



# **AGENDA OF THE PROTECTION AND POLICY COMMITTEE**

**MONDAY, FEBRUARY 8, 2021, 5:30 PM**  
**Virtual Meeting. Public may join via Zoom.**

**A. Zoom Meeting Information.**

- I. This item contains documents which provide call in information and instructions for the Zoom Meeting

**B. Roll Call.**

**C. Approval of the Agenda.**

**D. Approval of Minutes.**

- I. Approval of the minutes from the January 25, 2021 Protection & Policy Committee Meeting.

**E. Regular Business.**

- I. Consideration with possible action on a request by The Sardine Can at 128. S Broadway Ave. to extend their license premises to parking lot for one day special events on June 9, 2021, June 30, 2021, July 21, 2021, August 11, 2021 and September 1, 2021.
2. Consideration with possible action on a request by Gerzak's Liquor & Catering, LLC at 1244 Velp with a license premises description as "1 room retail store-liquor on shelves, beer cave, fridge units, backroom (app 300 sq feet).
3. Discussion with possible action on a resolution for the City of Green Bay to adopt the Brown County All-Hazard Mitigation Plan.
4. Consideration with possible action on a request by Ald. Lefebvre to look at varying aspects of Green Bay's license alcohol establishments with a discuss on a moratorium.
5. A request by Ald. Wery to receive update, with possible action, on additional changes to the massage spa ordinance.

6. A request by Ald. Brunette for discussion with possible action on forwarding the Face Covering Ordinance to the Brown County Health Department for review.

**F. Informational.**

- I. The Liquor Violation Report for February 8, 2021.

**G. Adjournment.**

- 1) THIS MEETING IS RECORDED: THE VIDEO OF THIS MEETING AND MINUTES ARE AVAILABLE ONLINE AT [www.greenbaywi.gov](http://www.greenbaywi.gov)
- 2) ACCESSIBILITY: Any person wishing to attend who requires special accommodation because of a disability, should contact the City Safety Manager at 920-448-3125 at least 48 hours before the scheduled meeting time so that arrangements can be made.
- 3) QUORUM: Please take notice that a majority or quorum of the Common Council will attend this Protection and Policy committee meeting and will constitute a meeting of the Common Council for purposes of discussion and information gathering relative to this agenda.
- 4) REPRESENTATION: The party requesting the communication, or their representative, should be present at this meeting.
- 5) FOR ALL LICENSING ISSUES, the Committee may convene in closed session pursuant to §19.85 (1)(b) and/or §19.85 (1)(f) Wis. Stats., for the purpose of considering information with respect to licensing for a person, including financial, social, or personal information. The Committee will thereafter reconvene in open session pursuant to Section 19.85(2), Wis. Stats., to take action on items discussed in closed session, if appropriate, and to consider the remainder of the agenda.

# Virtual Meeting Instructions

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## Protection & Policy Committee Meeting 2/8/2021

### Zoom Meeting Information

Join Zoom Meeting

<https://us02web.zoom.us/j/84891440225>

Meeting ID: 848 9144 0225

Passcode: 151813

One tap mobile

+13126266799,,84891440225#,,,,\*151813# US (Chicago)

+19292056099,,84891440225#,,,,\*151813# US (New York)

### Dial by your location

+1 312 626 6799 US (Chicago)

+1 929 205 6099 US (New York)

+1 301 715 8592 US (Washington DC)

+1 346 248 7799 US (Houston)

+1 669 900 6833 US (San Jose)

+1 253 215 8782 US (Tacoma)

Meeting ID: 848 9144 0225

Passcode: 151813

Find your local number: <https://us02web.zoom.us/u/kefAemEZ7H>

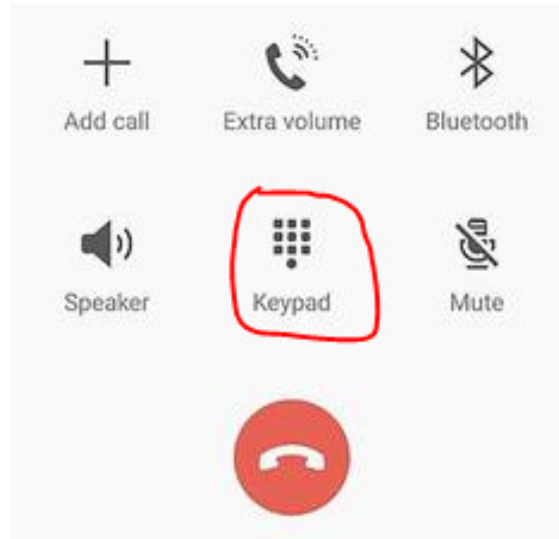
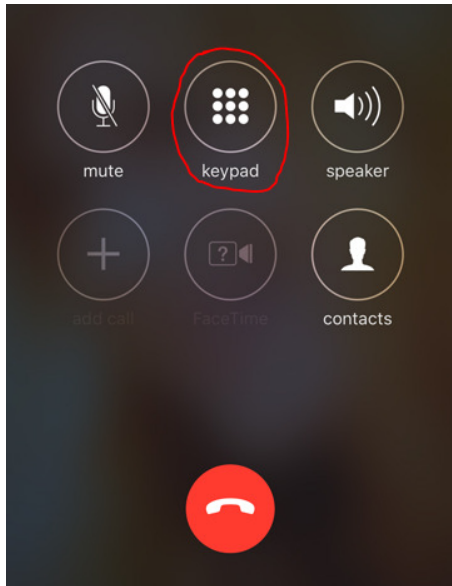
## Additional Information

1. Wisconsin Open Meetings Law still applies
  - a. Persons interested in speaking to an item must give their name and address
  - b. Committee/Commission/Board members will still follow *Roberts Rules of Order*
2. All zoom meetings will have a password in the instructions. Please enter when prompted.
3. Please log into the Zoom meeting 10 minutes before the meeting starts to ensure proper technology is working.
  - a. If you are a Board Member, please log into [CivicClerk](#) with a computer, laptop, or tablet device.
4. Once you are in the meeting please mute yourselves.
  - a. You may unmute yourself when you are called upon to speak.
5. Waiting room
  - a. When you call in, all callers/participants will be placed in a “waiting room.”
  - b. Persons on the agenda will be admitted to the meeting, and then once the item is concluded, the host will permanently mute you from the meeting (you can still hear the meeting).
6. Using Zoom with a tablet or computer
  - a. Tablet—you will be asked to sign in. Download the app either with the Apple Store or the Play Store
  - b. Computer—you will be asked to sign in. You may download the app or click on the link to open Zoom in your browser.
7. Registering
  - a. The host may ask you to register for the meeting. A registration link will be sent to you along with the invite. You’ll receive another email confirming that you’re registered for the meeting.
  - b. If you’re using a phone, your registration will still be tied to an email.
8. Raising your hand
  - a. Committee members—you can either use CivicClerk and request to speak or you can “raise your hand” in the zoom meeting (you’d need to use a computer or tablet) to let the host know you’d like to speak. You can also un-mute yourselves and start speaking.
  - b. Persons on the agenda—you can “raise your hand” but you’d need to use a computer. You will be allowed to speak, per Wisconsin Open Meetings Rules, once the committee has “opened the floor for interested parties to speak.” Once the committee is finished with your agenda item, the host will mute you permanently, unless the committee opens the floor again.
9. What devices should I use?
  - a. Smart phone (please see more detailed instructions on page 3)
  - b. Land line
  - c. Tablet—well in advance of the meeting, please download the Zoom Meeting app before you join a meeting by using either the Apple Store or the Play Store. You will be asked to input your name, thus identifying you for the meeting. You’ll also be asked to verify your email.
  - d. Computer—well in advance of the meeting, please download the Zoom Meeting app, but you can also click on a link to open the Zoom Meeting in your browser. You will be asked to input your name, thus identifying you for the meeting.
  - e. For tablet and computer users—if you download the app you will be asked to verify your email.
10. Zoom etiquette
  - a. Muting yourselves when you’re not talking will prevent your background noise from interfering with others’ ability to listen to and participate in the meeting.
  - b. If you’re using a telephone, please identify yourself with your phone number and name before you speak. Zoom meeting hosts can see only your telephone number and will ask you to identify yourselves.
11. Closed session
  - a. Persons in the Zoom meeting will be put into a waiting room while the committee meets in Closed Session. Participants will be admitted back into the Zoom meeting once the committee reconvenes in Open Session.
  - b. Persons watching live on YouTube will see a gray screen with the City logo during closed session.
12. Persons interested in attending anonymously or listening to the meeting may call in by dialing \*67 followed by the phone number above.

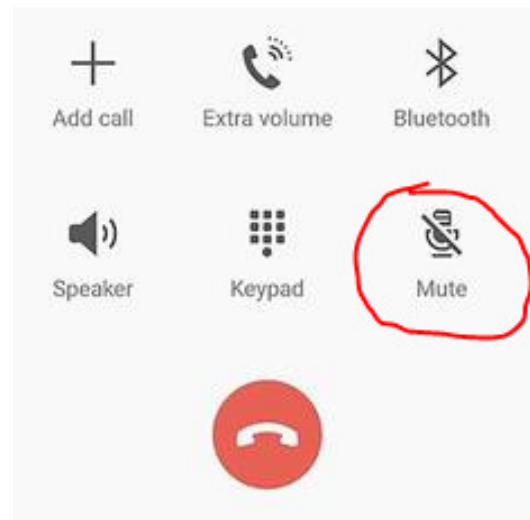
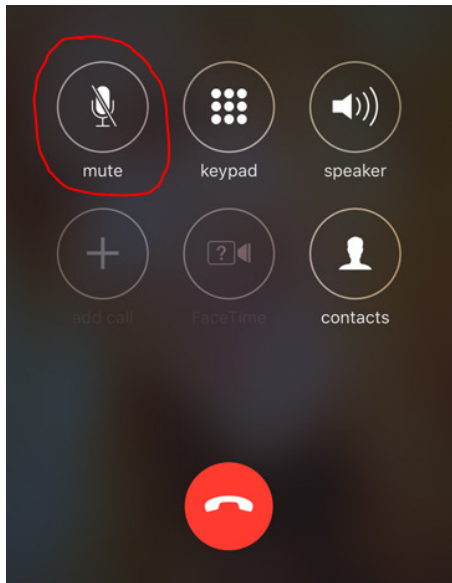


## Calling into the Zoom meeting using a smartphone

1. Dial the phone number listed at the beginning of this document.
2. When prompted, enter the Meeting ID number followed by #
  - a. If you're using a smartphone, you can access the keypad by clicking "Keypad" on your screen



3. Once you are in the meeting, notify the meeting host that you are in and state your name.
4. If you do not need to talk, please make sure your phone is on **Mute**
  - a. If you're using a smartphone, look at your screen and click the Mute button



- b. If you're using a computer, you should see a Mute button in the Zoom application





Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # D.I**

Approval of the minutes from the January 25, 2021 Protection & Policy Committee Meeting.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

None



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.1**

Consideration with possible action on a request by The Sardine Can at 128. S Broadway Ave. to extend their license premises to parking lot for one day special events on June 9, 2021, June 30, 2021, July 21, 2021, August 11, 2021 and September 1, 2021.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

- I. 2021 Block Party Letter - updated



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.2**

Consideration with possible action on a request by Gerczak's Liquor & Catering, LLC at 1244 Velp with a license premises description as "1 room retail store-liquor on shelves, beer cave, fridge units, backroom (app 300 sq feet) (Previously licensed as J&D Gerczak Liq & Catering, LLC).

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

1. CLASS A LICENSE STIPULATION.BOURDELAISR.360-1244VELP
2. application-1244VELP



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.3**

Discussion with possible action on a resolution for the City of Green Bay to adopt the Brown County All-Hazard Mitigation Plan.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

1. Resolution - Adopt Brown Co All Hazards Mitigation Plan
2. 2020 All Hazard Draft Ch 4 FINAL
3. 2020 All Hazard Draft Ch 2 FINAL
4. 2020 All Hazard Draft Ch 1 FINAL
5. 2020 All Hazard Draft Ch 5 FINAL
6. 2020 All Hazard Draft Ch 3 FINAL

**RESOLUTION ADOPTING BROWN COUNTY  
ALL HAZARDS MITIGATION PLAN**

**February 2, 2021**

BY THE COMMON COUNCIL OF THE CITY OF GREEN BAY:

WHEREAS, the City of Green Bay recognizes that natural hazards pose a threat to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted all hazards mitigation plan is required as a condition of future grant funding for mitigation projects; and

WHEREAS, the County Board of Brown County has adopted the Brown County All Hazard Mitigation Plan as its official plan; and

WHEREAS, the City of Green Bay has reviewed such plan and recommends approval thereof for the City of Green Bay;

NOW, THEREFORE BE IT RESOLVED, that the Common Council of the City of Green Bay hereby adopts the *2020 Brown County All Hazards Mitigation Plan*, a copy of which is on file with the City Clerk, as its official plan and directs that a copy of the same be forwarded to the Brown County Emergency Management Department.

BE IT FURTHER RESOLVED, that upon approval of the *2020 Brown County All Hazards Mitigation Plan*, the Brown County Emergency Management Department will submit the adopted plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval, as required under the Hazard Mitigation Grant Program.

Adopted \_\_\_\_\_

Approved \_\_\_\_\_

\_\_\_\_\_  
Mayor

\_\_\_\_\_  
Clerk

## CHAPTER 4      MITIGATION STRATEGIES

### **INTRODUCTION**

The Disaster Mitigation Act of 2000 defines mitigation as a "sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects." Mitigation planning is the systematic process of learning about the hazards that can affect the county, setting clear goals, identifying appropriate actions and following through with an effective mitigation strategy. Mitigation encourages long-term reduction of hazard vulnerability and can reduce the enormous costs associated with a disaster including costs to property owners and to public agencies. Mitigation can also protect critical community facilities, reduce exposure to liability, and minimize community disruption.

This chapter outlines the general goals to be achieved through the implementation of this all hazard mitigation plan. The natural hazards discussed in this chapter are listed in the order of priority as determined by the All Hazard Plan Steering Committee. For each natural hazard, there is list of mitigation strategies (actions and projects), noted with implementation status, along with potential stakeholders and a timetable for implementation. A summary of the recommended mitigation strategies can be found in Table 4.1 at the end of this chapter.

### **PROGRESS SINCE LAST UPDATE**

Since the previous Hazard Mitigation Plan was approved and adopted in 2012, Brown County has been actively pursuing many of the mitigation efforts that were identified as either efforts that were underway or that were already in place. Below is a summary of the mitigation efforts that were identified in the previous plan and their current status.

- *Floodplain mapping and zoning completed and enforced:* This effort is a continually evolving effort. Brown County adopted the most recent (2009) FEMA FIRM Map and regularly adopts and updates the official floodplain zoning map based on approved flood studies. Brown County Zoning administers floodplain zoning in the unincorporated areas of the county. This has also been done by many of the incorporated communities that administer floodplain zoning.
- *Stormwater management and detention activities instituted:* Many Brown County communities have adopted storm water management ordinances. The State of Wisconsin also regulates storm water via NR 216 (Storm Water Discharge Permits) and NR 151 (Runoff Management).
- *Monitoring, warning, and evacuation procedures maintained and communicated:* These procedures are not always static. Things around the county change and so to should the procedures involving monitoring, warning, and evacuating people in the event of a hazard. These procedures may be on file but the training and communication of these procedures is always needed.
- *Building codes established and enforced:* All entities that administer building permits and enforce building code regulations have a building inspector on staff or contract for their services. Building inspectors must be certified/licensed by the State of Wisconsin.

- *Land use controls adopted and enforced:* Many land use controls are in place at the state, county, and local levels. Having land use controls can be a powerful tool to achieve an end goal but they are only good if they are administered consistently. Most hazards don't understand political boundaries and therefore it takes multi-jurisdictional cooperation and coordination to mitigate some hazards. All Brown County agencies that administer land use control codes and ordinances could coordinate more.
- *Capital improvement plans prepared and referenced:* Brown County and the local municipalities use various forms of a capital improvement plan. These plans are typically updated every year to include new projects.
- *Incident response exercises scheduled and assessed:* Brown County Emergency Management keeps up to date on required exercises.
- *Intergovernmental cooperation partnerships established and maintained:* Intergovernmental cooperation is critical to the prevention and mitigation efforts when hazards do occur.
- *Education pieces prepared and distributed:* While the education pieces were prepared and distributed, they should also be reviewed and updated periodically.
- *Disaster plan prepared, distributed, and followed:* Brown County has an Emergency Operations Plan.

## **CURRENT MITIGATION EFFORTS**

In the preparation of this all hazard mitigation plan for Brown County, it is important to understand that many mitigation activities are already underway and/or in place. Brown County, local communities, hospitals, and schools have been very proactive in attempting to mitigate the impacts of natural hazards by adopting and using their own individual emergency response plans. A list of those plans can be found in Chapter 3. The following list highlights some of the mitigation activities currently being undertaken throughout the county by these entities.

- Floodplain mapping and zoning.
- In accordance with NR 115 (Shoreland Zoning) and NR 116 (Floodplain Management Program) Brown County and the local municipal governments enforce the adopted ordinances.
- Brown County and the communities served by public sewer, are required to have Municipal Separate Storm Sewer System (MS4) permits to comply with Wisconsin Administrative Code, NR 216. While this is water quality focused it is directly linked to stormwater management.
- Storm water management requirements:
  - Some local municipal governments have adopted and enforce storm water management ordinances.
- Monitoring, warning, and evacuation procedures maintained and communicated
- Building codes established and enforced



- Land use controls adopted and enforced
- Capital improvement plans prepared and referenced
- Incident response exercises scheduled and assessed
- Intergovernmental cooperation partnerships established and maintained
- Education pieces prepared and distributed
- Disaster plans prepared, distributed, and followed

#### Primary Mitigation Goals

PMG1 - To preserve life and minimize the potential for injuries or death.

PMG2 - To preserve and enhance the quality of life throughout Brown County by identifying potential property damage risks and recommending appropriate mitigation strategies to minimize potential property damage.

PMG3 - To identify potential funding sources for mitigation projects and form the basis for grant applications.

PMG4 - Coordinate mitigation efforts through communication and collaboration between jurisdictions and all departments.

PMG5 - Develop and implement plans and programs to identify and reduce a hazard's risk (e.g. Emergency action plans, Power Restoration Plans, Post-Hazard Evaluation and Action Plan, etc.).

PMG6 - Identify areas of greatest impact from hazards (e.g. High-water marks, repetitive loss, etc.).

#### Secondary Mitigation Goals

SMG1 - Implement policies and programs designed to reduce or eliminate the impacts of natural hazards.

SMG2 - Collect and utilize data to improve mitigation strategies.

SMG3 - Build and support local capacity and commitment to improve implementation of mitigation strategies.

SMG4 - Continue enforcement measures to reduce the impacts of natural hazards.

SMG5 - Utilize natural resource protection measures as a means to reduce the impacts of natural hazards.

SMG6 - Incorporate Green Infrastructure (GI) and Low Impact Development (LID) mitigation strategies to the impacts of natural hazards.

SMG7 - Continue training, education and outreach programs to improve disaster response and overall education of hazard planning and mitigation.

## **MITIGATION CATEGORIES**

To establish a framework for the development of mitigation strategies to address the goals listed above, a clear understanding of what techniques should be considered during the planning process was necessary. The following six broad mitigation categories served as that basis in the formulation of mitigation strategies for each of the natural hazards addressed in this plan.

### **Prevention**

Prevention activities are intended to keep issues associated with hazard events from getting worse. They are particularly effective in limiting Brown County's and each community's future vulnerability, especially in areas where development has not occurred, or capital improvements have not been substantial. Examples of prevention activities include:

#### **Planning and Zoning**

- Suggest municipalities adopt Brown County All-Hazard Mitigation Plan into local municipality plans or ordinances when no local plan exists.
- Ensure that there are adequate groundwater wellhead protection plans in place that are utilized.

#### **Hazard Mapping**

- Develop a mapping system with data that maps hazardous materials (open air and/or closed storage). These materials could have adverse impacts to the community and natural environment during a natural disaster or emergency. Develop a database and map to identify and track all hazardous material located within the region.

#### **Building Codes**

- Review and update building codes to ensure that structures are built to a standard that will endure most hazard events.

#### **Studies/Data Collection and Analysis**

- Continue to maintain hazardous material locations to the extent possible.

#### **Open Space Preservation**

- Obtain and preserve open spaces within key areas of Brown County.
- Develop an action plan to identify priority parcels and potential funding sources to purchase vulnerable property.
- Continue to maintain and enforce Chapter 22 (Shorelands and Wetlands) of the Brown County Code of Ordinances.
- Continue to maintain the Brown County Sewage Plan.
- Continue to maintain and enforce Chapter 21 (Land Division and Subdivision) of the Brown County Code of Ordinance.

#### **Floodplain Regulations**

- Obtain and preserve open spaces within the floodplain. Develop an action plan to identify priority parcels and potential funding sources to purchase vulnerable property.
- Continue to maintain and enforce Chapter 23 (Floodplains) of the Brown County Code of Ordinances.

## Storm Water Management

- Several sections of the urbanized areas flood after heavy rain events causing damage to infrastructure and property. Develop a mapping system and database that identifies areas where flooding occurs on a more frequent basis. This process would help place drainage ways into a future Capital Improvement Plan (CIP.)

## Drainage System Maintenance

- Address aging storm water infrastructure that needs maintenance to protect the natural waterways. Develop a plan to identify priority maintenance and replace areas.
- Develop funding sources to purchase, maintain, and protect the natural drainage systems. When parcels near watercourse and navigable waterways are slated to be developed the municipalities should attempt to purchase and protect the public access to these natural amenities. Develop a plan that identifies priority parcels and potential funding sources.

## Capital Improvements Programing

- Develop ability to manage grass and forest fires for municipalities that have vast woodlands. Acquire equipment to properly control forest fires and grass fires.

## Riverine Setbacks

- Continue to enforce development restrictions for steep slope areas and areas that drain to other natural resource features such as waterway or wetlands.

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## **Property Protection**

Property protection measures are intended to enable structures to better withstand hazard events, remove structures from hazardous locations, or provide insurance to cover potential losses. Examples include:

### Acquisition

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Relocation

- Develop a plan to relocate residential areas outside of flood zones and limit future development in area for natural and recreational uses, particularly in areas where structures are repeatedly damaged during flood events.
- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Building Elevation

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Critical Facilities Protection or "Hardening"

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Retrofitting (i.e., wind proofing, flood proofing, seismic design standards, etc.)

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Insurance

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

### Safe Room Construction

- Develop funding sources to purchase, relocate, elevate, or retrofit structures located within the floodplain. Develop a plan and/or asset map to help residents and businesses leverage any available public or private funding.

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## **Natural Resource Protection**

Natural resource protection activities reduce the impact of hazards by preserving or restoring the function of environmental systems. In some cases, natural systems may include high hazard areas such as floodplains, steep sloped areas or barrier islands. Thus, natural resource protection measures can serve the dual purpose of protecting lives and property while enhancing environmental goals such as improved water quality or recreational opportunities. Parks, recreation or conservation agencies and organizations often implement natural resource protection measures. Examples include:

### Floodplain Protection

- Many rivers, including Suamico River, north and west branches of Suamico River, and Potters Creek, have multiple tributaries with Flood Zone A that require protection.

### Riparian Buffers

- Utilize riparian buffers to improve water quality in both urban and rural settings.

### Fire Resistant Landscaping

- Encourage the use of landscaping that is fire proof and fire resistant for residential and commercial properties that develop in area to prevent fast spread of future fires.

### Best Management Practices

- Create an educational campaign to inform the public on best management practices on their private property.

### Fuel Breaks

- Hazards associated with fuel lines, gas meters and control panels include breaking of unprotected pipes (especially at the entry point through walls or fuel tank structures), leaking fuel causing an environmental and fire hazard and the inability of pressure relief devices to operate properly if submerged during a flood.
- Each piece of equipment should be kept above the DFE, Placed in protected shafts and have some flexibility.

## Erosion and Sediment Control

- Create a county-wide system where there is equal environmentally sensitive area protection for all natural resources at the municipality level in addition to the existing county level. Identify potential funding sources to enforce regional erosion and sediment control measures.

## Wetland Preservation and Restoration

- Continue to work with the WI DNR to protect wetlands through the administration of NR 115, NR 121, the 2040 Brown County Sewage Plan, and CH 21 (Land Division and Subdivision) of the Brown County Code of Ordinances

## Habitat Preservation

- Develop protections for woodlands that may be vulnerable to any natural disaster.

## Slope Stabilization

- Development of structures near steep slope may lead to erosion and structural collapse. Strongly enforce required environmentally sensitive area setbacks and encourage use of vegetation that stabilizes soil and slopes.

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## Structural Projects

Structural mitigation projects are intended to lessen the impact of a hazard by physically modifying the environment. These mitigation measures are usually designed by engineers and maintained by public entities. Most of the examples provided herein are aimed at stormwater and flood management projects. Examples include:

## Reservoirs

- Storage of floodwaters in reservoirs causes the broadest range of flood-modifying effects such as reduction in flood flow rate, extent of area flooded, timing, etc. Except in the area immediately downstream from the dam, however, storage may not provide as high a degree of relief from flood damage in specific areas as may be achieved by other more localized tools.
- Flood storage may function alone, in groups, or with other mitigation strategies.
- Create an inventory of all reservoirs in Brown County and monitor their condition on an annual basis.

## Levees/Dikes/Floodwalls

- Dikes, levees, and floodwalls protect a portion of the floodplain from flooding, up to a design level. These works may have adverse as well as beneficial effects. They can increase the height of the flood immediately upstream, across the stream, and downstream by reducing the amount of floodplain area available for overbank floodwater conveyance and/or storage. **Although they may be effective for the emergency, they should not be considered as permanent flood protection measures.**
- A list of dams and levees is maintained by the DNR. Conditions of these facilities should be monitored annually.

## Detention/Retention

- Onsite detention measures can provide temporary storage of urban runoff waters, extending the period of runoff with the intent of reducing flood peaks. The temporary storage of runoff may also result in increased infiltration.
- Effective implementation of these measures includes providing for continuous maintenance, determining the drainage area to be served by a single structure, and determining the effects of detention on the timing of runoff in different segments of the watershed.

## Channel Modification

- Channel modification may be necessary for certain areas, however; altering the natural course of a waterway may have negative impacts to areas upstream and downstream and it can negatively impact the local ecology.
- Acquisition of all permits from federal, state, county, and local entities must be obtained prior to any alteration to a navigable waterway.

### Storm Sewer Construction

- Areas like CTH G, located east from CTH GV, in Ledgeview flood periodically due to undersized storm water pipes under the street. Properly sized storm water pipes and crossings to allow sufficient water flow to prevent flooding during heavy rain and snow melt events should be considered.

### Shoreline Protection

- Seawalls, bulkheads, and revetments are designed to protect development along coastal areas by restricting wave impacts.
- Breakwaters and jetties are designed to protect harbors and navigation channels from wave action or to stabilize inlets.
- Groin fields or segmented offshore breakwaters provide shoreline protection by trapping sand.
- Beach nourishment and building sand dunes are often a cost effective, quasi-natural method of restoring eroding beaches and protecting existing development.

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## **Emergency Services**

Although not typically considered a “mitigation technique,” efficient emergency response can significantly reduce injuries and loss of life associated with hazards. These actions are typically taken immediately prior to, during, or in response to a hazard event. Examples include:

### Warning Systems

- Improve safety during a hazard event by continuing to install tornado siren systems on future fire station structures.
- Continue to develop new warning systems that can be broadcast to the public through various forms of media (i.e. television, social media, county website).

### Search and Rescue

- Adequately fund police and fire departments to purchase necessary search and rescue equipment can help minimize loss of life.
- Maintain/continue ongoing training for search and rescue personnel.

### Evacuation Planning and Management

- Keep emergency action plans up-to-date.

### Flood "Fighting" Techniques

- Continue utilizing flood forecasting systems for major waterways such as the East River and the Fox River to monitor and plan for necessary mitigation and or evacuation of key areas.
- Continue to coordinate issuing flood watches and warnings with local media to notify residents of the potential for dangerous conditions in their area. The success of issuing these watches and warnings depends on the strength of the emergency action plan and the implementing organization's ability to respond before the flood occurs.

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## **Public Information and Awareness**

Public Information and Awareness activities are used to advise residents, business owners, potential property buyers, visitors and government officials about hazards, hazardous areas and mitigation techniques they can use to protect themselves and their property. These public awareness measures should be available in languages spoken by residents of Brown County. Measures used to educate and inform the public include:

### **Outreach and Education**

- Continue to engage local stakeholders for annual updates on emergency actions plans, public health plans, or other related documents.
- Maintain a contact list for the distribution of educational materials.
- Schedule periodic educational seminars/training for emergency management personnel.
- Continue to work with local school districts on the implementation of emergency action plans.

### **Speaker Series, Demonstration Events**

- Coordinate with State and Federal agencies to provide demonstration or training events.

### **Informing the Public**

- Continue to use local news stations, local new papers, and county and local social media accounts to keep the public informed of current and potential hazards.

### **Real Estate Disclosure**

- Real Estate disclosures in Wisconsin require property owners and their agents (realtors) to disclose any condition or defect that would result in a significant negative effect on the property value, that would significantly impair the health or safety of future occupants, or that would significantly shorten or negatively affect the normal life of the property.

### **Training**

- All emergency management personnel need to continue to attend training events and stay current on any license or certifications.

## **MITIGATION STRATEGIES (ACTIONS AND PROJECTS)**

Top hazard concerns were identified for each individual community from a broader range of possible incidents, including natural hazards. Nearly every participating community identified severe weather incidents as their top hazard concern. Vulnerability also was assessed on a countywide basis using the following parameters to determine an overall priority rating that was based on past events to include costs, frequency of occurrence, warning time, geographic extent, likely adverse impact, and future occurrences. The designation of high, medium, or low priority was determined based on whether or not that activity was already being done, the need to expand an activity, cost to implement, the time period to implement, whether or not the strategy is connected to another natural hazard, and the level of impact if implemented.

The mitigation strategies identified in this plan are listed below in order of priority as determined by the All Hazards Mitigation Plan Steering Committee. It was determined that some of the mitigation strategies were crossing between several natural hazard categories or were based in cooperation that was better suited for a countywide strategy section that precedes the natural hazards.

| <b>Prioritized Mitigation Measures by Hazard</b> |                                                                                                                                                                    |                              |                                                                  |           |          |                                                                                                                                                                                                                  |
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| <b>All Hazards/Countywide</b>                    |                                                                                                                                                                    |                              |                                                                  |           |          |                                                                                                                                                                                                                  |
| #                                                | Mitigation Measure/Location                                                                                                                                        | Goals Addressed              | Responsible Entities                                             | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                            |
| 1.1                                              | Utilize digital media (social media & text) for emergency alerts.                                                                                                  | PMG1<br>SMG1<br>SMG3         | BC EM<br>BC LIO<br>BC<br>Administration<br>Local EM<br>Personnel | Ongoing   | H        | Brown County currently uses digital media platforms for various emergency alerts. Digital media will continue to evolve and improve. Its imperative that Brown County and the local units of government keep up. |
|                                                  | Countywide                                                                                                                                                         |                              |                                                                  |           |          |                                                                                                                                                                                                                  |
| 1.2                                              | Maintain intergovernmental cooperation agreements with neighboring communities and private businesses for acquisition of necessary equipment for disaster clean-up | PMG1<br>PMG4<br>SMG1<br>SMG3 | BC EM, Local Governments                                         | Ongoing   | H        | Cooperation between county departments, local governments, and other organizations is crucial to the health safety and welfare of Brown County citizens.                                                         |
|                                                  | Countywide                                                                                                                                                         |                              |                                                                  |           |          |                                                                                                                                                                                                                  |
| 1.3                                              | Bury utility lines when possible                                                                                                                                   | PMG1<br>PMG2<br>PMG3<br>PMG4 | BC, Local Muni's                                                 | Ongoing   | L        | While this mitigation measure has its benefits it also has its drawbacks i.e. cost. When projects are proposed underground utilities should be considered by both the County and the local municipalities.       |
|                                                  | County, Local Municipalities                                                                                                                                       |                              |                                                                  |           |          |                                                                                                                                                                                                                  |



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| 1.4 | Include driver safety strategies for severe weather events in driver education classes and materials.                                       | PMG1<br>PMG5                         | State DOT                                                             | Ongoing | L | While this is not under Brown County's jurisdiction, it is an important measure that can be taken to keep people safe when learning to drive.                                                                                                                                              |
|     | Statewide                                                                                                                                   |                                      |                                                                       |         |   |                                                                                                                                                                                                                                                                                            |
| 1.5 | Continue to maintain GIS data that is utilized by E 911 personnel in responding to emergencies.                                             | PMG5<br>SMG2                         | BC LIO, WI Cartographers Office, Local GIS Professionals              | Ongoing | M | Developing and maintaining a GIS system takes a massive amount of time and expertise. Critical data used by BC EM professionals includes: Address Points, Street Centerlines, Police and Fire Boundary layers, Critical Facilities                                                         |
|     | County                                                                                                                                      |                                      |                                                                       |         |   |                                                                                                                                                                                                                                                                                            |
| 1.6 | Develop an implementation plan for the Water Storage Capacity Needs for the Lower Fox River Basin study.                                    | PMG1<br>PMG2<br>PMG4<br>PMG5<br>PMG6 | BC Planning, BC Land and Water Conservation, BC EM, BC Administration | 5 years | H | Link to the Study: <a href="https://www.outagamie.org/home/showdocument?id=73817">https://www.outagamie.org/home/showdocument?id=73817</a><br>Finding funding for this project is critical to achieving the potential flood mitigation benefits associated with this study. (Cost is high) |
|     | Brown County, Outagamie County, Communities within the Lower Fox River Watershed                                                            |                                      |                                                                       |         |   |                                                                                                                                                                                                                                                                                            |
| 1.7 | Continue delivery of federal emergency assistance when a Presidential Disaster is declared or when FEMA declares a county eligible for aid. | PMG3                                 | BC EM                                                                 | Ongoing | H | Maintaining eligibility for disaster relief funding is critical. (Cost is low)                                                                                                                                                                                                             |

| Winter Storms, Heavy Snow, Blizzards, Ice |                                                                                                                    |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
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| #                                         | Mitigation Measure/Location                                                                                        | Goals Addressed              | Responsible Entities                                                 | Timetable                         | Priority | Comment/Cost Estimate                                                                                                                                                                                           |
| 2.1                                       | Inventory plowing and sanding equipment for use during winter emergencies                                          | PMG4<br>SMG1                 | BC EM, BC DPW, Local DPW's, Private Co.'s                            | Annually especially during winter | H        | This is largely a function of DPW departments to ensure they are prepared for winter emergencies. Needs should be identified and included in capital improvement plans. (Cost could be high depending on needs) |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.2                                       | Maintain lines of communication between governments, support agencies, police, fire, EMS, hospitals, and DPW's     | PMG1<br>PMG4<br>SMG1<br>SMG7 | BC EM, BC DPW, Local DPW's, Hospitals, Police and Fire               | Ongoing                           | H        | Facilitated by BC EM with support from County Executive. During large or prolonged winter emergencies coordination between agencies is critical to the preservation of life and property. (Cost is low)         |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.3                                       | Utilize BC Emergency Operations Plan for coordination of public safety, support agencies, and resource acquisition | PMG4<br>PMG5<br>SMG1<br>SMG7 | EM Dept, BC Sheriff, Police and Fire, Hospitals                      | Ongoing                           | H        | Keep the BC Emergency Operations Plan up-to-date and staff trained on utilizing this plan. (Cost is low)                                                                                                        |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.4                                       | Prepare and distribute winter safety information to the media and vulnerable populations.                          | PMG5<br>SMG1<br>SMG7         | BC EM, UW-Extension, BC Health and Human Services, Homeless Shelters | Annually                          | L        | Local news channels and other agencies like UW-Extension, BC Health and Human Services, local homeless shelters and BC EM can partner to keep the vulnerable populations in Brown County safe. (Cost is low)    |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.5                                       | Produce and distribute emergency preparedness information for winter weather hazards on the roads                  | PMG5<br>SMG1<br>SMG7         | BC EM, WisDOT, BC Sheriff, Local Police Depts.                       | Ongoing                           | L        | Coordinate with WisDOT and local news outlets on the distribution of emergency preparedness information. (Cost is low)                                                                                          |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.6                                       | Continue tree trimming programs                                                                                    | PMG2<br>SMG1                 | Local Forestry or DPW's, BC Parks, BC Highway, Utility Companies     | Ongoing                           | M        | Brown County, Local municipalities, and utility companies should continue tree trimming programs to prevent power outages. Can be part of local and county budgets. (Cost depends on need per agency)           |
|                                           | Countywide                                                                                                         |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.7                                       | Develop/enforce restrictions on planting large or fast-growing trees near power lines                              | PMG5<br>SMG1<br>SMG4         | Local Muni's                                                         | Ongoing                           | L        | UW-Extension can be a helpful resource. Communities can also coordinate with utility companies for the location of future power lines. (Cost is low)                                                            |
|                                           | Local Municipalities                                                                                               |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |
| 2.8                                       | Identify key locations and install snow fencing to limit blowing and drifting of snow                              | PMG1<br>PMG2<br>PMG4         | All DPW's                                                            | Ongoing                           | M        | Snow fencing can be an effective measure to deter snow and ice accumulation on roadways. (Cost is low)                                                                                                          |
|                                           | Brown County and Local Municipalities                                                                              |                              |                                                                      |                                   |          |                                                                                                                                                                                                                 |

| Flooding (Stormwater, Riverine, Storm Water, Flash) |                                                                                                                                                                                                                     |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
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| #                                                   | Mitigation Measure/Location                                                                                                                                                                                         | Goals Addressed                              | Responsible Entities                                | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                                                          |
| 3.1                                                 | Monitor NWS flood forecast                                                                                                                                                                                          | PMG4<br>SMG2<br>SMG7                         | BC EM                                               | Ongoing   | H        | Coordinate with NWS and Local meteorologists to determine when flood watches and warnings could be issued. (Cost is low)                                                                                                                                       |
|                                                     | Countywide                                                                                                                                                                                                          |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.2                                                 | Maintain congregate care facility procedures                                                                                                                                                                        | PMG1<br>PMG4                                 | EM Dept., Non-govt Agencies                         | Ongoing   | M        | See Brown County Evacuation Plan. (Cost is low)                                                                                                                                                                                                                |
|                                                     | Countywide                                                                                                                                                                                                          |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.3                                                 | Maintain and update emergency procedures for gas and electricity cut-off and sandbagging                                                                                                                            | PMG2<br>PMG5<br>SMG1<br>SMG7                 | BC EM, BC Highway Department                        | Ongoing   | M        | A copy of each utility company's emergency plan should be updated and on file with BC EM. (Cost is low)                                                                                                                                                        |
|                                                     | Countywide                                                                                                                                                                                                          |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.4                                                 | Maintain ordinances for proper land use planning codes and ordinances.                                                                                                                                              | PMG5<br>SMG1<br>SMG3<br>SMG6<br>SMG7         | County and Local Planning and Zoning Departments    | Ongoing   | M        | This includes shoreland zoning, floodplain zoning, comprehensive plans, and other regulatory codes and ordinances. (Cost is moderate)                                                                                                                          |
|                                                     | Brown County, Local Municipalities                                                                                                                                                                                  |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.5                                                 | Enforce environmentally sensitive area regulations that preserve natural resources adjacent to and in defined floodplains                                                                                           | PMG4<br>PMG6<br>SMG1<br>SMG4<br>SMG5<br>SMG6 | County and Local Planning and Zoning Departments    | Ongoing   | M        | Keep the Brown County Sewage Plan and the Brown County Subdivision Ordinances up to date. (Cost is moderate)                                                                                                                                                   |
|                                                     | Countywide                                                                                                                                                                                                          |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.6                                                 | Inventory and assess areas throughout both the rural and urban Brown County that have repeated flooding problems and identify Green Infrastructure and Low Impact Development Strategies to minimize future events. | PMG1<br>PMG2<br>PMG3<br>PMG6<br>SMG1         | EM Dept., BC Planning, BC DPW, Local Municipalities | Ongoing   | M        | Knowing which areas experience repetitive flooding issues can help decisionmakers focus funding on those key areas. (Cost is moderate)                                                                                                                         |
|                                                     | Repetitive flood areas                                                                                                                                                                                              |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.7                                                 | Maintain storm water management plans and ordinances that are consistent with the State of Wisconsin minimum requirements.                                                                                          | PMG2<br>SMG1<br>SMG4                         | Local municipalities                                | Ongoing   | M        | Storm water management requirements currently reside at the local level for most Brown County Communities. Brown County ensures that storm water management is addressed during the land division review process in all villages and towns. (Cost is Moderate) |
|                                                     | Local municipalities                                                                                                                                                                                                |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |
| 3.8                                                 | Incorporate FEMA approved changes to the floodplain maps to better determine areas and facilities susceptible to recurring flooding.                                                                                | PMG2<br>PMG6<br>SMG1<br>SMG2<br>SMG3         | BC Zoning, BC LIO                                   | Ongoing   | M        | This effort has been valuable for numerous citizens and professionals around Brown County. (Cost is low)                                                                                                                                                       |
|                                                     | Countywide                                                                                                                                                                                                          |                                              |                                                     |           |          |                                                                                                                                                                                                                                                                |

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| 3.9  | Implement a rural drainage improvement program that would include ditch, bridge, and culvert maintenance and improvements.                                        | PMG5                 | County and local DPW Departments  | 1-5 years | L | This would be a useful program to maintain drainage systems to prevent possible water backups and flooding of both public and private property. (Cost depends on amount of maintenance)          |
|      | Countywide, Local Municipalities                                                                                                                                  |                      |                                   |           |   |                                                                                                                                                                                                  |
| 3.10 | Promote the sale of flood insurance to residents with flood prone properties throughout the county.                                                               | PMG5<br>SMG7         | BC Zoning<br>Local Municipalities | Ongoing   | L | This is important for people living in areas mapped on the FEMA FIRM maps. It is also important for people living in areas that have not been studied but are near a waterway. (Cost is low)     |
|      | Countywide in flood prone areas                                                                                                                                   |                      |                                   |           |   |                                                                                                                                                                                                  |
| 3.11 | Implement floodproofing techniques such as elevation, relocation, barrier construction, and wet flood-proofing for residents, businesses and critical facilities. | PMG1<br>PMG2<br>SMG1 | Local Municipalities,<br>BC EM    | Ongoing   | M | Identifying all areas that are within mapped floodplains and that are in a floodplain based on elevation can help identify if structures or other critical facilities are at risk. (Cost is low) |
|      | Countywide in flood prone areas                                                                                                                                   |                      |                                   |           |   |                                                                                                                                                                                                  |

| Thunderstorms and Lightning |                                                                                                             |                                      |                                                                                         |                  |          |                                                                                                                                                                                                                                                                        |
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| #                           | Mitigation Measure/Location                                                                                 | Goals Addressed                      | Responsible Entities                                                                    | Timetable        | Priority | Comment/Cost Estimate                                                                                                                                                                                                                                                  |
| 4.1                         | Continue to utilize radio and television for public awareness                                               | PMG1<br>PMG4<br>SMG1<br>SMG7         | BC EM, Local TV and Radio Stations                                                      | Ongoing          | H        | An effective process is already in place using area radio and TV stations. (Low cost)                                                                                                                                                                                  |
|                             | Brown County                                                                                                |                                      |                                                                                         |                  |          |                                                                                                                                                                                                                                                                        |
| 4.2                         | Educate public on severe weather safety procedures                                                          | PMG1<br>PMG4<br>SMG1<br>SMG7         | BC EM, UW-Extension, BC Human Services, BC Health, Schools, Local weather professionals | Ongoing          | H        | Schools have weather related safety drills every year. The schools often coordinate the drills with educational materials focused on severe weather.                                                                                                                   |
|                             | Countywide                                                                                                  |                                      |                                                                                         |                  |          | New materials are available periodically and should be used as much as possible.                                                                                                                                                                                       |
| 4.3                         | Make weather radios available through local communities and Brown County EM Office                          | PMG1<br>SMG1                         | BC EM, BC Sheriff, BC Human Services, BC Health                                         | Ongoing          | L        | While many people have cell phones and receive weather alerts on them, weather radios can still be used when cell phones don't have service.                                                                                                                           |
|                             | Countywide                                                                                                  |                                      |                                                                                         |                  |          |                                                                                                                                                                                                                                                                        |
| 4.5                         | Install safe shelters at county and local parks and campgrounds                                             | PMG1<br>PMG3<br>SMG1<br>SMG6         | BC Parks, Local Municipalities, BC EM, BC Public Safety                                 | Reviewed in 2009 | M        | Improvements were included in both Brown County's and the local communities Capital Improvements Plans. If there are improvements that are still planned but not yet constructed, the Dept. of Commerce's CDBG program may provide funds for this type of improvement. |
|                             | Brown County, Local Municipalities                                                                          |                                      |                                                                                         |                  |          |                                                                                                                                                                                                                                                                        |
| 4.6                         | Install lightning protection on communication infrastructure and other critical facilities                  | PMG2                                 | Telecommunications companies, BC Facilities Management, BC EM                           | Ongoing          | L        | New communication towers are constructed frequently. Each tower should include lightning and grounding protection equipment.                                                                                                                                           |
|                             | Countywide                                                                                                  |                                      |                                                                                         |                  |          |                                                                                                                                                                                                                                                                        |
| 4.7                         | Encourage use of fire and wind resistant construction materials and techniques                              | PMG1<br>PMG2<br>PMG3<br>PMG6<br>SMG1 | BC EM, UW-Extension, Local Building Inspectors, Local Zoning Administrators             | Ongoing          | L        | On-going education through residential and commercial building associations.                                                                                                                                                                                           |
|                             | Local Municipalities                                                                                        |                                      |                                                                                         |                  |          | State Building Code, Local Municipal Building Codes                                                                                                                                                                                                                    |
| 4.8                         | Provide information to builders and owners of manufactured homes about use of tie-downs with ground anchors | PMG1<br>PMG2<br>SMG7                 | BC EM, UW-Extension, Local Building Inspectors, BC Home Builders Assoc.,                | Ongoing          | L        | Most lending institutions and loan programs require the use of tie-downs and ground anchors.                                                                                                                                                                           |
|                             | Local Municipalities                                                                                        |                                      |                                                                                         |                  |          | Review local building code for tie-down requirement.                                                                                                                                                                                                                   |

| Tornadoes and High Winds |                                                                                                                                                 |                              |                                                              |           |          |                                                                                                                                                                                                       |
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| #                        | Mitigation Measure/Location                                                                                                                     | Goals Addressed              | Responsible Entities                                         | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                 |
| 5.1                      | Maintain and enhance early warning system for tornadoes                                                                                         | PMG1<br>SMG1                 | BC EM, BC Sheriff, Public Safety, Local News Stations        | Ongoing   | H        | Continue to use notifications that reach the public via any and all media platforms. (Cost is moderate)                                                                                               |
|                          | Countywide                                                                                                                                      |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.2                      | Distribute tornado warning procedures to BC school districts                                                                                    | PMG4<br>PMG5<br>SMG1<br>SMG7 | BC EM, BC Sheriff, UW-Extension, Local Schools               | Annually  | H        | Promote Tornado Awareness Week. While this is typically a one-week awareness timeframe, tornado preparedness information should be available during tornado season (April – September). (Cost is low) |
|                          | Countywide                                                                                                                                      |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.3                      | Promote tornado safety public information through partnerships with NWS and BC Severe Weather Spotters                                          | PMG4<br>PMG5<br>SMG1<br>SMG7 | BC EM, Sheriff, UW-Extension, NWS                            | Ongoing   | M        | Public education can be carried out by a number of different agencies to help prevent loss of life during tornado and high wind events. (Cost is low)                                                 |
|                          | Countywide                                                                                                                                      |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.4                      | Increase the number of sirens to reach more county residents                                                                                    | PMG1<br>SMG1                 | BC EM, Local Muni's                                          | Ongoing   | H        | Priority locations may include mobile home parks, large public gathering areas, rural public parks, and new subdivisions. (Cost is moderate)                                                          |
|                          | Countywide                                                                                                                                      |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.5                      | Assist schools, businesses, public facility managers, and individuals to determine "best available" tornado safety area.                        | PMG5<br>SMG1<br>SMG7         | BC EM, Local Fire Depts.                                     | Ongoing   | M        | Currently handled by BC EM. Could include the local fire departments and any other entity that may be able to assist. (Cost is low)                                                                   |
|                          | Countywide                                                                                                                                      |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.6                      | Develop and maintain a comprehensive safety plan for every publicly owned building                                                              | PMG5<br>SMG1<br>SMG7         | BC EM, Risk Manners, Facilities Managers                     | 1-5 years | M        | Risk managers and facilities managers should facilitate the development of plans for each facility. (Cost is moderate)                                                                                |
|                          | Countywide, Local municipalities                                                                                                                |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.7                      | Require new residential development (w/o basement) to incorporate safe shelter space.                                                           | PMG1<br>PMG6<br>SMG1         | State and Municipal Building Code, Planning Depts, BC EM     | Ongoing   | M        | Educate developers and community leaders on the importance of safe shelters. (Cost may be high)                                                                                                       |
|                          | Local Municipalities                                                                                                                            |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.8                      | Improve mobile home safety through requiring tie-downs.                                                                                         | PMG1<br>PMG2<br>SMG1         | State and Municipal Building Code, Local Building Inspectors | 1-5 years | M        | To prevent catastrophic damage to mobile homes, all building codes need to be amended to include requirements for tiedowns. (Cost is low)                                                             |
|                          | Local Municipalities                                                                                                                            |                              |                                                              |           |          |                                                                                                                                                                                                       |
| 5.9                      | Establish agreements with neighboring counties and with private businesses to acquire heavy equipment and to dispose of waste after a disaster. | PMG4<br>SMG3                 | BC EM, BC Port and Solid Waste, County Executive             | As Needed | H        | These agreements already exist however, if something were to change these agreements should be reviewed and amended appropriately.(Cost is low)                                                       |
|                          | Brown County, Outagamie County, Winnebago County                                                                                                |                              |                                                              |           |          |                                                                                                                                                                                                       |

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| 5.10 | Develop/enforce restrictions on planting large or fast-growing trees near power lines | PMG2<br>SMG1<br>SMG4 | Local Municipalities                              | Ongoing | L | UW-Extension can be a helpful resource. Communities can also coordinate with utility companies for the location of future power lines. (Cost is low)                                                                 |
|      | Countywide                                                                            |                      |                                                   |         |   |                                                                                                                                                                                                                      |
| 5.11 | Continue tree trimming programs                                                       | PMG2<br>SMG1         | BC Parks, BC Highway, Local Forestry and/or DPW's | Ongoing | M | Tree trimming should be done annually to prevent power outages. (Cost may be high depending on how much tree trimming needs to be done)                                                                              |
|      | Countywide, Local municipalities                                                      |                      |                                                   |         |   |                                                                                                                                                                                                                      |
| 5.12 | Install high wind warning devices at key locations and bridges                        | PMG1<br>PMG2<br>PMG6 | State, County, Local DPW's                        | Ongoing | L | Most signs should be in place. If new locations are identified, the jurisdiction responsible for maintenance of the facility should be contacted and made aware of the need for these warning devices. (Cost is low) |
|      | Countywide                                                                            |                      |                                                   |         |   |                                                                                                                                                                                                                      |

| Extreme Temperatures |                                                                                                            |                              |                                                       |           |          |                                                                                                                                                                                  |
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| #                    | Mitigation Measure/Location                                                                                | Goals Addressed              | Responsible Entities                                  | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                            |
| 6.1                  | Encourage social service entities and energy providers to expand programs to assist "at risk" populations. | PMG1<br>PMG4<br>PMG5<br>SMG1 | BC Social Services, WPS                               | Ongoing   | H        | Utility payment assistance and acquisition of appliances can keep people in homes and out of homeless shelters or on the street. (Cost is moderate)                              |
|                      | Countywide                                                                                                 |                              |                                                       |           |          |                                                                                                                                                                                  |
| 6.2                  | Establish centers with proper amenities including transportation availability.                             | PMG1<br>PMG4<br>PMG5<br>SMG1 | Public and private transportation providers, BC EM    | As needed | L        | Emergency cooling and heating centers can be set up if needed. Brown County Emergency Management can coordinate with other entities as host sites. (Cost is low)                 |
|                      | Countywide                                                                                                 |                              |                                                       |           |          |                                                                                                                                                                                  |
| 6.3                  | Maintain agreements with area facilities to serve as heating or cooling centers.                           | PMG2<br>PMG4<br>PMG5<br>SMG1 | BC Administration, BC EM, Red Cross, Private Entities | As needed | L        | These facilities include the Resch Center, Bay Park Square Mall, Brown County Libraries, and local libraries. Additional facilities as agreements are established. (Cost is low) |
|                      | Various locations                                                                                          |                              |                                                       |           |          |                                                                                                                                                                                  |

| Dam Failures |                                                                                                                                      |                                              |                                       |           |          |                                                                                                                                                                                                                                                                                                                  |
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| #            | Mitigation Measure/Location                                                                                                          | Goals Addressed                              | Responsible Entities                  | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                                                                                                            |
| .1           | Ensure Lamers Packerland Drive Dam is maintained and functioning properly as stated in the Emergency Action Plan                     | PMG1<br>PMG2<br>PMG5<br>SMG1                 | BC EM,<br>Ashwaubenon<br>Public Works | Ongoing   | H        | This is one of the only dams in Brown County that has a high risk rating if the dam were to fail. Maintaining this dam is extremely important for residents and businesses located down stream (Cost is moderate)                                                                                                |
|              | Lamers Packerland Dam                                                                                                                |                                              |                                       |           |          |                                                                                                                                                                                                                                                                                                                  |
| 7.2          | Create emergency procedures brochures and distribute them to all property owners within the potential risk area downstream of a dam. | PMG1<br>PMG2<br>PMG5<br>PMG6<br>SMG1<br>SMG7 | BC EM, BC<br>Zoning                   | Ongoing   | M        | Most dams in Brown County do not pose a serious risk to life or property, however, property owners should know that they are down stream from a dam and there is potential for their property to be impacted if the dam were to fail. Single purpose GIS map may help inform people of their risk. (Cost is low) |
|              | Areas down stream of known dams                                                                                                      |                                              |                                       |           |          |                                                                                                                                                                                                                                                                                                                  |
| 7.3          | Monitor water levels and communicate those conditions as necessary.                                                                  | SMG1<br>SMG2                                 | Dam Owners,<br>WDNR, ACOE             | Ongoing   | L        | (Cost is low)                                                                                                                                                                                                                                                                                                    |
|              | Countywide                                                                                                                           |                                              |                                       |           |          |                                                                                                                                                                                                                                                                                                                  |



| Coastal Hazards |                                                                                                                                                                                             |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------|-----------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #               | Mitigation Measure/Location                                                                                                                                                                 | Goals Addressed      | Responsible Entities                                | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                                                                                                                                                               |
| 8.1             | Monitor natural features along the Bay of Green Bay for deterioration.                                                                                                                      | PMG2<br>PMG6<br>SMG2 | BC Zoning, WI Sea Grant, Local Municipalities, WDNR | Ongoing   | M        | Many agencies keep track of various aspects of coastal resources. UWGB may be a good resource for collecting and tracking coastal deterioration. (Cost is high)                                                                                                                                                                                                     |
|                 | Town of Green Bay, Town of Scott, City of Green Bay, Village of Howard, Village of Suamico                                                                                                  |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |
| 8.2             | Maintain maps indicating past incidences and areas most susceptible to future hazards.                                                                                                      | PMG6<br>SMG2<br>SMG3 | BC LIO, UWGB, WI Sea Grant                          | Ongoing   | M        | This effort would be similar to the mapping created for flooding events that cause road closures that was created by the BC LIO. (Cost is moderate)                                                                                                                                                                                                                 |
|                 | Town of Green Bay, Town of Scott, City of Green Bay, Village of Howard, Village of Suamico                                                                                                  |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |
| 8.3             | Maintain current land use regulations that permit to building structures within vulnerable coastal areas.                                                                                   | PMG2<br>SMG1<br>SMG4 | BC Zoning, BC Planning, Local Municipalities        | Ongoing   | H        | This should help to reduce loss of property and loss of life if proper precautions and enforced. (Cost is low)                                                                                                                                                                                                                                                      |
|                 | Brown County, Town of Green Bay, Town of Scott, City of Green Bay, Village of Howard, Village of Suamico                                                                                    |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |
| 8.4             | Work with the Coast Guard to monitor drifting ice that can damage shore structures and destroy vegetation, move sand or stones from beaches, or dump sand, rock or other debris on beaches. | PMG6<br>SMG2         | Coast Guard, BC EM, NWS                             | Ongoing   | L        | This is a long term monitoring project that could help to identify and/or predict future coastal hazards. (Cost is moderate)                                                                                                                                                                                                                                        |
|                 | Bay of Green Bay                                                                                                                                                                            |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |
| 8.5             | Construction of riprap to manage bluff erosion.                                                                                                                                             | PMG2                 | Private property owners, BC Parks, BC DPW           | As needed | L        | Private property owners may have a desire to install riprap barriers to help protect their property from erosion. Brown County and the local municipalities may also be interested in these types of projects. In both cases, WDNR is the primary point of contact for discussing such project and identifying what if any permits will be required. (Cost is high) |
|                 | Brown County, Town of Green Bay, Town of Scott, City of Green Bay, Village of Howard, Village of Suamico                                                                                    |                      |                                                     |           |          |                                                                                                                                                                                                                                                                                                                                                                     |

| Drought |                                                                                                                                                |                              |                                                    |           |          |                                                                                                                                                                                                                |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------|-----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #       | Mitigation Measure/Location                                                                                                                    | Goals Addressed              | Responsible Entities                               | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                          |
| 9.1     | Implement and enforce water usage regulations/ordinances for both urban and rural water users.                                                 | PMG2<br>PMG5<br>SMG1<br>SMG4 | Local Municipalities                               | 1-5 years | L        | Droughts in NE WI do occur however, access to freshwater is typically not an issue. It would be important to have water usage regulations in place to use when the conditions require them. (Cost is moderate) |
|         | Local Municipalities                                                                                                                           |                              |                                                    |           |          |                                                                                                                                                                                                                |
| 9.2     | Utilize such entities as UW-Extension, Brown County Land and Water Conservation, etc. for proper irrigation methods and ground water movement. | PMG1<br>PMG4<br>SMG7         | UW-Extension, UWGB, BC Land and Water Conservation | Ongoing   | M        | Educational efforts are typically best if sustained for long periods of time or indefinitely. (Cost is low)                                                                                                    |
|         | Rural Brown County                                                                                                                             |                              |                                                    |           |          |                                                                                                                                                                                                                |
| 9.3     | Ensure adequate wellhead protection plans are in place and utilized.                                                                           | PMG1<br>PMG5<br>SMG1<br>SMG4 | BC Land and Water Conservation, BC Zoning, WDNR    | Ongoing   | M        | Measures already in place. (Cost is low)                                                                                                                                                                       |
|         | Non-sewered areas of Brown County                                                                                                              |                              |                                                    |           |          |                                                                                                                                                                                                                |
| 9.4     | Assist farmer with purchasing crop insurance.                                                                                                  | PMG5<br>SMG1<br>SMG7         | UW-Extension, USDA, BC Land and Water Conservation | Ongoing   | L        | An information brochure or information on websites should be adequate. (Cost is low)                                                                                                                           |
|         | Rural Brown County                                                                                                                             |                              |                                                    |           |          |                                                                                                                                                                                                                |

| Fires – Forest and Wildland |                                                                                                                                   |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------------------------------|-----------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #                           | Mitigation Measure/Location                                                                                                       | Goals Addressed                      | Responsible Entities                                  | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                                                                                                                                         |
| 10.1                        | Notifying media outlets on burning restrictions being issued                                                                      | PMG2<br>PMG4                         | DNR, Local Law Enforcement, Local New Channels, BC EM | Ongoing   | H        | If there are burn restriction, notification of the public is paramount in helping to prevent fires from occurring. (Cost is low)                                                                                                                                                                                                              |
|                             | Countywide                                                                                                                        |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
| 10.2                        | Adopt and enforce burning permit ordinances.                                                                                      | PMG1<br>PMG2<br>PMG5<br>SMG4         | Local Municipalities                                  | Ongoing   | H        | Brown County does not issue permits for open burning, but residents MUST notify the local fire department prior to open burning to ensure that there is no “burning ban” or “burning restrictions” in place. This measure would require that the municipalities issue a permit for anyone wishing to conduct open burning. (Cost is moderate) |
|                             | Local Municipalities                                                                                                              |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
| 10.3                        | Keep mutual aid fire protection agreements up-to-date and ensure that they include provisions for wildfires.                      | PMG4<br>SMG1                         | Local Municipalities                                  | Ongoing   | M        | Mutual aid fire protection agreements are in place around Brown County. These agreements can change on occasion and it is imperative that changes to agreements are sent to BC EM and County Dispatchers. (Cost is low)                                                                                                                       |
|                             | Countywide                                                                                                                        |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
| 10.4                        | Prevent or alleviate wildfires through property maintenance surrounding power lines and efficient response to fallen power lines. | PMG2<br>SMG7                         | WPS, ATC, Private Property Owners                     | Ongoing   | M        | WPS and ATC need to continually remind property owners of the importance of maintaining areas surrounding power lines. (Cost is moderate)                                                                                                                                                                                                     |
|                             | Along utility lines                                                                                                               |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
| 10.5                        | Identify and map areas that are most susceptible to wildland fires                                                                | PMG2<br>PMG6<br>SMG2<br>SMG3         | BC Planning                                           | 1-5 years | L        | This may be possible if Brown County can coordinate with WDNR to determine what areas are most susceptible to fires. (Cost is moderate)                                                                                                                                                                                                       |
|                             | Countywide                                                                                                                        |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |
| 10.6                        | Utilize zoning and subdivision ordinances to limit or restrict development on or in areas that are most susceptible to fires.     | PMG2<br>PMG5<br>SMG1<br>SMG3<br>SMG4 | Municipal zoning administrators, BC Planning          | 1-5 years | L        | Each community will need to determine if this is a priority that necessitates changes to local municipal codes/ordinances. (Cost is moderate)                                                                                                                                                                                                 |
|                             | Local Municipalities                                                                                                              |                                      |                                                       |           |          |                                                                                                                                                                                                                                                                                                                                               |

| Fog  |                                                                                                                         |                              |                                |           |          |                                                                                                                             |
|------|-------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------|-----------|----------|-----------------------------------------------------------------------------------------------------------------------------|
| #    | Mitigation Measure/Location                                                                                             | Goals Addressed              | Responsible Entities           | Timetable | Priority | Comment/Cost Estimate                                                                                                       |
| 11.1 | Encourage news media to broadcast emergency information concerning fog.                                                 | PMG1<br>PMG4<br>SMG7         | BC EM, NWS, Local New Stations | As needed | H        | Brown County EM should coordinate with the NWS and the local news stations to issue fog advisories as needed. (Cost is low) |
|      | Countywide                                                                                                              |                              |                                |           |          |                                                                                                                             |
| 11.2 | Install fog warning devices at intersections and on bridges most susceptible to fog occurrences.                        | PMG1<br>PMG2<br>PMG6<br>SMG1 | BC DPW, Local DPW's            | Ongoing   | M        | Bridges and low-lying areas are prone to fog. Installing warning devices in these locations is recommended. (Cost is low)   |
|      | Various location as determined by past fog events.                                                                      |                              |                                |           |          |                                                                                                                             |
| 11.3 | Install and maintain pavement reflectors and reflective stripping along heavily traveled roads most susceptible to fog. | PMG1<br>PMG2<br>SMG1         | WisDOT, BC DWP, Local DPWs     | As needed | M        | Striping and reflective materials should be kept to standards recommended by WisDOT. (Cost is low)                          |
|      | Various location as determined appropriate.                                                                             |                              |                                |           |          |                                                                                                                             |

| Storm: Hail |                                                                                                                                                                              |                      |                                                             |           |          |                                                                                                                                                                                                                              |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------|-----------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #           | Mitigation Measure/Location                                                                                                                                                  | Goals Addressed      | Responsible Entities                                        | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                        |
| 12.1        | Continue distribution of hail insurance options such as the Federal Crop Insurance Corporations (FCIC) through the UW-Extension office.                                      | PMG2<br>PMG4<br>SMG7 | UW Extension                                                | Ongoing   | L        | Hail storms in Brown County are rare and hail storms that do cause damage are very rare. However, when hail does pose a threat, NE WI business and residents are often unprepared and damage can be extensive. (Cost is low) |
|             | Countywide                                                                                                                                                                   |                      |                                                             |           |          |                                                                                                                                                                                                                              |
| 12.2        | Documentation of hail damage will be the responsibility of the Brown County Emergency Management Board, comprised of county and federal agricultural agency representatives. | PMG3<br>PMG6<br>SMG7 | BC EM, BC Land and Water Conservation, Local municipalities | As needed | H        | While hail events don't happen often, the damage they cause must be documented quickly and efficiently. Potential to use ArcGIS to collect damage information (Cost is moderate)                                             |
|             | Countywide                                                                                                                                                                   |                      |                                                             |           |          |                                                                                                                                                                                                                              |

## Man Made Hazards

### Utility Failure

| #    | Mitigation Measure/Location                                                                                                | Goals Addressed | Responsible Entities               | Timetable | Priority | Comment/Cost Estimate |
|------|----------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------|-----------|----------|-----------------------|
| 13.1 | Provide information to residents on preparedness planning for utility failures on the county website, Facebook and Twitter |                 | BC EM, Public Health               | Ongoing   | M        | (Cost is low)         |
| 13.2 | Identify which county owned facilities have back-up power systems and ensure they are working and tested regularly.        |                 | County and Local EM and Facilities | 1-5 years | M        | (Cost is low)         |

