Ottawa County
Groundwater Sustainability Initiative:
Proactive Strategies Index

Adopted November 26, 2019
Acknowledgements

-Ottawa County Board of Commissioners-
Joseph S. Baumann
Roger A. Bergman, *Vice Chair*
Allen Dannenberg
Gregory J. DeJong, *Chair*
Matthew R. Fenske
Francisco C. Garcia
James H. Holtvluwer
Phillip D. Kuyers
Randall J. Meppelink
Kyle J. Terpstra
Doug R. Zylstra

-Groundwater Task Force-
Phil Kuyers, *Chair*
Ottawa County Board of Commissioners
Greg DeJong, *Vice Chair*
Ottawa County Board of Commissioners
David Kraker
Ottawa County Planning Commission
Joe Bush
Ottawa County Water Resources Commissioner
Adam Elenbaas
Allendale Township
Bill Vandenberg
Blended Township
Jim Bakker
Walters Gardens
Merle Langeland
Ottawa County Farm Bureau
Steve Hecksel
Hecksel Brothers Well Drillers
Eric Neubecker
Raymer Well Drilling
Dale Zahn
WMLAR
Barbara Marczak
Prein & Newhof Engineering
Dr. Al Steinman
GVSU AWRI

-Ottawa County Planning Commission-
Matthew Fenske
Nathan Pyle
Jason Pasatta
Francisco Garcia
David Kraker
Kirk Perschbacher
Timothy Grifhorst
Terry Hossink
Ric Gajewski
Acknowledgements

-Groundwater Executive Committee-
Al Vanderberg
Ottawa County Administrator

Al Steinman, PhD.
Grand Valley State University Annis Water Resources Institute

John Yellich, CPG
Michigan Geological Survey

Adeline Hambley
Ottawa County Department of Public Health

Pat Staskiewicz, P.E.
Ottawa County Public Utilities

Matthew Allen
Ottawa County Department of Public Health

Paul Sachs
Planning and Performance Improvement Department

-Planning and Performance Improvement-
Paul Sachs
Shannon Virtue
Pamela VandenHeuvel
Matthew Chappuies
Becky Huttenga
David Kurili
James Kilborn
Rich Lakeberg
Julie Lamer
Special Thanks

Douglas Huesdash  
ACRE AgTech

Lynee Wells  
Aligned Planning

Adam Elenbaas  
Allendale Charter Township

Nathan Wiechel  
Allendale Christian Schools

Lizzie Schab  
Allendale Township Library

Bill Vandenberg  
Blendon Township

Jennifer Howland  
City of Grand Haven

Tim Burkman  
City of Grand Rapids

LaVonne Marshall  
Coopersville Area District Library

Don Carpenter  
Drummond Carpenter

David Wardwell  
Dune Technologies

Fishbeck

Melissa Huisman  
Gary Baker Memorial Library

Kelly Rice  
GEI Consultants

Rob Bristow  
Georgetown Public Library

Travus Burton  
Grand Valley State University

Peter Wampler, Ph.D  
Grand Valley State University

Ken Freestone  
Green Michigan

Steve Hecksel  
Hecksel Bros. Well Drilling

Dianne Koolker  
Herrick District Library

Michelle Gibbs  
Hope College

David Van Wylen  
Hope College

Heather Wood-Gramza  
Howard Miller Library

Zachary Curtis, Ph.D  
Hydrosimulatics INC

Merle Langeland  
Langeland Farms

John Martin  
Loutit District Library

Kelly Goward  
Macatawa Area Coordinating Council

Danielle Bouchard  
McKenna

Shu-Guang Li, Ph.D  
Michigan State University

Heidi Lindberg  
Michigan State University Extension

Heather Varboncoeur  
Natural Resources Conservation Service

Dave Nyitray  
ODC Network

Ted Malefyt  
ODC Network

Dan Callam  
ODC Network

Mary Judnich  
Office of Senator Stabenow

Christine Spitzley  
OHM Advisors

Todd Wolters  
Olive Township

Randy Vander Zwaag  
Olive Township

Mike Fine  
Ottawa Area Intermediate School District

Megan Boos  
Ottawa Conservation District

Sara Bronkema  
Ottawa Conservation District

Benjamin Jordan  
Ottawa Conservation District

Douglas Van Essen  
Ottawa County Corporation Counsel

Kristina Wieghmink  
Ottawa County Department of Public Health

Lisa Stefanovsky  
Ottawa County Department of Public Health

Mistelle Serio  
Ottawa County Farm Bureau

Luke DeHaan  
Ottawa County Farm Bureau

Ottawa County GIS Department

Ottawa County Parks & Recreation

Brett Laughlin  
Ottawa County Road Commission

Dennis Cole  
Ottawa County Water Resources

Amber McLain  
Patmos Library

Kathy Kuck  
Robinson Township

Bonnie Hayward  
Robinson Township

Maggie McKeithan  
Spring Lake District Library

Allison Jesky  
West Michigan Nursery and Landscape Association

Keith Hogan  
West Michigan Nursery and Landscape Association

Alan Hicks  
Westshore Consulting

Williams & Works
Dear Reader,

Thank you for being invested in Ottawa County’s water sustainability efforts. It is our hope that in reading this document you will reach a better understanding of our groundwater challenges and how we plan to address them.

