas do not overlap with major flood project areas in the next six years of the CIP.

Staff plans to present at the August 17 City Council meeting the Water Resources Management Plan major amendment, and request to submit for agency review. The major amendment was ordered at the same meeting as the approval of the flood risk reduction strategy. The work included update and added detail to the City's stormwater model and revision of the policy and implementation program to incorporate elements of the FRRS.

Conclusions

At the August 3 work session staff will further demonstrate how the FRRS is being implemented and how it provides community value. Staff looks forward to Council input to help guide the priority and policy of our work and future recommendations.

While flood risk reduction is a community wide and generational project, we're in a much better place today because of the work. We're leading our peers in realizing and reducing flood risk, but at the same time we feel unprepared for the challenge of future flooding from climate change.

Attachments:

FRRS Appendix H, with notes.
Flood Project Area Heat Map

Links to past Council Consideration of Water Resource Management Plan, Flood Risk Reduction Task Force, and Morningside Flood Infrastructure Project and provided below:

September 21, 2021 Council Meeting – MFIP 30% Design Check In
April 20, 2021 Council Meeting – MFIP Staff Recommendation
March 16, 2021 Council Work Session – MFIP Preliminary Staff Recommendation
September 1, 2020 Council Work Session – Morningside Flood Infrastructure Project (MFIP) Update
April 21, 2020 Approve Public Participation Plan for MFIP and Request for Purchase for Engineering and Engagement Services

Public Participation Plan
April 7, 2020 Flood Risk Reduction Strategy approval
March 5, 2019 FRRS Strategy Update
March 5, 2019 – Work Session – Water Resources Management – Morningside Neighborhood Flood Risk Reduction Strategy, Lake Cornelia Clean Water Strategy, and Chloride Pollution Prevention
September 5, 2018 – Adoption of 2018 Comprehensive Water Resources Management Plan
April 3, 2018 – Work Session – Comprehensive Water Resources Management Plan – Implementation Discussion
January 17, 2018 – Authorize Staff to Submit Draft Comprehensive Water Resources Management Plan for Agency Review
November 21, 2017 – Work Session – Draft 2018 Comprehensive Water Resources Management Plan Presentation for Review and Comment
Water Resources Library – Historical Morningside Neighborhood Stormwater Reports

Appendix H

Actions Sheets Key

Sector: The sector of work under which the action would fall. Infrastructure (I), Regulatory Program (R), Outreach and Engagement (O), and Emergency Services (E).

Task Force Rank: Based on aggregate of individual Task Force member rankings. Task Force members were asked to rank their top 10 with the action believed to have the most community enthusiasm ranked number 1 and the action believed to have the least community enthusiasm ranked number 10. Actions beyond 10 were effectively not ranked.

Cost Score: Staff scored.

$ Minor; Savings or efficiency, takes minor amount of staff time, or can roll into existing duties with existing staff time and resources, <0 to 20hrs, <0 to $2K

$$ Modest; Modest additional costs, modest amount of staff time. 20 to 100hrs, $2-10K

$$$ Moderate; Moderate additional costs, takes moderate amount of additional staff time, or can be contracted out in future budgets. 100-500hrs, $10-50K

$$$$ High; Additional costs, takes additional staff time, can be contracted out with additional resources. 500-2000hrs, $50-200K

$$$$$ Major; Significant costs, takes significant amount of staff time, or can be included in future capital improvement plans. 2000+hrs, $200K+

Staff Rated Effectiveness Score: Staff scored. Based on effectiveness and confidence at reducing community vulnerability to flooding, at reducing community exposure to flooding, and at reducing the community share of climate change drivers.

Action Category:

Quick Win = do now or contract under flood risk reduction effort.

Planning = develop a plan as part of flood risk reduction effort, or include in Comprehensive Water Resources Management Plan amendment, future budget, or Capital Improvement Plan (CIP).

Development = may be worth doing with additional resources, a special circumstance, a partnership, or as technology improvements change cost structure.

None = benefit is not worth the cost or effort.

			Task Force Average Rank	Cost	Effectiveness	Category	
I.07	Infrastructure	Better Maintain Existing System	5.0	$$$$$	high	Planning	Resources Added for PW utilities staff
I.08	Infrastructure	Control Sources of Clogs	7.3	$$$$$	high	Planning	
E.01	Emergency Services	Develop Local Flooding Emergency Response Plan	7.4	$$$	medium	Planning	
I.15	Infrastructure	New Storage in Parks	7.6	$$$$$	high	Developmen	2022 MFIP, 2023+CIP
I.19	Infrastructure	Buy Low Homes	8.4	$$$$$	low	None	
I.16	Infrastructure	New Storage in Roads	8.4	$$$$$	high	Developmen	2022 MFIP, 2023+CIP
I.13	Infrastructure	Search for System Constraints and Quick Wins	9.0	$$$	high	Planning	2022 MFIP, 2023+CIP
I.10	Infrastructure	Reduce Sanitary System Inflow	9.1	$$$$$	medium	Ongoing	
I.24	Infrastructure	Flood Storage with Predictive Pumping	9.1	$$$$$	high	Developmen	2022 MFIP, 2023+CIP
R.08	Regulatory Program	Update Plans with Flood Risk	9.3	$$$	low	Planning	2021 CAP, 2022 WRMP
R.03	Regulatory Program	Regulate Impervious	9.3	$$$$	low	Developmen	2021 CC Ordinance
I.25	Infrastructure	Capital Project Prioritization Framework	9.5	$$	medium	Development	
I.01	Infrastructure	Citywide Risk Modeling	9.6	$$$	high	Planning	2022 WRMP
R.04	Regulatory Program	Require Private Flood Storage	9.8	$$$$	low	None	
E.02	Emergency Services	Define and Communicate the Available Services	9.9	$$	medium	Quick Win	FRRS/Done
I.09	Infrastructure	Reduce Vulnerability of Sanitary Lift Stations	10.0	$$$$$	medium	Development	2022 MFIP, 2023+CIP
I.14	Infrastructure	Bigger Pipes	10.0	$$$$$	high	Developmen	2022 MFIP, 2023+CIP
I.03	Infrastructure	Peak Flood Visualization	10.1	$$$	high	Planning	2022 WRMP
I.04	Infrastructure	Flow Path Visualization	10.3	$$$	high	Planning	2022 WRMP
O.08	Outreach and Engagement	Develop Flood Intervention Fact Sheets	10.3	$$$	medium	Quick Win	FRRS/Done
O.07	Outreach and Engagement	Develop Frequently Asked Questions (FAQs)	10.5	$$	high	Quick Win	FRRS/Done
I.17	Infrastructure	Design to a Future Risk Level	10.6	$$$$$	medium	Planning	
I.18	Infrastructure	Plan Emergency Overflow Paths	10.6	$$$	high	Planning	FRRS/Done
O.01	Outreach and Engagement	Build Awareness of Stormwater System	10.6	$$	low	Planning	
I.02	Infrastructure	Standardize Failure Analysis	10.6	$$$$	medium	Development	
O.06	Outreach and Engagement	Promote Sandbag Service	10.8	$$	high	Quick Win	FRRS/Done
O.10	Outreach and Engagement	Host Flood Summit	10.8	$$$	medium	Development	
R.02	Regulatory Program	Flow Path Review	10.9	$$$	high	Planning	
O.05	Outreach and Engagement	Develop a 'What is My Flood Risk?" Map	10.9	$$$	high	Quick Win	FRRS/Done
I.05	Infrastructure	Predictive Snowmelt Modeling	11.0	$$$	low	Development	
I.06	Infrastructure	Active Lake Level Monitoring, Smart Infrastructure Pilot	11.0	$$$$	high	Developmer	2022 MFIP, 2023+CIP
I.11	Infrastructure	Assess Water Supply System Risk	11.0	$$$$	medium	Planning	
I.12	Infrastructure	Communicate Risk to Power and Utility Industry	11.0	$$	medium	Development	
I.20	Infrastructure	Incentivize Redevelopment of Exposed Structures	11.0	$$$$$	low	None	
R.01	Regulatory Program	More Permit Review and Regulation	11.0	$$$	medium	Development	
R.05	Regulatory Program	Regulate Development to a Higher Flood Standard	11.0	$$	low	Development	
R.06	Regulatory Program	Tiered Stormwater Utility Fee Based on Impervious Cover	11.0	$$$	low	Development	
R.07	Regulatory Program	Participate in the Community Rating System	11.0	$$	low	Planning	
O.02	Outreach and Engagement	Develop and Communicate Dynamic Flood Threat Indicator	11.0	$$$	low	Development	
O.03	Outreach and Engagement	Groundwater Level Viewer	11.0	$$	low	Planning	
O.04	Outreach and Engagement	Promote WaterAlert (USGS) Subscriptions	11.0	$	low	Quick Win	
O.09	Outreach and Engagement	Provide Stormwater Technical Assistance Grant Program	11.0	$$$	medium	Quick Win	
O.11	Outreach and Engagement	Engage With Stakeholders at Time of Capital Investment	11.0	$$	medium	Development	Permitting/Regulatory
O.12	Outreach and Engagement	Engage Realtors, Developers, Insurers on Local Flood Risk	11.0	$	medium	Development	

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.01	Infrastructure	Citywide Risk Modeling	Create a standard method across the city (and potentially across other nearby cities) to analyze the risk and consequence of potential for failure of the entire storm sewer system, pipe by pipe, structure by structure. Additionally, this would include creating a standard method to determine impacts due to failure of a part of the system. Finally, reporting methods (maps, prioritized infrastructure components, etc.) would be standardized so that infrastructure risk in different parts of the city and even nearby cities can be easily compared by staff, residents, and decision-makers.	A general understanding of the risk of each part of the storm sewer infrastructure system will be able to help prioritize maintenance and inspection activities. Additionally, failure analysis which is often risk based, is not currently standard and is generally quantified on a case by case basis and by the people involved. Therefore, comparing infrastructure risk in different parts of a city or between cities is quite difficult. The only way to know which parts of the infrastructure system should be prioritized in maintenance, with a finite maintenance crew, is to assess the risk of entire storm sewer system in a standard and comprehensive way.	The process of evaluating risk of infrastructure may not lend itself to a process that is general. It may be a process that is so "case by case" that the standardized method may become overly complicated and onerous.	TBD	$$$	high	Planning
I.02	Infrastructure	Standardize Failure Analysis	Create a standard process for investigating reported or actual failures after significant events. Post event investigation would survey debris lines for peak flow elevations, review damage, investigate system function using hydrologic models, investigate past maintenance records and report expected and actual system performance.	This is an alternative or lead-in to smart infrastructure that allows the organization to build knowledge of system function, and periodically review and plan interventions in operations and maintenance that may lead to better system function.	Additional data could sit on the shelf if there is not organizational capacity to review, utilize or react to it.	TBD	$$$$	medium	Development
I.03	Infrastructure	Peak Flood Visualization	Create products that visualize and explain the extent of expected flooding during storm events. The various types of products could be paper and/or digital maps, the online water resources web map, Google Earth xml files, or other innovative methods.	Creating maps or other visualizations of the potential extent of flooding helps identify the locations throughout the city that are most likely to flood. Additionally, similar to the activity of education and outreach, identifying areas of potential flooding and areas that do not show flooding help the public become aware of instances when the system is not functioning as expected. As the public becomes more aware of flooding throughout the city through these products, the new knowledge can likely motivate more citizens to take part in flood risk reduction efforts when they are aware of the extent of flooding throughout the city.	With new flood mapping that is far more extensive than traditional FEMA maps, flood insurance prices and home prices may be affected. Maps alone do not tell the entire story; they cannot explain other flood characteristics such as duration. The public may react to the maps by implementing a fix that doesn't appropriately address the issue, i.e., a resident might plan to place a sandbag wall when the duration of flooding is so long that they might still be exposed to basement flooding from groundwater seepage. Some interpretations of the flood maps from the public may not be accurate. Notes concerning the reliability of the tools must be included (based on a calibrated or uncalibrated model, validated with observed data, etc.).	TBD	$$$	high	Planning

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.04	Infrastructure	Flow Path Visualization	Create visual products that explain the routes that water would flow during storm events. The various types of products could be paper and/or digital maps with flow direction arrows, the online water resources web map, Google Earth xml files, animations or videos, or other innovative methods.	Creating maps or other visualizations of flood water flow paths helps identify the locations throughout the city that should remain open (no obstructions, no development, no pedestrians, cars, etc.) during a flood. Additionally, similar to the activity of education and outreach, identifying areas where water should be flowing during flooding events helps the public be aware of times when the system is not functioning as expected. Areas that would be emergency overflow areas (EOFs) during a flood can also be improved prior to flooding so that when activated, they do not erode.	With new flood mapping that is far more extensive than traditional FEMA maps, flood insurance prices and home prices may be affected. Maps alone do not tell the entire story; they cannot explain other flood characteristics such as duration. Some reactions to the flood maps from the public may not be entirely appropriate. Notes concerning the reliability of the tools must be included (based on a calibrated or uncalibrated model, validated with observed data, etc.). Homeowners who live adjacent to flow paths and/or emergency over flows (EOFs) may take it into their own hands, on their own property, to alter the terrain so that water does not flow adjacent to their home. This may have other adverse consequences on their own or on other people's homes.	TBD	$$$	high	Planning
I.05	Infrastructure	Predictive Snowmelt Modeling	Forecasted/predicted snowmelt modeling to help the city better understand spring flood risk.	Predictive snowmelt modeling may help city staff and the community better understand spring flood risk. Forecasted high springtime water levels associated increased flood risk may inform flood risk reduction measures by the city (e.g. preparation for emergency pumping, sandbags, etc.), especially for landlocked basins and basins with restricted outlets.	While melt can be estimated, it is uncertain due to duration of melt and any intervening rainfalls. This can lead undue alarm or a 'cry-wolf' affect. This effort may be better at a watershed or metro area level. Alternatives include amplifying general messages from the NWS. Existing water levels and snowpack measurements are required to forecast spring water levels. Collecting this information may take considerable staff time; but without this information, the snowmelt modeling may only provide a limited benefit for restricted outlet and landlocked basins.	TBD	$$$	low	Development
I.06	Infrastructure	Active Lake Level Monitoring, Smart Infrastructure Pilot	Construct water level and discharge measurement sensors at key stormwater management system points (i.e. critical lakes, ponds, streams, and pipes).	Current water level measurements can be used to monitor flood exposure, and therefore inform flood management activities (i.e. emergency pumping, sandbagging) as well as optimize operation of dynamic stormwater management systems equipped with adjustable weirs and outlets. Inconsistencies between measured data and flood models has led to identification of stormwater infrastructure no longer functioning as intended (i.e. sediment filled pipes, pipes with frost heaves, sediment filled channels, clogged outlets, etc.). Increasing the number of sensors throughout the city would allow for a more widespread system performance evaluation.	Sensors can be difficult to maintain and are frequently damaged by adverse weather conditions and vandalism. Discharge monitoring may lead to identification of Inflow and Infiltration (I&I) issues. Data connections could be considered to creek flow gages maintained by watershed districts. The ability to construct and utilize adjustable weirs based on forecasted data may be limited by the DNR. For these additional measurements to be useful, the existing flood models may need to be refined to provide real-time forecasting abilities.	TBD	$$$$	high	Development

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.07	Infrastructure	Better Maintain Existing System	Use a proactive asset management strategy to proactively inspect system to 1) identify infrastructure with relatively minor issues that can be readily repaired, and 2) add operations to remove collected debris and sediment from system trash racks, storm sewer pipes, catch basins, and inlets.	Repair and replace stormwater infrastructure before minor issues escalate to costly replacements (inspect concrete pipe cracks, CCTV, stormwater pump head tests, ditch/stream thalweg surveys). Additionally, trash racks, culvert inlets, and storm sewer pipes can be blocked by sediment and debris. Poorly performing infrastructure reduces the overall stormwater infrastructure system efficiency and results in additional flooding/drainage issues.	Addressing minor issues may provide water quality benefits. Less complaints from residents and more confidence in the stormwater management system.	TBD	$$$$$	high	Planning
I.08	Infrastructure	Control Sources of Clogs	Street and flow path debris can clogs and plug stormwater infrastructure. Proactive street sweeping and maintenance of inlets and flow paths can reduce debris sources.	Trash racks, culvert inlets, and storm sewer pipes can be blocked by sediment and debris, resulting in additional flooding/drainage issues. Even if partially plugged, additional flooding can occur. To address these sources of clogs and debris, the city could evaluate the benefits of implementing/constructing more stormwater Best Management Practices (BMPs) (i.e. vegetative cover, construction stormwater management, etc.).	Addressing the sources of clogs and debris may provide water quality benefits and documentation of these measures may be useful for the Municipal Separate Storm Sewer System (MS4) permit and Stormwater Pollution Prevention Program. Addressing the sources of clogs and debris may also require enforcement, which could adversely impact relationships with private property owners in the city.	TBD	$$$$$	high	Planning
I.09	Infrastructure	Reduce Vulnerability of Sanitary Lift Stations	Assess risk, floodproof, raise or relocate sanitary lift stations out of floodplain. For those sanitary lift stations that are low in elevation and within the floodplain, it may be important to elevate the lift station, or move it entirely so that it is no longer in the floodplain.	When sanitary lift stations are in the floodplain, they can become unreachable during a significant flood. Additionally, they may become inundated with stormwater. This could cause a problem by allowing stormwater into the sanitary system, overwhelming it with too much flow. Improvements could include raising the electrical and controls systems, floodproofing the hatch, planning for emergency sandbagging and pumping to access, raising a section of the structure, or relocating entirely.	Often these features are placed where they are for multiple very good reasons. Moving a lift station is a significant task, especially when space in a well-developed city is hard to come by. And finding another place out of the floodplain that is still as good as the original place (with regard to the other deciding factors) is a difficult task.	TBD	$$$$$	medium	Development
I.10	Infrastructure	Reduce Sanitary System Inflow	Failures in the sanitary sewer system can cause backup into structures.	The long term reduction of sources of infiltration and inflow of surface and groundwaters can incrementally reduce risk.	This program is ongoing and associated with the sanitary sewer utility. It is ongoing in standalone projects and the neighborhood and Municipal State Aid (MSA) street reconstruction programs.	TBD	$$$$	medium	Ongoing
I.11	Infrastructure	Evaluate Water Supply System Risk	For those water supply systems (for example, wells) that are low in elevation and within the floodplain, it may be important to elevate the system, or move it entirely so that it is no longer in the floodplain.	When water supply systems are in the floodplain, they can become unreachable during a significant flood. Additionally, they may become inundated with stormwater. This could cause a problem by contaminating the water supply system and creating an expensive condition that requires remediation.	Often these features are placed where they are for multiple very good reasons. Moving water supply systems is a significant task, especially when space in a well-developed city is hard to come by. And finding another place out of the floodplain that is still as good as the original place (with regard to the other deciding factors) is a difficult task. Often distribution pipes are buried under roads and this would require tearing up roads.	TBD	$$$$	medium	Planning

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.12	Infrastructure	Communicate Risk to Power and Utility Industry	Much like an emergency action plan, or education and outreach, this activity would be providing the proper information to private utility companies (electric, internet, fiber optic, etc.) of the locations and facilities that are most flood prone. Ideally, the activity that publishes flood extent visualizations could feed into this one.	Access to buried utilities could be very limited around flood prone facilities. During flood events, driven often by large storm events, electricity could be down in parts of the city. The private utility companies should be aware of the areas and facilities prone to flooding so that they can plan to reduce the vulnerability of exposed systems, or be better prepared to fix elements of their system during and after a storm.	This could become a daunting task every time the modeling is updated and the maps are recreated. Additionally, if there are flooding issues and private utilities are down, the city could be blamed or even sued if the private utilities company feels that the provided information was not accurate enough to help them be successful.	TBD	$$	medium	Development
I.13	Infrastructure	Search for System Constraints and Quick Wins	The stormwater network involves a complex system of overland flow, stormwater pipes, ditches, ponds, basins, and streams to convey stormwater off of the landscape. Using existing models and infrastructure data, identify the isolated and "easy to solve" choke points that may be limiting the overall capacity of the stormwater management system.	Significant reductions in flood risk may be achievable in areas with "easy to solve" stand-alone constraints. These "easy to solve" fixes are likely to be significantly less expensive than other comprehensive system changes.	Some of these retrofits are likely to be located within stormwater easements on private property (i.e. backyard flooding problems). Replacement/retrofit of the storm sewer in these areas may be disruptive. (Assume this is a desktop review to find these "easy to solve" retrofits and other activities are the construction/implementation for those locations). The effort can be used to inform future project scope and selection to better target resources to flood risk reduction.	TBD	$$$	high	Planning
I.14	Infrastructure	Bigger Pipes	Replace undersized storm sewer in specific flood areas in some areas where there are no/limited downstream impacts associated with larger discharge from bigger pipes.	Replace undersized storm sewer in specific flood areas to improve discharge away from the site and reduce flooding for areas without concerns of downstream impacts.	In many instances, retrofitting bigger pipes is likely to lead to downstream impacts. Furthermore, other governing agencies, such as watershed management organizations or downstream cities, may limit or refuse additional discharge associated with larger pipes because of downstream impacts. There are limited opportunities for this type of risk transfer after the affects of climate change are factored in to an already constrained system.	TBD	$$$$$	high	Development
I.15	Infrastructure	New Storage in Parks	Retrofit new storage into or under park spaces.	There is limited available, open space for construction of stormwater storage. Utilizing the space in or under park spaces is one of the few remaining places for stormwater storage. Increased stormwater storage will reduce downstream discharge and reduce flood risk (impacts) to downstream properties.	There will likely resistance from the community to flooded parks and additional resources may be required to convert the park to a multipurpose land use. The addition of new storage may not be applicable everywhere, including sites with limited infiltration capacity, polluted ground, adjacent to wellheads, or with high bedrock. To use park spaces as flood storage, the city will likely need to educate residents about the multipurpose land use and that the park space will be flooded from time to time. The Park and Recreation Department, Park and Recreation Commission, and park users would be stakeholders. Stormwater reuse for irrigation may be an option is some parks.	TBD	$$$$$	high	Development