### Hazardous Materials Incidents

| #    | Mitigation Measure/Location                                         | Goals Addressed | Responsible Entities                 | Timetable | Priority | Comment/Cost Estimate |
|------|---------------------------------------------------------------------|-----------------|--------------------------------------|-----------|----------|-----------------------|
| 14.1 | Update the LEPC off-site plans to ensure thoroughness and currency. |                 | LEPC and BC and Local EM Departments | Ongoing   | H        | (Cost is low)         |
| 14.2 | Maintain a strong LEPC committee with diverse representation.       |                 | LEPC and BC and Local EM Departments | Ongoing   | H        | (Cost is low)         |

### Manure Spill Incidents

| #    | Mitigation Measure/Location                                                                                                                 | Goals Addressed | Responsible Entities           | Timetable | Priority | Comment/Cost Estimate |
|------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------|-----------|----------|-----------------------|
| 15.1 | Provide public information to livestock products regarding mitigation measures to protect against the hazards of a commercial manure spill. |                 | BC Land and Water Conservation | Ongoing   | M        | (Cost is low)         |
| 15.2 | Continue enforcement and update as necessary Chapter 26 (Animal Waste Management) of the Brown County Code of Ordinances.                   |                 | BC Land and Water Conservation | Ongoing   | M        | (Cost is low)         |

### Public Health Incidents

| #    | Mitigation Measure/Location                                                                                             | Goals Addressed | Responsible Entities    | Timetable | Priority | Comment/Cost Estimate                                                                                                                                                                                                    |
|------|-------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------|-----------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16.1 | Provide high-quality, coordinated public information in support of the PHEP Plan for periods of public health concerns. |                 | BC Public Health, BC EM | Ongoing   | M        | Public health concern may include air quality alerts, communicable disease outbreaks and contaminated water supplies. Local public health will take the lead in informing, supervision, distribution of vaccines and all |

|      |                                                                                                                     |  |                                   |         |   |                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|---------|---|-------------------------------------------------------------------------------------------------|
|      |                                                                                                                     |  |                                   |         |   | other related services (Cost varies depending on event)                                         |
| 16.2 | Undertake training and document plans to provide mass medication distribution in response to public health threats. |  | BC and Local Public Health Depts. | Ongoing | M | Public health clinics to meet the needs of the population in adequate timeframes. (Cost is low) |

### Mass Casualty Incidents

| #    | Mitigation Measure/Location                                                                   | Goals Addressed | Responsible Entities                                  | Timetable        | Priority | Comment/Cost Estimate     |
|------|-----------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------|------------------|----------|---------------------------|
| 17.1 | Continue exercise programs to ensure first response preparedness for mass casualty incidents. |                 | Local Hospitals, Fire, Police, Other first responders | Ongoing          | H        | (Cost is low to moderate) |
| 17.2 | Mass fatality plan will be reviewed annually as part of Emergency Response Plan.              |                 | EM Departments, Public Health, Coroners               | Ongoing / annual | M        | (Cost is low)             |

### Aircraft Incidents

| #    | Mitigation Measure/Location                                              | Goals Addressed | Responsible Entities                                           | Timetable | Priority | Comment/Cost Estimate |
|------|--------------------------------------------------------------------------|-----------------|----------------------------------------------------------------|-----------|----------|-----------------------|
| 18.1 | Support ongoing fire department and EMS training for aircraft incidents. |                 | BC EM, Fire Departments, Austin Straubel International Airport | Ongoing   | M        |                       |

### Terrorism/Intentional Acts of Violence

| #    | Mitigation Measure/Location                                                                                                                                    | Goals Addressed | Responsible Entities | Timetable | Priority | Comment/Cost Estimate                                                                                |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------|-----------|----------|------------------------------------------------------------------------------------------------------|
| 19.1 | Provide Terrorism Liaison Officer training to appropriate individuals to create "eyes and ears" in the public so that they might report suspicious activities. |                 | BC EM                | Ongoing   | L        | Training is offered free and is provided by the state intelligence information center. (Cost is low) |

**Table 4.2: Local Jurisdiction Top Authorities, Policies, Programs and Resources**

| Municipality     | Top Authorities                                     | Staff Involved                    | Policies and Ordinances                                        | Programs                                                                                 | Resources             |
|------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------|
| C of De Pere     | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland Zoning            | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | City Budget, BC EM    |
| C of Green Bay   | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland Zoning            | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | City Budget, BC EM    |
| V of Allouez     | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Ashwaubenon | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Bellevue    | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Denmark     | BC EM, Local Fire, Police, DPW, Zoning              | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Hobart      | BC EM, Local Fire, Police, DPW, Zoning              | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Howard      | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| V of Pulaski     | BC EM, Local Fire, Police, DPW, Zoning              | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |

Table 4.2 continued

| Municipality     | Top Authorities                                     | Staff Involved                    | Policies and Ordinances                                        | Programs                                                                                 | Resources             |
|------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------|
| V of Wrightstown | BC EM, Local Fire, Police, DPW, Zoning              | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Village Budget, BC EM |
| T of Eaton       | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Glenmore    | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Green Bay   | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Holland     | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Humboldt    | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Lawrence    | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |
| T of Ledgeview   | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM    |



Table 4.2 continued

| Municipality     | Top Authorities                                     | Staff Involved                    | Policies and Ordinances                                        | Programs                                                                                 | Resources          |
|------------------|-----------------------------------------------------|-----------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------|
| T of New Denmark | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM |
| T of Pittsfield  | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM |
| T of Rockland    | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM |
| T of Scott       | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM |
| T of Wrightstown | BC EM, Local Fire, Police, DPW, Planning and Zoning | EM Coordinator, Chiefs, Directors | Erosion Control, Storm Water Mgt., Shoreland/Floodplain Zoning | Comprehensive Plan, County and Local Hazard Mitigation Plan, Shoreland/Floodplain Zoning | Town Budget, BC EM |

| Table 4.3: Communities participating in the NFIP as of 7/30/2020 |                                                                                                                                                                                                 |                       |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Municipality                                                     | One Flood Protection Mitigation Action                                                                                                                                                          | Resources             |
| <b>Cities</b>                                                    |                                                                                                                                                                                                 |                       |
| City of De Pere                                                  | Maintain protective measures such as sandbagging, protection of buildings and other structures, and emergency gas and electricity cutoff procedures. *                                          | City Budget, BC EM    |
| City of Green Bay                                                | Utilize FEMA floodplain mapping with existing flood maps and data sources to better determine areas and facilities susceptible to recurring flooding. *                                         | City Budget, BC EM    |
| <b>Villages</b>                                                  |                                                                                                                                                                                                 |                       |
| Village of Allouez                                               | Inventory and assess areas through both the rural and urban areas of Brown County that have repeated flash flooding problems and identify activities to remediate or rectify those locations. * | Village Budget, BC EM |
| Village of Ashwaubenon                                           | Ensure the residents located within the flood zone have information on emergency procedures if the Ashwaubenon dam is compromised. *                                                            | Village Budget, BC EM |
| Village of Bellevue                                              | Inventory and assess areas through both the rural and urban areas of Brown County that have repeated flash flooding problems and identify activities to remediate or rectify those locations. * | Village Budget, BC EM |
| Village of Hobart                                                | Utilize FEMA floodplain mapping with existing flood maps and data sources to better determine areas and facilities susceptible to recurring flooding. *                                         | Village Budget, BC EM |
| Village of Howard                                                | Continue to monitor the National Weather Service flood forecasts. *                                                                                                                             | Village Budget, BC EM |
| Village of Pulaski                                               | Implement a rural drainage program that would include ditch, bridge, and culvert maintenance and improvements. *                                                                                | Village Budget, BC EM |
| Village of Suamico                                               | Inventory and assess areas through both the rural and urban areas of Brown County that have repeated flash flooding problems and identify activities to remediate or rectify those locations. * | Village Budget, BC EM |
| Village of Wrightstown                                           | Utilize FEMA floodplain mapping with existing flood maps and data sources to better determine areas and facilities susceptible to recurring flooding. *                                         | Village Budget, BC EM |

\*NFIP Mitigation Measure

| Table 4.4: Jurisdictions with Site Specific Mitigation Actions |                                                                                                                                                                                                          |                                                             |                                                                                                                                  |                                                                                                                                                                                              |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Municipality                                                   | Project Name                                                                                                                                                                                             | Project Location                                            | Construction Type                                                                                                                | Mitigation Benefits                                                                                                                                                                          |
| City of Green Bay                                              | Shipyards District to Seymour Park Green Infrastructure Corridor                                                                                                                                         | City of Green Bay                                           | Integrating Green infrastructure into redevelopment                                                                              | Water quality and flood mitigation. This project is a high priority for the City and is planned to take place sometime in the next 1-9 years.                                                |
|                                                                | Seymour Park Stormwater Management                                                                                                                                                                       | City of Green Bay                                           | Planning stages                                                                                                                  | Water quality and flood mitigation. This project is a high priority for the City and is planned to take place sometime in the next 1-5 years.                                                |
|                                                                | Acquisition of hazard-properties along to East River and conversion to open space                                                                                                                        | City of Green Bay                                           | Property acquisition                                                                                                             | Elimination of repetitive loss properties. This project is a medium priority for the City and is planned to take place as funding is secured.                                                |
|                                                                | Redesign and re-construction of 7 flood-prone areas of East River Recreational Trail to protect public trail from high water levels through green infrastructure and conventional storm water management | City of Green Bay                                           | Design and reconstruction of public trail facilities utilizing Green Infrastructure and conventional storm water mgt approaches. | Protection of public property, water quality improvements, and flood mitigation. This project is a medium priority for the City and is planned to take place sometime in the next 1-5 years. |
|                                                                | Bay Beach wetland restoration, shoreline stabilization & storm water management to mitigate impact of high bay levels utilizing vegetative management, structural flood control and green infrastructure | City of Green Bay                                           | Green Infrastructure, nature-based solutions, and conventional storm water management approaches.                                | Coastal flood mitigation, habitat restoration, and water quality improvements. This project is a high priority for the City and is planned to take place sometime in the next 1-5 years.     |
|                                                                | South Bay Shore Dike Reinforcement                                                                                                                                                                       | City of Green Bay                                           | Continuation of project underway                                                                                                 | Coastal flood mitigation, erosion prevention. This project is a high priority for the City and is planned to be completed in the next 1-5 years.                                             |
|                                                                | Museum Way Storm Lift Station to reduce high water impacts to Antoinette area.                                                                                                                           | City of Green Bay                                           | Construction a lift station.                                                                                                     | Flood mitigation to low lying areas. This project is a high priority for the City. No timeline was provided                                                                                  |
|                                                                | Stormwater management and Green Infrastructure improvements to mitigate Ellis Creek high water impacts.                                                                                                  | Ellis Creek: Main St. to Lime Kiln Rd.                      | Complete flood study, design and construct green infrastructure improvements.                                                    | Flood mitigation, water quality improvements. This project is a medium priority for the City. No timeline was provided                                                                       |
|                                                                | Stormwater management solutions for the downtown area to address weather events along the Fox River (wind, seiche, rain).                                                                                | Impact areas: E Mason to E Walnut, Fox River to Monroe Ave. | Identify stormwater management solution that may help alleviate flooding from seiche, wind, rain events                          | Flood mitigation, water quality improvements. This project is a medium priority for the City. No timeline was provided                                                                       |
|                                                                | Mitigate Joliet Park parking lot flooding through shoreline stabilization and vegetative management on Bay of Green Bay.                                                                                 | Joliet Park                                                 | Shoreline stabilization and vegetative management                                                                                | Flood mitigation and protecting public property. This project is a low priority for the City. No timeline was provided                                                                       |

| Table 4.4: Continued |                                                                                |                                                               |                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |
|----------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Municipality         | Project Name                                                                   | Project Location                                              | Construction Type                                                                                                                                                                                                                                                                       | Mitigation Benefits                                                                                                                                  |
| Village of Denmark   | New/Expand Storm Warning Sirens                                                | Village Hall                                                  | None. Includes standard AC siren with radio decoder, antenna and weatherproof cabinet. Siren is omni directional with 8hp continuous duty DC motors, siren heaters, batteries, dual pro chargers, battery blankets and magnetic starter in a NEMA 3R enclosure plus electrical service. | Existing and new developments in the village would be in range of the sirens. New sirens would meet FEMA recommended Alert Level for entire village. |
|                      | New/Expand Storm Warning Sirens                                                | Corner of Wisconsin Ave and Grand Ave on east side of village | None. Includes standard AC siren with radio decoder, antenna and weatherproof cabinet. Siren is omni directional with 8hp continuous duty DC motors, siren heaters, batteries, dual pro chargers, battery blankets and magnetic starter in a NEMA 3R enclosure plus electrical service. | Existing and new developments in the village would be in range of the sirens. New sirens would meet FEMA recommended Alert Level for entire village. |
| Village of Pulaski   | Ditch Cleaning: Middle Branch of Suamico River on North 4 <sup>th</sup> Avenue | North 4 <sup>th</sup> Avenue                                  |                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |
|                      | Storm Sewer installation Fourth Avenue                                         | 4 <sup>th</sup> Avenue                                        |                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |
|                      | Emergency power backup: Village Hall and Police Department                     | Village Hall                                                  |                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |
|                      | Emergency power backup Well #2                                                 | Well #2                                                       |                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |
| Village of Suamico   | Improve Snow and Ice Control Measures                                          | Village Wide                                                  | Adding an additional snowplow route in 2021 by delaying the sale of oldest snow plow.                                                                                                                                                                                                   | Will reduce the amount of time necessary to clear roads during snow events.                                                                          |
|                      | Flood Study                                                                    | Shoreline Roads                                               | Study to develop flood mitigation strategies along the Bay.                                                                                                                                                                                                                             | Reduce safety hazards for residents and emergency responders during sustained NE wind events.                                                        |

| Table 4.4: Continued   |                                               |                                                 |                                                                                                            |                                                                                                                                                       |
|------------------------|-----------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Municipality           | Project Name                                  | Project Location                                | Construction Type                                                                                          | Mitigation Benefits                                                                                                                                   |
| Village of Wrightstown | Emergency Response Plan                       | Village-Wide                                    | None. Work in progress; requires participation by other entities such as local private and public schools. | Improvement in efforts to provide Public Safety aspects to residents and schools during possible incidents; hazardous spills, massive accidents, etc. |
|                        | Infrastructure replacement plan               | Village Wide                                    | None. Work in progress.                                                                                    | Create plan for sustainable infrastructure replacement avoid system failures                                                                          |
|                        | Public Safety assessments                     | Village Wide                                    | Assess growth and future Public Safety needs for the community                                             | Define future growth needs and create plan to improve public safety resources                                                                         |
|                        | Backup power for local EOC                    | Village Hall                                    | Install natural gas generator and needed connections                                                       | Allow village hall to function through daily task and have sustainable EOC                                                                            |
| Town of Ledgeview      | Mystery Valley Flood Reduction                | South of Dickinson & North of Oak Ridge         | Dredging                                                                                                   | Reduce Flooding and Increase water flow throughout Mystery Valley subdivision                                                                         |
|                        | Dickinson Road Sewer Main                     | Dickinson Road: Monroe Road to East River Drive | Sewer improvements                                                                                         | Increase sewer capacity at Interceptor                                                                                                                |
|                        | East River/Ledgeview Park Downed Tree Removal | East River: Ledgeview Road to Dickinson Road    | Fallen Tree and Debris Removal                                                                             | Remove Fallen Trees and Debris to increase flow and minimize flooding                                                                                 |

Some communities did not provide community specific projects. Those communities include:

Town of Eaton,  
Town of Glenmore  
Town of Green Bay  
Town of Holland  
Town of Humboldt  
Town of Lawrence

Town of Morrison  
Town of New Denmark  
Town of Pittsfield  
Town of Rockland  
Town of Scott  
Town of Wrightstown

Village of Howard  
Village of Hobart  
Village of Bellevue  
Village of Ashwaubenon  
Village of Allouez  
City of De Pere

| Table 4.4: Continued                     |                                                                                        |                                                      |                                                                                                                                                                                                                     |                                                                                                                                                                  |
|------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Other Entity                             | Project Name                                                                           | Project Location                                     | Construction Type                                                                                                                                                                                                   | Mitigation Benefits                                                                                                                                              |
| Green Bay Metropolitan Sewerage District | Design and Install a permanent berm at the East River Lift Station.                    | Ledgeview (321 East River Drive)                     | Design and install a permanent berm at this location within the next 5 years                                                                                                                                        | Will reduce the risk of damage and the frequent need to install temporary sand berms for flood protection.                                                       |
| The Nature Conservancy                   | Build flood storage on municipal riparian lands and floodplain areas of the East River | East River Watershed, floodplains and riparian zones | Identify opportunities for construction of flood water storage systems (e.g., wetlands, stormwater detention basins) on municipality owned lands within the East River floodplain                                   | Minimize and mitigate flooding to areas within the East River watershed.                                                                                         |
|                                          | Restore wetlands for flood protection                                                  | Countywide                                           | Locate potentially restorable wetlands in Brown County that have high value for flood water storage; build partnerships and funding to restore the wetlands.                                                        | Minimize and mitigate flooding to areas around Brown County                                                                                                      |
|                                          | Rural road protection through culvert replacement program.                             | Countywide                                           | Replace broken or undersized culverts to minimize road failure and overtopping.                                                                                                                                     | Replacing broken or undersized culverts can help alleviate damage to infrastructure and minimize flooding issues adjacent to the culvert.                        |
|                                          | Develop a floodplain and riparian lands protection program.                            | Countywide                                           | Identify and preserve floodplains through acquisition and protection by the most appropriate municipality or partner organization.                                                                                  | Additional flood studies would be required to identify floodplain areas and codes/ordinances would need to be reviewed and amended to help preserve floodplains. |
|                                          | Develop an East River Resiliency Collaborative                                         | East River Watershed                                 | Formalize a coalition of stakeholders from municipalities and other groups within the East River Watershed to collectively fund long-term, watershed-scale projects through multi-jurisdictional funding mechanisms | This creates a potential fundraising group that can help support other mitigation strategies focused on the East River Watershed.                                |
|                                          | East River Community Resiliency Project                                                | East River Watershed                                 | Provide technical support and engage in planning efforts to develop flood mitigation strategies for the municipalities of the East River watershed                                                                  | Project will be launching in 2021.                                                                                                                               |
|                                          | East River Stormwater Infrastructure Improvements                                      | East River Watershed                                 | Stormwater system improvements (where feasible) to prioritize pre-treatment and retention using bioswales and phytoremediation                                                                                      |                                                                                                                                                                  |

| Table 4.4: Continued   |                   |                  |                                                                                                                                                        |                                                                                                                                                                                                           |
|------------------------|-------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Other Entity           | Project Name      | Project Location | Construction Type                                                                                                                                      | Mitigation Benefits                                                                                                                                                                                       |
| The Nature Conservancy | Manure Management | Countywide       | Provide support and outreach to Brown County farmers on using tools like NOAA's Runoff Risk Toolkit, to identify optimal times for manure application. | In progress. NOAA planned launch 2021.<br><br><a href="https://vlab.ncep.noaa.gov/web/noaa-runoff-risk/runoff-risk-background">https://vlab.ncep.noaa.gov/web/noaa-runoff-risk/runoff-risk-background</a> |

## CHAPTER 2      BROWN COUNTY PROFILE

### INTRODUCTION

During the early stages of any planning project it is important to develop an understanding of the physical elements and social components of the planning area and how these elements could influence the contents and scope of the plan. This chapter of the Brown County All Hazards Mitigation Plan inventories and details the county's history, general physical composition, land cover and land use, demographics, development patterns, critical infrastructure, and emergency response resources.



The profile draws on data and information from the US Census Bureau; Wisconsin Department of Natural Resources; *Brown County Comprehensive Plan*; the *Brown County Farmland Preservation Plan*; watershed plans; FEMA regulations; infrastructure maps (sewer, water, etc.); and utility maps. Information used to prepare the maps in this chapter were drawn from the Brown County Land Information Office, Brown County Planning Commission, existing county plan documents, and the State of Wisconsin.

### HISTORICAL AND CULTURAL SETTING

It is believed that human habitation of the area *that is currently known as* Brown County, may have existed near the Red Banks area along the east shore of the Bay of Green Bay as far back as 7000 B.C. Since then, many different Indian tribes have periodically inhabited the lands adjacent to the Bay of Green Bay and the Fox River. Prior to the 1600s, the Winnebago and Menomonee Indian tribes inhabited this area: however, by the mid-1600s, other tribes, such as the Ottawa, Huron, Fox, Sauk, Potawatomi, and Ojibwa, moved into the area as they were displaced from 297 acres of their ancestral lands further east. They in turn, displaced the Winnebago and Menomonee tribes. As a result of European settlers the Oneida tribe was relocated to the west side of Brown County from the State of New York.

Jean Nicolet has commonly been cited as being the first European to set foot in what would one day become the State of Wisconsin when he arrived at the Red Banks area in 1634. This event heralded a period of rapid change for the area adjacent to the bay and the Fox River as other French explorers and fur traders quickly followed Nicolet. By the mid-1600s, French missionaries also began to visit the area. These visits eventually became so numerous that in 1671 the first permanent European development, the St. Francis Xavier mission, was established along the Fox River near the De Pere rapids. In 1701, following this initial wave of French explorers, fur traders, and missionaries, the French government established a military stockade called Fort St. Francis in the area along the bay near the mouth of the Fox River where the Canadian National Railroad yards in the City of Green Bay are now located. By 1764, the first recorded settler, Augustin de Langlade, moved to this area and established a trading post.

Eventually, the French presence in this region gave way to British influences. In 1761, the French Fort St. Francis was rebuilt by the British and renamed Fort Edward Augustus. In 1763, France ceded the area to England. By the mid-1780s, the colony established by de



Langlade, which would eventually become part of the City of Green Bay, had reached a population of about 50 people.

In 1783, England ceded this region to the United States. However, it was not until after the War of 1812 that the British presence was erased when American pioneers from New England and New York outnumbered the original French-Canadian settlers. By 1812, the population of the settlement established by de Langlade had increased to about 250 people. In 1816, Fort Edward Augustus was once again rebuilt and renamed Fort Howard. At that point in time, the Fort Howard area was the second largest settlement in Wisconsin. By 1824, the settlement originally founded by de Langlade had reached a population of about 500 people with an additional 600 troops stationed at Fort Howard. In 1824, Brown County's first county courthouse was founded. In 1854, Green Bay incorporated as a city. Large-scale immigration into this area began by the late 1840s, so that by 1860 about 11,800 people inhabited the area identified today as Brown County.

Brown County was created in 1818 as part of the Michigan Territory, and at that time, it included much of Upper Michigan and all of Wisconsin from Lake Michigan to the Wisconsin River and south to Illinois. By the time the Wisconsin Territory was established in 1836, the southern one-third of Brown County had been removed to form new counties in the rapidly growing southeastern portion of the territory. When Wisconsin became a state in 1848, the counties of Door, Oconto, Outagamie, and Waupaca were created from Brown County. The following year, Kewaunee County was created. By 1853, Brown County had been reduced to 534 square miles when Shawano County was created. Brown County was formally established by congress in 1861.

Brown County's first communities, Navarino (which later became part of the City of Green Bay) and De Pere, were founded in 1829 along the shores of the Fox River near the Bay of Green Bay. Other early Brown County communities, Astor (which later became part of the City of Green Bay) and Wright (which later became the Village of Wrightstown), were also located along the Fox River. Jurisdictional changes continued with incorporation of the Town of Allouez as a village in 1986, the Towns of Bellevue and Hobart as villages in 2002, and the Town of Suamico as a village in 2003. The 24 municipalities of present-day Brown County include 2 cities, 9 villages, and 13 towns. Since its inception, the City of Green Bay has always been and continues to be Brown County's largest community.

## **PHYSICAL CHARACTERISTICS**

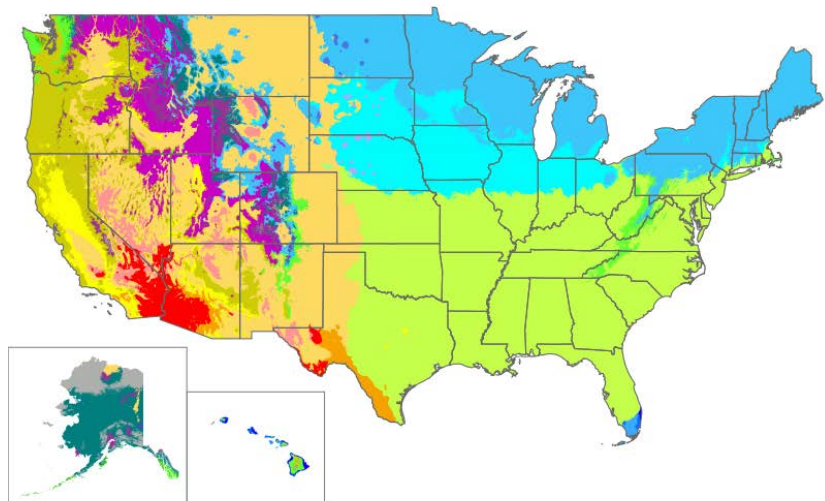
### **Climate**

Using the widely accepted Koppen climate classifications, Brown County's climate is classified as "humid continental". This climate is a sub type of the more generalized Continental climate classification and is characterized by an extreme disparity between summer and winter temperatures that range from cold, snowy winters and warm summers

with periods of hot, humid conditions<sup>1</sup>. According to the Midwestern Regional Climate Center, the average annual temperature for NE Wisconsin is 43.73 degrees (2017). The average annual temperature has been trending higher since records were kept in 1895. The increase in temperature over approximately 125 years was slightly more than two degrees. The Increase in both regional and global average temperature has been linked to many other climatological changes including the frequency and intensity of extreme weather events<sup>2</sup>.

Precipitation is also an important element of the climate that can present important trends over time. Green Bay averages 29.53 inches of precipitation (rainfall) annually with an additional average of 51 inches of snowfall. The average annual precipitation has increased nearly 2.5 inches since 1895. The amount of precipitation generally increases during the spring and peaks in the summer months before falling though the fall and into the beginning of winter as depicted by the graph to the right<sup>3</sup>. Overall, the varied climate is favorable for many agricultural purposes however: more extreme weather events will pose issues for farmers as well as in more suburban and urban areas alike.

## Köppen climate types of the United States



### Köppen climate type

|                                     |                                             |                                |
|-------------------------------------|---------------------------------------------|--------------------------------|
| EF (Ice-cap)                        | Dsb (Warm-summer mediterranean continental) | Csa (Hot-summer mediterranean) |
| ET (Tundra)                         | Dsa (Hot-summer mediterranean continental)  | BSk (Cold semi-arid)           |
| Dfc (Subarctic)                     | Cfc (Subpolar oceanic)                      | BSh (Hot semi-arid)            |
| Dfb (Warm-summer humid continental) | Cfb (Oceanic)                               | BWk (Cold desert)              |
| Dfa (Hot-summer humid continental)  | Cfa (Humid subtropical)                     | BWh (Hot desert)               |
| Dwc (Subarctic)                     | Cwb (Subtropical highland)                  | Aw (Savanna)                   |
| Dwb (Warm-summer humid continental) | Cwa (Humid subtropical)                     | Am (Monsoon)                   |
| Dwa (Hot-summer humid continental)  | Csc (Cold-summer mediterranean)             | Af (Rainforest)                |
| Dsc (Dry-summer subarctic)          | Csb (Warm-summer mediterranean)             |                                |

\*Isotherm used to distinguish temperate (C) and continental (D) climates is -3°C

Data sources: Köppen types calculated from data from PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>; Outline map from US Census Bureau

Figure 1: Köppen Climate Types of the United States

### Green Bay Climate Graph - Wisconsin Climate Chart

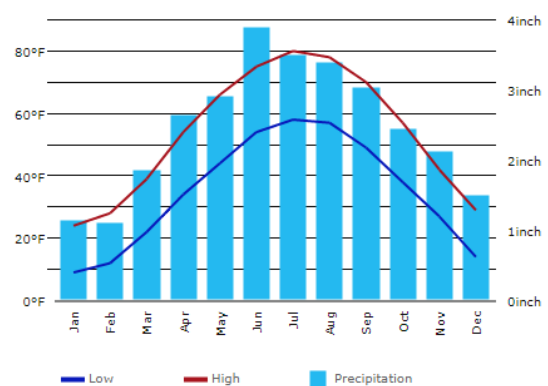


Table 1: Green Bay Climate Graph

<sup>1</sup> Encyclopedia Britannica: <https://www.britannica.com/science/humid-continental-climate>

<sup>2</sup> National Climate Assessment, GlobalChange.gov: <https://nca2014.globalchange.gov/highlights/report-findings/extreme-weather>

<sup>3</sup> US Climate Data: <https://www.usclimatedata.com/climate/green-bay/wisconsin/united-states/uswi0288>

## **Geology**

Brown County has three types of bedrock. The two more common types, as shown in the image to the right, are the Sinnipee Group (Green) and Dolomite (Tan). The third type of bedrock shown as the pink strip through the middle of Brown County is the Maquoketa Formation<sup>4</sup>. The local bedrock is at the heart of the most prominent landscape feature in the county. The Niagara Escarpment, is a prominent rock ridge that stretches nearly 1,000 miles in an arc across the Great Lakes region. This type of rock feature is associated with karst features consisting of cracked and fractured bedrock, such as limestone located close to the earth's surface. This bedrock is easily dissolved by water, and its cracks and layers allow water and pollutants to easily reach the groundwater. Sinkholes, shallow soils, sinking streams, and springs are commonly found in such areas. These features are located adjacent to the escarpment and more extensively in the Town of Green Bay, Town of Scott, Town of Ledgewood, and Town of Morrison.

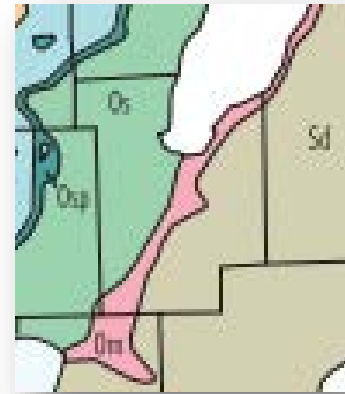


Figure 2: Brown County Bedrock

## **Soils**

Soil properties are used to define/identify problems facing agriculture and land development. Of these, texture and composition are usually the most meaningful. Some information that can be gathered from the soil properties include fertility, bearing capacity, internal drainage, erodibility, slope stability, etc. can be made.

As stated in the 1974 Soil Survey of Brown County, most of the soils in Brown County formed in glacial till and lake sediment that were high in clay. These soils are generally rich, heavy soils common to gently rolling topography and are well suited to farming. In the northwestern part of Brown County, the soils are slightly lighter (containing higher sand content) but remain acceptable for farming. On the south and west sides of the Bay of Green Bay and scattered throughout the rest of the County, the soils are organic peat and are poorly suited for farming. The 1974 Soil Survey of Brown County also states that ten soil associations are located within Brown County. A soil association is a landscape that has a distinctive proportional pattern of soils. Soil associations are useful in that they provide a general idea of the soils in a county, facilitate simple comparisons, and provide a general indication of the suitability of large areas for various land uses.

## **Topography**

The topography of much of Wisconsin was formed by glacial action. The topography that is familiar to us today is generally characterized by gently rolling moraines. The western two-thirds of Brown County include the roughly four-mile-wide Fox River Valley, a continuation of the same depression forming the Bay of Green Bay. This area slopes gently northeastward from Lake Winnebago in east central Wisconsin, drains to the bay, and is generally level to gently rolling. This lowland area contains many glacial landforms, including eskers, moraines, and remnants of extinct glacial lakes. During glacial times, the flat marshy land west and south of the bay had been covered by the bay. Most streams

<sup>4</sup> Wisconsin Geological & Natural History Survey: <https://wgnhs.uwex.edu/>

in the area flow northeastward and parallel the escarpment to the bay. Most streams also possess shallow channels, except in a few instances where the streams have cut through softer underlying glacial landforms, such as the Fox River in Wrightstown.

Forming the eastern boundary of the Fox River Valley is the aforementioned Niagara Escarpment, which rises relatively abruptly as high as 300 feet above the valley floor. On top of the Niagara Escarpment is a narrow strip of level land. East of that is generally a slightly rolling plain that drains east and southeast toward Lake Michigan. The headwaters of a number of streams that drain to Lake Michigan are located within this area. However, gaps in the Niagara Escarpment allow two streams—Baird Creek and Bower Creek—to flow westward to the Bay of Green Bay. The area is generally well drained but has many small wet depressions in places. Due to its location between two lobes of the last glacier to advance through Wisconsin, the southeastern portion of the County is hilly and has many poorly drained depressions. This area, which extends into southeastern Wisconsin, is called the Kettle Moraine area of the state. Land relief within the County ranges from approximately 600 feet above sea level to approximately 1,000 feet above sea level. The low point in the County (580 feet) is located in the City of Green Bay where the Fox River enters the bay. The highest point in the County is located in the Town of Holland, southeast of the unincorporated community of Greenleaf, at an elevation of about 1,020 feet.

## **Hydrology**

### **Groundwater**

Brown County residents and businesses obtain freshwater from two main sources, groundwater aquifers and Lake Michigan. The City of De Pere, City of Green Bay, Village of Allouez, Village of Ashwaubenon, Village of Bellevue, Village of Howard, Village of Hobart, Village of Wrightstown, Town of Ledgeview, and Town of Scott obtain fresh water via pipeline from Lake Michigan. For all other communities within Brown County, groundwater wells tap into the underground aquifers.

Groundwater is harvested from four aquifers that vary in depth. Most private wells in Brown County utilize two shallower aquifers, while most public wells obtain water from the deeper St. Peter Sandstone aquifer. Brown County does have a few areas that are highly susceptible to groundwater contamination. This was evident in a large scale well contamination case in 2006 in the Town of Morrison where more than 34 percent of wells tested

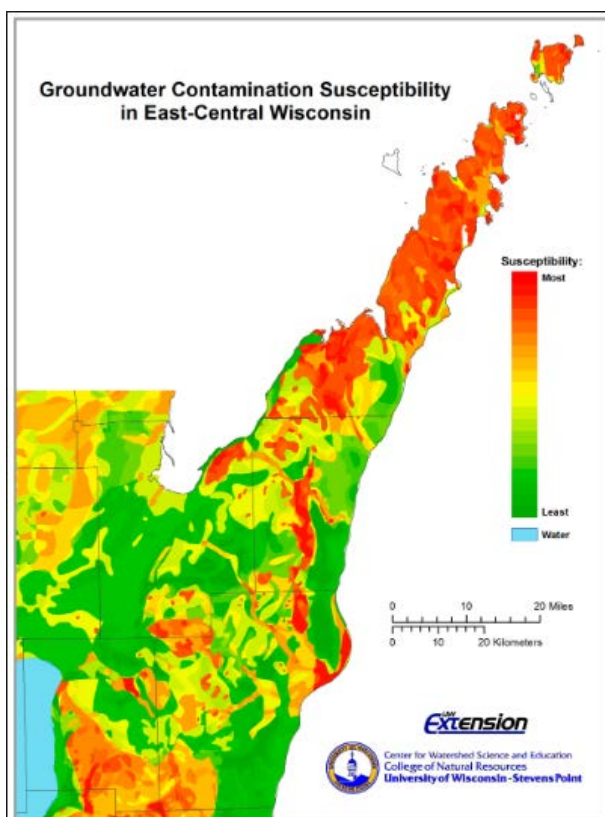


Figure 3: Groundwater Contamination Susceptibility



exceeded state drinking water standards<sup>5</sup> for a hazardous substance. In addition to the Town of Morrison, the northern end of the Town of Green Bay also an area that is highly susceptible to groundwater contamination.

Based upon data obtained from the Wisconsin Department of Natural Resources' drinking water website, there are 144 (2019) "active" separate public water supply systems (systems which can be used by the general public and which are regulated by the DNR) within Brown County. Of the 144 active systems, 19 (2019) are municipal community systems while the remainder are primarily associated with parks, eating and drinking establishments, or food processing plants. There are approximately 7,515 (2012) documented, private potable wells used for human consumption, sanitary use, or for the preparation of food in Brown County. It is likely that additional undocumented wells (old, inactive, or otherwise unrecorded with the DNR) are located throughout Brown County.

### Surface Waters

Brown County contains numerous significant surface water resources. The largest and most important are the Bay of Green Bay and the Fox River. Both of these water features have played an important role in the evolution of Brown County and the surrounding areas.



Figure 4: Bay of Green Bay

From an ecological perspective, the Bay of Green Bay is home to a variety of unique ecosystems which different wildlife including a unique feature called emergent wetlands. These wetlands are found along the west shore of the bay and are extremely important to local fisheries, waterfowl, and other native and migratory species.

Based upon a 2010 land use inventory undertaken by the Brown County Planning Commission, surface water features (including the Bay of Green Bay) encompassed approximately 55,552 acres or 14.1 percent of Brown County. The Fox River is the largest and most important river in northeastern Wisconsin. It is a navigable river that flows northward 155 miles from its headwaters in southern Green Lake County in east-central Wisconsin to the Bay of Green Bay. Its basin drains over 2,700 square miles of east-central and northeastern Wisconsin. In Brown County, it extends 19 miles from the Village of Wrightstown to its downstream end at Green Bay of Lake Michigan and drains about 311 square miles, or almost half of Brown County.

Other significant surface water resources in Brown County include its three named lakes: the small Lily, Middle, and Third Lakes located adjacent to one another in the eastern portion of the County, comprising approximately 50 acres. Also included are the numerous smaller rivers and streams, the biggest of which include Duck Creek, the East River, and the Suamico River.

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<sup>5</sup> Brown County Land and Water Conservation Department: <http://tinyurl.com/yy4b647x>

## **Floodplains**

Floodplains are important areas that store floodwaters, reduce flood peaks and velocities, and reduce sedimentation. They also provide wildlife habitat and serve to filter out pollution from water. Like surface waters, the importance of floodplains is also recognized and is regulated by federal, state, and local governments. The State of Wisconsin mandates floodplain zoning for all communities under Wisconsin Administrative Code NR 116. These minimum standards must be implemented in order to meet eligibility requirements for federal flood insurance programs. As required by NR 116, Brown County has adopted and enforces Chapter 23 of the Brown County Code.

The Federal Emergency Management Agency (FEMA) has prepared Flood Insurance Rate Maps (FIRM) for many of the larger rivers and streams, such as the East and Fox Rivers. The FIRM is a tool used by FEMA to identify Special Flood Hazard Areas (SFHA). Floodplains are a type of SFHA and are most commonly described as the area affected by the one percent chance flood event (100-year flood).<sup>6</sup> The Brown County Planning Commission and many local communities often require flood studies and the mapping of floodplains prior to development adjacent to rivers and streams. The FEMA maps currently in effect, were approved as part of the official Brown County Floodplain Zoning map in 2009.

## **Wetlands**

Wetlands are defined as “areas where water is at or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which have soils indicative of wet conditions.”<sup>7</sup> Wetlands are a significant natural resource that serves several important functions including but not limited to: enhancing water quality by absorbing excess nutrients into the roots, stems, and leaves of its plants, and slowing the flow of water to let suspended pollutants settle out. Wetlands also help regulate storm water runoff, which minimizes floods and periods of low flow. Today many wetlands have been destroyed or degraded through development, farming, and grazing. The result of these activities can be seen along the southern and eastern shores of the Bay of Green Bay where significant reductions in wetlands has occurred. However, the wetlands along the west shore of the bay, while adversely impacted by adjacent development and past farming practices, still remain the largest wetlands complex within Brown County. Other relatively large areas of wetlands are located in the southeastern portion of the Town of Holland and the northern portion of the Towns of Scott and Green Bay.

The Wisconsin DNR Wetlands Inventory maps for Brown County identify wetlands throughout the entire County, which are primarily along its lakes, rivers, and streams. According to the Wisconsin Department of Natural Resources inventory, about 38,142 acres of Brown County, or just under 10 percent, was comprised of wetlands in 2020.

## **Watersheds**

A watershed is a geographical area that is characterized by higher areas that form ridges that channel water to a lower area called a basin. Brown County is located within the Great Lakes-St. Lawrence drainage basin. Approximately one-fourth of the County is

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<sup>6</sup> FEMA Flood Zones: <https://www.fema.gov/flood-zones>

<sup>7</sup> WDNR Wetland Mapping: <https://dnr.wi.gov/topic/wetlands/inventory.html>

drained by streams tributary to Lake Michigan, and the remainder of the area is drained by streams tributary to the Bay of Green Bay and through the bay to Lake Michigan. Portions of four river basins and ten watersheds are located within Brown County.

1. The East River Watershed encompasses about 203 square miles, or about 38 percent of the County. Major streams within this area include the East and Fox Rivers and Baird and Bower Creeks.
2. The Apple and Ashwaubenon Creeks Watershed encompass about 47 square miles, or about 9 percent of the County. Major streams within this area include Apple, Ashwaubenon, and Dutchman Creeks.
3. The Plum Creek Watershed encompasses about 13 square miles, or about 2 percent of the County. Major streams within this area include Plum Creek.
4. The Duck Creek Watershed encompasses about 48 square miles, or about 9 percent of the County. Major streams within this area include Duck and Trout Creeks.
5. The West Twin River Watershed encompasses about 75 square miles, or about 14 percent of the County. Major streams within this area include the Devils and Neshota Rivers, and King and Twin Hill Creeks.
6. The Kewaunee River Watershed encompasses about 27 square miles, or about 5 percent of the planning area. Major streams within this area include School Creek.
7. The Red River and Sturgeon Bay Watershed encompasses about 13 square miles, or about 2 percent of the planning area. Major streams within this area include Gilson Creek.
8. The Branch River Watershed encompasses about 40 square miles, or about 7 percent of the County. Major streams within this area include the Branch River.
9. The Lower Manitowoc River Watershed encompasses about 2 square miles, or about 1 percent of the County. Major streams within this area include Mud Creek.

## **DEMOGRAPHICS**

In order to plan for any natural hazards that may occur within Brown County, it is important to gain an understanding of the population and housing characteristics for each community within the county. The population estimates provided by the Wisconsin Department of Administration (WDOA) and U.S. Bureau of the Census provide a clearer picture of where the largest population increases are expected to occur within the planning area. The increase in population will drive the need for new homes (single and multi-family) and the services associated with the new residents. The following sections summarize basic population and housing data for the 24 municipalities within the Brown County planning area.

## Population

Table 2.1 indicates Brown County gained 21,349 new residents, an 8.6 percent increase from year 2000 to 2010. Since 2010 the WDOA estimates that the county gained approximately 12,655 people between 2010 and the most recent WDOA population estimate in 2018. Map Figure 2-2 highlights the population change by community from 2010 to 2018. WDOA is further projecting that Brown County will add an additional 41,730 residents from 2020 to 2040, which represents a 15.39 percent increase during this 20-year time period.

Brown County's largest community, the City of Green Bay, is estimated to experience an increase in population of 5,450 residents over the same 20 year period, which equates to 5.04 percent. The county's only other city, De Pere, is estimated to experience an increase in population of 5,020 residents over the same 20 year period, which equates to 19.12 percent. The county's villages that are anticipated to grow at the highest rate include Hobart at 45.37 percent, Lawrence at 45.35 percent and Ledgeview at 45.29 percent. In total, the incorporated communities will add 41,730 new residents by 2040 or 15.39 percent of the overall county increase in residents. Some of these figures may change due to annexations of surrounding fast growing towns.

The 13 towns are projected to add 20,000 new residents by 2040. This is 7.38 percent of the county's overall anticipated increase in residents.

| Table 2.1: Population Comparison by Municipality, 2000-2030, Brown County, Wisconsin |         |         |  |                  |         |         |         |               |                |
|--------------------------------------------------------------------------------------|---------|---------|--|------------------|---------|---------|---------|---------------|----------------|
|                                                                                      | Census  | Census  |  | WDOA Projections |         |         |         | Number Change | Percent Change |
| Municipality                                                                         | 2000    | 2010    |  | 2025             | 2030    | 2035    | 2040    | 2025-2040     | 2025-2040      |
| <b>Cities</b>                                                                        |         |         |  |                  |         |         |         |               |                |
| De Pere                                                                              | 20,559  | 23,800  |  | 27,950           | 29,550  | 30,700  | 31,280  | 3,330         | 11.91%         |
| Green Bay                                                                            | 102,767 | 104,057 |  | 111,200          | 113,850 | 114,700 | 113,500 | 2,300         | 2.07%          |
| <b>Villages</b>                                                                      |         |         |  |                  |         |         |         |               |                |
| Allouez                                                                              | 15,443  | 13,975  |  | 14,150           | 14,200  | 14,030  | 13,600  | - 550         | -3.89%         |
| Ashwaubenon                                                                          | 17,634  | 16,963  |  | 17,630           | 17,870  | 17,810  | 17,440  | - 190         | -1.08%         |
| Bellevue                                                                             | 11,828  | 14,570  |  | 17,840           | 19,140  | 20,150  | 20,780  | 2,940         | 16.48%         |
| Denmark                                                                              | 1,958   | 2,123   |  | 2,385            | 2,490   | 2,550   | 2,565   | 180           | 7.55%          |
| Hobart*                                                                              | 5,090   | 6,182   |  | 9,705            | 10,810  | 11,750  | 12,480  | 2,775         | 28.59%         |
| Howard                                                                               | 13,546  | 17,399  |  | 23,820           | 26,110  | 28,000  | 29,370  | 5,550         | 23.30%         |
| Pulaski                                                                              | 3,013   | 3,321   |  | 4,010            | 4,210   | 4,335   | 4,385   | 375           | 9.35%          |
| Suamico                                                                              | 8,686   | 11,346  |  | 14,430           | 15,650  | 16,620  | 17,290  | 2,860         | 19.82%         |
| Wrightstown                                                                          | 1,934   | 2,676   |  | 3,540            | 3,830   | 4,055   | 4,210   | 670           | 18.93%         |

Table continued on next page



| <b>Towns</b> |                |                |  |                |                |                |                |               |              |
|--------------|----------------|----------------|--|----------------|----------------|----------------|----------------|---------------|--------------|
| Eaton        | 1,414          | 1,508          |  | 1,730          | 1,815          | 1,870          | 1,895          | 165           | 9.54%        |
| Glenmore     | 1,187          | 1,135          |  | 1,175          | 1,190          | 1,185          | 1,160          | - 15          | -1.28%       |
| Green Bay    | 1,772          | 2,035          |  | 2,385          | 2,530          | 2,625          | 2,675          | 290           | 12.16%       |
| Holland      | 1,339          | 1,519          |  | 1,715          | 1,790          | 1,840          | 1,855          | 140           | 8.16%        |
| Humboldt     | 1,338          | 1,311          |  | 1,375          | 1,395          | 1,390          | 1,365          | - 10          | -0.73%       |
| Lawrence     | 1,548          | 4,284          |  | 6,195          | 6,900          | 7,505          | 7,965          | 1,770         | 28.57%       |
| Ledgeview    | 3,363          | 6,555          |  | 9,710          | 10,810         | 11,760         | 12,480         | 2,770         | 28.53%       |
| Morrison     | 1,651          | 1,599          |  | 1,670          | 1,695          | 1,695          | 1,665          | - 5           | -0.30%       |
| New Denmark  | 1,482          | 1,541          |  | 1,715          | 1,780          | 1,820          | 1,825          | 110           | 6.41%        |
| Pittsfield   | 2,433          | 2,608          |  | 2,960          | 3,090          | 3,165          | 3,190          | 230           | 7.77%        |
| Rockland     | 1,522          | 1,734          |  | 2,075          | 2,210          | 2,310          | 2,370          | 295           | 14.22%       |
| Scott        | 3,138          | 3,545          |  | 4,210          | 4,470          | 4,665          | 4,770          | 560           | 13.30%       |
| Wrightstown  | 2,013          | 2,221          |  | 2,535          | 2,655          | 2,725          | 2,755          | 220           | 8.68%        |
| <b>Total</b> | <b>226,658</b> | <b>248,007</b> |  | <b>286,110</b> | <b>300,040</b> | <b>309,255</b> | <b>312,870</b> | <b>26,760</b> | <b>9.35%</b> |

\*Includes Oneida Nation

Source: U.S. Bureau of the Census 2000 and 2010; WDOA Demographic Services Center 2019

## **Households**

A household includes all the persons who occupy a housing unit as their usual place of residence.<sup>8</sup> The number of households in Brown County has increased by 6,330 from 2010 to 2017 (Table 2.2). Map Figure 2-3 reflects the additional number of households from 2010 to 2017. In 2017, there were approximately 103,267 households in Brown County, up from 96,937 in 2010. From 2010 to 2017, both the City of Green Bay and the City of De Pere experienced a net loss in households, -350 and -26 respectively.

The 11 incorporated communities accounted for roughly 87 percent of the households in Brown County while the 13 Towns account for the remaining 13 percent in 2017. Of the 6,330 households that were added between 2010 and 2017, 4,688 (74 percent) were added within the cities and villages. This suggests that while the Cities and Villages contain the majority of the households in Brown County, the development of new households in the towns is slightly disproportionate as compared to the overall percentage of households.

Brown County has been following the national and state trend of fewer persons per household. In 1990, there were 2.69 persons per household. In 2000, that number had dropped to 2.60 persons per household. And in 2010, that number dropped again to 2.48 persons per household<sup>9</sup>. It is expected that the census conducted in 2020 will reveal that the trend is either staying close to 2.48 persons per household or further declining.

## **Housing Units**

A *housing unit* is a house, an apartment, a mobile home or trailer, a group of rooms, or a single room occupied as a separate living quarters, or if vacant, intended for occupancy as separate living quarters. Separate living quarters are those in which the occupants live separately from any other individuals in the building and which have direct access from outside the building or through a common hall. For vacant units, the criteria of

<sup>8</sup> US Census Bureau, Households and Persons Per Household:  
<https://www.census.gov/quickfacts/fact/note/US/HSD410217>

<sup>9</sup> US Census

separateness and direct access are applied to the intended occupants whenever possible.

Table 2.2 provides a housing unit comparison between 2010 and 2017 for Brown County and each of its 24 municipalities. Map Figure 2-4 provides a comparison by community for their respective housing unit changes for 2010 and 2017. In 2010, there were 103,238 housing units in Brown County. By 2017, that number increased to 108,200 which represents approximately 4.8 percent increase. Of the total number of housing units in 2017, 87.6 percent were located in one of the 11 incorporated communities. The villages of Hobart (1,105), Howard (1,081), and the Town of Ledgeview (628), lead the way in new housing units from 2010 to 2017. The towns took nearly 34 percent of the new housing units in Brown County during this same time period.

- When comparing Brown County's housing vacancy rates for 2000 and 2010, the vacancy rate increased from 3.2 percent to 4.3 percent.

| Table 2.2: Population and Housing Comparison, 2000-2017, Brown County, Wisconsin |         |         |        |            |        |        |               |        |        |
|----------------------------------------------------------------------------------|---------|---------|--------|------------|--------|--------|---------------|--------|--------|
|                                                                                  | Persons |         |        | Households |        |        | Housing Units |        |        |
| Municipality                                                                     | 2010    | 2017    | Change | 2010       | 2017   | Change | 2010          | 2017   | Change |
| <b><u>Cities</u></b>                                                             |         |         |        |            |        |        |               |        |        |
| De Pere                                                                          | 23,800  | 24,695  | 3.76%  | 857        | 833    | -2.88% | 8,831         | 9,869  | 10.52% |
| Green Bay                                                                        | 104,057 | 104,796 | 0.71%  | 42,909     | 42,559 | -0.82% | 46,693        | 45,038 | -3.67% |
| <b><u>Villages</u></b>                                                           |         |         |        |            |        |        |               |        |        |
| Allouez                                                                          | 13,975  | 13,898  | -0.55% | 5,322      | 5,366  | 0.82%  | 5,597         | 5,623  | 0.46%  |
| Ashwaubenon                                                                      | 16,963  | 17,141  | 1.05%  | 7,365      | 7,608  | 3.19%  | 7,655         | 7,942  | 3.61%  |
| Bellevue                                                                         | 14,570  | 15,373  | 5.51%  | 5,755      | 6,508  | 11.57% | 6,187         | 6,712  | 7.82%  |
| Denmark                                                                          | 2,123   | 2,066   | -2.68% | 8,425      | 9,475  | 11.08% | 890           | 915    | 2.73%  |
| Hobart*                                                                          | 6,182   | 8,178   | 32.29% | 2,206      | 3,308  | 33.31% | 2,349         | 3,454  | 31.99% |
| Howard                                                                           | 17,399  | 19,121  | 9.90%  | 6,561      | 7,670  | 14.46% | 6,784         | 7,865  | 13.74% |
| Pulaski                                                                          | 3,321   | 3,335   | 0.42%  | 1,325      | 1,370  | 3.28%  | 1,392         | 1,510  | 7.81%  |
| Suamico                                                                          | 11,346  | 12,222  | 7.72%  | 4,047      | 4,619  | 12.38% | 4,170         | 4,735  | 11.93% |
| Wrightstown                                                                      | 2,676   | 3,138   | 17.26% | 757        | 901    | 15.98% | 994           | 1,162  | 14.46% |
| Table Continued on Next Page                                                     |         |         |        |            |        |        |               |        |        |

| <b>Towns</b> |                |                |              |               |                |              |                |                |              |
|--------------|----------------|----------------|--------------|---------------|----------------|--------------|----------------|----------------|--------------|
| Eaton        | 1,508          | 1,553          | 2.98%        | 538           | 580            | 7.24%        | 564            | 621            | 9.18%        |
| Glenmore     | 1,135          | 1,148          | 1.15%        | 419           | 398            | -5.28%       | 430            | 410            | -4.88%       |
| Green Bay    | 2,035          | 2,049          | 0.69%        | 745           | 851            | 12.46%       | 830            | 931            | 10.85%       |
| Holland      | 1,519          | 1,417          | -6.71%       | 534           | 514            | -3.89%       | 534            | 523            | -2.10%       |
| Humboldt     | 1,311          | 1,346          | 2.67%        | 546           | 505            | -8.12%       | 564            | 515            | -9.51%       |
| Lawrence     | 4,284          | 4,900          | 14.38%       | 1,441         | 1,787          | 19.36%       | 1,441          | 1,871          | 22.98%       |
| Ledgeview    | 6,555          | 7,614          | 16.16%       | 2,313         | 2,851          | 18.87%       | 2,364          | 2,992          | 20.99%       |
| Morrison     | 1,599          | 1,633          | 2.13%        | 571           | 607            | 5.93%        | 603            | 643            | 6.22%        |
| New Denmark  | 1,541          | 1,538          | -0.19%       | 581           | 575            | -1.04%       | 601            | 604            | 0.50%        |
| Pittsfield   | 2,608          | 2,722          | 4.37%        | 942           | 1,051          | 10.37%       | 1,024          | 1,092          | 6.23%        |
| Rockland     | 1,734          | 1,904          | 9.80%        | 580           | 644            | 9.94%        | 612            | 660            | 7.27%        |
| Scott        | 3,545          | 3,688          | 4.03%        | 1,258         | 1,533          | 17.94%       | 1,353          | 1,608          | 15.86%       |
| Wrightstown  | 2,221          | 2,529          | 13.87%       | 940           | 1,154          | 18.54%       | 776            | 905            | 14.25%       |
|              |                |                |              |               |                |              |                |                |              |
| <b>Total</b> | <b>248,007</b> | <b>258,004</b> | <b>4.03%</b> | <b>96,937</b> | <b>103,267</b> | <b>6.53%</b> | <b>103,238</b> | <b>108,200</b> | <b>4.81%</b> |

\*Includes Oneida Nation

Source: U.S. Bureau of the Census 2010; American Community Survey 2017.

## **Employment**

As shown on Table 2.3 (next page), Brown County added 8,240 workers since 2010. The number and type of employment opportunities grew slightly as well. Brown County continues to enjoy a very diverse economy. In 2010, county's labor force was led by the Educational Services, Health Care, and Social Assistance sector with 20.64 percent of the work force. The manufacturing sector has historically been a strong sector and accounted for 17.85 percent of the labor force in 2010 while retail trade was the third largest sector with 16.6 percent. Ten years later, in 2020, the Educational Services, Health Care, and Social Assistance sector increased to a 20.90 percent share of the total workforce while Manufacturing and Retail Trade also saw growth as a percentage of the total workforce.

| Table 2.3: Employment by Category, 2010 and 2017, Brown County, Wisconsin    |                         |         |                             |        |                              |         |                                  |                          |
|------------------------------------------------------------------------------|-------------------------|---------|-----------------------------|--------|------------------------------|---------|----------------------------------|--------------------------|
| Employment category                                                          | Number Employed in 2010 |         | Percentage Employed in 2010 |        | Est. Number Employed in 2017 |         | Est. Percentage Employed in 2017 | Percent Change 2010-2017 |
| Agriculture, Forestry, Fishing, Hunting, Mining                              |                         | 1,904   |                             | 1.51%  |                              | 2,347   | 1.75%                            | 23.27%                   |
| Construction                                                                 |                         | 6,233   |                             | 4.96%  |                              | 7,516   | 5.61%                            | 20.58%                   |
| Manufacturing                                                                |                         | 22,456  |                             | 17.85% |                              | 25,183  | 18.79%                           | 12.14%                   |
| Wholesale Trade                                                              |                         | 4,420   |                             | 3.51%  |                              | 4,051   | 3.02%                            | -8.35%                   |
| Retail Trade                                                                 |                         | 14,506  |                             | 11.53% |                              | 15,582  | 11.63%                           | 7.42%                    |
| Transportation & Warehousing, Utilities                                      |                         | 8,776   |                             | 6.98%  |                              | 8,101   | 6.04%                            | -7.69%                   |
| Information                                                                  |                         | 2,125   |                             | 1.69%  |                              | 1,807   | 1.35%                            | -14.96%                  |
| Finance, Insurance, real estate                                              |                         | 9,806   |                             | 7.80%  |                              | 9,785   | 7.30%                            | -0.21%                   |
| Professional Services, Management, Administrative, Waste Management Services |                         | 8,628   |                             | 6.86%  |                              | 10,501  | 7.84%                            | 21.71%                   |
| Educational Services, Health Care, and Social Assistance                     |                         | 25,965  |                             | 20.64% |                              | 28,006  | 20.90%                           | 7.86%                    |
| Arts, Entertainment, Recreation, Accommodation & Food Services               |                         | 11,815  |                             | 9.39%  |                              | 12,400  | 9.25%                            | 4.95%                    |
| Other                                                                        |                         | 5,477   |                             | 4.35%  |                              | 4,865   | 3.63%                            | -11.17%                  |
| Public Administration                                                        |                         | 3,664   |                             | 2.91%  |                              | 3,871   | 2.89%                            | 5.65%                    |
|                                                                              |                         |         |                             |        |                              |         |                                  |                          |
| Total                                                                        |                         | 125,775 |                             | 100%   |                              | 134,015 | 100%                             |                          |

Source: U.S. Census Bureau, American Community Survey

## **GEOGRAPHY**

### **Community Size**

Table 2.4 lists each Brown County municipality size in square miles. Brown County encompasses 616 square miles. Brown County communities account for approximately 534 of the 616 square miles which leaves approximately 82 square miles that comprise water features, Renard Isle, Little Tail Point, and Long Tail Point. Incorporated communities account for a little over 186 square miles or 30.25 percent of the total county.

| Table 2.4: Municipality Size in Square Miles |                                       |
|----------------------------------------------|---------------------------------------|
| Municipality                                 | Total Planning Area<br>(Square Miles) |
| <b>Cities</b>                                |                                       |
| De Pere                                      | 12.77                                 |
| Green Bay                                    | 46.12                                 |
| <b>Villages</b>                              |                                       |
| Allouez                                      | 5.21                                  |
| Ashwaubenon                                  | 12.86                                 |
| Bellevue                                     | 14.38                                 |
| Denmark                                      | 1.97                                  |
| Hobart*                                      | 33.12                                 |
| Howard                                       | 18.44                                 |
| Pulaski                                      | 2.30                                  |
| Suamico                                      | 35.75                                 |
| Wrightstown                                  | 3.45                                  |
| <b>Towns</b>                                 |                                       |
| Eaton                                        | 24.34                                 |
| Glenmore                                     | 32.85                                 |
| Green Bay                                    | 22.11                                 |
| Holland                                      | 35.99                                 |
| Humboldt                                     | 24.03                                 |
| Lawrence                                     | 15.93                                 |
| Ledgeview                                    | 17.22                                 |
| Morrison                                     | 36.44                                 |
| New Denmark                                  | 34.37                                 |
| Pittsfield                                   | 32.03                                 |
| Rockland                                     | 21.76                                 |
| Scott                                        | 18.24                                 |
| Wrightstown                                  | 32.95                                 |
| Total                                        | 534.65                                |

\*Includes Oneida Nation

Source: U.S. Census Bureau, Brown County Planning Commission.

### **Land Use**

Brown County encompasses approximately 342,546 acres. Of this, approximately 98,025 acres or 28.6 percent of the land mass of the county is developed. Approximately 250,944 acres or 73.2 percent of the land in the county is undeveloped. These undeveloped lands consist largely of agricultural lands, pastures, woodlands, and other natural features. A detailed inventory of land uses was completed in 2019 by Brown County Planning Commission staff. The land use information was then compiled into generalized land use categories and presented in Map Figure 2-5.



## Residential Land

Residential land accounts for 47,706 acres, or 13.92 percent of the total area of Brown County. The majority of this land is single family residential. Other residential land uses in Brown County included two family residential, multi-family residential, group quarters, and mobile homes. Vacant residential land is also counted in this category.

**Table 2.5: Brown County 2019 Land Use Inventory**

| Land Use                   | Acres          | % of Total     |
|----------------------------|----------------|----------------|
| Residential                | 47,706         | 13.92%         |
| Commercial                 | 4,964          | 1.44%          |
| Industrial                 | 6,873          | 2.0%           |
| Transportation             | 26,905         | 7.9%           |
| Communication/Utilities    | 1,576          | 0.46%          |
| Institutional/Governmental | 3,575          | 1.0%           |
| Outdoor Recreation         | 11,129         | 3.2%           |
| Agricultural               | 165,869        | 48.4%          |
| Natural Areas              | 73,945         | 21.6%          |
| Total                      | <b>342,546</b> | <b>100.00%</b> |

## Commercial Land

Although commercial land is scattered throughout the county, significant areas of commercial development can be seen along the Interstate 43 and 41, and State Highway 172; within the central business districts in cities and some villages; and lining commercial strip development along certain urban corridors such as East and West Mason Street. Total commercial land comprises of 4,964 acres, or 1.4 percent of Brown County.

## Industrial Land

Industrial land covers 6,873 acres or 2 percent of Brown County. Although the majority of the industrial land is dedicated to manufacturing, significant proportions of the industrial land is dedicated to warehousing and storage. Traditionally, industrial lands are generally situated along rail corridors and along rivers. Within the past two decades, industrial parks have emerged around Brown County's cities and villages.

## Transportation Land

The 26,905 acres or 7.9 percent of Brown County transportation land encompasses all modes of transportation. This includes roads, rail, air, marine, and non-motorized modes of moving people, goods, and services. It is the second largest category for developed land. Streets and roads constitute the majority of this land use, but off-street parking and rail and air related uses are also significant transportation land uses.

## Communications and Utilities Land

Over 1,576 acres or 0.46 percent of land in Brown County is for communications and utilities uses. Some of the more significant communications/utilities related land uses (in terms of land mass occupied) in Brown County include landfills, recycling plants and other non-landfill disposal facilities, sewage treatment plants, electric power plants and substations, and water utility facilities. Other key uses which fall under this category include natural gas terminals, local telephone services, radio stations and towers.

## Governmental and Institutional Land

Governmental and institutional land uses include public and private facilities for education, health or assembly, for cemeteries and related facilities, and for all government facilities used for administration or safety, except public utilities and areas of outdoor recreation. This category accounts for 3,575 acres or 1.0 percent of land within Brown County. Examples of institutional or governmental facilities in Brown County include city,

village and town halls; post offices; hospitals and clinics; municipal garages; fire stations; law enforcement facilities including prisons and jails, educational facilities, churches and cemeteries.

### **Park and Recreational Land**

Park and recreational land uses include outdoor sports and general recreation, camping and picnicking facilities, nature exhibits, areas designated for the preservation of historic or cultural resources. Park and recreational land accounts for 11,129 acres or 3.2 percent of the land within Brown County and comprises the third largest developed land category in the county.

### **Agricultural Land**

Agricultural land uses include farm buildings and accessories (barns, silos and sheds used for agricultural purposes), as well as lands devoted to animal husbandry and fish hatcheries/aquaculture. This category accounts for 169,869 acres or 48.4 percent of the land in Brown County.

### **Natural Features**

Natural features include all other natural areas and environmentally sensitive areas not included in the above referenced undeveloped areas. This category accounts for 73,945 acres or 21.6 percent of the total land area in Brown County.

### **General Development Trends**

The following development trends have been observed in Brown County. It is expected that these trends will influence the county's future growth and its preservation of natural and agricultural resources. All local municipalities in the county will need to address them within their planning processes. These basic development trends include:

- Current areas of higher density development will likely remain or increase in density while new areas outside established neighborhoods will develop at lower densities.
- Brown County can expect an increase in the number of dwelling units over the next several years.
- Brown County's natural features will continue to be impacted due to current and future development pressures throughout the county, increasing the potential for negative impacts.
- Commercial and industrial land uses will continue to be a prominent feature along main transportation corridors including Interstates 41 and 43, U.S. Highways 41 and 141, State Highways 32, 57, 54, 29, and 172.
- Brown County will experience an increased demand for services as the population's median age continues to increase.