We are asking for your assistance in championing water sustainability efforts by utilizing and promoting the strategies listed within this document. By working together, we can ensure clean fresh water is abundantly available for future generations.

Sincerely,

Paul Sachs
Director

Shannon Virtue
Assistant Director
Contents

Introduction
Overview
Our Approach
About this Document
Groundwater Challenges at a Glance
Why it Matters
10
11
12
13
14

Education Strategies
Outreach Campaign
Online Resources
Partnerships for Youth Education
Partnerships for College Education
Partnerships for Community Education
Community Presence
17
18
19
20
21
22

Integration Strategies
Stakeholder Integration
Household Conservation Strategies
Landscape and Irrigation Practices
Service-Provider Training
Landscape Contests and Demonstration Sites
Landscape Rebates and Low-Flow Fixture Promotions
Certified Blue
Agricultural Partnerships
26
27
28
29
30
31
32
33

Mitigation Strategies
Model Zoning Guidelines
Zoning Overlay Districts
County Groundwater Ordinance
Health Code Revisions
Exploring Other Policies
Water Recycling Strategies
Groundwater Monitoring Network
Infrastructure Mapping and Planning
Coordinated Future Land Use Plan
38
39
40
41
42
43
44
45
46

Coordination Strategies
County Support Personnel
Groundwater Technical Advisory Board
Groundwater Commission
Collaboration on Existing Efforts
Dynamic Relationships
How to get Involved
49
50
51
52
53
54

Appendix A Resolution
Appendix B Our Groundwater Story
Appendix C Links
Appendix D References
56
57
60
62
Introduction
A Water Shortage in Michigan?

Known as the Great Lakes State, Michigan’s abundance of freshwater lakes, streams, and coastlines are tied to the state’s identity.

This creates a false perception that clean drinking water will always be readily available at the tap. Most Michiganders have not put much thought into where their water comes from, or considered the possibility that it may one day be at risk.

Nearly half of all Michigan residents rely on groundwater sources to supply their homes and businesses. Many regions of the state utilize deep bedrock aquifers, which can contain salt and mineral deposits in some areas.

Ottawa County is faced with a particularly challenging situation where surface water is unable to recharge the deep aquifer, leading to rapidly declining levels of groundwater and increased mineralization of the water that is available.

Planners from Ottawa County have begun partnering with local scientists, policymakers, and stakeholders to identify practical solutions to ensure water is available for future generations.
Our Approach

Mission Statement

To ensure that the residents and stakeholders of Ottawa County have permanent, sustainable access to clean water for reasonable use.

Overarching Goals

- Protect the quality of the aquifer systems and reduce dependency on the bedrock aquifer system.
- Manage groundwater consumption and plan proactively to ensure continued access to abundant, clean water.
- Provide assistance and solutions to stakeholders to encourage sustainable water practices.

Strategic Measures

- Educate
- Integrate
- Mitigate
- Coordinate
About this Document

What Is It?

A Guidebook

This is, in essence, a "menu" of items that Ottawa County and its current and emerging partners are embarking on as a means to achieve water sustainability. This guidebook is not intended to be an exclusive list; and Ottawa County will continue to form new partnerships for implementation.

Who Is It For?

For Everyone

The strategies listed in this document are intended to be utilized by a widespread audience. This includes planners, policy-makers, homeowners, developers, business owners, farmers, and many more.

Who Made It?

Local Experts

We worked with conservationists, researchers, scientists, environmental experts, engineers, local planners and decision-makers, education professionals, concerned citizens, and many more!

Why Was It Made?

To Inspire

It is our hope that this document will guide, encourage, and inspire the people of West Michigan to make water conservation a priority.
A thick clay layer above our bedrock aquifer prevents it from being replenished

Our bedrock aquifer cannot pull water from Lake Michigan because they are not connected

Our geologic conditions, along with pumping rates, are causing:
- water levels to decline in the bedrock aquifer
- salt to be pulled up from the bottom of the bedrock aquifer

Groundwater is typically replenished by rainfall seeping into the ground

Did You Know...
More information on the Phase I and Phase II Groundwater Study results and Ottawa County’s Groundwater Story can be found in Appendix B, and online at miottawa.org/groundwater
Why This Matters

Falling water levels in our bedrock aquifer system

Wells dry up leaving homes and farms without water

Crops suffer yield loss and decreased quality

Plumbing corrosion can occur, and water may have a foul taste

Health concerns may arise for persons with diagnosed heart conditions, due to an increased intake of dietary sodium

Rising levels of sodium and other minerals in our bedrock aquifer groundwater supply