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.16	Infrastructure	New Storage in Roads	Retrofit new stormwater storage into or under roads.	There is limited available, open green space for construction of stormwater storage (i.e., a stormwater pond). As roads and parking lots are reconstructed, utilize this space in or under parking lots/roads as one of the few remaining places for stormwater storage. Increased stormwater storage can help reduce downstream discharge and reduce flood risk (impacts) to downstream properties.	Flooded roads and parking lots may receive pushback from the community and additional resources may be required to educate residents about where to drive/park during wet periods. The addition of new storage may not be applicable everywhere, including sites with limited infiltration capacity, polluted ground, adjacent to wellheads, or with high bedrock. Furthermore, stormwater storage on roadways is limited by requirements for emergency vehicle access. Storage under roadways is also limited by other buried utilities.	TBD	$$$$$	high	Development
I.17	Infrastructure	Design to a Future Risk Level	When designing a part of the stormwater infrastructure system, we can no longer rely on using design storm events that are based solely on past observed data. We should be considering what climate forecasting models are telling us, and we should be considering the expected life of the infrastructure.	A part of the stormwater infrastructure system that is mean to last 5 years and then no longer function does not necessarily need to be overly concerned with what the climate may be 30 years from now. Additionally, the probability of a 1% annual chance event occurring in the next 5 years is only about 5 percent. On the contrary, a part of the system meanT to be functional for the next 50 years should most certainly be considering the changing climate and the predictions of future large storm events. The probability of a 1% annual chance event occurring in the next 50 years is 40 percent. Given that, the chance of a piece of infrastructure being tested by its design storm during its life depends on the expected life of the infrastructure. And the magnitude of the change in the characteristics of the design storm event also depends on the expected life of the infrastructure.	This approach will create even more uncertainty in the design process. In all likelihood, ponds, pipes, structures, weirs, pumps, and all other infrastructure will be designed bigger, potentially uncomfortably big and uncomfortably expensive, if the future climate risk is seriously considered in design.	TBD	$$$$$	medium	Planning
I.18	Infrastructure	Plan Emergency Overflow Paths	Planning emergency flow paths is the approach of understanding the natural emergency overflows, and then planning to create, maintain, and protect those that exist, that safely pass stormwater flow, and therefore protect people and structures from flooding and harm.	Having a prepared understanding of the emergency flow paths, rather than surprise of where stormwater ends up flowing, is beneficial for the protection of infrastructure within the city. Additionally, similar to the activity of publishing visualizations of flow paths, this planning can help understand the function of the system and whether or not it is operating appropriately during large flood events.	Some residents may not like where emergency overflows are planned, prepared, maintained and protected. This would impact park uses. There are certainly instances of unplanned overflow locations that will surprise the public, and require study and private or public action to limit exposure. There may be pushback from the public in creating or maintaining these features. Outreach and would be necessary to communicate where these areas are and how park uses may be impacted.	TBD	$$$	high	Planning

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.19	Infrastructure	Buy Low Homes	Offer to purchase homes that are so flood exposed that the cost to protect them from flooding (or significantly reduce their flood exposure) is so high that it is beyond the value of the home. This is much like totaling a car after an accident significant enough that it doesn't even make sense to try and fix the car.	The cost of capital projects to protect some homes can be very high, particularly for some homes that are built very low and near bodies of water. The vulnerability can be due to a number of factors and decisions when the home was built. Regardless of the reason for the high vulnerability, the cost to protect homes in this condition is beyond the value of the home itself. Additionally, there may be a cost in emergency rescues for people who live in those homes during flood events. Therefore, buying the home is the most cost-effective solution. Buyouts have been shown to be a cost-saving measure for taxpayers because the damages avoided result in cost savings on both flood insurance and disaster relief.	Strategies to reduce vulnerability of these homes to flood can be much more fruitful. Buying out a resident is an emotional process; it may or may not be easy for a person to move, even if it is for their protection and benefit. Often, the cost/benefit for acquisitions makes the most sense on the lowest value homes - it is important to consider offsetting acquisitions with affordable housing options. Removing the vulnerable home will also remove a property/home from the tax base of the city. The loss in tax base may make sense if a 'fix' is considerably more expensive. The city then would have to decide if it is possible to redevelop the site, raise the future structure to limit exposure, or leave it vacant. A vacant site may provide minimal temporary storage. Leaving properties vacant could also increase green space. If state or federal funding is used, it might be deed restricted as open space in perpetuity.	TBD	$$$$$	low	None
I.20	Infrastructure	Incentivize Redevelopment of Exposed Structures	The city can create a program that is available to residents where they can redevelop or reduce the flood risk of their home and be helped financially by the city.	A redevelopment project of a home is expensive financially, takes time and effort, can be stressful if the home is inhabitable for a time, and has other factors that make it difficult. Incentives offered by the city can be motivating to a homeowner to help them decide to take action and protect themselves. The incentives can also turn the necessary project from impossible to possible financially. If the voluntary acquisitions are not an option, this approach may be able to reduce flood risk while maintaining, or even improving, the tax base.	This process of redevelopment is happening without incentives. Incentives complicate the financial proposition, and involve the city in a process that is atypical and may cause more uncertainty and conflict. Incentives may need to be large to convince a homeowner to take on such a big task. The overall cost of the city depends on the number of homes that they intend to provide aid to, and the number of people willing to join the incentive program.	TBD	$$$$$	low	None

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
I.24	Infrastructure	Flood Storage with Predictive Pumping	Add the innovative technology that monitors current conditions, tracks forecasts, models predicted flooding, and operates pumps to respond, to pump stations on water bodies that could benefit from predictive pumping flood risk reduction strategies.	Water bodies with passive outlets can only be drawn down to the outlet's invert, or sometimes below with long periods of evaporation and minimal rain. All of the water in the water body is taking up storage that cannot be filled with incoming stormwater. A water body with a pumped outlet could potentially be drawn down further than normal to create the opportunity for added stormwater storage during a flood event. This is a way to create or provide storage without actually creating additional ponds, underground storage, or other types of storage on the landscape. It's simply a way to better utilize the current volume available for storage within the city.	This method (predictive pumping) requires good weather forecasts, calibrated models with proven prediction capabilities. This method will likely be a long process of working with the DNR to develop a plan that improves storage capacity for the protection of the people, but also promotes protection of the other living things in and around the water body. Retrofitting predictive pumping will require more than electronics, wiring, and programming logic. It will likely require modifications to pipes on the suction side of the pump to be able to draw the water body down further. Some lift stations are quite small (fitting in the space of a manhole perhaps) and retrofitting this type of capability may require a small box or building on the surface to house the equipment.	TBD	$$$$$	high	Development
I.25	Infrastructure	Develop Capital Project Prioritization Framework	Maximize the effectiveness of limited funds by being deliberate in examining the vulnerability to floods and the greatest sources of possible disruption. Develop a scoring system using cost benefit analysis to identify and prioritize capital projects. The method used should be objective, transparent, and easy for the public to access and understand.	Capital projects don't go through a vetting process. Requests are considered without determining how a specific issue ranks in comparison to others with regard to flood exposure, effectiveness, etc. There is a feeling among the Task Force that 'the squeaky wheel gets the grease'.	Some project petitioners may find their project doesn't even register when compared to others. Even among Task Force members this would likely be the case. Judging criteria would have to be determined.	TBD	$$	medium	Development
R.01	Regulatory Program	More Permit Review and Regulation	Engineering review for small additions, accessory structures (sheds), impervious expansions not related to a building (deck/patio/etc.). Permits for grading, new homes, and major remodels with footprint changes all include engineering review for flow paths, grading and drainage. Retaining wall, minor remodels, interior remodels, mechanical, and other permit types are not reviewed.	Reviewing more permit types may catch additional issues relating to site-to-site, drainage.	This program is staff intensive, and would require additional resources for a fairly limited benefit.	TBD	$$$	medium	Development
R.02	Regulatory Program	Regulate Flow Paths	Inventory overland flow paths. Consider flow paths in permit review process. Make room for and plan for flow where it occurs by grading or armoring flow paths. Divert or limit unplanned flow paths by requiring engineered grading plans during permit review, when serious issue areas are encountered.	Some improvements may not be presently triggering a permit review by the Engineering Department. Staff could investigate and identify issue areas, create a comprehensive list, and require private properties to address the risk in design if at the time a permit is applied for on an issue area.	Minor addition to staff review process for permits that are already reviewed by Engineering. Minor addition in permits that would trigger a review by Engineering. May limit property owners ability to implement improvements on their property or increase their costs. Policy or code revision may be necessary.	TBD	$$$	high	Planning

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
R.03	Regulatory Program	Regulate Impervious	Impervious surfaces generate more runoff. Limiting impervious surfaces by changing ordinance can reduce runoff generation.	Analysis in task force effort showed this approach is very limited in terms of effectiveness.	Major additional cost to some private parties. Moderate addition to staff review process for permits that are already reviewed by Engineering. Moderate addition in permits that would trigger a review by Engineering. May limit property owners ability to implement improvements on their property or increase their costs. Policy or code revision would be necessary. Would increase green space and may promote more trees. Both cost and benefit is highly variable depending on the level of regulation, and if mitigation is allowed. The costs are born by both the public, and private parties, depending on the level of regulation.	TBD	$$$$	low	Development
R.04	Regulatory Program	Require Private Flood Storage	Projects that trigger the regulatory check would be required to store volume on their site.	There is a perception that redevelopment is adding volume and contributing to flood impacts. Analysis in task force effort showed this approach is very limited in terms of effectiveness. Current regulatory program manages risk on a permit-by-permit basis for residential, commercial, and industrial sites. Sites larger than one acre in size are required to control stormwater volume under the Construction Stormwater Permit.	Major addition to staff review process for permits that are already reviewed by Engineering. Additional design, coaching, and inspection necessary. Post-construction program with inspections necessary. Maintenance agreements or other legal instrument necessary. Enforcement necessary. Will limit property owners ability to implement improvements on their property and will increase their costs. Policy or code revision would be necessary. There are additional costs that would be born by private parties that is not included in the costs score.	TBD	$$$$	low	None
R.05	Regulatory Program	Regulate Development to a Higher Flood Standard	Level of protection is currently the 1% annual chance (100-year) storm. This would be more restrictive, applying standards for a larger storm event such as the 0.2% annual chance (500-year) storm. (i.e. higher lowest floors and potentially further setback from water).	Climate change is a main driver of increased flooding. Future predictions are that flood events will be larger and more frequent.	Minor addition to staff review process for permits that are already reviewed by Engineering. Minor addition in permits that would trigger a review by Engineering. May limit property owners ability to implement improvements on their property or increase their costs. Policy or code revision will be necessary.	TBD	$$	low	Development

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
R.06	Regulatory Program	Tier Stormwater Utility Fee Based on Impervious Cover	High impervious sites pay more. Model site runoff generation and rework the land use x acreage calculations to consider specific impervious of the individual site.	Make the polluter pay' concept. Applying penalties for adding impervious may deter those from implementing projects.	Staff intensive. Potential for a lot of negotiating back and forth about impervious cover. Would need to consider how residential stormwater BMPs like raingardens, landscaping, permeable pavements, and rain barrels fit it. May require staff intensive site inspections/verifications and annual or biannual updates. Some owners may be willing to 'pay their way out' to still be able to complete their project.	TBD	$$$	low	Development
R.07	Regulatory Program	Participate in the Community Rating System	The City of Edina participates in the National Flood Insurance Program. The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions.	Potential cost savings for those holding policies.	Number of policies and staff time required will determine if participation is cost-effective.	TBD	$$	low	Planning
R.08	Regulatory Program	Update Plans with Flood Risk	Roll the Flood Risk Reduction Strategy and Comprehensive Water Resources Management Plan amendment into the Comprehensive Plan with a major amendment.	Promote a citywide vision for flood risk reduction.	Need to collaborate with other comp plans and groups such as the Southdale work group and other small area plans.	TBD	$$$	low	Planning
O.01	Outreach and Engagement	Promote Awareness of Stormwater System	Education and outreach to community on the function and importance of the stormwater management system.	An education and outreach program will help the community understand the function and importance of the stormwater management system and its role to minimize flooding and manage water quality. Education may improve flooding issues (e.g. improved participation in Adopt-a-Drain), identify stormwater infrastructure that is no longer functioning as designed, and help residents understand multipurpose land use (e.g. flooded parks and soccer fields).	Additional understanding of flood risk has the potential to impact property values may reduce some property values. Synergy with MS4 required community education/outreach may limit additional city resources required. Education of the community may also improve water quality (reducing illicit dumping, salt usage, etc.). Staff would utilize customer service standards of integrity, quality, and service to assist residents in accessing available resources.	TBD	$$	low	Planning

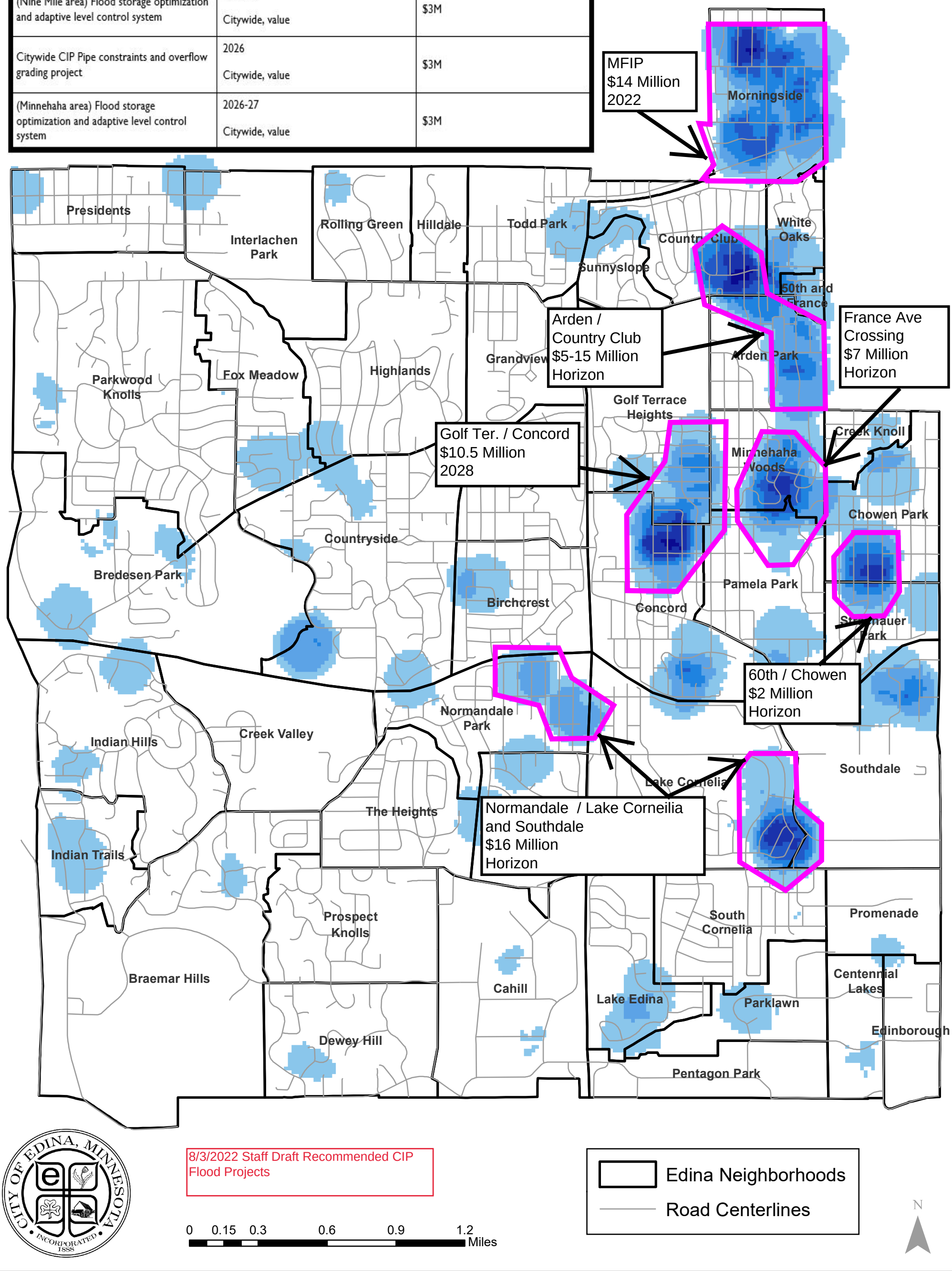
ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
O.02	Outreach and Engagement	Develop and Communicate Dynamic Flood Threat Indicator	Forecast flood threat for design storms and also scenarios such as ice jams, saturated conditions, and snow melt. Host the dynamic indicator online.	Perception of flood threat determines action.	Would require moderate maintenance effort. Groundwater level and extent is highly uncertain and non-continuous. May provide false sense of security.	TBD	$$$	low	Development
O.03	Outreach and Engagement	Develop Groundwater Level Viewer	Users can view relative groundwater level with year over year changes.	Flooding risk may increase if shallow groundwater is high and stormwater infiltration is limited.	May provide false sense of comfort. Groundwater elevations and extent is extremely variable spatially and temporally. Might be difficult to relate relative groundwater level to an individual basement elevation. Money may be better spent encouraging those at greatest risk to invest in draintile and sump pump systems instead.	TBD	$$	low	Planning
O.04	Outreach and Engagement	Promote WaterAlert (USGS) Subscriptions	Anyone can sign up for text alerts for available United States Geological Survey (USGS) stream gauge sites.	Program already operating. Would be low cost/energy to implement. Changes can be viewed in nearly real-time. Experience may help customers to benchmark their own risk on the hydrograph (water elevation graph).	May provide false sense of comfort. Urban streams tend to be flashy (i.e., flow and elevation can increase rapidly). Can add to website Frequently Asked Questions.	TBD	$	low	Quick Win
O.05	Outreach and Engagement	Develop a 'What is My Flood Risk?" Map	Complementary to existing water resources map with the goal of communicating flood risk clearly.	Better communication of flood risk. Understanding circumstance is first step in addressing vulnerability and exposure.	Concern over impact on property values as community becomes more flood aware. It may be difficult to show the depth of flooding on the map - some may be an inch whereas others may be more than a foot. Some assumptions are made about topography - more detailed surveys on a site by site basis could show structures higher or lower than the model and aerial photo suggest. Concern about accuracy and completeness. Feedback from those that use the map is critical.	TBD	$$$	high	Quick Win
O.06	Outreach and Engagement	Promote Sandbag Service	Create series of videos to communicate how to make a request for sandbags and how to build a sandbag wall. Train staff how to receive requests and provide assistance over the phone.	Most are unaware of the service. Those that are aware highly value the service.	Some property owners and renters may have limited ability to place their own sandbags. Unclear what service provider might do this type of work if it were hired out. Disposal of sandbags post-event. Staff would need to be trained on how to receive requests and provide assistance over the phone.	TBD	$$	high	Quick Win

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
O.07	Outreach and Engagement	Develop Frequently Asked Questions (FAQs)	Available on the City website. A resource for reception staff to direct customers to.	Would help to debunk myths. Help people self-serve the information. More immediate access to information versus calling a staff person, although always an option.	Occasional review and minor edits would be needed. Need to inform staff that the resource is available to share with customers. Standard customer service standards of integrity, quality, and service apply.	TBD	$$	high	Quick Win
O.08	Outreach and Engagement	Develop Flood Intervention Fact Sheets	Develop Fact Sheets for common interventions that property owners and renters could implement to reduce their exposure and vulnerability to flooding. Interventions may be pre, mid, or post storm. Fact sheets would provide a description, general cost information, and appropriate applications. Examples include floodproofing, elevating utilities, flood insurance, sanitary backflow prevention, sandbagging, among others.	Some feedback suggests that the interactive water resources map in its current form requires technical expertise to interpret. Changes to the interactive map would make the flood risk information more accessible. A potential barrier to reducing one's own exposure to flooding may be their perceived ability (knowledge, skills, and resources) to take action.	Other barriers, such as cost may limit a property owner or renter's ability to implement. Renters may have limited ability to implement strategies. Considerations ought to be made for all residential structures, not just single dwelling units. Fact sheets may be used by sellers to show how structures are less exposed/vulnerable.	TBD	$$$	medium	Quick Win
O.09	Outreach and Engagement	Provide Stormwater Technical Assistance Grant Program	Pilot year completed in 2019. Competitive grants help pay for technical evaluation of an issue affecting a resident's property. A report documents understanding of the problem and lays out a potential plan that could then be implemented by the property owner, at their cost.	Some technical assistance can increase the perceived ability (expertise, knowledge, resources) for an individual to help themselves. Case studies may be useful to others in similar situations.	Grant covers design, up to a cap. Grant does not cover implementation. Reformat to cover more, from 1:1 to presentation and future design consultations. This could be like a mini flood summit. $20,000/yr existing funding. Would need to ensure the program is attractive to applicants.	TBD	$$$	medium	Quick Win
O.10	Outreach and Engagement	Host Flood Summit	Direct mail invitations to at-risk properties. Get all stakeholders together including representatives from neighborhoods, insurance, emergency service professionals, county, police and fire, landscapers, home service providers, MN DNR, engagement professionals, decision-makers, Watershed Districts, infrastructure experts, neighboring cities. All share and discuss roles and approaches for a changing climate with increasing flood risk.	Incorporates various approaches involved in reducing exposure, increasing resilience to changing risks, transformation, reducing vulnerability, transferring and sharing risks, and preparing, responding, and recovering.	Would require major staff effort and coordination of other parties. Would be a pilot. Unaware of a local model to follow or existing process/program to leverage. Consider equity when selecting a pilot community.	TBD	$$$	medium	Development

ID	Sector	Activity Name	Description	Justification/Motivating factors	Tradeoffs and Other Considerations	Task Force Rank	Cost Score	Staff Rated Effectiveness Score	Action Category
O.11	Outreach and Engagement	Engage with Stakeholders at Time of Capital Investment	Incorporate into public improvements such as street reconstruction and park improvement projects. Develop custom engagement plans as appropriate.	Incorporate into public improvements such as street reconstruction and park improvement projects. Develop custom engagement plans as appropriate.	Opportunities to address problem areas may lie outside of the public improvement project boundaries. Some solutions may require private property cooperation in the form of easements, agreements, and assessments. This is a long term strategy driven by private and public investment.	TBD	$$	medium	Development
O.12	Outreach and Engagement	Engage with Realtors, Developers, and Insurance Agents on Local Flood Risk	Host a class to inform realtors, developers, and insurance agents on local flood risk. Presentation materials could be hosted online or made into a brief video.	As more stakeholders understand flood risk, there will likely be a market effect.	As more stakeholders understand flood risk, there may be a market effect. Desire for residents and property owners to be engaged first. Information must be accurate, current, and easy to understand.	TBD	$	medium	Development
E.01	Emergency Services	Develop Local Flooding Emergency Response Plan	Source flood threat information and predict flood threat. Define affected areas/parties and frontline communities. Develop warning system. Develop emergency response plan. Establish public information program. Develop maintenance and improvement program. Coordinate with other departments/agencies.	A hazard response plan exists for major disasters only. Customers expect a higher level of service and response than the current major disaster response plan provides. The perceived flood threat likely influences property owner/renter behavior. The plan should consider frontline communities and vulnerability. Developing a plan based on historical service requests alone is not an equitable approach.	This strategy doesn't effect the flood, but instead effects the preparation for and recovery after a disaster. Damages may be reduced and a return to normalcy may happen more rapidly. Would require setting a trigger condition. Opportunity to consider better protections for frontline communities.	TBD	$$$	medium	Planning
E.02	Emergency Services	Define and Communicate the Available Services	Info about what the City can and can't do about active flooding; explanation of how the City prioritizes flood-related requests for service posted to City website. Call center training and emergency response plan inclusion.	There is a gap between the status quo service level and customer expectations. Better defining available services may motivate property owners and renters to take actions to reduce their own exposure.	Potential equity disparity if service delivery is driven by requests for service only. Have a plan for engaging with frontline communities, reaching out rather than only waiting for a request for service.	TBD	$$	medium	Quick Win