## **CRITICAL COMMUNITY INFRASTRUCTURE (“CRITICAL FACILITIES”)**

Critical facilities in the 2012 International Building Code (IBC) (Section 1604, General Design Requirements, Table 1604.5) and American Society of Engineers (ASCE) 7-10 (Section 1.2, Definitions and Notations, Table 1.5-1) are classified as Risk Category IV facilities. Risk Categories in building codes are assigned to reflect current understanding of the risk to human life, health, and welfare associated with damage or failure of a facility by nature of its occupancy or use. Risk Category IV, the highest risk category, includes buildings and structures that, if severely damaged, would reduce the availability of essential community services necessary to cope with an emergency. Risk Category IV buildings and structures include hospitals, police stations, fire stations, emergency communication centers, and similar emergency facilities, as well as ancillary structures required for the operation of these facilities during an emergency, and facilities containing extremely hazardous materials that would threaten the public if released (ASCE 2010, IBC 2012)<sup>10</sup>.



Table 2.6 lists the critical facility categories selected by the Brown County All Hazards Mitigation Plan Steering Committee. Figure 2.6 at the end of this chapter shows all critical facilities in the county classified by critical facility type.

| Table 2.6: Critical Facility Categories          |                                                  |
|--------------------------------------------------|--------------------------------------------------|
| Administrative Buildings                         | Post Office                                      |
| Bridge                                           | Pre-School / Day Care                            |
| Dam                                              | Prison or Jail                                   |
| Electric Power Facility                          | Radio / Television Station                       |
| Electric Power Plant                             | Radio / Television Transmission Towers / Antenna |
| Generation/Processing of Communication Utilities | School                                           |
| Health Institution/Government Facility           | School – Higher Education Facility               |
| Hospital                                         | Sewage Sludge or Water Supply Chemical Disposal  |
| Long-Term Health Care Facility                   | Sewage Treatment Plant                           |
| Major Electric Power Transmission Lines          | Sports Stadium / Arena                           |
| Military Installation                            | Telephone Terminal / Dispatch Center             |
| Mobile Home Park                                 | Transmission of Communication / Utilities        |
| Natural Gas Substation                           | Water Supply Booster/Pumping Station             |
| Natural Terminals Plant                          | Water Supply Filter Treatment Plant              |
| Other Liquid Fuel Substation                     | Water Supply Storage Tank / Reservoir            |
| Other Liquid Fuel Terminal Plant                 | Water Supply Well                                |
| Police / Fire Station / Office                   |                                                  |

Source: Brown County All-Hazards Mitigation Plan Steering Committee

<sup>10</sup> Mitigation Assessment Team Report, Definitions of Critical Facilities and Risk Categories:  
<http://tinyurl.com/y32u829r>



## Schools

Brown County has 12 school districts within the county. Four of those school districts do not have any facilities within Brown County: Brillion, Kaukauna, Luxemburg-Casco, and Reedsville. Table 2.7 references the number of facilities and Map Figure 2-7 displays boundaries of each of the 12 school districts. PreK-12 schools are also highlighted on the county critical facilities Map Figure 2-6 as “School” and institutions of higher education are displayed as “School - Higher Education”.

There are several private schools in Brown County that complement the local public schools. Some of the larger facilities include Notre Dame Academy, and Northeastern Wisconsin Lutheran High School.

| SCHOOL DISTRICT  | Facility Type | Number of Facilities within Brown County | Student Enrollment (2018-2019) |
|------------------|---------------|------------------------------------------|--------------------------------|
| ASHWAUBENON      | Public        | 5                                        | 3,313                          |
|                  | Private       | 3                                        | 257                            |
| DENMARK          | Public        | 4                                        | 1,560                          |
|                  | Private       | 2                                        | 113                            |
| BRILLION         | Public        | -                                        | -                              |
|                  | Private       | -                                        | -                              |
| DE PERE          | Public        | 6                                        | 4,518                          |
|                  | Private       | 3                                        | 479                            |
| GREEN BAY        | Public        | 37                                       | 20,391                         |
|                  | Private       | 18                                       | 3,399                          |
| HOWARD-SUAMICO   | Public        | 9                                        | 6,103                          |
|                  | Private       | 1                                        | 307                            |
| KAUKAUNA         | Public        | -                                        | -                              |
|                  | Private       | -                                        | -                              |
| PULASKI          | Public        | 5                                        | 3,777                          |
|                  | Private       | 2                                        | 101                            |
| LUXEMBOURG-CASCO | Public        | -                                        | -                              |
|                  | Private       | -                                        | -                              |
| REEDSVILLE       | Public        | -                                        | -                              |
|                  | Private       | 1                                        | 87                             |
| WEST DE PERE     | Public        | 5                                        | 3,556                          |
|                  | Private       | 3                                        | 130                            |
| WRIGHTSTOWN      | Public        | 3                                        | 1,367                          |
|                  | Private       | 2                                        | 84                             |
| <b>TOTAL</b>     |               | <b>121</b>                               | <b>49,542</b>                  |

Source: WI Department of Public Instruction, Brown County Planning Commission.

In addition to the area public school districts, Brown County also has a number of institutions of higher education. They include:

- University of Wisconsin-Green Bay
- Northeast Wisconsin Technical College
- St. Norbert College
- Bellin College of Nursing
- College of Menominee Nation
- Globe University
- ITT Technical Institute
- Rasmussen College



### **Brown County Public Facilities**

Brown County owns a large number of public parks, administrative buildings, government offices, maintenance facilities, public works, and open spaces throughout the county. Several of these public facilities have been identified as critical facilities and are mapped on Map Figure 2-6.

### **Places of Interest**

There are several sites in Brown County that are regional attractions that draw a large number of visitors for special events, as well as on a seasonal or year-round basis. These areas have been identified as locations for concern and specific mitigation strategies have been developed during the planning process to appropriately address problems resulting from natural disasters. These sites include:

|                     |                                                                                                                     |
|---------------------|---------------------------------------------------------------------------------------------------------------------|
| Lambeau Field       | <br>Credit: Somerville Architects |
| Resch Center        | <br>Credit: Spancrete            |
| Resch Expo Hall     | <br>Credit: Nicholas Kozloski   |
| Kress Events Center | <br>Credit: UWGB                |

|                                                            |                                                                                      |
|------------------------------------------------------------|--------------------------------------------------------------------------------------|
| N.E.W Zoo                                                  |    |
|                                                            | Credit: Google Maps (Streetview)                                                     |
| Brown County Adventure Park                                |    |
|                                                            | Credit: Brown County                                                                 |
| Bay Park Square                                            |   |
|                                                            | Credit: Greater Green Bay Convention & Visitors Bureau                               |
| Donald J Schneider Stadium                                 |  |
|                                                            | Credit: Miron Construction                                                           |
| Mulva Family Fitness & Sports Center (St. Norbert College) |  |
|                                                            | Credit: St. Norbert College                                                          |



|                                     |                                                                                                                                                        |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Bay Beach Amusement Park</p>     |  <p>Credit: Yelp</p>                                                 |
| <p>Bay Beach Wildlife Sanctuary</p> |  <p>Credit: Greater Green Bay Convention &amp; Visitors Bureau</p>   |
| <p>Brown County Fairgrounds</p>     |  <p>Credit: Google Maps (Streetview)</p>                            |
| <p>Green Bay Botanical Gardens</p>  |  <p>Credit: Green Bay Botanical Gardens</p>                        |
| <p>Oneida Casino</p>                |  <p>Credit: Greater Green Bay Convention &amp; Visitors Bureau</p> |

|                                               |                                                                                                                             |
|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| <p>KI Convention Center</p>                   |  <p>Credit: KI Convention Center</p>      |
| <p>National Railroad Museum</p>               |  <p>Credit: Google Maps (Streetview)</p>  |
| <p>Heritage Hill State Park</p>               |  <p>Credit: Heritage Hill State Park</p> |
| <p>Weidner Center for the Performing Arts</p> |  <p>Credit: UWGB</p>                    |

## **Events**

In addition to places of interest in Brown County, there are a number of short-term or day-long events held throughout the year that draw a large number of people and resources to one location. These events have been examined and appropriate mitigation strategies have been developed if a natural disaster were to occur during the events. These events include:

- Artstreet
- Bellin Run
- Celebrate De Pere
- Cellcom Green Bay Marathon
- Festival Foods Fireworks & Celebrate Americafest
- Hispanic Festival
- Native American Festival
- Pulaski Polka Days
- Oneida Nation Pow-Wwow
- BayCare Clinic Century
- Pilgrimage to the Shrine of Our Lady of Good Help
- Titledown Bicycle Tour

### **Transportation**

The transportation system in Brown County provides the primary means by which people and goods move about the county. The county's transportation infrastructure is comprised of roads, bridges, railroads, airports, transit, and ports/marinas. The transportation infrastructure of the county is crucial for providing emergency services and evacuation before, during, and after a hazard event. Hazardous events can have other significant impacts on the transportation systems. Weather events such as heavy rain storms and winter storms that produce snow and ice can cause hazardous conditions which may produce traffic accidents or hazardous materials spills. Impacts to transportation infrastructure are evaluated for each hazard event in Chapter 3. Transportation facilities in Brown County, such as airport facilities, bridges, and bus facilities, are displayed on the county critical facilities map, Map Figure 2-6 and the county transportation network is displayed on Map Figure 2-8.

### **Roads**

Brown County currently contains two interstate highways, two US highways, nine state highways, several county trunk highways, and many local streets. These streets and highways are currently the primary means of reaching the destinations around the County. There are 2,345 miles of road in Brown County. Of that total, 1,790 miles are under jurisdiction of the local communities and 361 miles are maintained by the county<sup>11</sup>. For maps of county roads by functional class, please refer to the *Brown County Comprehensive Plan*.



Source: NBC 26 News

<sup>11</sup> WisDOT - <https://wisconsindot.gov/Documents/travel/road/hwy-maps/county-maps/brown.pdf>

## Bridges

There are a significant number of bridges in Brown County when considering all overpasses for highways, roads, and streets, rail, and water bodies. Note: Bridges for the purposes of this plan also include culverts. Although a majority of these critical passageways are small, many are considered vital to the movement of people and goods around the county, particularly those that cross the Fox River. The following are some of the largest bridges in the county including the Leo Frigo (I 43), Main Street/Nitschke (Green Bay), Walnut Street (Green Bay), Mason Street/Tilleman (Green Bay), Claude Allouez (De Pere), STH 172, and STH 96 (Wrightstown).



Source: Fineart America

## Railroads

Brown County has two railroads serving customers throughout the county including the Canadian National Railroad and the Escanaba and Lake Superior Railroad Company. Canadian National has three rail lines of which one runs from Green Bay to the Village of Luxemburg in Kewaunee County; the second runs from Green Bay to the Village of Denmark; and a third run stretches north-south from the Fox Valley north to the City of Oconto in Oconto County. The Escanaba and Lake Superior Railroad Company owns 335 miles of rail line that extends from Rockland, Michigan (just south of Ontonagon, MI) to Green Bay. In addition to the mainline, several branches exist including two branches, the 4.7-mile Stiles Junction to Oconto Falls and the 21-mile Crivitz to Marinette/Menominee line that are closer to Brown County.

## Airports

Brown County is served by one major airport, the Austin Straubel International Airport. Austin Straubel International Airport is a cornerstone for economic activity in Northeast Wisconsin. The airport functions 24 hours a day, 365 days a year and offers both commercial and general aviation services. The airport is also responsible for employing approximately 2000 people in aviation related jobs within the region. The Airport is currently served by four major airlines (American Airlines, Delta, Frontier, and United) offering direct service to five cities with connections available to any destination in the world. Austin Straubel International Airport is also a regional base of operations for the Federal Aviation Administration and the Transportation Security Administration serving one-third of Wisconsin and the Upper Peninsula of Michigan.

## Transit

The urbanized portion of Brown County is served by two public transit agencies (Green Bay Metro and the Oneida Transit System) and several private transit providers that primarily offer services to elderly and disabled residents of the area. Green Bay Metro operates 17 full service fixed routes and several limited service routes in the Cities of Green Bay and De Pere and the Villages of Allouez, Ashwaubenon, and Bellevue (see Figure 3-5 for Metro's fixed route system). Metro also connects with the Oneida Transit



System on the west side of Green Bay to enable people to transfer between the two systems.

### **Ports and Marinas**

Brown County has one port, (Port of Green Bay) and 13 marinas with three of them in Green Bay: Metro Boat Launch, Green Bay Yachting Club, and the South Bay Marina. The City of De Pere also contains three boat launch facilities Boat Yard Marina, and the Allouez Yacht Harbor; River Place Yacht Club in Ashwaubenon; and the Shipyard Marine, Suamico Boat Launch, and Windjammer's Sailing Club in Suamico.

### **Dams**

According to the Wisconsin Department of Natural Resources, Brown County has 52 dams of various sizes located throughout the county (Appendix G). Of those 52 dams, there are three large dams with a "high" hazard rating located in Ashwaubenon, Village of Suamico, and Town of Rockland. These three dams are known locally as the Macco Pond Dam, Blazie Investments Dam, and the Lamers Pond Dam. The remaining structures are large and small dams with "low" or no hazard ratings. Dams in Brown County are displayed on the county critical facilities map, Map Figure 2-6.

The Lamers Pond Dam in the Village of Ashwaubenon has an Emergency Action Plan (EAP) that was developed in 2002. The *Emergency Action Plan: Lamers Packerland Drive Detention Basin Control Structure* describes the dam hazard area; identifies those responsible for dam operation and implementation of the EAP; and describes the procedures for training participants, and reviewing, testing, and updating the EAP. No known EAP has been developed for the other two dams in the Town of Rockland and the Village of Suamico.

### **Lamers Pond Dam Description:**

The Lamers Basin control structure is located on a tributary to Dutchman's Creek as it passes under Packerland Drive just north of Interstate Highway 172, in Section 5, T23N, R20E. The dam is formed by the Packerland Drive roadway, which is owned and operated by the Brown County Highway Department. The Village of Ashwaubenon constructed and operates the control structure, regulating discharges through the Packerland culvert system. The drainage area at the dam is approximately three square miles. The reservoir flood storage capacity is 55 acre-feet at the emergency spillway crest (top of Packerland Drive), elevation 661.1 feet. Downstream of the dam, this tributary winds through fully developed residential areas before its confluence with Dutchman's Creek near STH 172/41 interchange. The main components of the dam are:

- Homogenous earth embankment, approximately 200 feet long at the toe, with a crest (top of road) elevation of 661.1 feet and an approximate structure height of 19 feet.
- Embankment slopes of 3H:1V, with a 76 feet wide road surface on the top (back of curb to back of curb).

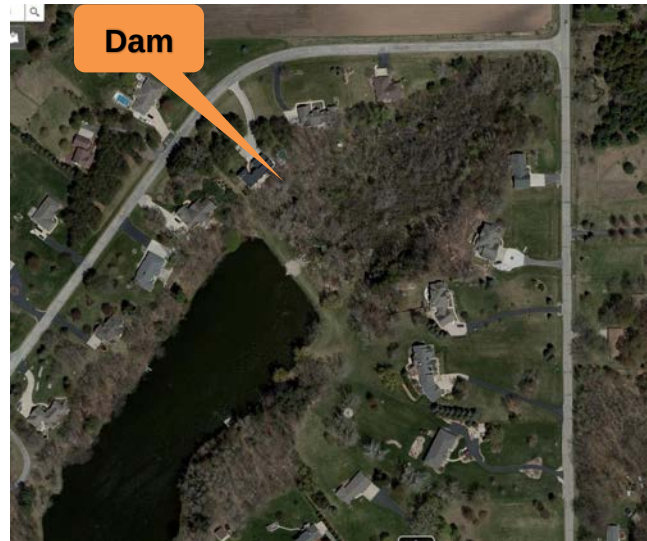


- Basin outlet control structure which reduces the existing twin 54-inch culverts under Packerland Drive to twin 42-inch pipe outlets.
- Basin outlet control structure also includes a box configuration with a concrete weir overflow (elevation 651.3) and a low-flow fish gate with flowline at elevation 645.0.

The Brown County Highway Department and Village of Ashwaubenon replaced the single 60" culvert in 1998 with the twin 54" culvert which now exist under Packerland Drive.

#### **Blaize Investments Dam Description:**

This dam is located in the Village of Suamico on a tributary of the Suamico River. This dam is owned and maintained by the Hidden Lake Association. If the dam were to fail, infrastructure downstream such as the road could be in jeopardy of significant damage. The Hidden Lake Association and the Village of Suamico should coordinate their efforts to ensure that the dam is maintained properly and develop an EAP that describes appropriate actions during and after a possible dam failure and procedures for training participants, and reviewing, testing, and updating the EAP.



#### **Macco Pond Dam/Springwater Dam Description:**

This dam is located in the Town of Rockland on a tributary of the East River. The dam is located on private property and is identified as being owned/maintained by the property owners. The reservoir associated with this dam is not very large; however, if the dam were to fail, County Highway PP may be impacted as it would be the first impediment that the water met. There is also a private residence located immediately adjacent to the intersection of the waterway and County Highway PP which, depending on the elevation of the structures on site and the impacts of the water, could be impacted. The Town of Rockland and the property owners should follow the EAP that describes appropriate actions during and after a dam failure, procedures for training participants, and reviewing, testing, and updating the EAP.



### ***Area Affected by a Breach or Major Flooding:***

A detailed floodplain study was completed for the Lamers Pond Dam establishing floodplain limits for floodplain zoning. A 100-year storm event with dam “non-existent” was also performed to determine the area that would be inundated if the dam were not in place and future development were to occur throughout the drainage basin. This higher flow condition has been mapped as the regulated downstream floodplain. A limited dam failure analysis was also performed downstream of the detention basin. The results of that evaluation showed the “hydraulic shadow” to be well contained within the valley section and below all residences except as noted below. The “hydraulic shadow” ends within about 2,000 feet of Packerland Drive.

No FEMA flood data is available for the other two dams listed.

### ***Population Affected by Lamers Pond Dam***

Only one residence (a low-lying home with a walk-out basement on the left overbank just upstream of Shady Lane) may be subject to flooding during the 100-year flood. Otherwise, no other residences, buildings, or campgrounds would be inundated during flooding or by the failure of the structure. The 2020 total assessed value of the one residence is \$195,300.

### **Critical Facilities**

No critical facilities, such as hospital, rescue and relief facilities, water supply facilities, hazardous waste facilities, or bridges, are in the hazard area. It was noted that with each of the three dams listed above, a County Highway is either the structure or is the first structure immediately downstream of the dam. All of which would be important roadways in their respective areas and if damaged, would cause major issues with local traffic and would require that emergency response personnel be aware of and plan alternate routes.

### **Communication Facilities**

Brown County has an extensive communications infrastructure. Television, radio, newspapers, and broader electronic and print media serve as the primary means of notifying the public of hazard events in Brown County. These various types of communication facilities are displayed on the county critical facilities map, Map Figure 2-6. In addition to the traditional communication methods, hazard events are increasingly noticed by way of social media and can be distributed by way of text messages.

### **Newspaper**

Brown County is served by one newspaper, the Green Bay Press-Gazette, which is a daily newspaper owned by Gannett Company, Inc.

### **Television**

There are seven local broadcast television stations that service Brown County. Table 2.8 identifies each of these stations as well as their national affiliate and the location from which they broadcast.

| Table 2.8: Broadcast Television Stations Serving Brown County, Wisconsin |         |                  |           |                    |
|--------------------------------------------------------------------------|---------|------------------|-----------|--------------------|
| Name                                                                     | Channel |                  | Affiliate | Broadcast Location |
| WBAY-TV                                                                  | 2       | 2-1, 2-2, 2-3    | ABC       | Green Bay          |
| WFRV-TV                                                                  | 5       |                  | CBS       | Green Bay          |
| WLUK-TV                                                                  | 11      |                  | Fox       | Green Bay          |
| WCWF                                                                     | 14      |                  | CW        | Suring             |
| WGBA                                                                     | 26      | 26-1, 26-2       | NBC       | Green Bay          |
| WACY                                                                     | 32      |                  | MNT       | Appleton           |
| WPNE                                                                     | 38      | 38-1, 38-2, 38-3 | PBS       | Green Bay          |

Source: Wikipedia®, a registered trademark of the Wikimedia Foundation, Inc., 2019.

## Radio

There are 42 FM and 17 AM radio stations that broadcast in or around Brown County. The following table lists these stations.

| Table 2.9: Radio Stations, Source: radio-locator.com, 2019. |          |                    |                         |
|-------------------------------------------------------------|----------|--------------------|-------------------------|
| WHID                                                        | 88.1 FM  | Green Bay, WI      | Public Radio            |
| WPNE                                                        | 89.3 FM  | Green Bay, WI      | Public Radio            |
| WORQ                                                        | 90.1 FM  | Green Bay, WI      | Christian Contemporary  |
| WPFF                                                        | 90.5 FM  | Sturgeon Bay, WI   | Christian Contemporary  |
| WOVM                                                        | 91.1 FM  | Appleton, WI       | Adult Album Alternative |
| WEMY                                                        | 91.5 FM  | Green Bay, WI      | Christian Contemporary  |
| W221DA (WNCY)                                               | 92.1 FM  | Howard, WI         | Country                 |
| W226BD (WGEE)                                               | 93.1 FM  | Green Bay, WI      | Country                 |
| WGEE                                                        | 93.5 FM  | New London, WI     | Country                 |
| WYDR                                                        | 94.3 FM  | Neenah-Menasha, WI | Adult Hits              |
| WZOR                                                        | 94.7 FM  | Mishicot, WI       | Rock                    |
| WKSZ                                                        | 95.9 FM  | De Pere, WI        | Top-40                  |
| W245BS (WAUN)                                               | 96.9 FM  | Green Bay, WI      | Regional Mexican        |
| WTAQ                                                        | 97.5 FM  | Glenmore, WI       | News/Talk               |
| WQLH                                                        | 98.5 FM  | Green Bay, WI      | Hot AC                  |
| WOWN                                                        | 99.3 FM  | Shawano, WI        | Classic Hits            |
| WDKF                                                        | 99.7 FM  | Sturgeon Bay, WI   | Country                 |
| WNCY                                                        | 100.3 FM | Neenah-Menasha, WI | Country                 |
| WIXX                                                        | 101.1 FM | Green Bay, WI      | Top-40                  |
| W268BG (WRVM)                                               | 101.5 FM | Green Bay, WI      | Religious               |
| W270AJ (WNFL-AM)                                            | 101.9 FM | Green Bay, WI      | Sports                  |
| WRVM                                                        | 102.7 FM | Suring, WI         | Religious               |
| WOGB                                                        | 103.1 FM | Reedsville, WI     | Classic Hits            |
| Table continued on next page                                |          |                    |                         |

|                  |          |                    |                              |
|------------------|----------|--------------------|------------------------------|
| WKZG             | 104.3 FM | Seymour, WI        | Holiday (Adult Contemporary) |
| WPCK             | 104.9 FM | Denmark, WI        | Christian Contemporary       |
| WAPL             | 105.7 FM | Appleton, WI       | Classic Rock                 |
| W292DR (WHBY-AM) | 106.3 FM | Wrightstown, WI    | News/Talk                    |
| WKRU             | 106.7 FM | Allouez, WI        | Classic Rock                 |
| WDUZ             | 107.5 FM | Brillion, WI       | Sports                       |
| WTMJ             | 620 AM   | Milwaukee, WI      | News/Talk                    |
| WCUB             | 980 AM   | Two Rivers, WI     | Country                      |
| WJOK             | 1050 AM  | Kaukauna, WI       | Religious                    |
| WHBY             | 1150 AM  | Kimberly, WI       | News/Talk                    |
| WNAM             | 1280 AM  | Neenah-Menasha, WI | Nostalgia                    |
| WTAQ             | 1360 AM  | Green Bay, WI      | News/Talk                    |
| WDUZ             | 1400 AM  | Green Bay, WI      | Sports                       |
| WNFL             | 1440 AM  | Green Bay, WI      | Sports                       |
| WGBW             | 1590 AM  | Denmark, WI        | Oldies                       |

### **Power Facilities**

The power generating plants located in Brown County include both publicly- and privately-owned facilities. Various types of power facilities are mapped on the county critical facilities map, Map Figure 2-6.

### **Public Water Supply Systems**

Based upon data obtained from the Wisconsin Department of Natural Resources' drinking water website, there are 130 separate public water systems within Brown County. These systems can be used by the general public and are regulated by the WDNR. In addition to public water systems, there are thousands of private wells in Brown County. Private residence obtain groundwater through a private well which the WDNR recommended testing on a regular basis to ensure the water is safe to drink and free of toxins such as nitrates, pesticides, heavy metals, and Volatile Organic Compounds (VOC).

The City of Green Bay, *Village of Hobart*, *Village of Wrightstown*, *Town of Scott*, and the Village of Ashwaubenon obtain their water from Lake Michigan through a pipeline originating near the City of Kewaunee. The City of De Pere and the villages of Allouez, Bellevue, and Howard and towns of Lawrence and Ledgeview comprise the Central Brown County Water Authority and are receiving water from Lake Michigan through a pipeline originating in the City of Manitowoc.

### **Wastewater Treatment Systems**

Most of Brown County is served by Green Bay Metropolitan Sewerage District wastewater treatment system and is within the Brown County Sewer Service Area (SSA). The City of De Pere system was connected to the Green Bay Metropolitan Sewerage District wastewater treatment system in 2009. The SSA Plan identifies those areas eligible to receive sanitary sewer service so that wastewater treatment facilities can be designed to

provide adequate treatment capacity for the anticipated population growth in the sewer service area, while protecting sensitive natural areas and water quality.

### **Military Installations**

Brown County has three military installations. The Army National Guard Unit is located on Military Avenue in Green Bay. The US Defense Logistics Agency is located on N Madison Street in the City of Green Bay and the Navy Operational Support Center is stationed in Ashwaubenon.

### **EPCRA Facilities**

Emergency Planning and Community Right to Know Act (EPCRA) establishes requirements for Federal, State and local governments, Indian Tribes, and industry regarding emergency planning and “Community Right-to-Know” reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public’s knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. EPCRA facilities in Brown County are displayed on the county critical facilities map, Map Figure 2-6.

### **EMERGENCY SERVICES AND FACILITIES**

Brown County Emergency Management provides county-wide communications for the public to police, fire, and emergency medical services. *These* emergency facilities are displayed on the county critical facilities map, Map Figure 2-6.

### **Police**

The Brown County Sheriff’s Department, located in Bellevue, is a full service law enforcement agency that serves portions of Brown County that do not provide their own law enforcement/protection services, including Allouez, Bellevue, Eaton, Glenmore, Green Bay (town), Holland, Howard, Humboldt, Ledgeview, Morrison, New Denmark, Pittsfield, Rockland, Scott, Suamico, and Wrightstown (town). The communities of Allouez, Bellevue, Denmark, Howard, and Suamico also contract for additional police services from the sheriff’s department.

The remaining communities within Brown County provide their own law enforcement, including the Cities of De Pere and Green Bay, the Village of Ashwaubenon, and the Oneida Nation. The communities of Denmark, Hobart, Lawrence, Pulaski, and the Village of Wrightstown also provide their own law enforcement but contract with the sheriff’s department for backup service when necessary.

### **Fire, Rescue, and Emergency Medical Services**

As with most counties in Wisconsin, Brown County does not provide fire, rescue services or emergency medical services. Fire services in Brown County are provided on an individual community basis or are obtained through contracts with neighboring communities. There are 18 fire districts in Brown County. They include Denmark (with service to Eaton, portions of Glenmore, and New Denmark in Brown County and Franklin in Manitowoc County); Hobart; Holland; Pulaski (with service to Pittsfield); Suamico; Wayside; Wrightstown (village); Lawrence; New Franken (a joint department between the towns of Green Bay, Humboldt, and Scott); Greenleaf (with service to the western half of

Rockland and to the Town of Wrightstown); Morrison (with service to the eastern half of Rockland, portions of Glenmore, and to Morrison); Ledgeview (with service to portions of Glenmore); De Pere (with service to Lawrence); Howard; and the City of Green Bay (with service provided to the Villages of Allouez and Bellevue). Lastly, Austin Straubel International Airport has a private contracted Fire Department (Protect), and many of the area paper mills and one chemical company have internalized Fire Brigades both structural and incipient.

The Federal and State governments define departments as *Career departments – 100% paid FTE with no part-time supplemental staffing*. Currently Green Bay is the only complete career department in Brown County. Combination departments – some career positions supplemented with paid on call or part-time coverage. Allouez, Ashwaubenon, Bellevue, Howard, and De Pere are officially combination departments. Volunteer – do not work duty shifts, receive no pay per call, or only receive a stipend for expenses per the IRS “*bright line*” test. Morrison, Holland Town, Greenleaf, New Franken, Pulaski, Hobart, Suamico and Lawrence fall into this category.

Rescue and emergency medical services are also provided on an individual community basis or are obtained through agreements/contracts with neighboring communities or private providers. As examples, most communities in Brown County rely upon County Rescue Services, a private provider located in the Village of Bellevue with additional stations in Howard, Suamico and Denmark that is supported by a joint partnership with Bellin and St. Vincent Hospitals. These communities include the towns of Eaton, Glenmore, Green Bay, Hobart, Holland, Howard, Humboldt, Morrison, Rockland, Scott, Suamico, Wrightstown (both village and town). The village of Allouez receives EMS from Green Bay Metro Fire Department while the village of Bellevue receives EMS from Brown County currently and is planning to switch to Green Bay Metro in 2022. The village of Ashwaubenon and cities of De Pere (with service to Lawrence and Ledgeview) and Green Bay provide their own rescue services.

### **Hospitals & Medical Clinics**

Brown County has four hospitals serving the county and municipalities. They are the Aurora BayCare Medical Center on 2845 Greenbrier Road in Green Bay; HSHS St. Mary’s Hospital on 1726 Shawano Avenue in Green Bay; Bellin Hospital on 744 S. Webster Avenue in Green Bay; and HSHS St. Vincent Hospital on 835 S. Van Buren Street in Green Bay.

#### **Large Hospitals:**

- Aurora BayCare Medical Center – 2845 Greenbrier Road, Green Bay, WI.
- Bellin Hospital – 744 Webster Ave., Green Bay, WI.
- HSHS St. Vincent Hospital – 835 Van Buren St. Green Bay, WI.
- HSHS St. Mary’s Hospital Medical Center – 1726 Shawno Ave., Green Bay, WI

#### **Clinics:**

- N.E.W. Community Clinic – 622 Bodart St., Green Bay, WI
- Green Bay VA HCC (Huempfer) – 2851 University Ave. Green Bay, WI.

- BayCare Clinic – 1035 Kepler Dr., Green Bay, WI.
- Aurora BayCare Health Center – 3237 Voyager Dr., Green Bay, WI.
- Orthopedics & Sports Medicine BayCare Clinic – 1160 Kepler Dr., Green Bay, WI.
- New Clinic – NWTC Campus
- Prevea East Mason Health Center – 3021 Voyager Dr., Green Bay, WI.
- Prevea Washington Street Health Care – 102 N Washington St, Green Bay, WI.
- Aurora Health Center – 4070 Equestrian Rd., Green Bay, WI.
- BayCare Clinic – 164 N Broadway, Green Bay, WI.
- Prevea Allouez Health Center – 1821 S Webster Ave., Allouez, WI.
- Prevea Shawano Ave Health Center – 1727 Shawano Ave., Green Bay, WI.
- Aurora Health Center – 1565 Allouez Ave., Green Bay, WI.
- Prevea Pulaski Health Center – 940 Augustine St., Pulaski, WI.
- Aurora Health Center – 980 S St Augustine St., Pulaski, WI.
- Bellin Health Cardiology Associates – 723 S Wisconsin St., Pulaski WI.
- Aurora Health Center – 629 Solvang Wy., Denmark, WI.
- Bellin Health Denmark – 595 County Rd R, Denmark, WI.

#### Walk-in Clinics:

- Bellin Health Fast (Green Bay East) – 1976 Lime Kiln Rd., Green Bay, WI.
- Bellin Health Fast (Green Bay West) – 2015 Shawano Ave., Green Bay, WI.

#### Urgent Care:

- Aurora BayCare Urgent Care – 2845 Greenbrier Road, Green Bay, WI.
- Aurora BayCare Urgent Care – 2253 W Mason St., Green Bay, WI.
- Aurora Urgent Care – 1881 Chicago St., De Pere, WI.
- Bellin Health (Bellevue) – 3263 Eaton Rd., Bellevue, WI.
- Prevea Urgent Care – 2793 Lineville Rd., Green Bay, WI.
- Prevea Urgent Care – 2502 S Ashland Ave., Green Bay, WI.
- Prevea Urgent Care – 1601 Lawrence Dr., Green Bay, WI.
- Prevea Urgent Care – 3021 Voyager Dr. Green Bay, WI.
- Ashwaubenon Respiratory Clinic – 1630 Commanche Ave., Bellevue, WI.

It should be noted that this list was derived from an exhaustive online search and that this list may not include all facilities in Brown County. Some facilities may also have capabilities that would allow them to be adapted to shelter-in-place inpatient and victim

medical services. These facilities may be needed in the time of a community disaster that requires hospitals to activate surge capacity and/or should a hospital disaster occur that renders the facility inhospitable for patient occupancy. Elements of consideration for these critical facilities are those buildings that may have medical utilities (electrical generators, medical gas systems, life safety compartmentalization, imaging equipment, laboratory services, and surgical capabilities), physically large enough to provide critical mass, and/or are under the business auspice of the hospital.

### **Emergency Warning Systems**

Most of the cities and villages in Brown County have emergency sirens to warn residents in the event of a tornado. There are 59 tornado sirens in the county. The county Dispatch Center is responsible for testing and activating the systems.

### **Emergency Operations Center**

Brown County emergency response operations will be carried out at Brown County's designated Emergency Operations Center (EOC) in the City of Green Bay. The EOC has 24-hour per day operational capabilities.

### **Heavy Equipment Inventory**

Brown County and each of the municipalities maintain a wide array of heavy equipment that could be available during specific emergency response situations. On certain projects and during times of an emergency, the county and communities will share specific pieces of equipment on a lease or rental basis.

| <b>Community</b>       | <b>Emergency Contact</b>                  | <b>24-Hour Contact</b> |
|------------------------|-------------------------------------------|------------------------|
| Brown County           | Paul Fontecchio, Public Works Director    | 920-492-4925           |
| City of Green Bay      | Steve Grenier, Public Works Director      | 920-448-3100           |
| City of De Pere        | Scott Thoresen, Public Works Director     | 920-339-4060           |
| Oneida Tribe           | Jacque Boyle, Public Works Manager        | 920-869-1059           |
| Village of Allouez     | Seah Gehin, Public Works Director         | 920-448-2800           |
| Village of Ashwaubenon | Doug Martin, Director of Eng. & Utilities | 920-492-2337           |
| Village of Howard      | Geoff Farr, Public Works Director         | 920-434-4060           |
| Village of Bellevue    | David Betts, Public Works Director        | 920-468-5507           |
| Village of Hobart      | Jerry Lancelle, Pub. Works Coordinator    | 920-869-3807           |
| Village of Suamico     | Andy Smits, Public Works Director         | 920-434-8410           |
| Village of Denmark     | Erika Thronson, Public Works Director     | 920-362-7982           |
| Village of Pulaski     | Joel Van Lannen, PW Team Leader           | 920-822-5192           |
| Village of Wrightstown | Andy Vickman, Public Works Director       | 920-660-4337           |
| GB Water Department    | Andrea Hay, Dir. of Communications        | 920-621-7726           |
| WPS Gas                | Emergency Hotline                         | 800-450-7280           |
| WPS Electric           | Emergency Hotline                         | 800-450-7240           |
| WPS Local Affairs      | Scott Sheppard                            | 920-380-3376           |

### **Private Contractors**

Brown County and several communities work with the following major vendors to secure heavy equipment/vehicles when needed:

- Aring Equipment Company, Inc., 1800 N. Ashland Avenue, De Pere, WI 54115, 920-336-3601



- Badger Crane & Dragline, 1316 Russett Court, Green Bay, WI 54313, 920-662-7624
- Barlament Erection and Crane Rentals, 1575 Lineville Road, Green Bay, WI 54313, 920-434-3677
- Brooks Tractor Incorporated, 1031 Lawrence Drive, De Pere, WI 54115, 920-336-5711
- Fabco Equipment Inc., 600 Hansen Road, Green Bay, WI 54301, 920-498-8000
- 4 Star Equipment, Inc. 1273 Cornell Rd, Green Bay, WI 54313, 888-223-9300
- Kocken Construction Equipment, 780 Morris Ave., Green Bay, WI 54304, 920-494-7429
- Miller-Bradford & Risberg Inc., 3203 French Road, De Pere, WI 54115, 920-638-7448
- M&R Track Service, 310 E Clay St. #8, Wrightstown, WI 54180
- Riesterer & Schnell, Inc., N2909 State Highway 32, Pulaski, WI 54162, 920-822-3077
- Riesterer & Schnell, Inc., 3200 S. County Road P, Denmark, WI 54208, 920-863-2181
- Roland Machinery Company, 3275 French Road, De Pere, WI 54115, 920-532-0165
- RSC Rental Equipment, 3161 Market Street, Green Bay, WI 54304, 920-337-0777
- Service Motor Company, 3969 Champeau Road, New Franken, WI 54229, 920-468-7700
- Weyers Equipment, Inc., N1957 E. Frontage Road, Kaukauna, WI 54130, 920-766-1861

### **Bulk Fuel**

The West Shore Pipeline that provided petroleum products to Green Bay originated in the Chicago area. This pipeline is no longer in service and the primary source of fuel has transitioned to shipping via the great lakes. The following is a list of bulk fuel providers that can be called upon in emergency scenarios.

- Kwik Trip – 1626 Oak St., La Crosse, WI 54603, Phone: 608-781-8988
- Titledown Oil – 1275 Glory Rd., Green Bay, WI 54304, Phone: 920-336-8983
- Packer City International – 611 Hansen Rd., Green Bay, WI 54304, Phone: 920-499-0878
- Halron Oil Company – 1618 State St., Green Bay, WI 54306, Phone: 920-436-4000
- Klemm Tank Lines – 2204 Pamperin Rd., Howard, WI, 54313, Phone: 920-434-6343
- Semfuel – 955 Challenger Dr., Green Bay, WI 54311, 800-236-5858

- Tilot Oil Company, 1121 McDonald St., Green Bay, WI 54303, Phone: 920-432-7711

It should also be noted that the Port of Green Bay has fuel storage on site and may be called upon if fuel from other sources is not an option.

## **OTHER INFORMATION**

Additional pre- and post-disaster information may be needed during or after a disaster event. The following is some information that could be helpful.

### **Pre-Disaster**

#### **Elderly Housing**

The elderly population is a demographic that may be exceptionally vulnerable to hazard events. Brown County has a large number of elderly housing facilities located throughout the county. Each of the individual facilities should maintain their own emergency preparedness and evacuation procedures. “Long-term Health Care Facilities” are displayed on the county critical facilities map, Map Figure 2.6.

#### **Staging Areas**

As stated in the Brown County Evacuation Plan, temporary collection points will be set up at the county polling places located within the evacuation area. Community Emergency Response Team (CERT) Volunteers will assist evacuees at these polling places. Transportation resources will be directed to the staging area as determined by officials in the incident command center. A list of polling places and evacuation routes are provided in the county’s evacuation plan.

#### **Temporary Shelters**

Temporary shelters, designed for short duration lodging, may be needed before, during, and after a hazard event to provide beds and basic sanitary facilities. Brown County has identified temporary emergency shelters located throughout the county that can provide interim housing for people evacuated from their homes. These shelters consist primarily of schools and churches, plus facilities such as the Red Cross building and other public owned buildings. A list of Brown County shelters can be found in the *Brown County Evacuation Plan*.

Agreements between public and private facilities and the Red Cross vary in number from year to year and are subject to verification of availability at the time of request.

#### **Temporary Pet Shelters**

Temporary pet shelters may also be needed before, during, and after a hazard event if people are required to evacuate their homes. It is important to provide a method to segregate the pets in the shelters. Aside from the Bay Area Humane Society, there are

no other temporary pet shelters in the county unless agreements are created with private entities.

### **Post-Disaster**

#### **Solid and Special Waste Landfills**

Often, the remaining debris from a destructive storm event cannot be land filled in typical landfills. Therefore, it is important to know where the nearest subtitle-d solid and special waste landfills are located. A landfill of this nature cannot be found in Brown County. However, the Veolia Inc. landfill in Outagamie County and Waste Management's landfill near Whitelaw may be used as disposal sites in case of an emergency.

#### **Long Term Shelters**

Long term shelters may be needed if people are unable to return to their homes for an extended period after a hazard event. Brown County works with agencies to set up long term housing. Agencies like the Red Cross develop contracts with a variety of possible shelter locations however the facilities are subject to availability at the time they are requested. Housing arrangements for those residents permanently displaced by the natural disaster will be made primarily through the Brown County Department of Human Services or Integrated Community Services.

#### **Long Term Pet Shelters**

Humane Societies often serve as long-term pet sheltering facilities if needed after a hazard event. Bay Area Humane Society may be able to fill this role along with volunteer pet owners.

# Planning Area

## Brown County All Hazard Mitigation Plan

Brown County, WI

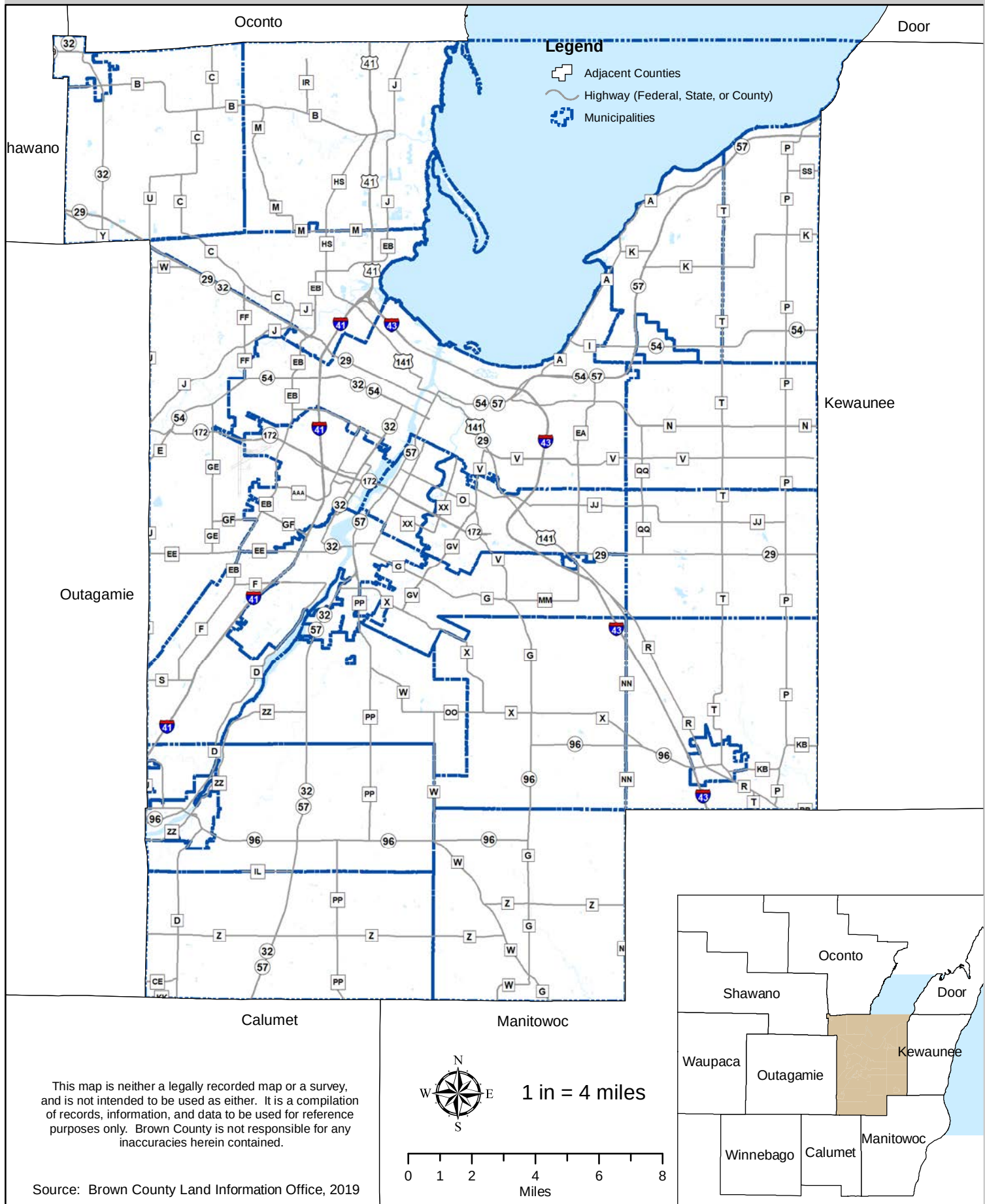


Figure 2-1

# Population Percent Change 2010-2018

## Brown County All Hazard Mitigation Plan

Brown County, WI

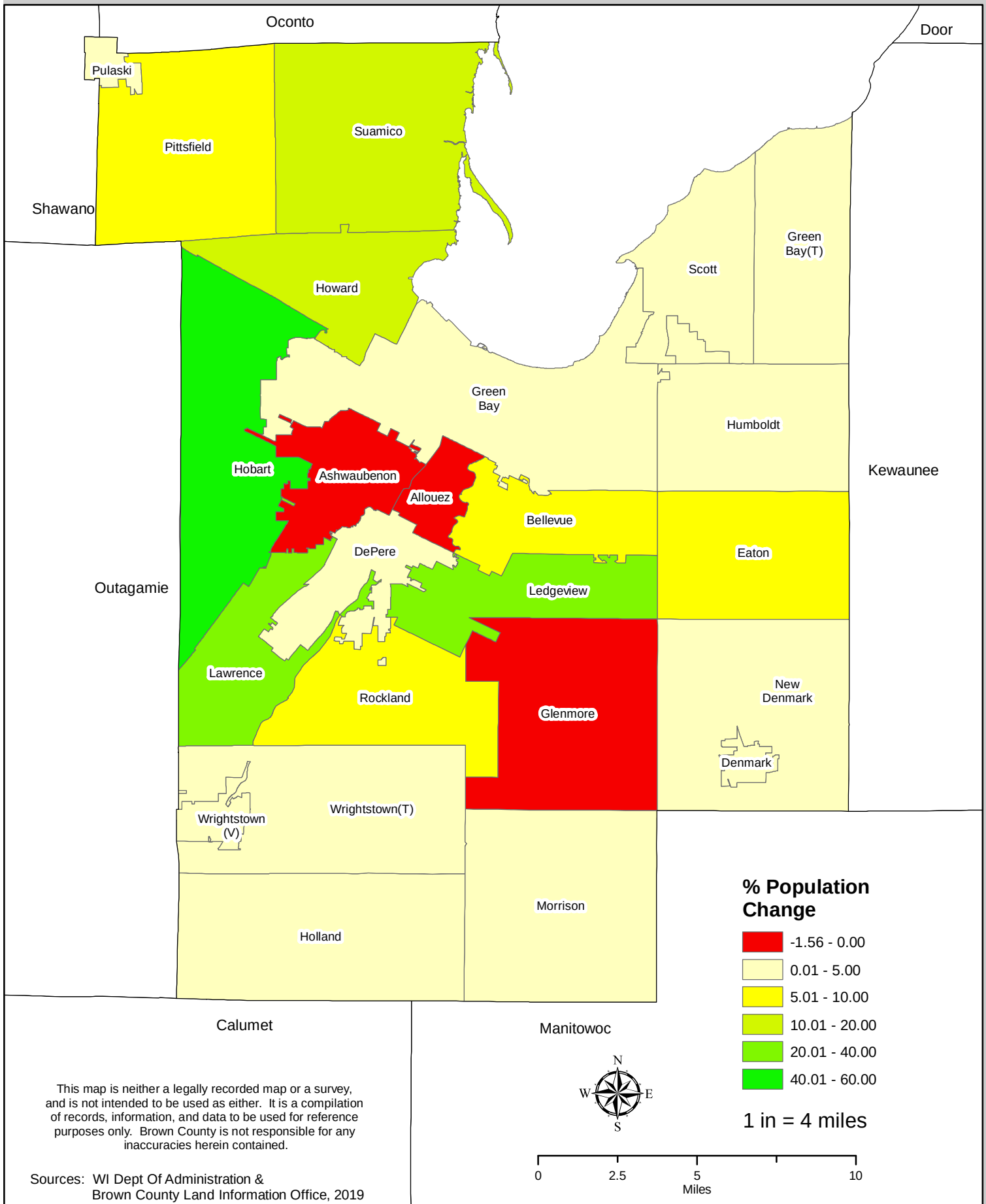
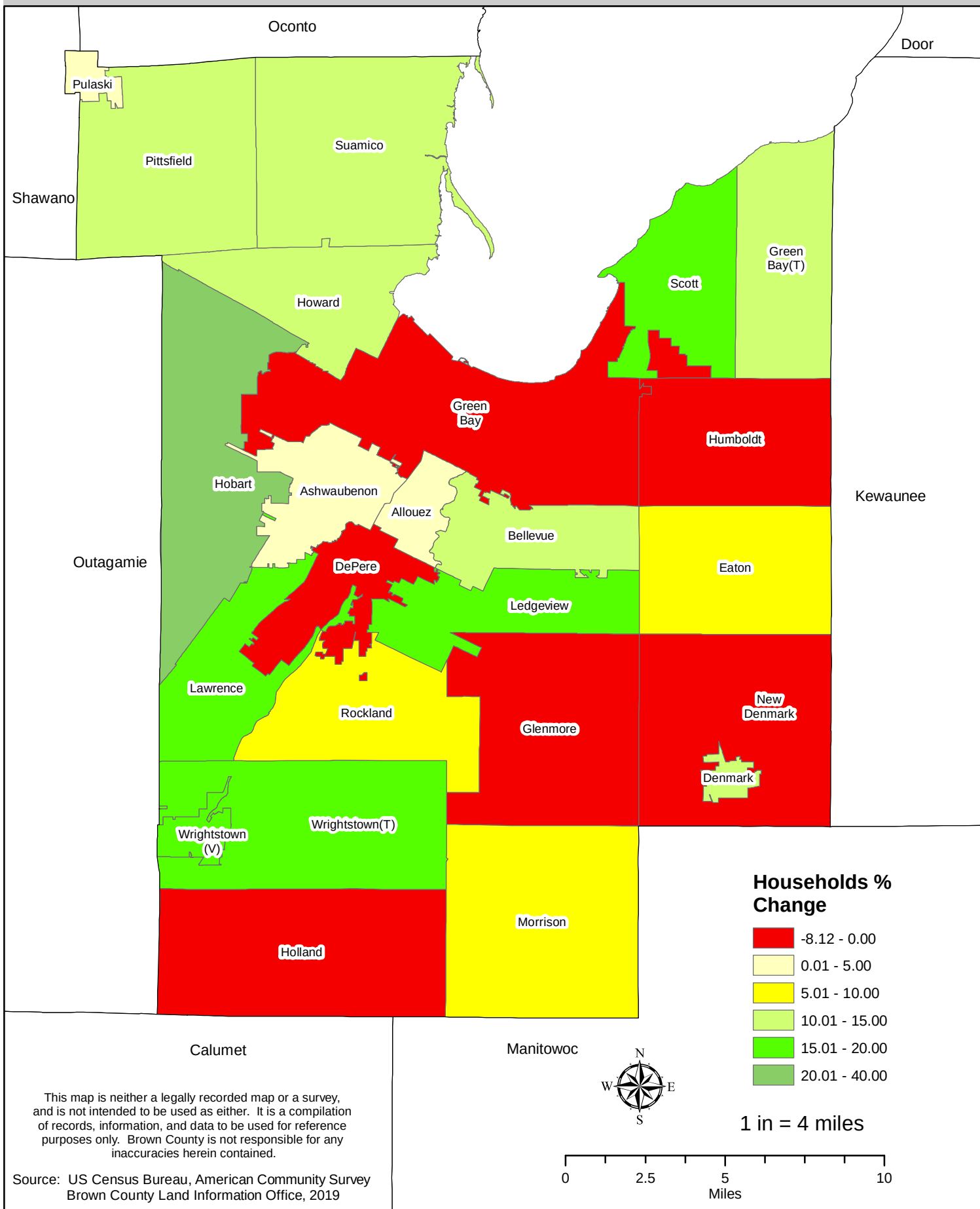


Figure 2-2

# Households Percent Change 2010-2017

## Brown County All Hazard Mitigation Plan

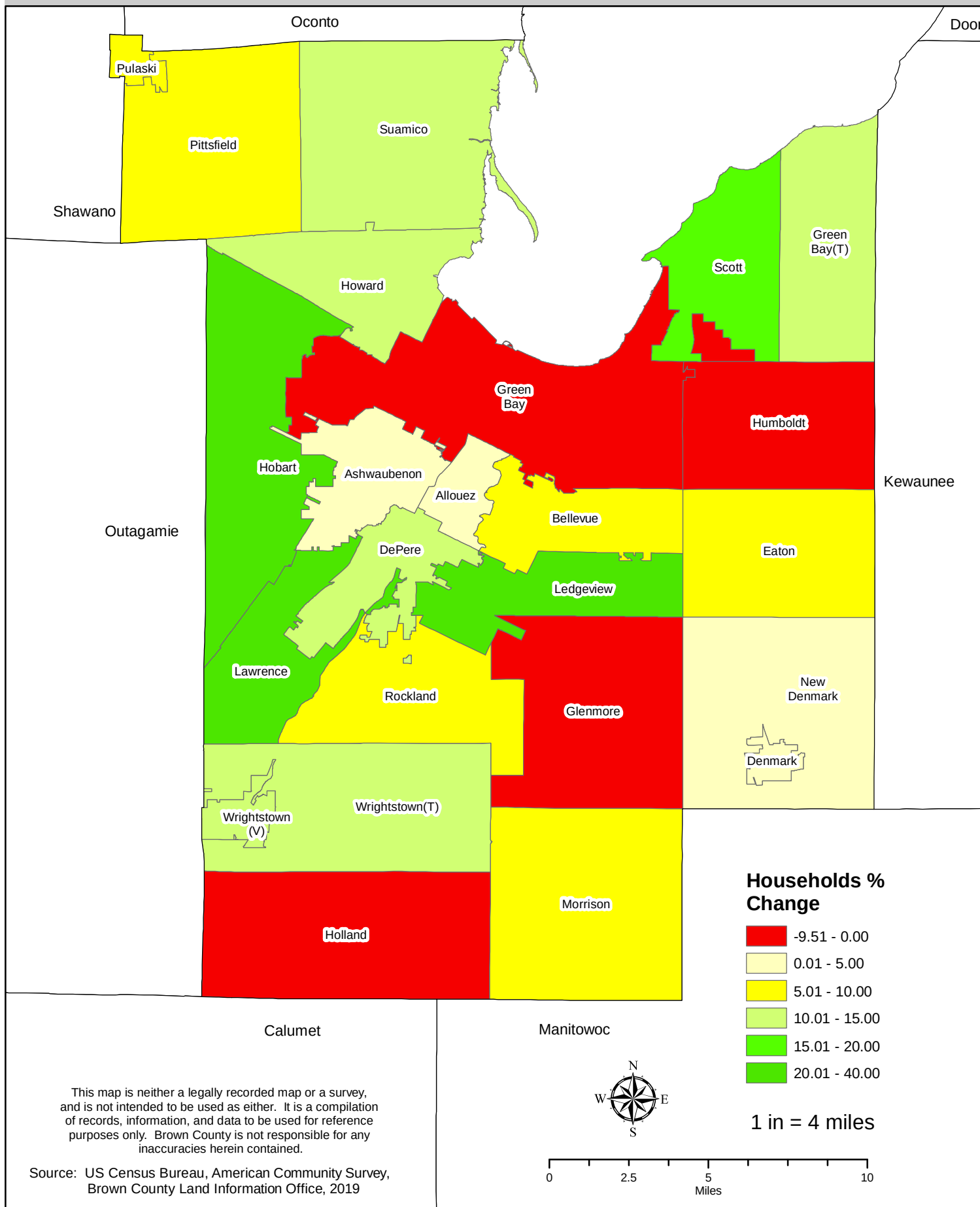
Brown County, WI



# Housing Units Percent Change 2010-2017

## Brown County All Hazard Mitigation Plan

Brown County, WI

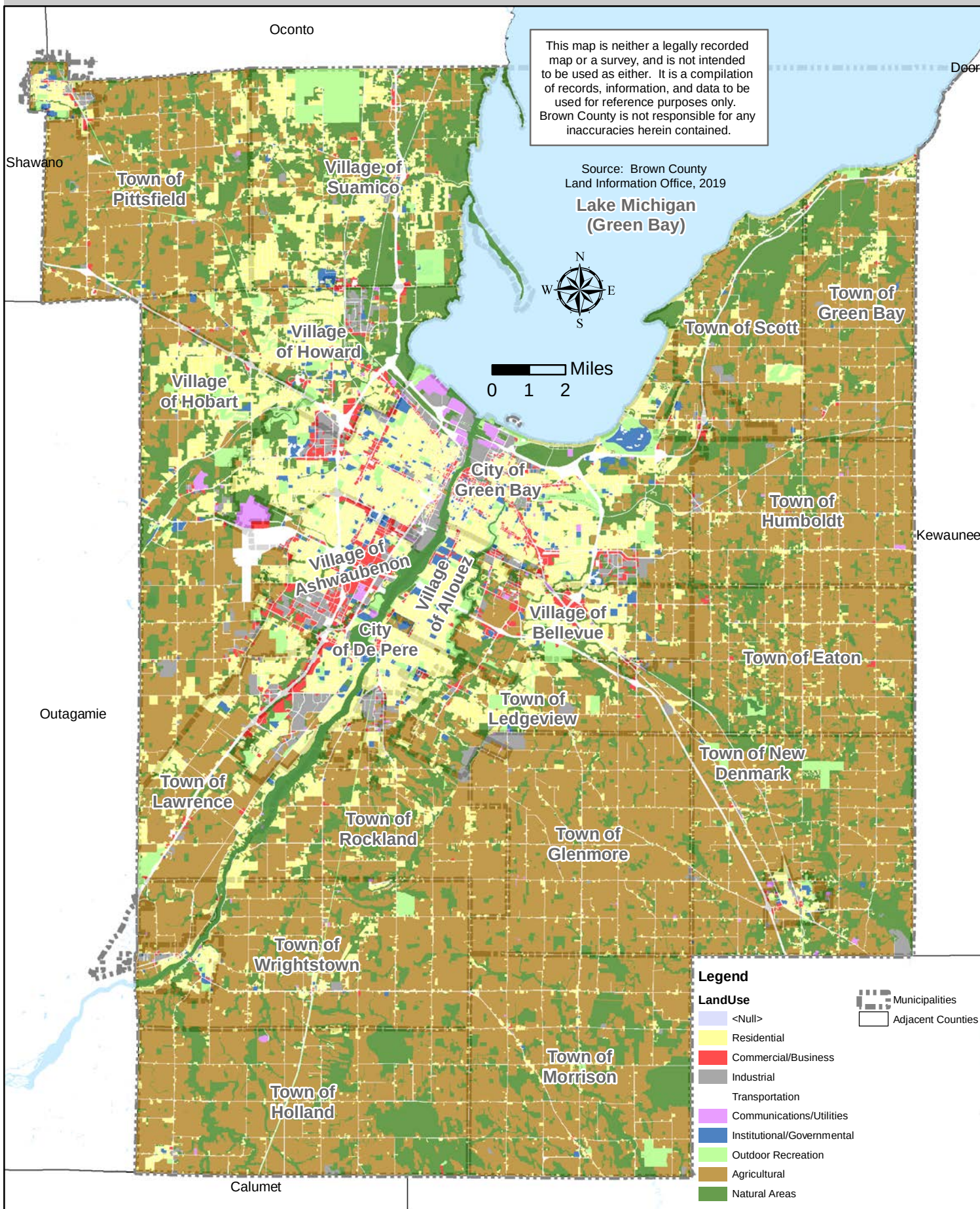




# 2019 Land Use

## Brown County All Hazard Mitigation Plan

Brown County, WI





# Critical Facilities

## Brown County All Hazard Mitigation Plan

Brown County, WI

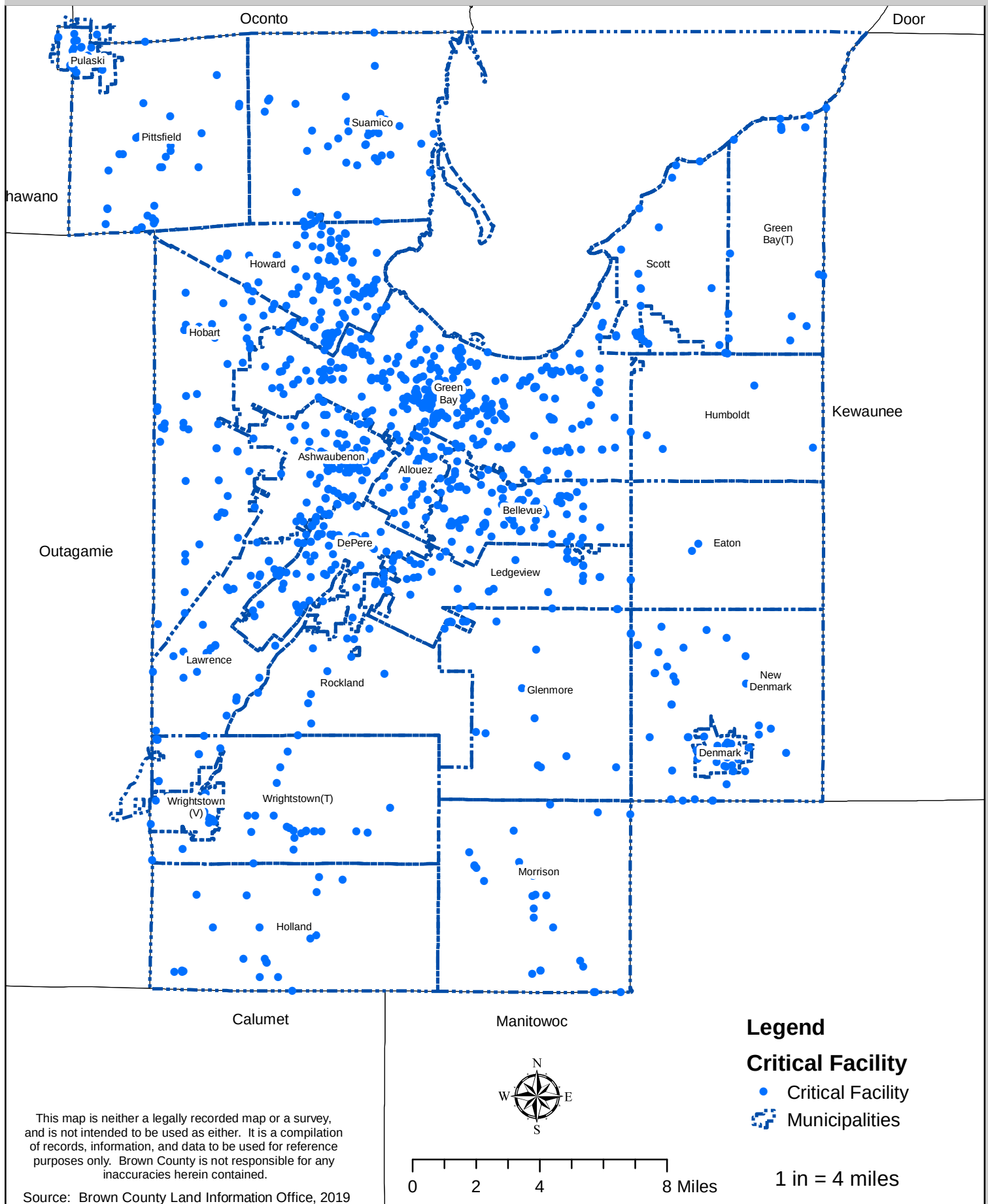


Figure 2-6

# School District Boundaries

## Brown County All Hazard Mitigation Plan

Brown County, WI

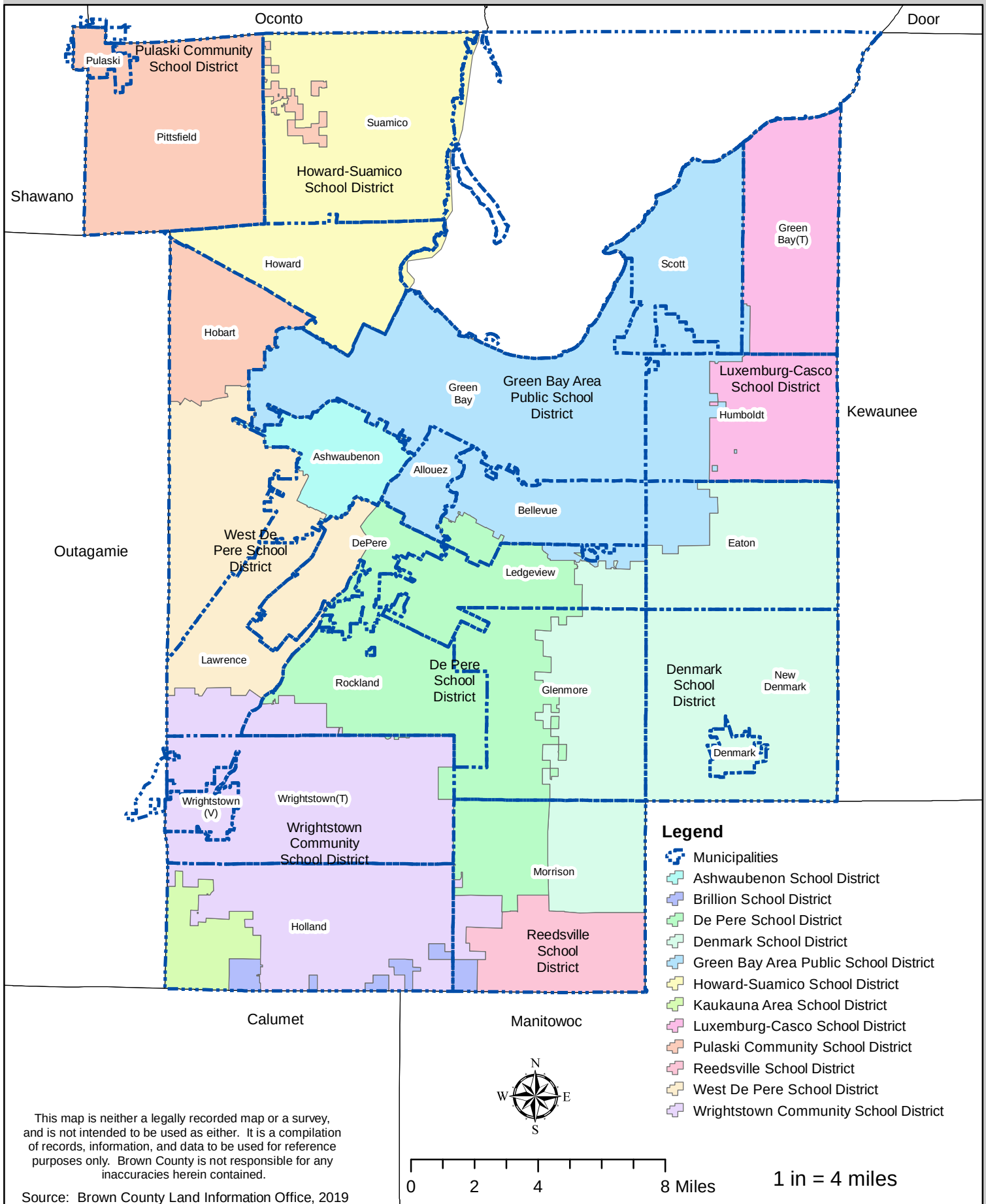


Figure 2-7

# Transportation Network

## Brown County All Hazard Mitigation Plan

Brown County, WI

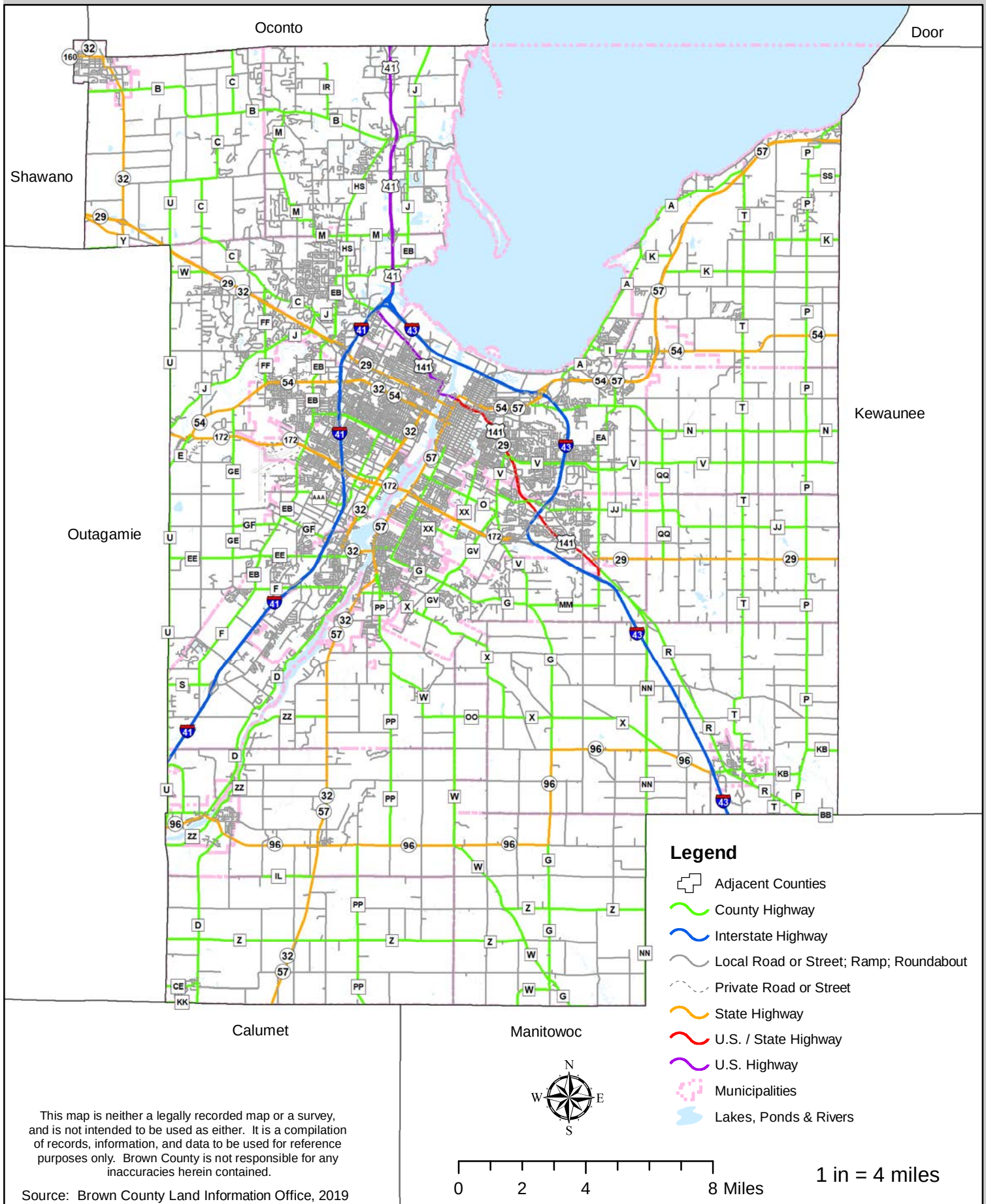


Figure 2-8



# Brown County, Wisconsin 2020 All Hazards Mitigation Plan



Prepared by the Brown County All Hazard Plan Steering Committee  
with Assistance from the Brown County Planning Commission  
DATE: \_\_\_\_\_



# **Brown County, Wisconsin**

## **Steering Committee Members**

Angela Kowalzek-Adrians, NEW Water  
Anna Destree, Brown County Public Health  
Ben Risch, Wisconsin Public Service  
Bob Mayer, American Red Cross  
Bill Bosiacki, Brown County Zoning  
Brian Uhl, Village of Ashwaubenon Public Safety  
David Litton, City of Green Bay  
Dan Teaters, Brown County Planning  
Jeff DuMez, Brown County Land Information  
Jody Lemmens, Brown County Sheriff's Department  
Julia Noordyk, UW Sea Grant  
Justin Hewitt, City of Green Bay  
Kurt Minten, Town of Lawrence Fire Department  
Lauri Maki, Brown County Emergency Management  
Matt Heyroth, Brown County Zoning  
Michael Piacenti, Brown County Highway Department  
Sam Martin, BC Emergency Management  
Sara Lornson, City of De Pere Public Health  
Stephanie School, HSHS St Mary's  
Steve Grenier, City of Green Bay Department of Public Works

# **BROWN COUNTY ALL HAZARDS MITIGATION PLAN**

**ADOPTED:** \_\_\_\_\_



Prepared by:

Brown County Planning Commission  
305 E. Walnut St., Room 320  
Green Bay, WI 54305-3600  
(920) 448-6480

*The preparation of this document was financed with a grant from the State of Wisconsin Department of Military Affairs Division of Emergency Management (Project Number PDMC-PL-05-WI-2017-001) with local matching in-kind funds from Brown County.*

## RESOLUTION OF ADOPTION

Resolution No. \_\_\_\_\_

A RESOLUTION adopting the *Brown County All Hazards Mitigation Plan*.