If left unchecked, unmanaged growth will only worsen these issues

Ottawa County Population Growth (US Census)
Education Strategies

Advocating for change in regional water conservation perceptions
<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Outreach Campaign</td>
<td>○ Multimedia advertising ○ Literature distribution</td>
<td>➔ EPA WaterSense ○ Ottawa County Department of Public Health</td>
<td>In Development</td>
<td>■ Secure funding ○ Hire marketing firm</td>
</tr>
<tr>
<td>2</td>
<td>Online Resources</td>
<td>○ County-hosted groundwater website</td>
<td></td>
<td>Initiated</td>
<td>■ Manage ongoing updates to site</td>
</tr>
<tr>
<td>3</td>
<td>Partnerships for Youth Education</td>
<td>○ 6th-8th grade curriculum supplement</td>
<td>➔ Allendale Christian School ○ ODC Network ○ Ottawa Area Intermediate School District ○ Ottawa County Parks &amp; Recreation</td>
<td>Initiated</td>
<td>■ Pilot supplemental curriculum in local school district ○ Consider broader implementation</td>
</tr>
<tr>
<td>4</td>
<td>Partnerships for College Education</td>
<td>○ Research collaboration ○ Curriculum integration ○ Outreach opportunities</td>
<td>➔ Grand Valley State University ○ Hope College</td>
<td>Initiated</td>
<td>■ Continue developing relationships for educational opportunities</td>
</tr>
<tr>
<td>5</td>
<td>Partnerships for Community Education</td>
<td>○ Public lectures ○ Informational resources ○ Hands-on workshops</td>
<td>➔ Allendale Township Library ○ Coopersville Area District Library ○ Gary Byker Library of Hudsonville ○ Georgetown Township Public Library ○ Herrick District Library ○ Holland-Hope College Sustainability Institute ○ Howard Miller Public Library ○ Loutit District Library ○ Patmos Library ○ Spring Lake District Library</td>
<td>Initiated</td>
<td>■ Continue developing relationships for educational opportunities</td>
</tr>
<tr>
<td>6</td>
<td>Community Presence</td>
<td>○ Engage the public at key events/locations</td>
<td>➔ Grand Valley State University ○ Holland-Hope College Sustainability Institute ○ Macatawa Area Coordinating Council ○ ODC Network ○ Ottawa County Parks &amp; Recreation</td>
<td>Initiated</td>
<td>■ Seek opportunities to have a public presence</td>
</tr>
</tbody>
</table>
Outreach Campaign
Create a culture of conservation

In collaboration with the Ottawa County Department of Public Health, informative and educational materials and messaging are being developed for distribution across the County to the general public and select stakeholder groups.

Outreach includes multimedia advertising campaigns, as well as the distribution of printed materials by various, committed partners.

Water-related marketing materials, branded with the campaign logo, are also being given out with the intent of raising awareness.

Future outreach strategies may benefit from the hiring of a professional marketing agency.

Current Partners
Online Resources
Your one-source destination for local groundwater info

In 2018, the "Ottawa County Groundwater" website was launched to be a place where visitors can access detailed information about the County’s groundwater challenges.

The site also includes information on project partners and an interactive map of groundwater issues across the County.

The website will be continually updated to ensure information is as current, complete, and accurate as possible. As conservation projects and programs launch, updates will be posted to a dynamic "strategy status" page.

Did You Know...
You can access the County’s groundwater page at www.miottawa.org/groundwater
Partnerships for Youth Education

Working with the next generation of water consumers

Partnerships are being created with local educators to help introduce supplemental materials related to the County’s groundwater challenges into existing K-12 curriculum.

The supplemental materials will feature components of regional subsurface geology and impacts of consumptive water use, in addition to including take-home conservation strategies.

Hands-on, experiential learning exercises will also be developed in collaboration with other community partners.
Partnerships for College Education

Advanced education opportunities

The County has initiated partnerships with regional colleges and universities to support the development of public awareness efforts, and will be hosting seminars and presentations on groundwater concerns for faculty and staff.

These partnerships are anticipated to evolve into more advanced groundwater outreach programs and research projects to further support the County’s conservation efforts.

Opportunities also exist to implement water conservation practices into vocational trades programs.
Partnerships for Community Education

Engagement programs for everyone

The County is developing partnerships to influence adult and general-public educational programming.

These opportunities include offering lectures, informational resources, and hands-on workshops with organizations such as:

- Libraries
- Rotaries
- Chambers of Commerce
- Neighborhood associations
- Environmental groups

Current Partners

Photo credit: Mode Shift
Community Presence
We go where you go

Establishing an influential presence within the community is a critical element in implementing positive change.

The County and its partners have begun to develop a physical presence in the area. Current and future endeavours include:

- Informational kiosks at events
- Educational signage in parks
- Hands-on mobile exhibits
Integration Strategies

Partner-managed programs designed to make a difference
<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
</table>
| 7  | Stakeholder Integration        | ○ Collaborative partnerships to promote conservation      | ➔ Various groups                                      | In Development | ■ Identify stakeholder groups  
■ Initiate meetings                                      |
| 8  | Household Conservation Strategies | ○ Various tips for general water conservation  
○ Disseminated through various outlets | ➔ EPA WaterSense  
➔ Green Michigan                                      | Initiated | ■ Explore new outlets to get messaging out |
| 9  | Landscape and Irrigation Practices | ○ Professionally curated, water-friendly landscape recommendations  
○ Water saving recommendations for irrigating landscapes | ➔ GEI Consultants, Inc.  
➔ Macatawa Area Coordinating Council  
➔ Natural Resources Conservation Service  
➔ Ottawa Conservation District  
➔ West Michigan Nursery and Landscape Association | In Development | ■ Work with partners to develop recommendations |
| 10 | Service-Provider Training      | ○ Training and credentialing programs for professionals  | ➔ EPA WaterSense  
➔ GEI Consultants, Inc.  
➔ West Michigan Nursery and Landscape Association | In Development | ■ Work with partners to develop program guidelines |
| 11 | Landscape Contests and Demonstration Sites | ○ Contest to inspire water-friendly landscapes  
○ Public exhibits, showcasing best management practices in landscaping | ➔ GEI Consultants, Inc.  
➔ West Michigan Nursery and Landscape Association | In Development | ■ Identify partner locations  
■ Work with partners to identify project guidelines |
## Integration Strategies