City of Edina
Flood Project Area Heat Map

Project Area	Approximate Project Year(s) / Recon Units (if applicable)	Concept Level or Best Guess Estimate
(Nine Mile area) Flood storage optimization and adaptive level control system	2024-25 Citywide, value	$3M
Citywide CIP Pipe constraints and overflow grading project	2026 Citywide, value	$3M
(Minnehaha area) Flood storage optimization and adaptive level control system	2026-27 Citywide, value	$3M



8/3/2022 Staff Draft Recommended CIP Flood Projects

0 0.15 0.3 0.6 0.9 1.2 Miles

Edina Neighborhoods

Road Centerlines

N

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Flood Risk Reduction Strategy – Report
Clean Water Strategy – Policy Development

City Council Work Session

August 3, 2022

Ross Bintner – Engineering Services Manager
Jessica Wilson – Water Resources Manager

Surface Water Utility

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1. Overview of utility
2. Review & next Steps for two core services

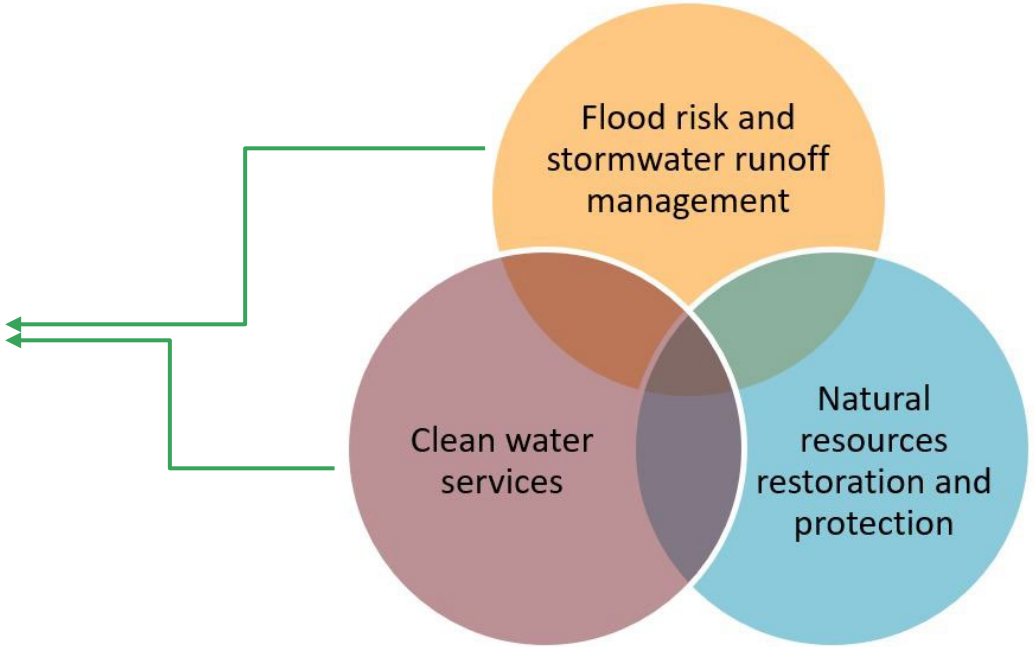
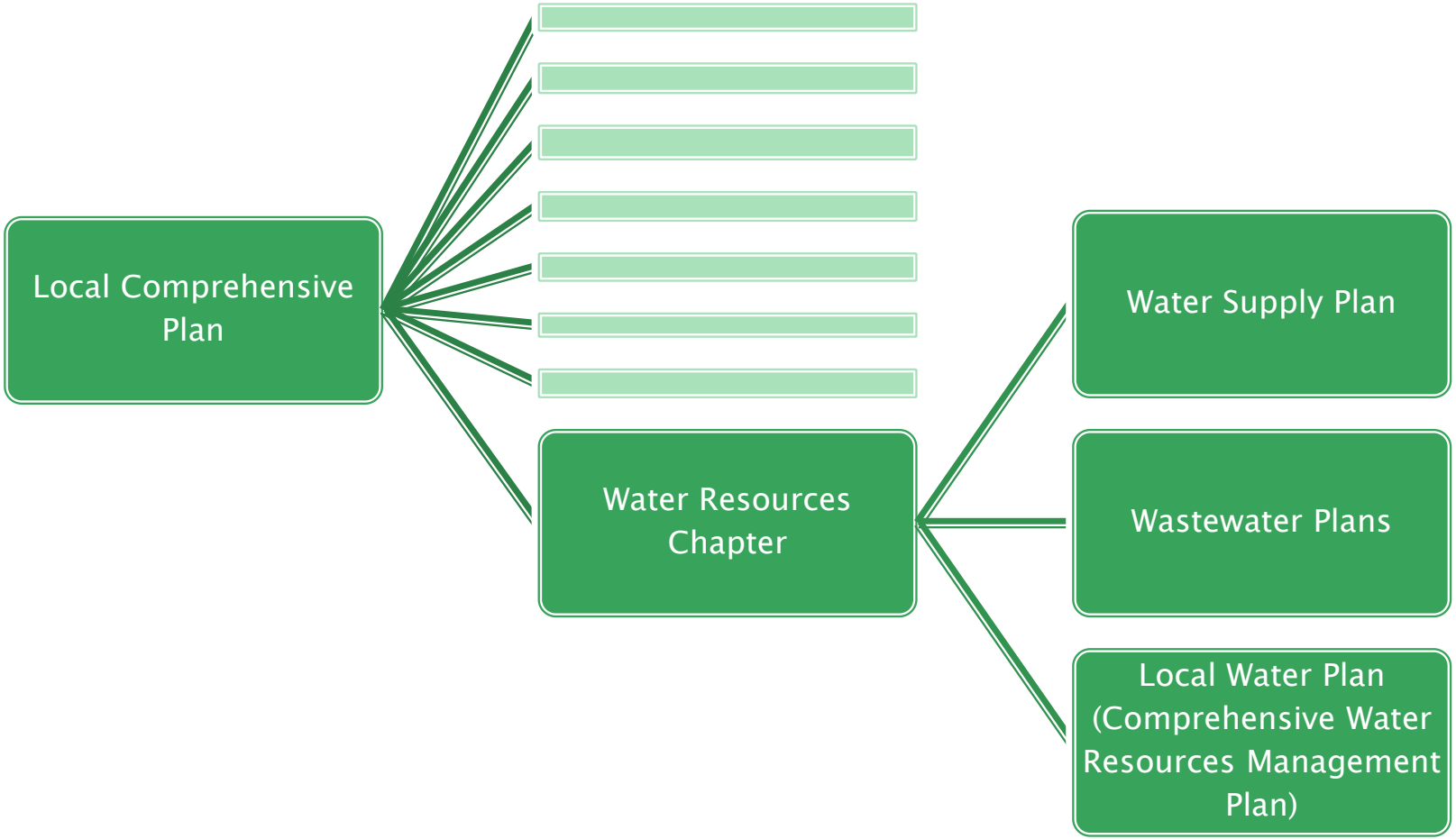


Figure 3.1. Core services of water resources program


Local Comprehensive Plan
Water Resources Chapter
Water Supply Plan
Wastewater Plans
Local Water Plan (Comprehensive Water Resources Management Plan)

Strategy Implementation

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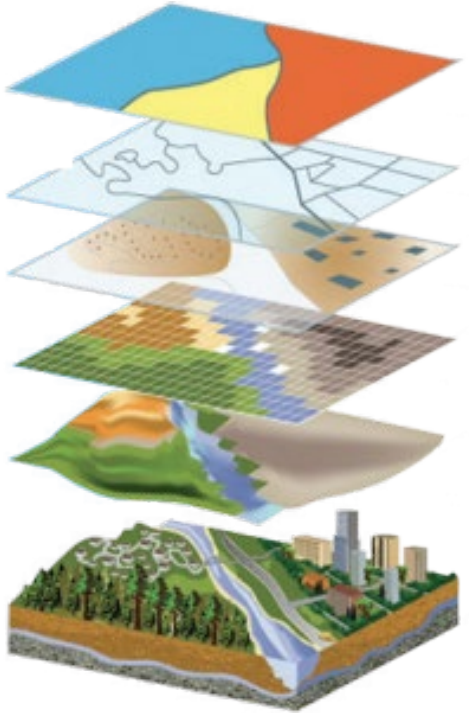
Flood Risk Reduction Strategy and Clean Water Strategy

- Identify focus geographies (Morningside, Cornelia)
- Engage stakeholders
- Define the service target
- Evaluate strategies (infrastructure, programs, O&M)
- Implement (through capital investment, partnerships, private redevelopment, risk management)



Strategy

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We work with the community to **comprehensively reduce flood risk**;

- **INFRASTRUCTURE**: We will renew our infrastructure and operate it to reduce risk. We will plan public streets and parks to accept and transmit flood waters to reduce the risk and disruption of related city services.
- **REGULATION**: We acknowledge competing demands of land use and addressing drainage, groundwater and surface water issues. We help people solve issues without harming another.
- **OUTREACH AND ENGAGEMENT**: We make flood information available and give people tools for flood resilience.
- **EMERGENCY SERVICES**: We help people prepare for floods, remove people from harm during floods, and recover after floods.

Framework

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How we view risk

Drivers of increasing flood risk

Areas of work

Infrastructure

Regulation

Outreach & Engagement

Emergency Services

Pathways to structural flood risk

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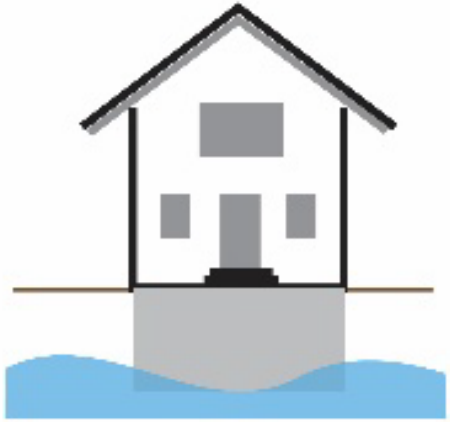
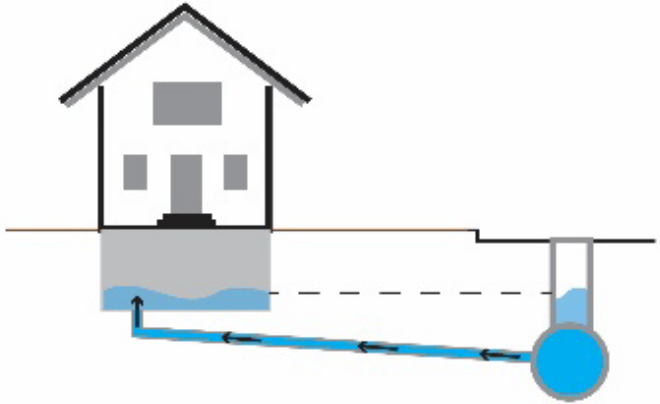
Surface water



Groundwater



Sanitary backflow

Community flood exposure

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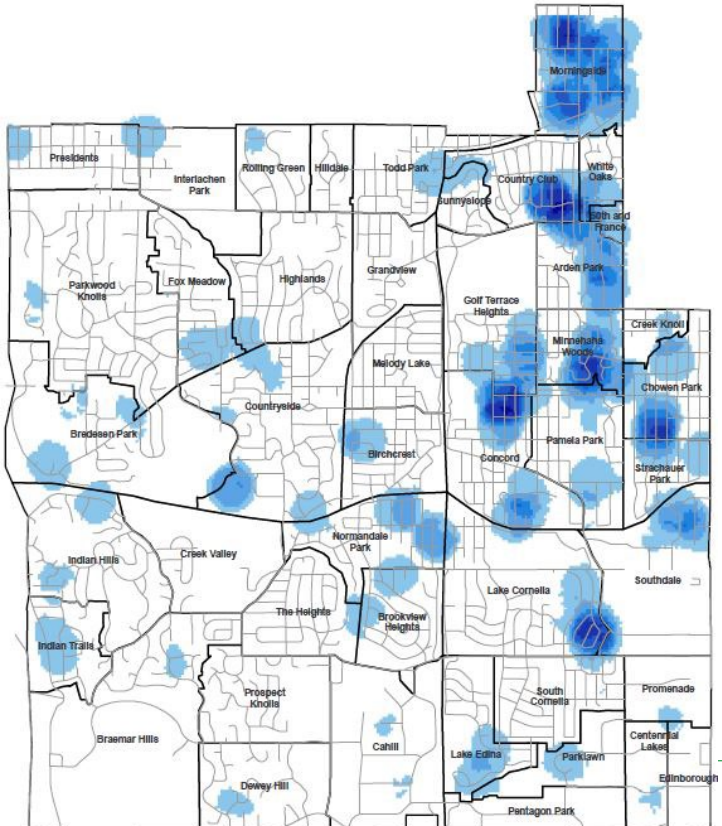
(1% probability event)

- 12547 single family
- ~6-10% Direct exposure
- ~3-7% Sanitary Backflow*
- ~12-20% Groundwater*

* If approximate ratios follow Morningside area and study methodology



Two-year review of risk reduction

The CITY of EDINA

Outreach and Engagement

- Maps, Fact-Sheets, Technical Support
- 2D modeling

Regulation

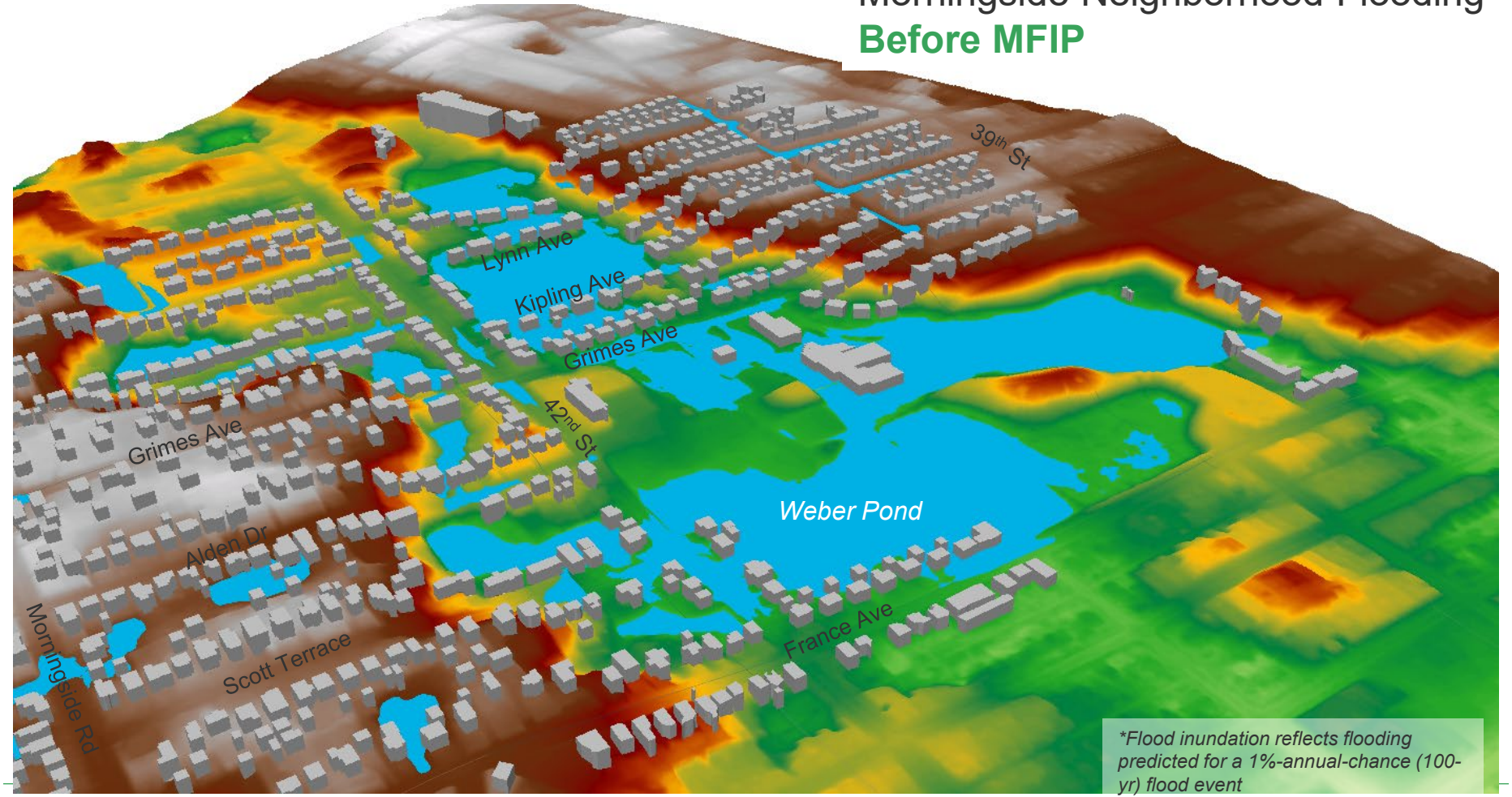
- Impervious Surface Ordinance
- Redevelopment / Rebuilds

Infrastructure

- MFIP, Recon Process, +O&M staff

Morningside Neighborhood Flooding*

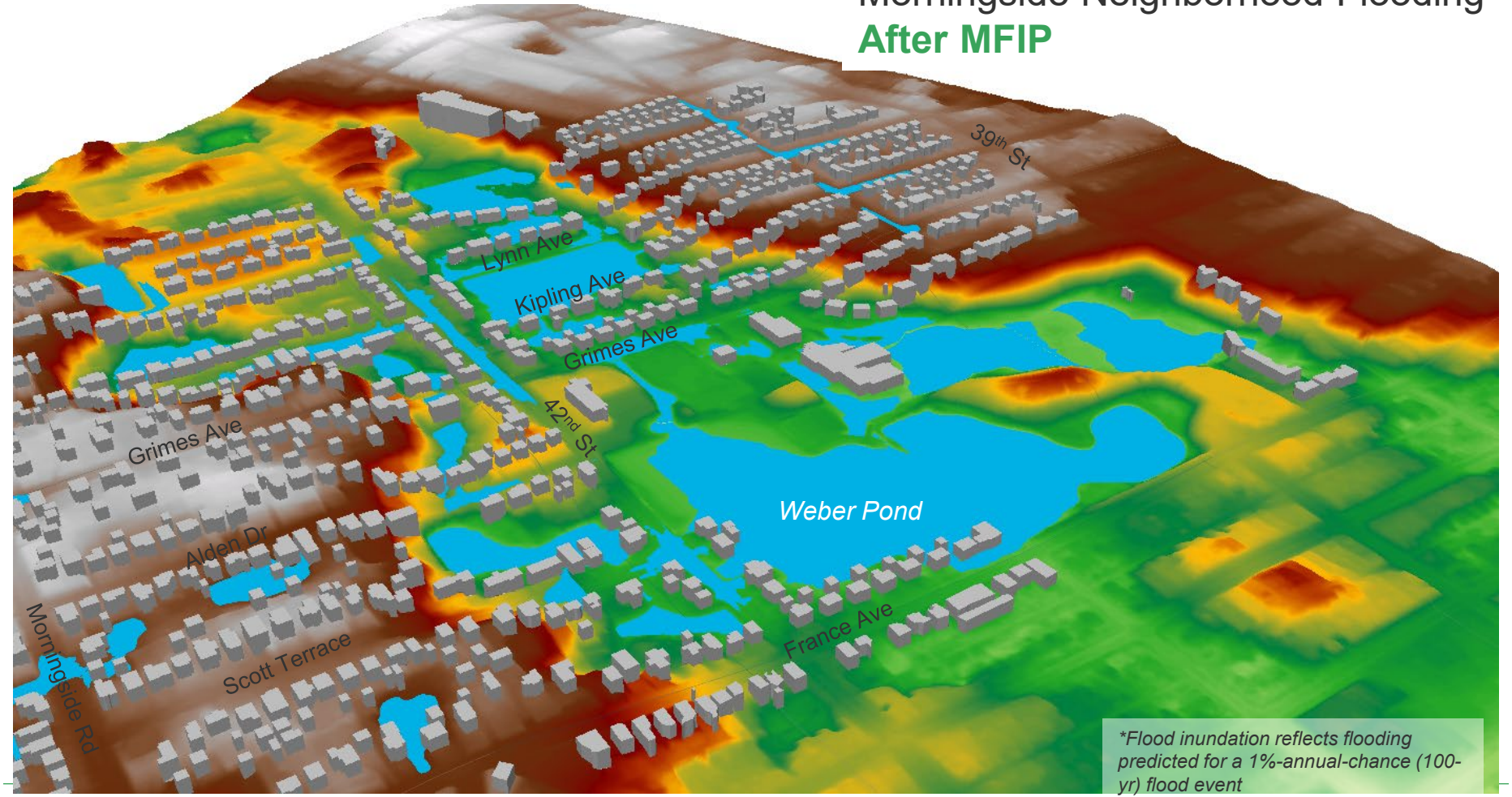
Before MFIP



*Flood inundation reflects flooding predicted for a 1%-annual-chance (100-yr) flood event

Morningside Neighborhood Flooding*

After MFIP



*Flood inundation reflects flooding predicted for a 1%-annual-chance (100-yr) flood event

FRRS Next Steps

- August 20, 2022 CC meeting: Water Resources Management Plan major amendment, start agency review
  - (legal/policy review, infrastructure define, natural systems defined)
- August 20, 2022 CC Work session: utility rates and finance
- Sept-Dec 2022: Capital Improvement Plan
- 2023 Staff Workplans: Emergency Services planning, risk review