WHEREAS, Brown County recognizes the threat that natural hazards pose to people and property; and

WHEREAS, undertaking hazard mitigation actions before disasters occur will reduce the potential for harm to people and property and save taxpayer dollars; and

WHEREAS, an adopted all hazards mitigation plan is required as a condition of future grant funding for mitigation projects.

NOW, THEREFORE BE IT RESOLVED, that the County Board of Brown County, Wisconsin, hereby adopts the *Brown County All Hazards Mitigation Plan* as an official plan; and

BE IT FURTHER RESOLVED, that upon approval of the *Brown County All Hazards Mitigation Plan*, the Brown County Emergency Management Department will submit the adopted plan to Wisconsin Emergency Management and Federal Emergency Management Agency officials for final review and approval, as required under the Hazard Mitigation Grant Program.

I HEREBY CERTIFY that the foregoing Resolution was duly passed by the County Board of Brown County, Wisconsin, on the \_\_\_\_\_ day of \_\_\_\_\_, 2020.

Dated \_\_\_\_\_, 2020. \_\_\_\_\_  
County Executive

Dated \_\_\_\_\_, 2020. \_\_\_\_\_  
County Clerk

Approved \_\_\_\_\_, 2020. \_\_\_\_\_  
County Board Chair

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# CHAPTER 1: INTRODUCTION AND PLANNING PROCESS

## **PURPOSE FOR THE PLAN**

An update to the *Brown County All Hazards Mitigation Plan* began during January of 2019. A Steering Committee comprised of local and county officials and emergency management personnel guided the update process over a two year timeframe with professional planning support from the Brown County Planning Commission.

The plan's purpose is to evaluate the county's potential exposure to natural hazards and to identify appropriate mitigation strategies. Consistent with the Code of Federal Regulations (44 CFR Part 201.6), the county identified natural hazards and, although not required, the county also identified man made hazards. Based on these required components, this plan conforms to Federal All Hazards Mitigation Planning requirements.

Completion of the 2019 plan update will continue to allow Brown County Emergency Management personnel to identify areas of risk, assess the magnitude of the risk, and develop strategies to continue reducing risks. Through this process, the county can address issues related to incompatible land uses; identification and protection of critical facilities; and assess costs associated with natural disaster relief and rescue efforts. Completion and approval of the plan will also make Brown County eligible to apply for future disaster relief and mitigation project funds to implement applicable recommended mitigation strategies.

The following sections discuss the Disaster Mitigation Act of 2000 which led to the requirement for All Hazards Mitigation Plans as well as the funding of this planning effort to develop the five parts of this plan.

## **DISASTER MITIGATION ACT OF 2000**

The development of the *Brown County, Wisconsin 2012 All Hazards Mitigation Plan* is in response to the enactment of the Disaster Mitigation Act (DMA) of 2000. The act attempts to stem the losses from disasters, reduce future public and private expenditures, and speed up response and recovery from disasters. The following is a summary of the parts of the Disaster Mitigation Act of 2000 that pertain to local governments and tribal organizations. The Act:

- Establishes a new requirement for local governments and tribal organizations to prepare an All Hazards Mitigation Plan in order to be eligible for funding from FEMA through the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program.
- Establishes a requirement that natural hazards need to be addressed in the risk assessment/vulnerability analysis part of the All Hazards Mitigation Plan. Addressing man-made/technological hazards is encouraged, but not required.
- Authorizes up to seven percent of Hazard Mitigation Grant Program funds available to a state after a federal disaster to be used for development of state, local and tribal organization All Hazards Mitigation Plans.

- Established November 1, 2004, as the date by which local governments and tribal organizations are to prepare and adopt their respective plans in order to be eligible for the FEMA Hazard Mitigation Grant Program. This deadline was November 1, 2003 for the Pre-Disaster Mitigation Program.

The plan is being revised in 2019-2020 and is expected to remain current and eligible for funding for a period of time not exceeding 5 years.

### **PLANNING VISION**

This plan utilizes the same three visionary elements to fulfill the requirements established through DMA 2000:

**Reduce Hazard Risks and Impacts** – This All Hazard Mitigation Plan assessed vulnerability of life and property to a broad range of potential natural hazards, and developed a prioritized range of mitigation strategies to reduce both risks and impacts.

**Build on Existing Efforts** – Many cities, villages, towns, school districts, and businesses, often lead by county personnel, have already engaged in mitigation and/or response *training and planning*. The intent of this plan is to maximize these efforts by inventorying, coordinating, and building on these efforts when possible, and developing new strategies to fill any gaps identified among existing efforts. This plan incorporates information and strategies from existing emergency response plans and other relevant public documents.

**Share Information and Raise Awareness** – Public engagement methods used in the preparation of this plan sought input from a diverse range of stakeholders including the general public and various public, private, and non-profit sector representatives. One of the most commonly heard messages throughout these planning meetings and workshops is the need for clear information and ongoing communication among all stakeholders. Mitigation strategies identified in this plan address the public information and communication component in a universal manner (regardless of hazard type) and within a hazard-specific context, as applicable.

### **PLANNING GOAL**

Historically, Brown County had several federal disaster declarations for flooding, severe storms (including winter storms), and tornadoes. More generally, Wisconsin disasters over the same period incurred millions of dollars in Federal Emergency Management Agency (FEMA) expenditures. Most recently, Brown County has seen two of the wettest years in recorded history (2018 & 2019), near record water levels in the Great Lakes, both of which contributed to numerous flooding events causing millions of dollars in property damage and loss.

The goal of this plan is to meet the requirements established by the Disaster Mitigation Act of 2000, and to eliminate or reduce vulnerability to significant or repetitive damage from one or more hazards determined to have potential in Brown County, Wisconsin.

## **PLANNING PROCESS**

Development of the *Brown County, Wisconsin 2020 All Hazards Mitigation Plan* was based on the planning requirements and guidance provided by the Federal Emergency Management Agency (FEMA) and the Wisconsin Department of Military Affairs, Wisconsin Emergency Management (WEM). *Through* following these requirements and guidance, the plan meets the requirements of the Disaster Mitigation Act of 2000.

Since the WEM guidance for All Hazards Mitigation Plans recommended that planning areas “be consistent with a community’s comprehensive planning boundary,” the planning area for the *Brown County, Wisconsin 2020 All Hazards Mitigation Plan* includes all of the County of Brown, encompassing the cities of Green Bay and De Pere; villages of Allouez, Ashwaubenon, Bellevue, Denmark, Hobart, Howard, Pulaski, Suamico, and Wrightstown; and towns of Eaton, Glenmore, Green Bay, Holland, Humboldt, Lawrence, Ledgeview, Morrison, New Denmark, Pittsfield, Rockland, Scott, and Wrightstown. By including the entirety of Brown County and all municipalities contained within, this plan is compliant with WEM.

## **PLANNING APPROACH**

Brown County initiated development of this updated plan with a pre-planning meeting held in January, 2019. Brown County staff and representatives from each of the communities were invited to a meeting to inform them of the process and to encourage their input and participation during the plan development period.

Development of the plan was structured along a four-phase planning process:

**Phase I: Start-Up, Assess Community Support**

**Phase II: Assess Risks**

**Phase III: Develop a Mitigation Plan**

**Phase IV: Implement the Mitigation Plan**

## **STEERING COMMITTEE**

Brown County established a Hazard Mitigation Plan Steering Committee to oversee the development of the plan. Committee members were selected from all county departments involved in emergency management issues (i.e. Emergency Management, Sheriff, Highway, Health, Planning, Zoning, and Water Utility), county officials, and local community emergency personnel. Because the plan focused on updates, the Steering Committee did not include representation from adjacent counties, however; draft copies of the plan were sent to the adjacent counties prior to FEMA approval, and a final copy was posted to the Brown County website. The Steering Committee was responsible for providing input, guiding the planning process, reviewing and commenting on draft chapters of the plan, and advocating for approval at the county level. Brown County’s Emergency Management Coordinator collected and distributed information along with the Brown County Planning Commission for Steering Committee meetings in addition to handling the administrative portion of the grant.

During the assessment of natural hazard conditions, the Steering Committee reviewed and adjusted the prioritized potential natural hazards facing Brown County. The committee’s risk assessment for natural hazards can be found in Table 3.1 of Chapter 3

of this plan. Based on the results of this exercise and analysis of past natural hazards, the Steering Committee prioritized and selected the natural hazards that were to be the focus of this plan:

The 2020 Brown County All Hazards Mitigation Plan Steering Committee held meetings on the following dates:

1. January 17, 2019
2. March 28, 2019
3. December 21, 2020

The Steering Committee was also invited to participate in three virtual workshop that were part of a secondary project that sought to develop mitigation strategies using green infrastructure, low impact development, and nature-based solutions. The three workshops associated with this project were held on the following dates:

1. September 8, 2020
2. September 11, 2020
3. September 18, 2020

### **INCORPORATED COMMUNITY INVOLVEMENT**

The *Brown County All Hazards Mitigation Plan* covers all the unincorporated towns within the county. The plan enables those communities to be automatically eligible for pre and post disaster funding opportunities. The county's eleven incorporated communities (two cities and nine villages) will need to adopt the All Hazards Mitigation Plan as their own in order to be eligible for these pre and post disaster funding grants.

The county's incorporated communities were invited to participate in the development of the plan throughout the two year process. Through the Brown County Emergency Management Department and Brown County Planning and Land Services Department, each municipality in Brown County was informed of the update and invited to participate at various times throughout the planning process. Since the adoption of the 2012 Brown County All Hazards Mitigation Plan, Brown County Emergency Management personnel has worked closely with the local municipalities and the Brown County Land Information Office to keep important datasets up to date for the E-911 system. Datasets important to emergency personnel such as critical facilities, street centerlines, addresses, and police and fire zones are continually reviewed and updated as necessary. This constant communication between Brown County and the local municipalities has been critical to this update process.

A near final-draft plan summary was sent to each community in December 2020 to keep the municipalities updated with the planning process. A final plan was provided to the Brown County Board of Supervisors through the emergency management and planning committees to keep them informed of the progress being made on the development of the county's All Hazards Mitigation Plan. To ensure each municipality within Brown County had input regarding mitigation strategies applicable to their respective community, a request was sent to each town, village, and city requesting input on possible mitigation projects, with a focus being made on site specific issues that may be unique to each community. The results of that information were gathered and included in table 4.4 of this Plan.

Once a draft of the All Hazard Plan and Mitigation Strategies was completed, the document was shared with each municipality. Each of the incorporated communities were asked to review and comment during the same time WEM was reviewing the document. During their review each community was asked to ensure the plan addresses their specific mitigation needs and to provide feedback to the Steering Committee as necessary. Municipality involvement was utilized in order to allow communities to provide comments, to allow the communities to offer information that would increase the plan eligibility for pre and post disaster funding, and to allow the municipality an opportunity to adopt the plan.

### **RELATIONSHIP TO BROWN COUNTY EMERGENCY PLANS**

Brown County has prepared and adopted an ***Emergency Operations Plan*** for the county as part of its overall preparedness strategy.

The ***Emergency Operations Plan*** addresses response training and all aspects of response from occurrence forward. The purpose of the County Emergency Operations Plan is to:

1. Facilitate the protection of lives, property and the environment in major disasters of any nature.
2. Coordinate response to disasters, assess damages, identify mitigation opportunities and implement recovery efforts.
3. Describe the county's relationship in support of local units of governments during response and recovery.
4. Serve as a coordinating document for supporting Internal Agency Plans (IAP) (i.e., Policy and Procedures.)
5. Reflect information collected, decisions made, and procedures developed in the planning process and during response.
6. Provide a link between the county and municipal plans.

The All Hazards Mitigation Plan is complementary to the EOP and seeks to reduce hazard risks and impacts on a pre-event basis through:

- Structural hazard control or protection measures;
- Retrofitting of facilities;
- Acquisition and relocation of repetitive loss structures;
- Development of mitigation standards, regulations, policies, and programs;
- Review, updating, and enforcement of building codes;
- Public awareness and education programs; and
- Development or improvement of warning systems.

## **PLAN ORGANIZATION**

The 2020 *Brown County All Hazards Mitigation Plan* is divided into five chapters to specifically address each of FEMA's local mitigation plan requirements. The five chapters are as follows:

*Chapter 1 – Introduction* is the executive summary of the *Brown County All Hazards Mitigation Plan*. It provides the overarching vision, purpose, and regulatory context for preparing this plan. The chapter also provides a brief synopsis of the plan's main sections as outlined below.

*Chapter 2 – County Profile* of Brown County is its physical, social, economic, and political characteristics comprised mainly of the following:

|                              |                        |
|------------------------------|------------------------|
| Historical Setting           | Schools                |
| Climate                      | Public Facilities      |
| Geology                      | Transportation         |
| Topography and Soils         | Utilities              |
| Hydrology                    | Population and Housing |
| Land Cover and Land Use      | Demographic Trends     |
| Community Infrastructure     | Economics and Labor    |
| Emergency Response Resources |                        |

*Chapter 3 – Risk Assessment* profiles a range of potential natural hazards that could pose a threat to Brown County. As appropriate, selected events that may originate outside of the county have been included if they could jeopardize safety and stability within the county. This chapter also assesses vulnerabilities to the potential hazards based on a variety of considerations. This resulting assessment was used with other factors to identify priorities for future mitigation efforts.

*Chapter 4 – Mitigation Strategies* are a series of goals, objectives, and action steps to mitigate the impacts of each hazard. Each strategy has a lead department(s) responsible for addressing that strategy and for setting benchmarks to measure progress toward implementation.

*Chapter 5 – Plan Adoption and Maintenance* describes the planning process in terms of its technical, political, and public engagement components. This section also sets the course for plan implementation and updating, measuring progress, and continued engagement of persons with a stake in this plan; e.g., residents, municipal governments, county government, businesses, non-profit organizations, and schools.



## EXECUTIVE SUMMARY

### **BROWN COUNTY PROFILE SUMMARY (CHAPTER 2)**

Located in eastern Wisconsin, Brown County sits at the mouth of the Fox River. Brown County is the fourth most populous county in Wisconsin with an estimated population of over 264,000 people<sup>1</sup>. Of the 615 square miles that comprise the county, most of the population is concentrated in the central portion, while the south and eastern areas are largely rural. Brown County is becoming increasingly urbanized and has been one of the most rapidly growing counties in the State of Wisconsin in the past and current decade. Much of the new population growth is occurring in second and third ring suburbs around Green Bay such as Howard, Suamico, Bellevue, and Ledgeview, Lawrence, and Hobart. The county enjoys a diversified economy and is home to some of the region's largest employers such as Georgia-Pacific, Schneider National, Inc., Humana, and Green Bay Area School District.

As stated in the *1974 Soil Survey of Brown County*, most of the soils in the county formed of glacial till and lake sediment that are high in clay. Overall, the survey identifies ten soil associations in the county, and each is susceptible to erosion problems. Agriculture lands comprise nearly 50 percent of the county's total acreage. The local climate is characterized by cold, snowy winters and warm, humid summers. The growing season is approximately 152 days.

### **RISK ASSESSMENT SUMMARY (CHAPTER 3)**

*Natural hazards profiled by this plan include:*

Severe Winter Storms  
Extreme Temperatures  
Fog  
Coastal Hazards  
Drought  
Landslides  
Agriculture

Severe Summer Storms  
Flooding  
Wild Fires  
Agriculture  
Earthquakes  
Subsidence

Other hazards are discussed in this plan, but the natural hazards listed above are the primary focus.

The following information is provided for each hazard: a general description of the hazard, its event history in the county, vulnerability considerations, possible cascading effects, existing plans and programs to address the hazard, and known gaps and deficiencies in these programs.

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<sup>1</sup> WI Department of Administration, Population Projections by County:  
[https://doa.wi.gov/DIR/Final\\_Ests\\_Co\\_2020.pdf](https://doa.wi.gov/DIR/Final_Ests_Co_2020.pdf)

Chapter 3 includes a three-part assessment of hazard concerns in Brown County:

1) Critical Facilities by Jurisdiction: The plan includes a summary of critical facilities vulnerable to accidents or terrorism as identified by communities within Brown County. Community representatives used CBRNE principles (chemical, biological, radiological, nuclear, and explosives) to assess critical facility vulnerability within their own jurisdictions.

2) All Hazards by Jurisdiction: Community representatives also identified top hazard concerns for their individual communities from a broader range of possible incidents, including natural and man-made hazards. Nearly every participating community identified severe weather incidents as their top hazard concern.

3) Countywide Vulnerability and Priorities: Vulnerability was then assessed on a countywide basis using the following parameters to determine an overall priority rating: past events, frequency of occurrence, warning time, geographic extent, and likely adverse impact. This assessment yielded the following hazards listed by priority:

- |                                         |                                 |
|-----------------------------------------|---------------------------------|
| 1) Blizzards                            | 11) Agriculture                 |
| 2) Heavy Snow Storms                    | 12) Coastal Hazards             |
| 2) Stormwater Flooding                  | 13) Drought                     |
| 4) Ice Storms                           | 13) Forest Fires/wildland Fires |
| 5) Tornadoes/High Winds                 | 13) Fog                         |
| 5) Flooding (Flash, Riverine, and Lake) | 17) Subsidence                  |
| 7) Extreme Cold                         | 18) Hail Storms                 |
| 8) Lightning Storms/Thunderstorms       | 18) Landslide                   |
| 9) Extreme Heat                         | 20) Earthquake                  |
| 10) Dam Failure Flooding                |                                 |

#### **MITIGATION STRATEGIES SUMMARY (CHAPTER 4)**

Mitigation goals, objectives, and strategies were developed to:

- Reduce risks and potential impacts of the specific hazard events noted above.
- Address gaps in current preparedness plans and programs.
- Deal with concerns of collaborating entities (public, private, and non-profit sector representatives).
- Build on existing efforts, when possible.
- Enhance communication, information sharing, and education, when possible.

An overarching set of goals were developed to be applicable to any or all hazard situations, namely 1) communication, information sharing, and education; and 2) public health protection. Individual strategies within each of these goals were ranked based on priority, an identification of any new vs. ongoing efforts, target implementation dates, lead and participating agencies, potential funding sources, and possible benchmarks for future evaluation.

## **PLAN ADOPTION AND MAINTENANCE SUMMARY (CHAPTER 5)**

### **Plan Adoption Process**

A Steering Committee comprised of local and county officials and emergency management personnel guided the plan development process over a 2-year timeframe with professional planning support from the Brown County Planning Commission. Wisconsin Emergency Management (WEM) and FEMA reviewed the county's draft All Hazards Mitigation Plan. Their comments are on file and were incorporated into the final draft of the plan. Development of the updated plan began in January 2019 and was approved by a resolution by the Brown County Board of Supervisors on January 20, 2020.

### **Public Review Process**

The public was able to comment during the drafting of the plan and during the final draft review process. A request was sent to each community to solicit their input on potential hazard problems within their municipality and possible mitigation strategies to address those conditions. While many communities responded, many communities did not.

While WEM was reviewing the draft *Brown County All Hazards Mitigation Plan*, a draft was posted to the Brown County website and the link was provided to each of the communities. Steering Committee members and communities were directed to the site to review the document with a complete set of maps, and hard copies were located at three key locations throughout the county for review by the public.

### **Plan Implementation**

Brown County's Office of Emergency Management will oversee the implementation, evaluation, and maintenance of the *Brown County All Hazards Mitigation Plan*. This plan incorporates many of the county's emergency operations plans already in place; therefore, the mitigation strategies and procedures overlap and are to act in conjunction with one another. The implementation of this All Hazards Plan will also satisfy the conditions and actions in other plans to include the *Brown County Comprehensive Plan*, capital improvements budget, and applicable ordinances. As local communities update their comprehensive plans and emergency operations procedures/plans, each municipality should reference the mitigation strategies outlined in this all hazard mitigation plan. In turn, updated mitigation actions created at the local level should be reviewed for inclusion in any future updates of the *Brown County All Hazards Mitigation Plan*.

### **Plan Evaluation**

Each mitigation strategy includes a matrix for monitoring implementation progress. More detailed steps will be developed, as needed, for more complex initiatives. At minimum, the Brown County Office of Emergency Management's designated committee will meet with municipalities and implementation partners to evaluate progress for each mitigation strategy, compile summary progress reports, and promote findings through the media, County Board of Supervisors, county committees, and local communities on an annual basis. This collaborative implementation approach will also provide a forum for identifying additional mitigation gaps.

### **Plan Maintenance**

Brown County Emergency Management will review the plan annually with an update completed every five years. Brown County Emergency Management staff will continue to coordinate with local municipalities and other agencies to implement mitigation projects. Newly identified mitigation needs will be addressed through the development of additional goals, objectives, or strategies, as applicable. If there are changes needed in the priorities for implementation, the rationale will be documented. Revisions and updates will be distributed to the oversight committee appointed by the Brown County Emergency Management Office, municipalities, and implementation partners such as local hospitals and the Red Cross for review and approval.

Plan revisions will be made available through the Brown County's Office of Emergency Management website for general public review and comment during the plan updating process. Public comment on revisions and updates also will be solicited through a comprehensive public outreach strategy (news releases, open houses, partnerships). Updates and revisions to the plan will also be a way to further promote the need for continued hazard preparedness at all levels. The updated plan will be submitted for approval by the Brown County Board of Supervisors, WEM, and FEMA every five years.

## CHAPTER 5      PLAN ADOPTION AND MAINTENANCE

### **PLAN ADOPTION PROCESS**

The *2020 Brown County All Hazards Mitigation Plan* was prepared to ensure Brown County and its communities stay in compliance with the Disaster Mitigation Act of 2000 and remain eligible for various funding sources. The plan is divided into five chapters that address all of FEMA's local mitigation plan requirements. A Steering Committee comprised of local and county officials and emergency management personnel guided the plan development process over a 24-month timeframe with professional planning support from the Brown County Planning Commission.

Wisconsin Emergency Management (WEM) and FEMA each had a role in reviewing the county's draft All Hazards Mitigation Plan. The *2020 Brown County All Hazards Mitigation Plan* was sent to WEM on \_\_\_\_\_ for their pre-review. WEM forwarded the plan on to the FEMA Regional Office for review and informal approval. Final comments were received from WEM and FEMA on \_\_\_\_\_ and included in the plan as appropriate. When the plan met FEMA's guidelines, the *2020 Brown County All Hazards Mitigation Plan* was adopted by resolution by the Brown County Board of Supervisors on \_\_\_\_\_. Incorporated communities were encouraged to adopt the plan as well but were not required to do so.

### **PUBLIC REVIEW PROCESS**

The public was able to comment on the draft via a virtual public meeting held in December of 2020. The draft document was also shared with each community for review. Final Plans were also provided to the county's Executive Committee, Public Education and Information Committee of Brown County's Office of Emergency Management and the Planning, Development, and Transportation Committee of the Brown County Planning Commission to keep them abreast of the planning process and to encourage their input and comments. A series of e-mail requests were sent to each community to solicit their input on potential hazard problems within their municipality and possible mitigation strategies to address those conditions. A letter was sent to each of the county's eleven incorporated municipalities asking them to review the plan to ensure any issues specific to their community were included in the final plan. Any input received was incorporated into *Chapter 4: Mitigation Strategies* and as appropriate elsewhere in the document. The review did not include representation from adjacent counties.

While WEM and FEMA were reviewing the draft *Brown County All Hazards Mitigation Plan*, copies of the draft plan were provided to each member of the Steering Committee, a CD copy was provided to the communities, the plan could be viewed on the Brown County website and a hard copy located at three key locations throughout the county for review by the public.

Once the plan was reviewed by WEM and FEMA, their comments were integrated as appropriate into the plan as well as those received from the Steering Committee members and public. The public was allowed to provide comments and ask questions regarding the development of the all hazard mitigation plan throughout the entire development process. All comments received during the plan review process and open houses were considered for inclusion in this plan.

### **PLAN IMPLEMENTATION**

Brown County's Office of Emergency Management will oversee the implementation, evaluation, and maintenance of the *2020 Brown County All Hazards Mitigation Plan*. This plan incorporates many of the emergency operations plans already in place; therefore, the mitigation strategies and procedures overlap and are to act in conjunction with one another. The implementation of this all

hazard plan will also satisfy the conditions and actions in the other plans to include the county's comprehensive plan, capital improvements budget, and applicable ordinances.

Table 4.1 in Chapter 4: *Mitigation Strategies* lists the strategies by natural hazard, along with priority, timeline for implementation, lead county department(s), and cost if known. Through the guidance and direction of the Office of Emergency Management, a committee will be created or an existing committee will be directed to oversee the implementation and maintenance of the hazard mitigation plan. This committee will communicate with the identified departments on their role in the implementation of the plan. A work plan will be created based on the mitigation strategies with those of highest priority receiving preference. Local communities will be asked to participate in the implementation and monitoring of the plan due to the fact that the broad scope of many of the strategies requires local participation. Assignment of roles and responsibilities will be handled under the direction of the committee set to implement the plan. Work will commence according to priority status of each mitigation strategy and available funding.

### **PLAN INTEGRATION MECHANISMS**

Since the last plan there have been many methods that have been used to integrate components of the *2020 Brown County All Hazards Mitigation Plan*. The following summarizes some of the methods in place since the last plan, or that have been developed since the last plan:

**Comprehensive Planning** – Brown County municipalities facilitated the development, or update of 15 additional comprehensive plans since the last All Hazard Mitigation Plan was written. Each comprehensive plan included a section that identified environmentally sensitive areas, natural features, flood plains, and floodways to help create a better understanding of areas subject to flooding.

**Capital Improvement Planning** – Brown County municipalities facilitated the development capital improvement plans to provide improved emergency management services. Some of the improvements related to fire, tornado warning, storm water control, etc.

**Environmentally Sensitive Area Education** – Brown County residents are offered education and information on a daily basis regarding environmentally sensitive areas, including floodways, and floodplains. In 2020, a new informational flyer and booklet, explaining the hazards of developing near certain hazard areas was published to further enhance public awareness.

**Storm Water Management Planning** – Brown County municipalities facilitated the development of 4 additional storm water management plan ordinances since the last All Hazard Mitigation Plan was written, for a total of 11 municipalities. Storm water management plan reviews for all other municipalities are reviewed by Brown County at the time land is subdivided by way of a plat or certified survey map. The Brown County review was in place prior to the last All Hazard Mitigation Plan being written.

### **PLAN EVALUATION**

Each mitigation strategy includes a matrix for monitoring implementation progress. In addition, more detailed steps will be developed, as needed, for more complex initiatives. On at least an annual basis, Brown County's Office of Emergency Management designated committee will meet with municipalities and implementation partners to evaluate progress for each mitigation strategy, compile summary progress report, and promote findings through the media, County Board of Supervisors, county committees, and local communities. This collaborative implementation approach will also provide a forum for identifying additional mitigation needs.

## **PLAN MAINTENANCE**

Federal regulations require that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act (44 CFR Section 201.6.d(3) and Section 201.7(d)(3)). This plan's format allows Brown County and Brown County municipalities to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a plan that will remain current and relevant. BC Emergency Management intends to update the plan on a five-year cycle from the date of plan approval. This cycle may be accelerated to less than 5 years based on the following triggers:

- A presidential disaster declaration that impacts the planning area
- A hazard event that causes loss of life
- An update of a participating jurisdiction's comprehensive plan

It will not be the intent of the update process to develop a completely new hazard mitigation plan. Based on needs identified by the planning team, the update will, at a minimum, include the following elements:

- The update process will be convened through a new steering committee.
- The hazard risk assessment will be reviewed and, if necessary, updated using best available information and technologies.
- Action plans will be reviewed and revised to account for any actions completed, dropped, or changed and to account for changes in the risk assessment or planning partnership policies identified under other planning mechanisms (such as the comprehensive plan).
- The draft update will be sent to appropriate agencies and organizations for comment.
- The public will be given an opportunity to comment on the update prior to adoption.
- Partners' governing bodies will adopt their respective portions of the updated plan.

Because plan updates can require a year or more to complete, Brown County will initiate efforts to update the plan before it expires. Brown County will consider applying for funding to update the plan no later than 2 calendar years before plan expiration.

Plan revisions will be made available through the Brown County Emergency Management website for general public review and comment during the plan updating process. Public comment on revisions and updates also will be solicited through a comprehensive public outreach strategy as deemed appropriate by Brown County Emergency Management to include any of the following; new releases, open houses, posters, brochures, partnerships. Public outreach efforts for the plan updates will further use these opportunities to provide ongoing public education on hazard preparedness. The reviewed and updated plan will be submitted to the Brown County Board of Supervisors, WEM, and FEMA for approval as necessary or at a minimum, every five years.

## **IMPLEMENTATION**

The implementation of the *Brown County All Hazards Mitigation Plan* will be the responsibility of several Brown County departments with assistance provided by officials and emergency personnel from local communities, schools, and hospitals. The County Executive, with consultation and input from the Brown County Board of Supervisors, will oversee implementation of the plan through implementation of the individual strategies outlined in this chapter.

### **Brown County Departments include:**

|                         |                            |                   |
|-------------------------|----------------------------|-------------------|
| Emergency Management    | Department of Public Works | Planning          |
| Facility Management     | Zoning                     | Parks             |
| Land Information Office | Public Safety              | Solid Waste       |
| Human Services          | Aging and Disability       | Land Conservation |
| UW-Extension            | Sheriff                    | Health            |



# APPENDIX

## Appendix A – Steering Committee Agendas

The Brown County All Hazard Plan Steering Committee held meetings on the following dates:

1. January 17, 2019
2. March 28, 2019
3. December 21, 2020

The Steering Committee was also invited to participate in three virtual workshop that were part of a secondary project that sought to develop mitigation strategies using green infrastructure, low impact development, and nature-based solutions. The three workshops associated with this project were held on the following dates:

1. September 8, 2020
2. September 11, 2020
3. September 18, 2020

Due to the COVID-19 pandemic, most of the information and participation from the Steering Committee was done through email correspondence or virtually through an online platform.

**AGENDA**  
**BROWN COUNTY ALL-HAZARDS MITIGATION PLAN UPDATE**  
**STEERING COMMITTEE**  
**Thursday, January 17, 2019**  
**Brown County Emergency Management Office**  
**(Brown County Jail)**  
**3030 Curry Lane, 2<sup>nd</sup> Floor**  
**Green Bay, WI**  
**1:30 p.m.**

**ROLL CALL:**

|                    |       |                  |       |
|--------------------|-------|------------------|-------|
| Rich Annen         | _____ | Chuck Lamine     | _____ |
| Bill Bosiacki      | _____ | Jody Lemmens     | _____ |
| Tom Collins        | _____ | David Litton     | _____ |
| Anna Destree       | _____ | Lauri Maki       | _____ |
| Jeff DuMez         | _____ | Bob Mayer        | _____ |
| Chief Eric Dunning | _____ | Kurt Minten      | _____ |
| Steve Grenier      | _____ | Michael Moore    | _____ |
| Matt Heyroth       | _____ | Jared Preston    | _____ |
| Justin Hewitt      | _____ | Michael Piacenti | _____ |
| Lynn Kroll         | _____ | Stephanie School | _____ |
| Tom Kujawa         | _____ | Dan Teaters      | _____ |

1. Introductions.
2. Overview of the Plan and how the Plan is used.
3. Discuss Project Timeline and Purpose for Steering Committee Performing Update.
4. Discuss Information and Maps in Chapters 1 and 2 of the Plan.
5. Establish Future Meeting Dates.
6. Other matters.
7. Adjourn.

ANY PERSON WISHING TO ATTEND WHO, BECAUSE OF A DISABILITY, REQUIRES SPECIAL ACCOMMODATION SHOULD CONTACT THE BROWN COUNTY HUMAN RESOURCES OFFICE AT 448-4065 BY THE DAY BEFORE THE MEETING SO ARRANGEMENTS CAN BE MADE.

**AGENDA**  
**BROWN COUNTY ALL-HAZARDS MITIGATION PLAN UPDATE**  
**STEERING COMMITTEE**  
**Thursday March 28, 2019**  
**Brown County Emergency Management Office**  
**(Brown County Jail)**  
**3030 Curry Lane, 2<sup>nd</sup> Floor**  
**Green Bay, WI**  
**1:30 p.m.**

**ROLL CALL:**

|                    |       |                  |       |
|--------------------|-------|------------------|-------|
| Rich Annen         | _____ | Chuck Lamine     | _____ |
| Bill Bosiacki      | _____ | Jody Lemmens     | _____ |
| Tom Collins        | _____ | David Litton     | _____ |
| Anna Destree       | _____ | Lauri Maki       | _____ |
| Jeff DuMez         | _____ | Bob Mayer        | _____ |
| Chief Eric Dunning | _____ | Kurt Minten      | _____ |
| Steve Grenier      | _____ | Michael Moore    | _____ |
| Matt Heyroth       | _____ | Jared Preston    | _____ |
| Justin Hewitt      | _____ | Michael Piacenti | _____ |
| Lynn Kroll         | _____ | Stephanie School | _____ |
| Tom Kujawa         | _____ | Dan Teaters      | _____ |

1. Introductions.
2. Discuss the Committees review of Chapters 1 and 2 of the Plan.
3. Affirm list of natural hazards.
4. Generate list of man-made hazards and vulnerabilities.
5. Determine how hazards should be evaluated.
6. Confirm next meeting date: April \_\_\_\_, 2019.
7. Other matters.
8. Adjourn.

ANY PERSON WISHING TO ATTEND WHO, BECAUSE OF A DISABILITY, REQUIRES SPECIAL ACCOMMODATION SHOULD CONTACT THE BROWN COUNTY HUMAN RESOURCES OFFICE AT 448-4065 BY THE DAY BEFORE THE MEETING SO ARRANGEMENTS CAN BE MADE.

**AGENDA**  
**BROWN COUNTY ALL-HAZARDS MITIGATION PLAN UPDATE**  
**STEERING COMMITTEE**  
**December 21, 2020**  
**Virtual Meeting via Zoom**  
**2:00 p.m.**

**ROLL CALL:**

Rich Annen  
Bill Bosiacki  
Tom Collins  
Anna Destree  
Jeff DuMez  
Steve Grenier  
Matt Heyroth  
Justin Hewitt  
Angela Kowalzek-Adrians  
Jody Lemmens  
David Litton

Sara Lornson  
Lauri Maki  
Bob Mayer  
Kurt Minten  
Michael Moore  
Julia Noordyk  
Michael Piacenti  
Ben Risch  
Stephanie School  
Dan Teaters  
Brian Uhl

Introductions.

Overview of GI LID project final report

Review and discuss Draft BC AHMP

Approvals  
WI Emergency Management  
BC Approval

Other matters.

Adjourn.

ANY PERSON WISHING TO ATTEND WHO, BECAUSE OF A DISABILITY, REQUIRES SPECIAL ACCOMMODATION SHOULD CONTACT THE BROWN COUNTY HUMAN RESOURCES OFFICE AT 448-4065 BY THE DAY BEFORE THE MEETING SO ARRANGEMENTS CAN BE MADE.



*[All credit for photos used in this document go to Brown County, WI]*

# Recommendations for Integrating Green Infrastructure and All Hazard Mitigation Planning in Brown County, WI

December 2020

## INTRODUCTION

The Disaster Mitigation Act (DMA) of 2000 requires state, local, and tribal governments to have a Federal Emergency Management Agency (FEMA)-approved hazard mitigation plan (HMP) to establish eligibility for FEMA's Hazard Mitigation Assistance (HMA) funding programs. The purpose of an HMP is to identify a set of strategies to mitigate the natural hazards that impact the community. Each plan must identify hazard vulnerabilities and impacts, and then outline actions to mitigate the vulnerabilities and impacts identified. HMPs must be updated every 5 years and can be amended throughout the 5-year plan lifecycle. Hazard mitigation actions should be integrated into local jurisdictional mechanisms and can include plans/policies, capital projects, development requirements, and programs.

The frequency and severity of many risks, especially for flooding, is increasing with urbanization and changes in climate. As such, many local jurisdictions are adopting a proactive and integrated approach to anticipating and mitigating these risks. Failing to anticipate and mitigate potential risks early can increase the cost and liability to address the hazard risk later, especially after a hazard event has occurred. In addition, hazard preparedness is beginning to factor into local economic stability in terms of bond rating and desirability for businesses and residents to locate in the region. A proactive, integrated approach to hazard mitigation planning evaluates strategies that reduce risk while investing in co-benefits that increase environmental sustainability, economic value and local quality of life.

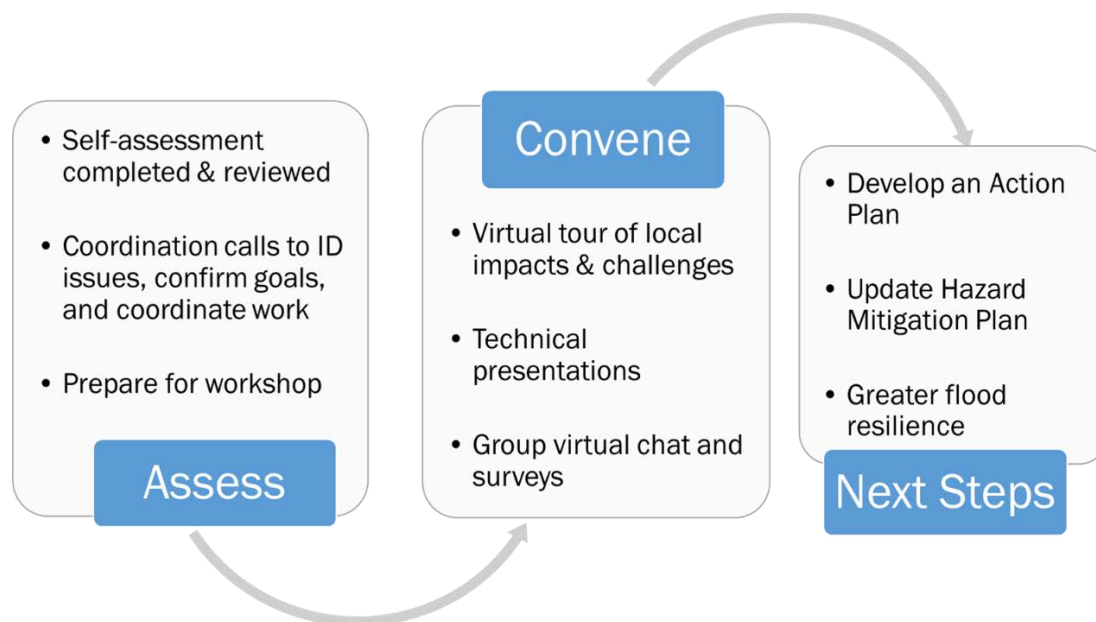
FEMA recently updated HMP Guidance to include provisions that allow for and incentivize integrated and green infrastructure/low impact development (GI/LID) approaches to hazard mitigation, including:

- More focus on integrated planning including natural resources.
- Future conditions considerations including impervious area expansion.
- Incentives to exceed the minimum plan content requirements - "Enhanced Plans" are eligible for more post-disaster funding.
- FEMA focus on resilience creates openness for local initiatives integrated into planning.
- In addition to FEMA, other state and federal agencies are more often prioritizing grant and loan funding for projects with co-benefits, such as GI/LID, that provide multiple community benefits.





This pilot project, which was sponsored by the U.S. Environmental Protection Agency (EPA) Office of Water and EPA Region 5, brought together representatives from EPA, Wisconsin Emergency Management, and FEMA to work with Brown County, Wisconsin and its local partners to examine options for integrating GI/LID into the county's All Hazard Mitigation Plan (AHMP). In providing this assistance to Brown County, EPA and its project consulting team used the following three stage process:



#### THREE STAGES OF TECHNICAL ASSISTANCE FOR BROWN COUNTY, WI

This report documents the key outcomes of technical assistance provided to Brown County to achieve the following goals:

- Identify the local flood and stormwater issues that could be addressed via hazard mitigation planning.
- Using local input, gauge the capacity/capability to address the flood and stormwater issues identified.
- Identify the gaps in capacity/capability.
- Enhance understanding of what makes a good mitigation project.
- Identify feasible actions that leverage the capacity/capability for integration into the Brown County AHMP.

EPA anticipates that this effort will provide an example that can be followed by other communities to integrate GI/LID into their local HMPs.

## COMMUNITY CONTEXT

Brown County is located in east-central Wisconsin at the southern end of the bay of Green Bay on western Lake Michigan. The County has over 250,000 residents, with more than 100,000 of those residents living in the county seat of Green Bay, making it the fourth most populous county in Wisconsin. Urban development in Brown County is centered around Green Bay while the southern and eastern portions of the county are predominantly rural/agricultural. There are 13 townships, nine villages, and two cities in the county.



Brown County's location at the head of Green Bay and the mouth of Fox River has resulted in a long history as an economic and transportation crossroads for western Lake Michigan. Economic development in Brown County consists of a diverse group of industries led principally by paper and paper product manufacturers along the Fox River. Another important industry is cheese making — Green Bay is the largest cheese processing, concentrating, and shipping center in the U.S. Among the numerous other industries in Brown County are manufacturing, finance, transportation, and communications.

Geologically the county has been greatly influenced by glacial forces and the topography is generally categorized as gently rolling moraines. The western two-thirds of the county slopes northeastward where it drains into the Fox River before discharging into Green Bay. This drainage contains most of the Urban development in Brown County which is centered in and around the City of Green Bay and its adjacent communities with smaller areas of urban development in communities outside of this area. Drainage in rural areas is provided by natural stream channels often enhanced with agricultural drainage tile systems. In urban areas, stormwater sewer systems provide drainage of stormwater runoff into Green Bay. These systems exhibit a wide range of age, condition, and capacity. Throughout the county, older roadways are drained by way of a roadside ditch system while new construction contains modern stormwater infrastructure such as subsurface drainage systems and stormwater capture and treatment facilities.





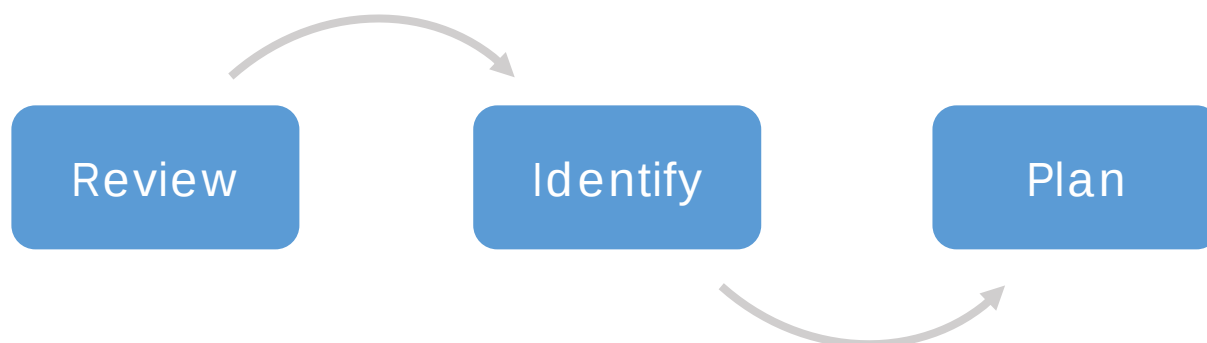
As part of updating the Brown County AHMP planners from the county and partner jurisdictions are assessing strategies for mitigating a wide diversity of identified hazards. Given the climate, development patterns, and shoreline/riverside setting of the county flooding impacts are a major hazard throughout the county and occur in response to a variety of causes including seiche, ice dams, snowmelt, riverine, and stormwater runoff. This flood risk was a high ranked hazard of concern for the planning area and is an emphasis of the Brown County AHMP Update.

## COMMUNITY CONVENING

Brown County and AHMP partner representatives; state agency representatives; non-governmental organization representatives; FEMA staff; and EPA staff and consultants convened for a series of virtual workshops on September 8, 11, and 18, 2020. Workshop 1 provided a review of the flooding issues within Brown County which may be addressed by the Hazard Mitigation process. Workshop 2 focused on identifying green infrastructure solutions applicable to Brown County flooding issues and identifying possible alternatives to address them. Workshop 3 focused on building a set of action plan items that would lead to the integration of green infrastructure into Brown County's AHMP.



The ESRI Storymaps platform was used as the primary workshop delivery mechanism allowing facilitators to share information and graphics throughout each workshop while simultaneously providing workshop participants an opportunity to share information relevant to their respective community. Storymaps is a web-based application of ArcGIS that enables the sharing and building of maps and other data collaboratively. The Storymaps platform is particularly applicable to the virtual workshop setting. The three workshops followed a review-identify-plan process.



## Workshop 1

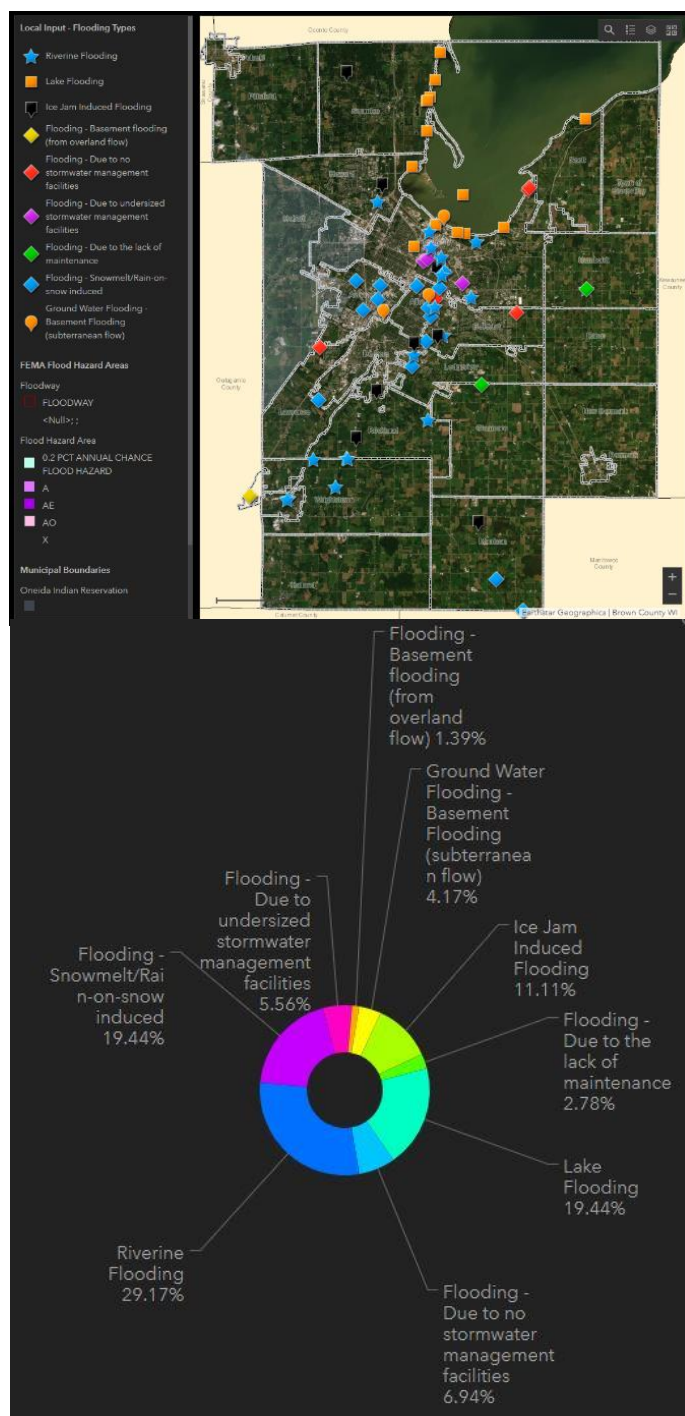
Workshop 1 was held on September 8, 2020, as a 2-hr virtual meeting. There were approximately 50 participants representing numerous communities throughout Brown County (see Appendix A for list of workshop attendees).

EPA Region 5 staff introduced the purpose of the workshops as a collaborative exploration of GI and its application within Brown County's AHMP update process.

The Brown County lead planner for the AHMP led off with a presentation of historical flooding problems throughout Brown County and detailed various flooding types and their causes. These included seiche, ice/snowmelt, coastal, and stormwater flooding. The presentation included a review of a county mapping application which tracks historic flooding incidents and provides a snapshot of the geographic distribution of flooding across the County.

Participants were then asked to provide information on known flooding issues within their respective communities. The ESRI ArcGIS StoryMaps application was used to collect this information via a survey link in which participants provided key information including; flooding type, impacted community, comments, representative photos, and other identifying information. For each entry participants were able to identify the flooding location via the mapping platform. This information was then uploaded to the story-mapping platform in real-time.

- Participants identified 50 individual locations of flooding issues geographically grouped according to flooding type
- Riverine flooding was the most reported flooding type at 29%
- Snowmelt/rain-on-snow and lake flooding were the next most common types reported at 19%
- Flooding due to the lack of, or undersized, stormwater management facilities were less reported at 7% and 6% of responses respectively.



Participants were then asked to complete a core capability exercise in the form of a web-based survey containing questions related to the capabilities to address stormwater flooding throughout the County. The first part of the core capabilities exercise focused on county-level capabilities where participants were asked to rate various stormwater capabilities in the county as either strengths or weaknesses. The second part of the exercise focused on the participant's local community and consisted of a yes/no response to a series of questions regarding each community's flood/stormwater programs and their relative core capacity.

## Workshop 2

Workshop 2 was held on September 11, 2020 and followed the same general format as Workshop 1. The workshop began with a recap of the overall objectives of the workshops and a review of the results of Workshop 1. The facilitators provided an analysis of the core capability exercise responses provided by the workshop participants. The results highlighted several county scale strengths and challenges in the current policies and regulations in which flooding hazards are managed and mitigated. The following elements were rated as strengths or weaknesses by more than 60% of participant respondents. While other elements received a more even quantity of responses.

### County-level Strengths

- Consistent regulations and practices to manage stormwater
- A good understanding of stormwater management issues by the public
- Future development within the county is managed so that flood hazards due to existing development are not increased
- Adequate capacity and resources to implement current stormwater management programs
- Floodplain management policies are consistent

### County-level Challenges

- Stormwater management facilities are not always adequately sized and maintained
- Procuring funding for maintenance of publicly owned stormwater facilities
- Appropriating funding for the construction of needed new capital stormwater facilities
- Achieving public understanding of stormwater management and flood risks
- Gaining public and political support for the use of LID/GI and/or nature-based solutions (NBS) to manage stormwater



### Local Capabilities

The core capabilities exercise also indicated occasional contrast between participants' perception of county level capacity and capability within their specific jurisdiction. Rather than a



strength/weakness response which was requested for the county level portion of the exercise, participants in the local core capabilities portion were asked to answer yes/no on a series of questions regarding their individual community's capacity to address hazards. Key results included the following:

- The local jurisdiction has an established stormwater utility to finance construction and operation of publicly owned stormwater collection and treatment systems (70% responded 'No')
- The floodplain program is coordinated with stormwater, source water, and other water resource programs (47% responded 'Yes')
- The local jurisdiction has a capital facilities program that can fund the construction of stormwater management facilities (58% responded 'Yes')

Some of the key findings from the capabilities exercise had a significant influence on the outcomes of this project. Most notable was the shift in focus from localized actions that target each planning partner individually, to more large scale, regional actions that would help address the significant variance in capability at the local level. A large variance in capacity/capability between the smaller towns/cities and the City of Green Bay/Brown County was identified by the core capability exercise. While this was not a surprise to the planning team, this finding did warrant a course correction in the focus of the discussion that followed Workshop 2.

The facilitator then provided a technical presentation on green infrastructure and its relevance to addressing stormwater flooding issues. The presentation included an overview of green infrastructure function and practices as well as information on the various benefits which green infrastructure provides in addition to its core function of protecting water quality. Particular focus was on the role which green infrastructure practices can serve in reducing overall stormwater runoff volumes and therefore reducing downstream flood impacts.

The presentation included a review of green infrastructure practices which may be applicable to Brown County. These included both urban practices such as permeable pavement, bioretention, and infiltration-based practices as well as practices applicable to rural/agricultural settings. Rural practices include many which are already incorporated into local watershed management plans serving the drainage areas in Brown County including wetland restoration, vegetated buffers, tile system management, and water and sediment control basins (WASCONBS). Finally, the presentation briefly reviewed program and policy elements necessary for the successful implementation of green infrastructure on a regional scale. These include stakeholder coordination, technical capacity, education and outreach, and funding/policy elements.



## Workshop 3

Roughly 30 people convened virtually for Workshop 3 to support development of the Action Plan for integrating GI with the AHMP for Brown County. The group consisted of key stakeholders that could influence the incorporation of GI concepts into existing policies and future hazard mitigation projects.

As noted above, the results of the Workshop 2 core capabilities exercise resulted in a course correction for the content and focus of Workshop 3. The original game plan for Workshop 3 was to establish breakout groups organized by flood hazard problem type and similarity in core capability, with the objective of identifying clearly defined hazard mitigation actions for each planning partner to the Brown County Hazard Mitigation Plan. However, this approach was revised when it became apparent that the issues identified would be better addressed at the regional scale. So, the focus for discussion for Workshop 3 was shifted to how the issues identified could be addressed regionally. This discussion resulted in the identification of “countywide” actions that would benefit all planning partners to the Brown County Hazard Mitigation Plan. Area-wide actions are a best-management practice for multi-jurisdictional hazard mitigation plans and can be an effective way to build support for regional scale actions.

Participants in the action planning workshop identified 5 overarching actions that are important to Brown County and encompass the strengths, challenges, and opportunities discussed at the two earlier workshops for integrating GI into the AHMP.

### Countywide Action Plan

1. Complete a comprehensive watershed master plan to regionalize the stormwater management program for Brown County
2. Develop a technical guidance manual on GI/LID Best Management Practices (BMP) for Brown County
3. Develop a public education and outreach program to promote the benefits and uses of GI/LID
4. Establish a funding coordination group within Brown County that can help identify and coordinate funding opportunities for GI/LID/NBS projects
5. Perform a comprehensive review of the local stormwater management codes and standards within Brown County

## Countywide #1: Comprehensive Watershed Masterplan

Utilizing existing plans and programs as the foundation, complete a comprehensive watershed masterplan that looks at the feasibility and applicability to regionalize the stormwater management program for Brown County. This Master Plan will strive to answer the following questions:

- What are the current problems within Brown County (BC) in both a water quality and quantity context?
- What is the degree of consistency of adequate stormwater management codes and standards (including those needed to support GI) throughout the planning area and what are the barriers to implementing effective codes countywide?
- How will the identified problems change in the future based on projected growth if regulated to the current codes and standards within the county?
- How could the impacts of these identified problems (both current and future) be mitigated via various means, such as revisions to existing codes and standards to mitigate potential impacts that may occur due to new and redevelopment activities and projects?
- Estimated cost for that mitigation

| Applies to<br>New or<br>Existing Assets | Lead &<br>Support<br>Agencies &<br>Roles                                                                                                                 | Immediate<br>Next Steps                                                         | Estimated<br>Cost | Funding<br>Sources                                                                                        | Success<br>Measures                                                                                                                                                                  | Timeframe  | Priority    |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|
| New and<br>Existing                     | BC Planning<br>(Lead), BC<br>Land and<br>Water Con.,<br>NEW Water,<br>Local<br>Governments,<br>WDNR, ACOE,<br>UWGB, Sea<br>Grant, Oneida<br>Tribe, NEWSC | Find funding<br>sources to<br>apply for<br>grants, test<br>political<br>support | High              | FEMA HMA<br>grants (BRIC,<br>HMGP), HUD<br>(CDBG-DR<br>and MIT), EDA<br>Community<br>Resilience<br>Grants | The master<br>plan will<br>determine if<br>this regional<br>approach to<br>stormwater<br>management<br>is feasible from<br>a practical,<br>financial, and<br>political<br>standpoint | Short-term | High/Medium |

## Countywide #2: Develop a Technical Guidance Manual

As an interim implementation measure to the completion of Countywide Action #1, develop a technical guidance manual that presents the appropriate GI/LID/NBS BMPs for Brown County. This manual will be utilized as an interim implementation tool to support the promotion, uses, and benefits of GI/LID/NBS practices to manage both stormwater quality and quantity.

| Applies to New or Existing Assets | Lead & Support Agencies & Roles          | Immediate Next Steps                                                 | Estimated Cost | Funding Sources       | Success Measures                                                                                                                     | Timeframe  | Priority |
|-----------------------------------|------------------------------------------|----------------------------------------------------------------------|----------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| New and Existing                  | BC Planning (Lead), Sea Grant, New Water | Find funding sources to apply for grants, form an oversite committee | Medium         | WI Coastal Management | Technical guidance manual will provide Brown County and local muni's with a resource tor GI/LID/NBS BMPs and lead to more GI/LID/NBS | Short-term | Low      |

## Countywide #3: Public Education/Outreach Program

As an interim implementation measure to the completion of Countywide Action #1, develop a public education and outreach program that promotes the benefits and uses of GI/LID/NBS stormwater projects at the local and private property owner scales.

| Applies to<br>New or<br>Existing Assets | Lead &<br>Support<br>Agencies &<br>Roles                                                                               | Immediate<br>Next Steps                                                                      | Estimated<br>Cost | Funding<br>Sources                                               | Success<br>Measures                                                                                                                                                                                                                                  | Timeframe  | Priority |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| New and<br>Existing                     | NEWSC/UW<br>Extension and<br>the Leads<br>(TBD), BC<br>Planning,<br>Muni's, Fox<br>Watershed<br>Alliance, New<br>Water | Coordinate<br>with support<br>agencies, find<br>funding<br>sources to<br>apply for<br>grants | Medium            | WI DNR –<br>Surface Water<br>Grant,<br>WCMO, FEMA<br>BRIC (C&CB) | NEWSC is a<br>stormwater<br>consortium<br>that helps<br>municipalities<br>navigate MS4<br>requirements<br>including<br>education<br>and outreach<br>efforts;<br>NEWSC could<br>also be a<br>good<br>organization<br>to help<br>promote<br>GI/LID/NBS | Short-term | Medium   |



## Countywide #4: Funding Coordination Group

As an interim implementation measure to the completion of Countywide Action #1, establish a funding coordination group within Brown County that can help identify and coordinate funding opportunities for GI/LID/NBS stormwater management projects within the planning area.

| Applies to New or Existing Assets | Lead & Support Agencies & Roles       | Immediate Next Steps                     | Estimated Cost | Funding Sources | Success Measures                                      | Timeframe  | Priority |
|-----------------------------------|---------------------------------------|------------------------------------------|----------------|-----------------|-------------------------------------------------------|------------|----------|
| New and Existing                  | BC EM, BC Planning, BC Administration | Find funding sources to apply for grants | Low            | Local funding   | To secure funding for any of these countywide actions | Short-term | Medium   |

## Countywide #5: Codes and Standards Review

Perform a comprehensive review of the local stormwater management codes and standards within Brown County to identify obstacles and/or barriers to the implementation and enforcement of GI/LID/NBS standards and practices for stormwater management. As an option under this action, Brown County's urban and urbanizing area communities could utilize the GI audit tool provided in "Tackling Barriers to Green Infrastructure, An Audit of Local Codes and Ordinance," to assess their capacity to support and promote GI during development and redevelopment projects.

| Applies to New or Existing Assets | Lead & Support Agencies & Roles                                  | Immediate Next Steps                     | Estimated Cost | Funding Sources        | Success Measures              | Timeframe | Priority   |
|-----------------------------------|------------------------------------------------------------------|------------------------------------------|----------------|------------------------|-------------------------------|-----------|------------|
| New and Existing                  | BC Planning, Local Municipal Planning Depts (Lead), WI Sea Grant | Find funding sources to apply for grants | Medium         | FEMA (BRIC C&CB Grant) | Get all communities reviewed* | 1-5 years | Medium/Low |

\* The audit tool already exists and has been used by the City of Green Bay. This audit can be done ASAP if desired by a local municipality.