<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
</table>
| 12 | Landscape Rebates and Low-Flow Fixture Promotions | ○ Programs to help consumers offset the cost of installing alternative landscapes  
○ Advertised list of low-flow fixture types with funding opportunities | ➔ GEI Consultants, Inc.  
➔ Ottawa Conservation District  
➔ West Michigan Nursery and Landscape Association  
➔ Green Michigan | In Development | ■ Secure funding  
■ Work with partners to develop program guidelines |
| 13 | Certified Blue                         | ○ Certification & recognition program to incentivize water conservation practices in the built environment | ➔ EPA WaterSense  
➔ Green Michigan | In Development | ■ Work with partners to develop recommendations |
| 14 | Agricultural Partnerships              | ○ Educational, logistical, and financial resources to help our producers conserve water | ➔ Michigan Agriculture Environmental Assurance Program  
➔ MSU Extension  
➔ Natural Resources Conservation Service  
➔ Ottawa Conservation District  
➔ Ottawa County Farm Bureau | In Development | ■ Work with partners to develop program guidelines |
Stakeholder Integration
Custom solutions for groups and organizations

Many groups play a role in water use and conservation. By establishing partnerships with the unique types of water-user/stakeholder groups, the County can implement specific conservation and awareness measures.

Examples of stakeholder groups include:
- Homeowners
- Landscapers
- Business owners
- Realtors
- Environmental stewards
- Land developers
- Golf course managers
Household Conservation Strategies
Simple ways to start saving water today

There are many simple ways a person can help to conserve water by adjusting their daily routines.

Ottawa County will collaborate with environmental organizations, homeowners, schools, and other stakeholders to continually promote general water saving tips.

These tips can be communicated via:
- Informational pamphlets and brochures
- Social media messaging/website updates
- Posters and signage
- Public service announcements

Did You Know...
A leaky faucet dripping every second wastes roughly 1,660 gallons of water per year!
Landscape and Irrigation Practices

Promote water-friendly lawns and water-conscious irrigation practices

Traditional turf-grass lawns require a significant amount of water to maintain a green appearance. Communities with threatened water resources have adopted alternative practices that utilize native (and other) plant species which require less water.

Many techniques have also been developed to maximize efficiency of irrigation systems and even utilize alternative sources of water, such as rain water collection.

The County and its partners are working to promote these practices through:
- Developing best management practices
- Distributing messaging and literature
- Facilitating workshops

Did You Know...
Over 8 billion gallons of water are devoted to lawn and landscape irrigation in the United States every year! 2
Service-Provider Training

Credentialing programs to ensure a standard of efficient practices

Service-provider professionals, such as landscapers, irrigation installers, and homebuilders all have an impact on water consumption through the practices and equipment they use and install.

The County can collaborate with accrediting bodies, training institutions, and stakeholder groups to establish and promote programs to educate and certify these types of professionals to utilize the latest and most appropriate techniques and equipment.

Current Partners
Landscape Contests and Demonstration Sites

Encourage and incentivize awesome examples of landscaping

Art and design contests have proven to be a successful means of public engagement in West Michigan.

By hosting an annual contest for excellence in sustainable landscape design, Ottawa County and its partners hope to inspire others to participate in sustainable practices and increase the regional popularity and perception of such concepts.

Partnerships are also being pursued with local institutions to exhibit professionally-designed landscape examples. Displayed at libraries, County Parks, and other facilities, these gardens will represent sustainable landscape design possibilities within our communities.

Current Partners

Did You Know...

Using native plants adapted to the local climate can reduce outdoor water use by 20-50%!
Landscape Rebates and Low-Flow Fixture Promotions

Helping to offset the cost of switching to water-saving household applications, both indoor and outdoor

The quantity of materials required to convert a turf-grass yard into a water-conscious landscape may pose a financial barrier for some. Ottawa County and its partners plan to explore cost-rebate options by utilizing grants, corporate sponsorships or other funding sources.

The County and its partners support the implementation of water-saving low-flow fixtures (e.g. showerheads, faucets, and toilets) through existing and potential programs. The distribution of these fixtures to homeowners at reduced or no cost depends on available grant funding along with public and private donations.

Did You Know...

Toilets are among the biggest indoor water wasters, followed by showers, faucets, and clothes washing machines. A moderate toilet leak can waste 6,000 gallons of clean, drinkable water in a month!  

Current Partners
Certified Blue
Recognizing water conservation efforts

The County is exploring options to implement a certification and recognition program for homes and businesses that meet certain water efficiency criteria.

Benefits to certification can include higher resale value of real property, positive corporate imaging, and an overall sense of pride in being water-friendly. Certified establishments can be advertised in County publications.

An annual award can be offered to homeowners and business owners who utilize innovative conservation strategies during their everyday operations.