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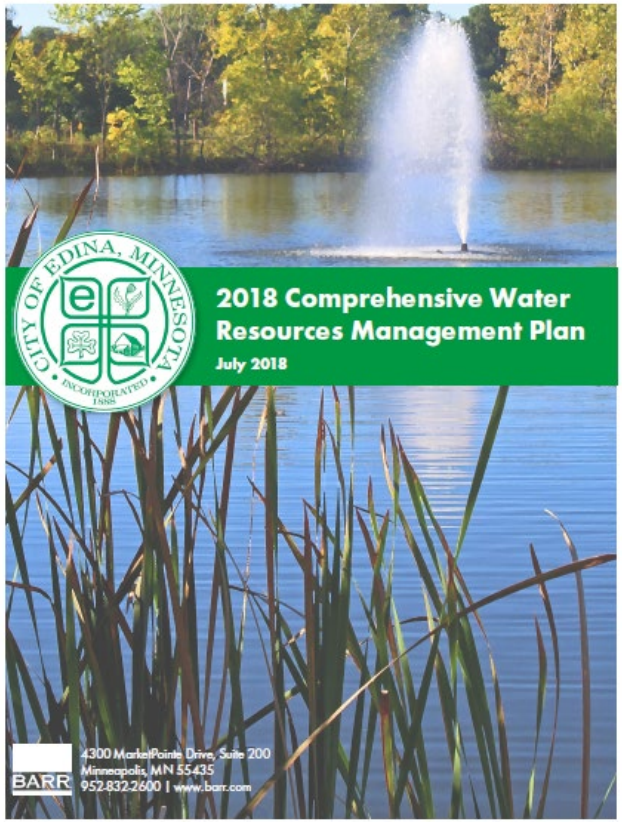
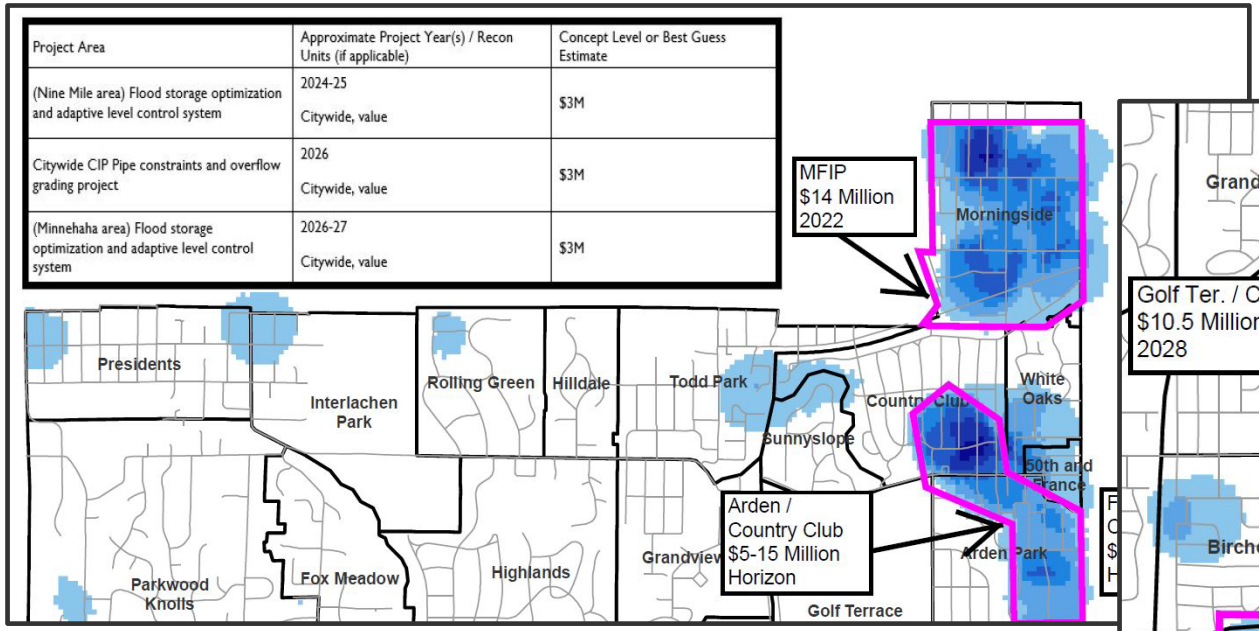
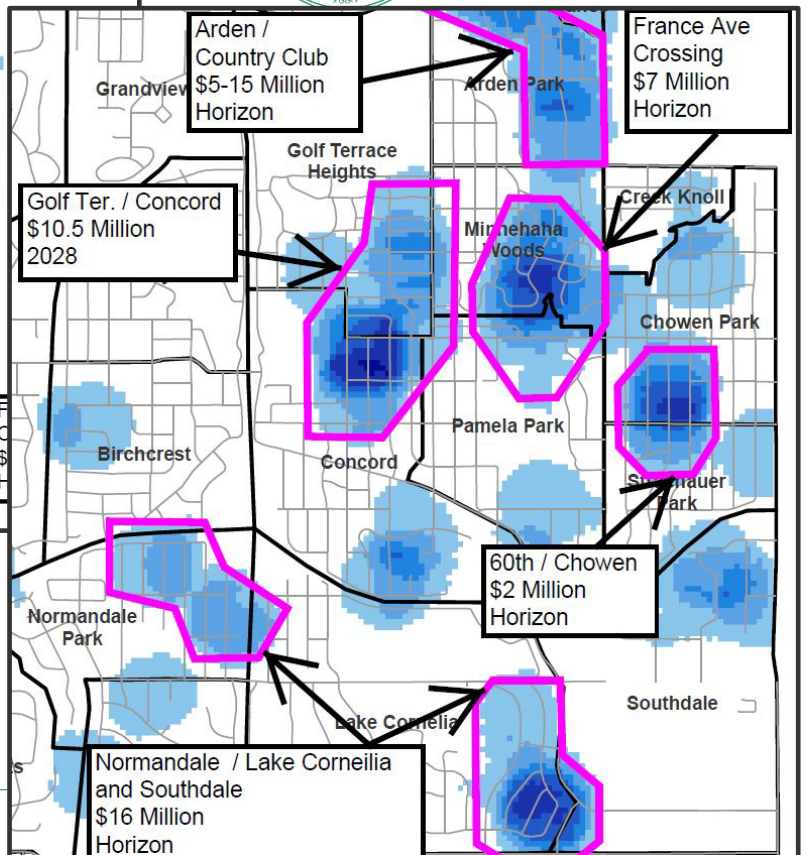


FRRS Next Steps

The CITY of EDINA

Project Area	Approximate Project Year(s) / Recon Units (if applicable)	Concept Level or Best Guess Estimate
(Nine Mile area) Flood storage optimization and adaptive level control system	2024-25 Citywide, value	$3M
Citywide CIP Pipe constraints and overflow grading project	2026 Citywide, value	$3M
(Minnehaha area) Flood storage optimization and adaptive level control system	2026-27 Citywide, value	$3M





- Pace of work review with utility rate study
- opportunity limited with road projects
- citywide opportunities with top value

Flood Service Level - Discussion

The CITY of EDINA

Clean Water Strategy

The CITY of EDINA

- Focus on Lake Cornelia.
- The 2018 Comprehensive Water Resources Management Plan had us committed to start in 2020.
- We've just completed phase I and wish to get some policy direction as we embark on phase 2.

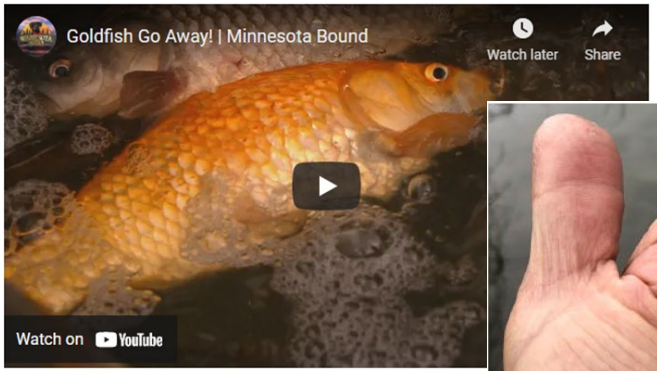
Clean Water Strategy - Phase 1

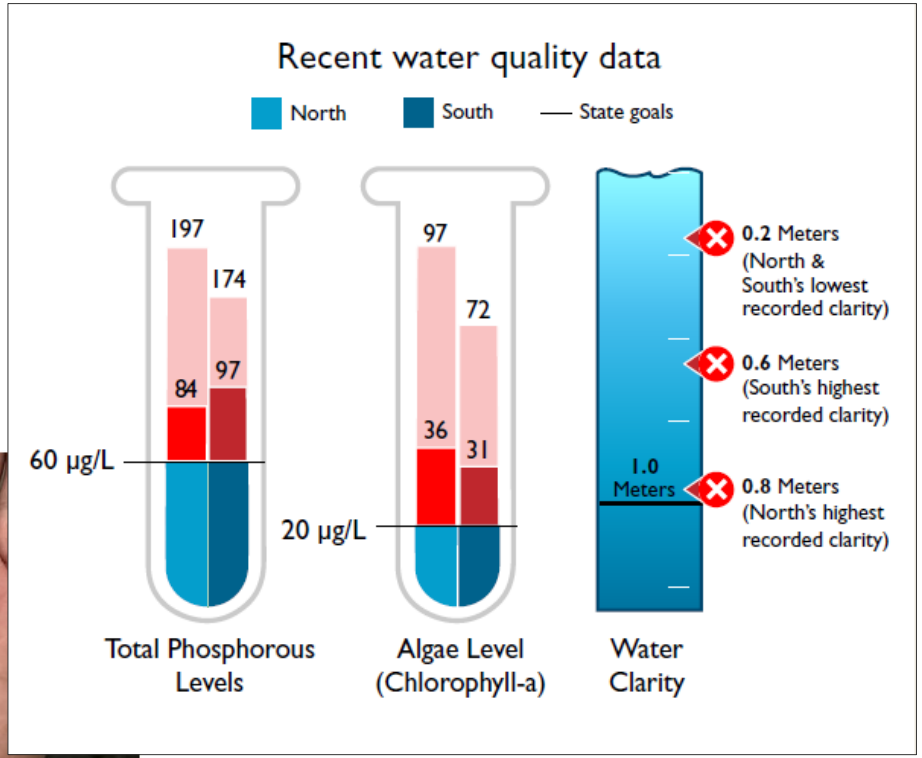
The CITY of EDINA

- We are in-line with peer communities, slightly above and slightly below in some areas.
- Clean water service level goals and priorities are not well defined.
- Where goals and priorities are defined, they are often based on the regulatory minimum.
- The regulatory minimum requires cities achieve checklist activities which are weakly tied to outcomes at the lake.
- The regulatory paradigm is such that we can continue to have water resources that fail to meet clean water standards, and in some ways actually work against clean water, and still meet the rules.

Lake Cornelia

- Poor water quality
- Infested with invasive curlyleaf pondweed
- Infested with goldfish





- 2022
- 2021
- 2020
- 2016

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Shallow Lake Ecology

- Shallow lakes behave differently than deep lakes
- All lakes in Edina are shallow
- Shallow lakes can exist in two states – the clear water state or the turbid water state
- Lakes tend to stay in one state or the other
- It takes a big change for the lake to switch from one state to the other

The Brutal Reality

A dichotomy of choices

Algae Dominated State

Limits:

- Contact recreation
  - nuisance and harmful algal blooms
- Poor recreational fishery
- Minimal wildlife habitat
- User-specific aesthetics

Supports:

- Minimal inhibition of recreational boating

Plant Dominated State

Limits:

- recreational boating
- User-specific aesthetics

Supports:

- Contact recreation
  - Minimal nuisance and harmful algal blooms
- Recreational fishery
- Wildlife habitat

Photo credit: Vadnais Lakes Watershed Management Organization

BARR

Policy Option 1: Clear Water

- Native rooted, floating, and emergent aquatic vegetation are encouraged. We recognize that shallow lakes have beneficial uses beyond boating and swimming, to include wildlife habitat and aesthetic views.
- We invest in preventing pollution, mitigating pollution, and restoring ecological processes.
- We focus on outcomes at the lake.
- This policy option is supported by staff.

Policy Option 2: Turbid Water

The CITY of EDINA

- We do routine and non-specific destruction of all aquatic vegetation. Boating and swimming are priority uses. The fishery suffers from low dissolved oxygen, lack of food, and lack of habitat. We add copper sulfate to knock algae back for about two weeks at a time – a practice that continues forever.
- We continue the status quo activities and pace of achievement stipulated by regulators for preventing pollution and mitigating pollution. Though this meets the regulatory requirements for activity, this pace puts us on a generational (or never) timeframe for reducing pollutant loading enough to achieve a clean lake outcome.
- Water quality continues to degrade. Algal blooms become more frequent including potential Harmful Algal Blooms (HABs). We never achieve a clean water outcome.

Policy Option 3: The Compromise

- We choose to make both clean water and recreation the priority. However, Mother Nature doesn't negotiate, and we continue to fail at both. Recall the brutal reality of the dichotomy of choices. The outcome at the lake is a turbid water state. While this doesn't result in a clean water outcome, it is an option that we could pursue and still meet the regulatory minimum requirements, which only requires us to do a little bit more activity each year.

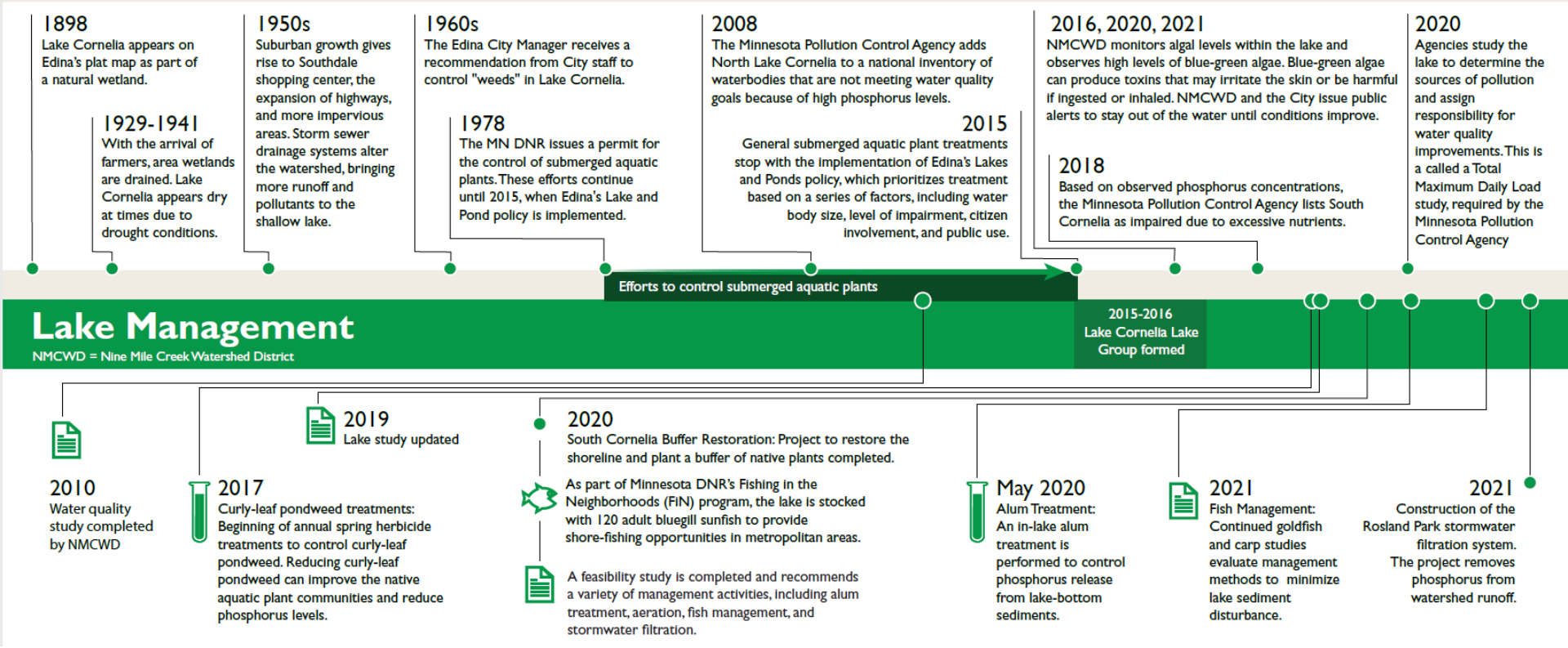
Lake and Pond Policy

The CITY of EDINA

- Under current policy, residents can make requests for aquatic vegetation management (algae and submerged plants). Eligible city-coordinated and/or city-funded activities are determined based on established criteria.
- Shallow lake management has evolved, new challenges with HABs, and long-term use of dye and copper treatments for algae control has been called into question.
- Lake and Pond management could look more like, more capital investment in pollution prevention (sweeping, for example), pollution mitigation (infrastructure, for example), and restoration of ecological processes (alum treatments, invasive curlyleaf pondweed control, sediment-Phosphorus control, for example).

Lake Cornelia

The CITY of EDINA



How do we engage people on this topic?

- Residents often want the best of both worlds (dichotomy of choices).
- The minimum regulatory compliance and 'clean water/recreation compromise' approaches have failed spectacularly when it comes to outcomes at the lake.
- Staff recommends moving into phase II, then getting reactions from the public on a draft vision and roadmap for closing the clean water gap.

Phase 2 Scope

- Phase II of City's clean water strategy is currently intended to outline the philosophy and vision of the City's Clean Water Strategy and lay out options to close the gaps identified in the phase I memo and/or improve the level of service. Reprioritization and establishment of goals developed during phase II will help integrate those goals into the existing programs to best align services and available funding to protect and improve surface water.
- A scope for phase II will be brought for Council's consideration in fall 2022.

Key Questions

The CITY of EDINA

- Comments on policy considerations? Outcomes? Principles?
- Comments on priority waterbodies and pollutants? Can we have tiered goals based on waterbody characteristics? Lake Cornelia as a focus area might define top-end of level of effort. What other waterbodies would belong in this tier versus a lower tier?
- What are you hearing from people about water resources management? What do you think we need?
- What do you need to know to decide?
- What other questions should we answer with phase II scope?

CITY OF EDINA

4801 West 50th Street
Edina, MN 55424
www.edinamn.gov

Date: August 3, 2022

Agenda Item #: IV.

To: Mayor and City Council

Item Type: Other

From: Jessica V. Wilson, CFM, Water Resources Manager

Item Activity: Discussion, Information

Subject: Clean Water Strategy

ACTION REQUESTED:
No Action Requested:
Review attached report.

INTRODUCTION:
Staff will present early ideas for development of a Clean Water Strategy.

ATTACHMENTS:

Clean Water Strategy Report
Lake Cornelia Summary Sheet
Phase 1 Memo
Staff Presentation

STAFF REPORT

Date: August 3rd, 2022

To: CITY COUNCIL

From: Jessica Wilson, CFM, Water Resources Manager

Subject: Clean Water Strategy - Report

Information / Background:

We are just getting started on the Clean Water Strategy that we had committed to in the 2018 Comprehensive Water Resources Management Plan. We are behind schedule - we had originally committed to doing the Flood Risk Reduction Strategy in 2019 and the Clean Water Strategy in 2020.

We are at the beginning of this process in establishing the baseline condition of clean water work in Edina and seeking feedback from City Council on policy considerations. The current Comprehensive Water Resources Management Plan lacks a clear goal for waterbodies and fails to outline a roadmap for meaningful actions that could lead to clean water outcomes, instead focusing narrowly on activities that check the boxes for our regulatory agencies.

Clean surface water is not 'utility' that rings the phones and needs a different kind of assurance mechanism. Our work is an add-on to land planning, development, and road or utility projects and it lacks focus. Our industry is not action and outcome oriented and there is much uncertainty in meeting regulatory clean-water goals not to mention customer expectations around clean water in any reasonable timeframe.

We've completed phase 1, summarized below. We're seeking Council's direction on policy paths and priorities. We intend to come back with a phase II scope which should start to build the vision that the City wants to pursue with a focus on intended outcomes.

Recent Work - Phase 1 Report

The scope of phase 1 was to identify the goals and expectations of the City's current program in comparison to what the City is currently accomplishing. Questions asked during this phase include:

- What are the City's current priorities concerning clean (surface) water?
- What is the City's current program accomplishing, and what level of service is the City achieving?
- What are others doing to deliver clean surface water?

We also created summary sheets for 13 lakes and clean water topic fact sheets to highlight the history and current state of water and clean water activities within the City. The Lake Cornelia summary sheet is provided.

We are at-peer level in our work with some areas above and below peer. A copy of the phase I memo is provided. Lake summary sheets can be accessed from the Water Resources library at https://www.edinamn.gov/1334/Water-Resources

Phase II of City's clean water strategy is currently intended to outline the philosophy and vision of the City's Clean Water Strategy and lay out options to close the gaps identified in the phase I memo and/or improve the level of service. Reprioritization and establishment of goals developed during phase II will help integrate those goals into the existing programs to best align services and available funding to protect and improve surface water. A scope for phase II will be brought for Council's consideration in fall 2022.

Policy Options

All lakes and ponds in Edina are considered shallow. The deepest lake, Mirror Lake, is 15 ft deep at its maximum depth.

Shallow lakes behave differently than deep lakes. Shallow lakes can exist in two states – the clear water state or the turbid water state. Lakes tend to stay in one state or another. It takes a big change for the lake to switch from one state to the other. I often compare this to where a boulder is along a hill. The turbid state is the boulder at the bottom of the hill, and the clear water state is the boulder at the top of the hill.

There are three potential policy options.

Policy Option 1: Clear Water

We make clean water the priority. Native rooted, floating, and emergent aquatic vegetation are encouraged. We recognize that shallow lakes have beneficial uses beyond boating and swimming, to include wildlife habitat and aesthetic views. Native plants act as nutrient sinks, making them less available for algae to grow. As we approach clean water goals, algal blooms are less frequent, and water is more transparent. As conditions improve, chemical algal treatments may no longer warranted. Submerged aquatic vegetation is thick, covering the entire littoral area of the waterbody, and is encouraged. Boating and swimming are inhibited by dense vegetation. Submerged aquatic plant destruction is only completed for non-native species and where a measurable water quality benefit can be realized (curly leaf pondweed, for example). This policy option is supported by staff.