Table Legend:

Applies to New or Existing Assets: Existing assets are the general building stock and/or critical facilities and infrastructure that currently exist within the planning area. New assets are the future building stock and/or critical facilities and infrastructure that have yet to be constructed.

Lead & Support Agencies & Roles: Agencies that will play a role in the implementation of the action. The lead agency will take the responsibility for implementation and oversight of the action while the support agency(s) with assuming a supporting role as determined by the lead agency. The lead agency has been underlined in the table.

Immediate Next Steps: What actions are needed to be taken by the lead and support agencies to get the action to a point of implementation.

Estimated Cost: Enter "High," "Medium" or "Low" as follows:

- High: Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed action.
- Medium: Could budget for under existing work-plan but would require a reapportionment of the budget or a budget amendment, or the cost of the action would have to be spread over multiple years.
- Low: Possible to fund under existing budget. Action is or can be part of an existing ongoing program.

Funding Sources: Identify funding sources for the action. If it is a grant, include the funding sources for the cost share. Refer to your fiscal capability assessment to identify possible sources of funding and refer to the table below for project eligibility for FEMA's hazard mitigation assistance grant program.

Success Measures: Measurement of success as it pertains to the implementation of the action. This can be either quantitative, measured by a metric, or qualitative, measured by subjective measures.

Time Frame: Indicate the timeline as "short-term" (1 to 5 years) or "long-term" (5 years or greater) or "ongoing" (a continual program).

Priority: Enter "High," "Medium" or "Low" as follows:

- High Priority: An action that meets multiple objectives, has benefits that exceed costs, and has a secured source of funding. Action can be completed in the short term (1 to 5 years).
- Medium Priority: An action that meets multiple objectives, has benefits that exceed costs, and is eligible for funding though no funding has yet been secured for it. Action can be completed in the short term (1 to 5 years), once funding is secured. Medium-priority actions become high-priority actions once funding is secured.
- Low Priority: An action that will mitigate the risk of a hazard, has benefits that do not exceed the costs or are difficult to quantify, has no secured source of funding, and is not eligible for any known grant funding. Action can be completed in the long term (1 to 10 years). "Wish-list" actions. They may be eligible for grant funding from programs that have not yet been identified.

## NEXT STEPS



The countywide actions have been crafted and formatted so that they could easily be integrated into the Brown County AHMP. "Countywide" means that the entire planning area would benefit from the outcome of the action. The AHMP will include countywide actions for other hazards of concern addressed by the plan as well. While these actions are not jurisdiction specific, each entity participating in the multi-jurisdictional planning effort are encouraged to show their support for these actions by specifically including their endorsement of a specific countywide action in their individual action plans for their jurisdiction. For example, an action that could be incorporated into a jurisdiction specific action plan could read as follows:

*Support the designated lead and partner agencies as needed in the implementation of the countywide actions identified in the Brown County All Hazard Mitigation Plan.*

If a jurisdiction wants only to endorse certain countywide actions, but not all; the above statement could be crafted to only address those actions the jurisdiction wishes to endorse. As stated earlier, countywide actions can be a good platform from which to build consensus on regional scale actions. All jurisdictions participating in the Brown County hazard mitigation planning effort are encouraged to fully vet these 5 actions before including them in their individual action plans. It is important to note that there was consensus among those that participated in these workshops that the scale of the problem(s) to be addressed in the planning area warranted regional scale actions. In the future Brown County may want to pursue such regional scale actions in conjunction with regional and state agencies and other local partners.

The following text provides a comprehensive strategy for implementing these county-wide actions into the Brown County AHMP. The text draws on required plan components and best practices for development and maintenance of hazard mitigation plans while highlighting GI/LID/NBS elements identified during the workshop.

### Plan Implementation/Maintenance Strategy

A hazard mitigation plan must present a plan maintenance process that includes the following (44 CFR Section 201.6(c)(4)):

- A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan over a 5-year cycle
- A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate
- A discussion on how the community will continue public participation in the plan maintenance process

While these points can be considered the “minimum” requirements for DMA planning compliance, a robust plan maintenance strategy is the key to keeping a plan dynamic, especially multi-jurisdictional scope plans like the Brown County planning effort. Therefore, it is recommended that the Brown County Hazard Mitigation Plan include the following plan implementation and maintenance strategy as a stand-alone chapter in the plan to emphasize its importance. The following strategy exceeds the 44 CFR section 201.6 requirements and meets the Community Rating System (CRS) plan maintenance requirements specified under activity 510.

#### *Recommended Plan Text for Brown County*

*The following text should be included in the Brown County Hazard Mitigation Plan as a stand-alone chapter. Special note is made where GI/LID/NBS elements should be highlighted or reinforced.*

This chapter details the formal process that will ensure that the hazard mitigation plan remains an active and relevant document and that the planning partners maintain their eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years.

This chapter also describes how public participation will be integrated throughout the plan maintenance and implementation process. It also explains how the mitigation strategies outlined in this plan will be incorporated into existing planning mechanisms and programs, such as comprehensive land-use planning processes, capital improvement planning, and building code enforcement and implementation.

The plan’s format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant. Pursuant to 44CFR 201.6(c)(4)(i), the plan maintenance matrix shown in Table-1 provides a synopsis of responsibilities for the overall plan maintenance strategy, which are discussed in further detail in the sections below.

Table-1. Plan Maintenance Matrix

| Task                              | Approach                                                                                                                                                             | Timeline                                                                                                                                                                                  | Lead Responsibility                                             | Support Responsibility                                                                             |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Monitoring-Progress Reporting     | Preparation of status updates and action implementation tracking as part of submission for annual progress report                                                    | January to January of each calendar year or upon full update to comprehensive plan or major disaster                                                                                      | Jurisdictional points of contact for each signatory to the plan | Jurisdictional implementation lead identified in the jurisdictional specific component of the plan |
| Evaluation                        | Annual progress reports will be evaluated by an oversight steering committee annually                                                                                | Finalized progress report completed by March 1 of each year                                                                                                                               | Brown County                                                    | Jurisdictional implementation lead identified in the jurisdictional specific component of the plan |
| Update                            | Reconvene the planning partners, at a minimum, every 5 years to guide a full update to review and revise the plan                                                    | Every 5 years or upon full update to comprehensive plan or major disaster                                                                                                                 | Brown County and oversight steering committee                   | Jurisdictional points of contact for each signatory to the plan                                    |
| Grant Monitoring and Coordination | Grant funding opportunities will be monitored via agency notifications, state associations and post-disaster response                                                | Ongoing during the performance period of this plan                                                                                                                                        | Brown County                                                    | Jurisdictional points of contact for each signatory to the plan                                    |
| Plan Integration                  | Create a linkage between the hazard mitigation plan and individual jurisdictions' comprehensive plans or similar plans identified in the core capability assessments | Ongoing during the performance period of this plan as opportunities for integration become available, or according to timelines identified in the actions plans for each planning partner | Jurisdictional points of contact identified in Volume 2 annexes | Jurisdictional implementation lead identified in the jurisdictional specific component of the plan |

| Task                          | Approach                                                                                                                                                                                 | Timeline                                                                                                                                                                                                           | Lead Responsibility                                                                                                                                                                                                                                                                                                                                                   | Support Responsibility                                                             |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Continuing Public Involvement | Keep the website maintained and receive comments through it over the course of the plan; maintain planning partner links to the website; post county-wide progress report to the website | Ongoing during the performance period of the plan. Progress reports to be posted annually. Participating CRS communities are to provide the annual progress report to their governing bodies for their information | Brown County will maintain the overall hazard mitigation plan website and post the Countywide progress report annually (Each planning partner will provide a link to the website and post their individual progress report at their discretion. Participating CRS communities will follow protocol identified under step 10 of the 10-step CRS planning requirements) | Brown County and Jurisdictional implementation lead identified in Volume 2 annexes |

### Plan Monitoring-Annual Progress Reporting

Brown County will be the lead agency responsible for monitoring the plan, and each partner will support plan implementation by tracking the status of all recommended mitigation actions relevant to that partner. Staff or departments with primary responsibility are identified in each jurisdictional specific component of the plan.

The minimum task of each planning partner will be the monitoring of the progress of its individual action plan during a 12-month performance period. This review will include the following:

- The internal process for monitoring and evaluating the plan's processes will be evaluated as part of the annual progress reporting process
- Summary of any hazard events that occurred during the performance period and the impact these events had on the planning area
- Review of mitigation success stories
- Review of continuing public involvement [including the development of a countywide GI/LID/NBS education and outreach program]
- Brief discussion about why targeted strategies were not completed
- Re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding)
- Recommendations for new projects



- Changes in or potential for new funding options (grant opportunities)
- Impact of any other planning programs or actions that involve hazard mitigation

A template that shows the minimum level of detail that will be sought for preparing a progress report is provided in Appendix B. Brown County will oversee progress reporting and will have the discretionary authority on how to capture this information at least annually over the performance period of the plan. This information may be captured by various means available to the planning partnership. This report should be used as follows:

- Posted on the Brown County website page dedicated to the hazard mitigation plan
- Provided to the local media through available media outlets
- Presented to planning partner governing bodies to inform them of the progress of actions implemented during the reporting period
- Provided as part of the CRS annual re-certification package for planning partners that participate in the CRS. The CRS requires an annual recertification to be submitted by October 1 of every calendar year for which the community has not received a formal audit. To meet this recertification timeline, the planning team will strive to complete progress reports between June and September each year.



Uses of the progress report will be at the discretion of each planning partner. Annual progress reporting is not a requirement specified under 44 CFR. However, it may enhance the planning partners' opportunities for funding. While failure to implement this component of the plan maintenance strategy will not jeopardize a planning partner's compliance under the DMA, it may jeopardize its opportunity to partner and leverage funding opportunities with the other partners.

### Plan Evaluation

Brown County has used a volunteer Steering Committee to oversee the update of the AHMP and made recommendations on key elements including the maintenance strategy. It was the Steering Committee's position that an oversight committee with representation similar to the initial Steering Committee should have an active role in the Plan maintenance strategy. Therefore, it is recommended that a Steering Committee remain a viable body involved in key elements of the Plan maintenance strategy. The new Steering Committee, managed by the Brown County Emergency Management Department, should strive to include representation from the planning partners, as well as other stakeholders in the planning area, at the discretion of Brown County.

The principal role of the Steering Committee in this plan maintenance strategy will be to provide a review forum to be used by Brown County and its planning partners to identify enhancements to be considered at the next update [such as the evaluation of a potential watershed master plan(s) for incorporation of GI/LID/NBS elements as part of flood hazard mitigation efforts]. Keeping a Steering

Committee intact will provide a head start on future updates. However, it should be noted that completion of the progress report is the responsibility of each planning partner, not the responsibility of the Steering Committee. It will be the Steering Committee's role to serve as a resource to all planning partners as needed to review the progress report in an effort to identify issues needing to be addressed by future plan updates.

### Plan Update

Federal regulations require that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the Disaster Mitigation Act (44 CFR Section 201.6.d(3) and Section 201.7(d)(3)). This format allows all of the individual planning partners to review and update plan sections when new data become available. New data can be easily incorporated including newly recommended actions, resulting in a plan that will remain current and relevant. The County intends for planning partners to support updating the plan on a five-year cycle from the date of plan approval. This cycle may be accelerated to less than 5 years based on the following triggers:

- A presidential disaster declaration that impacts the planning area
- A hazard event that causes loss of life
- An update of a participating jurisdiction's comprehensive plan

It will not be the intent of the update process to develop a completely new hazard mitigation plan. Based on needs identified by the planning team, the update will, at a minimum, include the following elements:

- The update process will be convened through a new steering committee
- The hazard risk assessment will be reviewed and, if necessary, updated using best available information and technologies
- Action plans will be reviewed and revised to account for any actions completed, dropped, or changed and to account for changes in the risk assessment or planning partnership policies identified under other planning mechanisms (such as the comprehensive plan)
- The draft update will be sent to appropriate agencies and organizations for comment
- The public will be given an opportunity to comment on the update prior to adoption
- Partners' governing bodies will adopt their respective portions of the updated plan

Because plan updates can require a year or more to complete, Brown County will initiate efforts to update the plan before it expires. Brown County will consider applying for funding to update the plan no later than 2 calendar years before plan expiration.

### Grant Monitoring and Coordination

Brown County will identify grant funding opportunities and send notifications to participating partner jurisdictions. This will include the organization of a GI/LID/NBS coordination group to identify grant opportunities related to these elements. Once these grant opportunities are identified, planning partners interested in pursuing a grant will convene in a short meeting to review the hazard mitigation plan and pursue a strategy to capture that grant funding including grant application. Brown County Emergency Management will assume lead responsibility for planning and facilitating grant



opportunity meetings. Review of the hazard mitigation plan at these meetings can include the following:

- Discussion of any hazard events that occurred during the prior year and their impact on the planning area
- Impact of potential grant opportunities on the implementation of mitigation actions
- Re-evaluation of the action plans to determine if the timeline for identified actions needs to be amended (such as changing a long-term action to a short-term action because of funding availability)
- Recommendations for new actions/removal of completed or unwarranted projects
- Impact of any other planning programs or initiatives that involve hazard mitigation

If multiple planning partners decide to pursue the same grant funding opportunity, partnerships can be formed to utilize the hazard mitigation plan in the grant application. Coordination should always include Brown County Emergency Management.

### Incorporation into Other Planning Mechanisms

The information on hazard, risk, vulnerability, and mitigation contained in this plan is based on the best science and technology available at the time this plan was prepared. Note that the comprehensive plans of the planning partners are considered to be integral parts of the Brown County AHMP. The planning partners used their comprehensive plans, capital improvement plans, and the hazard mitigation plan as complementary documents that work together to achieve the goal of reducing risk exposure to the citizens of the planning area. An update to a comprehensive plan may trigger an update to the hazard mitigation plan.

All municipal planning partners are committed to creating a linkage between the hazard mitigation plan and their individual comprehensive plans by identifying a mitigation action as such and giving that action a high priority. Other planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan include the following:

- Emergency response plans
- Training and exercise of emergency response plans
- Debris management plans
- Recovery plans
- Capital improvement programs
- Municipal codes [including GI/LID/NBS code reviews]
- Community design guidelines
- Green Infrastructure design guidelines
- Stormwater management programs
- Water system vulnerability assessments
- Community wildfire protection plans
- Comprehensive flood hazard management plans
- Resiliency plans
- Community Development Block Grant-Disaster Recovery action plans
- Public information/education plans

Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation. As information becomes available from other planning mechanisms that can enhance this plan, that information will be incorporated via the update process.

### Continuing Public Participation

The public outreach strategy used during development of the current update will provide a framework for public engagement through the plan maintenance process. It can be adapted for ongoing public outreach as determined to be feasible by the planning partnership such as for educating stakeholders on the potential application of green infrastructure. A steering committee similar to the one involved in developing this hazard mitigation plan update will be put in place to provide stakeholder input on plan maintenance activities.

The public will continue to be apprised of hazard mitigation activities through the website and reports on successful hazard mitigation actions provided to the media. Brown County will keep the website maintained, including monitoring the email address where members of the public can submit comments to the steering committee. This site will house the final plan and will be a one-stop shop for information regarding the plan, the partnership and plan implementation. Copies of the plan also will be distributed to the Brown County Library System.

Upon initiation of the next plan update process, a new public involvement strategy will be initiated, with guidance from the new steering committee. This strategy will be based on the needs and capabilities of the planning partnership at the time of the update. At a minimum, it will include the use of local media outlets.



## Additional Resources

Community Rating System Frequently Asked Questions

[www.floodsmart.gov/floodsmart/pages/crs/community\\_rating\\_system.jsp](http://www.floodsmart.gov/floodsmart/pages/crs/community_rating_system.jsp)

FEMA Building Community Resilience with Nature-based Solutions

[www.fema.gov/Riskmap-nature-based-solutions-guide-2020.pdf](http://www.fema.gov/Riskmap-nature-based-solutions-guide-2020.pdf)

FEMA Building Resilient Infrastructure and Communities (BRIC)

[www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities](http://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities)

FEMA Flood Mitigation Assistance Grant Program

[www.fema.gov/flood-mitigation-assistance-grant-program](http://www.fema.gov/flood-mitigation-assistance-grant-program)

FEMA Hazard Mitigation Grant Program

[www.fema.gov/hazard-mitigation-grant-program](http://www.fema.gov/hazard-mitigation-grant-program)

FEMA National Flood Insurance Program, Community Rating System

[www.fema.gov/national-flood-insurance-program-community-rating-system](http://www.fema.gov/national-flood-insurance-program-community-rating-system)

FEMA Pre-Disaster Mitigation Grant Program

[www.fema.gov/pre-disaster-mitigation-grant-program](http://www.fema.gov/pre-disaster-mitigation-grant-program)

HUD Community Development Block Grant Disaster Recovery Program

<https://www.hudexchange.info/programs/cdbg-dr/>

Implementing Stormwater Infiltration Practices at Vacant Parcels & Brownfields

<http://www.epa.state.il.us/water/watershed/publications/implementing-stormwater-infiltration-practices.pdf>

National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide

<https://nacto.org/publication/urban-street-stormwater-guide/>

National Stormwater Calculator

<https://www.epa.gov/water-research/national-stormwater-calculator>

NOAA Resilience Grant Program

[coast.noaa.gov/resilience-grant/](http://coast.noaa.gov/resilience-grant/)

U.S. EPA Building Blocks for Sustainable Communities

<http://www.epa.gov/dced/buildingblocks.htm>

U.S. EPA Flood Resilience for Riverine and Coastal Communities Checklist

Tool helps communities adapt to climate change and plan for disaster resilience by auditing local plans, policies, and development regulations. For more information on flood resilience, visit:

[www2.epa.gov/smartgrowth/flood-resilience-checklist](http://www2.epa.gov/smartgrowth/flood-resilience-checklist)

U.S. EPA Green Infrastructure Website

<http://www.epa.gov/green-infrastructure>

U.S. EPA Green Infrastructure Funding Sources

<https://www.epa.gov/green-infrastructure/green-infrastructure-funding-opportunities>

U.S. EPA Manage Flood Risk

[www.epa.gov/green-infrastructure/manage-flood-risk](http://www.epa.gov/green-infrastructure/manage-flood-risk)

U.S. EPA Reference Documents on Incorporating Green Infrastructure into Brownfields Projects

[https://www.epa.gov/sites/production/files/2015-07/documents/green\\_infrastructure-9-16-14.pdf](https://www.epa.gov/sites/production/files/2015-07/documents/green_infrastructure-9-16-14.pdf)

<http://www.epa.gov/green-infrastructure>

U.S. EPA Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale

<http://www.epa.gov/smartgrowth/water-quality-scorecard-incorporating-green-infrastructure-practices-municipal>

## APPENDIX A – WORKSHOP ATTENDEES

| 9/8/20 | 9/11/20 | 9/18/20 | Name             | Title                                   | Affiliation                                          |
|--------|---------|---------|------------------|-----------------------------------------|------------------------------------------------------|
| •      | •       |         | Bertler, Joe     | Fire Chief                              | Village of Suamico Fire Department                   |
| •      |         |         | Bosiacki, Bill   | Zoning Administrator                    | Brown County Zoning                                  |
| •      |         | •       | Butry, Adam      | Health, Safety, Security Coordinator    | NEW Water (Green Bay Metropolitan Sewerage District) |
| •      | •       | •       | Clements, Trevor | Principal Planner                       | Tetra Tech                                           |
| •      |         |         | Delzell, Sophie  | Environmental Communications Specialist | Tetra Tech                                           |
| •      | •       | •       | DuMez, Jeff      | GIS Coordinator / LIO                   | Brown County                                         |
| •      | •       |         | Dunks, Steve     | Zoning Administrator                    | Village of Suamico                                   |
| •      |         | •       | Estrup, Cindy    | Sergeant Emergency Manager              | University of Wisconsin Green Bay                    |
| •      | •       | •       | Flaner, Rob      | Hazard Mitigation Program Manager       | Tetra Tech                                           |
|        |         | •       | Fuller, Trevor   | Planning and Zoning Administrator       | Village of Allouez                                   |
| •      | •       | •       | Garcia, Chris    | Transportation Planner                  | Bay-Lake Regional Planning Commission                |
| •      | •       | •       | Genchanok, Yana  | Environmental Engineer                  | EPA                                                  |
| •      | •       | •       | Goo, Robert      | Environmental Protection Specialist     | US EPA                                               |
| •      | •       | •       | Grenier, Steve   | Director of Public Works                | City of Green Bay                                    |
| •      | •       | •       | Gresham, Kaylynn | Emergency Management Director           | Oneida Nation                                        |
| •      | •       | •       | Grosshans, Jon   | Community Planner                       | EPA                                                  |
| •      |         |         | Hewitt, Justin   | Project Specialist                      | Green Bay Water utility                              |
| •      | •       |         | Heyroth, Matt    | Assistant Zoning Administrator          | Brown County Planning and Land Services - Zoning     |
| •      |         |         | Jacobs, Meghan   | Market Human Resources Manager          | Bryant & Stratton College                            |
| •      |         |         | Janke, Ed        | Chief                                   | Village of Howard                                    |

|   |   |   |                          |                                                      |                                                               |
|---|---|---|--------------------------|------------------------------------------------------|---------------------------------------------------------------|
| • |   |   | Juedes, Jesse            | Supervisor                                           | Town of Wrightstown                                           |
| • | • |   | Kaster, Mike             | Director of Engineering                              | Village of Howard                                             |
| • | • |   | Koenig, Julie            | Clerk                                                | Town of Rockland                                              |
| • | • | • | Kotenberg, Kurt          | Warning Coordination Meteorologist                   | National Weather Service                                      |
| • | • | • | Kowalzek-Adrians, Angela | Contract & Grant Specialist                          | NEW Water (Green Bay Metropolitan Sewerage District)          |
| • |   |   | Kozak, Michelle          | Chief of Emergency Management                        | Army Corp - Chicago                                           |
| • | • |   | Kozloski, Nick           | Lieutenant                                           | ASHWAUBENON                                                   |
| • |   |   | Ladwig, Holly            | 211 and Program Investment Manager                   | Brown County United Way                                       |
| • |   |   | Lange, Brad              | Administrator                                        | City of Green Bay                                             |
| • | • | • | Maki, Lauri              | Director                                             | Brown County Emergency Management                             |
| • | • | • | Marsh, Janette           | Nonpoint Source Specialist State and Tribal Programs | U.S. EPA Region 5                                             |
| • |   |   | Massie, Joe              | Communications Specialist                            | Brown County                                                  |
| • |   |   | Moore, Mike              | Services Manager                                     | Wisconsin Public Service                                      |
| • | • | • | Mosso, Dacia             | Associate Director of Environmental Sciences         | Tetra Tech                                                    |
| • | • | • | Neumann, Blake           | East River Resiliency Fellow                         | The Nature Conservancy                                        |
| • |   | • | Neumeyer, Paul           | Zoning Administrator                                 | City of Green Bay                                             |
| • | • | • | Noordyk, Julia           | Water Quality and Coastal Community Specialist       | UW Sea Grant                                                  |
| • |   | • | Pelch, Steve             | Coordinator                                          | North East Wisconsin Healthcare Emergency Readiness Coalition |
| • | • | • | Peltier, Cullen          | Director                                             | Brown County Public Safety Communications                     |
| • | • | • | Peterson, Cadence        | Mitigation Planner                                   | FEMA RV                                                       |
| • | • | • | Qualls, Nathan           | Director of Technical Services                       | NEW Water (Green Bay Metropolitan Sewerage District)          |



|   |   |   |                    |                                                   |                                                      |
|---|---|---|--------------------|---------------------------------------------------|------------------------------------------------------|
| • | • |   | Risch, Ben         | Emergency Dispatch Supervisor                     | Wisconsin Public Service Corp                        |
|   | • | • | Rowell, Andy       | Public Works Director                             | Village of Bellevue                                  |
| • | • | • | Sarau, Lisa        | Staff Engineer                                    | NEW Water (Green Bay Metropolitan Sewerage District) |
| • |   |   | School, Stephanie  | Emergency Management Specialist                   | Hospital Sisters Health System (HSBS)                |
| • | • | • | Smith, Jonathan    | Senior Stormwater Engineer                        | Tetra Tech                                           |
|   | • | • | Smith, Madison     | Planner                                           | City of Green Bay                                    |
|   | • | • | Smudde, Jeff       | Director of Environmental Programs                | NEW Water (Green Bay Metropolitan Sewerage District) |
|   |   | • | Sommers, Katie     | State Hazard Mitigation Officer                   | WI Emergency Management                              |
|   | • |   | Studer, Melissa    | Senior Stormwater Engineer                        | Tetra Tech                                           |
| • | • | • | Teaters, Dan       | Senior Planner, Natural Resources & Land Division | Brown County Planning and Land Services              |
| • | • | • | Tews, Randy        | Deputy Chief                                      | ASHWAUBENON                                          |
| • |   |   | Treml, Ben         | Regional Conservation Warden                      | WI - DNR                                             |
| • | • | • | UsarekWitek, Magda | Project Planner/GIS Specialist                    | Tetra Tech                                           |
| • | • |   | Vickman, Andy      | Superintendent of Public Works and Utilities      | Village of Wrightstown                               |
| • | • |   | Wescott, Patrick   | Director of Operations                            | NEW Water (Green Bay Metropolitan Sewerage District) |
| • | • | • | Willemon, Genny    | EMR Coordinator/Safety Chair, NEW HERC President  | Brown County                                         |

## APPENDIX B – PROGRESS REPORT TEMPLATE

### 2020 Brown County Hazard Mitigation Plan Annual Progress Report

**Reporting Period:** (Insert reporting period)

**Background:** Brown County and participating cities and special purpose districts in the county developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the participating partners organized resources, assessed risks from natural hazards within the county, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, these jurisdictions maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under the Robert T. Stafford Act. The plan can be viewed on-line at:

(Insert Website address)

**Summary Overview of the Plan's Progress:** The performance period for the *2020 Brown County Hazard Mitigation Plan* became effective in Month Year with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before Month Year. As of this reporting period, the performance period for this plan is considered to be \_\_\_% complete. The hazard mitigation plan has targeted \_\_\_ hazard mitigation actions to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

\_\_\_ out of \_\_\_ actions (\_\_\_%) reported ongoing action toward completion.

\_\_\_ out of \_\_\_ actions (\_\_\_%) were reported as being complete.

\_\_\_ out of \_\_\_ actions (\_\_\_%) reported no action taken.

**Purpose:** The purpose of this report is to provide an annual update on the implementation of the action plan identified in the *2020 Brown County Hazard Mitigation Plan*. The objective is to ensure that there is a continuing and responsive planning process that will keep the hazard mitigation plan dynamic and responsive to the needs and capabilities of the partner jurisdictions. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area
- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement.

**The Hazard Mitigation Plan Steering Committee:** The Hazard Mitigation Plan Steering Committee, made up of planning partners and stakeholders within the planning area, reviewed and approved this progress report at its annual meeting held on \_\_\_\_\_, 202\_. It was determined through the plan's development process that a steering committee would remain in service to oversee maintenance of the plan. At a minimum, the Steering Committee will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the Steering Committee membership is as indicated in Table 1.

**Table 1. Steering Committee Members**

| Name | Title | Jurisdiction/Agency |
|------|-------|---------------------|
|      |       |                     |
|      |       |                     |
|      |       |                     |
|      |       |                     |
|      |       |                     |
|      |       |                     |
|      |       |                     |

**Natural Hazard Events within the Planning Area:** During the reporting period, there were \_\_ natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

**Changes in Risk Exposure in the Planning Area:** *(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

**Mitigation Success Stories:** *(Insert brief overview of mitigation accomplishments during the reporting period)*

**Review of the Action Plan:** Table 2 reviews the action plan, reporting the status of each action. Reviewers of this report should refer to the hazard mitigation plan for more detailed descriptions of each action and the prioritization process.

*Address the following in the "status" column of the following table:*

- Was any element of the action carried out during the reporting period?
- If no action was completed, why?
- Is the timeline for implementation for the action still appropriate?
- If the action was completed, does it need to be changed or removed from the action plan?

**Table 2. Action Plan Matrix**

| Action Taken?<br>(Yes or No) | Time Line | Priority      | Status | Status (X, O, ✓) |
|------------------------------|-----------|---------------|--------|------------------|
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |
| Action # __ —                |           | [description] |        |                  |

Completion status legend:  
✓ = Project Completed  
O = Action ongoing toward completion  
X = No progress at this time

**Changes That May Impact Implementation of the Plan:** (Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)

**Recommendations for Changes or Enhancements:** Based on the review of this report by the Hazard Mitigation Plan Steering Committee, the following recommendations will be noted for future updates or revisions to the plan:

*Public review notice: The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Brown County Hazard Mitigation Plan website. Any questions or comments regarding the contents of this report should be directed to:*

**Brown County Planning and Land Services  
305 E. Walnut St.  
Green Bay, WI 54301  
Ph: 920 448-6480**

## **Appendix C – Final Plan Shared with Municipalities Letter**

To be included after FEMA approval

LETTER Place holder



## Appendix D – List of Critical Facilities

The following list of critical facilities was derived from the Brown County Land Information Office address points data set. The Brown County Land Information Office and Emergency Management Departments work closely together to identify infrastructure and various facilities round the county that qualify as critical facilities and include that information in the GIS system used by Emergency Management for emergency response. The following table include the Geographic ID number, the critical facility use, critical facility name (if applicable) and the municipality in which its located.

| ID    | Usage                                 | Name                               | Municipality    |
|-------|---------------------------------------|------------------------------------|-----------------|
| 8333  | WATER TOWER                           | DE PERE WATER TOWER - E MATTHEW DR | CITY OF DE PERE |
| 79768 | Electric Power Substation             | DEPERE ENERGY CENTER               | CITY OF DE PERE |
| 79773 | Water Supply Storage Tanks/Reservoirs | DEPERE WATER PUMP 3                | CITY OF DE PERE |
| 79774 | Water Supply Storage Tanks/Reservoirs | DEPERE WATER PUMP 4                | CITY OF DE PERE |
| 79775 | WATER PUMP                            | DEPERE WATER PUMP 5                | CITY OF DE PERE |
| 79776 | WATER PUMP                            | DEPERE WATER PUMP 6                | CITY OF DE PERE |
| 79820 | ELDERLY CARE FACILITY                 | RENNES HEALTH CENTER-NH            | CITY OF DE PERE |
| 79839 | Radio/Television Stations             | WGEE RADIO TOWERS                  | CITY OF DE PERE |
| 79841 | ELECTRICAL SUBSTATION                 | WPS SUB STATION 13                 | CITY OF DE PERE |
| 79842 | ELECTRICAL SUBSTATION                 | WPS SUB STATION 15                 | CITY OF DE PERE |
| 80523 | DAM                                   | DEPERE DAM                         | CITY OF DE PERE |
| 80635 | Bridge (road over road)               | CLAUDE ALLOUEZ EAST OVER FRONT ST  | CITY OF DE PERE |
| 81596 | SCHOOL & RED CROSS DESIGNATED SHELTER | SYBLE HOPP SCHOOL                  | CITY OF DE PERE |
| 81597 | ELEMENTARY SCHOOL                     | WESTWOOD ELEMENTARY                | CITY OF DE PERE |
| 81620 | SCHOOL                                | WEST DEPERE HIGH SCHOOL            | CITY OF DE PERE |
| 81850 | CARE-CHILD                            | CREEKSIDE CHRISTIAN MONTESSORI     | CITY OF DE PERE |
| 82050 | CARE-CHILD                            | ENCOMPASS CHILD CARE               | CITY OF DE PERE |
| 82615 | HEALTH                                | AURORA PHARMACY                    | CITY OF DE PERE |
| 95402 | CLINIC                                | AURORA HEALTH CENTER               | CITY OF DE PERE |
| 95590 | SCHOOL & RED CROSS DESIGNATED SHELTER | DICKINSON ELEMENTARY SCHOOL        | CITY OF DE PERE |
| 95949 | SCHOOL                                | NOTRE DAME ELEMENTARY              | CITY OF DE PERE |
| 95978 | CHURCH                                | FIRST UNITED PRESBYTERIAN          | CITY OF DE PERE |
| 96232 | SCHOOL                                | SNC BUSH ART CENTER                | CITY OF DE PERE |
| 96498 | CLINIC                                | BELLIN HEALTH CENTER               | CITY OF DE PERE |
| 96562 | RESIDENTIAL CARE HOMES                | RENAISSANCE ASSISTED LIVING        | CITY OF DE PERE |

|               |                                            |                                     |                 |
|---------------|--------------------------------------------|-------------------------------------|-----------------|
| <b>96699</b>  | SCHOOL                                     | ALTMAYER ELEMENTARY                 | CITY OF DE PERE |
| <b>97102</b>  | HIGH SCHOOL & RED CROSS DESIGNATED SHELTER | DEPERE HIGH SCHOOL                  | CITY OF DE PERE |
| <b>97136</b>  | FIRE STATION                               | DPFD FIRE STATION 1                 | CITY OF DE PERE |
| <b>97137</b>  | FIRE & AMBULANCE STATION                   | DPFD FIRE STATION 2                 | CITY OF DE PERE |
| <b>97280</b>  | SCHOOL                                     | FOX VIEW INTERMEDIATE SCHOOL        | CITY OF DE PERE |
| <b>97317</b>  | School                                     | MONTESSORI CHILDRENS WORLD          | CITY OF DE PERE |
| <b>97352</b>  | RETAIL SALES                               | PREVEA CLINIC                       | CITY OF DE PERE |
| <b>98112</b>  | Municipal Garage                           | DEPERE MSC                          | CITY OF DE PERE |
| <b>98375</b>  | SCHOOL                                     | OUR LADY OF LOURDES SCHOOL          | CITY OF DE PERE |
| <b>98425</b>  | POLICE STATION                             | DEPERE POLICE DEPT                  | CITY OF DE PERE |
| <b>98435</b>  | POST OFFICE                                | POST OFFICE DEPERE                  | CITY OF DE PERE |
| <b>98556</b>  | WASTEWATER TREATMENT DePere Facility       | DE PERE SEWER PLANT - NEW Water DBF | CITY OF DE PERE |
| <b>98615</b>  | SPORTS STADIUM                             | SNC SOCCER STADIUM                  | CITY OF DE PERE |
| <b>98981</b>  | MIDDLE SCHOOL                              | WEST DEPERE MID SCHOOL              | CITY OF DE PERE |
| <b>189084</b> | FIRE & AMBULANCE STATION                   | DEPERE FIRE STATION 1               | CITY OF DE PERE |
| <b>189085</b> | FIRE STATION                               | DEPERE FIRE STATION 2               | CITY OF DE PERE |
| <b>244490</b> | Bridge (railroad over road)                | NA                                  | CITY OF DE PERE |
| <b>244496</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>244506</b> | Bridge (road over road)                    | NA                                  | CITY OF DE PERE |
| <b>244507</b> | Bridge (road over road)                    | NA                                  | CITY OF DE PERE |
| <b>244508</b> | Bridge (road over water)                   | CLAUDE ALLOUEZ BRIDGE               | CITY OF DE PERE |
| <b>244509</b> | Bridge (road over road)                    | STH 32-57 & CTH PP OVERPASS         | CITY OF DE PERE |
| <b>244510</b> | Bridge (road over trail)                   | NA                                  | CITY OF DE PERE |
| <b>244511</b> | Bridge (road over water)                   | I-41 & ASHWAUBENON CREEK            | CITY OF DE PERE |
| <b>244513</b> | Bridge (road over water)                   | SCHEURING RD OVER ASHWAUBENON CREEK | CITY OF DE PERE |
| <b>244563</b> | Bridge (railroad over road)                | NA                                  | CITY OF DE PERE |
| <b>244564</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>244636</b> | Bridge (road over road)                    | I-41 & SCHEURING RD OVERPASS        | CITY OF DE PERE |
| <b>244750</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>244751</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>244753</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>244755</b> | Bridge (road over water)                   | I-41 & ASHWAUBENON CREEK            | CITY OF DE PERE |
| <b>244756</b> | Bridge (road over water)                   | NA                                  | CITY OF DE PERE |
| <b>245092</b> | Bridge (road over road)                    | NA                                  | CITY OF DE PERE |

|               |                                                 |                                            |                   |
|---------------|-------------------------------------------------|--------------------------------------------|-------------------|
| <b>247900</b> | Wastewater Facility (Lift Station)              | NEW Water OPLS-LS                          | CITY OF DE PERE   |
| <b>252736</b> | Dam                                             | NA                                         | CITY OF DE PERE   |
| <b>252753</b> | Dam                                             | NA                                         | CITY OF DE PERE   |
| <b>252754</b> | Dam                                             | NA                                         | CITY OF DE PERE   |
| <b>252755</b> | Dam                                             | NA                                         | CITY OF DE PERE   |
| <b>252764</b> | Dam                                             | NA                                         | CITY OF DE PERE   |
| <b>27799</b>  | GENERATION/PROCESSING OF COMMUNICATION/UTILITIE | NA                                         | CITY OF GREEN BAY |
| <b>28798</b>  | SUB-STATION                                     | NA                                         | CITY OF GREEN BAY |
| <b>36787</b>  | CLINICS                                         | NA                                         | CITY OF GREEN BAY |
| <b>37071</b>  | PRIMARY SCHOOLS                                 | ALDO LEOPOLD SCHOOL MONROE ENTRANCE        | CITY OF GREEN BAY |
| <b>38171</b>  | Lift Station (Stormwater)                       | NA                                         | CITY OF GREEN BAY |
| <b>44603</b>  | Lift Station (Stormwater)                       | NA                                         | CITY OF GREEN BAY |
| <b>45504</b>  | Lift Station (Stormwater)                       | NA                                         | CITY OF GREEN BAY |
| <b>46427</b>  | Lift Station (Stormwater)                       | NA                                         | CITY OF GREEN BAY |
| <b>48380</b>  | PRE-SCHOOL/DAY CARE                             | ENCOMPASS CHILD CARE                       | CITY OF GREEN BAY |
| <b>49051</b>  | ADMINISTRATIVE BUILDINGS                        | NA                                         | CITY OF GREEN BAY |
| <b>49684</b>  | CHURCHES/TEMPLES/SYNAGOGUES                     | NA                                         | CITY OF GREEN BAY |
| <b>51622</b>  | MUNICIPAL GARAGES                               | NA                                         | CITY OF GREEN BAY |
| <b>52352</b>  | TELEPHONE TERMINALS/DISPATCH CENT               | NA                                         | CITY OF GREEN BAY |
| <b>52359</b>  | MUNICIPAL GARAGES                               | NA                                         | CITY OF GREEN BAY |
| <b>52415</b>  | FIRE STATION                                    | GB FIRE STATION 3                          | CITY OF GREEN BAY |
| <b>52911</b>  | Electric Power Substations                      | NA                                         | CITY OF GREEN BAY |
| <b>54687</b>  | PRIMARY SCHOOLS                                 | LINCOLN ELEMENTARY SCHOOL SHAWANO ENTRANCE | CITY OF GREEN BAY |
| <b>54998</b>  | ELECTRIC SUBSTATION                             | NA                                         | CITY OF GREEN BAY |
| <b>55155</b>  | Wastewater Treatment Plan?                      | NEW Water MS-PG                            | CITY OF GREEN BAY |

|              |                                               |                             |                   |
|--------------|-----------------------------------------------|-----------------------------|-------------------|
| <b>55317</b> | Electric Power Substation                     | WPS SUBSTATION              | CITY OF GREEN BAY |
| <b>55705</b> | Administrative Building                       | NA                          | CITY OF GREEN BAY |
| <b>56706</b> | CHURCHES/TEMPLES/SYNAGOGUES                   | NA                          | CITY OF GREEN BAY |
| <b>56728</b> | WATER SUPPLY STORAGE TANKS/RESERVOIRS         | NA                          | CITY OF GREEN BAY |
| <b>60878</b> | WATER WELL                                    | NA                          | CITY OF GREEN BAY |
| <b>61031</b> | Wastewater Facility                           | NEW Water MS-14             | CITY OF GREEN BAY |
| <b>78859</b> | Water Supply Storage Tanks/Reservoirs         | WATER TOWER - S HURON       | CITY OF GREEN BAY |
| <b>79388</b> | NA                                            | AMERICAN FOODS GROUP        | CITY OF GREEN BAY |
| <b>79393</b> | NA                                            | EDEN BROOK-NH               | CITY OF GREEN BAY |
| <b>79863</b> | PHONE COMPANY                                 | ATT BUILDING                | CITY OF GREEN BAY |
| <b>79887</b> | Clinic                                        | BAYSHORE COUNSELING         | CITY OF GREEN BAY |
| <b>79893</b> | HOSPITAL                                      | BELLIN HOSPITAL             | CITY OF GREEN BAY |
| <b>79952</b> | Radio/Television Transmission Towers/Antennae | CELLCOM TOWER SHOP          | CITY OF GREEN BAY |
| <b>80032</b> | NA                                            | GOLDEN HOUSE                | CITY OF GREEN BAY |
| <b>80035</b> | CHURCH & RED CROSS DESIGNATED SHELTER         | GRACE LUTHERAN CHURCH       | CITY OF GREEN BAY |
| <b>80055</b> | POLICE STATION                                | HQ                          | CITY OF GREEN BAY |
| <b>80180</b> | Pre-School/Day Care                           | PRECIOUS MEMORIES CHILDCARE | CITY OF GREEN BAY |
| <b>80183</b> | NA                                            | PRO CHEMICALS INC           | CITY OF GREEN BAY |
| <b>80224</b> | CHURCH & RED CROSS DESIGNATED SHELTER         | ST ELIZABETH SETON          | CITY OF GREEN BAY |
| <b>80225</b> | CHURCH & RED CROSS DESIGNATED SHELTER         | ST JAMES LUTHERAN CHURCH    | CITY OF GREEN BAY |
| <b>80228</b> | HOSPITAL                                      | ST MARYS HOSPITAL           | CITY OF GREEN BAY |
| <b>80229</b> | CHURCH & RED CROSS DESIGNATED SHELTER         | ST PETER PAUL CHURCH        | CITY OF GREEN BAY |
| <b>80248</b> | Daycare                                       | THREE SISTERS HEADSTART     | CITY OF GREEN BAY |

|              |                                            |                                |                   |
|--------------|--------------------------------------------|--------------------------------|-------------------|
| <b>80258</b> | CHURCH & RED CROSS DESIGNATED SHELTER      | TRINITY LUTHERAN CHURCH        | CITY OF GREEN BAY |
| <b>80282</b> | MEDICAL BUILDING                           | WEBSTER MEDICAL BLDG           | CITY OF GREEN BAY |
| <b>80302</b> | FITNESS CENTER                             | YMCA                           | CITY OF GREEN BAY |
| <b>80303</b> | FITNESS CENTER                             | YWCA                           | CITY OF GREEN BAY |
| <b>80758</b> | ELDERLY CARE FACILITY                      | GRANCARE NURSING CTR- NH       | CITY OF GREEN BAY |
| <b>80868</b> | COMMUNITY CENTER                           | SALVATION ARMY                 | CITY OF GREEN BAY |
| <b>81130</b> | CHILD CARE                                 | PEACE NURSERY CTR              | CITY OF GREEN BAY |
| <b>81237</b> | COMMUNICATIONS                             | ATT BUILDING                   | CITY OF GREEN BAY |
| <b>81254</b> | RADIO STATIONS & BROADCASTING              | WQLH                           | CITY OF GREEN BAY |
| <b>81265</b> | TEXTILE GOODS                              | ASPIRO                         | CITY OF GREEN BAY |
| <b>81280</b> | CHEMICALS                                  | US OIL TANKS                   | CITY OF GREEN BAY |
| <b>81288</b> | FEDERAL GOVERNMENT                         | SOCIAL SECURITY ADMINISTRATION | CITY OF GREEN BAY |
| <b>81289</b> | CBRF CLASS C 359                           | CARE FOR ALL AGES - NH         | CITY OF GREEN BAY |
| <b>81394</b> | Hospital                                   | BELLIN POWER PLANT             | CITY OF GREEN BAY |
| <b>81453</b> | CHURCH & RED CROSS DESIGNATED SHELTER      | CELEBRATION CHURCH             | CITY OF GREEN BAY |
| <b>81492</b> | UTILITIES                                  | UWGB PUMP STATION              | CITY OF GREEN BAY |
| <b>81502</b> | ELDERLY CARE FACILITY                      | BORNEMANN NURSING HOME - NH    | CITY OF GREEN BAY |
| <b>81524</b> | CLINIC                                     | AURORA ORTHOPEDICS             | CITY OF GREEN BAY |
| <b>81599</b> | HIGH SCHOOL & RED CROSS DESIGNATED SHELTER | EAST HIGH SCHOOL               | CITY OF GREEN BAY |
| <b>81600</b> | SCHOOL & RED CROSS DESIGNATED SHELTER      | EISENHOWER SCHOOL              | CITY OF GREEN BAY |
| <b>81601</b> | SCHOOL & RED CROSS DESIGNATED SHELTER      | ELMORE SCHOOL                  | CITY OF GREEN BAY |
| <b>81602</b> | SCHOOL & RED CROSS DESIGNATED SHELTER      | FORT HOWARD SCHOOL             | CITY OF GREEN BAY |
| <b>81603</b> | SCHOOL & RED CROSS DESIGNATED SHELTER      | FRANKLIN MIDDLE SCHOOL         | CITY OF GREEN BAY |

|              |                                                 |                           |                   |
|--------------|-------------------------------------------------|---------------------------|-------------------|
| <b>81607</b> | SCHOOL & RED CROSS DESIGNATED SHELTER           | JEFFERSON SCHOOL          | CITY OF GREEN BAY |
| <b>81608</b> | SCHOOL & RED CROSS DESIGNATED SHELTER           | PREBLE HIGH SCHOOL        | CITY OF GREEN BAY |
| <b>81610</b> | CHURCH, SCHOOL & RED CROSS DESIGNATED SHELTER   | ST PAULS UNITED METHODIST | CITY OF GREEN BAY |
| <b>81611</b> | SCHOOL & RED CROSS DESIGNATED SHELTER           | WASHINGTON MIDDLE SCHOOL  | CITY OF GREEN BAY |
| <b>81614</b> | SCHOOL                                          | ST PAUL LUTHERAN SCHOOL   | CITY OF GREEN BAY |
| <b>81615</b> | SCHOOL                                          | EDISON MIDDLE SCHOOL      | CITY OF GREEN BAY |
| <b>81616</b> | SCHOOL & RED CROSS DESIGNATED SHELTER           | DANZ SCHOOL               | CITY OF GREEN BAY |
| <b>81618</b> | SCHOOL                                          | NOTRE DAME ACADEMY        | CITY OF GREEN BAY |
| <b>81636</b> | CHURCH                                          | ST MARK LUTHERAN CHURCH   | CITY OF GREEN BAY |
| <b>81637</b> | CHURCH & RED CROSS DESIGNATED SHELTER           | ST PATRICKS PARISH        | CITY OF GREEN BAY |
| <b>81640</b> | CHURCH & RED CROSS DESIGNATED SHELTER           | ST WILLEBRORD PARISH      | CITY OF GREEN BAY |
| <b>81930</b> | Radio/Television Stations                       | WNCY RADIO                | CITY OF GREEN BAY |
| <b>81989</b> | CLINIC                                          | PREVEA CLINIC             | CITY OF GREEN BAY |
| <b>82647</b> | CHEMICALS                                       | SEM STREAM                | CITY OF GREEN BAY |
| <b>83327</b> | SCHOOL                                          | NWTC ARTISAN CENTER       | CITY OF GREEN BAY |
| <b>83647</b> | ELECTRIC POWER SUBSTATIONS                      | NA                        | CITY OF GREEN BAY |
| <b>83680</b> | UTILITIES                                       | WEST SHORE PIPELINE CO    | CITY OF GREEN BAY |
| <b>83936</b> | GENERATION/PROCESSING OF COMMUNICATION/UTILITIE | NA                        | CITY OF GREEN BAY |
| <b>84075</b> | SCHOOL                                          | REDEEMER LUTHERAN SCHOOL  | CITY OF GREEN BAY |
| <b>84110</b> | MEDICAL FACILITY                                | MEDICAL ARTS BUILDING     | CITY OF GREEN BAY |
| <b>84944</b> | ELECTRIC POWER SUBSTATIONS                      | NA                        | CITY OF GREEN BAY |
| <b>84949</b> | DAY CARE                                        | ROYAL MONTESSORI ACADEMY  | CITY OF GREEN BAY |
| <b>84964</b> | MEDICAL CLINIC                                  | DOUSMAN CLINIC            | CITY OF GREEN BAY |

|              |                                               |                           |                   |
|--------------|-----------------------------------------------|---------------------------|-------------------|
| <b>85276</b> | Daycare                                       | EARLY LEARNING CENTER     | CITY OF GREEN BAY |
| <b>85293</b> | CLINIC                                        | NEW COMMUNITY CLINIC      | CITY OF GREEN BAY |
| <b>85334</b> | Administrative Building                       | GB PACKAGING              | CITY OF GREEN BAY |
| <b>85514</b> | SEWAGE TREATMENT PLANTS                       | NEW Water MS-CFB          | CITY OF GREEN BAY |
| <b>87116</b> | Lift Station (Sanitary)                       | NA                        | CITY OF GREEN BAY |
| <b>87167</b> | WALK-IN CLINIC                                | PREVEA CLINIC             | CITY OF GREEN BAY |
| <b>87884</b> | Pre-School/Day Care                           | ENCOMPASS CHILD CARE      | CITY OF GREEN BAY |
| <b>87885</b> | Lift Station (Sanitary)                       | LOT 1 - LAMBEAU-SOUTHEAST | CITY OF GREEN BAY |
| <b>87910</b> | Radio/Television Transmission Towers/Antennae | ATT BUILDING              | CITY OF GREEN BAY |
| <b>88000</b> | School                                        | ST THOMAS MORE SCHOOL     | CITY OF GREEN BAY |
| <b>88627</b> | HEATING & COOLING PLANT                       | UWGB HEATING PLANT        | CITY OF GREEN BAY |
| <b>88670</b> | UNIVERSITY BUILDING                           | UWGB COFRIN HALL          | CITY OF GREEN BAY |
| <b>93346</b> | SUBSTATION                                    | WPS substation            | CITY OF GREEN BAY |
| <b>93531</b> | PHYSICIANS & SURGEONS                         | NEW ENT SC                | CITY OF GREEN BAY |
| <b>93599</b> | CLINIC                                        | AURORA HEALTH CENTER      | CITY OF GREEN BAY |
| <b>94110</b> | MEDICAL FACILITY                              | ASCEND HEALTH             | CITY OF GREEN BAY |
| <b>94195</b> | ELECTRICAL SUBSTATION & SHED                  | WPS SUB STATION           | CITY OF GREEN BAY |
| <b>94465</b> | CLINICS                                       | NA                        | CITY OF GREEN BAY |
| <b>94813</b> | TRUCK STORAGE                                 | DPW WAREHOUSE             | CITY OF GREEN BAY |
| <b>94927</b> | CLINIC                                        | EAST SIDE FAMILY PRACTICE | CITY OF GREEN BAY |
| <b>94935</b> | Pre-School/Day Care                           | I DO WISHES               | CITY OF GREEN BAY |
| <b>94981</b> | COUNTY GOVERNMENT OFFICES                     | NORTHERN BUILDING         | CITY OF GREEN BAY |
| <b>95006</b> | WELL STATION                                  | GB WATER UTILITY          | CITY OF GREEN BAY |

|              |                                       |                              |                   |
|--------------|---------------------------------------|------------------------------|-------------------|
| <b>95012</b> | PAPER MILL                            | GEORGIA PACIFIC              | CITY OF GREEN BAY |
| <b>95035</b> | DAY CARE 321                          | KINDER CARE                  | CITY OF GREEN BAY |
| <b>95089</b> | WELL STATION                          | GB WATER UTILITY             | CITY OF GREEN BAY |
| <b>95123</b> | CONVERTING AREA-                      | GEORGIA PACIFIC              | CITY OF GREEN BAY |
| <b>95125</b> | DOCTOR OFFICES                        | AURORA DIALYSIS              | CITY OF GREEN BAY |
| <b>95181</b> | WELL STATION                          | GB WATER UTILITY             | CITY OF GREEN BAY |
| <b>95183</b> | CHILD CARE                            | PARAGON COMMUNITY SERVICES   | CITY OF GREEN BAY |
| <b>95271</b> | COLD STORAGE                          | AMERICOLD LOGISTICS          | CITY OF GREEN BAY |
| <b>95300</b> | DAY CARE                              | ENCOMPASS CHILD CARE         | CITY OF GREEN BAY |
| <b>95321</b> | WELL STATION                          | GB WATER UTILITY             | CITY OF GREEN BAY |
| <b>95349</b> | CHILD CARE                            | ENCOMPASS CHILD CARE         | CITY OF GREEN BAY |
| <b>95370</b> | CLINIC                                | PREVEA CLINIC                | CITY OF GREEN BAY |
| <b>95385</b> | SCHOOL                                | LEONARDO DA VINCI SCHOOL     | CITY OF GREEN BAY |
| <b>95417</b> | SCHOOL                                | CESA 7 HEAD START            | CITY OF GREEN BAY |
| <b>95423</b> | CLINIC                                | AURORA HEALTH CENTER         | CITY OF GREEN BAY |
| <b>95449</b> | BUSINESS                              | ATT BUILDING                 | CITY OF GREEN BAY |
| <b>95460</b> | SOCIAL SERVICE & WELFARE ORG          | AGING RESOURCE CTR           | CITY OF GREEN BAY |
| <b>95498</b> | HOSPITAL                              | AURORA SURGERY CTR           | CITY OF GREEN BAY |
| <b>95546</b> | PHYSICIANS & SURGEONS                 | CARDIOLOGY ASSOCIATES        | CITY OF GREEN BAY |
| <b>95560</b> | CLINICS                               | CLINICARE CONVENIENCE CLINIC | CITY OF GREEN BAY |
| <b>95705</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | KING ELEMENTARY SCHOOL       | CITY OF GREEN BAY |
| <b>95718</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | LINCOLN ELEMENTARY SCHOOL    | CITY OF GREEN BAY |
| <b>95731</b> | GOVERNMENT OFFICES                    | MEDICAL EXAMINER             | CITY OF GREEN BAY |



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|--------------|--------------------------------------------------|------------------------------|-------------------|
| <b>95782</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | RED SMITH ELEMENTARY SCHOOL  | CITY OF GREEN BAY |
| <b>95899</b> | ELDERLY CARE FACILITY                            | BORNEMANN CBRF NORTH - NH    | CITY OF GREEN BAY |
| <b>95900</b> | CHILD CARE SERVICE                               | BRIGHT BEGINNINGS CHILD CARE | CITY OF GREEN BAY |
| <b>95905</b> | DAY CARE                                         | ENCOMPASS CHILD CARE         | CITY OF GREEN BAY |
| <b>95932</b> | NURSING & CONVALESCENT HOMES                     | FREEDOM HOUSE MINISTRIES     | CITY OF GREEN BAY |
| <b>95952</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | SOUTHWEST HIGH SCHOOL        | CITY OF GREEN BAY |
| <b>95953</b> | HIGH SCHOOL & RED CROSS DESIGNATED SHELTER       | WEST HIGH SCHOOL             | CITY OF GREEN BAY |
| <b>95956</b> | SCHOOL                                           | NEW LUTHERAN HIGH SCHOOL     | CITY OF GREEN BAY |
| <b>95957</b> | SCHOOL (K-8)                                     | ALDO LEOPOLD SCHOOL          | CITY OF GREEN BAY |
| <b>95982</b> | CHURCH & RED CROSS DESIGNATED SHELTER            | INCARNATION LUTHERAN CHURCH  | CITY OF GREEN BAY |
| <b>96237</b> | STATE GOVERNMENT-PUBLIC HEALTH                   | PUBLIC HEALTH                | CITY OF GREEN BAY |
| <b>96297</b> | BUILDING IS USED AS A CHURCH                     | KINGDOM AGENDA CHURCH        | CITY OF GREEN BAY |
| <b>96479</b> | GUEST HOME                                       | ALTRUSA HOUSE                | CITY OF GREEN BAY |
| <b>96612</b> | CHURCH & RED CROSS DESIGNATED SHELTER            | FIRST UNITED METHODIST       | CITY OF GREEN BAY |
| <b>96623</b> | CHURCH                                           | SEVENTH DAY ADVENTIST CHURCH | CITY OF GREEN BAY |
| <b>96719</b> | ARMORY & RED CROSS DESIGNATED SHELTER            | NATIONAL GUARD               | CITY OF GREEN BAY |
| <b>96752</b> | ELEMENTARY SCHOOL & RED CROSS DESIGNATED SHELTER | BAIRD SCHOOL                 | CITY OF GREEN BAY |
| <b>96798</b> | Long Term Health Care Facility                   | SHELTER CARE                 | CITY OF GREEN BAY |
| <b>96807</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | BEAUMONT SCHOOL              | CITY OF GREEN BAY |
| <b>96815</b> | Sports Stadium/ Arenas                           | LAMBEAU - BELLIN HEALTH GATE | CITY OF GREEN BAY |
| <b>96887</b> | Prisons or Jails                                 | HUBER JAIL                   | CITY OF GREEN BAY |
| <b>96892</b> | COURTHOUSE                                       | COURTHOUSE                   | CITY OF GREEN BAY |
| <b>96948</b> | RECREATION CENTE                                 | BOYS AND GIRLS CLUB          | CITY OF GREEN BAY |

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|--------------|---------------------------------------|---------------------------|-------------------|
| <b>96952</b> | TELEVISION STATIONS & BROADCASTS      | WFRV                      | CITY OF GREEN BAY |
| <b>96953</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | CHAPPELL SCHOOL           | CITY OF GREEN BAY |
| <b>96987</b> | RAILROAD                              | CN RAILROAD               | CITY OF GREEN BAY |
| <b>97139</b> | MEDICAL OFFICE                        | ARBES DR PODIATRIST       | CITY OF GREEN BAY |
| <b>97190</b> | MUNICIPAL GARAGE                      | GB STREET DEPT            | CITY OF GREEN BAY |
| <b>97288</b> | PRE-SCHOOL                            | GARDEN OF EARLY LEARNING  | CITY OF GREEN BAY |
| <b>97302</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | GARDEN OF EARLY LEARNING  | CITY OF GREEN BAY |
| <b>97311</b> | CITY HALL                             | CITY HALL GREEN BAY       | CITY OF GREEN BAY |
| <b>97313</b> | Administrative Building               | FIRE DEPT SHOP            | CITY OF GREEN BAY |
| <b>97334</b> | FIRE STATION                          | GNFD FIRE STATION 1       | CITY OF GREEN BAY |
| <b>97335</b> | FIRE & AMBULANCE STATION              | GNFD FIRE STATION 2       | CITY OF GREEN BAY |
| <b>97336</b> | FIRE & AMBULANCE STATION              | GNFD FIRE STATION 3       | CITY OF GREEN BAY |
| <b>97337</b> | FIRE STATION                          | GNFD FIRE STATION 4       | CITY OF GREEN BAY |
| <b>97338</b> | FIRE & AMBULANCE STATION              | GNFD FIRE STATION 5       | CITY OF GREEN BAY |
| <b>97339</b> | FIRE & AMBULANCE STATION              | GNFD FIRE STATION 6       | CITY OF GREEN BAY |
| <b>97340</b> | FIRE & AMBULANCE STATION              | GNFD FIRE STATION 7       | CITY OF GREEN BAY |
| <b>97397</b> | CLINIC WITHIN HOSPITAL                | GB ONCOLOGY               | CITY OF GREEN BAY |
| <b>97424</b> | CLINIC                                | GB SURGICAL               | CITY OF GREEN BAY |
| <b>97428</b> | PETROLEUM STORAGE                     | GB TERMINAL CORP          | CITY OF GREEN BAY |
| <b>97492</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | KELLER ELEMENTARY SCHOOL  | CITY OF GREEN BAY |
| <b>97543</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | HOWE ELEMENTARY SCHOOL    | CITY OF GREEN BAY |
| <b>97546</b> | COUNTY GOVERNMENT-SOCIAL/HUMAN        | SOPHIE BEAUMONT BUILDING  | CITY OF GREEN BAY |
| <b>97591</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | JACKSON ELEMENTARY SCHOOL | CITY OF GREEN BAY |

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| <b>97625</b> | CARE-CHILD                                       | JUST 4 KIDS CHILD CARE           | CITY OF GREEN BAY |
| <b>97645</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | KENNEDY ELEMENTARY SCHOOL        | CITY OF GREEN BAY |
| <b>97765</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | LOMBARDI SCHOOL                  | CITY OF GREEN BAY |
| <b>97783</b> | SCHOOL & RED CROSS DESIGNATED SHELTER            | MAC ARTHUR SCHOOL                | CITY OF GREEN BAY |
| <b>97796</b> | CARE-OTHER                                       | CROSSROADS CARE CENTER - NH      | CITY OF GREEN BAY |
| <b>97797</b> | SKILLED NURSING CARE                             | CROSSROADS CARE CENTER - NH      | CITY OF GREEN BAY |
| <b>97848</b> | SEWER TREATMENT PLANT (236,000 customers served) | GB MET SEWER PLANT-NEW Water GBF | CITY OF GREEN BAY |
| <b>97863</b> | CLINIC                                           | VA CLINIC                        | CITY OF GREEN BAY |
| <b>98100</b> | SCHOOLS                                          | MARTIN ELEMENTARY SCHOOL         | CITY OF GREEN BAY |
| <b>98111</b> | CLINICS                                          | BELLIN HEALTH MRI                | CITY OF GREEN BAY |
| <b>98118</b> | OFFICE 591                                       | GB MUNICIPAL COURT               | CITY OF GREEN BAY |
| <b>98161</b> | CARE-OTHER                                       | CURATIVE CONNECTION              | CITY OF GREEN BAY |
| <b>98193</b> | CARE-OTHER                                       | NICOLET PSYCHIATRIC              | CITY OF GREEN BAY |
| <b>98194</b> | SCHOOLS                                          | NICOLET ELEMENTARY SCHOOL        | CITY OF GREEN BAY |
| <b>98207</b> | TECH COLLEGE                                     | NWTC                             | CITY OF GREEN BAY |
| <b>98372</b> | CLINIC                                           | OSMS                             | CITY OF GREEN BAY |
| <b>98433</b> | POST OFFICES                                     | POST OFFICE COFRIN               | CITY OF GREEN BAY |
| <b>98437</b> | POST OFFICE                                      | POST OFFICE MONROE               | CITY OF GREEN BAY |
| <b>98458</b> | WAREHOUSE                                        | PROCTOR AND GAMBLE               | CITY OF GREEN BAY |
| <b>98496</b> | SOCIAL SERVICE & WELFARE ORGAN                   | RED CROSS                        | CITY OF GREEN BAY |
| <b>98497</b> | NON PROFIT                                       | RED CROSS                        | CITY OF GREEN BAY |
| <b>98537</b> | CBRF 359 CLASS C                                 | HOUSE OF HOPE                    | CITY OF GREEN BAY |
| <b>98591</b> | HOMELESS SHELTER                                 | ST JOHNS SHELTER                 | CITY OF GREEN BAY |