Current Partners
Agricultural Partnerships

Support and assist our farmers with water conservation

Farms and farmers are a pillar of our economic, social, and food community, and water is an essential part of their operation.

By partnering with farmers, as well as the various organizations that work directly with them, Ottawa County can help provide:

- Educational materials and guidebooks on modern water saving technology and groundwater recharge techniques
- Logistical support to implement water conservation techniques, including storm and surface water retention/storage for irrigation, and advanced irrigation technologies
- Connections to financial resources to fund water conserving equipment and water storage facilities

Current Partners

[Logos of various organizations]
Mitigation Strategies

Using policy to enhance groundwater sustainability
## Mitigation Strategies

<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Model Zoning Guidelines</td>
<td>○ Zoning recommendations to protect groundwater resources</td>
<td></td>
<td>In Development</td>
<td>■ Establish partnerships</td>
</tr>
<tr>
<td>16</td>
<td>Zoning Overlay Districts</td>
<td>○ Specifically designed zoning districts to protect groundwater resources</td>
<td></td>
<td>In Development</td>
<td>■ Establish partnerships</td>
</tr>
<tr>
<td>17</td>
<td>County Groundwater Ordinance</td>
<td>○ Guidelines for utilizing groundwater resources in certain areas</td>
<td>Ottawa County Department of Public Health</td>
<td>In Development</td>
<td>■ Work with partners to develop draft ordinance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Offset-program for developers</td>
<td>Ottawa County Road Commission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Health Code Revisions</td>
<td>○ Identify and enhance health codes to further protect groundwater</td>
<td>Ottawa County Department of Public Health</td>
<td>In Development</td>
<td>■ Work with partner to identify changes</td>
</tr>
</tbody>
</table>
| 19 | Exploring Other Policies     | ○ Examining current and potential policies for opportunities to enhance groundwater conservation | Drummond Carpenter, PLLC  
Michigan Groundwater Association  
Ottawa County Department of Public Health  
Ottawa County Road Commission  
Ottawa County Water Resources Commissioner | In Development | ■ Work with partners to explore opportunities |
## Mitigation Strategies

<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
</table>
| 20 | Water Recycling Strategies       | ▪ Exploring innovative opportunities to utilize alternative water sources | ➔ Drummond Carpenter, PLLC  ➔ Michigan Geological Survey  ➔ Ottawa County Department of Public Health | In Development  | ■ Work with partners to identify and test new systems  
|    |                                 |                                                           |                                                           |                 | ■ Modify regulations, as necessary           |
| 21 | Groundwater Monitoring Network   | ▪ Establish a large-scale monitoring system to better understand our hyper-local geology | ➔ Michigan Geological Survey  ➔ Michigan Groundwater Association | In Development  | ■ Secure Funding  
|    |                                 |                                                           |                                                           |                 | ■ Work with partners to develop action plan |
| 22 | Infrastructure Mapping and Planning | ▪ Countywide water and wastewater infrastructure map; and ▪ Expansion recommendation plan | ➔ Ottawa County Department of Geospatial Insights & Solutions  ➔ Ottawa County Road Commission | In Development  | ■ Work with partners to map and plan infrastructure |
| 23 | Coordinated Future Land Use Plan | ▪ Coordinated countywide future land use plan, developed with groundwater considerations |                                                           | In Development  |                                                               |
Model Zoning Guidelines
Ensuring future development does not come at a cost to groundwater quality and quantity

Rapidly expanding residential development is adding strain to our groundwater supply.

In order to allow our County to continue its growth, yet also protect our resources, thoughtful zoning practices will need to be implemented.

The County has begun reviewing best practices for groundwater conservation through zoning and land use techniques, including components of Low Impact Development (LID). The compiled strategies and recommendations will be distributed for use at the local level.

The Planning and Performance Improvement Department will be available to provide assistance to local units with implementing any changes.

Examples of other modifications may include:
- Lot size/density requirements
- Landscaping requirements
- Allowable uses

Did You Know...
LID (Low-Impact Development) is an approach to planning and engineering design to mitigate the impact of our built environment on the natural environment.
Zoning Overlay Districts

Ensuring future development does not come at a cost to groundwater quality and quantity

Groundwater challenges present themselves in different ways and in different levels of severity across the County. In other words, our geologic conditions are not confined within political boundaries.

Zoning overlay districts can span across multiple jurisdictions, and be defined by geologic conditions, not political boundaries. The districts would apply specific development and use standards, to address localized groundwater issues.

The County aims to review options with various environmental experts and local representatives, utilizing existing and needed data (e.g. data from the proposed groundwater monitoring network - Strategy 24) to define district boundaries and standards.
County Groundwater Ordinance

Protecting groundwater through innovative policy

The County is researching options and examples for implementing an ordinance that would protect groundwater by managing certain aspects of development and enhance municipal water access.

Innovative techniques used by other jurisdictions include:

- Prioritized development credit programs
- Expanding municipal water infrastructure with new funding sources
- Rebate options for connecting to municipal water

Current Partners

[Image of Ottawa County Department of Public Health]
Health Code Revisions

Many state and local environmental health regulations are designed to protect groundwater.

The County is working to revise and enhance some of these existing regulations in order to accommodate for the particularly sensitive nature of our geology.