The boulder is at the top of the hill. It takes a lot of effort to get it to the top of the hill. Once there, it takes sustained care to keep it there and takes a lot of work to get it back there if it rolls down the hill.

Policy Option 2: Turbid Water

We do routine and non-specific destruction of all aquatic vegetation. No plants make for easy paddling and there's no risk of your foot touching lake 'weeds'. Boating and swimming are priority uses. The fishery suffers from low dissolved oxygen, lack of food, and lack of habitat. Water quality continues to degrade, and we never reach clean water goals as defined and described by the MPCA and federal Clean Water Act. Algal blooms become more frequent including potential Harmful Algal Blooms (HABs). We add copper sulfate to knock algae back for about two weeks at a time – a practice that continues forever.

The boulder is at the bottom of the hill. Our past failures have gotten us down here. It's easy to stay here. Significant effort is needed to roll the boulder back to the top of the hill.

Policy Option 3: The Compromise

We choose to make both clean water and recreation the priority. However, Mother Nature doesn't negotiate, and we continue to fail at both. We invest resources in battling natural ecological processes. Boats can freely move through the water, uninhibited by vegetation. The public is advised to avoid contact with the water. Only the lowest quality aquatic animals are found. Swimming is uncommon as algal blooms become more frequent including potential HABs. We never meet regulatory clean water goals, nor do we meet recreation expectations.

The boulder is being held somewhere in the middle. It's very hard to hold here – recall that lakes tend to exist in one of two states, a clear water state or a turbid water state.

Minnesotans take great pride in our more than 10,000 lakes and it's common for people to want all lakes to be all things – a pristine clear water lake like on the north shore which they can boat and swim in. Residents care deeply about their waterbodies. How do we get people up to speed and channel their energy and enthusiasm into actions that will help us achieve clean water? There are industries for aquatic vegetation destruction and aeration. These products and services are continually sold to shallow lake residents with the promise that they will 'clean up' their lake when at best they do nothing and at worst they work against clean water goals.

The paradox of shallow lakes is that in order to have a clean and healthy lake, we must encourage the shallow lake ecology which makes it unsuitable for most recreation and challenges our notion of a conventional lake aesthetic. Recreation and clean water services can directly compete with each other. Managers cannot realistically deliver a shallow lake with a sandy bottom, no plants, and clear water.

Which waterbodies do we prioritize?

The status quo is to treat all waterbodies the same. There are hundreds of small waterbodies in Edina, many less than a couple acres in size. When resources are spread too thin, it's difficult to make the investments that are necessary to move a lake from a turbid state to a clean water state. It takes sustained effort and significant resources to restore and then protect a waterbody. We propose prioritizing waterbodies so that we can focus resources on meaningful activities to achieve clean water outcomes. This means nonpriority waterbodies would receive a lower tier of service.

There are many ways to categorize and sort waterbodies.

Staff proposes prioritizing the following waterbodies based on size, Impaired Waters List status, poor water quality, and existing monitoring data and lake studies.

- Lake Cornelia (on Impaired Waters List)
- Lake Edina (on Impaired Waters List)
- Arrowhead Lake
- Indianhead Lake
- Mirror Lake

The Nine Mile Creek Watershed District completed a lake study on Lake Cornelia and Lake Edina in 2019, completed a draft lake study for Arrowhead and Indianhead Lakes in 2022 and are just starting a lake study for Mirror Lake.

What pollutants do we prioritize?

Eutrophication is the process by which a body of water becomes enriched in dissolved nutrients that stimulate the growth of aquatic plants (including algae) usually resulting in the depletion of dissolved oxygen.

Chloride pollution is a growing problem in Minnesota. The primary source in waterbodies in Edina is from deicing salts applied to roads, sidewalks, and parking lots for winter maintenance. Excess chloride makes water more saline and can limit the ability for freshwater plants and animals to survive and reproduce.

Sediment is material that broken down by processes of weathering and erosion and is subsequently transported to and settles to the bottom of a waterbody. Sediment can come from soil erosion or decomposition of plants and animals. The most common source in urban settings is from construction activities. Sediment clogs waterways and stormwater systems, creates cloudy water, and can also transport nutrients.

Staff proposes focusing clean water outcomes on managing the following pollutants.

- Limiting Nutrients (phosphorus and/or nitrogen)
- Chloride
- Sediment

How do we achieve clean water?

Focus on desired outcomes. Adopt these three clean water principles.

Prevent pollution

- Source control. Reduce inputs. Reduce pollutants including chloride, fertilizer, pesticides (including copper sulfate). Encourage smart residential lawn care.
- Keep it clean. Increase street sweeping. Regulate erosion and sediment control for construction activities. Encourage smart residential lawn care. Promote the adopt-a-drain program.

Mitigate pollution

- Infrastructure. Assets are both public and private. Asset types include conveyance, structural, ponds (subset of structural), and private/non-city owned. Maintain/retrofit what we already have. Capture and treat most polluted water. Optimize operations and maintenance to get the most benefit. Implement smart technology to get additional benefit for minimal cost.
- Illicit discharge detection and elimination. Identify and mitigate illicit discharges to the storm sewer system and waterbodies.

Restore ecological processes

- Aquatic plants. Restore ecological processes to reap ecosystem benefits (plants provide a sink for nutrients, oxygenation, bottom stabilizer, wildlife refuge). Control invasive curlyleaf pondweed.

- Control lake sediment phosphorus source. Utilize alum and iron to reduce bioavailable nutrients. Implement oxygenation to control sediment phosphorus release.
- Control invasive fish. Remove invasive rough fish. Enhance with native fish.
- Land Management (natural areas restoration). Restore natural areas (Syncs with 2015 Parks Strategic Plan and 2021 Climate Action Plan).

Though not explicit principles for water resources management, engagement, monitoring and studying/understanding, communication, regulation, and climate action, among others, are threaded in on a more tactical level.

Phase II of City's clean water strategy is currently intended to outline the philosophy and vision of the City's Clean Water Strategy and lay out options to close the gaps identified in the phase I memo and/or improve the level of service. Reprioritization and establishment of goals developed during phase II will help integrate those goals into the existing programs to best align services and available funding to protect and improve surface water. A scope for phase II will be brought for Council's consideration in fall 2022. Phase II will also include a public participation plan to describe how we intend to get reactions from the public about the forthcoming Clean Water Strategy.

Potential next steps

The reality is that this will take a long time. We've been polluting and mismanaging water resources for decades. Clean up efforts will take a long-term commitment. We don't know what success looks like yet.

There is room for growth in all principles/activities listed above. We have yet to determine how big the gaps are, which activities are the most beneficial, the time/cost it would take to close the gap. Phase II could establish goals based on desired surface water outcomes, determine gaps in implementing clean water principles for priority waterbodies/pollutants, establish the investment in capital and time necessary to close the gaps, and estimate the benefit.

We intend to bring a phase II scope for council consideration in fall 2022.

Key questions

Staff includes the following key questions for consideration during the August 3 work session.

- Comments on policy considerations? Outcomes? Principles?
- Comments on priority waterbodies and pollutants? Can we have tiered goals based on waterbody characteristics? Lake Cornelia as a focus area might define top-end of level of effort. What other waterbodies would belong in this tier versus a lower tier?
- What are you hearing from people about water resources management? What do you think we need?
- What do you need to know to decide?
- What other questions should we answer with phase II scope?

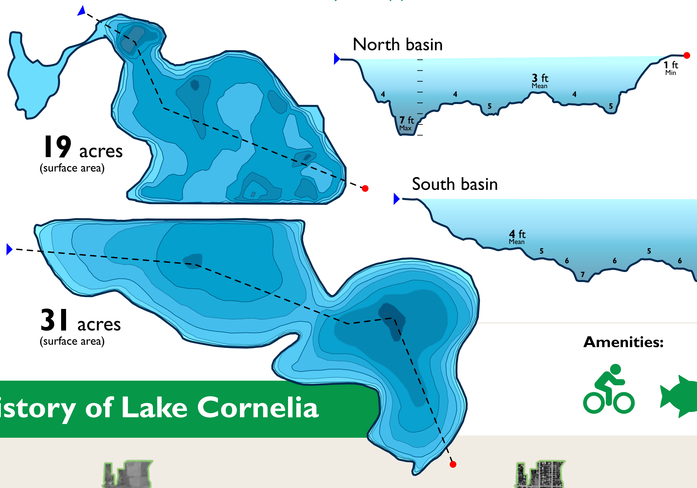
Links to past conversations on this topic

March 5, 2019 – Work Session – Water Resources Management – Morningside Neighborhood Flood Risk Reduction Strategy, Lake Cornelia Clean Water Strategy, and Chloride Pollution Prevention
September 5, 2018 – Adoption of 2018 Comprehensive Water Resources Management Plan
April 3, 2018 – Work Session – Comprehensive Water Resources Management Plan – Implementation Discussion
January 17, 2018 – Authorize Staff to Submit Draft Comprehensive Water Resources Management Plan for Agency Review
November 21, 2017 – Work Session – Draft 2018 Comprehensive Water Resources Management Plan Presentation for Review and Comment

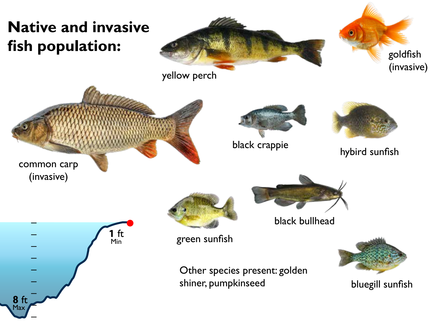
Public water ID: 27002800 Watershed District: Nine Mile Creek

Lake Cornelia

Lake Cornelia is a shallow lake with northern and southern basins connected by storm pipes.



Native and invasive fish population:



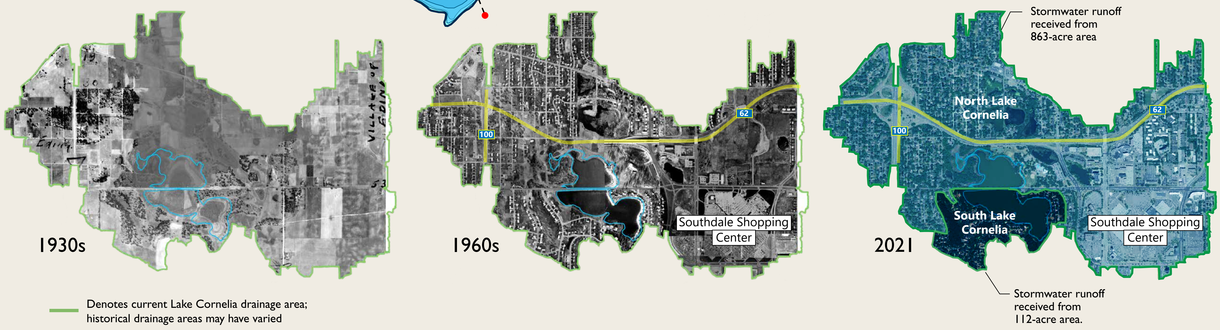
Other species present: golden shiner, pumpkinseed

Amenities:

A pavilion, a picnic shelter, tables, grills, a 1.1-mile paved path, and a fishing pier. Rosland Park, adjacent to Lake Cornelia, has baseball fields, a disc golf course, a playground, pickleball courts, and tennis courts.

There are no public swimming beaches at Lake Cornelia. Non-motorized boats only.

History of Lake Cornelia



1898
Lake Cornelia appears on Edina's plat map as part of a natural wetland.

1929-1941
With the arrival of farmers, area wetlands are drained. Lake Cornelia appears dry at times due to drought conditions.

1950s
Suburban growth gives rise to Southdale shopping center, the expansion of highways, and more impervious areas. Storm sewer drainage systems alter the watershed, bringing more runoff and pollutants to the shallow lake.

1960s
The Edina City Manager receives a recommendation from City staff to control "weeds" in Lake Cornelia.

1978
The MN DNR issues a permit for the control of submerged aquatic plants. These efforts continue until 2015, when Edina's Lake and Pond policy is implemented.

2008
The Minnesota Pollution Control Agency adds North Lake Cornelia to a national inventory of waterbodies that are not meeting water quality goals because of high phosphorus levels.

2015
General submerged aquatic plant treatments stop with the implementation of Edina's Lakes and Ponds policy, which prioritizes treatment based on a series of factors, including water body size, level of impairment, citizen involvement, and public use.

2016, 2020, 2021
NMCWD monitors algal levels within the lake and observes high levels of blue-green algae. Blue-green algae can produce toxins that may irritate the skin or be harmful if ingested or inhaled. NMCWD and the City issue public alerts to stay out of the water until conditions improve.

2018
Based on observed phosphorus concentrations, the Minnesota Pollution Control Agency lists South Cornelia as impaired due to excessive nutrients.

2020
Agencies study the lake to determine the sources of pollution and assign responsibility for water quality improvements. This is a called a Total Maximum Daily Load study, required by the Minnesota Pollution Control Agency

Efforts to control submerged aquatic plants

Lake Management

NMCWD = Nine Mile Creek Watershed District

2010
Water quality study completed by NMCWD

2017
Curly-leaf pondweed treatments: Beginning of annual spring herbicide treatments to control curly-leaf pondweed. Reducing curly-leaf pondweed can improve the native aquatic plant communities and reduce phosphorus levels.

2019
Lake study updated

2020
South Cornelia Buffer Restoration: Project to restore the shoreline and plant a buffer of native plants completed.

As part of Minnesota DNR's Fishing in the Neighborhoods (FiN) program, the lake is stocked with 120 adult bluegill sunfish to provide shore-fishing opportunities in metropolitan areas.

A feasibility study is completed and recommends a variety of management activities, including alum treatment, aeration, fish management, and stormwater filtration.

2015-2016 Lake Cornelia Lake Group formed

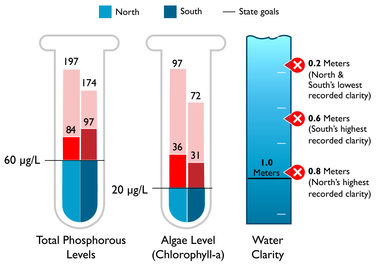
May 2020
Alum Treatment: An in-lake alum treatment is performed to control phosphorus release from lake-bottom sediments.

2021
Fish Management: Continued goldfish and carp studies evaluate management methods to minimize lake sediment disturbance.

2021
Construction of the Rosland Park stormwater filtration system. The project removes phosphorus from watershed runoff.

Water Quality

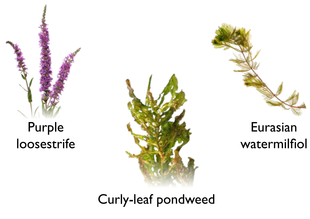
Recent water quality data



Water quality data for six of the years between 2013 and 2020 is available from the Nine Mile Creek Watershed District and the Metropolitan Council's Citizen-Assisted Monitoring Program. Summer-average highs and lows of water quality parameters over those years are provided above.

Lake Cornelia has poor water quality. Both basins are on Minnesota's impaired waters list for excess nutrients. The poor water quality is primarily due to excess phosphorus in the lake. The phosphorus comes from many sources, including stormwater runoff, decaying plants, and nutrient-rich sediments. Bottom-feeding fish also stir up this sediment, releasing phosphorus and creating murky water.

Aquatic Plants



Diverse aquatic vegetation is critical to the health of Edina lakes—providing food and shelter for fish and waterfowl and improving water quality. Invasive plant species within the lake are shown above.

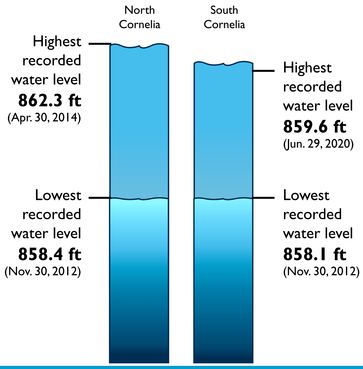
Curly-leaf pondweed further contributes to the lake's problems. The invasive, non-native aquatic plant grows under the ice during the winter and in early spring, often crowding out native species. It dies in late June and early July, much earlier than other native species. As curly-leaf pondweed decays, phosphorus is released into the water, fueling algal production.

Eurasian watermilfoil is a rooted, submerged aquatic plant, and purple loosestrife is a colorful, perennial wetland plant. Both species outcompete native plants, and neither provides suitable shelter, food, or nesting habitat for native animals.

Water Levels

2012-2022
North Cornelia water level data is from Nine Mile Creek Watershed District.

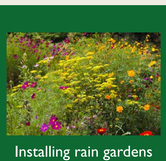
1964-2002, 2012-2022
South Cornelia water level data is from Minnesota Department of Natural Resources and Nine Mile Creek Watershed District.

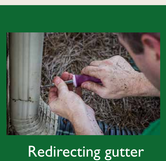


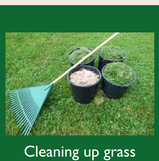
Find more information from the City of Edina:
Interactive flood map
Water resources library

How You Can Help

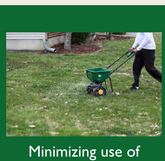
Steps that you can take to help Lake Cornelia include:


Installing rain gardens and planting shoreline buffers


Redirecting gutter downspouts towards vegetated areas


Cleaning up grass clippings and leaves


Participating in the adopt-a-drain program (mn.adoptadrain.org)


Minimizing use of fertilizer on lawns

Learn more about these strategies at ninemilecreek.org

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engineering and environmental consultants

BARR

Memorandum

To: Ross Bintner and Jessica Vanderwerff Wilson, City of Edina
From: Barr Engineering Co.
Subject: Phase I – Edina Clean Water Strategy
Date: June 22, 2022
Project: 23271913.00

1.0 Project Purpose and Background

The City of Edina (City) engaged Barr Engineering Co. (Barr) to assist in the effort of developing a Clean Water Strategy to guide and align the implementation of clean water services within the city. The overall effort of developing the strategy was split into two phases, with Phase I focused on identifying the goals and expectations of the City's current program in comparison to what the City is currently accomplishing. Questions asked while performing this phase of the work, include:

- What are the City's current priorities concerning clean (surface) water?
- What is the City's current program accomplishing, and what level of service is the City achieving?
- What are others doing to deliver clean surface water?

This memorandum summarizes findings from this phase of work, during which Barr performed a review of existing city documents and stated priorities, interviewed City water resources staff, summarized existing data on the current state of Edina water bodies, reviewed clean water philosophies and practices of four comparable cities, and created a series of lake summary sheets and clean water topic fact sheets to highlight the history and current state of water and clean water activities within the City.

2.0 Current Goals, Priorities, and Expected Level of Service

To understand the City's current goals, policies and commitments to clean water level of service, Barr reviewed several foundational documents that speak to the City's overall planning, public infrastructure, and practices related to stormwater management: the 2018 City of Edina Comprehensive Plan, the 2015 Living Streets Plan, the 2022 draft Stormwater Pollution Prevention Plan (currently under-development at the time of this project), the 2018 Comprehensive Water Resources Management Plan, in addition to the stormwater management rules and ordinances of the City of Edina, Nine Mile Creek Watershed District (NMCWD), and Minnehaha Creek Watershed District (MCWD).

The City's Comprehensive Plan and 2015 Living Streets Plan are grounded in themes of sustainability. The Comprehensive Plan acknowledges the importance of accounting for climate change, sustainability, and

aging infrastructure needs when considering growth and development. Considerations for the City's asset management needs are integrated throughout the document. Chapter 7 of the Plan is focused on water resources and the approach taken to manage the city's stormwater utility. As described within this plan, Edina's stormwater utility asset management approach includes working to understand and react to service level deficits, understanding and responding to risk, and taking a life cycle view on stormwater infrastructure needs. The Plan describes the City's stormwater utility services as providing: "*drainage of surface waters, management of rainfall runoff and flood risk, reduction of water pollution, treatment of stormwaters, and protection of natural water bodies and wetlands to provide outcomes supportive of local, state and national surface water goals and policies.*" The City's Comprehensive Water Resource Management Plan is referenced for additional details on utility service level expectations.

The 2015 Living Streets Plan describes how City goals related to sustainability will be accounted for, when planning and redeveloping city streets. The Plan acknowledges the impact that City streets can have on the water resources and, conversely, the role they can play in effective stormwater management by incorporating green infrastructure and other low-impact-development stormwater practices as part of street projects. Similar to the Comprehensive Plan, the Living Streets Plan includes a commitment to work with community stakeholders, technical professionals and decision-makers to define expectations for capital projects that the city implements and the services it will provide. The Living Streets Plan describes the stormwater utility's services as providing flood protection and clean water. The Plan references a desire to go above-and-beyond in managing stormwater when possible, but does not include definition of what the base service level expectation is; rather referencing the City's Comprehensive Water Resources Management Plan as the document for use in identifying priorities of the stormwater utility.

The City's Comprehensive Water Resources Management Plan (CWRMP) is incorporated into its Comprehensive Plan, by reference, and is identified in both the Comprehensive Plan and Living Streets Plan as the primary resource for information on City goals and priorities associated with level of service and priorities related to the City's stormwater utility. The CWRMP describes the City's goals and commitments for clean water service levels, as primarily focused on meeting federal, state, regional and local mandates on surface water protection; in some cases, moving beyond these minimum requirements. The prioritization of capital improvements is described as first focusing on those projects that provide long-term, measurable improvement to waterbodies that have been included on the Federal List of Impaired Waters or those that are otherwise shown to not be meeting clean water goals. The City's 2014 lake and pond management policy includes a system to prioritize resident requests for aquatic vegetation management. Higher priority is given to those waterbodies that are currently listed as impaired, or otherwise shown to not be meeting the state water quality standard. Within the CWRMP, the City makes a commitment to manage their water resources to ensure beneficial uses of its lakes, streams, ponds and wetlands remain available to the community. Such beneficial uses may include: aesthetic appreciation, wildlife habitat protection, nature observation, and recreational activities. The CWRMP also describes several programs and policies designed to encourage and facilitate partnership with local watershed districts and residents on activities that advance a healthier lake ecosystem or other clean water benefit.

Several of these programs and policies have implicit or implied narrative goals, such as promoting a diverse aquatic plant community. Explicit metrics or level of service goals associated with these activities are not defined.