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|---------------|-----------------------------------------------------|------------------------------------|----------------------|
| <b>98643</b>  | CHILDCARE FACILITY                                  | EARLY CHILDHOOD CENTER<br>ST MARYS | CITY OF GREEN<br>BAY |
| <b>98675</b>  | SCHOOL & RED CROSS DESIGNATED<br>SHELTER            | ANN SULLIVAN SCHOOL                | CITY OF GREEN<br>BAY |
| <b>98699</b>  | SCHOOL & RED CROSS DESIGNATED<br>SHELTER            | TANK ELEMENTARY<br>SCHOOL          | CITY OF GREEN<br>BAY |
| <b>98706</b>  | ROOMING HOUSE CB                                    | ATTIC CORRECTIONAL                 | CITY OF GREEN<br>BAY |
| <b>98743</b>  | Administrative Building                             | MINOKA HILL SCHOOL                 | CITY OF GREEN<br>BAY |
| <b>98918</b>  | OILS-PETROLEUM-MANUFACTURERS                        | US OIL COMPANY                     | CITY OF GREEN<br>BAY |
| <b>98965</b>  | WATER UTILITY OFFICES                               | GB WATER UTILITY                   | CITY OF GREEN<br>BAY |
| <b>98983</b>  | CHURCH                                              | WEST MORAVIAN CHURCH               | CITY OF GREEN<br>BAY |
| <b>98998</b>  | ELECTRICAL UTILITY COMPANY                          | WPS CORPORATION                    | CITY OF GREEN<br>BAY |
| <b>99002</b>  | CLINIC                                              | NEW COMMUNITY CLINIC               | CITY OF GREEN<br>BAY |
| <b>99004</b>  | ELEMENTARY SCHOOL & RED CROSS<br>DESIGNATED SHELTER | WILDER ELEMENTARY<br>SCHOOL        | CITY OF GREEN<br>BAY |
| <b>126264</b> | Wastewater Facility (Lift Station)                  | NEW Water MS-09                    | CITY OF GREEN<br>BAY |
| <b>139685</b> | COMMERCIAL STORAGE                                  | NA                                 | CITY OF GREEN<br>BAY |
| <b>189077</b> | FIRE STATION                                        | GB FIRE STATION 1                  | CITY OF GREEN<br>BAY |
| <b>189078</b> | FIRE STATION                                        | GB FIRE STATION 2                  | CITY OF GREEN<br>BAY |
| <b>189079</b> | FIRE STATION                                        | GB FIRE STATION 4                  | CITY OF GREEN<br>BAY |
| <b>189080</b> | FIRE STATION                                        | GB FIRE STATION 5                  | CITY OF GREEN<br>BAY |
| <b>189081</b> | FIRE STATION                                        | GB FIRE STATION 6                  | CITY OF GREEN<br>BAY |
| <b>189082</b> | FIRE STATION                                        | GB FIRE STATION 7                  | CITY OF GREEN<br>BAY |
| <b>201614</b> | Administrative Building                             | HEAD START LEARNING<br>CTR         | CITY OF GREEN<br>BAY |
| <b>238277</b> | ELECTRICAL SUBSTATION                               | NA                                 | CITY OF GREEN<br>BAY |
| <b>244297</b> | Bridge (road over water)                            | NA                                 | CITY OF GREEN<br>BAY |
| <b>244298</b> | Bridge (pedestrian over road)                       | NA                                 | CITY OF GREEN<br>BAY |

|               |                             |    |                   |
|---------------|-----------------------------|----|-------------------|
| <b>244299</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244300</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244301</b> | Bridge (railroad over road) | NA | CITY OF GREEN BAY |
| <b>244313</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244314</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244372</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244373</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244374</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244375</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244376</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244377</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244378</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244379</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244380</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244417</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244425</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244437</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244438</b> | Culvert (road over water)   | NA | CITY OF GREEN BAY |
| <b>244439</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244440</b> | Bridge (road over road)     | NA | CITY OF GREEN BAY |
| <b>244444</b> | Bridge (road over railroad) | NA | CITY OF GREEN BAY |
| <b>244445</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |
| <b>244446</b> | Bridge (road over water)    | NA | CITY OF GREEN BAY |

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|---------------|----------------------------------------------|-------------------------------|-------------------|
| <b>244451</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |
| <b>244452</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244453</b> | Bridge (road over former rail yard)          | NA                            | CITY OF GREEN BAY |
| <b>244512</b> | Bridge (road over road)                      | I-43 & GREENBRIER RD OVERPASS | CITY OF GREEN BAY |
| <b>244535</b> | Bridge (road over road, railroad, and water) | NA                            | CITY OF GREEN BAY |
| <b>244536</b> | Bridge (road over road, railroad, and water) | NA                            | CITY OF GREEN BAY |
| <b>244537</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244538</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244539</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244540</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244541</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244542</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244543</b> | Bridge (road over road)                      | I-43 & HUMBOLDT RD OVERPASS   | CITY OF GREEN BAY |
| <b>244544</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |
| <b>244545</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |
| <b>244550</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244589</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244590</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244591</b> | Bridge (road over water)                     | NA                            | CITY OF GREEN BAY |
| <b>244592</b> | Bridge (road over water and trail)           | NA                            | CITY OF GREEN BAY |
| <b>244593</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |
| <b>244594</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |
| <b>244595</b> | Bridge (road over road)                      | NA                            | CITY OF GREEN BAY |

|               |                                |                       |                   |
|---------------|--------------------------------|-----------------------|-------------------|
| <b>244596</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244597</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244598</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244599</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244600</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244601</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244602</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244603</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244772</b> | Bridge (railroad)              | NA                    | CITY OF GREEN BAY |
| <b>244773</b> | Bridge (road)                  | NA                    | CITY OF GREEN BAY |
| <b>244774</b> | Bridge (road)                  | NA                    | CITY OF GREEN BAY |
| <b>244775</b> | Bridge (road)                  | NA                    | CITY OF GREEN BAY |
| <b>244776</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244777</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244778</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244779</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244780</b> | Bridge (railroad over water)   | NA                    | CITY OF GREEN BAY |
| <b>244781</b> | Bridge (pedestrian over water) | EAST RIVER FOOTBRIDGE | CITY OF GREEN BAY |
| <b>244782</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244783</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244784</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244785</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |
| <b>244786</b> | Bridge (road over road)        | NA                    | CITY OF GREEN BAY |

|               |                                     |                             |                   |
|---------------|-------------------------------------|-----------------------------|-------------------|
| <b>244787</b> | Bridge (road over water)            | NA                          | CITY OF GREEN BAY |
| <b>244788</b> | Bridge (road over road)             | NA                          | CITY OF GREEN BAY |
| <b>244789</b> | Bridge (road over road)             | NA                          | CITY OF GREEN BAY |
| <b>244793</b> | Bridge (road over water)            | NA                          | CITY OF GREEN BAY |
| <b>244797</b> | Bridge (road over water)            | NA                          | CITY OF GREEN BAY |
| <b>244798</b> | Bridge (railroad over water)        | NA                          | CITY OF GREEN BAY |
| <b>244829</b> | Bridge (railroad over water)        | NA                          | CITY OF GREEN BAY |
| <b>244830</b> | Bridge (road over road)             | I-43 & HUMBOLDT RD OVERPASS | CITY OF GREEN BAY |
| <b>244831</b> | Bridge (road over water)            | NA                          | CITY OF GREEN BAY |
| <b>244832</b> | Bridge (road over road)             | NA                          | CITY OF GREEN BAY |
| <b>245493</b> | Wastewater Facility (Lift Station?) | NEW Water MS-05             | CITY OF GREEN BAY |
| <b>245494</b> | Wastewater Facility (Lift Station?) | NEW Water MS-06             | CITY OF GREEN BAY |
| <b>247092</b> | Wastewater Facility                 | NEW Water MS-13             | CITY OF GREEN BAY |
| <b>252740</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>252748</b> | Dike                                | NA                          | CITY OF GREEN BAY |
| <b>252756</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>252759</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>252762</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>252765</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>252766</b> | Dam                                 | NA                          | CITY OF GREEN BAY |
| <b>253501</b> | Electrical substation               | NA                          | CITY OF GREEN BAY |
| <b>253908</b> | Dike extending along bayshore       | NA                          | CITY OF GREEN BAY |
| <b>96888</b>  | PUBLIC SAFETY & COMMUNICATIONS      | BC PUBLIC SAFETY            | CITY OF GREEN BAY |



|               |                                                  |                        |                      |
|---------------|--------------------------------------------------|------------------------|----------------------|
| <b>78055</b>  | RED CROSS DESIGNATED SHELTER?<br>(confirm)       | NA                     | TOWN OF EATON        |
| <b>78313</b>  | Radio/Television Transmission<br>Towers/Antennae | NA                     | TOWN OF EATON        |
| <b>81662</b>  | TOWN HALL                                        | EATON TOWN HALL        | TOWN OF EATON        |
| <b>97123</b>  | FIRE STATION                                     | DNFD FIRE STATION 2    | TOWN OF EATON        |
| <b>189074</b> | FIRE STATION                                     | DENMARK FIRE STATION 2 | TOWN OF EATON        |
| <b>252767</b> | Dam                                              | NA                     | TOWN OF EATON        |
| <b>5837</b>   | COMMUNICATIONS TOWER                             | WFRV TOWER             | TOWN OF<br>GLENMORE  |
| <b>79858</b>  | ELECTRICAL SUBSTATION                            | WPS SUB STATION 10     | TOWN OF<br>GLENMORE  |
| <b>83941</b>  | RADIO TOWER                                      | RADIO TOWER            | TOWN OF<br>GLENMORE  |
| <b>88345</b>  | RADIO/TELEVISION TRANSMISSION<br>TOWERS/ANTENNAE | NA                     | TOWN OF<br>GLENMORE  |
| <b>98483</b>  | RADIO TOWER                                      | Radio Tower            | TOWN OF<br>GLENMORE  |
| <b>98551</b>  | BC RADIO TOWER                                   | BC TOWER - SCRAYS HILL | TOWN OF<br>GLENMORE  |
| <b>133493</b> | RADIO TOWER                                      | NA                     | TOWN OF<br>GLENMORE  |
| <b>135961</b> | RADIO TOWER - AVIATION                           | RADIO TOWER - FAA      | TOWN OF<br>GLENMORE  |
| <b>144910</b> | TOWN HALL & RED CROSS DESIGNATED<br>SHELTER      | GLENMORE TOWN HALL     | TOWN OF<br>GLENMORE  |
| <b>144913</b> | COMMUNICATIONS TOWER                             | NBC 26 TOWER           | TOWN OF<br>GLENMORE  |
| <b>144919</b> | RADIO TOWER                                      | WAPL FM RADIO TOWER    | TOWN OF<br>GLENMORE  |
| <b>244362</b> | Bridge (road over water)                         | NA                     | TOWN OF<br>GLENMORE  |
| <b>244572</b> | Bridge (road over water)                         | NA                     | TOWN OF<br>GLENMORE  |
| <b>244619</b> | Bridge (road over water)                         | NA                     | TOWN OF<br>GLENMORE  |
| <b>78309</b>  | CELL TOWER                                       | NA                     | TOWN OF GREEN<br>BAY |
| <b>79399</b>  | TOWN HALL                                        | TOWN OF GREEN BAY HALL | TOWN OF GREEN<br>BAY |
| <b>79400</b>  | ELECTRICAL SUBSTATION                            | WPS SUB STATION 3      | TOWN OF GREEN<br>BAY |
| <b>81274</b>  | UTILITY TOWER                                    | UTILITY TOWER          | TOWN OF GREEN<br>BAY |
| <b>83940</b>  | RADIO TOWER                                      | RADIO TOWER            | TOWN OF GREEN<br>BAY |

|               |                                       |                                   |                   |
|---------------|---------------------------------------|-----------------------------------|-------------------|
| <b>85749</b>  | CELL TOWER                            | NA                                | TOWN OF GREEN BAY |
| <b>94889</b>  | Pre-School/Day Care                   | DAY BY DAY DISCOVERIES CHILD CARE | TOWN OF GREEN BAY |
| <b>98438</b>  | POST OFFICE                           | POST OFFICE NEW FRANKEN           | TOWN OF GREEN BAY |
| <b>244316</b> | Bridge (road over water)              | NA                                | TOWN OF GREEN BAY |
| <b>244368</b> | Bridge (road over water)              | NA                                | TOWN OF GREEN BAY |
| <b>244369</b> | Bridge (road over water)              | NA                                | TOWN OF GREEN BAY |
| <b>244791</b> | Bridge (road over road)               | NA                                | TOWN OF GREEN BAY |
| <b>244792</b> | Bridge (road over road)               | NA                                | TOWN OF GREEN BAY |
| <b>244795</b> | Bridge (road over water)              | NA                                | TOWN OF GREEN BAY |
| <b>247895</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-05-MS-17         | TOWN OF GREEN BAY |
| <b>247896</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-06               | TOWN OF GREEN BAY |
| <b>247897</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-07               | TOWN OF GREEN BAY |
| <b>247898</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-08               | TOWN OF GREEN BAY |
| <b>136</b>    | LIFT STATION                          | HOLLAND SANITARY LIFT STATION     | TOWN OF HOLLAND   |
| <b>206</b>    | WATER TOWER                           | HOLLANDTOWN WATER TOWER           | TOWN OF HOLLAND   |
| <b>82077</b>  | TOWN HALL                             | HOLLAND TOWN HALL                 | TOWN OF HOLLAND   |
| <b>85205</b>  | Primary Schools                       | NA                                | TOWN OF HOLLAND   |
| <b>95985</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | ST CLARE PARISH                   | TOWN OF HOLLAND   |
| <b>97446</b>  | BC RADIO TOWER                        | BC TOWER - GREENLEAF              | TOWN OF HOLLAND   |
| <b>97522</b>  | FIRE STATION                          | HOFD FIRE STATION                 | TOWN OF HOLLAND   |
| <b>189087</b> | FIRE STATION                          | HOLLANDTOWN FIRE STATION          | TOWN OF HOLLAND   |
| <b>244349</b> | Bridge (road over water)              | NA                                | TOWN OF HOLLAND   |
| <b>244351</b> | Bridge (road over water)              | NA                                | TOWN OF HOLLAND   |

|               |                            |                     |                  |
|---------------|----------------------------|---------------------|------------------|
| <b>244352</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244353</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244354</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244355</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244583</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244584</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244585</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244586</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244814</b> | Bridge (road over water)   | NA                  | TOWN OF HOLLAND  |
| <b>244815</b> | Bridge (trail over water)  | NA                  | TOWN OF HOLLAND  |
| <b>252743</b> | Dam                        | NA                  | TOWN OF HOLLAND  |
| <b>252746</b> | Dam                        | NA                  | TOWN OF HOLLAND  |
| <b>252749</b> | Dam                        | NA                  | TOWN OF HOLLAND  |
| <b>97242</b>  | WATER FILTRATION PLANT     | GB FILTRATION PLANT | TOWN OF HUMBOLDT |
| <b>244367</b> | Bridge (road over water)   | NA                  | TOWN OF HUMBOLDT |
| <b>244551</b> | Bridge (road over water)   | NA                  | TOWN OF HUMBOLDT |
| <b>244794</b> | Bridge (road over water)   | NA                  | TOWN OF HUMBOLDT |
| <b>244796</b> | Culverts (road over water) | NA                  | TOWN OF HUMBOLDT |
| <b>13372</b>  | Wastewater Facility        | NEW Water MS-10     | TOWN OF LAWRENCE |
| <b>14841</b>  | TOWN UTILITY?              | NA                  | TOWN OF LAWRENCE |
| <b>78839</b>  | PIPELINE TERMINAL          | NA                  | TOWN OF LAWRENCE |
| <b>80405</b>  | ELECTRICAL SUBSTATION      | WPS SUB STATION 6   | TOWN OF LAWRENCE |
| <b>83285</b>  | CLINIC                     | PREVEA CLINIC       | TOWN OF LAWRENCE |

|               |                            |                                      |                     |
|---------------|----------------------------|--------------------------------------|---------------------|
| <b>97493</b>  | SCHOOL                     | HEMLOCK CREEK<br>ELEMENTARY          | TOWN OF<br>LAWRENCE |
| <b>97690</b>  | FIRE STATION               | LWFD FIRE STATION 2                  | TOWN OF<br>LAWRENCE |
| <b>97691</b>  | FIRE STATION               | LWFD FIRE STATION 1                  | TOWN OF<br>LAWRENCE |
| <b>189090</b> | FIRE STATION               | LAWRENCE FIRE STATION 2              | TOWN OF<br>LAWRENCE |
| <b>189091</b> | FIRE STATION               | LAWRENCE FIRE STATION 1              | TOWN OF<br>LAWRENCE |
| <b>244304</b> | Bridge (road over water)   | MID VALLEY DR &<br>ASHWAUBENON CREEK | TOWN OF<br>LAWRENCE |
| <b>244305</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244306</b> | Bridge (road over road)    | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244318</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244335</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244336</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244514</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244566</b> | Bridge (road over road)    | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244621</b> | Culverts (road over water) | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244635</b> | Bridge (road over road)    | I-41 & SCHEURING RD<br>OVERPASS      | TOWN OF<br>LAWRENCE |
| <b>244637</b> | Bridge (road)              | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244659</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244660</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244661</b> | Bridge (road over road)    | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244662</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244663</b> | Culvert (road over water)  | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244664</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |
| <b>244665</b> | Bridge (road over water)   | NA                                   | TOWN OF<br>LAWRENCE |

|               |                                |                               |                   |
|---------------|--------------------------------|-------------------------------|-------------------|
| <b>244666</b> | Bridge (road over water)       | NA                            | TOWN OF LAWRENCE  |
| <b>244667</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>244668</b> | Bridge (road over water)       | NA                            | TOWN OF LAWRENCE  |
| <b>244669</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>244670</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>244671</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>244672</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>244673</b> | Culvert (road over water)      | NA                            | TOWN OF LAWRENCE  |
| <b>252744</b> | Dam                            | NA                            | TOWN OF LAWRENCE  |
| <b>252752</b> | Dam                            | NA                            | TOWN OF LAWRENCE  |
| <b>82149</b>  | COMMERCIAL                     | SAGE MEADOWS                  | TOWN OF LAWRENCE  |
| <b>6003</b>   | SEWER & WATER INFRASTRUCTURE   | LEDGEVIEW SANITARY DISTRICT   | TOWN OF LEDGEVIEW |
| <b>78977</b>  | SANITARY DIST                  | Ledgeview Sanitary District 2 | TOWN OF LEDGEVIEW |
| <b>79848</b>  | BUILDING                       | LEDGEVIEW NURSING HOME - CLSD | TOWN OF LEDGEVIEW |
| <b>79855</b>  | ELECTRICAL SUBSTATION          | WPS SUB STATION 7             | TOWN OF LEDGEVIEW |
| <b>81730</b>  | ELDERLY CARE FACILITY          | CARATON COMMONS               | TOWN OF LEDGEVIEW |
| <b>81787</b>  | Long Term Health Care Facility | CARATON COMMONS               | TOWN OF LEDGEVIEW |
| <b>84608</b>  | MEDICAL CLINIC                 | MERCY FAMILY MEDICAL          | TOWN OF LEDGEVIEW |
| <b>85188</b>  | UTILITIES                      | CELLCOM TOWER                 | TOWN OF LEDGEVIEW |
| <b>94825</b>  | ELEMENTARY SCHOOL              | HERITAGE ELEMENTARY SCHOOL    | TOWN OF LEDGEVIEW |
| <b>95429</b>  | CLINIC                         | PREVEA CLINIC                 | TOWN OF LEDGEVIEW |
| <b>95436</b>  | CLINIC                         | BELLIN HEALTH CENTER          | TOWN OF LEDGEVIEW |
| <b>96198</b>  | TOWER                          | WI PUBLIC RADIO-TV TOWER      | TOWN OF LEDGEVIEW |

|               |                           |                            |                   |
|---------------|---------------------------|----------------------------|-------------------|
| <b>96950</b>  | COMMUNICATIONS TOWER      | WBAY TOWER                 | TOWN OF LEDGEVIEW |
| <b>97181</b>  | MIDDLE SCHOOL             | DEPERE MIDDLE SCHOOL       | TOWN OF LEDGEVIEW |
| <b>97276</b>  | UTILITIES                 | FOX 11 TOWER               | TOWN OF LEDGEVIEW |
| <b>97779</b>  | FIRE STATION              | LVFD FIRE STATION 1        | TOWN OF LEDGEVIEW |
| <b>97780</b>  | FIRE STATION              | LVFD FIRE STATION 2        | TOWN OF LEDGEVIEW |
| <b>189092</b> | FIRE STATION              | LEDGEVIEW FIRE STATION 1   | TOWN OF LEDGEVIEW |
| <b>189093</b> | FIRE STATION              | LEDGEVIEW FIRE STATION 2   | TOWN OF LEDGEVIEW |
| <b>244522</b> | Culvert (road over water) | NA                         | TOWN OF LEDGEVIEW |
| <b>244524</b> | Bridge (road over road)   | I-43 & CTH MM OVERPASS     | TOWN OF LEDGEVIEW |
| <b>244525</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244526</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244527</b> | Bridge (road over road)   | NA                         | TOWN OF LEDGEVIEW |
| <b>244528</b> | Bridge (road over road)   | NA                         | TOWN OF LEDGEVIEW |
| <b>244534</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244552</b> | Bridge (road over road)   | I-43 & PINE GROVE OVERPASS | TOWN OF LEDGEVIEW |
| <b>244553</b> | Bridge (road over road)   | I-43 & PINE GROVE OVERPASS | TOWN OF LEDGEVIEW |
| <b>244558</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244560</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244562</b> | Bridge (road over water)  | NA                         | TOWN OF LEDGEVIEW |
| <b>244617</b> | Bridge (road over road)   | NA                         | TOWN OF LEDGEVIEW |
| <b>244618</b> | Bridge (road over road)   | NA                         | TOWN OF LEDGEVIEW |
| <b>244639</b> | Culvert (road over water) | NA                         | TOWN OF LEDGEVIEW |
| <b>244640</b> | Bridge (road over road)   | I-43 & CTH MM OVERPASS     | TOWN OF LEDGEVIEW |

|               |                                           |                                 |                                 |
|---------------|-------------------------------------------|---------------------------------|---------------------------------|
| <b>244641</b> | Culvert (road over water)                 | NA                              | TOWN OF LEDGEVIEW               |
| <b>244643</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244644</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244645</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244646</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244647</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244819</b> | Bridge (road over water)                  | NA                              | TOWN OF LEDGEVIEW               |
| <b>244822</b> | Culverts (road over water)                | NA                              | TOWN OF LEDGEVIEW               |
| <b>247902</b> | Sewerage district building                | NEW Water MS-03                 | TOWN OF LEDGEVIEW               |
| <b>252745</b> | Dam                                       | NA                              | TOWN OF LEDGEVIEW               |
| <b>257908</b> | Bridge (railroad over road and water)     | NA                              | TOWN OF LEDGEVIEW               |
| <b>247899</b> | Wastewater Facility (Lift Station)        | NEW Water EBS-LS-09             | TOWN OF LUXEMBURG (KEWAUNEE CO) |
| <b>81623</b>  | K-8 SCHOOL & RED CROSS DESIGNATED SHELTER | ZION LUTHERAN SCHOOL OF WAYSIDE | TOWN OF MORRISON                |
| <b>96537</b>  | TOWN HALL                                 | MORRISON TOWN HALL              | TOWN OF MORRISON                |
| <b>96943</b>  | PHONE COMPANY                             | WAYSIDE TELEPHONE CO            | TOWN OF MORRISON                |
| <b>98091</b>  | FIRE STATION                              | MOFD FIRE DEPT                  | TOWN OF MORRISON                |
| <b>98558</b>  | SEWAGE TREATMENT                          | MORRISON SEWAGE PLAN            | TOWN OF MORRISON                |
| <b>99037</b>  | FIRE STATION                              | WSFD FIRE STATION               | TOWN OF MORRISON                |
| <b>99047</b>  | School                                    | MORRISON LUTHERAN SCHOOL        | TOWN OF MORRISON                |
| <b>189094</b> | FIRE STATION                              | MORRISON FIRE DEPT              | TOWN OF MORRISON                |
| <b>189100</b> | FIRE STATION                              | WAYSIDE FIRE STATION            | TOWN OF MORRISON                |
| <b>244293</b> | Bridge (road over water)                  | NA                              | TOWN OF MORRISON                |
| <b>244294</b> | Bridge (road over water)                  | NA                              | TOWN OF MORRISON                |

|               |                           |                     |                     |
|---------------|---------------------------|---------------------|---------------------|
| <b>244317</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244356</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244357</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244358</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244359</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244360</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244361</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244570</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244571</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244579</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244580</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244581</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244812</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>244813</b> | Bridge (road over water)  | NA                  | TOWN OF MORRISON    |
| <b>80407</b>  | TOWERS MANUFACTURERS      | AMERICAN TOWER CORP | TOWN OF NEW DENMARK |
| <b>97090</b>  | BC RADIO TOWER            | BC TOWER - DENMARK  | TOWN OF NEW DENMARK |
| <b>244363</b> | Bridge (road over water)  | NA                  | TOWN OF NEW DENMARK |
| <b>244364</b> | Bridge (road over water)  | NA                  | TOWN OF NEW DENMARK |
| <b>244365</b> | Bridge (road over water)  | NA                  | TOWN OF NEW DENMARK |
| <b>244366</b> | Bridge (road over water)  | NA                  | TOWN OF NEW DENMARK |
| <b>244554</b> | Bridge (road over road)   | NA                  | TOWN OF NEW DENMARK |
| <b>244555</b> | Bridge (road over road)   | NA                  | TOWN OF NEW DENMARK |
| <b>244556</b> | Culvert (road over water) | NA                  | TOWN OF NEW DENMARK |



|               |                              |    |                     |
|---------------|------------------------------|----|---------------------|
| <b>244565</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244573</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244574</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244575</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244576</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244577</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244578</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244642</b> | Culvert (road over water)    | NA | TOWN OF NEW DENMARK |
| <b>244649</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244650</b> | Culvert (road over water)    | NA | TOWN OF NEW DENMARK |
| <b>244651</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244652</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244653</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244655</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244656</b> | Culvert (road over water)    | NA | TOWN OF NEW DENMARK |
| <b>244657</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244658</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>244807</b> | Bridge (railroad over water) | NA | TOWN OF NEW DENMARK |
| <b>244808</b> | Bridge (road over trail)     | NA | TOWN OF NEW DENMARK |
| <b>244809</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244810</b> | Bridge (road over road)      | NA | TOWN OF NEW DENMARK |
| <b>244811</b> | Bridge (road over water)     | NA | TOWN OF NEW DENMARK |
| <b>252734</b> | Dam                          | NA | TOWN OF NEW DENMARK |

|               |                                       |                       |                     |
|---------------|---------------------------------------|-----------------------|---------------------|
| <b>252747</b> | Dam                                   | NA                    | TOWN OF NEW DENMARK |
| <b>93244</b>  | CELL TOWER                            | NA                    | TOWN OF PITTSFIELD  |
| <b>93613</b>  | SCHOOL                                | LANNOME SCHOOL        | TOWN OF PITTSFIELD  |
| <b>96555</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | PEACE LUTHERAN CHURCH | TOWN OF PITTSFIELD  |
| <b>97258</b>  | BC RADIO TOWER                        | BC TOWER - FLINTVILLE | TOWN OF PITTSFIELD  |
| <b>98484</b>  | RADIO TOWER                           | WQLH RADIO TOWER      | TOWN OF PITTSFIELD  |
| <b>230668</b> | CELL TOWER                            | NA                    | TOWN OF PITTSFIELD  |
| <b>244320</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244321</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244322</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244323</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244324</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244325</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244387</b> | Bridge (road over road)               | NA                    | TOWN OF PITTSFIELD  |
| <b>244392</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244395</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244398</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244400</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244404</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244405</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244408</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244411</b> | Bridge (road over water)              | NA                    | TOWN OF PITTSFIELD  |
| <b>244587</b> | Bridge (road over road)               | NA                    | TOWN OF PITTSFIELD  |

|               |                                       |                                     |                    |
|---------------|---------------------------------------|-------------------------------------|--------------------|
| <b>244674</b> | Culvert (road over water)             | NA                                  | TOWN OF PITTSFIELD |
| <b>244675</b> | Bridge (road over water)              | NA                                  | TOWN OF PITTSFIELD |
| <b>244676</b> | Bridge (road over water)              | NA                                  | TOWN OF PITTSFIELD |
| <b>244759</b> | Culverts (road over water)            | NA                                  | TOWN OF PITTSFIELD |
| <b>244760</b> | Bridge (trail over water)             | NA                                  | TOWN OF PITTSFIELD |
| <b>244761</b> | Bridge (trail over water)             | NA                                  | TOWN OF PITTSFIELD |
| <b>249092</b> | LIFT STATION                          | LIFT STATION 11919                  | TOWN OF PITTSFIELD |
| <b>249093</b> | LIFT STATION                          | PITTSFIELD LIFT STATION - KUNESH RD | TOWN OF PITTSFIELD |
| <b>5525</b>   | SUBSTATION                            | OLD MARTIN RD SUBSTATION            | TOWN OF ROCKLAND   |
| <b>98523</b>  | CITY GOVERNMENT-EXECUTIVE OFFI        | ROCKLAND TOWN HALL                  | TOWN OF ROCKLAND   |
| <b>244343</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244677</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244678</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244679</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244818</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244820</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>244824</b> | Bridge (road over water)              | NA                                  | TOWN OF ROCKLAND   |
| <b>252735</b> | Dam                                   | NA                                  | TOWN OF ROCKLAND   |
| <b>252737</b> | Dam                                   | NA                                  | TOWN OF ROCKLAND   |
| <b>80428</b>  | Water Supply Booster/Pumping Stations | SCOTT SANITARY DIST                 | TOWN OF SCOTT      |
| <b>82079</b>  | TOWN HALL                             | SCOTT TOWN HALL                     | TOWN OF SCOTT      |
| <b>93478</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | ST KILLIANS CHURCH                  | TOWN OF SCOTT      |
| <b>97254</b>  | GOVERNMENT OFFICES                    | US FISH AND WILDLIFE SERVICE        | TOWN OF SCOTT      |
| <b>98177</b>  | FIRE STATION                          | NFFD FIRE STATION                   | TOWN OF SCOTT      |
| <b>98550</b>  | WATER UTILITY                         | WATER TOWER - SCOTT                 | TOWN OF SCOTT      |

|               |                                       |                                 |                     |
|---------------|---------------------------------------|---------------------------------|---------------------|
| <b>98976</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER | WEQUIOCK SCHOOL                 | TOWN OF SCOTT       |
| <b>134764</b> | Wastewater Facility                   | NEW Water MS-14A                | TOWN OF SCOTT       |
| <b>167136</b> | TOWN UTILITY (PRV STATION)            | NEW Water MS-15                 | TOWN OF SCOTT       |
| <b>189095</b> | FIRE STATION                          | NEW FRANKEN FIRE DEPARTMENT     | TOWN OF SCOTT       |
| <b>244370</b> | Bridge (road over water)              | NA                              | TOWN OF SCOTT       |
| <b>244371</b> | Bridge (road over water)              | NA                              | TOWN OF SCOTT       |
| <b>244790</b> | Bridge (road over water)              | NA                              | TOWN OF SCOTT       |
| <b>247891</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-01-MS-16       | TOWN OF SCOTT       |
| <b>247892</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-02             | TOWN OF SCOTT       |
| <b>247893</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-03             | TOWN OF SCOTT       |
| <b>247894</b> | Wastewater Facility (Lift Station)    | NEW Water EBS-LS-04             | TOWN OF SCOTT       |
| <b>78306</b>  | Water Supply Storage Tanks/Reservoirs | WRIGHTSTOWN SANITARY            | TOWN OF WRIGHTSTOWN |
| <b>79409</b>  | SEWAGE PLANT                          | WRIGHTSTOWN SEWAGE PLANT        | TOWN OF WRIGHTSTOWN |
| <b>80448</b>  | TOWN HALL                             | WRIGHTSTOWN TOWN HALL           | TOWN OF WRIGHTSTOWN |
| <b>93556</b>  | SCHOOLS                               | ST MARYS SCHOOL                 | TOWN OF WRIGHTSTOWN |
| <b>97328</b>  | FIRE STATION                          | GREENLEAF FIRE STATION          | TOWN OF WRIGHTSTOWN |
| <b>97447</b>  | FIRE DEPT WATER SOURCE                | FILL SITE - GREENLEAF           | TOWN OF WRIGHTSTOWN |
| <b>98436</b>  | POST OFFICE                           | POST OFFICE GREENLEAF           | TOWN OF WRIGHTSTOWN |
| <b>120165</b> | SEWERAGE LIFT STATION                 | GREENLEAF SEWERAGE LIFT STATION | TOWN OF WRIGHTSTOWN |
| <b>189076</b> | FIRE STATION                          | GLFD FIRE STATION               | TOWN OF WRIGHTSTOWN |
| <b>227467</b> | COMMUNICATION TOWER                   | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244337</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244338</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244339</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244340</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244341</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |
| <b>244342</b> | Bridge (road over water)              | NA                              | TOWN OF WRIGHTSTOWN |

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|---------------|---------------------------------------|-----------------------|---------------------|
| <b>244344</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244345</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244347</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244348</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244350</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244546</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244557</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244567</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244568</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244569</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244582</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244816</b> | Bridge (road over water)              | NA                    | TOWN OF WRIGHTSTOWN |
| <b>244817</b> | Bridge (railroad over water)          | NA                    | TOWN OF WRIGHTSTOWN |
| <b>252761</b> | Dam                                   | NA                    | TOWN OF WRIGHTSTOWN |
| <b>18480</b>  | MUNICIPAL FACILITIES                  | NA                    | VILLAGE OF ALLOUEZ  |
| <b>18925</b>  | WATER TOWER                           | NA                    | VILLAGE OF ALLOUEZ  |
| <b>22126</b>  | WATER SUPPLY BOOSTER/PUMPING STATIONS | NA                    | VILLAGE OF ALLOUEZ  |
| <b>79434</b>  | POLICE STATION                        | ALLOUEZ PUBLIC SAFETY | VILLAGE OF ALLOUEZ  |
| <b>79438</b>  | PSYCH CLINIC                          | BELLIN PSYCHIATRIC    | VILLAGE OF ALLOUEZ  |
| <b>79442</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | FIRST BIBLE BAPTIST   | VILLAGE OF ALLOUEZ  |
| <b>79452</b>  | CLINIC                                | PREVEA CLINIC         | VILLAGE OF ALLOUEZ  |
| <b>81372</b>  | VILLAGE HALL                          | ALLOUEZ VILLAGE HALL  | VILLAGE OF ALLOUEZ  |
| <b>81592</b>  | SCHOOL                                | RESURRECTION SCHOOL   | VILLAGE OF ALLOUEZ  |

|               |                                                  |                                |                    |
|---------------|--------------------------------------------------|--------------------------------|--------------------|
| <b>82400</b>  | CLINIC                                           | BAY AREA NEPHROLOGY            | VILLAGE OF ALLOUEZ |
| <b>84067</b>  | Administrative Building                          | ALLOUEZ COMMUNITY CENTER       | VILLAGE OF ALLOUEZ |
| <b>86187</b>  | PRE-SCHOOL/DAY CARE                              | RIVERSIDE CHRISTIAN CHILD CARE | VILLAGE OF ALLOUEZ |
| <b>95412</b>  | ELDERLY CARE FACILITY                            | ODD FELLOWS HOME - NH          | VILLAGE OF ALLOUEZ |
| <b>95595</b>  | ELEMENTARY SCHOOL & RED CROSS DESIGNATED SHELTER | DOTY ELEMENTARY SCHOOL         | VILLAGE OF ALLOUEZ |
| <b>95851</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER            | WEBSTER ELEMENTARY SCHOOL      | VILLAGE OF ALLOUEZ |
| <b>95897</b>  | ELDERLY CARE FACILITY                            | BISHOPS COURT - NH             | VILLAGE OF ALLOUEZ |
| <b>97341</b>  | FIRE STATION & PUBLIC SAFETY                     | GNFD FIRE STATION 8            | VILLAGE OF ALLOUEZ |
| <b>97653</b>  | DIALYSIS CLINIC                                  | DAVITA DIALYSIS CTR            | VILLAGE OF ALLOUEZ |
| <b>97700</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER            | LANGLADE ELEMENTARY            | VILLAGE OF ALLOUEZ |
| <b>98649</b>  | DIALYSIS CLINIC                                  | DIALYSIS CENTER                | VILLAGE OF ALLOUEZ |
| <b>138234</b> | MUNICIPAL WELL                                   | ALLOUEZ WELL 4                 | VILLAGE OF ALLOUEZ |
| <b>140093</b> | Water Supply Wells                               | ALLOUEZ WELL 7                 | VILLAGE OF ALLOUEZ |
| <b>189083</b> | FIRE STATION & PUBLIC SAFETY                     | GB FIRE STATION 8              | VILLAGE OF ALLOUEZ |
| <b>244315</b> | Bridge (road over water)                         | NA                             | VILLAGE OF ALLOUEZ |
| <b>244457</b> | Bridge (road over road)                          | NA                             | VILLAGE OF ALLOUEZ |
| <b>244458</b> | Bridge (road over road)                          | NA                             | VILLAGE OF ALLOUEZ |
| <b>244491</b> | Bridge (road over road)                          | NA                             | VILLAGE OF ALLOUEZ |
| <b>244492</b> | Bridge (road over road)                          | NA                             | VILLAGE OF ALLOUEZ |
| <b>244493</b> | Bridge (road over road)                          | NA                             | VILLAGE OF ALLOUEZ |
| <b>244517</b> | Bridge (railroad over road and trail)            | NA                             | VILLAGE OF ALLOUEZ |
| <b>244547</b> | Bridge (railroad over water)                     | NA                             | VILLAGE OF ALLOUEZ |
| <b>244548</b> | Bridge (road over water)                         | NA                             | VILLAGE OF ALLOUEZ |

|               |                                       |                              |                        |
|---------------|---------------------------------------|------------------------------|------------------------|
| <b>244608</b> | Bridge (road over water)              | NA                           | VILLAGE OF ALLOUEZ     |
| <b>244609</b> | Bridge (road over water)              | NA                           | VILLAGE OF ALLOUEZ     |
| <b>244723</b> | Bridge (road over railroad)           | NA                           | VILLAGE OF ALLOUEZ     |
| <b>244725</b> | Bridge (railroad over road)           | NA                           | VILLAGE OF ALLOUEZ     |
| <b>244727</b> | Bridge (railroad over water)          | NA                           | VILLAGE OF ALLOUEZ     |
| <b>244728</b> | Bridge (railroad over water)          | NA                           | VILLAGE OF ALLOUEZ     |
| <b>245492</b> | Wastewater Facility (Lift Station?)   | NEW Water MS-04              | VILLAGE OF ALLOUEZ     |
| <b>248291</b> | Dialysis clinic                       | ST VINCENT REGIONAL DIALYSIS | VILLAGE OF ALLOUEZ     |
| <b>86808</b>  | ELDERLY CARE FACILITY                 | WYNDEMERE MEMORY CARE        | VILLAGE OF ALLOUEZ     |
| <b>284387</b> | SCHOOL                                | RESURRECTION CHURCH          | VILLAGE OF ALLOUEZ     |
| <b>17193</b>  | Pipeline facility?                    | PIPELINE                     | VILLAGE OF ASHWAUBENON |
| <b>18608</b>  | ELECTRICAL SUBSTATION                 | NA                           | VILLAGE OF ASHWAUBENON |
| <b>27487</b>  | FIRE STATION                          | AFFD STATION 2               | VILLAGE OF ASHWAUBENON |
| <b>79472</b>  | WATER TOWER                           | ASHWAUBENON WATER TOWER 2    | VILLAGE OF ASHWAUBENON |
| <b>79475</b>  | WATER WELL                            | ASHWAUBENON WATER WELL 3     | VILLAGE OF ASHWAUBENON |
| <b>79478</b>  | WATER WELL                            | ASHWAUBENON WATER WELL 5     | VILLAGE OF ASHWAUBENON |
| <b>79523</b>  | Daycare                               | CORMIER EARLY EDUCATION CTR  | VILLAGE OF ASHWAUBENON |
| <b>79603</b>  | Military Installations                | NAVAL RESERVE CENTER         | VILLAGE OF ASHWAUBENON |
| <b>79607</b>  | COLD STORAGE WAREHOUSE                | NORTHLAND COLD STORAGE       | VILLAGE OF ASHWAUBENON |
| <b>79622</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | PILGRIM CONGREGATION         | VILLAGE OF ASHWAUBENON |
| <b>81322</b>  | Airport                               | AIR HOST                     | VILLAGE OF ASHWAUBENON |
| <b>81594</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER | VALLEY VIEW SCHOOL           | VILLAGE OF ASHWAUBENON |
| <b>81621</b>  | SCHOOL                                | PARKVIEW MIDDLE SCHOOL       | VILLAGE OF ASHWAUBENON |

|              |                                       |                               |                        |
|--------------|---------------------------------------|-------------------------------|------------------------|
| <b>81653</b> | ARENA                                 | RESCH CENTER                  | VILLAGE OF ASHWAUBENON |
| <b>82790</b> | CARE-CHILD                            | STEPPING STONES CHILD CARE    | VILLAGE OF ASHWAUBENON |
| <b>82797</b> | ELDERLY CARE FACILITY                 | WOODSIDE HAVEN - NH           | VILLAGE OF ASHWAUBENON |
| <b>83495</b> | SCHOOL                                | ST JOSEPH SCHOOL              | VILLAGE OF ASHWAUBENON |
| <b>84287</b> | MEDICAL CLINIC                        | BAYCARE CLINIC                | VILLAGE OF ASHWAUBENON |
| <b>84351</b> | PREK - 8TH PRIVATE SCHOOL             | ENTERPRISE ACADEMY            | VILLAGE OF ASHWAUBENON |
| <b>84781</b> | CLINIC                                | BELLIN FAST CARE              | VILLAGE OF ASHWAUBENON |
| <b>85349</b> | CLINIC                                | BELLIN HEALTH CARE SERVICES   | VILLAGE OF ASHWAUBENON |
| <b>87744</b> | NA                                    | PREVEA PLASTIC SURGERY CENTER | VILLAGE OF ASHWAUBENON |
| <b>87816</b> | NA                                    | BAYCARE CLINIC                | VILLAGE OF ASHWAUBENON |
| <b>94897</b> | WATER TOWER                           | ASHWAUBENON WATER TOWER 1     | VILLAGE OF ASHWAUBENON |
| <b>94898</b> | PUBLIC SAFETY DEPT                    | ASHWAUBENON PUBLIC SAFETY     | VILLAGE OF ASHWAUBENON |
| <b>95434</b> | CLINIC                                | PREVEA CLINIC                 | VILLAGE OF ASHWAUBENON |
| <b>95765</b> | SCHOOL & RED CROSS DESIGNATED SHELTER | PIONEER ELEMENTARY SCHOOL     | VILLAGE OF ASHWAUBENON |
| <b>95896</b> | CHILD CARE SERVICE                    | ASHWAUBENON DAY CARE          | VILLAGE OF ASHWAUBENON |
| <b>95902</b> | CHILD CARE SERVICE                    | KINDERCARE                    | VILLAGE OF ASHWAUBENON |
| <b>95907</b> | CHILD CARE SERVICE                    | KIDZ IN MOTION                | VILLAGE OF ASHWAUBENON |
| <b>96604</b> | CLINIC                                | BELLIN HEALTH - TITLETOWN     | VILLAGE OF ASHWAUBENON |
| <b>96726</b> | FIRE & AMBULANCE STATION              | ASHWAUBENON PS STATION 1      | VILLAGE OF ASHWAUBENON |
| <b>96727</b> | FIRE STATION                          | ASHWAUBENON PS STATION 2      | VILLAGE OF ASHWAUBENON |
| <b>96731</b> | Arena Stadium                         | CORNERSTONE COMMUNITY CTR     | VILLAGE OF ASHWAUBENON |
| <b>96916</b> | CLINIC                                | BELLIN CANCER CENTER          | VILLAGE OF ASHWAUBENON |
| <b>96951</b> | COMMERCIALS-RADIO & TELEVISION        | NBC 26                        | VILLAGE OF ASHWAUBENON |



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|---------------|--------------------------|---------------------|------------------------|
| <b>97232</b>  | NA                       | BILLIE KRESS CENTER | VILLAGE OF ASHWAUBENON |
| <b>97275</b>  | TV STATION               | FOX 11              | VILLAGE OF ASHWAUBENON |
| <b>97305</b>  | UTILITIES                | WPS GATE STATION    | VILLAGE OF ASHWAUBENON |
| <b>97417</b>  | RADIOLOGY CLINIC         | GB RADIOLOGY        | VILLAGE OF ASHWAUBENON |
| <b>98110</b>  | CLINIC                   | BELLIN HEALTH MRI   | VILLAGE OF ASHWAUBENON |
| <b>98913</b>  | Military Installations   | ARMY RESERVE CENTER | VILLAGE OF ASHWAUBENON |
| <b>98996</b>  | DOT                      | DEPT OF TRANS       | VILLAGE OF ASHWAUBENON |
| <b>101861</b> | Administrative Building  | ASHW VILLAGE GARAGE | VILLAGE OF ASHWAUBENON |
| <b>189070</b> | FIRE STATION             | AFFD STATION 1      | VILLAGE OF ASHWAUBENON |
| <b>244302</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244303</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244307</b> | Bridge (road over water) | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244308</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244309</b> | Bridge (road over water) | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244386</b> | Bridge (road over water) | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244441</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244442</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244461</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244465</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244470</b> | Bridge (road over water) | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244471</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244472</b> | Bridge (road over water) | NA                  | VILLAGE OF ASHWAUBENON |
| <b>244473</b> | Bridge (road over road)  | NA                  | VILLAGE OF ASHWAUBENON |

|               |                                      |    |                        |
|---------------|--------------------------------------|----|------------------------|
| <b>244474</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244475</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244476</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244477</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244478</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244479</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244480</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244481</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244482</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244483</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244484</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244485</b> | Bridge (over road and railroad)      | NA | VILLAGE OF ASHWAUBENON |
| <b>244486</b> | Bridge (over road and railroad)      | NA | VILLAGE OF ASHWAUBENON |
| <b>244487</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244488</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244489</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244498</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244499</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244500</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |
| <b>244501</b> | Bridge (road over road and railroad) | NA | VILLAGE OF ASHWAUBENON |
| <b>244502</b> | Bridge (road over road and railroad) | NA | VILLAGE OF ASHWAUBENON |
| <b>244503</b> | Bridge (road over road)              | NA | VILLAGE OF ASHWAUBENON |
| <b>244504</b> | Bridge (road over water)             | NA | VILLAGE OF ASHWAUBENON |

|               |                              |                  |                        |
|---------------|------------------------------|------------------|------------------------|
| <b>244505</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244604</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244605</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244606</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244607</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244626</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244627</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244628</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244629</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244630</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244631</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244632</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244633</b> | Bridge (road over road)      | NA               | VILLAGE OF ASHWAUBENON |
| <b>244769</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244770</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244771</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>244825</b> | Bridge (railroad over water) | NA               | VILLAGE OF ASHWAUBENON |
| <b>244826</b> | Bridge (road over water)     | NA               | VILLAGE OF ASHWAUBENON |
| <b>247491</b> | Wastewater Facility          | NEW Water MS-13A | VILLAGE OF ASHWAUBENON |
| <b>247492</b> | Wastewater Facility          | NEW Water MS-13B | VILLAGE OF ASHWAUBENON |
| <b>247493</b> | Wastewater Facility          | NEW Water MS-13C | VILLAGE OF ASHWAUBENON |
| <b>247494</b> | Wastewater Facility          | NEW Water MS-13D | VILLAGE OF ASHWAUBENON |
| <b>252760</b> | Dam                          | NA               | VILLAGE OF ASHWAUBENON |

|               |                                       |                                      |                        |
|---------------|---------------------------------------|--------------------------------------|------------------------|
| <b>257907</b> | Bridge (railroad over water)          | NA                                   | VILLAGE OF ASHWAUBENON |
| <b>98539</b>  | ELDERLY CARE FACILITY                 | MAPLE RIDGE MGM HEALTHCARE - NH      | VILLAGE OF ASHWAUBENON |
| <b>13386</b>  | VILLAGE UTILITY?                      | NA                                   | VILLAGE OF BELLEVUE    |
| <b>16772</b>  | Water Supply Storage Tanks/Reservoirs | Water Tower                          | VILLAGE OF BELLEVUE    |
| <b>19987</b>  | SANITARY DISTRICT BUILDING            | BELLEVUE WELL 2                      | VILLAGE OF BELLEVUE    |
| <b>20144</b>  | WATER TOWER                           | NA                                   | VILLAGE OF BELLEVUE    |
| <b>22230</b>  | Wastewater Facility (Lift Station?)   | NEW Water MS-01                      | VILLAGE OF BELLEVUE    |
| <b>25521</b>  | Radio/Television Stations             | MIDWEST COMMUNICATIONS               | VILLAGE OF BELLEVUE    |
| <b>62708</b>  | LONG-TERM HEALTH CARE FACILITIES      | NA                                   | VILLAGE OF BELLEVUE    |
| <b>79681</b>  | Administrative Building               | BELLEVUE WATER DEPT                  | VILLAGE OF BELLEVUE    |
| <b>79686</b>  | ELDERLY CARE FACILITY                 | CENTURY RIDGE                        | VILLAGE OF BELLEVUE    |
| <b>79687</b>  | EMS                                   | COUNTY RESCUE STATION 1              | VILLAGE OF BELLEVUE    |
| <b>79695</b>  | NA                                    | VETERANS ASSISTANCE FOUNDATION       | VILLAGE OF BELLEVUE    |
| <b>79741</b>  | ELECTRICAL SUBSTATION                 | WPS SUB STATION                      | VILLAGE OF BELLEVUE    |
| <b>79742</b>  | ELECTRICAL SUBSTATION                 | WPS SUB STATION                      | VILLAGE OF BELLEVUE    |
| <b>80642</b>  | CHILD CARE                            | TINY TOWN CHILD CARE                 | VILLAGE OF BELLEVUE    |
| <b>81491</b>  | ELDERLY CARE FACILITY                 | CENTURY RIDGE - NH                   | VILLAGE OF BELLEVUE    |
| <b>81650</b>  | APARTMENTS                            | BELLEVUE RETIREMENT - NH             | VILLAGE OF BELLEVUE    |
| <b>82083</b>  | CARE-CHILD                            | KINDER CARE                          | VILLAGE OF BELLEVUE    |
| <b>84306</b>  | CARE-CHILD                            | STAY N PLAY CHILD CARE               | VILLAGE OF BELLEVUE    |
| <b>87995</b>  | Long Term Health Care Facility        | PATIENT PINES ASSISTED LIVING - 1721 | VILLAGE OF BELLEVUE    |
| <b>96000</b>  | College or University                 | BELLIN COLLEGE OF NURSING            | VILLAGE OF BELLEVUE    |
| <b>96073</b>  | MEDICAL CLINIC                        | BELLIN HEALTH GENERATIONS            | VILLAGE OF BELLEVUE    |

|               |                                       |                              |                     |
|---------------|---------------------------------------|------------------------------|---------------------|
| <b>96905</b>  | FIRE STATION                          | BVFD FIRE STATION 1          | VILLAGE OF BELLEVUE |
| <b>96906</b>  | FIRE STATION                          | BVFD FIRE STATION 2          | VILLAGE OF BELLEVUE |
| <b>97456</b>  | CARE-CHILD                            | CENTERPIECE                  | VILLAGE OF BELLEVUE |
| <b>97828</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER | MCAULIFFE SCHOOL             | VILLAGE OF BELLEVUE |
| <b>98592</b>  | SHERIFFS DEPT                         | BCSO                         | VILLAGE OF BELLEVUE |
| <b>189071</b> | FIRE STATION                          | BELLEVUE FIRE STATION 1      | VILLAGE OF BELLEVUE |
| <b>189072</b> | FIRE STATION                          | BELLEVUE FIRE STATION 2      | VILLAGE OF BELLEVUE |
| <b>198777</b> | AMBULANCE STATION                     | CR STATION 1                 | VILLAGE OF BELLEVUE |
| <b>244295</b> | Bridge (road over water)              | NA                           | VILLAGE OF BELLEVUE |
| <b>244296</b> | Bridge (road over water)              | NA                           | VILLAGE OF BELLEVUE |
| <b>244495</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |
| <b>244497</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |
| <b>244515</b> | Bridge (road over road)               | I-43 & MANITOWOC RD OVERPASS | VILLAGE OF BELLEVUE |
| <b>244519</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |
| <b>244520</b> | Bridge (road over water)              | NA                           | VILLAGE OF BELLEVUE |
| <b>244521</b> | Bridge (road over water)              | NA                           | VILLAGE OF BELLEVUE |
| <b>244523</b> | Culvert (road over water)             | NA                           | VILLAGE OF BELLEVUE |
| <b>244529</b> | Bridge (road over water)              | NA                           | VILLAGE OF BELLEVUE |
| <b>244530</b> | Culvert (road over water)             | NA                           | VILLAGE OF BELLEVUE |
| <b>244531</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |
| <b>244532</b> | Culvert (road over water)             | NA                           | VILLAGE OF BELLEVUE |
| <b>244533</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |
| <b>244549</b> | Bridge (road over road)               | NA                           | VILLAGE OF BELLEVUE |

|               |                             |    |                     |
|---------------|-----------------------------|----|---------------------|
| <b>244610</b> | Bridge (road over road)     | NA | VILLAGE OF BELLEVUE |
| <b>244611</b> | Bridge (road over road)     | NA | VILLAGE OF BELLEVUE |
| <b>244612</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244613</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244614</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244615</b> | Bridge (road over road)     | NA | VILLAGE OF BELLEVUE |
| <b>244616</b> | Bridge (railroad over road) | NA | VILLAGE OF BELLEVUE |
| <b>244634</b> | Bridge (road over road)     | NA | VILLAGE OF BELLEVUE |
| <b>244680</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244681</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244682</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244683</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244684</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244686</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244687</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244688</b> | Bridge (road over water)    | NA | VILLAGE OF BELLEVUE |
| <b>244689</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244690</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244691</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244692</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244693</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |
| <b>244694</b> | Bridge (road over road)     | NA | VILLAGE OF BELLEVUE |
| <b>244695</b> | Culvert (road over water)   | NA | VILLAGE OF BELLEVUE |

|               |                                    |                 |                     |
|---------------|------------------------------------|-----------------|---------------------|
| <b>244696</b> | Culvert (road over water)          | NA              | VILLAGE OF BELLEVUE |
| <b>244697</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244698</b> | Culvert (road over water)          | NA              | VILLAGE OF BELLEVUE |
| <b>244699</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244700</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244701</b> | Culvert (road over water)          | NA              | VILLAGE OF BELLEVUE |
| <b>244702</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244703</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244704</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244705</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244706</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244707</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244799</b> | Bridge (pedestrian over water)     | NA              | VILLAGE OF BELLEVUE |
| <b>244800</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244801</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244802</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244803</b> | Bridge (road over road)            | NA              | VILLAGE OF BELLEVUE |
| <b>244804</b> | Bridge (road over road)            | NA              | VILLAGE OF BELLEVUE |
| <b>244805</b> | Bridge (road over road)            | NA              | VILLAGE OF BELLEVUE |
| <b>244806</b> | Bridge (railroad over road)        | NA              | VILLAGE OF BELLEVUE |
| <b>244827</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>244828</b> | Bridge (road over water)           | NA              | VILLAGE OF BELLEVUE |
| <b>245491</b> | LIFT STATION (WASTEWATER FACILITY) | NEW Water MS-02 | VILLAGE OF BELLEVUE |

|               |                                       |                                   |                     |
|---------------|---------------------------------------|-----------------------------------|---------------------|
| <b>253906</b> | Water tower                           | BELLEVUE WATER TOWER              | VILLAGE OF BELLEVUE |
| <b>258707</b> | Culvert (road over water)             | NA                                | VILLAGE OF BELLEVUE |
| <b>2961</b>   | CHURCH & RED CROSS DESIGNATED SHELTER | OUR SAVIORS LUTHERAN CHURCH       | VILLAGE OF DENMARK  |
| <b>3691</b>   | WATER SYSTEM                          | VIL OF DENMARK WATER              | VILLAGE OF DENMARK  |
| <b>3757</b>   | SCHOOL                                | DENMARK ELEMENTARY SCHOOL         | VILLAGE OF DENMARK  |
| <b>78128</b>  | HEALTH CENTER                         | BELLIN HEALTH CENTER              | VILLAGE OF DENMARK  |
| <b>78778</b>  | COMMERCIAL                            | PRO GAS                           | VILLAGE OF DENMARK  |
| <b>79378</b>  | WATER UTILITY                         | DENMARK WATER DEPT                | VILLAGE OF DENMARK  |
| <b>79745</b>  | VILLAGE HALL                          | DENMARK VILLAGE HALL              | VILLAGE OF DENMARK  |
| <b>81595</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER | DENMARK MIDDLE SCHOOL             | VILLAGE OF DENMARK  |
| <b>81933</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER | DENMARK HIGH SCHOOL               | VILLAGE OF DENMARK  |
| <b>93636</b>  | CLINIC                                | AURORA HEALTH CENTER              | VILLAGE OF DENMARK  |
| <b>93696</b>  | CHURCH                                | ALL SAINTS RECTORY                | VILLAGE OF DENMARK  |
| <b>96139</b>  | CARE-CHILD                            | DENMARK EARLY CHILDHOOD CTR       | VILLAGE OF DENMARK  |
| <b>97089</b>  | WATER RESOURCE                        | FILL SITE - DENMARK - WATER TOWER | VILLAGE OF DENMARK  |
| <b>97122</b>  | FIRE STATION                          | DNFD FIRE STATION 1               | VILLAGE OF DENMARK  |
| <b>97306</b>  | UTILITIES                             | WPS GATE STATION                  | VILLAGE OF DENMARK  |
| <b>98434</b>  | POST OFFICE                           | POST OFFICE DENMARK               | VILLAGE OF DENMARK  |
| <b>98557</b>  | GOVERNMENT                            | DENMARK SEWAGE PLANT              | VILLAGE OF DENMARK  |
| <b>98939</b>  | AMBULANCE SERVICE                     | COUNTY RESCUE STATION 4           | VILLAGE OF DENMARK  |
| <b>189073</b> | FIRE STATION                          | DENMARK FIRE STATION 1            | VILLAGE OF DENMARK  |
| <b>198780</b> | AMBULANCE SERVICE                     | CR STATION 4                      | VILLAGE OF DENMARK  |
| <b>244559</b> | Bridge (road over road)               | NA                                | VILLAGE OF DENMARK  |



|               |                                               |                            |                    |
|---------------|-----------------------------------------------|----------------------------|--------------------|
| <b>244561</b> | Bridge (road over trail)                      | NA                         | VILLAGE OF DENMARK |
| <b>244638</b> | Bridge (road over road)                       | NA                         | VILLAGE OF DENMARK |
| <b>244708</b> | Bridge (road over road)                       | NA                         | VILLAGE OF DENMARK |
| <b>63127</b>  | OUTDOOR RECREATION                            | NA                         | VILLAGE OF HOBART  |
| <b>64365</b>  | WATER TOWER                                   | NA                         | VILLAGE OF HOBART  |
| <b>78254</b>  | FIRE STATION                                  | HOBART FIRE STATION 2      | VILLAGE OF HOBART  |
| <b>81612</b>  | SCHOOL                                        | HILLCREST SCHOOL           | VILLAGE OF HOBART  |
| <b>84357</b>  | RADIO/TELEVISION TRANSMISSION TOWERS/ANTENNAE | NA                         | VILLAGE OF HOBART  |
| <b>88545</b>  | WELL                                          | HOBART WATER WELL          | VILLAGE OF HOBART  |
| <b>93451</b>  | CHURCH & RED CROSS DESIGNATED SHELTER         | ST JOSEPH PARISH           | VILLAGE OF HOBART  |
| <b>96474</b>  | MUNICIPAL OFFICES                             | HOBART VILLAGE OFFICE      | VILLAGE OF HOBART  |
| <b>96681</b>  | AIRPORT FIRE STATION                          | ARFF                       | VILLAGE OF HOBART  |
| <b>97483</b>  | FIRE STATION                                  | HBFD FIRE STATION 1        | VILLAGE OF HOBART  |
| <b>97484</b>  | FIRE STATION                                  | HBFD FIRE STATION 2        | VILLAGE OF HOBART  |
| <b>98136</b>  | OTHER USES                                    | TRANS CANADA ANR PIPELINE  | VILLAGE OF HOBART  |
| <b>98235</b>  | CLINIC                                        | ONEIDA COMMUNITY HEALTH    | VILLAGE OF HOBART  |
| <b>98273</b>  | ADMINISTRATIVE BUILDING (Oneida)              | ONEIDA HOUSING AUTHORITY   | VILLAGE OF HOBART  |
| <b>98307</b>  | Pre-School/Day Care                           | ONEIDA CHILD CARE          | VILLAGE OF HOBART  |
| <b>98308</b>  | TRIBAL CIVIC CENTER                           | ONEIDA CIVIC CENTER        | VILLAGE OF HOBART  |
| <b>98309</b>  | TRIBAL                                        | ONEIDA LAND MANAGEMENT     | VILLAGE OF HOBART  |
| <b>98311</b>  | POLICE STATION                                | ONEIDA POLICE              | VILLAGE OF HOBART  |
| <b>98333</b>  | Administrative Building                       | ONEIDA VETERANS DEPARTMENT | VILLAGE OF HOBART  |
| <b>138854</b> | WATER WELL                                    | NA                         | VILLAGE OF HOBART  |

|               |                           |                       |                   |
|---------------|---------------------------|-----------------------|-------------------|
| <b>187070</b> | AIRPORT FIRE STATION      | AIRPORT FIRE          | VILLAGE OF HOBART |
| <b>189086</b> | FIRE STATION              | HOBART FIRE STATION 1 | VILLAGE OF HOBART |
| <b>244330</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244334</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244384</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244443</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244450</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244454</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244455</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244456</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244516</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244620</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244711</b> | Culvert (road over water) | NA                    | VILLAGE OF HOBART |
| <b>244712</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244713</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244714</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244715</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244716</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244717</b> | Culvert (road over water) | NA                    | VILLAGE OF HOBART |
| <b>244718</b> | Culvert (road over water) | NA                    | VILLAGE OF HOBART |
| <b>244719</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244720</b> | Bridge (road over water)  | NA                    | VILLAGE OF HOBART |
| <b>244721</b> | Culvert (road over water) | NA                    | VILLAGE OF HOBART |

|               |                                       |                                  |                   |
|---------------|---------------------------------------|----------------------------------|-------------------|
| <b>244722</b> | Culvert (road over water)             | NA                               | VILLAGE OF HOBART |
| <b>244767</b> | Bridge (former railroad over water)   | NA                               | VILLAGE OF HOBART |
| <b>244768</b> | Bridge (road over water)              | NA                               | VILLAGE OF HOBART |
| <b>244823</b> | Bridge (road over water)              | NA                               | VILLAGE OF HOBART |
| <b>247901</b> | Wastewater Facility (Lift Station?)   | NEW Water MS-07                  | VILLAGE OF HOBART |
| <b>252741</b> | Dam                                   | NA                               | VILLAGE OF HOBART |
| <b>252742</b> | Dam                                   | NA                               | VILLAGE OF HOBART |
| <b>252750</b> | Dam                                   | NA                               | VILLAGE OF HOBART |
| <b>252751</b> | Dam                                   | NA                               | VILLAGE OF HOBART |
| <b>252763</b> | Dam                                   | NA                               | VILLAGE OF HOBART |
| <b>65511</b>  | GAS GATE STATION                      | WPS GATE STATION                 | VILLAGE OF HOWARD |
| <b>66139</b>  | CHURCHES/TEMPLES/SYNAGOGUES           | NA                               | VILLAGE OF HOWARD |
| <b>80318</b>  | PRESCHOOL                             | BIG APPLE PRESCHOOL              | VILLAGE OF HOWARD |
| <b>80320</b>  | ELDERLY CARE FACILITY                 | CARDINAL RIDGE-NH                | VILLAGE OF HOWARD |
| <b>80324</b>  | DAYCARE                               | CUDDLE CARE DAY CARE             | VILLAGE OF HOWARD |
| <b>80341</b>  | PUBLIC WORKS                          | HOWARD PUBLIC WORKS              | VILLAGE OF HOWARD |
| <b>80395</b>  | ELECTRICAL SUBSTATION                 | WPS SUB STATION 2                | VILLAGE OF HOWARD |
| <b>80396</b>  | ELECTRICAL SUBSTATION                 | WPS SUB STATION 5                | VILLAGE OF HOWARD |
| <b>80931</b>  | CLINIC                                | PREVEA CLINIC                    | VILLAGE OF HOWARD |
| <b>81543</b>  | AMBULANCE BASE                        | COUNTY RESCUE STATION 2          | VILLAGE OF HOWARD |
| <b>83210</b>  | UTILITIES                             | WPS SUB STATION                  | VILLAGE OF HOWARD |
| <b>83494</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | ST JOHN THE BAPTIST - NEW CHURCH | VILLAGE OF HOWARD |
| <b>83848</b>  | ELDERLY CARE FACILITY                 | ALPHA SENIOR CONCEPTS            | VILLAGE OF HOWARD |