Some potential revision areas include:

- Minimum separation distances between wells and septic systems
- Minimum distance requirements for new development to connect to municipal water/wastewater infrastructure
- Advanced types of on-site wastewater treatment (e.g. aerobic), where applicable

Did You Know...

An aerobic treatment system differs from a traditional septic system in that it utilizes oxygenated processes to break down organic matter. This method is cleaner and more efficient.
Exploring Other Policies

Examine existing practices for improvement opportunities

Numerous other policies may have a direct or indirect impact on our groundwater. The County will be reviewing these policies, as they are identified.

Potential policies to review include:

- Road de-icing policy
- Runoff storage solutions
- Development guidelines for stormwater management
- Enhanced well drilling records
- Real Estate Transfer Evaluation Program

Current Partners

Did You Know...
Permeable Pavers are designed to increase the amount of water infiltrated back into the ground
Water Recycling Strategies

Innovative systems & ways to permit them

Opportunities exist for capturing, storing, and reusing water from various systems that typically discharge water as a waste byproduct. Recycled water from these systems can be used for irrigation, agricultural, or other applications.

These systems, however, may require certain types of approval from health or environmental agencies, and/or require significant coordination to implement.

The County is working with various agencies to facilitate the use and promotion of these systems, and is exploring options for piloting demonstration projects.

Possible sources for water recycling can include:
- Household and industrial greywater systems
- Dewatering bags from various sources
- Sump collection systems
- Stormwater collection & storage

Current Partners
Groundwater Monitoring Network

Furthering our understanding of the water beneath our feet

The studies conducted by Michigan State University illustrated the nature of the groundwater problems and where they are occurring. Now, the County aims to identify what solutions will be most effective.

This will be done by:

- Establishing a substantial network of monitoring wells to track long-term patterns in groundwater flow
- Identifying areas that naturally facilitate bedrock aquifer recharge
- Examining our ability to augment groundwater recharge, by means of injection wells, or other methods
- Calculating our groundwater consumption, then setting benchmarks for improvement through a groundwater budget

Did You Know...

A groundwater budget is similar to a financial budget. It measures how much groundwater is being taken out, versus how much is being put back into the aquifer, in a particular area.
Infrastructure Mapping and Planning

Currently, water and wastewater infrastructure systems are managed by several independent authorities across the County.

As a result, a comprehensive map or database showing the full extent of water and wastewater infrastructure across the County does not exist.

Data collection and mapping efforts are underway to set the framework for:

- Detailed map creation
- Availability and demand analysis
- Strategic planning of future system expansions

Current Partners
Coordinated Future Land Use Plan
Planning for long-term development patterns

Future land use planning and groundwater management are mutually beneficial strategies.

The Planning and Performance Improvement Department is in the process of developing a framework for a new Countywide future land use plan, in collaboration with local planning practitioners and other community stakeholders.

Areas of groundwater concern will be taken into consideration when designating areas for desired growth. Additionally, water and wastewater infrastructure planning can benefit from future land use modeling.
Coordination Strategies

Creating accountability through organization structure
## Coordination Strategies

<table>
<thead>
<tr>
<th>#</th>
<th>Strategy</th>
<th>Summary / Components</th>
<th>Current Partners</th>
<th>Status</th>
<th>Critical Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>County Support Personnel</td>
<td>○ Newly created position within the County to manage groundwater efforts</td>
<td></td>
<td>In Development</td>
<td>■ Allocate funding for new position</td>
</tr>
<tr>
<td>25</td>
<td>Groundwater Technical Advisory Board</td>
<td>○ A group of scientists and policy-makers assembled to assist County efforts and provide technical expertise</td>
<td></td>
<td>In Development</td>
<td>■ Identify all members ■ Develop board bylaws and mission</td>
</tr>
<tr>
<td>26</td>
<td>Groundwater Commission</td>
<td>○ Formal commission created to ensure the continued pursuit of County and regional groundwater conservation</td>
<td>Ottawa County Groundwater Task Force</td>
<td>In Development</td>
<td>■ Identify all members ■ Develop board bylaws and mission</td>
</tr>
<tr>
<td>27</td>
<td>Collaboration on Existing Efforts</td>
<td>○ County to support the efforts of its partners</td>
<td>All partners</td>
<td>In Development</td>
<td>■ Support our partners!</td>
</tr>
</tbody>
</table>
County Support Personnel

County staff to oversee and assist conservation efforts

A dedicated groundwater technician and liaison can provide support and assistance to Ottawa County’s partners and stakeholders. The groundwater specialist (i.e. land use planner) would be employed by the County, within the Planning and Performance Improvement Department.

Primary responsibilities may include:

- Research & development for various ordinances and policies
- Making recommendations for zoning standards and overlays
- Facilitating communications and programs between various partners
- Managing the implementation of various programs outlined in this document
- Handling public relations
Groundwater Technical Advisory Board
Professionals offering technical expertise

The ad-hoc Groundwater Executive Committee that was formulated to oversee the creation of this plan will be formalized into a permanent advisory board to oversee the plan’s implementation process and provide technical and logistical assistance on various groundwater issues across the County.