The City's Stormwater Pollution Prevention Plan (SWPPP) is aligned with meeting the City's requirements for stormwater management, resulting from their state Municipal Separate Storm Sewer Systems (MS4) Permit. This document contains information on city activities and programs designed to satisfy the permit's six minimum control measures. The document does not define nor contain commitments for utility asset level of service; however, it does contain information and city commitments on best practices and activities that the City will undertake to protect its surface waters by addressing illicit discharges, working to prevent or reduce the discharge of pollutants into the MS4, and performing inspections and maintenance of city-owned structural BMPs, among other items. The state MS4 permit mandates that the City of Edina have a regulatory mechanism in place to address and control stormwater management activities on public infrastructure and site redevelopment projects. The City of Edina's stormwater rules address erosion, sediment control, and rate control requirements. The City defers regulatory authority for the regulation of water quality and volume control of stormwater runoff to the Minnehaha Creek and Nine Mile Creek Watershed Districts. Both watershed districts have stormwater management requirements that meet or exceed those required by the state.

2.0 Current Accomplishments

Current City programs are primarily aligned with meeting federal, state, regional, and local regulatory requirements, and particularly those of the City's Phase II MS4 permit. The City actively partners with its local watershed districts on studies and implementation activities to protect and improve surface water quality within its waterbodies. Following its lake and pond management policy, the City also plays an active role in supporting in-lake management activities that advance a clean water benefit. Details of the City's Water Resources Implementation Program are outlined in Table 15.1 of the City's CWRMP.

As part of the Clean Water Strategy effort, Barr reviewed the current status and governing requirements for 13 waterbodies within the City of Edina. Attachment A includes a table summarizing available information for these waterbodies, including: public waterbody and beneficial use classification, water quality impairment status, availability of water quality data and frequency of monitoring, known information on aquatic plants and fish communities and lake physical characteristics.

Results of this review highlight the significant challenge of protecting and managing shallow lake systems within a fully built-out, urban setting. Of the thirteen waterbodies reviewed, two (Lake Cornelia and Lake Edina) are currently included on the USEPA's Federal List of Impaired Waters. All of the waterbodies with available surface water quality monitoring data have been shown to consistently not meet state water quality standards. Most of the lakes also have aquatic invasive species present. The City's creeks (North and South Fork of Nine Mile Creek, and Minnehaha Creek) are also listed as impaired by the USEPA.

The attached lake summary sheets highlight and summarize the best available water quality, aquatic vegetation, fish community, and water level data for each of the 13 lakes reviewed. Also summarized is the history of each waterbody, showing how the surrounding landscape and land use has changed as the city has developed around them. Key lake management activities performed by the City or other government partners, and results of lake studies are also highlighted on the sheets.

3.0 Review of Other Cities

In an effort to understand what other cities are doing to advance clean water, Barr reviewed readily-available information on the clean water programs and practices of four similarly-sized suburban cities, as identified and requested by City staff. The cities chosen have similarities to Edina, in relation to their status as a suburb of a larger metropolitan area and/or prevalence of natural waterbodies. Barr's review was focused on identifying information related to each city's clean water philosophy, noting apparent influences on the city's clean water programs, how the cities use partnerships to advance their clean water goals, and any particularly notable practices the cities were undertaking to advance water resource management. The four cities reviewed were: Evanston and Highland Park, Illinois, Everett, Washington and Apple Valley, Minnesota.

Evanston and Highland Park, Illinois are suburbs of Chicago, situated on Lake Michigan. Evanston, IL has a population of 78,110 and is located 12 miles north of Chicago. Highland Park has a population of 29,622 and is located 22 miles northwest of downtown. Responsibility for stormwater management in both of these cities falls to their Public Works Department. Both cities have educational materials readily-available on their websites, to educate citizens regarding stormwater management, ways that residents can manage stormwater on their property, methods for residents to prevent pollution, and more.

While it is situated directly on Lake Michigan, the majority of Evanston drains to combined sewer systems that outlet to Metropolitan Water Reclamation District (MWRD) facilities. However, a small portion of Evanston does drain to Lake Michigan; this portion of the city is covered by an MS4 permit. As part of their Climate Action and Resiliency Plan, Evanston has stated goals for protection, restoration and expansion of its urban canopy and natural areas, in addition to the promotion of using green stormwater infrastructure (GSI) toward a goal of eliminating combined sewer overflows. These goals are also reflected in the City's Stormwater Management Plan. The City is currently undergoing an update to their Stormwater Management Plan, including development of a city-wide hydrology and hydraulic model for use in setting goals associated with flood protection and prioritizing capital improvements. The City historically had a partnership with MWRD through which residents could obtain free rain barrels; that program ended in 2016.

The City of Highland Park, IL drains primarily to two large waterbodies: the Chicago River and Lake Michigan. Highland Park actively partners and benefits from several county-level water management programs, including participation as a member of the Lake County Stormwater Management Commission which provides services under 4 of the 6 Minimum Control Measures required by Highland Park's MS4

permit. This includes implementation of their Watershed Development Ordinance, which regulates stormwater management requirements for development projects within the County. A local watershed group and the county health department perform water quality monitoring within the city. The City's website highlights work the City is doing to preserve and restore natural areas.

Everett, WA is located 27 miles northeast of Seattle. Stormwater runoff from the city flows to one of 3 large waterbodies: Lake Washington, the Snohomish River or Port Gardner Bay. A northern portion of the city drains to a CSO. The City's Surface and Stormwater Services Group is within their Public Works Department. The stated goal of the surface and stormwater group is to reduce stormwater pollution, promote private stormwater management and protect rivers, streams, and groundwater. Everett 's stormwater management programs are aligned to meet requirements of its Phase II MS4 permit. The city generally defers to the Washington State Department of Ecology Stormwater Management Manual for Western Washington to define its stormwater policies and regulations. The city does implement a permitting program and has several resources on-line for developers to ease in the permitting process.

The City of Everett's website provides education and lists multiple programs to get residents involved in stormwater management, including a program that covers up to $2,500 for installation of a raingarden and a program that sells pre-made rain barrels for $55. The city provides several resources to educate the public on at-home activities to promote clean water. The city website also includes specific information for all the local lakes, including an interactive map that allows the user to select a lake and learn details regarding water clarity, phosphorus, and algae. The city has historically partnered with other government agencies to advance ecological restoration projects within the city. The city participates in vegetation management within a local lake annually. City staff performed surface water and macroinvertebrate sampling within city streams at several locations.

Apple Valley, MN is located 20 miles south of Minneapolis and southeast of Edina. The city's Public Works Department oversees operation and maintenance of the storm sewer system. Within Public Works is the Natural Resources Division which oversees and coordinates the city's programs and policies for surface water management. Apple Valley falls under the jurisdiction of the Black Dog Watershed Management Organization, Vermillion River Watershed Joint Powers Organization, and Dakota County Soil and Water Conservation District. The Black Dog WMO performs surface water quality and aquatic vegetation monitoring in select Apple Valley lakes. The city has also historically participated in the Metropolitan Council's Citizen-Assisted Monitoring Program (CAMP) for lake water quality monitoring and performs vegetation and fish surveys on priority lakes. The city has successfully partnered with their watershed organizations, and neighboring communities to secure state funds and implement several water quality improvement projects.

Apple Valley has several webpages and other online resources targeted at public education on lake, pond and stormwater management, the city's activities to advance clean water, and actions that residents can take to assist on their own property. Resources include fact sheets for several lakes within the city, in addition to lake management and operational plans. The city also provides FAQs regarding ponds and

lakes addressing questions such as: why ponds are weedy, why ponds are green, and why does the pond smell. The City of Apple Valley offers a cost share program, of up to $500, for residents that install raingardens, shoreline buffers, or native gardens on their property.

Based on this review of four communities, Edina's storm and surface water management practices are generally in-line with their peers. Each of the cities reviewed had a foundational focus of meeting their MS4 permit requirements, with supplementary programs and practices aligned with climate resiliency and natural resource protection and restoration. Each of the cities relies on partnerships to help advance their goals. The cities of Everett, WA and Apple Valley, MN appear to take a more active role and to have more substantial programs in the management of their natural resources, appearing to strategically focus city resources particularly in those areas where partnerships are not available. They both have a robust on-line presence with resources targeted at public engagement and education as associated with storm and surface water management. Given the City of Edina's long history of focusing on their natural resources and strong partnerships with their watersheds and lake associations, Edina may want to consider similar educational strategies for actively communicating city priorities and practices, past management activities, and educational messages to help inform and engage the public in contributing to the management of its surface waters. Edina may similarly want to consider the strategies being utilized by Everett and Apple Valley in structuring the city's programs focused on natural resource management as coordinated and complimentary to those of its other local governmental partners.

4.0 Gaps Analysis

There are several ways in which the City of Edina can, and does, work to protect and improve water quality within its surface waters. These include various city policies, zoning and regulations, the management of city properties, engagement with its resident, and the building and maintenance of capital infrastructure. Through review of City documents, discussion of current clean water commitments with City staff, and review of the City's clean water level of accomplishments, the following gaps and areas for potential improvement in Edina's clean water services were identified.

These gaps and areas for potential improvement were placed into categories related to the type of city activity they're associated with: "Managing the Landscape", "Managing its Waters", and "Resident Education and Engagement".

Managing the Landscape:

- The City of Edina leverages the strengths and regulatory authority of its watershed districts, relying on them for stormwater regulation and advancement of many of the clean water activities within the City. The NMCWD takes an active role in lake water quality monitoring, advancing technical studies and implementing water quality improvement projects within the city. The MCWD has historically been less active in performing this type of work in Edina. This is, in part, due to the fact that MCWD has fewer large waterbodies than NMCWD within the City. As a result,

the area of Edina within NMCWD has more lake water quality information and resources available to inform the development and implementation of clean water management strategies.

- The City relies on its watershed districts for implementation of stormwater rules and post-construction controls, as required by the City's MS4 permit for water quality pollutant removal. The City maintains rules for stormwater management on smaller sites (< 1 acre) when triggered by flooding and drainage issues. NMCWD's rules for stormwater management are more stringent than MCWD's rules, as related to the scale of project that triggers them. Both organizations' rules have historically been consistent with MS4 permit requirements. As part of the effort to update their SWPPP and CWRMP, the City is working to more clearly document the delineation of roles and responsibilities associated with stormwater permitting and inspections of stormwater controls as required by their MS4 permit.
- The City's Comprehensive Plan and Livings Streets Plan contain goals and strategies focused on stormwater management, resiliency and moving above-and-beyond stormwater regulatory requirements, but point to the CWRMP for further definition of management goals and prioritization of areas for implementation. The City's CWRMP does not currently contain a comprehensive, city-wide prioritization of these items for use in informing implementation.
- Though listed as a management strategy within its Water Resources Implementation goals, the City is not currently performing additional strategic street sweeping in targeted areas for water quality improvement. Many of Edina's peer cities are using targeted street sweeping as a cost-effective strategy to reduce pollutant loading to surface waterbodies.

Managing its Waters:

- The City's current waterbody classification, prioritization and management policy was created to provide a framework for the City to respond to resident requests for lake management activities. This policy was last updated in 2018. Since that time, additional lake data have been collected, several additional lake and watershed-based management studies and implementation strategies have been developed, clean water projects have been implemented, and guidance on best practice in shallow lake management has evolved. In addition, new lake management challenges such as harmful algal blooms (HABs) have emerged and questions have arisen about potential impacts of the long-term use of dye and copper treatments for in-lake algal control. The existing prioritization and lake management framework does not fully account for these considerations.
- The City currently defines its clean water goals as primarily focused on meeting federal, state, regional and local mandates on surface water protection, with a commitment to manage their water resources to ensure beneficial uses remain available to the community. Specific goals or delineation of management priorities for individual waterbodies and their associated drainage areas are not currently identified within the CWRMP.

Resident Education and Engagement:

- The City of Edina has several water resources webpages and an online report library focused on engaging the public, providing information on water resources within the city, regulatory requirements, and actions the public can take to help with protecting city waters. In addition, the City has two publicly available interactive map viewers: the Water Resources viewer and the "What is my Flood Risk?" viewer, where the public can engage with relevant information on City waterbodies within a map-based format. The City's current webpages on lake management and water quality topics, are more limited than what's provided for flooding, and also more limited than that provided by two of the four peer cities reviewed. The lake summary and clean water topic sheets being created as part of the Clean Water Strategy may help with addressing part of this gap.
- The City's Water Resources staff currently lack a comprehensive view of how city residents feel about the status of Edina's waterbodies, resident priorities for their use, and how the City is currently performing in their management.

5.0 Conclusion

The City of Edina places a high value on the management of its water resources and has numerous plans, policies, and programs in place to support protection of water resources. The City's currently stated clean water goals related to their surface waterbodies are tied to federal, state, and local water quality requirements. The following table summarizes the City's current clean water outcomes, as associated with these requirements, for nine waterbodies within the city. Four other waterbodies reviewed for this project did not have sufficient data available for reporting. As highlighted within the table, despite the City's on-going efforts and clean water investments, outcomes within these lakes compared to state-defined clean water goals are poor. Two of Edina's lakes (Lake Cornelia and Lake Edina) are currently included on the USEPA's Federal List of Impaired Waters. All of the waterbodies with available surface water quality monitoring data have been shown to consistently not meet state water quality standards; with some lakes being significantly over the goal for summer average total phosphorus. Most of the lakes also have aquatic invasive species present. The City's creeks (North and South Fork of Nine Mile Creek, and Minnehaha Creek) are also listed as impaired by the USEPA.

Lake	Designated as "Impaired" by MPCA and USEPA[1]	Range of Summer Average Total Phosphorus Concentration (µg/L)[2]	Notes on Water Quality Data Availability	Summary of Aquatic Invasive Species[3]
Lake Cornelia – North	X	High: 211; Low: 84; Average: 142	Data available for 9-years between 2007 to 2020.	Invasive species include: goldfish and common carp; curly-leaf pondweed, purple loosestrife, and Eurasian watermilfoil.
Lake Cornelia - South		High: 174; Low: 97; Average: 131	Data available for 6-years between 2008 to 2020.	
Lake Edina	X	High: 146; Low: 77; Average: 111	Data available for 5-years between 2008 to 2020.	Invasive species include: curly-leaf pondweed and Eurasian watermilfoil.
Hawkes		High: 123; Low: 88; Average: 110	Data available for 4-years between 2016 to 2019.	*Data not available.*
Arrowhead		High: 80; Low: 52; Average: 68	Data available for 4-years between 2011 to 2020.	Invasive species include: purple loosestrife, curly-leaf pondweed, and Eurasian watermilfoil.
Indianhead		High: 146; Low: 53; Average: 94	Data available for 4-years between 2011 to 2020.	Invasive species include: purple loosestrife, yellow iris, and curly-leaf pondweed.
Pamela		High: 213; Low: 51; Average: 121	Data available for 7-years between 2004 to 2015.	*Data not available.*
Harvey		Average: 152	Data available for 1-year in 2010.	*Data not available.*
Mirror		High: 119; Low: 104; Average: 112	Data available for 2-years between 2004 to 2012.	Invasive species include: goldfish, purple loosestrife, and curly-leaf pondweed.
Melody		High: 164; Low: 140; Average: 152	Data available for 2-years between 2009 to 2010.	Invasive species include: curly-leaf pondweed and Eurasian watermilfoil.

[1] As noted within the MN Pollution Control Agency's 2022 List of Impaired Waters. Waters listed as 'impaired' by the State of MN and USEPA are not meeting state or federal water quality standards.
[2] Based on data collected and reported by the Nine Mile Creek Watershed District, the Metropolitan Council, and the MN Pollution Control Agency. The state goal for average summer total phosphorus concentrations for shallow lakes in this region is less than or equal to 60 µg/L.
[3] Based on data collected and reported by the Nine Mile Creek Watershed District and the MN Department of Natural Resources.

The City's current policies of protecting beneficial uses for its residents and promoting balanced lake ecosystems are difficult to assess without further definition of goals at the city and/or waterbody-level. As part of Phase II of the Clean Water Strategy, we recommend that the City (re-) prioritize and further define goals for clean water services both within its surface waterbodies, as well as in those areas that drain to them.

Developing a reprioritization and goals for its surface waterbodies will help the City to become more proactive and less reactive in the implementation of in-lake clean water services, by further defining how and when it will engage in lake management activities. It will also assist in identifying priority areas on the landscape for the implementation and advancement of watershed-based clean water services such as strategic street sweeping, pursuit of further partnerships with its watershed districts and other organizations, and grants for above-and-beyond water quality improvements.

Phase II of City's clean water strategy is currently intended to outline the philosophy and vision of the City's Clean Water Strategy and lay out options to close the gaps identified in this Phase I memo and/or improve the level of service. Reprioritization and establishment of goals developed during Phase II will help the City integrate those goals into their existing programs in an effort to best align city services and available funding to protect and improve the city's surface water.

Attachment A: Edina Lake Management Summary Table

Name	Public Waterbody ID (1 unless noted)	Public Waterbody Classification (1 unless noted)	State Assessment Unit ID (1 unless noted)	Beneficial Use Classification (2 unless noted)	Is it currently listed as impaired? (3)	Applicable WLAs (3)	If impaired, is TMDL/WRAPS complete? If yes, include link	Is it directly upstream of an impaired water? (1)	Has a UAA study done by WD? (4)	Is water quality data available? If yes, include link	Water Quality Parameters (most recent years) (2)	Sampling Frequency by State (2)	Water Quality Sampling by WD (4)	Frequency by WD (4)	Vegetation Sampling / Observation (noted by who and timing)	Citizen Monitoring/Other monitoring (2)	Lake Association / Lake Group (1)	Assigned classification for aquatic vegetation management (high, med, low, or none) (1)
Lake Cornelia	27002801 and 2700282	P	North - 27-0028-01; South- 27-0028-02	2B	Yes, nutrients	Included in Lower MN River WRAPS (2014); WLA for TP	https://www.pca.state.mn.us/sites/default/files/wq-iw7-50e.pdf		Yes	https://webapp.pca.state.mn.us/surface-water/impairment/27-0028-01; https://webapp.pca.state.mn.us/surface-water/impairment/27-0028-02	Chl-a, TKN, TP, secchi, DO, NO2NO3, Turb (2020)	Almost every year	Secchi, Chl-a, turbidity, Do, Temp, Specific conductivity, TP, ortho P, TN, TKN, Nitrate and nitrite, Chlorides, pH	Every year except 2018 and 2019. Monthly sampling May to Sept	Phytoplankton, plants- once every three years (4)	Citizen Lake Monitoring (Secchi) and MCES Citizen Lake Monitoring (TP, Chl-A, Secchi)	Lake Cornelia group	High
Melody Lake	27066900	W	27-0669-00	2B	No		No		No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0669-00	Chl-a, TP, Secchi (2010)	2009 and 2010					Friends of Melody Lake	High
Mirror Lake	27005500	P	27-0055-00	2B	No		No		No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0055-00	Secchi (2020)	Almost every year	Secchi, Chl-a, turbidity, Do, Temp, Specific conductivity, TP, ortho P, TN, TKN, Nitrate and nitrite, Chlorides, pH	2020 last year (typically once every 7 years). Monthly sampling May to Sept	Phytoplankton, zooplankton, aquatic plants with IBI, at same time as WQ sampling (4)	Citizen Lake Monitoring (Secchi)	No	Low
Highlands Lake	27066800	P	27-0668-00		No		No		No	Not on MPCA	Not on MPCA website	Not on MPCA					No	Medium
Lake Edina	27002900	P	27-0029-00	2B	Yes, nutrients	Included in Lower MN River WRAPS (2014); WLA for TP	https://www.pca.state.mn.us/sites/default/files/wq-iw7-50e.pdf		Yes	https://webapp.pca.state.mn.us/surface-water/impairment/27-0029-00	Chl-a, DO, TKN, NO2NO3, pH, TP, turb, Secchi (2020)	Every 5 years	Secchi, Chl-a, turbidity, Do, Temp, Specific conductivity, TP, ortho P, TN, TKN, Nitrate and nitrite, Chlorides, pH	2020 most recent (typically 2-3 years) monthly sampling May to Sept	Phytoplankton, zooplankton, aquatic plants with IBI, at same time as WQ sampling (4)	MCES Citizen Lake Monitoring (TP, Chl-A, Secchi)	No	High
Indianhead Lake	27004400	P	27-0044-00	2B	No		No		No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0044-00	Chl-a, DO, TKN, NO2NO3, pH, TP, turb, Secchi (2020)	Every 5-10 years	Secchi, Chl-a, turbidity, Do, Temp, Specific conductivity, TP, ortho P, TN, TKN, Nitrate and nitrite, Chlorides, pH	Last two years monthly sampling May to Sept	Phytoplankton, zooplankton, aquatic plants with IBI, at same time as WQ sampling (4)	Citizen Lake Monitoring (Secchi)	The Indianhead Lake Association	High
Lake Nancy/Lake Otto	27067700- Nancy and 27067800-Otto	W	27-0677-00 Nancy		No		No	Yes	No	Not on MPCA	Not on MPCA website	Not on MPCA website					Lake Nancy Lake Association	Nancy-High, Otto-Low
Arrowhead Lake	27004400	P	27-0045-00		No		No		No	https://www.ninemilecreek.org/whats-happening/lake-creek-monitoring/	Not on MPCA website	Not on MPCA website	Secchi, Ch-a, turbidity, Do, Temp, Specific conductivity, TP, ortho P, TN, TKN, Nitrate and nitrite, Chlorides, pH	Last two years (before that every 3-5 years) monthly May to Sept	Phytoplankton, zooplankton, aquatic plants with IBI, at same time as WQ sampling (4)		Arrowhead Lake Association	High
Hawkes Lake	27005600	P	27-0056-00	2B	No		No		No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0056-00	Chl-a, TKN, NO2NO3, Pheo, TP, Secchi (2019)	Every year the past 6 years				MCES Citizen Lake Monitoring (TP, Chl-A, Secchi)	No	Low
Lake Harvey	27067000	W	27-0670-00	2B	No		No		No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0670-00	Chl-a, TKN, NO2NO3, Pheo, TP, TSS, Secchi (2004)	Only 2014				MCES Citizen Lake Monitoring (TP, Chl-A, Secchi)	No	Low
Lake Pamela	27067500	P	27-0675-00	2B	No		No	Yes	No	https://webapp.pca.state.mn.us/surface-water/impairment/27-0675-00	Chl-a, TKN, NO2NO3, TP, TSS, Secchi (2015)	Almost every year 2005 to 2015				MCES Citizen Lake Monitoring (TP, Chl-A, Secchi), Clean water legacy surface water monitoring, long term metropolitan lake chloride monitoring	No	High
Southwest Ponds	Not in table 16.3				No		No		No								No	
Centennial Lakes			27-1120-00 (2)	2B	No		No		No	Not on MPCA							No	

2B = cool and warm water aquatic life and habitat and wetlands
2Bg = cool and warm water aquatic life and habitat and wetlands, including biological criteria

Sources:
(1) City of Edina Comprehensive Water Resources Management Plan
(2) MPCA Surface Water Database
(3) Lower Minnesota River Watershed TMDL Part II by MPCA
(4) Nine Mile Creek (fact sheets or reports)
(5) Lake Finder
(6) DNR infested water list
(7) City of Edina staff, 2021
(8) UAA Study for Edina and Cornelia
(9) Edina XPSWMM Updates by Barr
(10) City of Edina Bathymetry Data
(11) GIS data developed for City.