|               |                                       |                               |                   |
|---------------|---------------------------------------|-------------------------------|-------------------|
| <b>93626</b>  | UTILITIES                             | WPS SUB STATION 9             | VILLAGE OF HOWARD |
| <b>95000</b>  | WELL STATION                          | GB WATER UTILITY              | VILLAGE OF HOWARD |
| <b>95532</b>  | CLINIC                                | BELLIN HEALTH CENTER          | VILLAGE OF HOWARD |
| <b>95909</b>  | CHILD CARE SERVICE                    | STARTING POINT DAYCARE        | VILLAGE OF HOWARD |
| <b>95959</b>  | SCHOOL                                | LINEVILLE INTERMEDIATE SCHOOL | VILLAGE OF HOWARD |
| <b>95979</b>  | CHURCH                                | GOOD SHEPHERD LUTHERAN CHURCH | VILLAGE OF HOWARD |
| <b>96602</b>  | ELDERLY CARE FACILITY                 | TENDER HEARTS ASSISTED LIVING | VILLAGE OF HOWARD |
| <b>96794</b>  | SCHOOLS                               | BAYVIEW MIDDLE SCHOOL         | VILLAGE OF HOWARD |
| <b>96972</b>  | CHURCH & RED CROSS DESIGNATED SHELTER | HOPE COMMUNITY CHURCH         | VILLAGE OF HOWARD |
| <b>97265</b>  | SCHOOL                                | FOREST GLEN ELEMENTARY SCHOOL | VILLAGE OF HOWARD |
| <b>97304</b>  | UTILITIES                             | WPS GATE STATION              | VILLAGE OF HOWARD |
| <b>97539</b>  | SCHOOLS                               | HOWARD ELEMENTARY SCHOOL      | VILLAGE OF HOWARD |
| <b>97550</b>  | FIRE STATION                          | HWFD FIRE STATION 1           | VILLAGE OF HOWARD |
| <b>97551</b>  | FIRE STATION                          | HWFD FIRE STATION 2           | VILLAGE OF HOWARD |
| <b>97836</b>  | SCHOOL                                | MEADOWBROOK ELEMENTARY        | VILLAGE OF HOWARD |
| <b>98959</b>  | WATER TOWER                           | WATER TOWER - HOWARD          | VILLAGE OF HOWARD |
| <b>98960</b>  | WATER TOWER                           | WATER TOWER - HOWARD          | VILLAGE OF HOWARD |
| <b>115939</b> | COMMERCIAL BUILDING                   | NSIGHT TELE SERVICES          | VILLAGE OF HOWARD |
| <b>144360</b> | WATER TOWER                           | WATER TOWER - HOWARD          | VILLAGE OF HOWARD |
| <b>189088</b> | FIRE STATION                          | HOWARD FIRE STATION 1         | VILLAGE OF HOWARD |
| <b>189089</b> | FIRE STATION                          | HOWARD FIRE STATION 2         | VILLAGE OF HOWARD |
| <b>198778</b> | AMBULANCE STATION                     | CR STATION 2                  | VILLAGE OF HOWARD |
| <b>244291</b> | MUNICIPAL WELL                        | HOWARD WELL 2                 | VILLAGE OF HOWARD |

|               |                                             |               |                   |
|---------------|---------------------------------------------|---------------|-------------------|
| <b>244292</b> | MUNICIPAL WELL                              | HOWARD WELL 3 | VILLAGE OF HOWARD |
| <b>244310</b> | Bridge (road over road, railroad and water) | NA            | VILLAGE OF HOWARD |
| <b>244311</b> | Bridge (road over road)                     | NA            | VILLAGE OF HOWARD |
| <b>244312</b> | Bridge (trail over road)                    | NA            | VILLAGE OF HOWARD |
| <b>244381</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244382</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244383</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244385</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244388</b> | Bridge (road)                               | NA            | VILLAGE OF HOWARD |
| <b>244403</b> | Bridge (trail over road)                    | NA            | VILLAGE OF HOWARD |
| <b>244406</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244407</b> | Bridge (road over road)                     | NA            | VILLAGE OF HOWARD |
| <b>244409</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244410</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244412</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244413</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244414</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244415</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244416</b> | Bridge (road over water)                    | NA            | VILLAGE OF HOWARD |
| <b>244418</b> | Bridge (trail over road)                    | NA            | VILLAGE OF HOWARD |
| <b>244419</b> | Bridge (road over road)                     | NA            | VILLAGE OF HOWARD |
| <b>244420</b> | Bridge (road over road)                     | NA            | VILLAGE OF HOWARD |
| <b>244421</b> | Bridge (road over railroad)                 | NA            | VILLAGE OF HOWARD |

|               |                                             |    |                   |
|---------------|---------------------------------------------|----|-------------------|
| <b>244422</b> | Bridge (road over railroad)                 | NA | VILLAGE OF HOWARD |
| <b>244423</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244424</b> | Bridge (road)                               | NA | VILLAGE OF HOWARD |
| <b>244426</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244427</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244428</b> | Culvert (road over water)                   | NA | VILLAGE OF HOWARD |
| <b>244429</b> | Culvert (road over water)                   | NA | VILLAGE OF HOWARD |
| <b>244430</b> | Culvert (road over water)                   | NA | VILLAGE OF HOWARD |
| <b>244432</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244433</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244434</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244435</b> | Bridge (road over road, railroad and water) | NA | VILLAGE OF HOWARD |
| <b>244436</b> | Bridge (road over road, railroad and water) | NA | VILLAGE OF HOWARD |
| <b>244447</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244448</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244449</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244588</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244625</b> | Bridge (road over road)                     | NA | VILLAGE OF HOWARD |
| <b>244730</b> | Culvert (road over water)                   | NA | VILLAGE OF HOWARD |
| <b>244731</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244732</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244733</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |
| <b>244734</b> | Bridge (road over water)                    | NA | VILLAGE OF HOWARD |

|               |                              |    |                   |
|---------------|------------------------------|----|-------------------|
| <b>244735</b> | Bridge (road over trail)     | NA | VILLAGE OF HOWARD |
| <b>244736</b> | Bridge (road over trail)     | NA | VILLAGE OF HOWARD |
| <b>244737</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244738</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244739</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244740</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244741</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244742</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244743</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244744</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244745</b> | Bridge (railroad over water) | NA | VILLAGE OF HOWARD |
| <b>244746</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244747</b> | Culvert (road over water)    | NA | VILLAGE OF HOWARD |
| <b>244748</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |
| <b>244749</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244762</b> | Bridge (railroad over water) | NA | VILLAGE OF HOWARD |
| <b>244763</b> | Bridge (road over water)     | NA | VILLAGE OF HOWARD |
| <b>244766</b> | Bridge (trail over railroad) | NA | VILLAGE OF HOWARD |
| <b>244833</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |
| <b>244834</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |
| <b>244835</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |
| <b>244836</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |
| <b>244837</b> | Bridge (road over road)      | NA | VILLAGE OF HOWARD |

|               |                                                |                                             |                   |
|---------------|------------------------------------------------|---------------------------------------------|-------------------|
| <b>247091</b> | Wastewater Facility (Lift Station) & restrooms | NEW Water MS-08-AND Pamperin Park restrooms | VILLAGE OF HOWARD |
| <b>247495</b> | Wastewater Facility                            | NEW Water MS-22                             | VILLAGE OF HOWARD |
| <b>249492</b> | LIFT STATION                                   | HOWARD LIFT STATION ON LAKEVIEW DR          | VILLAGE OF HOWARD |
| <b>249493</b> | LIFT STATION                                   | HOWARD LIFT STATION ON RIVERVIEW DR         | VILLAGE OF HOWARD |
| <b>249494</b> | LIFT STATION                                   | HOWARD LIFT STATION ON VALLEY LN            | VILLAGE OF HOWARD |
| <b>252738</b> | Dam                                            | NA                                          | VILLAGE OF HOWARD |
| <b>252739</b> | Dam                                            | NA                                          | VILLAGE OF HOWARD |
| <b>257107</b> | Bridge (road over road, railroad and water)    | NA                                          | VILLAGE OF HOWARD |
| <b>257108</b> | Bridge (road over road, railroad and water)    | NA                                          | VILLAGE OF HOWARD |
| <b>257109</b> | Bridge (road over road, railroad and water)    | NA                                          | VILLAGE OF HOWARD |
| <b>257110</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257111</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257112</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257113</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257114</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257115</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257116</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257507</b> | Bridge (road over water)                       | NA                                          | VILLAGE OF HOWARD |
| <b>257508</b> | Bridge (railroad over water)                   | NA                                          | VILLAGE OF HOWARD |
| <b>257509</b> | Bridge (railroad over water)                   | NA                                          | VILLAGE OF HOWARD |
| <b>257510</b> | Bridge (road over road)                        | NA                                          | VILLAGE OF HOWARD |
| <b>257511</b> | Bridge (road over road and railroad)           | NA                                          | VILLAGE OF HOWARD |
| <b>257512</b> | Bridge (road over railroad)                    | NA                                          | VILLAGE OF HOWARD |



|               |                                                 |                         |                    |
|---------------|-------------------------------------------------|-------------------------|--------------------|
| <b>257513</b> | Bridge (road over railroad)                     | NA                      | VILLAGE OF HOWARD  |
| <b>258708</b> | Bridge (road over road)                         | NA                      | VILLAGE OF HOWARD  |
| <b>259107</b> | Bridge (railroad over water)                    | NA                      | VILLAGE OF HOWARD  |
| <b>74195</b>  | GENERATION/PROCESSING OF COMMUNICATION/UTILITIE | NA                      | VILLAGE OF PULASKI |
| <b>77107</b>  | Electric Power Substation                       | NA                      | VILLAGE OF PULASKI |
| <b>80417</b>  | WATER DEPT                                      | PULASKI WATER DEPT      | VILLAGE OF PULASKI |
| <b>80598</b>  | Long Term Health Care Facility                  | THE PINES - NH          | VILLAGE OF PULASKI |
| <b>80623</b>  | CLINIC                                          | PREVEA CLINIC PULASKI   | VILLAGE OF PULASKI |
| <b>88053</b>  | OIL TANKS                                       | OLSON OIL TANKS         | VILLAGE OF PULASKI |
| <b>93543</b>  | PUBLIC UTILITIES                                | PULASKI WATER AND SEWER | VILLAGE OF PULASKI |
| <b>93583</b>  | CLINIC                                          | AURORA HEALTH CENTER    | VILLAGE OF PULASKI |
| <b>93614</b>  | SCHOOL                                          | PULASKI MIDDLE SCHOOL   | VILLAGE OF PULASKI |
| <b>93618</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER           | PULASKI HIGH SCHOOL     | VILLAGE OF PULASKI |
| <b>95954</b>  | SCHOOL & RED CROSS DESIGNATED SHELTER           | ASSUMPTION BVM SCHOOL   | VILLAGE OF PULASKI |
| <b>97282</b>  | CHURCH                                          | ASSUMPTION RECTORY      | VILLAGE OF PULASKI |
| <b>98408</b>  | FIRE STATION                                    | PULASKI FIRE STATION    | VILLAGE OF PULASKI |
| <b>98428</b>  | CHILD CARE SERVICE                              | ENCOMPASS CHILD CARE    | VILLAGE OF PULASKI |
| <b>98440</b>  | POST OFFICE                                     | POST OFFICE PULASKI     | VILLAGE OF PULASKI |
| <b>189096</b> | FIRE STATION                                    | PFFD FIRE STATION       | VILLAGE OF PULASKI |
| <b>244757</b> | Bridge (road over water)                        | NA                      | VILLAGE OF PULASKI |
| <b>244758</b> | Bridge (road over water)                        | NA                      | VILLAGE OF PULASKI |
| <b>247496</b> | Wastewater Facility                             | NEW Water MS-23         | VILLAGE OF PULASKI |
| <b>253907</b> | WATER TOWER                                     | PULASKI WATER DEPT      | VILLAGE OF PULASKI |

|               |                                            |                               |                    |
|---------------|--------------------------------------------|-------------------------------|--------------------|
| <b>72086</b>  | LIFT STATION                               | SUAMICO LIFT STATION 7        | VILLAGE OF SUAMICO |
| <b>72393</b>  | Utility building?                          | NA                            | VILLAGE OF SUAMICO |
| <b>79311</b>  | PRE-SCHOOL/DAY CARE                        | TENDER HEART LEARNING         | VILLAGE OF SUAMICO |
| <b>80439</b>  | CHURCH & RED CROSS DESIGNATED SHELTER      | ST BENEDICT CHURCH            | VILLAGE OF SUAMICO |
| <b>80444</b>  | ELECTRICAL SUB STATION                     | WPS SUB STATION 8             | VILLAGE OF SUAMICO |
| <b>81544</b>  | AMBULANCE / RESCUE SQUAD                   | COUNTY RESCUE STATION 3       | VILLAGE OF SUAMICO |
| <b>81560</b>  | CLINIC                                     | AURORA HEALTH CENTER          | VILLAGE OF SUAMICO |
| <b>82084</b>  | CARE-CHILD                                 | KINDER CARE                   | VILLAGE OF SUAMICO |
| <b>83385</b>  | CLINIC                                     | BELLIN FAST CARE              | VILLAGE OF SUAMICO |
| <b>83600</b>  | CARE-CHILD                                 | TINY TOWN CHILD CARE          | VILLAGE OF SUAMICO |
| <b>85750</b>  | GOVERNMENT                                 | SUAMICO VILLAGE HALL          | VILLAGE OF SUAMICO |
| <b>86348</b>  | CHURCH                                     | PILGRIM LUTHERAN CHURCH       | VILLAGE OF SUAMICO |
| <b>93622</b>  | CHURCH & RED CROSS DESIGNATED SHELTER      | ST EDWARD AND ISIDORE CHURCH  | VILLAGE OF SUAMICO |
| <b>93641</b>  | CARE-CHILD                                 | SHINING STARS DAYCARE         | VILLAGE OF SUAMICO |
| <b>95910</b>  | CHILD CARE SERVICE                         | TEDDY BEAR DAY CARE           | VILLAGE OF SUAMICO |
| <b>96771</b>  | SCHOOL                                     | BAY HARBOR ELEMENTARY         | VILLAGE OF SUAMICO |
| <b>96782</b>  | HIGH SCHOOL & RED CROSS DESIGNATED SHELTER | BAY PORT HIGH SCHOOL          | VILLAGE OF SUAMICO |
| <b>98441</b>  | POST OFFICE                                | POST OFFICE SUAMICO           | VILLAGE OF SUAMICO |
| <b>98673</b>  | FIRE STATION                               | SMFD STATION 1                | VILLAGE OF SUAMICO |
| <b>98674</b>  | FIRE STATION                               | SMFD STATION 2                | VILLAGE OF SUAMICO |
| <b>98963</b>  | GOVERNMENT                                 | WATER TOWER - SUAMICO         | VILLAGE OF SUAMICO |
| <b>98964</b>  | SANITARY DISTRICT BUILDING                 | SUAMICO WATER TREATMENT PLANT | VILLAGE OF SUAMICO |
| <b>189097</b> | FIRE STATION                               | SUAMICO FIRE STATION 1        | VILLAGE OF SUAMICO |

|               |                                   |                        |                    |
|---------------|-----------------------------------|------------------------|--------------------|
| <b>189098</b> | FIRE STATION                      | SUAMICO FIRE STATION 2 | VILLAGE OF SUAMICO |
| <b>198779</b> | AMBULANCE / RESCUE SQUAD          | CR STATION 3           | VILLAGE OF SUAMICO |
| <b>244319</b> | Bridge (road over road and water) | NA                     | VILLAGE OF SUAMICO |
| <b>244326</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244327</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244328</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244329</b> | Bridge (road over road and water) | NA                     | VILLAGE OF SUAMICO |
| <b>244389</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244390</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244391</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244393</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244394</b> | Bridge (road over railroad)       | NA                     | VILLAGE OF SUAMICO |
| <b>244396</b> | Bridge (road over railroad)       | NA                     | VILLAGE OF SUAMICO |
| <b>244397</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244399</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244401</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>244402</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244624</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244709</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244710</b> | Bridge (road over road)           | NA                     | VILLAGE OF SUAMICO |
| <b>244764</b> | Bridge (railroad over water)      | NA                     | VILLAGE OF SUAMICO |
| <b>244765</b> | Bridge (road over water)          | NA                     | VILLAGE OF SUAMICO |
| <b>249495</b> | LIFT STATION                      | SUAMICO LIFT STATION 2 | VILLAGE OF SUAMICO |

|               |                                            |                                |                        |
|---------------|--------------------------------------------|--------------------------------|------------------------|
| <b>252757</b> | Dam                                        | NA                             | VILLAGE OF SUAMICO     |
| <b>1726</b>   | MUNICIPAL SERVICES / PD                    | WRIGHTSTOWN POLICE DEPARTMENT  | VILLAGE OF WRIGHTSTOWN |
| <b>2769</b>   | WATER TOWER                                | VIL OF WRIGHTSTOWN WATER TOWER | VILLAGE OF WRIGHTSTOWN |
| <b>78311</b>  | WATER TOWER                                | NA                             | VILLAGE OF WRIGHTSTOWN |
| <b>79411</b>  | PHONE COMPANY                              | ATT BUILDING                   | VILLAGE OF WRIGHTSTOWN |
| <b>79418</b>  | DAY CARE                                   | KIDS CARE                      | VILLAGE OF WRIGHTSTOWN |
| <b>80564</b>  | SEWAGE PLANT                               | WRIGHTS PUBLIC WORKS           | VILLAGE OF WRIGHTSTOWN |
| <b>81349</b>  | CLINIC                                     | BELLIN HEALTH WRIGHTSTOWN      | VILLAGE OF WRIGHTSTOWN |
| <b>81591</b>  | MIDDLE SCHOOL                              | WRIGHTSTOWN MIDDLE SCHOOL      | VILLAGE OF WRIGHTSTOWN |
| <b>82064</b>  | SCHOOL                                     | ST JOHN LUTHERAN SCHOOL        | VILLAGE OF WRIGHTSTOWN |
| <b>84115</b>  | VILLAGE HALL                               | WRIGHTSTOWN VILLAGE HALL       | VILLAGE OF WRIGHTSTOWN |
| <b>94826</b>  | HIGH SCHOOL & RED CROSS DESIGNATED SHELTER | WRIGHTSTOWN HIGH SCHOOL        | VILLAGE OF WRIGHTSTOWN |
| <b>95947</b>  | ELEMENTARY SCHOOL                          | WRIGHTSTOWN ELEMENTARY SCHOOL  | VILLAGE OF WRIGHTSTOWN |
| <b>97821</b>  | RESIDENTIAL                                | MATTHEWS SENIOR LIVING         | VILLAGE OF WRIGHTSTOWN |
| <b>98442</b>  | POST OFFICE                                | POST OFFICE WRIGHTSTOWN        | VILLAGE OF WRIGHTSTOWN |
| <b>98989</b>  | FIRE STATION                               | WFFD FIRE STATION              | VILLAGE OF WRIGHTSTOWN |
| <b>99030</b>  | CHILD CARE                                 | WRIGHTCARE CHILD CARE          | VILLAGE OF WRIGHTSTOWN |
| <b>189099</b> | FIRE STATION                               | WRIGHTSTOWN FIRE STATION       | VILLAGE OF WRIGHTSTOWN |
| <b>244346</b> | Bridge (road over water)                   | NA                             | VILLAGE OF WRIGHTSTOWN |
| <b>244648</b> | Bridge (road over water)                   | NA                             | VILLAGE OF WRIGHTSTOWN |
| <b>252758</b> | Dam                                        | NA                             | VILLAGE OF WRIGHTSTOWN |

## **Appendix E – BC Shoreland Zoning Code**

**CHAPTER 22**  
(Revised 10-4-2016)

**SHORELANDS AND WETLANDS**

**STATUTORY AUTHORIZATION, FINDING OF FACT, STATEMENT OF PURPOSE AND TITLE**

**22.01 STATUTORY AUTHORIZATION.** This ordinance (Chapter 22) for shoreland protection is adopted pursuant to the authorization set forth in s. 59.692, Wis. Stats., to implement ss. 59.692, 59.694, & 281.31, Wis. Stats., and Ch. NR 115 of the Wisconsin Administrative Code. These rules and laws shall apply until amended and then shall apply as amended.

**22.02 FINDING OF FACT.** Uncontrolled use of the shorelands and pollution of the navigable waters of Brown County would adversely affect the public health, safety, convenience, and general welfare and impair the tax base. The legislature of Wisconsin has delegated responsibility to the counties to further the maintenance of safe and healthful conditions; prevent and control water pollution; protect spawning grounds, fish and aquatic life; control building sites, placement of structures and land uses; and to preserve shore cover and natural beauty. This responsibility is hereby recognized by Brown County, Wisconsin.

**22.03 PURPOSE AND INTENT (s. NR 115.01).** For the purpose of promoting the public health, safety, convenience and welfare, and promote and protect the public trust in navigable waters this ordinance has been established to:

- (1) Further the maintenance of safe and healthful conditions and prevent and control water pollution through:
  - (a) Establishing minimum lot sizes to provide adequate area for private on-site waste treatment systems.
  - (b) Controlling filling and grading to prevent serious soil erosion problems.
  - (c) Limiting impervious surfaces to control runoff which carries pollutants.
- (2) Protect spawning grounds, fish and aquatic life through:
  - (a) Preserving wetlands and other fish and aquatic habitat.
  - (b) Regulating pollution sources.
  - (c) Controlling shoreline alterations, dredging and lagooning.
- (3) Control building sites, placement of structures and land uses through:
  - (a) Prohibiting certain uses detrimental to the shoreland area.
  - (b) Setting minimum lot sizes and widths.
  - (c) Setting minimum building setbacks from waterways.
  - (d) Setting the maximum height of near shore structures.
- (4) Preserve and restore shoreland vegetation and natural scenic beauty through:
  - (a) Restricting the removal of natural shoreland cover.

- (b) Preventing shoreline encroachment by structures.
- (c) Controlling shoreland excavation and other earth moving activities.
- (d) Regulating the use and placement of boathouses and other structures.

**22.04 TITLE.** This ordinance constituting Chapter 22 of the Brown County Code, shall be known, cited and referred to as: The Shorelands and Wetlands Ordinance for Brown County, Wisconsin.

### **GENERAL PROVISIONS**

**22.05 AREAS TO BE REGULATED.** Areas regulated by this ordinance shall include all the lands (referred to herein as "shorelands") in the unincorporated areas of Brown County which are:

- (1) Within 1,000 feet of the ordinary high-water mark of navigable lakes, ponds or flowages. (s. NR 115.03(8).) Lakes, ponds or flowages in Brown County shall be presumed to be navigable if they are listed in the Wisconsin Department of Natural Resources ("Department") publication FH-800 2009 "Wisconsin Lakes" book available electronically at the following web site: <http://dnr.wi.gov/org/water/fhp/lakes/lakemap/> or are shown on United States Geological Survey quadrangle maps (1:24,000 scale), or other zoning base maps.
- (2) Within 300 feet of the ordinary high-water mark of navigable rivers or streams, or to the landward side of the floodplain, whichever distance is greater. (s. NR 115.03(8).) Rivers and streams in Brown County shall be presumed to be navigable if they are designated as perennial waterways or intermittent waterways on United States Geological Survey quadrangle maps. (1:24,000) Flood hazard boundary maps, flood insurance rate maps, flood boundary- floodway maps, county soil survey maps or other existing county floodplain zoning maps shall be used to delineate floodplain areas.
- (3) Determinations of navigability and ordinary high-water mark location shall initially be made by the zoning administrator. When questions arise, the zoning administrator may contact the appropriate office of the Department for a final determination of navigability or ordinary high-water mark. The county may work with surveyors with regard to s. 59.692(1h), Wis. Stats. Field locating the ordinary high-water mark on the Bay of Green Bay ("Bay") shall not exceed the elevation of 583 feet, IGLD85 unless deemed appropriate by the zoning administrator to set higher based on site conditions per the definition of ordinary high-water mark in this ordinance. The all-time historic high water elevation of the Bay is 582.35 feet, IGLD85 as calculated by the Army Corps of Engineers (USACOE).
- (4) Under s. 281.31(2m), Wis. Stats., notwithstanding any other provision of law or administrative rule promulgated thereunder, this ordinance does not apply to:
  - (a) Lands adjacent to farm drainage ditches if:
    - 1. Such lands are not adjacent to a natural navigable stream or river.
    - 2. Those parts of such drainage ditches adjacent to such lands were not navigable streams before ditching.
  - (b) Lands adjacent to artificially constructed drainage ditches, ponds or stormwater retention basins that are not hydrologically connected to a natural navigable water body.
- (5) The Brown County Private Sewage System Ordinance (Chapter 11 of this Code), The Floodplains Ordinance for Brown County, Wisconsin (Chapter 23 of this Code) and the Brown

County Land Division and Subdivision Ordinance (Chapter 21 of this Code), as referred to in this ordinance, have been adopted separately and are applicable throughout Brown County where there is jurisdiction.

- (6) The provisions of this ordinance apply to the county's regulation of the use and development of unincorporated shoreland areas. Unless specifically exempted by law, all cities, villages, towns, counties and, when s. 13.48 (13), Wis. Stats., applies, state agencies are required to comply with, and obtain all necessary permits under, local shoreland ordinances. The construction, reconstruction, maintenance or repair of state highways and bridges carried out under the direction and supervision of the Wisconsin Department of Transportation is not subject to local shoreland zoning ordinances if s. 30.2022 (1), Wis. Stats., applies. (s. NR 115.02.) Shoreland zoning requirements in annexed or incorporated areas are provided in ss. 61.353 and 62.233, Wis. Stats.

**22.06 SHORELAND WETLAND ZONING MAPS.** The most recent version of the Wisconsin Wetland Inventory as depicted on the Department of Natural Resources Surface Water Data Viewer is made part of this ordinance. The maps can be viewed at: <http://dnrmaps.wi.gov/SL/Viewer.html?Viewer=SWDV&runWorkflow=Wetland> and the data will also be available on the county GIS.

**22.07 COMPLIANCE (NR 115.04).** The use of any land or water, the size, shape and placement of lots, the use, size, type and location of structures on lots, the installation and maintenance of water supply and waste disposal facilities, the filling, grading, lagooning, dredging of any lands, the cutting of shoreland vegetation, the subdivision of lots, shall be in full compliance with the terms of this ordinance and other applicable local, state or federal regulations. (However, see Section 22.46 of this ordinance for standards applicable to nonconforming uses.) Buildings, signs and other structures shall require a permit unless otherwise expressly excluded by a provision of this ordinance. Property owners, builders and contractors are responsible for compliance with the terms of this ordinance.

**22.08 MUNICIPALITIES AND STATE AGENCIES REGULATED.** Unless specifically exempted by law, all cities, villages, towns, and counties are required to comply with this ordinance and obtain all necessary permits. The construction, reconstruction, maintenance and repair of state highways and bridges by the Wisconsin Department of Transportation are exempt when s. 30.2022(1), Wis. Stats., applies.

**22.09 ABROGATION AND GREATER RESTRICTIONS.** The provisions of this ordinance supersede all the provisions of any county zoning ordinance adopted under s. 59.69, Wis. Stats., which relate to shorelands. In other words if a zoning standard only applies to lands that lie within the shoreland and applies because the lands are in shoreland, then this ordinance supersedes those provisions. However, where an ordinance adopted under a statute other than s. 59.692, Wis. Stats., does not solely relate to shorelands and is more restrictive than this ordinance, for example a floodplain ordinance, that ordinance shall continue in full force and effect to the extent of the greater restrictions, but not otherwise.

- (1) (s. 59.692(2)(a), Wis. Stats.) This ordinance shall not require approval or be subject to disapproval by any town or town board.
- (2) (s. 59.692(2)(b), Wis. Stats.) If an existing town ordinance relating to shorelands is more restrictive than this ordinance or any amendments thereto, the town ordinance continues in all respects to the extent of the greater restrictions, but not otherwise.
- (3) This ordinance is not intended to repeal, abrogate or impair any existing deed restrictions,



covenants or easements. However, where this ordinance imposes greater restrictions, the provisions of this ordinance shall prevail.

- (4) The following provisions of The Floodplains Ordinance for Brown County (Chapter 23) are hereby incorporated by reference; these provisions shall only apply to the shoreland area where they impose greater restrictions than this ordinance otherwise imposes.
- (5) (s. 59.692(1k)(a)1., Wis. Stats.) This ordinance may establish standards to regulate matters that are not regulated in NR 115, but that further the purposes of shoreland zoning as described in section 22.03 of this ordinance.
- (6) (s. 59.692(1k)(a)1., Wis. Stats.) Counties may not establish shoreland zoning standards in a shoreland zoning ordinance that does any of the following:
  - (a) Requires approval to install or maintain outdoor lighting in shorelands, imposes any fee or mitigation requirement to install or maintain outdoor lighting in shorelands, or otherwise prohibits or regulates outdoor lighting in shorelands if the lighting is designed or intended for residential use.
  - (b) Requires any inspection or upgrade of a structure before the sale or other transfer of the structure may be made.
- (7) (s. 59.692(7), Wis. Stats.) The construction and maintenance of a facility is considered to satisfy the requirements of this ordinance if:
  - (a) The Department has issued all required permits or approvals authorizing the construction or maintenance under ch. 30, 31, 281, or 283 of the Wisconsin Statutes.

For purposes hereof, a "facility" means any property or equipment of a public utility, as defined in s. 196.01(5), Wis. Stats., or a cooperative association organized under ch. 185, Wis. Stats., for the purpose of producing or furnishing heat, light, or power to its members only, that is used for the transmission, delivery, or furnishing of natural gas, heat, light, or power.

**22.10 INTERPRETATION (59.69(13)).** In their interpretation and application, the provisions of this ordinance shall be held to be minimum requirements and shall be liberally construed in favor of the county and shall not be deemed a limitation or repeal of any other powers granted by Wisconsin Statutes. Where a provision of this ordinance is required by statute and a standard in Ch. NR 115, Wis. Adm. Code, and where the ordinance provision is unclear, the provision shall be interpreted in light of the statute and Ch. NR 115 standards in effect on the date of the adoption of this ordinance or in effect on the date of the most recent text amendment to this ordinance.

**22.11 SEVERABILITY.** If any portion of this ordinance is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of this ordinance shall not be affected.

#### **LAND DIVISION AND SANITARY REGULATIONS**

**22.12 LAND DIVISION REVIEW (s. NR 115.05(2)).** The county shall review, pursuant to s. 236.45, Wis. Stats., all land divisions in shoreland areas which create three or more parcels or building sites of five acres each or less within a five-year period. In such review the following factors shall be considered:

- (1) Hazards to the health, safety or welfare of future residents.
- (2) Proper relationship to adjoining areas.
- (3) Public access to navigable waters, as required by law.
- (4) Adequate storm drainage facilities.
- (5) Conformity to state law and administrative code provisions.

**22.13 PLANNED UNIT DEVELOPMENT (s. NR 115.05(1)(a)4.).**

- (1) **PURPOSE.** The Planned Unit Development is intended to permit smaller non-riparian lots where the physical layout of the lots is so arranged as to better assure the control of pollution and preservation of ground cover than would be expected if the lots were developed with the normal lot sizes and setbacks and without special conditions placed upon the Planned Unit Development at the time of its approval. A condition of all Planned Residential Unit Development is the preservation of certain open space, preferably on the shoreland, in perpetuity.
- (2) **REQUIREMENTS FOR PLANNED UNIT DEVELOPMENT.** The Brown County Planning and Land Services Department may at its discretion, upon its own motion or upon petition, approve a Planned Unit Development Overlay District upon finding, that all of the following facts exist:
  - (a) **Area.** The area proposed for the Planned Unit Development shall be at least 2 acres in size or have a minimum of 200 feet of frontage on navigable water.
  - (b) **Lots.** Any proposed lot in the Planned Unit Development that does not meet the minimum size standards of sections 22.16 and 22.17 of this ordinance shall be a non-riparian lot.
  - (c) **Lot sizes, widths, setbacks, and vegetation removal.** When considering approval of a Planned Unit Development the governing body shall consider whether proposed lot sizes, widths, and setbacks are of adequate size and distance to prevent pollution or erosion along streets or other public ways and waterways. Increased shoreland setbacks shall be a condition of approval as a way of minimizing adverse impacts of development. Shore cover provisions in section 22.33 of this ordinance shall apply except that maximum width of a lake frontage opening shall be 100 feet and minimum vegetative buffer depth shall be increased to offset the impact of the proposed development.

**SANITARY REGULATIONS**

**22.14 SANITARY REGULATIONS (NR 115.05(3)).**

- (1) The county shall adopt sanitary regulations for the protection of health and the preservation and enhancement of water quality.
  - (a) Where public water supply systems are not available, private well construction shall be required to conform to Ch. NR 812, Wis. Adm. Code.
  - (b) Where a public sewage collection and treatment system is not available, design and construction of private on-site waste treatment system shall, prior to July 1, 1980, be required to comply with Ch. SPS 383, Wis. Adm. Code, and after June 30, 1980, be

governed by a private sewage system ordinance adopted by the county under s. 59.70(5), Wis. Stats.

### **DIMENSIONS OF BUILDING SITES**

#### **22.15 PURPOSE (s. NR 115.05(1)(a)).**

- (1) Minimum lot sizes in the shoreland area shall be established to afford protection against danger to health, safety and welfare, and protection against pollution of the adjacent body of water.

#### **22.16 LOTS SERVED BY PUBLIC SANITARY SEWER (s. NR 115.05(1)(a)1.).**

- (1) The minimum lot area shall be 10,000 sq. ft. and the minimum average lot width shall be 65 feet with at least 65 feet of frontage at the ordinary high-water mark.

#### **22.17 LOTS NOT SERVED BY PUBLIC SANITARY SEWER (s. NR 115.05(1)(a)2.).**

- (1) The minimum lot area shall be 20,000 sq. ft. and the minimum average lot width shall be 100 feet with at least 100 feet of frontage at the ordinary high-water mark.

#### **22.18 SUBSTANDARD LOTS (s. NR 115.05(1)(a)3).** A legally created lot or parcel that met minimum area and minimum average width requirements when created, but does not meet current lot size requirements, may be used as a building site if all of the following apply:

- (1) The substandard lot or parcel was never reconfigured or combined with another lot or parcel by plat, survey, or consolidation by the owner into one property tax parcel.
- (2) The substandard lot or parcel has never been developed with one or more of its structures placed partly upon an adjacent lot or parcel.
- (3) The substandard lot or parcel is developed to comply with all other ordinance requirements.

Note: The intent of this provision is to allow lots that were legally created that currently do not meet the minimum lot width and area requirements to be considered a building site provided all ordinance requirements can be met. Substandard lots that have been reconfigured by a certified survey map or consolidated into one legal description with the Register of Deeds, which result in a larger (closer to conforming) lot should be allowed to be utilized as a building site. Additionally, lots that have a legal description for each substandard lot on record with the Register of Deeds but have one tax parcel number assigned by the Real Property Lister or Assessor for taxing/assessing purposes should be considered separate building sites and should not be considered consolidated. Lots that have had development over the lot lines should be combined with a legal description and recorded with a new deed prior to new development occurring.

#### **22.19 HEIGHT (s. NR 115.05(1)(f)).** To protect and preserve wildlife habitat and natural scenic beauty, on or after February 1, 2012, a county may not permit any construction that results in a structure taller than 35 feet within 75 feet of the ordinary high-water mark of any navigable waters.

- (1) Height Measurement: The maximum 35 foot measurement shall be made from the highest grade elevation next to the foundation as measured to the midpoint of the roof line.

## **IMPERVIOUS SURFACE STANDARDS**

**22.20 PURPOSE (s. NR 115.05(1)(e)).** Establish impervious surface standards to protect water quality, fish and wildlife habitat and to protect against pollution of navigable waters. County impervious surface standards shall apply to the construction, reconstruction, expansion, replacement or relocation of any impervious surface on a riparian lot or parcel and any nonriparian lot or parcel that is located entirely within 300 feet of the ordinary high-water mark of any navigable waterway.

**22.21 CALCULATION OF PERCENTAGE OF IMPERVIOUS SURFACE (s. NR 115.05(1)(e)1m.).** Percentage of impervious surface shall be calculated by dividing the surface area of the existing and proposed impervious surfaces on the portion of a lot or parcel that is within 300 feet of the ordinary high-water mark by the total surface area of that lot or parcel, and multiplied by 100. Impervious surfaces described in section 22.25 of this ordinance shall be excluded from the calculation of impervious surface on the lot or parcel. If an outlot lies between the ordinary high water mark and the developable lot or parcel and both are in common ownership, the lot or parcel and the outlot shall be considered one lot or parcel for the purposes of calculating the percentage of impervious surface.

Note: For properties that have been "condominiumized" the impervious surface calculations apply to the entire property. The property is still under one legal description and the proposed expansion to a unit is not the only impervious surface calculated since the regulation states lot or parcel and not a unit. It will be important to remember also that mitigation applies to the property as a whole and not just to the portion of the frontage that might be in front of the unit impacted.

**22.22 IMPERVIOUS SURFACE STANDARD (s. NR 115.05(1)(e)2.).** Except as allowed in sections 22.23 through 22.25 of this ordinance allow up to 15% impervious surface on the portion of a lot or parcel that is within 300 feet of the ordinary high-water mark.

**22.23 IMPERVIOUS SURFACE STANDARD FOR HIGHLY DEVELOPED SHORELINES. (s. NR 115.05(1)(e)2m. and s. 59.692(1k)(am)2, Wis. Stats.).** The county at its discretion may adopt an ordinance for highly developed shorelines allowing up to 30% for residential land use and up to 40% for commercial, industrial or business land uses for lands that meet one of the following standards:

- (1) The highly developed shoreline is identified as an Urbanized Area or Urban Cluster in the 2010 US Census or has a commercial, industrial, or business land use as of January 31, 2013.
- (2) After conducting a hearing and receiving approval by the Department, the county has established a map of additional areas of highly developed shorelines that are at least 500 feet in length and meet one of the following criteria:
  - (a) The majority of the lots are developed with more than 30% of impervious surface area.
  - (b) Located on a lake served by a sewerage system as defined in NR 110.03(30), Wis. Adm. Code.
  - (c) The majority of the lots contain less than 20,000 square feet in area.
  - (d) The highly developed shoreline is identified on the Green Bay MPO 2045 Metropolitan Planning Area Boundary approved by WisDOT June 16, 2014.
  - (e) The highly developed shoreline is also identified on the HDS map created on 6/15/16 or as amended to reflect areas that match any of (a), (b) or (c) above.

**22.24 MAXIMUM IMPERVIOUS SURFACE (s. NR 115.05(1)(e)3.).** A property may exceed the impervious surface standard under sections 22.22 or 22.23 of this ordinance provided the following standards are met:

- (1) For properties where the impervious surface standard applies under section 22.22 of this ordinance, a property owner may have more than 15% impervious surface but not more than 30% impervious surface on the portion of a lot or parcel that is within 300 feet of the ordinary high-water mark.
- (2) For properties on shorelands where the impervious surface standard for highly developed shorelines applies under section 22.23 of this ordinance, a property owner may have more than 30% impervious surface but not more than 40% impervious surface for residential land uses. For commercial, industrial or business land uses, a property owner may have more than 40% impervious surface but not more than 60% impervious surface.
- (3) For properties that exceed the standard under sections 22.22 or 22.23 of this ordinance but do not exceed the maximum standard under sections 22.24(1) or 22.24(2) of this ordinance, a permit can be issued for development with a mitigation plan that meets the standards found in section 22.51 of this ordinance.

**22.25 TREATED IMPERVIOUS SURFACES (s. NR 115.05(1)(e)3m. and s. 59.692(1k)(a)5, Wis. Stats.).** Impervious surfaces that can be documented to show they meet either of the following standards shall be excluded from the impervious surface calculations under section 22.21 of this ordinance.

- (1) The impervious surface is treated by devices such as stormwater ponds, constructed wetlands, infiltration basins, rain gardens, bio-swales or other engineered systems.
- (2) The runoff from the impervious surface discharges to an internally drained pervious area that retains the runoff on or off the parcel and allows infiltration into the soil.

**22.26 EXISTING IMPERVIOUS SURFACES (s. NR 115.05(1)(e)4.).** For existing impervious surfaces that were lawfully placed when constructed but that do not comply with the impervious surface standard in section 22.22 of this ordinance or the maximum impervious surface standard in section 22.24 of this ordinance, the property owner may do any of the following:

- (1) Maintain and repair the existing impervious surfaces.
- (2) Replace existing impervious surfaces with similar surfaces within the existing building envelope.
- (3) Relocate or modify an existing impervious surface with similar or different impervious surface, provided that the relocation or modification does not result in an increase in the percentage of impervious surface that existed on the effective date of this ordinance and the impervious surface meets the applicable setback requirements in sections 22.27 or 22.28 hereof.

NOTE: The impervious surface standards set forth herein shall not be construed to supersede other provisions of this ordinance. All of the provisions of this ordinance still apply to new or existing development.

### **SETBACKS FROM THE WATER**

**22.27 BUILDING SETBACKS (s. NR 115.05(1)(b)).** Permitted building setbacks shall be established to conform to health, safety and welfare requirements, preserve natural beauty, reduce flood

hazards and avoid water pollution.

- (1) **SHORELAND SETBACK (s. NR 115.05(1)(b)1.).** Unless exempt under section 22.27(2), or reduced under section 22.28 of this ordinance, a setback of 75 feet from the ordinary high-water mark of any navigable waters to the nearest part of a building or structure shall be required for all buildings and structures.
- (2) **EXEMPT STRUCTURES (s. NR 115.05(1)(b)1m. and s. 59.692(1k)(a)(6), Wis. Stats.).** All of the following structures are exempt from the shoreland setback standards in Subsection (1), above:
  - (a) Boathouses located entirely above the ordinary high-water mark and entirely within the access and viewing corridor that do not contain plumbing and are not used for human habitation. The roof of a boathouse may be used as a deck provided that:
    1. The boathouse has a flat roof.
    2. The roof has no side walls or screens.
    3. The roof may have a railing that meets the Department of Safety and Professional Services standards.
  - (b) Shoreland Permit – Special. Open sided and screened structures such as gazebos, decks, patios and screen houses in the shoreland setback area that satisfy the requirements in s. 59.692(1v), Wis. Stats.
    1. The part of the structure that is nearest to the water is located at least 35 feet landward from the ordinary-high water mark.
    2. The floor area of all the structures in the shoreland setback area will not exceed 200 square feet.
    3. The structure that is the subject of the request for special zoning permission has no sides or has open or screened sides.
    4. The county must approve a plan that will be implemented by the owner of the property to preserve or establish a vegetative buffer zone that covers at least 70% of the half of the shoreland setback area that is nearest to the water.
  - (c) Broadcast signal receivers, including satellite dishes or antennas that are one meter or less in diameter and satellite earth station antennas that are two meters or less in diameter.
  - (d) Utility transmission and distribution lines, poles, towers, water towers, pumping stations, well pumphouse covers, private on-site wastewater treatment systems that comply with Ch. SPS 383, Wis. Adm. Code and other utility structures that have no feasible alternative location outside of the minimum setback and that employ best management practices to infiltrate or otherwise control storm water runoff from the structure.
  - (e) Stairways, walkways, and rail systems that are necessary to provide pedestrian access to the shoreline and are a maximum of 60 inches in width.
  - (f) Devices or systems used to treat runoff from impervious surfaces.
- (3) **EXISTING EXEMPT STRUCTURES (s. 59.692(1k)(a)2m., Wis. Stats.).** Existing exempt structures may be maintained, repaired, replaced, restored, rebuilt and remodeled provided the activity does not expand the footprint and does not go beyond the three-dimensional building envelope of the existing structure. The county may allow expansion of a structure beyond the existing footprint if the expansion is necessary to comply with applicable state or federal requirements.

NOTE: Section 59.692(1k)(a)2m., Wis. Stats., prohibits the county from requiring any approval or imposing any fee or mitigation requirement for the activities specified in section 22.27(3) hereof. However, it is important to note that property owners may be required to obtain permits or

approvals and the county may impose fees under Brown County Ordinances it adopted pursuant to other statutory requirements, such as floodplain zoning, general zoning, sanitary codes, building codes, or even stormwater erosion control.

**22.28 REDUCED BUILDING SETBACKS (NR 115.05(1)(b)1. and (s. 59.692(1n), Wis. Stats.)** A setback less than the 75' required setback from the ordinary high water mark shall be permitted for a proposed principal structure and shall be determined as follows:

- (1) Where there are existing principal structures in both directions, the setback shall equal the average of the distances the two existing principal structures are set back from the ordinary high water mark provided all of the following are met:
  - (a) Both of the existing principal structures are located on adjacent lot to the proposed principal structure.
  - (b) Both of the existing principal structures are located within 250' of the proposed principal structure and are the closest structure.
  - (c) Both of the existing principal structures are located less than 75' from the ordinary high water mark.
  - (d) The average setback shall not be reduced to less than 35' from the ordinary high water mark of any navigable water.

Note: s. 59.692(1d)(a), Wis. Stats., requires counties to adopt the standards consistent with Section 22.28(1) or reducing the shoreland setback.

- (2) Where this is an existing principal structure in only one direction, the setback shall equal the distance the existing principal structure is set back from the ordinary high water mark and the required setback of 75' from the ordinary high water mark provided all of the following are met:
  - (a) The existing principal structure is located on adjacent lot to the proposed principal structure.
  - (b) The existing principal structure is located within 250' of the proposed principal structure and is the closest structure.
  - (c) The existing principal structure is located less than 75' from the ordinary high water mark.
  - (d) The average setback shall not be reduced to less than 35' from the ordinary high water mark of any navigable water.

**22.29 FLOODPLAIN STRUCTURES (s. NR 115.05(1)(b)2.).** Buildings and structures to be constructed or placed in a floodplain shall be required to comply with any applicable floodplain zoning ordinance.

**22.30 CRITICAL SLOPE SETBACK.** All residential, commercial or industrial structures shall be set back a minimum of 20 feet from the top ridgeline of a 20% or greater slope measured to the foundation and must comply with the ordinary high-water mark required setbacks of this ordinance, whichever is greater. Elevation change will be analyzed to determine how steep or significant the slope is to decide the applicability of this section. Decks, patios, stairways, fences, gazebos, screen houses, pools, boathouses and storage sheds can be located within the 20 foot setback but must not exceed a building footprint of 500 square feet. If a geotechnical study is completed for the proposed area, a shoreland permit may be issued for a structure within the 20 foot setback subject to being constructed following the recommendations of the study. A certificate of compliance will need to be completed by the responsible architect or engineer after construction and prior to occupancy. This certificate must be returned to the Zoning Office within 60 days of completion of the project.

(1) Special exceptions. A special exception permit shall be required for the following:

(a) For any proposed encroachment into the critical slope setback not identified in section 22.30 of this ordinance.

**22.31 SHORELAND PERMIT- AGRICULTURAL.** The following uses shall be permitted within the Shoreland District or as defined by the Brown County Land Conservation Department on their most current hazard maps to the extent that they are not prohibited in a particular area by any underlying zoning ordinance. The hazard maps can be found at the Brown County Land and Water Conservation Department or on its website.

(1) Agricultural uses are permitted providing they comply with the provisions of this ordinance.

(a) A minimum of 35 feet of land free of row crops and seeded to grass, alfalfa, or other close-growing crop shall be maintained between the farmed area and the edge of the navigable stream; navigable stream crossings shall be permitted for livestock and shall be of a design deemed appropriate by the Brown County Land Conservation Department. A farmer may be exempt from this section if soil and water conservation practices are deemed sufficient and no pollution is occurring in the opinion of the Brown County Land Conservation Department.

(b) If there is a pollution problem resulting from the grazing or pasturing of livestock, the farmer/operator will be required to erect a fence no closer than 16-1/2 feet of the edge of the navigable stream or otherwise abate the pollution in such a manner as may be determined by the Brown County Land Conservation Department. If a fence has to be erected, provision will be allowed for watering livestock in the navigable stream.

### **REMOVAL OF SHORE COVER - VEGETATION**

**22.32 PURPOSE (s. NR 115.05(1)(c)1.).** To protect natural scenic beauty, fish and wildlife habitat, and water quality, a county shall regulate removal of vegetation in shoreland areas, consistent with the following: The County shall establish ordinance standards that consider sound forestry and soil conservation practices and the effect of vegetation removal on water quality, including soil erosion, and the flow of effluents, sediments and nutrients.

**22.33 ACTIVITIES ALLOWED WITHIN VEGETATIVE BUFFER ZONE (s. NR 115.05(1)(c)2.).** To protect water quality, fish and wildlife habitat and natural scenic beauty, and to promote preservation and restoration of native vegetation, the county shall designate land that extends from the ordinary high water mark to a minimum of 35 feet inland as a vegetative buffer zone and prohibit removal of vegetation in the vegetative buffer zone except as allowed in section 22.34 hereof.

**22.34 SHORELINE CUTTING.** Tree and shrubbery cutting in an area parallel to the ordinary high-water mark, and extending 35 feet inland from all points along the ordinary high-water mark, shall be limited in accordance with the following provisions:

(1) The county may allow routine maintenance of vegetation.

(2) The county may allow removal of trees and shrubs in the vegetative buffer zone to create access and viewing corridors. Per s. 59.692(1f)(b), Wis. Stats, the viewing corridor may be at least 35 feet wide for every 100 feet of shoreline frontage. The viewing corridor may run contiguously for the entire maximum width or shoreline frontage owned.

(3) The county may allow removal of trees and shrubs in the vegetative buffer zone on a parcel



with ten or more acres of forested land consistent with “generally accepted forestry management practices” as defined in s. NR 1.25 (2)(b), and described in Department Publication “Wisconsin Forest Management Guidelines” (Publication FR-226), provided that vegetation removal be consistent with these practices.

- (4) The county may authorize by permit additional vegetation management activities in the vegetative buffer zone. The permit issued under this Subsection shall require that all management activities comply with detailed plans approved by the county and designed to control erosion by limiting sedimentation into the waterbody, to improve the plant community by replanting in the same area, and to maintain and monitor the newly restored area. The permit also shall require an enforceable restriction to preserve the newly restored area.
- (5) The county may allow removal of vegetation within the vegetative buffer zone to manage exotic or invasive species, damaged vegetation, vegetation that must be removed to control disease, or vegetation creating an imminent safety hazard, provided that any vegetation removed be replaced by replanting in the same area as soon as practicable.

Note: Wis. Stats., § 59.692(1f)(a) prohibits the county from requiring a property owner to establish a vegetative buffer zone on previously developed land or expand an existing vegetative buffer zone. However, as part of the County’s shoreland mitigation standards, the establishment or expansion of the vegetative buffer may remain an option.

**22.35 MINIMUM STANDARD OF A VEGETATIVE BUFFER.** Planting Densities. The table below describes planting standards for two major shoreland types: woodland, and barrens/dry prairie/wet prairie. The woodland has a nearly complete canopy of trees while the barrens/prairie and wetland are more open. Plant numbers are to be calculated based on the area in square feet to be reestablished and the appropriate density. The area to be reestablished shall be calculated for each layer.

(1) Shoreland Buffer Planting Standards (Table 1)

|                            | Woodland Buffer           |                                                        | Wetland / Prairie Buffer  |                                                        |
|----------------------------|---------------------------|--------------------------------------------------------|---------------------------|--------------------------------------------------------|
| Layer                      | Minimum number of species | Density per 100 square feet                            | Minimum number of species | Density per 100 square feet                            |
| Tree Canopy*               | 3                         | 1                                                      | 1                         | 0.2                                                    |
| Shrub Understory**         | 4                         | 2                                                      | 2                         | 0.5                                                    |
| Groundcover Plant Plugs*** | 1                         | 50<br>Must be Mulched                                  | 5                         | 70<br>Must be Mulched                                  |
| Groundcover Seeding        | 1                         | Varies Grass<br>4oz./1000sqft.<br>Forbs 3oz./1000sqft. | 5                         | Varies Grass<br>4oz./1000sqft.<br>Forbs 3oz./1000sqft. |

- \* Tree must be  $\geq 2$  years old and 18" tall or taller
- \*\* Shrubs must be 1 Liter container size or larger
- \*\*\* Plugs must be 3" tall or 1" dia.

(2) Types of Vegetation Buffer Establishment.

- (a) Avoidance- Your buffer may be totally intact or undisturbed. If that is the case, your affidavit will simply state that you will not disturb the area and will remain compliant with placement of your viewing corridor. The area designated as Vegetative Buffer must meet the density requirements of (Table 1).
  - (b) Accelerated Recovery (enhancement) - This method entails actually installing some plant materials to achieve proper vegetation density, outlined in (Table 1). Simply stated, you will be filling in areas that are too thin or where the vegetation is missing.
  - (c) Accelerated Recovery (creation) - This method is used when no buffer exists. The area in question may have been graded to bare soil or the site may have been mowed for many years. Creation will involve planting groundcover, shrubs and trees after removal of existing vegetation.
- (3) Brown County Native Plant List. Species of plants must be selected from the Brown County Native Plant List and approved for shoreline buffers by the Brown County Zoning Administrator. Substitutions must be approved by the Brown County Zoning Administrator. Substitutions to the list will be allowed in the event of lack of plant stock or seed availability on a case-by-case basis. All plants may be transplanted from areas outside of the buffer zone. The following link to the Wisconsin Botanical Information System shall be used to determine Brown County native plants. County: Brown, Origin: Native.  
<http://www.botany.wisc.edu/herb/Countysearch.html>
- (4) Shoreland Buffer Plan Requirements. When restoration of a shoreland buffer is chosen as a mitigation option, a restoration plan shall be completed by an engineer, landscape architect, surveyor or other licensed contractor acceptable by the Brown County Zoning Administrator. Said Plan must be approved by the county and shall include:
- (a) Name and address of property owner.
  - (b) Property address and legal description.
  - (c) Extent of the shoreland buffer.
  - (d) Scale (e.g. 1 inch = 10 feet) or as approved by reviewer.
  - (e) North arrow.
  - (f) Ordinary high water mark (OHWM) location.
  - (g) Location of all structures in the shoreland buffer zone.
  - (h) Viewing and access corridor.
  - (i) Boundary of the shoreland buffer zone.
  - (j) Existing trees, shrubs, and native ground cover.
  - (k) Areas to be planted with trees, shrubs, and groundcovers.
  - (l) Implementation schedule.
  - (m) A plant species list; indicate if you are requesting substitutions from the prepared list.

- (n) Erosion control practices (to be installed prior to and during buffer establishment).
  - (o) Water diversions and channelized flow areas.
  - (p) Buffer maintenance (weeding, replanting).
- (5) Certificate of Completion. No later than 2 years after issuance of the shoreland permit, the property owner shall complete the mitigation practices and shall certify in writing to the Brown County Zoning Administrator that the required mitigation has been completed. As part of the certification, the property owner shall submit photos documenting the mitigation measures and the Brown County Planning and Land Services Department staff may conduct an on-site compliance inspection. If the project for which the permit was issued was never completed then the implementation of the mitigation plan will not be required. An affidavit of correction to that effect shall be recorded on to the deed at the property owner's expense.
  - (6) Subsequent Development. Shoreland permit applications shall require additional mitigation and will be dependent on the scope of the project.

#### **FILLING, GRADING, LAGOONING, DREDGING, DITCHING AND EXCAVATING**

**22.36 GENERAL STANDARDS (s. NR 115.05(1)(d)).** Filling, grading, lagooning, dredging, ditching and excavating may be permitted only in accordance with the provisions of s. NR 115.04, the requirements of Ch. 30, Wis. Stats., and other state and federal laws where applicable, and only if done in a manner designed to minimize erosion, sedimentation and impairment of fish and wildlife habitat and natural scenic beauty. Erosion control is required as per Best Management Practices. Filling, grading, lagooning, dredging, ditching or excavating which does not require a permit under section 22.37 of this ordinance may be permitted in the shoreland area provided that:

- (1) It is done in a manner designed to minimize erosion, sedimentation and impairment of fish and wildlife habitat.
- (2) Filling, grading, lagooning, dredging, ditching or excavating in a shoreland-wetland district meets the requirements of sections 22.41(2) and 22.41(3) of this ordinance.
- (3) All applicable federal, state and local authority is obtained in addition to a permit under this ordinance.
- (4) Any fill placed in the shoreland area is protected against erosion by the use of riprap, vegetative cover or a bulkhead.

#### **22.37 PERMIT REQUIRED.**

- (1) Filling, grading, lagooning, dredging, ditching and excavating. Erosion control is required as per Best Management Practices. A permit is required for any shoreland area as defined in this ordinance and on which there is either:
  - (a) At least 1,000 square feet of filling, grading and excavating.
  - (b) Filling of more than 500 square feet within 100 feet of any shoreland wetland. A 35 foot setback is required on wetlands.
  - (c) Not more than 20,000 square feet of filling, grading and excavating within 100 feet of navigable water.

- (2) Special exceptions. A special exception permit shall be required for the following:
- (a) For any filling, grading and excavating of any area within the shoreland district which is within 100 feet horizontal distance of navigable water and on which there is:
    - 1. Filling, grading and excavating greater than 20,000 square feet.
  - (b) For any construction or dredging commenced on any artificial waterway, canal, ditch, lagoon, pond, lake or similar waterway which is within 300 feet landward of the ordinary high-water mark of a navigable body of water or where the purpose is the ultimate connection with a navigable body of water.
  - (c) This subsection (2) does not apply to soil conservation practices such as terraces, runoff diversions, grassed waterways, waste storage facilities, and channel restoration, which are used for sediment reduction. All projects designed by other Brown County Departments, DNR, USF & WS, NRCS, and other governmental departments will not require a special exception permit, only a shoreland permit will be required. The shoreland permit fee will be waived when the agency designing the project will have direct supervision over the construction. A letter must be provided to this office by that agency upon completion indicating the project was completed as permitted. The DOT is exempt from permit requirements when section 30.12(4)(a), Wisconsin Statutes, applies.
  - (d) Municipal projects designed by licensed architects or engineers will not require a special exception permit, only a shoreland permit will be required.
- (3) Conditions. In issuance of a shoreland permit or in granting a special exception permit for filling or grading, the Board of Adjustments or Brown County Zoning Office may attach the following conditions in addition to the provisions specified in Section 22.58 that:
- (a) The smallest amount of bare ground be exposed for as short a time as feasible.
  - (b) Temporary ground cover such as mulch be used and permanent cover such as sod be planted.
  - (c) Diversions, silting basins, terraces, and other methods to trap sediment be used.
  - (d) Fill is stabilized according to accepted engineering standards.
  - (e) Fill will not restrict a floodway or destroy the storage capacity of a floodplain.
  - (f) Sides of a channel or artificial watercourse be stabilized to prevent slumping.
  - (g) Sides of channels or artificial watercourses be constructed with side slopes of two units horizontal distance to one unit vertical or flatter, unless bulkheads or rip rapping are provided.
  - (h) In shoreland areas with no floodplain mapped a minimum 35 foot no fill area is required from the ordinary high-water mark. If floodplain analysis is submitted and approved by the Department the 35 foot no fill area may be reduced.

**22.38 PERMIT CONDITIONS.** In granting a special exception permit under section 22.37(2), the Board of Adjustment shall attach the following conditions, where appropriate, in addition to those provisions specified in sections 22.58(2) and 22.58(3):

- (1) The smallest amount of bare ground shall be exposed for as short a time as feasible.
- (2) Temporary ground cover (such as mulch or jute netting) shall be used and permanent vegetative cover shall be established.

- (3) Diversion berms or bales, silting basins, terraces, filter fabric fencing, and other methods shall be used to prevent erosion.
- (4) Lagoons shall be constructed to avoid fish trap conditions.
- (5) Fill shall be stabilized according to accepted engineering standards.
- (6) Filling shall comply with any local floodplain zoning ordinance and shall not restrict a floodway or destroy the flood storage capacity of a floodplain.
- (7) Channels or artificial watercourses shall be constructed with side slopes of two units horizontal distance to one unit vertical or flatter which shall be promptly vegetated, unless bulkheads or riprap are provided.

### **SHORELAND-WETLAND DISTRICT**

**22.39 DESIGNATION (s. NR. 115.04).** This district shall include all shorelands within the jurisdiction of this ordinance which are designated as wetlands on the most recent version of the Wisconsin Wetland Inventory as depicted on the Department of Natural Resources Surface Water Data Viewer.

- (1) Locating shoreland-wetland boundaries. (s. NR 115.04(b)2.) Where an apparent discrepancy exists between the shoreland-wetland district boundary shown on the Wisconsin Wetland Inventory Maps and actual field conditions, the zoning administrator shall contact the appropriate office of the Department to determine if the shoreland-wetland district boundary as mapped is in error. If Department staff concur with the zoning administrator that a particular area was incorrectly mapped as a wetland or meets the wetland definition, the zoning administrator shall have the authority to immediately grant or deny a zoning permit in accordance with the regulations applicable to the correct zoning district. In order to correct wetland mapping errors on the official zoning map, an official zoning map amendment must be initiated within a reasonable period of time.

**22.40 PURPOSE.** This district is created to maintain safe and healthful conditions, to prevent water pollution, to protect fish spawning grounds and wildlife habitat, to preserve shore cover and natural beauty and to control building and development in wetlands whenever possible. When development is permitted in a wetland, the development should occur in a manner that minimizes adverse impacts upon the wetland.

**22.41 PERMITTED USES (s. NR 115.04(3)).** The following uses shall be allowed, subject to general shoreland zoning regulations contained in this ordinance, the provisions of Chs. 30, 31, and 281.36, Wis. Stats., and the provisions of other applicable local, state and federal laws:

- (1) Activities and uses which do not require the issuance of a shoreland permit, but which must be carried out without any filling, flooding, draining, dredging, ditching, tiling or excavating except as allowed under sections 22.41(2) or 22.41(3) of this ordinance.
  - (a) Hiking, fishing, trapping, hunting, swimming, and boating.
  - (b) The harvesting of wild crops, such as marsh hay, ferns, moss, wild rice, berries, tree fruits, and tree seeds, in a manner that is not injurious to the natural reproduction of such crops.

- (c) The pasturing of livestock.
  - (d) The cultivation of agricultural crops.
  - (e) The practice of silviculture, including the planting, thinning, and harvesting of timber.
  - (f) The construction or maintenance of duck blinds.
- (2) Uses which do not require the issuance of a shoreland permit and which may include limited filling, flooding, draining, dredging, ditching, tiling, or excavating but only to the extent specifically provided below:
- (a) Temporary water level stabilization measures necessary to alleviate abnormally wet or dry conditions that would have an adverse impact on silvicultural activities if not corrected.
  - (b) The cultivation of cranberries including flooding, dike and dam construction or ditching necessary for the growing and harvesting of cranberries.
  - (c) The maintenance and repair of existing agricultural drainage systems including ditching, tiling, dredging, excavating and filling necessary to maintain the level of drainage required to continue the existing agricultural use. This includes the minimum filling necessary for disposal of dredged spoil adjacent to the drainage system provided that dredged spoil is placed on existing spoil banks where possible.
  - (d) The construction or maintenance of fences for the pasturing of livestock, including limited excavating and filling necessary for such construction or maintenance.
  - (e) The construction or maintenance of piers, docks or walkways built on pilings, including limited excavating and filling necessary for such construction and maintenance.
  - (f) The maintenance, repair, replacement or reconstruction of existing town and county highways and bridges, including limited excavating and filling necessary for such maintenance, repair, replacement or reconstruction.
- (3) Uses which require the issuance of a shoreland permit under section 22.56-(shoreland permits) and which may include limited filling, flooding, draining, dredging, ditching, tiling or excavating, but only to the extent specifically provided below:
- (a) The construction and maintenance of roads which are necessary to conduct silvicultural activities or agricultural cultivation provided that:
    - 1. The road cannot, as a practical matter, be located outside the wetland.
    - 2. The road is designed and constructed to minimize adverse impact upon the natural functions of the wetland enumerated in section 22.43(2).
    - 3. The road is designed and constructed with the minimum cross-sectional area practical to serve the intended use.
    - 4. Road construction activities are carried out in the immediate area of the roadbed only.
  - (b) The construction or maintenance of nonresidential buildings provided that:
    - 1. The building is essential for and used solely in conjunction with the raising of waterfowl, minnows or other wetland or aquatic animals; or some other use permitted in the shoreland-wetland district.
    - 2. The building cannot, as a practical matter, be located outside the wetland.
    - 3. Such building is not designed for human habitation and does not exceed 500 square feet in floor area.

4. Only limited filling or excavating necessary to provide structural support for the building is authorized.
- (c) The establishment of public and private parks and recreation areas, natural and outdoor education areas, historic and scientific areas, wildlife refuges, game bird and animal farms, fur animal farms, fish hatcheries, and public boat launching ramps and attendant access roads, provided that:
1. Any private development is used exclusively for the permitted use and the applicant has received a permit or license under Ch. 29, Wis. Stats., where applicable.
  2. Filling or excavating necessary for the construction or maintenance of public boat launching ramps or attendant access roads is allowed only where such construction or maintenance meets the criteria in section 22.41(3)(a)1- 4.
  3. Ditching, excavating, dredging, or dike and dam construction in public and private parks and recreation areas, natural and outdoor education areas, historic and scientific areas, wildlife refuges, game bird and animal farms, fur animal farms, and fish hatcheries is allowed only for the purpose of improving wildlife habitat and to otherwise enhance wetland values.
- (d) The construction or maintenance of electric, gas, telephone, water and sewer transmission and distribution facilities, by public utilities and cooperative associations organized for the purpose of producing or furnishing heat, light, power or water to their members and the construction or maintenance of railroad lines provided that:
1. The transmission and distribution facilities and railroad lines cannot, as a practical matter, be located outside the wetland.
  2. Such construction or maintenance is done in a manner designed to minimize adverse impact upon the natural functions of the wetland enumerated in section 22.43(2).

**22.42 PROHIBITED USES (s. NR 115.04(4)).** Any use not listed in sections 22.41(1), 22.41(2) or 22.41(3) of this ordinance is prohibited, unless the wetland or portion of the wetland has been rezoned by amendment of this ordinance in accordance with section 22.43 of this ordinance and s. 59. 69(5)(e), Wis. Stats.