Responsibilities of the board may include:

- Providing technical support and recommendations
- Helping diagnose and solve unique groundwater challenges
- Advising residents, developers, and business owners on water conservation techniques, technologies, and methods best suited for the area

Did You Know...
Some of Michigan’s most esteemed water systems experts have been involved in the process of identifying the conservation strategies and techniques listed in this document!
Groundwater Commission
A stakeholder-led committee providing leadership

As part of the initial groundwater studies, a task force of qualified individuals with diverse backgrounds was organized to oversee the process. This task force will be transitioning into a formal commission to provide accountability and oversight of groundwater sustainability efforts.
Collaboration on Existing Efforts
Supporting our partners and their efforts

The County recognizes the extensive efforts its partners commit to preserving groundwater through their own programs. In addition to working on its direct water conservation and advocacy efforts, the County will provide ongoing support to partner organizations and their efforts.

Continued support will come in various forms, such as:

- Logistical coordination
- Resource contribution
- Promotion and collaboration
Dynamic Relationships

This is an illustration of the working relationship between Ottawa County, its groundwater advocacy teams, and community partners.
How to Get Involved

Not already one of our partners?

Want to make a difference?

➔ Contact the Ottawa County Planning and Performance Improvement Department today to discover how we can work together!
Appendices
Appendix A - Resolution

COUNTY OF OTTAWA
STATE OF MICHIGAN

RESOLUTION

At a regular meeting of the Ottawa County Board of Commissioners, held at the Fillmore Complex in the Township of Olive, Michigan on November 26, 2019 at 1:30 p.m. local time.


ABSENT: Commissioners: Roger Bergman. (1)

It was moved by Commissioner Kyle Terpstra and supported by Commissioner Randall Meppelink that the following Resolution be adopted:

WHEREAS it is the goal of the Ottawa County Board of Commissioners to contribute to the long-term economic, social and environmental health of the County; and

WHEREAS it has been determined through extensive scientific study that the County is experiencing issues with groundwater depletion and mineralization; and

WHEREAS under current development conditions, the groundwater issues will continue to worsen; and

WHEREAS the groundwater issues pose significant risk to the long-term economic, social and environmental health of the County; and

WHEREAS Ottawa County personnel, in partnership with a multitude of area partner organizations, have developed a series of strategies to address the groundwater challenges, entitled “Ottawa County Groundwater Sustainability Initiative: Proactive Strategies Index (Fall 2019)”;

NOW THEREFORE IT BE RESOLVED that the Ottawa County Board of Commissioners endorses and pledges to support, within its resource limitations, the efforts of Ottawa County personnel and their partners to implement groundwater sustainability initiatives, including those listed in the “Ottawa County Groundwater Sustainability Initiative: Proactive Strategies Index (Fall 2019)”.


NAYS: Commissioners: None

RESOLUTION DECLARED ADOPTED.
Appendix B - Our Groundwater Story

Part 1
Responding to Concern

Ottawa County is the fastest growing county in Michigan. It is also one of the most agriculturally diverse and productive counties in the State, and nationally. As the County’s population continues to grow and its agricultural industry flourishes into the future, access to abundant clean water is essential.

Residents, agricultural producers, and businesses in Ottawa County obtain their water from two primary sources: municipal water systems and natural aquifer systems. The County’s urbanized areas are served principally by municipal systems that distribute water processed from Lake Michigan, while its rural areas rely on water that is pumped from underground geologic aquifer systems. Since 2005, there have been instances in the County where the aquifer system has not had the capacity to support new withdrawals, mainly due to low water levels.

There have also been instances where extracted groundwater contained elevated levels of sodium chloride. In order to understand the long-term sustainability of the County’s aquifer system, the Ottawa County Board of Commissioners requested that a comprehensive, forward-looking study be conducted. One of the primary goals of the study was to identify those areas of the County where continued and/or increased groundwater withdrawals may negatively impact the sustainability and quality of the aquifer system.

Did You Know...
Local farmers have seen their crops become damaged by using groundwater with high levels of sodium chloride.
Appendix B - Our Groundwater Story

Part 2

Groundwater Studies

Michigan State University (MSU) was hired in 2012 to conduct the comprehensive, two-part groundwater study for Ottawa County. An initial Phase I groundwater assessment was completed by MSU in 2013. The assessment validated the anecdotal reports: in certain areas of our bedrock aquifer, water levels have been gradually declining over the last 20 years, and sodium chloride levels are rising above recommended standards for drinking water (>250 mg/L) and agricultural irrigation (>70 mg/L).

The primary reasons for the declining water levels and increasing sodium chloride concentrations are two-fold. First, water in the deep bedrock aquifer is not being replenished as quickly as it is being withdrawn for water consumption. This is occurring mainly because of the unique geology underneath Ottawa County.

A substantial layer of impermeable clay material sits atop the deep bedrock aquifer nearly 100 foot below the land surface. This naturally occurring clay layer prevents water that percolates down from the surface from recharging back into the bedrock aquifer.

Secondly, the bedrock aquifer, known as the Marshall Formation, is naturally-rich in sodium chloride. Consequently, as water levels decrease, the concentration of sodium chloride increases in the water that is being pumped from the aquifer system.

A Phase II study began in 2014 by MSU to assess how the County’s groundwater supply will be impacted as demand for water increases into the future. This study utilized water-demand projections for the years 2020, 2025, and 2035 based on anticipated growth trends countywide. The study results, finalized by MSU in March 2018, provide community officials with the information needed to develop a sustainable action plan for effectively and collaboratively managing our groundwater resources.