Is there a fact sheet on the WD website, if yes include link	Watershed District	Max Depth	Average Depth	Lake Surface Area	Littoral Area	Shore Length	Ordinary High Water Level	Lake Level Management Plan	DNR Water Level Data	Watershed District Water Level Data	Bathymetry Data	Managed Outlet? (9)	Invasive Aquatic Plants (confirmed and managed)	Invasive Fish	Fish Stocked?	Confirmed HAB	Drainage Area (9)	FEMA Regulated Zone	FEMA 100-Yr Elevation (NGVD29)	Modeled 100-Year High Water Level
https://www.ninemilecreek.org/explore-the-watershed/explore-our-lakes-and-creeks/lake-cornelia/	Nine Mile Creek WD	6.5 feet (5), 8 feet (10)	4.6 feet (10)	52.63 acres (5), 33.3 acres (11)	58.24 acres (5)	2.34 miles (5), 1.32 miles (11)			https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27002800	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	No	Curly-leaf pondweed (4), purple loosestrife (4), hybrid cattail (4), Eurasian watermilfoil (6)	Carp and goldfish (7)	Bluegill (2020, 2016, 2015, 2014, 2012, 2011), Back Crappie (2015, Hybrid sunfish (2015), Pumpkinseed sunfish (2015) (5)	Annual since 2016 (7)	982.1 acres	AE	864	
No	Minnehaha Creek WD	7 feet (10)	4.2 feet (10)	8.51 acres (2), 8.3 acres (11)		0.86 miles					x	Pumped (controlled elev at 887.4)	Curly leaf pondweed (7), Eurasian watermilfoil (7)				176.2 acres			
No	Nine Mile Creek WD	14 fete (10)	5.4 feet (10)	21.29 acres (2), 22.8 acres (11)		1.37 miles			https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27005500	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	Pumped (controlled elev at app. 908.5)	Purple loosestrife (7), Curly leaf pondweed (7)	Goldfish (7)			282 acres			
No	Nine Mile Creek WD	8 feet (10)	3.7 feet (10)	9.0 acres (2), 11.4 acres (11)		0.69 miles (11)					x	Pumped (controlled at 888.5)			Bluegill, fathead minnow, largemouth bass, yellow perch (2015) (5)		272.9 acres			
https://www.ninemilecreek.org/explore-the-watershed/explore-our-lakes-and-creeks/lake-edina/	Nine Mile Creek WD	5 feet (4,8), 4 feet (10)	3 feet (4,8), 2.9 (10)	23.55 acres (2), 25 acres (4), 23.9 (11)		0.99 miles			https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27002900	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	No	Eurasian watermilfoil (4,5,6), Curly-lead pondweed (4)				394.9 acres	AE	824.5	
https://www.ninemilecreek.org/explore-the-watershed/explore-our-lakes-and-creeks/indianhead-lake/	Nine Mile Creek WD	6.5 feet (4), 7 feet (10)	4.7 feet (10)]	12.46 acres (2), 14 acres (4), 14.1 acres (11)		0.92 miles (11)	863.7 ft NGVD 29 (5)		https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27004400	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	No - landlocked	Purple loosestrife (4), Yellow Iris (4), Curly leaf pondweed (7)		Bluegill (2016, 2013), Black Crappie (2016, 2013), Largemouth Bass (2016, 2013), Hybrid sunfish (2016) (5)		113.9 acres			
No	Nine Mile Creek WD	4 feet (10)	2.5 feet (10)	Nancy- 3.75 acres (2); 4.3-acres (11) / Otto - 10.25-acres (11)		Nancy - 0.45-miles (11); Otto - 0.82-miles (11)			https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27067700	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	No		Carp and goldfish (7)			148.7 acres			
https://www.ninemilecreek.org/explore-the-watershed/explore-our-lakes-and-creeks/arrowhead-lake/	Nine Mile Creek WD	7 feet (5), 9 feet (10)	7 feet (4), 4.8 feet (10)	22.03 acres (5), 21.1 acres (11)	22.03 acres (5)	1.09 miles (5), 5, 0.98 (11)	875.8 ft NGVD 29 (5)	Yes	https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27004500	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY	x	No - landlocked	Eurasian watermilfoil (5,6), Purple loosestrife (4), curly leaf pondweed (7)		Bluegill and largemouth bass (2016) (5)		178.7 acres			
No	Nine Mile Creek WD			5.38 acres (2), 6.8 acres (11)		0.53 miles (11)			https://www.dnr.state.mn.us/lakefind/showlevel.html?downum=27005600	https://maps.barr.com/NMCWD/WebTool/Home/WaterLevels?selectIDs=NANCY		Pumped (controlled elevation at 885.1)					341.7 acres			
No	Minnehaha Creek WD			6.71 acres (2), 6.6 acres (11)		0.51 miles (11)						No, not pumped, piped outlet					42 acres			
No	Minnehaha Creek WD	8 feet (10)	3.4 feet (10)	6.75 acres (2), 7 acres (11)		0.54 miles (11)					x	No					276.4 acres	AE		
No	Nine Mile Creek WD											No- piped (all but one, other is landlocked)					411.5 acres			
No	Nine Mile Creek WD	9 feet (5, 10)	4.3 feet (10)	5.86 acres (2), 7.6 acres (11)	3.33 acres (5)	0.87 miles (5)					x	Not pumped, piped outlet			Bluegill (2020, 2017, 2016, 2015, 2014, 2012, 2011), Black Crappie (2017), Northern Pike (2017,2014), Pumpkinseed sunfish (2016), Largemouth bass (2014) (5)		214.3 acres			

Attachment B: Lake Summary Sheets

Attachment C: Clean Water Fact Sheets

The CITY of EDINA

Flood Risk Reduction Strategy – Report
Clean Water Strategy – Policy Development

City Council Work Session

August 3, 2022

Ross Bintner – Engineering Services Manager
Jessica Wilson – Water Resources Manager

Surface Water Utility

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1. Overview of utility
2. Review & next Steps for two core services

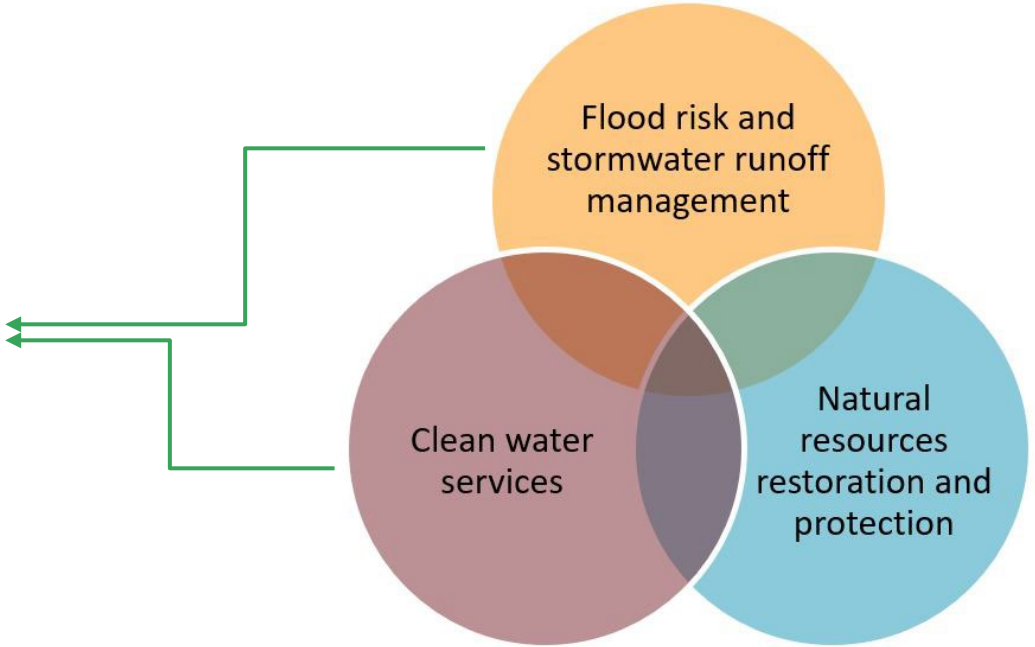
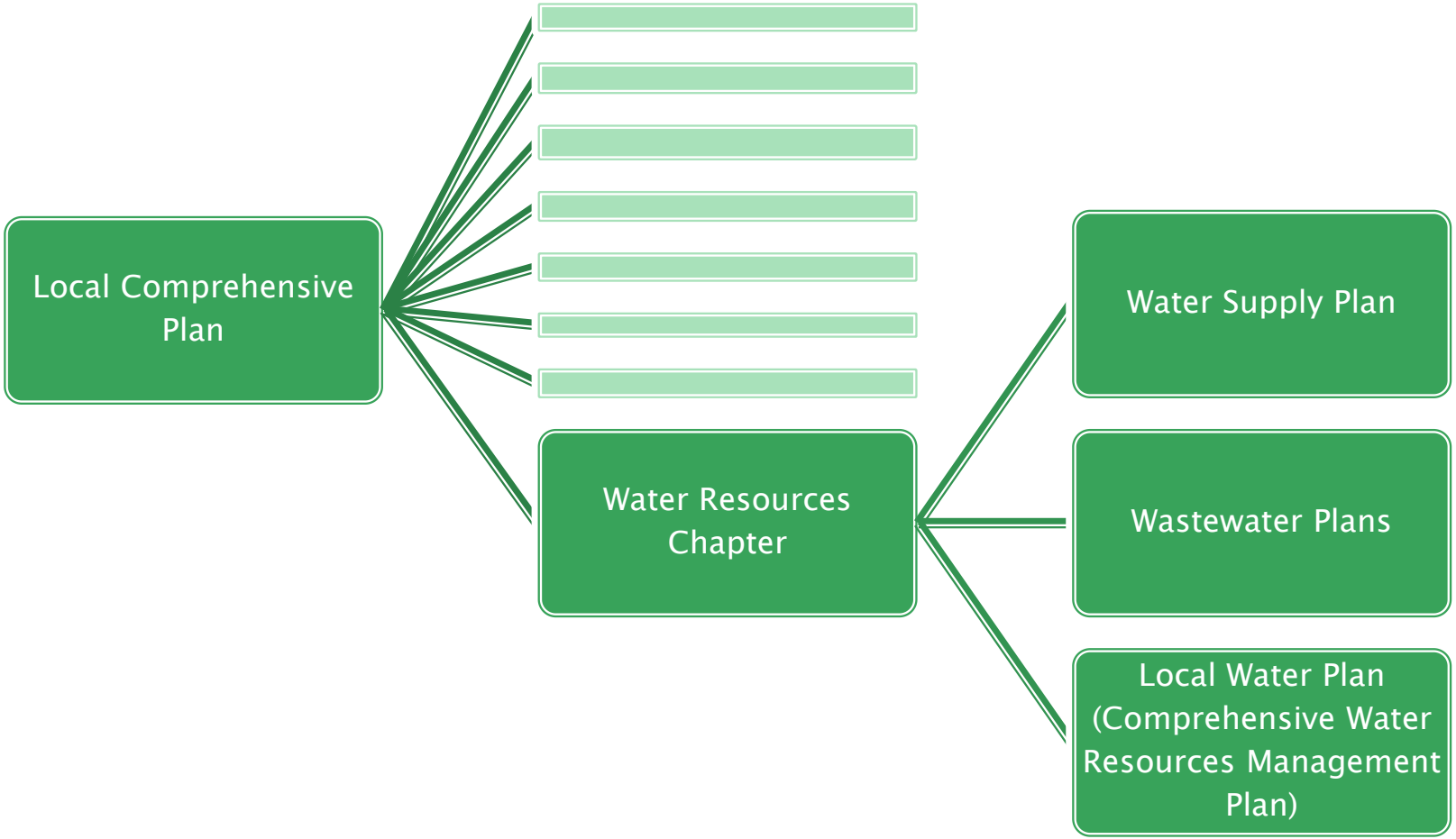


Figure 3.1. Core services of water resources program


Local Comprehensive Plan
Water Resources Chapter
Water Supply Plan
Wastewater Plans
Local Water Plan (Comprehensive Water Resources Management Plan)

Strategy Implementation

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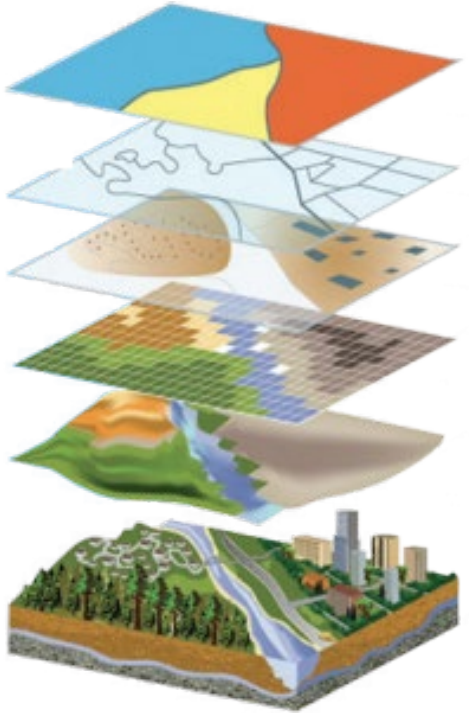
Flood Risk Reduction Strategy and Clean Water Strategy

- Identify focus geographies (Morningside, Cornelia)
- Engage stakeholders
- Define the service target
- Evaluate strategies (infrastructure, programs, O&M)
- Implement (through capital investment, partnerships, private redevelopment, risk management)



Strategy

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We work with the community to **comprehensively reduce flood risk**;

- **INFRASTRUCTURE**: We will renew our infrastructure and operate it to reduce risk. We will plan public streets and parks to accept and transmit flood waters to reduce the risk and disruption of related city services.
- **REGULATION**: We acknowledge competing demands of land use and addressing drainage, groundwater and surface water issues. We help people solve issues without harming another.
- **OUTREACH AND ENGAGEMENT**: We make flood information available and give people tools for flood resilience.
- **EMERGENCY SERVICES**: We help people prepare for floods, remove people from harm during floods, and recover after floods.

Framework

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How we view risk

Drivers of increasing flood risk

Areas of work

Infrastructure

Regulation

Outreach & Engagement

Emergency Services

Pathways to structural flood risk

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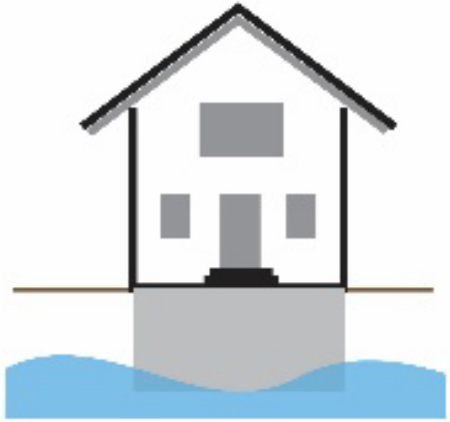
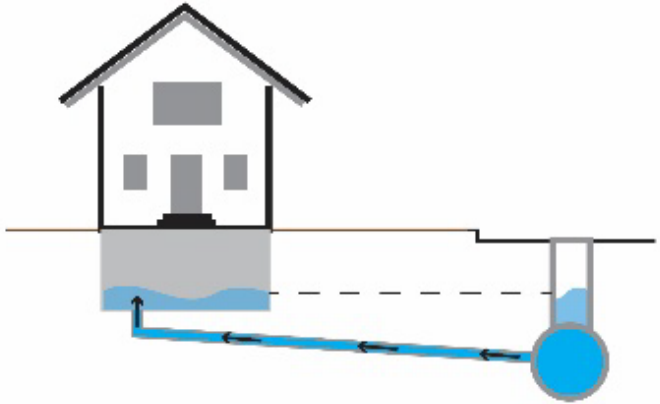
Surface water



Groundwater



Sanitary backflow

Community flood exposure

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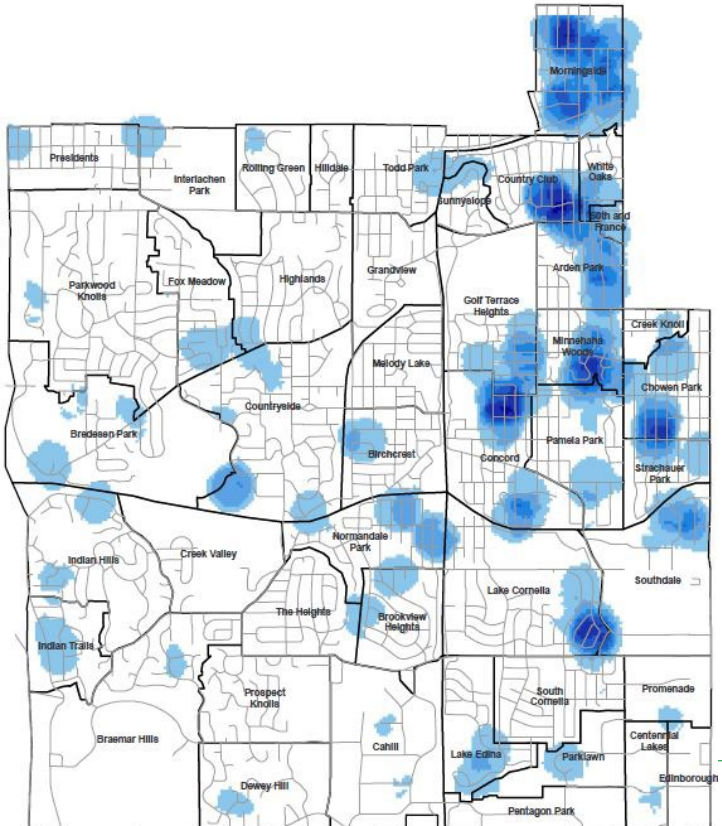
(1% probability event)

- 12547 single family
- ~6-10% Direct exposure
- ~3-7% Sanitary Backflow*
- ~12-20% Groundwater*

* If approximate ratios follow Morningside area and study methodology



Two-year review of risk reduction

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Outreach and Engagement

- Maps, Fact-Sheets, Technical Support
- 2D modeling

Regulation

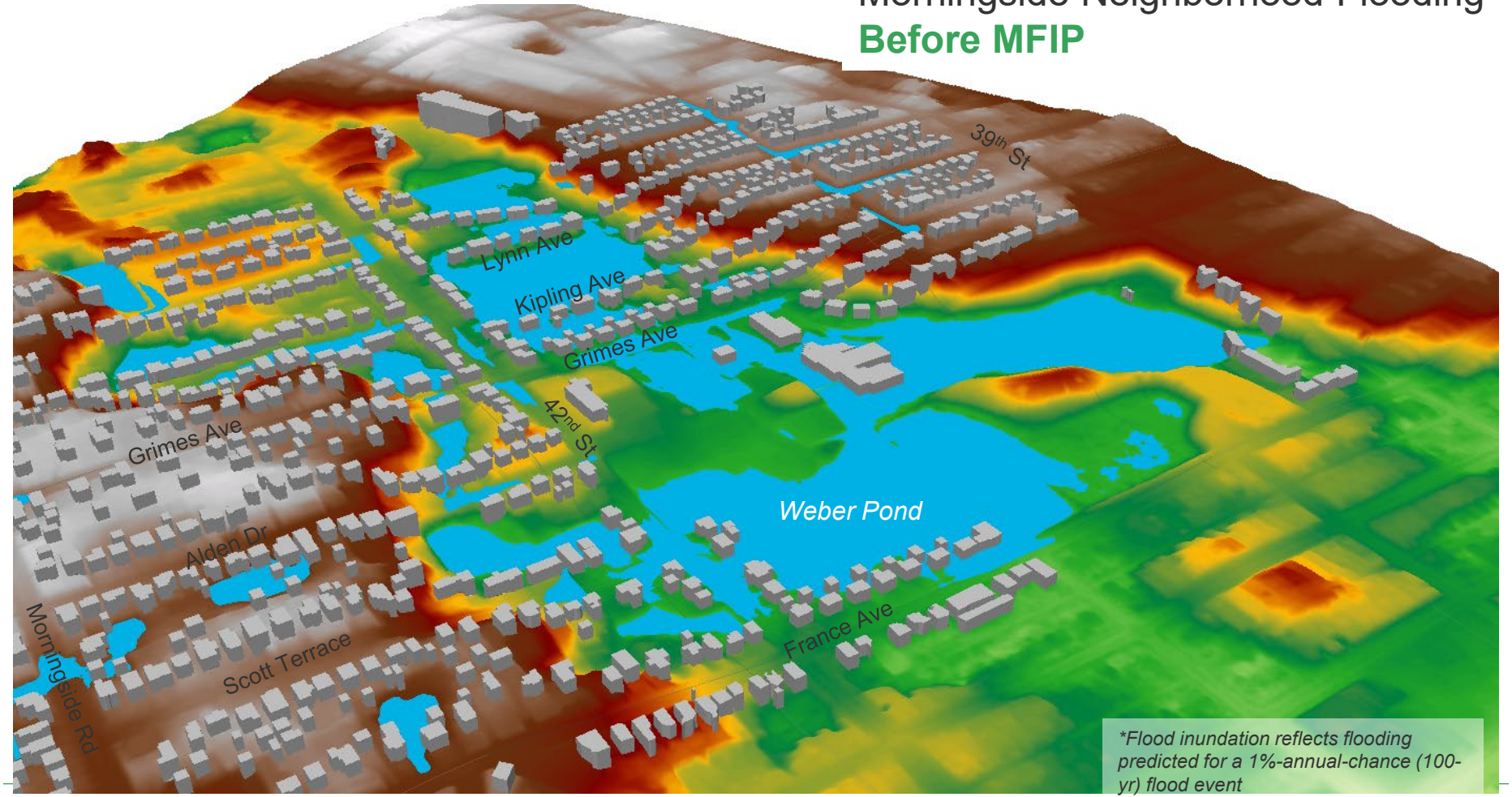
- Impervious Surface Ordinance
- Redevelopment / Rebuilds