Did You Know...
The full scientific study results can be found in the Phase I and Phase II Reports, available online at miottawa.org/groundwater

Figure a. above, illustrates the increasing amount of groundwater that is being pumped from the bedrock aquifer, especially in the central portion of the County.
Part 3
The Planning Process
& Moving Forward
Since the completion of the Phase II Study in 2018, the County has made it a priority to proactively address our groundwater issues going forward. The Planning and Performance Improvement Department has been working hard to initiate an awareness campaign, and to establish partners to help identify and manage solutions to address the issues. As of fall 2019, the County has held over 50 meetings with various community stakeholder groups and organizations, and has been present at a multitude of community events to spread awareness, garner support, and learn about the ways in which we can all work together towards a future of water sustainability. This document is a brief summary of partnerships and programs the County has established, or plans to establish.

In order to ensure that groundwater sustainability remains a priority for the County for years to come, its Board of Commissioners have adopted a formal resolution to support the ongoing efforts of its staff and partners.

Moving forward, you can look to see our logo wherever an opportunity exists to promote water sustainability!
## Appendix C - Links

### Partner Organizations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website/Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allendale Christian School</td>
<td>allendalechristian.org</td>
</tr>
<tr>
<td>Allendale Township Library</td>
<td>allendalelibrary.org</td>
</tr>
<tr>
<td>Coopersville Area District Library</td>
<td>cooperstownlibrary.org</td>
</tr>
<tr>
<td>Drummond Carpenter</td>
<td>drummondcarpenter.com</td>
</tr>
<tr>
<td>EPA WaterSense</td>
<td>epa.gov/watersense</td>
</tr>
<tr>
<td>Gary Byker Library of Hudsonville</td>
<td>hudsonvillelibrary.org/news-events</td>
</tr>
<tr>
<td>GEI Consultants</td>
<td>geiconsultants.com</td>
</tr>
<tr>
<td>Grand Valley State University</td>
<td>gvsu.edu</td>
</tr>
<tr>
<td>Georgetown Township Public Library</td>
<td>gtwp.com/186/Library</td>
</tr>
<tr>
<td>Green Michigan</td>
<td>greenmichigan.org</td>
</tr>
<tr>
<td>Herrick District Library</td>
<td>herrickdl.org</td>
</tr>
<tr>
<td>Holland-Hope College Sustainability Institute</td>
<td>hope.edu/offices/sustainability/resources.html</td>
</tr>
<tr>
<td>Hope College</td>
<td>hope.edu</td>
</tr>
<tr>
<td>Howard Miller Public Library</td>
<td>hmpl.org</td>
</tr>
<tr>
<td>Loutit Public Library</td>
<td>loutitlibrary.org</td>
</tr>
<tr>
<td>Macatawa Area Coordinating Council</td>
<td>the-macc.org</td>
</tr>
<tr>
<td>Michigan Agriculture Environmental Assurance Program</td>
<td>maeap.org</td>
</tr>
<tr>
<td>Michigan Association of Conservation Districts</td>
<td>macd.org</td>
</tr>
<tr>
<td>Michigan Geological Survey</td>
<td>wmich.edu/geologysurvey</td>
</tr>
<tr>
<td>Michigan Groundwater Association</td>
<td>michigangroundwater.com</td>
</tr>
<tr>
<td>Michigan State University Extension</td>
<td>canr.msu.edu/outreach</td>
</tr>
<tr>
<td>Natural Resources Conservation Service</td>
<td>nrcs.usda.gov/wps/portal/nrcs/site/national/home</td>
</tr>
<tr>
<td>Ottawa Area Independent School District</td>
<td>oaisd.org</td>
</tr>
<tr>
<td>Ottawa County Department of Public Health</td>
<td>miottawa.org/health/ochd</td>
</tr>
<tr>
<td>Ottawa County Farm Bureau</td>
<td>ottawa.michfb.com</td>
</tr>
<tr>
<td>Ottawa County Geospatial Insights and Solutions</td>
<td>miottawa.org/Departments/GIS</td>
</tr>
<tr>
<td>Ottawa County Parks and Recreation</td>
<td>miottawa.org/parks</td>
</tr>
<tr>
<td>Ottawa County Road Commission</td>
<td>ottawacorc.com</td>
</tr>
<tr>
<td>Ottawa County Water Resources Commissioner</td>
<td>miottawa.org/Departments/Drain</td>
</tr>
<tr>
<td>ODC Network</td>
<td>outdoordiscovery.org</td>
</tr>
<tr>
<td>Patmos Library</td>
<td>patmoslibrary.org</td>
</tr>
<tr>
<td>Spring Lake District Library</td>
<td>sllib.org</td>
</tr>
<tr>
<td>West Michigan Nursery and Landscape Association</td>
<td>wmnl.com</td>
</tr>
</tbody>
</table>
Appendix C - Links

Other Useful Links

Alliance for Water Efficiency
allianceforwaterefficiency.org

EPA WaterSense
epa.gov/watersense

U.S. Geological Survey
usgs.gov/water

Water Footprint Calculator
watercalculator.org
Appendix D - References


Thank You!