Infrastructure

- MFIP, Recon Process, +O&M staff

Morningside Neighborhood Flooding*

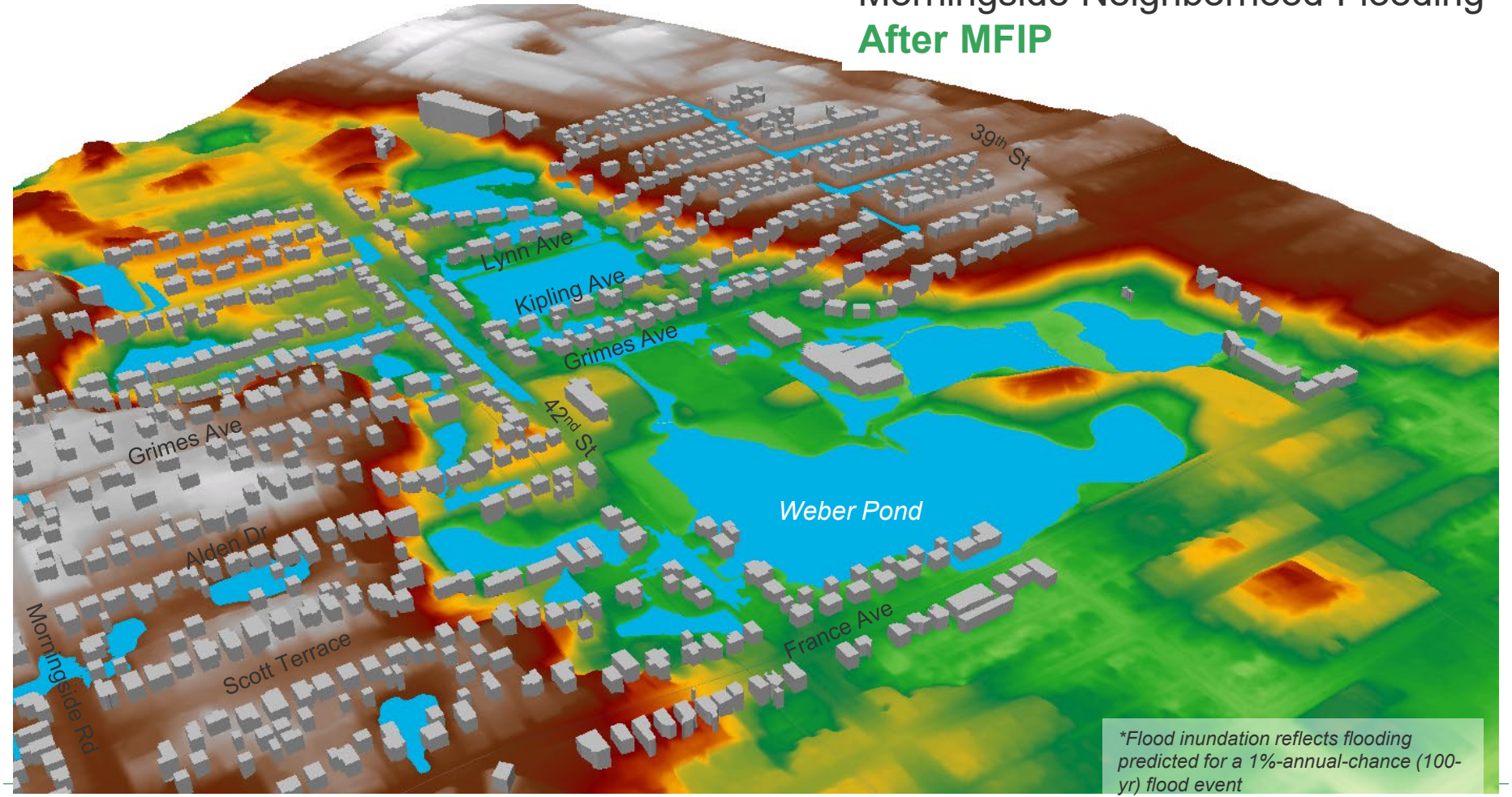
Before MFIP



*Flood inundation reflects flooding predicted for a 1%-annual-chance (100-yr) flood event

Morningside Neighborhood Flooding*

After MFIP



*Flood inundation reflects flooding predicted for a 1%-annual-chance (100-yr) flood event

FRRS Next Steps

- August 20, 2022 CC meeting: Water Resources Management Plan major amendment, start agency review
  - (legal/policy review, infrastructure define, natural systems defined)
- August 20, 2022 CC Work session: utility rates and finance
- Sept-Dec 2022: Capital Improvement Plan
- 2023 Staff Workplans: Emergency Services planning, risk review

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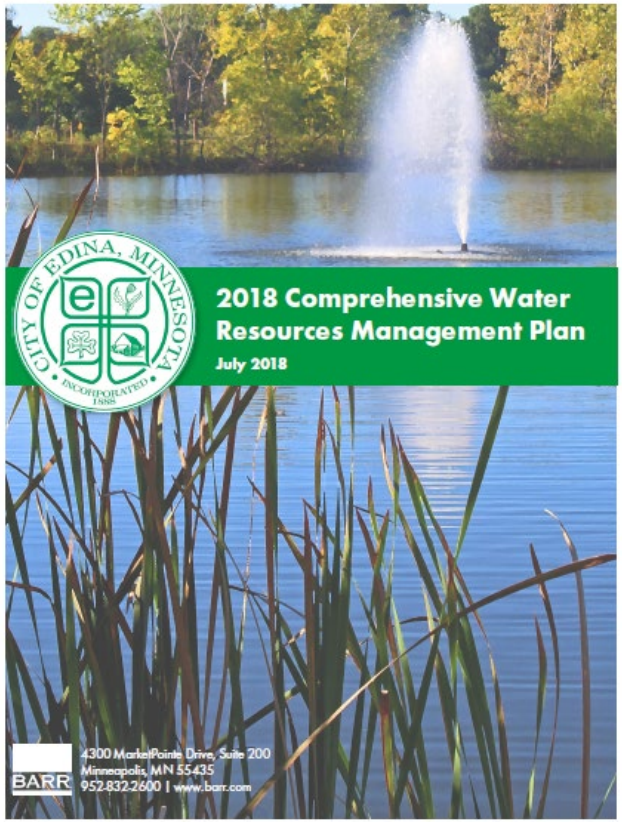

FRRS Next Steps

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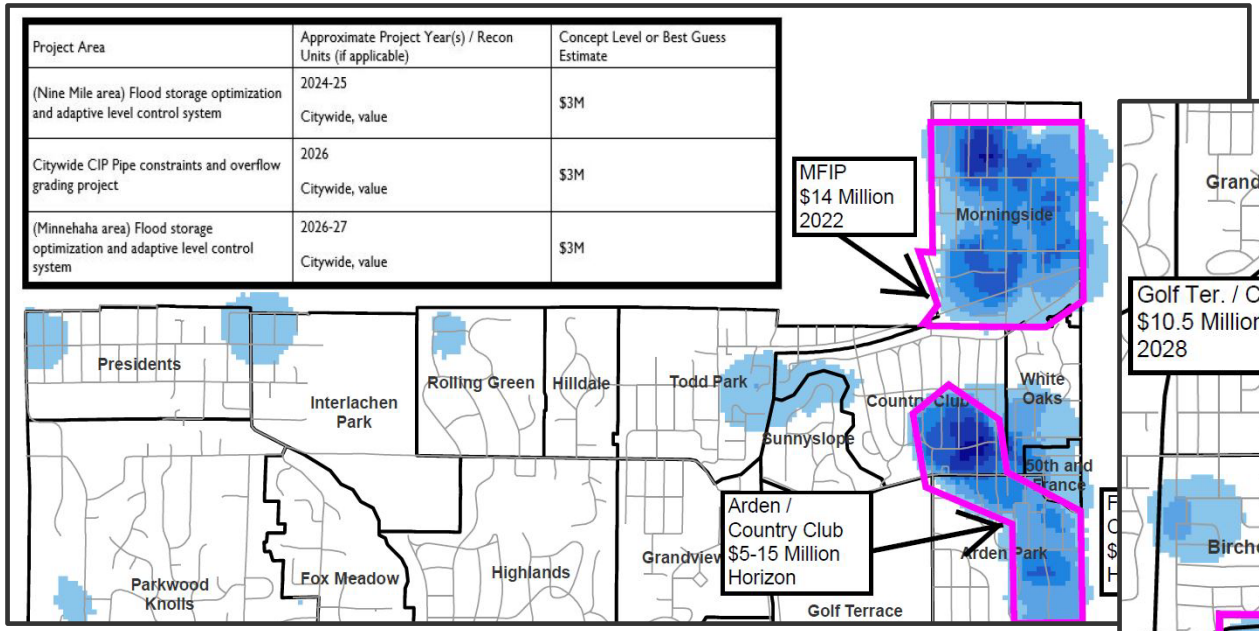
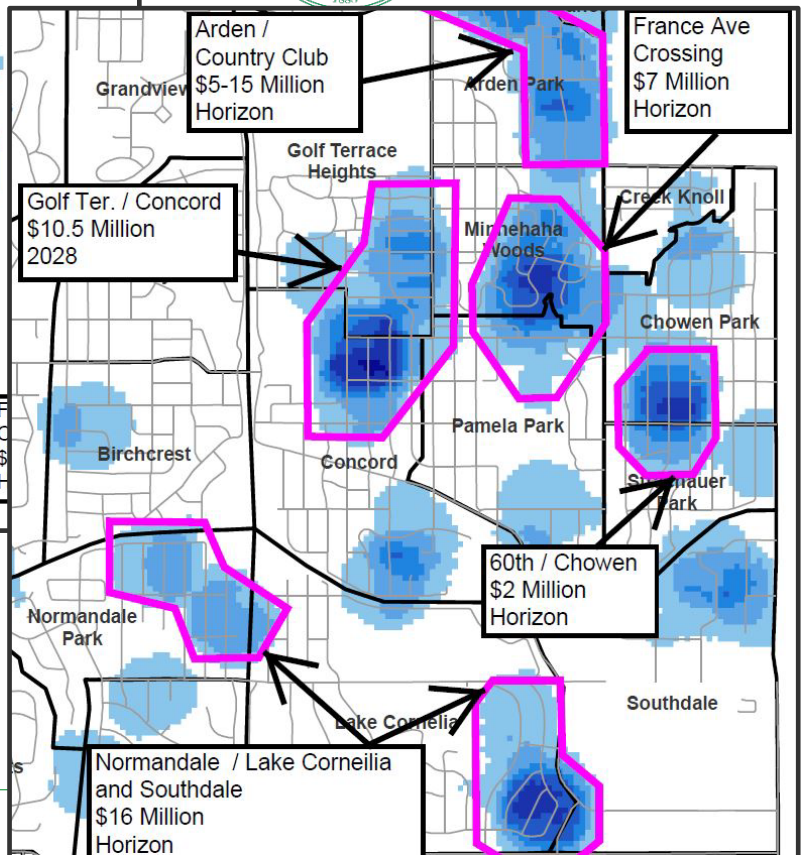
Project Area	Approximate Project Year(s) / Recon Units (if applicable)	Concept Level or Best Guess Estimate
(Nine Mile area) Flood storage optimization and adaptive level control system	2024-25 Citywide, value	$3M
Citywide CIP Pipe constraints and overflow grading project	2026 Citywide, value	$3M
(Minnehaha area) Flood storage optimization and adaptive level control system	2026-27 Citywide, value	$3M





- Pace of work review with utility rate study
- opportunity limited with road projects
- citywide opportunities with top value

Flood Service Level - Discussion

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Clean Water Strategy

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- Focus on Lake Cornelia.
- The 2018 Comprehensive Water Resources Management Plan had us committed to start in 2020.
- We've just completed phase I and wish to get some policy direction as we embark on phase 2.

Clean Water Strategy - Phase 1

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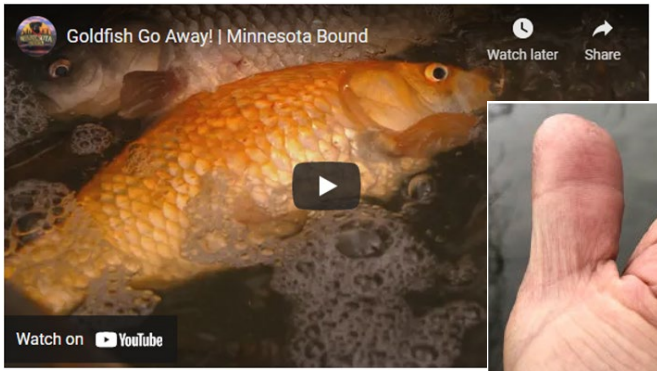
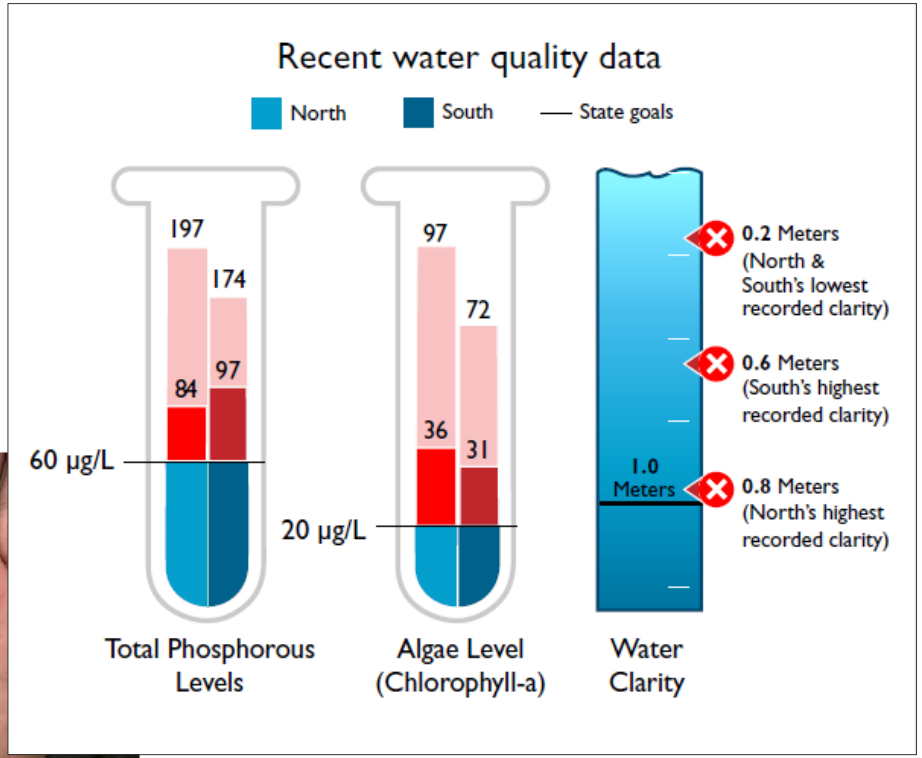
- We are in-line with peer communities, slightly above and slightly below in some areas.
- Clean water service level goals and priorities are not well defined.
- Where goals and priorities are defined, they are often based on the regulatory minimum.
- The regulatory minimum requires cities achieve checklist activities which are weakly tied to outcomes at the lake.
- The regulatory paradigm is such that we can continue to have water resources that fail to meet clean water standards, and in some ways actually work against clean water, and still meet the rules.

Lake Cornelia

- Poor water quality
- Infested with invasive curlyleaf pondweed
- Infested with goldfish





- 2022
- 2021
- 2020
- 2016

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Shallow Lake Ecology

- Shallow lakes behave differently than deep lakes
- All lakes in Edina are shallow
- Shallow lakes can exist in two states – the clear water state or the turbid water state
- Lakes tend to stay in one state or the other
- It takes a big change for the lake to switch from one state to the other

The Brutal Reality

A dichotomy of choices

Algae Dominated State

Limits:

- Contact recreation
  - nuisance and harmful algal blooms
- Poor recreational fishery
- Minimal wildlife habitat
- User-specific aesthetics

Supports:

- Minimal inhibition of recreational boating

Plant Dominated State

Limits:

- recreational boating
- User-specific aesthetics

Supports:

- Contact recreation
  - Minimal nuisance and harmful algal blooms
- Recreational fishery
- Wildlife habitat

Photo credit: Vadnais Lakes Watershed Management Organization

BARR

Policy Option 1: Clear Water

- Native rooted, floating, and emergent aquatic vegetation are encouraged. We recognize that shallow lakes have beneficial uses beyond boating and swimming, to include wildlife habitat and aesthetic views.
- We invest in preventing pollution, mitigating pollution, and restoring ecological processes.
- We focus on outcomes at the lake.
- This policy option is supported by staff.

Policy Option 2: Turbid Water

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- We do routine and non-specific destruction of all aquatic vegetation. Boating and swimming are priority uses. The fishery suffers from low dissolved oxygen, lack of food, and lack of habitat. We add copper sulfate to knock algae back for about two weeks at a time – a practice that continues forever.
- We continue the status quo activities and pace of achievement stipulated by regulators for preventing pollution and mitigating pollution. Though this meets the regulatory requirements for activity, this pace puts us on a generational (or never) timeframe for reducing pollutant loading enough to achieve a clean lake outcome.
- Water quality continues to degrade. Algal blooms become more frequent including potential Harmful Algal Blooms (HABs). We never achieve a clean water outcome.

Policy Option 3: The Compromise

- We choose to make both clean water and recreation the priority. However, Mother Nature doesn't negotiate, and we continue to fail at both. Recall the brutal reality of the dichotomy of choices. The outcome at the lake is a turbid water state. While this doesn't result in a clean water outcome, it is an option that we could pursue and still meet the regulatory minimum requirements, which only requires us to do a little bit more activity each year.

Lake and Pond Policy

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- Under current policy, residents can make requests for aquatic vegetation management (algae and submerged plants). Eligible city-coordinated and/or city-funded activities are determined based on established criteria.
- Shallow lake management has evolved, new challenges with HABs, and long-term use of dye and copper treatments for algae control has been called into question.
- Lake and Pond management could look more like, more capital investment in pollution prevention (sweeping, for example), pollution mitigation (infrastructure, for example), and restoration of ecological processes (alum treatments, invasive curlyleaf pondweed control, sediment-Phosphorus control, for example).

Lake Cornelia

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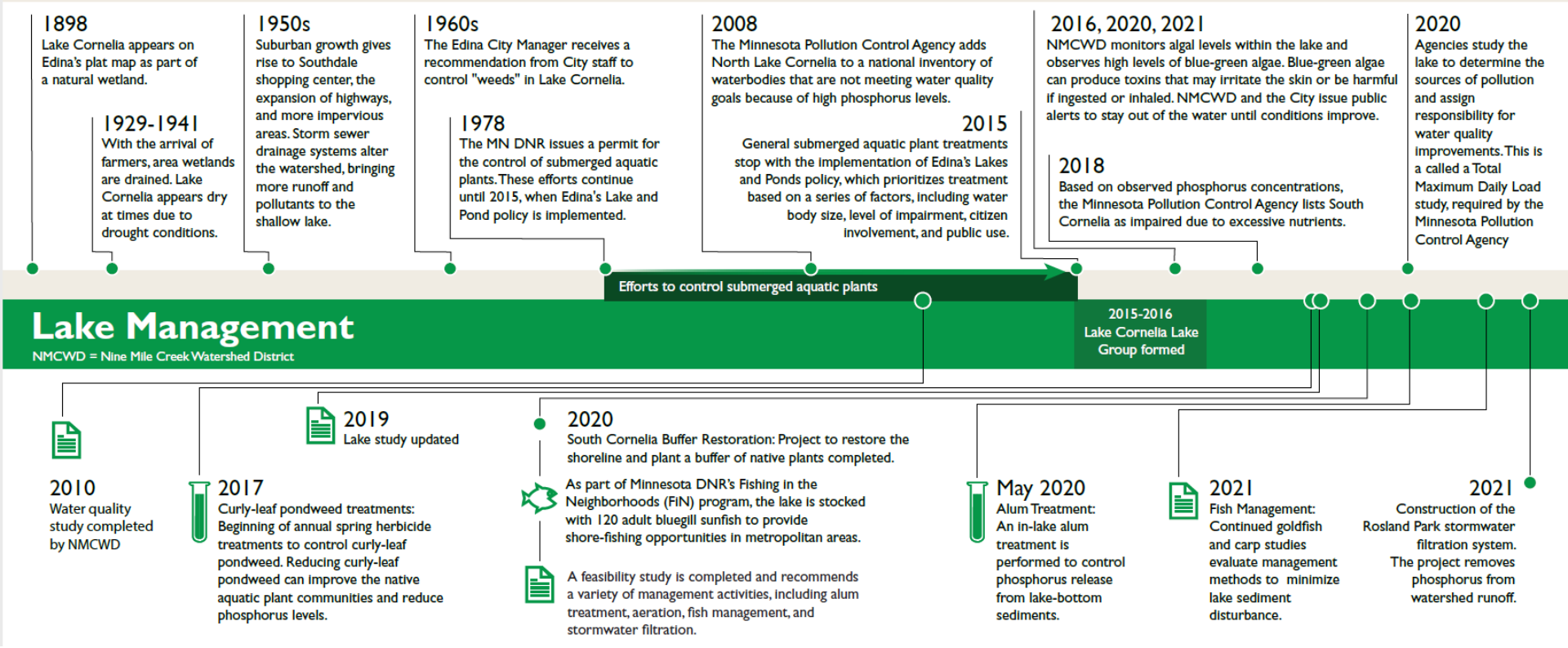

How do we engage people on this topic?

- Residents often want the best of both worlds (dichotomy of choices).
- The minimum regulatory compliance and 'clean water/recreation compromise' approaches have failed spectacularly when it comes to outcomes at the lake.
- Staff recommends moving into phase II, then getting reactions from the public on a draft vision and roadmap for closing the clean water gap.

Phase 2 Scope

- Phase II of City's clean water strategy is currently intended to outline the philosophy and vision of the City's Clean Water Strategy and lay out options to close the gaps identified in the phase I memo and/or improve the level of service. Reprioritization and establishment of goals developed during phase II will help integrate those goals into the existing programs to best align services and available funding to protect and improve surface water.
- A scope for phase II will be brought for Council's consideration in fall 2022.

Key Questions

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- Comments on policy considerations? Outcomes? Principles?
- Comments on priority waterbodies and pollutants? Can we have tiered goals based on waterbody characteristics? Lake Cornelia as a focus area might define top-end of level of effort. What other waterbodies would belong in this tier versus a lower tier?
- What are you hearing from people about water resources management? What do you think we need?
- What do you need to know to decide?
- What other questions should we answer with phase II scope?