**22.43 REZONING OF LANDS IN THE SHORELAND-WETLAND DISTRICT (s. NR 115.04(2)).**

- (1) For all proposed text and map amendments to the shoreland-wetland provisions of this ordinance, the appropriate district office of the Department shall be provided with the following:
  - (a) A copy of every petition for a text or map amendment to the shoreland-wetland provisions of this ordinance, within five days of the filing of such petition with the county clerk. Such petition shall include a copy of the Wisconsin Wetland Inventory Map adopted as part of this ordinance describing any proposed rezoning of a shoreland-wetland.
  - (b) Written notice of the public hearing to be held on a proposed amendment at least 10 days prior to such hearing.
  - (c) A copy of the county zoning agency's findings and recommendations on each proposed amendment within 10 days after the submission of those findings and recommendations to the county board.

- (d) Written notice of the county board's decision on the proposed amendment within 10 days after it is issued.
- (2) A wetland or a portion thereof, in the shoreland-wetland district shall not be rezoned if the proposed rezoning may result in a significant adverse impact upon any of the following:
  - (a) Storm and flood water storage capacity.
  - (b) Maintenance of dry season stream flow, the discharge of groundwater to a wetland, the recharge of groundwater from a wetland to another area, or the flow of groundwater through a wetland.
  - (c) Filtering or storage of sediments, nutrients, heavy metals or organic compounds that would otherwise drain into navigable waters.
  - (d) Shoreline protection against soil erosion.
  - (e) Fish spawning, breeding, nursery or feeding grounds.
  - (f) Wildlife habitat.
  - (g) Wetlands both within the boundary of designated areas of special natural resource interest and those wetlands which are in proximity to or have a direct hydrologic connection to such designated areas as defined in s. NR 103.04 which can be accessed at the following web site: <http://www.legis.state.wi.us/rsb/code/nr/nr103.pdf>.
- (3) If the Department notifies the county zoning agency that a proposed text or map amendment to the shoreland-wetland provisions of this ordinance may have a significant adverse impact upon any of the criteria listed in section 22.43(2) of this ordinance, that amendment, if approved by the county board, shall contain the following provision:

"This amendment shall not take effect until more than 30 days have elapsed after written notice of the county board's approval of this amendment is mailed to the Department of Natural Resources. During that 30 day period the Department of Natural Resources may notify the county board that it will adopt a superseding shoreland ordinance for the county under s. 59.692(6), Wis. Stats. If the Department does so notify the county board, the effect of this amendment shall be stayed until the s. 59.692(6) adoption procedure is completed or otherwise terminated."

### **NONCONFORMING USES AND STRUCTURES**

**22.44 DISCONTINUED NONCONFORMING USE (s. NR. 115.05(1)(g)3.).** If a nonconforming use is discontinued for a period of 12 months, any future use of the building, structure or property shall conform to this ordinance.

**22.45 MAINTENANCE, REPAIR, REPLACEMENT OR VERTICAL EXPANSION OF NONCONFORMING STRUCTURES (s. 59.692(1k)(a)2., 4. and (b), Wis. Stats.).** An existing structure that was lawfully placed when constructed but that does not comply with the required shoreland setback may be maintained, repaired, replaced, restored, rebuilt or remodeled if the activity does not expand the footprint of the nonconforming structure. Further, an existing structure that was lawfully placed when constructed but that does not comply with the required shoreland setback may be vertically expanded unless the vertical expansion would extend more than 35 feet above grade level. The county may allow expansion of a structure beyond the existing footprint if the expansion is necessary to comply with applicable state or federal



requirements.

**22.46 LATERAL EXPANSION OF NONCONFORMING PRINCIPAL STRUCTURE WITHIN THE SETBACK (s. NR 115.05(1)(g)5.).** An existing principal structure that was lawfully placed when constructed but that does not comply with the required building setback per sections 22.27 and 22.28 of this ordinance may be expanded laterally, provided that all of the following requirements are met:

- (1) The use of the structure has not been discontinued for a period of 12 months or more if a nonconforming use.
- (2) The existing principal structure is at least 35 feet from the ordinary high-water mark.
- (3) Lateral expansions are limited to a maximum of 200 square feet over the life of the structure. No portions of the expansion may be closer to the ordinary high-water mark than the closest point of the existing principal structure.
- (4) The county shall issue a permit that requires a mitigation plan that shall be approved by the county and implemented by the property owner by the date specified in the permit. The mitigation plan shall meet the standards found in section 22.51 hereof.
- (5) All other provisions of this ordinance shall be met.

**22.47 EXPANSION OF A NONCONFORMING PRINCIPAL STRUCTURE BEYOND SETBACK (s. NR 115.05(1)(g)5m.).** An existing principal structure that was lawfully placed when constructed but that does not comply with the required building setback under section 22.24(1) of this ordinance, may be expanded horizontally, landward or vertically provided that the expanded area meets the building setback requirements per section 22.27(1) or 22.28 hereof and that all other provisions of this ordinance are met. A mitigation plan is not required solely for expansion under this section, but may be required per section 22.22 of this ordinance.

**22.48 RELOCATION OF NONCONFORMING PRINCIPAL STRUCTURE (s. NR 115.05(1)(g)6.).** An existing principal structure that was lawfully placed when constructed but that does not comply with the required building setback per sections 22.27(1) and 22.28 of this ordinance may be relocated on the property provided that all of the following requirements are met:

- (1) The use of the structure has not been discontinued for a period of 12 months or more if a nonconforming use.
- (2) The existing principal structure is at least 35 feet from the ordinary high-water mark.
- (3) No portion of the relocated structure is located any closer to the ordinary high-water mark than the closest point of the existing principal structure.
- (4) The county determines that no other location is available on the property to build a principal structure of a comparable size to the structure proposed for relocation that will result in compliance with the shoreland setback requirement per section 22.27(1) hereof.
- (5) The county shall issue a permit that requires a mitigation plan that shall be approved by the county and implemented by the property owner by the date specified in the permit. The mitigation plan shall meet the standards found in section 22.51 of this ordinance and include enforceable obligations of the property owner to establish or maintain measures that the county determines are adequate to offset the impacts of the permitted expansion on water quality, near-shore aquatic habitat, upland wildlife habitat and natural scenic beauty. The mitigation measures shall be proportional to the amount and impacts of the replaced or

relocated structure being permitted. The obligations of the property owner under the mitigation plan shall be evidenced by an instrument recorded in the office of the Brown County Register of Deeds.

(6) All other provisions of this ordinance shall be met.

**22.49 MAINTENANCE, REPAIR, REPLACEMENT OR VERTICAL EXPANSION OF STRUCTURES THAT WERE AUTHORIZED BY VARIANCE (s. 59.692(1k)(a)2. and (a)4., Wis. Stats.).** A structure of which any part has been authorized to be located within the shoreland setback area by a variance granted before July 15, 2015 may be maintained, repaired, replaced, restored, rebuilt or remodeled if the activity does not expand the footprint of the authorized structure. Additionally, the structure may be vertically expanded unless the vertical expansion would extend more than 35 feet above grade level. The county may allow expansion of a structure beyond the existing footprint if the expansion is necessary to comply with applicable state or federal requirements.

**22.50 WET BOATHOUSES.** The maintenance and repair of nonconforming boathouses which extend beyond the ordinary high-water mark of any navigable waters shall be required to comply with s. 30.121, Wis. Stats.

### **MITIGATION**

**22.51 MITIGATION (s. 59.692(1v), Wis. Stats., and s. NR 115.05(1)(e)3., (g)5., & (g)6.).** When the county issues a permit requiring mitigation under sections 22.27(2)(b), 22.24, 22.47, or 22.49 of this ordinance, the property owner must submit a complete permit application that is reviewed and approved by the county. Existing buffer zones may be used to meet the mitigation point totals. The following mitigation practices may be used to obtain a minimum of 3 points.

(1) Mitigation Options –Maintenance of Existing or Establishment of Buffers.

- (a) Primary Active Buffer Zone – Shore buffer zone within 35 feet of the ordinary high-water mark, including trees, shrubbery, ground cover and other natural vegetation, and subject to no mowing is permitted other than the allowable viewing corridor. 3 points.
- (b) Passive Buffer Zone – Shoreland vegetation buffer area within 35 feet of the ordinary high-water mark, including un-mowed grass or other ground cover vegetation, but without the tree and shrub layers required to meet the 3 point mitigation standard. 2 points.
- (c) Side Lot Buffer Zone – A 10 foot wide side lot buffer zone including trees, shrubbery, ground cover and other natural vegetation extending along a side lot line for a depth of at least 75 feet from the ordinary high-water mark. 1 point. The side lot buffer area is subject to the condition of no mowing is permitted. Points for side lot line buffers may be additive, for a maximum of 2 points, if buffer areas exist and are maintained along both side lot lines.

(2) Mitigation Alternative Option.

- (a) At the discretion of the Brown County Zoning Administrator, up to three additional mitigation points may be approved for restoration or protection activities that are likely to provide significant benefits to meet the objectives of this ordinance. Examples may include but are not limited to construction of a storm water detention basin or implementation of other storm water management plan activities, replacement of seawalls with bio-engineered structures, rain gardens, bio swales, water diversion of

overland flow or removal of artificial sand beaches in compliance with all applicable statutes and provisions set forth in the Wisconsin Administrative Code. Up to 3 points.

(b) Factors to be considered in making the determination of number of points and approval of alternative mitigation practices include, but are not limited to:

1. Runoff diversion and/or retention.
2. Lot configuration.
3. Parcel size.
4. Location of impervious areas.
5. Sensitivity and level of development of the waterbody.
6. Significance toward meeting ordinance objectives.
7. Type, density and filtering capacity of vegetation/ground cover.
8. Replacement of a failing private on-site wastewater treatment system with a code compliant system as permitted by current standards.
9. Removal of existing impervious areas and structures.

**22.52 MITIGATION PLAN.** The application shall include the minimum of the following and comply with all requirements as described in section 22.35 of this ordinance:

- (1) A site plan that describes the proposed mitigation measures shall be designed and implemented to restore natural functions lost through development and human activities. The mitigation measures shall be proportional in scope to the impacts on water quality, near-shore aquatic habitat, upland wildlife habitat and natural scenic beauty.
  - (a) The plan shall be designed by an engineer, landscape architect, surveyor or other licensed contractor acceptable by the Brown County Zoning Administrator to offset the increased impervious surface as calculated by the county. The Brown County Zoning Administrator may determine that the mitigation area will be described by a metes and bounds description and staked on the lot by a professional land surveyor.
  - (b) An implementation schedule and enforceable obligation on the property owner to establish and maintain the mitigation measures shall be recorded in the office of the Brown County Register of Deeds.
- (2) The approved mitigation measures must be started within 1 year of the permit issue date. All plantings and any other activities must be completed within 2 years of the permit issue date.

**22.53 RECORDING REQUIREMENT.** The affidavit described in 22.52 of this ordinance, as modified by the county during the permitting process, must be recorded in the office of the Brown County Register of Deeds in order for the permit to be effective so that work may commence. If the affidavit is not recorded no permit shall be issued.

### **ADMINISTRATIVE PROVISIONS**

**22.54 PLANNING, DEVELOPMENT & TRANSPORTATION COMMITTEE.**

- (1) The committee shall oversee the functions of the zoning office; review and make recommendations to the Board of Adjustments of all proposed amendments to the shorelands and wetlands zoning ordinance map and text; and maintain a complete public record of all its proceedings as defined in s. 236.02(1), Wis. Stats., and required by s. 59.692(3), Wis. Stats.
- (2) The Planning, Development and Transportation Committee shall not grant variances or special exceptions to the terms of the ordinance.

**22.55 ZONING OFFICE (s. NR 115.05(4)).** There is hereby created the Brown County Zoning Office as authorized by s. 59.69, Wis. Stats. and a Brown County Board of Adjustment as authorized by s. 59.694, Wis. Stats. The appointment of a Zoning Administrator and such additional staff may occur as the workload may require. The Zoning Office shall exercise the following duties and powers:

- (1) Advise applicants as to the provisions of this ordinance and assist them in preparing permit applications and appeal forms.
- (2) Issue permits and certificates of compliance and inspect properties for compliance with this ordinance. A system of permits shall remain in place for new construction, development, reconstruction, structural alteration or moving of buildings and structures. A copy of applications shall be required to be filed in the office of the Brown County Zoning Administrator, unless prohibited by s. 59.692(1k), Wis. Stats.
- (3) Keep records of all permits issued, inspections made, work approved and other official actions.
- (4) A variance procedure which authorizes the Brown County Board of Adjustment to grant such variance from the terms of this ordinance as will not be contrary to the public interest where, owing to special conditions and the adoption of this ordinance, a literal enforcement of the provisions of this ordinance will result in unnecessary hardship. Provide copies of variances, special exceptions and decisions on appeals for map or text interpretations and map or text amendments within 10 days after they are granted or denied to the appropriate office of the Department.
- (5) Have access to any structure or premises between 7:30 a.m. and 4:30 p.m. for the purpose of performing his/her duties. Regular inspection of permitted work in progress to ensure conformity of finished structures with the terms of this ordinance.
- (6) Investigate and report violations of this ordinance to the appropriate Brown County Zoning Committee and the district attorney or corporation counsel as necessary.

**22.56 SHORELAND PERMITS.**

- (1) When required. Except where another section of this ordinance specifically exempts certain types of development from this requirement (as in sections 22.41(1) and 22.41(2)) hereof, a shoreland permit shall be obtained from the Brown County Zoning Administrator before any new development, as defined in section 22.64(h) of this ordinance, or any change in the use of an existing building or structure, is initiated.
- (2) Application. An application for a shoreland permit shall be made to the Brown County Zoning Administrator upon forms furnished by the county.
  - (a) Erosion control is required as per Best Management Practices.
- (3) Fees. As established in the annual county budget.
- (4) Expiration of permit. Shoreland permits shall expire 2 years from date of issuance.

**22.57 RELAXATION OF STANDARDS FOR PERSONS WITH DISABILITIES APPLIES TO ALL SHORELAND AREAS.** The Brown County Zoning office may issue a shoreland permit to relax the standards of this ordinance in order to provide reasonable accommodation of persons with disabilities as required by provisions of federal and state law. Such relaxation shall be consistent

with federal guidelines for accommodation of persons with disabilities and shall, where practicable, be terminated when the facility is no longer in use by a disabled person. A person applying for a permit for construction under this section shall establish the nature and extent of the disability and that the relaxation requested is the minimum necessary to provide reasonable use of the facility.

## **22.58 SPECIAL EXCEPTION PERMITS.**

- (1) Application for a special exception permit. Any use listed as a special exception in this ordinance shall be permitted only after an application has been submitted to the zoning administrator and a special exception permit has been granted by the Brown County Board of Adjustment.
- (2) Standards applicable to all special exceptions. In passing upon a special exception permit, the Brown County Board of Adjustment shall evaluate the effect of the proposed use upon:
  - (a) The maintenance of safe and healthful conditions.
  - (b) The prevention and control of water pollution including sedimentation.
  - (c) Compliance with local floodplain zoning ordinances and opportunity for damage to adjacent properties due to altered surface water drainage.
  - (d) The erosion potential of the site based upon degree and direction of slope, soil type and vegetative cover.
  - (e) The location of the site with respect to existing or future access roads.
  - (f) The need of the proposed use for a shoreland location.
  - (g) Its compatibility with uses on adjacent land.
  - (h) The amount of liquid and solid wastes to be generated and the adequacy of the proposed disposal systems.
  - (i) Location factors under which:
    1. Domestic uses shall be generally preferred.
    2. Uses not inherently a source of pollution within an area shall be preferred over uses that are or may be a pollution source.
    3. Use locations within an area tending to minimize the possibility of pollution shall be preferred over use locations tending to increase that possibility.
- (3) Conditions attached to special exceptions. Upon consideration of the factors listed above, the Board of Adjustment shall attach such conditions, in addition to those required elsewhere in this ordinance, as are necessary to further the purposes of this ordinance. Violations of any of these conditions shall be deemed a violation of this ordinance. Such conditions may include specifications for, without limitation because of specific enumeration: type of shore cover; specific sewage disposal and water supply facilities; landscaping and planting screens; period of operation; operational control; sureties; deed restrictions; location of piers, docks, parking and signs; and type of construction. To secure information upon which to base its determination, the Brown County Board of Adjustment may require the applicant to furnish, in addition to the information required for a shoreland permit, the following information:
  - (a) A plan of the area showing surface contours, soil types, ordinary high-water marks, ground water conditions, subsurface geology and vegetative cover.
  - (b) Location of buildings, parking areas, traffic access, driveways, walkways, piers, open

space and landscaping.

- (c) Plans of buildings, sewage disposal facilities, water supply systems and arrangement of operations.
  - (d) Specifications for areas of proposed filling, grading, lagooning or dredging.
  - (e) Other pertinent information necessary to determine if the proposed use meets the requirements of this ordinance.
- (4) Notice, public hearing and decision. Before acting upon an application for a special exception permit, the Board of Adjustment shall hold a public hearing. Notice of such public hearing, specifying the time, place and matters to come before the board, shall be given as a Class Two notice under Ch. 985, Wis. Stats. Such notice shall be provided to the appropriate district office of the Department at least 10 days prior to the hearing. The Brown County Board of Adjustment shall state in writing the grounds for granting or refusing a special exception permit.
- (5) Recording. When a special exception permit is approved, an appropriate record shall be made of the land use and structures permitted and such permit shall be applicable solely to the structures, use and property so described. A copy of any decision on a special exception permit shall be provided to the appropriate district office of the Department within 10 days after it is granted or denied.
- (6) Revocation. Where the conditions of a special exception permit are violated, the special exception permit shall be revoked by the Brown County Board of Adjustment.

## **22.59 VARIANCES.**

- (1) Decision. The Brown County Board of Adjustment may grant upon appeal a variance from the dimensional standards of this ordinance where an applicant convincingly demonstrates that:
- (a) Literal enforcement of the provisions of this ordinance will result in unnecessary hardship on the applicant.
  - (b) The hardship is due to special conditions unique to the property.
  - (c) Such variance is not contrary to the public interest.
  - (d) The request represents the minimum relief necessary to relieve unnecessary burdens.
- (2) Notice, hearing and decision. Before acting on an application for a variance, the Brown County Board of Adjustment shall hold a public hearing. Notice of such hearing specifying the time, place and matters of concern, shall be given a Class Two notice under Ch. 985, Wis. Stats. Such notice shall be provided to the appropriate district office of the Department at least 10 days prior to the hearing. The Brown County Board of Adjustment shall state in writing the reasons for granting or refusing a variance and shall provide a copy of such decision to the appropriate Department office within 10 days of the decision.

## **22.60 BOARD OF ADJUSTMENT.** The County Executive shall appoint the Brown County Board of Adjustment consisting of 3 members and 2 alternates under s. 59.694(2), Wis. Stats. The county board shall adopt such rules for the conduct of the business of the Brown County Board of Adjustment as required by s. 59.694(3), Wis. Stats.

- (1) Powers and duties.

- (a) The Brown County Board of Adjustment shall adopt such additional rules as it deems necessary and may exercise all of the powers conferred on such boards by s. 59.694(3), Wis. Stats.
  - (b) It shall hear and decide appeals where it is alleged there is error in any order, requirements, decision or determination made by an administrative official in the enforcement or administration of this ordinance.
  - (c) It shall hear and decide applications for special exception permits pursuant to section 22.58 hereof.
  - (d) It may grant a variance from the dimensional standards of this ordinance pursuant to section 22.59 hereof.
  - (e) In granting a special exception permit or variance, the board may not impose conditions which are more restrictive than any of the specific standards in this ordinance. Where this ordinance is silent as to the extent of restriction, the Brown County Board of Adjustment may impose any reasonable permit conditions to affect the purpose of this ordinance.
- (2) Appeals to the Brown County Board of Adjustment. Appeals to the Brown County Board of Adjustment may be made by any person aggrieved or by an officer, department, board or bureau of the county affected by any decision of the Zoning Administrator or other Administrative Officer. Such appeal shall be made within a reasonable time, as provided by the rules of the Board of Adjustment by filing with the officer whose decision is in question, and with the Brown County Board of Adjustment, a notice of appeal specifying the reasons for the appeal. The Brown County Zoning Administrator or other officer whose decision is in question shall promptly transmit to the board all the papers constituting the record concerning the matter appealed.
- (3) Hearing appeals and applications for variances and special exception permits.
- (a) The Brown County Board of Adjustment shall fix a reasonable time for a hearing on the appeal or application. Said Board shall give public notice thereof by publishing a Class 2 notice under Ch. 985, Wis. Stats, specifying the date, time and place of the hearing and the matters to come before it. Notice shall be mailed to the parties in interest. Written notice shall be given to the appropriate district office of the Department at least 10 days prior to hearings on proposed shoreland variances, special exceptions (conditional uses), and appeals for map or text interpretations.
  - (b) A decision regarding the appeal or application shall be made as soon as practical. Copies of all decisions on shoreland variances, special exceptions (conditional uses), and appeals for map or text interpretations shall be submitted to the appropriate district office of the Department within 10 days after they are granted or denied.
  - (c) The final disposition of an appeal or application to the Brown County Board of Adjustment shall be in the form of a written resolution or order signed by the chairman and secretary of said Board. Such resolution shall state the specific facts which are the basis of the Brown County Board of Adjustment's determination and shall either affirm, reverse, vary or modify the order, requirement, decision or determination appealed, in whole or in part, dismiss the appeal for lack of jurisdiction or prosecution or grant the application.
  - (d) At the public hearing, any party may appear in person or by agent or by attorney.

**22.61 FEES.** As established in the annual county budget.

## **ORDINANCE CHANGES**

**22.62 CHANGES AND AMENDMENTS.** The county board may from time to time, alter, supplement or change the boundaries of use districts and the regulations contained in this ordinance in accordance with the requirements of s. 59.692, Wis. Stats., ch. NR 115, Wis. Adm. Code and section 22.44 of this ordinance where applicable.

- (1) Amendments to this ordinance may be made on petition of any interested party as provided in s. 59.692, Wis. Stats.
- (2) Every petition for a text or map amendment filed with the county clerk shall be referred to the county zoning agency. A copy of each petition shall be mailed to the appropriate office of the Department within five days of the filing of the petition with the county clerk. Written notice of the public hearing to be held on a proposed amendment shall be provided to the appropriate district office of the Department at least 10 days prior to the hearing.
- (3) A copy of the county board's decision on each proposed amendment shall be forwarded to the appropriate district office of the Department within 10 days after the decision is issued.

## **VIOLATIONS**

**22.63 ENFORCEMENT AND PENALTIES.**

- (1) Any violation of the provisions of this ordinance by any person, firm, association, corporation (including building contractors) or his/her or their agent is hereby declared to be unlawful. A violator shall, upon conviction, forfeit to the county a penalty as specified under Chapter 30 of the Brown County Code. Each day during which such violation exists shall constitute a separate offense.
- (2) Every violation of this ordinance is a public nuisance, and the creation thereof may be enjoined and maintenance thereof may be abated by action at suit of the county, the state, or any citizen thereof. Any such violator may be required to forfeit as specified under Chapter 30 of the Brown County Code. Each day during which such violation exists shall constitute a separate offense.

## **EXPLANATION OF TERMS AND WORDS**

**22.64 DEFINITIONS.**

- (1) For the purpose of administering and enforcing this ordinance, the terms or words used herein shall be interpreted as follows: Words used in the present tense include the future; words in the singular number include the plural number; and words in the plural number include the singular number. The word "shall" is mandatory, not permissive. All distances, unless otherwise specified, shall be measured horizontally.
- (2) The following terms or words used in this ordinance mean:
  - (a) "ACCESS AND VIEWING CORRIDOR" – means a strip of vegetated land that allows safe pedestrian access to the shore through the vegetative buffer zone.



- (b) "ACCESSORY STRUCTURE OR USE" - means a detached subordinate structure or a use which is clearly incidental to, and customarily found in connection with, the principal structure or use to which it is related, and which is located on the same lot as the principal structure or use.
- (c) "AGRICULTURAL PRACTICE" - has the meaning found in s. 281.16 (1)(b), Wis. Stats.

NOTE: Section 281.16 (1)(b), Wis. Stats., defines "agricultural practice" to mean "beekeeping; commercial feedlots; dairying; egg production; floriculture; fish or fur farming; grazing; livestock raising; orchards; poultry raising; raising of grain, grass, mint and seed crops; raising of fruits, nuts and berries; sod farming; placing land in federal programs in return for payments in kind; owning land, at least 35 acres of which is enrolled in the conservation reserve program under 16 USC 3831 to 3836; and vegetable raising."

- (d) "BOATHOUSE" - means a permanent structure used for the storage of watercraft and associated materials and includes all structures which are totally enclosed, have roofs or walls or any combination of these structural parts.
- (e) "BUILDING ENVELOPE" - means the three dimensional space within which a structure is built.
- (f) "COUNTY ZONING AGENCY" - means that committee or commission created or designated by the county board under s. 59.69(2)(a), Wis. Stats., to act in all matters pertaining to county planning and zoning.
- (g) "DEPARTMENT" - means the Department of Natural Resources.
- (h) "DEVELOPMENT" - means any man-made change to improved or unimproved real estate, including, but not limited to the construction of buildings, structures or accessory structures; the construction of additions or substantial alterations to buildings, structures or accessory structures; the placement of mobile homes; ditching, lagooning, dredging, filling, grading, paving, excavation or drilling operations, and the deposition or extraction of earthen materials.
- (i) "DISABLED" - means having a physical or mental impairment that substantially limits one or more major life activities.
- (j) "DRAINAGE SYSTEM" - means one or more artificial ditches, tile drains or similar devices which collect surface runoff or groundwater and convey it to a point of discharge.
- (k) "EXISTING DEVELOPMENT PATTERN" - means that principal structures exist within 250 feet of a proposed principal structure on each lot in both directions along the shoreline.
- (l) "FLOODPLAIN" - means the land which has been or may be hereafter covered by flood water during the regional flood as shown on the county's official floodplain zoning maps. The regional flood is based upon a statistical analysis of stream flow records available for the watershed or an analysis of rainfall and runoff characteristics in the general watershed region, or both. The flood frequency of the regional flood is once in every 100 years. In any given year, there is a one % chance that the regional flood may occur.

NOTE: "Floodway" is defined in s. NR 116.03 (22) to mean "the channel of a river or stream, and those portions of the floodplain adjoining the channel required to carry the regional flood discharge."

- (m) "IMPERVIOUS SURFACE" - means an area that releases as runoff all or a majority of the precipitation that falls on it. "Impervious surface" excludes frozen soil but includes rooftops, sidewalks, driveways, parking lots, and streets unless specifically designed, constructed, and maintained to be pervious. Roadways as defined in s. 340.01(54), Wis.

Adm. Code, or sidewalks as defined in s. 340.01(58), Wis. Adm. Code, are not considered impervious surfaces.

- (n) "MITIGATION" - means balancing measures that are designed, implemented and function to restore natural functions and values that are otherwise lost through development and human activities.
- (o) "NAVIGABLE WATERS" - means Lake Superior, Lake Michigan, all natural inland lakes within Wisconsin and all streams, ponds, sloughs, flowages and other waters within the territorial limits of this state, including the Wisconsin portion of boundary waters, which are navigable under the laws of this state. Under s. 281.31(2)(d), Wis. Stats., notwithstanding any other provision of law or administrative rule promulgated thereunder, shoreland ordinances required under s. 59.692, Wis. Stats., and ch. NR 115, Wis. Adm. Code, do not apply to lands adjacent to:
  - 1. Farm drainage ditches where such lands are not adjacent to a natural navigable stream or river and such lands were not navigable streams before ditching; and
  - 2. Artificially constructed drainage ditches, ponds or stormwater retention basins that are not hydrologically connected to a natural navigable water body.
- (p) "ORDINARY HIGH-WATER MARK" - means the point on the bank or shore up to which the presence and action of surface water is so continuous as to leave a distinctive mark such as by erosion, destruction or prevention of terrestrial vegetation, predominance of aquatic vegetation, or other easily recognized characteristics. Field locating the ordinary high-water mark on the Bay of Green Bay shall not exceed the elevation of 583 feet, IGLD85 unless deemed appropriate by the zoning administrator to set higher based on site conditions per this definition of ordinary high-water mark. The all-time historic high water elevation of the Bay is 582.35 feet, IGLD85 as calculated by the Army Corps of Engineers (USACOE).
- (q) "REGIONAL FLOOD" - means a flood determined to be representative of large floods known to have generally occurred in Wisconsin and which may be expected to occur on a particular stream because of like physical characteristics, once in every 100 years.
- (r) "REASONABLE ACCOMMODATION" - means allowing a disabled person to deviate from the strict requirements of this ordinance if an accommodation is necessary and reasonable, in order not to unlawfully discriminate against the disabled person and to allow them equal housing opportunity.

NOTE: Federal courts have interpreted the "reasonable accommodations" requirement in the Federal Fair Housing Act to mean that an accommodation is reasonable "if it does not cause any undue hardship or fiscal or administrative burdens on the municipality, or does not undermine the basic purpose that the zoning ordinance seeks to achieve." Oxford House, Inc. v. Town of Babylon, 819 F. Supp. 1179, 1186 (E.D.N.Y. 1993)

- (s) "ROUTINE MAINTENANCE OF VEGETATION" – means normally accepted horticultural practices that do not result in the loss of any layer of existing vegetation and do not require earth disturbance.
- (t) "SHORELANDS" and "SHORELAND ZONE" - have the meaning found in s.59.692 (1)(b), Wis. Stats.

NOTE: Section 59.692 (1)(b), Wis. Stats., defines "shorelands" to mean "the area within the following distances from the ordinary high-water mark of navigable waters, as defined under s. 281.31 (2)(d), Wis. Stats.:

- 1. One thousand feet from a lake, pond or flowage. If the navigable water is a

glacial pothole lake, this distance shall be measured from the ordinary high-water mark of the lake.

2. Three hundred feet from a river or stream or to the landward side of the floodplain, whichever distance is greater.

- (u) "SHORELAND-SETBACK" – also known as the “shoreland setback area” in s.59.692(1)(bn), Wis. Stats., means an area in a shoreland that is within a certain distance of the ordinary high-water mark in which the construction or placement of buildings or structures has been limited or prohibited under an ordinance enacted under section 59.692, Wis. Stats.
- (v) "SHORELAND-WETLAND DISTRICT" - means the zoning district, created as a part of this shoreland zoning ordinance, comprised of shorelands that are designated as wetlands on the wetland maps which have been adopted and made a part of this ordinance.
- (w) "SPECIAL EXCEPTION (CONDITIONAL USE)" - means a use which is permitted by this ordinance provided that certain conditions specified in the ordinance are met and that a permit is granted by the Board of Adjustment or, where appropriate, the planning and zoning committee or county board.
- (x) "STRUCTURE" - means any man-made object with form, shape and utility, that is constructed or otherwise erected, attached to or permanently or temporarily placed, either upon the ground, a river bed, stream bed or lake bed or upon another structure. For the purpose of this chapter, the term “structure” includes garages, sheds, boathouses, sidewalks, walkways, retaining walls, porches, fire pits, patios, and decks, but does not include landscaping or earthwork including graded areas, filled areas, ditches, berms, or earthen terraces. The term “structure” does not include small objects that are easily moved by hand, such as canoes, kayaks, lawn chairs, portable grills, portable picnic tables, temporary snow fences, small temporary fences around individual plants or small groups of plants to prevent animal herbivory, bird feeders, birdhouses and birdbaths.
- (y) "UNNECESSARY HARDSHIP" - means that circumstance where special conditions, which were not self-created, affect a particular property and make strict conformity with restrictions governing area, setbacks, frontage, height or density unnecessarily burdensome or unreasonable in light of the purposes of this ordinance.
- (z) "VARIANCE" - means an authorization granted by the Brown County Board of Adjustment to construct, alter or use a building or structure in a manner that deviates from the dimensional standards of this ordinance.
- (aa) "VEGETATIVE BUFFER ZONE" – means an area along, and parallel to, the ordinary high-water mark, 35 feet from the water’s edge, that is either undisturbed or restored with native vegetation that provides or will provide natural features and functions for fish and wildlife habitat, water quality protection, and natural scenic beauty. This area may change based on mitigation measures designed by a professional landscape architect or professional stormwater engineer to compensate for and be proportional in scope to the impacts on the lot.
- (bb) "WETLAND" - has th found in s 23.32 (1), Wis. Stats. Means an area where water is at, near, or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.”

## CHAPTER 3      THREATS AND HAZARDS RISK ASSESSMENT

This chapter been prepared to identify the hazards believed to pose the greatest risk to the residents of Brown County; to profile the extent and severity of past county hazards; and to assess the vulnerability of the county to the risk of future hazard events. Through the risk assessment process, emergency management personnel will be able to more effectively evaluate potential hazard mitigation measures and develop useful strategies to address the risks associated with the identified hazards.

### **HAZARD IDENTIFICATION**

Although Brown County could potentially be at risk from several distinct hazards, this plan narrows the scope of the hazards to those that pose the greatest risk to residents and facilities of the county. Identification of the hazards was based on a priority ranking of the many different natural and man-made/technological hazards previously identified in the *2012 Brown County All Hazards Mitigation Plan*. The natural and man-made/technological hazards included in this list were first identified in the *Resource Guide to All Hazards Mitigation Planning in Wisconsin* that was prepared by the Association of Wisconsin Regional Planning Commissions through funding provided by the State of Wisconsin Department of Military Affairs, Wisconsin Emergency Management, and the Federal Emergency Management Agency.

The following is a list of the hazards considered by the Steering Committee.

#### Natural Hazards

- Lightning Storm/Thunderstorm
- Heavy Snow Storm
- Ice Storm
- Tornadoes/High Winds
- Blizzards
- Stormwater Flooding
- Flooding (Flash, Ravine, Lake)
- Extreme Cold
- Extreme Heat
- Fog
- Hail Storms
- Dam Failure Flooding
- Forest Fires
- Wildland Fires
- Coastal Hazards
- Agriculture
- Drought
- Earthquake
- Landslide
- Subsidence



Flooding



Tornados



Winter Storms



Wild Fires



Thunderstorms



Drought

## **HAZARDS RISK ASSESSMENT SURVEY**

Members of Brown County's previous 2007 and 2012 All Hazards Mitigation Plan Steering Committee created a *Natural Hazard Identification and Risk Assessment Matrix*. Each Steering Committee member was asked to assign a risk rating (1 = low, 2 = moderate, and 3 = high) to the various risk assessment criteria for each natural hazard. The total number of points for each of the identified natural hazards was then calculated. Members of the 2019 Committee reviewed the results for updates but did not propose significant changes.

The Steering Committee members combined the following natural hazards:

- Lightning Storms and Thunderstorms as "Lightning Storms/Thunderstorms" (exclusive occurrence was deemed to be rare in Brown County);
- Tornado and High Winds as "Tornado/High Winds" (deemed that their assessment and mitigation actions would be the same in Brown County);
- Flash Flooding, Riverine Flooding, and Lake Flooding as "Flooding (Flash, Riverine, and Lake)" (deemed that their assessment and mitigation actions would be the same in Brown County).

Table 3.1: Risk Assessment Ranking for Natural Hazards, Brown County, Wisconsin

| Rank | Natural Hazard                       | Risk Assessment Ranking Total |
|------|--------------------------------------|-------------------------------|
| 1    | Blizzards                            | 32                            |
| 2    | Heavy Snow Storms                    | 31                            |
| 2    | Stormwater Flooding                  | 31                            |
| 4    | Ice Storms                           | 30                            |
| 5    | Tornadoes/High Winds                 | 28                            |
| 5    | Flooding (Flash, Riverine, and Lake) | 28                            |
| 7    | Extreme Cold                         | 26                            |
| 8    | Lightning Storms/Thunderstorms       | 23                            |
| 9    | Extreme Heat                         | 22                            |
| 10   | Dam Failure Flooding                 | 20                            |
| 11   | Agricultural                         | 18                            |
| 12   | Coastal Hazards                      | 17                            |
| 13   | Drought                              | 16                            |
| 13   | Forest Fires                         | 16                            |
| 13   | Wildland Fires                       | 16                            |
| 13   | Fog                                  | 16                            |
| 17   | Subsidence                           | 15                            |
| 18   | Hail Storms                          | 14                            |
| 18   | Landslide                            | 14                            |
| 20   | Earthquake                           | 13                            |

Source: Brown County Hazards Mitigation Plan Steering Committee, 2019,

## **NATURAL HAZARDS - HISTORICAL SUMMARY**

Past hazards statistics assisted the Steering Committee in determining the natural hazards to be evaluated in the plan. The National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) publishes National Weather Service (NWS) data describing past weather events and the resulting deaths, injuries and damages associated with each hazard event. This data is available at the county level. While the data is advertised as being available beginning in January, 1950, a considerable portion of the data for several of the hazard events is only available as early as the 1990's. This plan only utilized the data from January 1, 1990 through September of 2018. Descriptions of individual natural hazard events are located in the risk and vulnerability assessment in the portion of this chapter.

### **Frequency**

The data from the NCDC shows that of the 388 discernible events recorded from January 1, 1990 through September of 2019, thunderstorms and associated high winds are the most frequently occurring natural hazard event with 103 events recorded. This was followed by hail (73 events), winter storms (36 events), heavy snow (23 events), and strong winds (19 events) to round out the top five<sup>1</sup>. Table 3.2 shows the frequency of all reported natural hazards occurring in Brown County between January 1, 1990 and September of 2018.

### **Deaths**

From January, 1990 through June of 2019, deaths caused by natural hazard events occurred mostly from cold weather events. There were 5 deaths associated with cold/wind chill events occurring on one occasion in 1996, 2009, 2013, 2016, and 2018<sup>2</sup>.

**TABLE 3.2: NATURAL HAZARD OCCURRENCES  
1990-JUNE 2019, BROWN COUNTY,  
WISCONSIN**

| <b>NATURAL HAZARD</b>   | <b>Total</b> |
|-------------------------|--------------|
| BLIZZARD                | 7            |
| COLD/WIND CHILL         | 14           |
| DENSE FOG               | 12           |
| DROUGHT                 | 4            |
| DUST DEVIL              | 2            |
| EXCESSIVE HEAT          | 6            |
| EXTREME COLD/WIND CHILL | 4            |
| FLASH FLOOD             | 14           |
| FLOOD                   | 10           |
| FUNNEL CLOUD            | 6            |
| HAIL                    | 73           |
| HEAT                    | 10           |
| HEAVY RAIN              | 28           |
| HEAVY SNOW              | 22           |
| HIGH WIND               | 9            |
| ICE STORM               | 2            |
| LIGHTNING               | 14           |
| STRONG WIND             | 21           |
| THUNDERSTORM WIND       | 104          |
| TORNADO                 | 13           |
| WINTER STORM            | 38           |
| WINTER WEATHER          | 12           |
| <b>TOTAL</b>            | <b>425</b>   |

Source: NOAA National Climatic Data Center, 2019.

<sup>1</sup> NOAA: <http://tinyurl.com/y38yykxg>

<sup>2</sup> NOAA: <http://tinyurl.com/y38yykxg>

### **Injuries**

Six injuries occurred in Brown County from January, 1990 through September, 2018. Three injuries were the result of a heat wave in 2006 while one injury occurred from each of the following events: an ice storm in 1996, winds associated with a thunderstorm in 1996, and a strong wind event in 2008.

### **Property Damage**

The most damaging event during this same time frame, in terms of property damage, was a tornado in 2013 that resulted in approximately two million dollars in damage. Other event categories that have caused significant property damage in Brown County have been floods, flash floods, high winds, and thunderstorms. Lightning storms and winter storms have also resulted in more significant property damages.

### **Crop Damage**

The most damaging event from January 1, 1990 through June of 2019, in terms of crop damage, was associated with thunderstorm winds. Other events like floods and tornados have undoubtedly caused crop damage/loss, however, no reported losses were documented with NOAA.

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## **NATURAL HAZARDS PRIORITIZATION**

The purpose of rating the potential risks associated with each natural hazard and reviewing past hazard event data is to address those natural hazards posing the greatest threat to residents and to property. Based on the assessment of past data, the Steering Committee identified the following updated natural hazards to be the focus of the plan assessment, goals, objectives and strategies:



#### Winter Storms

- including heavy snow, ice, and blizzards involving high winds



#### Lightning Storms & Thunderstorms



#### Tornadoes & High Winds



#### Flooding

- including flash, ravine, and lake



#### Extreme Cold



#### Extreme Heat



#### Fog



#### Hail



#### Dam Failure Flooding



#### Fires

- includes Forest and Wildfires



#### Stormwater Flooding



#### Coastal Hazards



#### Drought

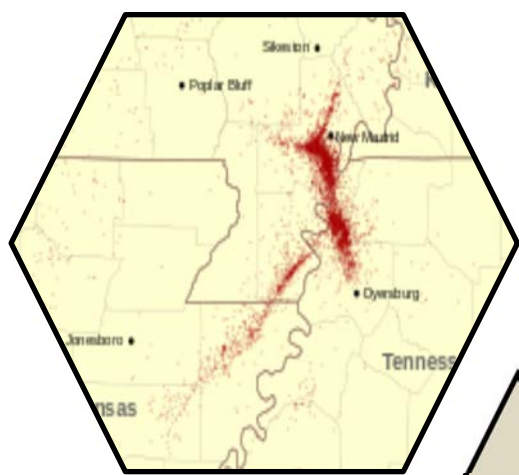


## **OTHER NATURAL HAZARDS POSING NO SIGNIFICANT RISK**

The following natural hazards were determined by the Steering Committee to have a minimal chance of occurring, to pose minimal risk to the safety of residents or property, or to offer very limited mitigation options. These natural hazards are excluded from the full assessment, but they are briefly discussed here to meet the comprehensive requirements for developing a hazards mitigation plan under Federal law.

### **Earthquakes**

According to the U.S. Geological Survey (USGS), there have been five documented and recognized earthquake events in Wisconsin. The closest of these to Brown County occurred in Clintonville in March 20, 2012, being a magnitude of 1.5 on the on the Richter Scale. The other events appear to have occurred near Iola and were documented between July and September of 2018. The four events that occurred near Iola were small ranging from 1.3 to 1.5 magnitude.<sup>3</sup>



The nearest active earthquake fault outside of Wisconsin is the New Madrid Fault, which stretches from northeast Arkansas to southern Illinois. Brown County falls within the lowest earthquake hazard shaking area. This represents the levels of horizontal shaking which have a 1-in-50 chance of being exceeded in a 50-year period. Similarly, Brown County falls within a 0%g-force to 1%g-force peak ground acceleration (PGA) zone as shown on the USGS PGA values map with a 10 percent chance of being exceeded over 50 years. Therefore, Brown County is considered unlikely to be substantially affected by earthquakes in the long-term future. The threat to Brown County from an earthquake is considered very low.

<sup>3</sup> USGS interactive Earthquake map: <http://tinyurl.com/yxwtpv9j>

If a tremor or earthquake was to occur anywhere in the county, damage to structures and infrastructure could be substantial due to the fact that construction design standards in the immediate geographic area do not require buildings to be designed and constructed to meet standards consistent with an area prone to earthquake activity. Obviously, the more urbanized and densely populated areas within Brown County would experience much greater losses, injuries, and possibly deaths if an earthquake were to occur. According to the Wisconsin Department of Revenue, the 2018 Equalized Value of Brown County is \$21,829,376,900, up from \$18,157,652,100 in 2011. The cities of Green Bay and De Pere accounted for \$8,721,374,700, an increase of \$1,047,440,800 since 2011. The six villages contribute another \$9,361,555,400, up from \$7,609,428,300 in 2011, while the 13 towns accounted for the remaining \$3,712,890,100 as compared to \$2,874,289,900 in 2011<sup>4</sup>.

The area's economy could also be significantly impacted for extended periods of time given the area's dependence on a transportation system that is not designed to withstand a significant seismic event. The cost to rebuild infrastructure and the loss of company revenues and employee wages has the potential to be significant to not just the County but rather, it has the potential to impact the state and region. County and local municipal officials would certainly need to seek financial assistance and equipment and manpower needs from the state and federal levels to deal with a seismic event in Brown County.

## **Landslides**

The term "landslide" includes a wide range of ground movement, including rock falls, deep failure of slopes and shallow debris flows. Although gravity acting on an overly steep slope is the primary reason for a landslide, there can be other contributing factors such as erosion by rivers, excess weight from the accumulation of rain or snow, or man-made and other structures stressing weak slopes to the point of failure. In some cases, slope material that becomes saturated with water may develop a debris flow or mudflow.

The U.S. Geological Survey *Landslide Overview Map of the Conterminous United States*<sup>5</sup> identifies moderate landslide susceptibility risks for parts of Brown County and the remainder of the county is considered at low risk. The majority of the land formations within Brown County does not include features that pose a landslide risk. While there are areas of the county that have steep slopes (greater than 20% grade) the soils involved pose more of a gradual erosion risk as opposed to the sudden, large-scale movement of ground associated with landslide hazards. Areas with the steepest slopes tend to be zoned as conservancy districts by the various local jurisdictions in the planning area and are protected from unsuitable development, further minimizing any related hazard risks. Hillside erosion (minor landslides) within the county is very uncommon and results from man-made impacts such as the removal of vegetation. Hillside erosion has not posed substantial risk to life or property and has been largely mitigated through subdivision law, site plan review, and erosion control plans for construction sites.

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<sup>4</sup> WI DOR – 2018 Statement of Changes in Equalized Values by Class and Item, <https://www.revenue.wi.gov/SLFReportsassessor/2018socBRO.pdf>

<sup>5</sup> <https://pubs.usgs.gov/pp/p1183/figures/map.jpg>

There are no records of substantial damage or injury from large landslides within Brown County and these hazard threats are considered low.

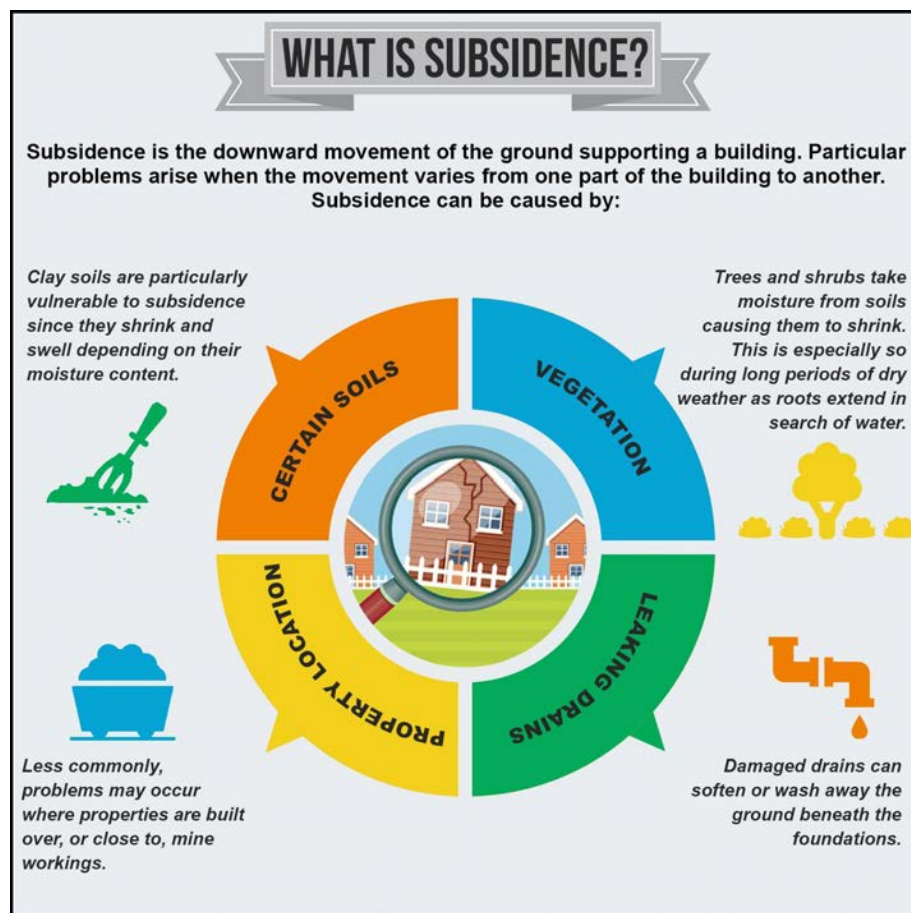
## **Subsidence**

Land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials<sup>6</sup>. The principal causes of land subsidence include: aquifer-system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost. More than 80 percent of the identified subsidence in the Nation is a consequence of exploitation of underground water. The increasing development of land and the pressure that it has on water resources threatens to exacerbate existing land-subsidence problems and could initiate new ones.

Brown County is not an area of excessively karst topography but certain karst features and groundwater usage for purposes of providing potable drinking water, industrial usage or agricultural production should be monitored since this could lead to land subsidence, particularly in the southeastern areas of Brown County where groundwater contamination has already occurred.

The more densely populated areas of Brown County do not rely on groundwater for a water supply. Many of the surrounding communities in central Brown County obtain their water supply from Lake Michigan.

There are no records of substantial damage or injury from large land subsidence within Brown County and these hazard threats are considered low.



<sup>6</sup> Land Subsidence: <https://water.usgs.gov/ogw/subsidence.html>

## Agricultural Hazards

Agriculture accounts for the largest and most expansive (geographically) land uses and one of the top contributors to the local and regional economy. Natural hazards such as; drought, excessive heat, floods, severe thunderstorms, tornadoes, and fires have the potential to impact the agriculture business. Although agricultural losses are not particularly common in Brown County the potential for widespread impacts/losses is present.

In addition to natural hazards, biological factors such as animal diseases and crop pests (insects and weeds) can pose significant threats for Brown County farmers and associated businesses. Significant efforts on a global scale have been dedicated toward improving livestock conditions and boosting crop yields to keep up with the growing demand for food and other agricultural products.

An emerging issue associated with flooding disasters across the United States are large scale farms that include manure pits or lagoons. Manure pits/lagoons pose a significant risk if not designed and maintained properly and if the location for the manure pit/lagoon is not chosen with all due respect to water ways and flood prone areas. With the number of large scale farming operations in the state of Wisconsin and in Brown County it is important for individuals at the local, county, and state level to consider the potential impacts of these facilities if a disaster were to occur.



**Figure 1: Manure pit/lagoon near a river before and after flooding event. Source: NPR**

## **HAZARD PROFILES**

Hazard profiles are intended to describe the frequency, severity, and probability of future natural and man-made/technological hazards that could have an impact on Brown County. These hazard profiles attempt to historically describe the cause and characteristics of each natural and man-made/technological hazard and how they have impacted the population, infrastructure, and environment of the county. These potential risks are evaluated to determine their likelihood of reoccurrence and to gauge the negative impacts to the existing (or planned) population and property that could occur as a result of these hazards.

Although this assessment will attempt to focus on the risk potential to the overall planning area, critical facilities are of particular concern. These entities provide essential products and services to the public that are necessary to preserve health, welfare, and quality of life of residents of Brown County, plus fulfill important public safety, emergency response, and/or disaster recovery functions.

A profile of both natural and manmade hazards are provided in their respective sections as follows. For the purposes of this plan, some hazards have been grouped into logically related hazard topics in order to better organize and describe the extent of the potential risk and vulnerability. The assessment for natural hazards follows in this order: flooding (including flash, riverine, and lake); tornadoes/high winds; lightning and thunderstorms, winter storms (including heavy snow storms, ice storms, and blizzards); storm water flooding; extreme cold; extreme heat; fog, hailstorms, dam failure flooding, forest fires, wildland fires, coastal hazards, and drought.

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## **NATURAL HAZARDS**

A natural hazard is an event that occurs naturally and causes harm to humans – or to other things that we care about, though usually the focus is on humans (which, we might note, is anthropocentric)<sup>7</sup>. The following hazards have been identified by the Steering Committee that pose a risk to Brown County residents.



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<sup>7</sup> Penn State College of Earth and Mineral Sciences - <https://www.e-education.psu.edu/geog30/node/378>



# Flooding

Flooding is one of the more imminent natural disasters that Brown County residents face on an annual basis. A flood is an event that creates general or temporary conditions of partial or complete inundation of normally dry land areas from:

- The overflow of inland or tidal waters;
- The unusual and rapid accumulation or runoff of surface waters from any source;
- Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.<sup>8</sup>

A flood event will inundate floodplain areas adjacent to waterways. Floodplains are characterized as lowlands adjacent to rivers and lakes. Most flood-related injuries and deaths occur when people are swept away by flood currents, and the majority of property damage is caused from sediment-laden floodwaters.

The severity of flooding is determined by rainfall intensity (or other water source) and duration. A large amount of rainfall over a short time span can result in flash flood conditions. However, several factors beyond intensity and duration also come into play. For instance, a small amount of rain can cause flooding in areas where the soil is saturated or in areas of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas. Topography and ground cover are also contributing factors for floods. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover.



**City of Green Bay Flooding**  
**Figure 2 Source: Brown County Planning**

## History

Sixteen flood and flash flood events have been reported by the National Climatic Data Center as having occurred in the planning area since January 1, 1990.

### **June 16, 1996**

Heavy rainfall fell across most of central and east central Wisconsin, as well as parts of northeast Wisconsin from June 16 through 18, 1996. Amounts over the three-day period ranged from two to seven inches in most locales. Runoff from the heavy rainfall caused rivers to rise substantially, with several peaking well above flood stage. Several streets, parks, campgrounds and county roads were flooded, and a few roads were washed out. Crop damage estimates amounted to at least 56 million dollars over the entire 15-county area.

<sup>8</sup> FEMA - <https://www.fema.gov/flood-or-flooding>

***March 31, 1998***

Thunderstorms with locally heavy rain caused the Duck Creek to rise above flood stage late on March 31. The flooding continued into early April. Flooding was confined to areas adjacent to the creek, but no damage was reported.

***April 1, 1998***

The flooding that occurred in early April was a carryover from the excessive precipitation that fell in late March. Duck Creek in Howard reached 17.85 feet, just above flood stage, on April 1, 1998.

***September 26, 1998***

Numerous thunderstorms with large hail, heavy rain, and strong winds rumbled across northern and east central Wisconsin during the early morning of September 26, 1998. Local flooding in Howard occurred after 3 inches of rain fell in only 2 hours, accompanied by large hail and strong winds resulting in 5,000 dollars in property damage.

***July 8, 2000***

A nearly stationary front covering Wisconsin combined with upper air support and abundant moisture produced a prolonged period of thunderstorms. A few of the storms contained high winds and hail but flooding from heavy rainfall caused the majority of the problems. Flooding of roads and/or basements was reported in Green Bay and De Pere. Small streams and creeks overflowed their banks and rural areas suffered some crop damage. Green Bay received 4.12 inches of rain on July 8, 2000 and 4.65 inches of rain in a 24-hour period spanning July 7 - 8. These totals set a new rainfall record for July 8, 2000 and for the month of July 2000. The previous record 24-hour total was 4.39 inches set on July 23, 1912. At least 25,000 customers lost electrical power.

***July 30, 2003***

This flooding event resulted in two areas in Brown County that were impacted and are identified separately in the NOAA data. The event included flash flooding resulting from storms associated with a cold front that moved southeast into a warm and unstable air mass. Early storms produced large hail and some wind damage before an east to west boundary formed in the Appleton area, providing the focus for training on thunderstorms and flooding. Heavy rain resulted in flash flooding that left 2 to 3 feet of water over many roads. Manhole covers popped off on streets in the Green Bay area. The downtown mall in Green Bay had to be evacuated as water started to flow into the lower levels from the street.

***March 5, 2004***

A late winter storm moved across southern Wisconsin and produced a large area of heavy precipitation across northeast and north central Wisconsin. Heavy snow fell across the north and rain fell across much of the east central part of the state. Significant snowmelt due to warm temperatures earlier in the week combined with over an inch of rain from the storm system in east central Wisconsin to produce flooding. Widespread lowland flooding was observed along the East River from De Pere to Allouez and a few intersections became flooded and had to be closed.

***March 28, 2005***

Well above normal temperatures during the last week of the month resulted in considerable snowmelt. Rainfall combined with runoff from melted snow, causing minor flooding on several rivers.

***July 15, 2010***

Heavy rainfall caused Apple Creek to rise about 2.5 feet above flood stage at the Apple Creek Campground. Brown County officials had to evacuate 28 people from the campground where water was up to 5 feet deep.

***August 20, 2010***

Thunderstorms produced torrential rains in Green Bay. Lombardi Avenue was closed between Oneida Street and Holmgren Way due to three feet of water and stalled cars on the road. Storm and isolated sanitary sewer backups occurred in this area, causing some damage to basements. In just ten minutes 0.88 inch of rain fell at Austin Straubel Airport, 0.54 inch of that fell in just four minutes.

***September 26, 2010***

Heavy rain fell over extreme northwest Brown County, causing flash flooding in Pulaski where a storm total of 3.97 inches of rain fell. Some roads in the area flooded, including State Highway 32, and a small creek that is normally about 1 foot deep was flowing at a depth of eight or nine feet.

***September 8, 2015***

Heavy rain developed as low pressure moved across Wisconsin. The heaviest rain fell during the morning. The highest rainfall totals were 3.50 inches in Allouez and 3.15 inches near Kaukauna (Outagamie Co.). Green Bay received 2.50 inches of rain, including 0.81 inch in just 15 minutes.



***July 22, 2017***

Scattered thunderstorms that formed ahead of an approaching cold front brought high winds that downed trees and heavily damaged a farm building in Oconto County, and produced torrential rainfall that flooded intersections in Green Bay.

***September 8, 2018***

Severe thunderstorms produced torrential rainfall that caused urban flooding and flash flooding in parts of the Green Bay area and Fox Valley. There were numerous reports of 2 to 4 inches of rain, along with a few even higher totals.

***September 17, 2018***

Thunderstorms brought a period of torrential rainfall to eastern Brown County, causing flash flooding on the east side of Green Bay and in Bellevue. About 50 people had to be rescued from cars that became trapped in flooded intersections. Employees and customers of some businesses had to shelter in place due to high water in their parking lots and surrounding streets. The ground floor of some buildings flooded, including a Green Bay Metro Fire Department station.

More than 100 people were evacuated from seven buildings, including residents of a 48-unit apartment building that housed mostly elderly people. The basement of the building flooded, leaving electrical services underwater. More than 70 people were left homeless for the night and stayed overnight at a local church.

Storm Events Source: NOAA Storm Events Database – Flooding and Flash Flooding

**Vulnerability**

Past floods are indicative of what can happen in the future, and flood studies and mitigation plans are based on the risk of future flooding. Flood studies extrapolate from historical records to determine the statistical potential that storms and floods of a certain magnitude will recur.

The probability of reoccurrence is expressed in percentages as the chance of a flood of a specific extent occurring in any given year. The most widely adopted design and regulatory standard for floods in the United States is the 1-percent annual chance flood and this is the standard formally adopted by FEMA.

The 1-percent annual flood, also known as the base flood, has a 1 percent chance of occurring in any particular year. It is also often referred to as the “100-year flood” since its probability of occurrence suggests it should only reoccur once every 100 years. This expression is, however, merely a simple and general way to express the statistical likelihood of a flood with actual recurrences varying from place to place.

These terms are often misunderstood. Frequently, people interpret the 50-year flood definition to mean occurring “once every 50 years,” which is incorrect. From a probability standpoint, a 50-year flood has a one in 50 (two percent) chance of occurring in any given year. In reality, a 50-year flood could occur two times in the same year, two years in a

row, or four times over the course of 50 years. On the other hand, it is possible for 100 years to pass without having a 50-year flood event. The term “50-year flood” has caused much confusion for people not familiar with statistics. Another way of looking at it is in the context that a base flood will happen during the life of a 30-year mortgage, a 26 percent chance.

The official floodplain study for insurance and regulatory purposes is the *Flood Insurance Study* by the Federal Emergency Management Agency (FEMA). Flood Insurance Studies have been prepared for Brown County (for unincorporated areas); for the cities of Green Bay and De Pere, the villages of Ashwaubenon, Allouez, Bellevue, and Howard. Flood Insurance Rate Maps (FIRMs) were updated for the unincorporated areas of Brown County and for the City of Green Bay in 2009.

FEMA uses the “base” flood as the basis for its regulatory requirements and flood insurance rate setting. This Hazards Mitigation Plan also uses the base flood for planning purposes. The base flood is the one percent chance flood, or the 100-year flood.

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent floods. If a house is low enough, it may be subject to the 10- or 25-year flood. During a typical 30-year mortgage, a house may have a 26 percent chance of being hit by the 100-year flood, but the odds are 96 percent (nearly guaranteed) that a 10-year flood will occur during the 30-year mortgage period. Compare those odds to the only five percent chance that the house will catch on fire during the same 30-year mortgage period.

Another term used is the “500-year flood,” which has a 0.2 percent chance of occurring in any given year. While the odds of it occurring are more remote, the “500-year flood” is the national standard used for protecting critical facilities, such as hospitals and power plants.

Within the long-range future (20 to 30 years), Brown County is considered to have a **high** probability of sustaining a 100-year flood. This probability is based on observation of past flooding events (and the extent of those events) by the Hazards Mitigation Plan Steering Committee and is consistent with the odds that a “base” flood will happen during the life of a 30-year mortgage.

## **Impacts**

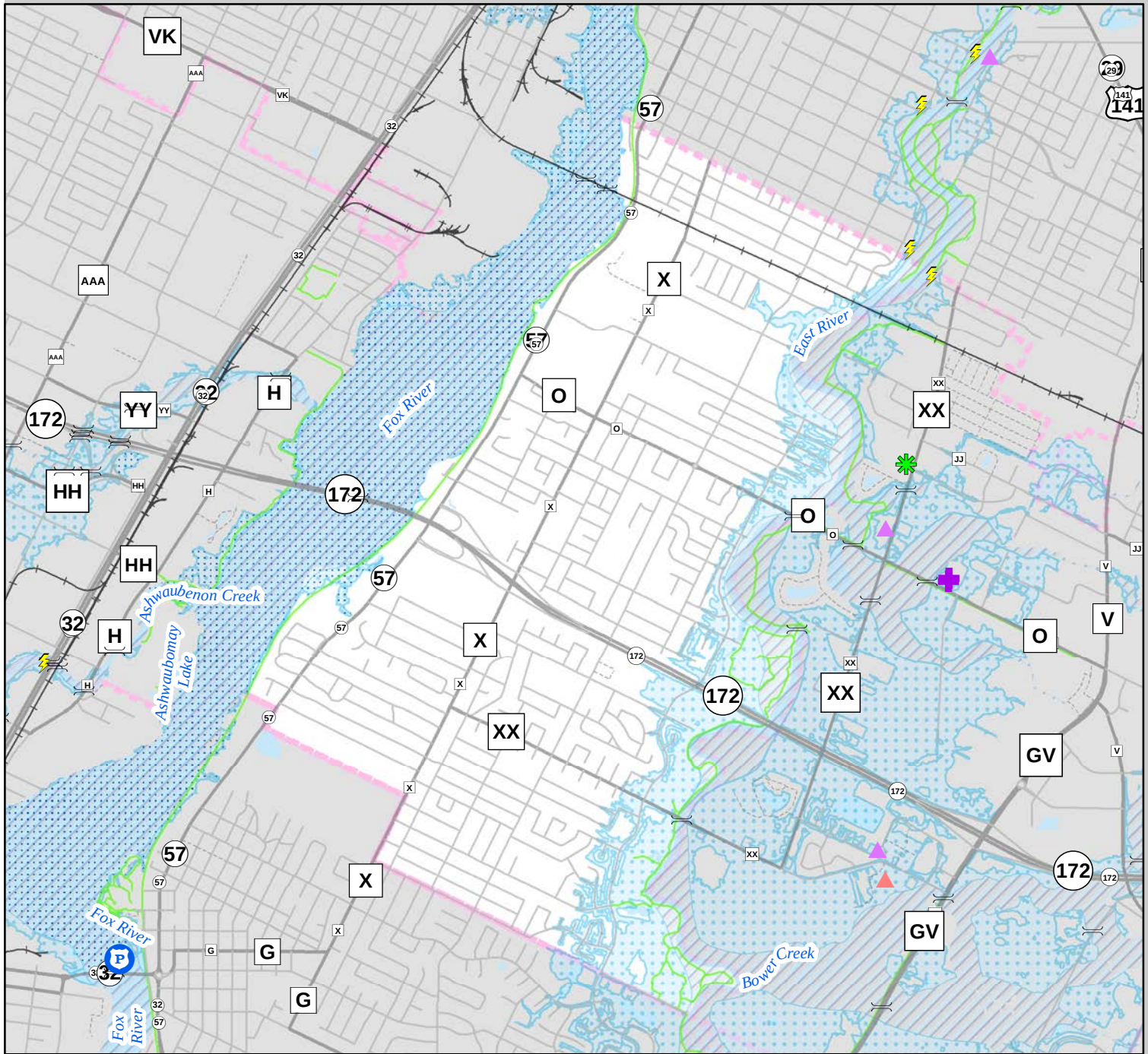
The following describes the various impacts that flooding has on the county.

### ***Critical Facilities***

Brown County Emergency Management and the Land Information Office coordinated with the local communities to confirm the type and location of the critical facilities as defined by the Steering Committee. The number of critical facilities that could be impacted by flooding was determined by using data collected in GIS and overlaying that information with the FEMA flood data. Using this method, 159 critical facilities were found in the 100-year floodplain. However, the 500-year flood is considered the most appropriate protection level for critical facilities. The following maps show the location of critical facilities within the areas of the county susceptible to the one percent chance event.

# Brown County Critical Facilities within 100 Year Floodplain

## Village of Allouez



Map 3.01

### Legend

- |  |            |  |                |  |                |
|--|------------|--|----------------|--|----------------|
|  | Business   |  | Other Landmark |  | EMS            |
|  | Adult Care |  | Utility        |  | Police Station |
|  | Child Care |  | Bridge         |  |                |

### Flood Hazard Areas

- Zone AE (100 year floodplain with Base Flood Elevation determined)
- Floodway Areas in Zone AE

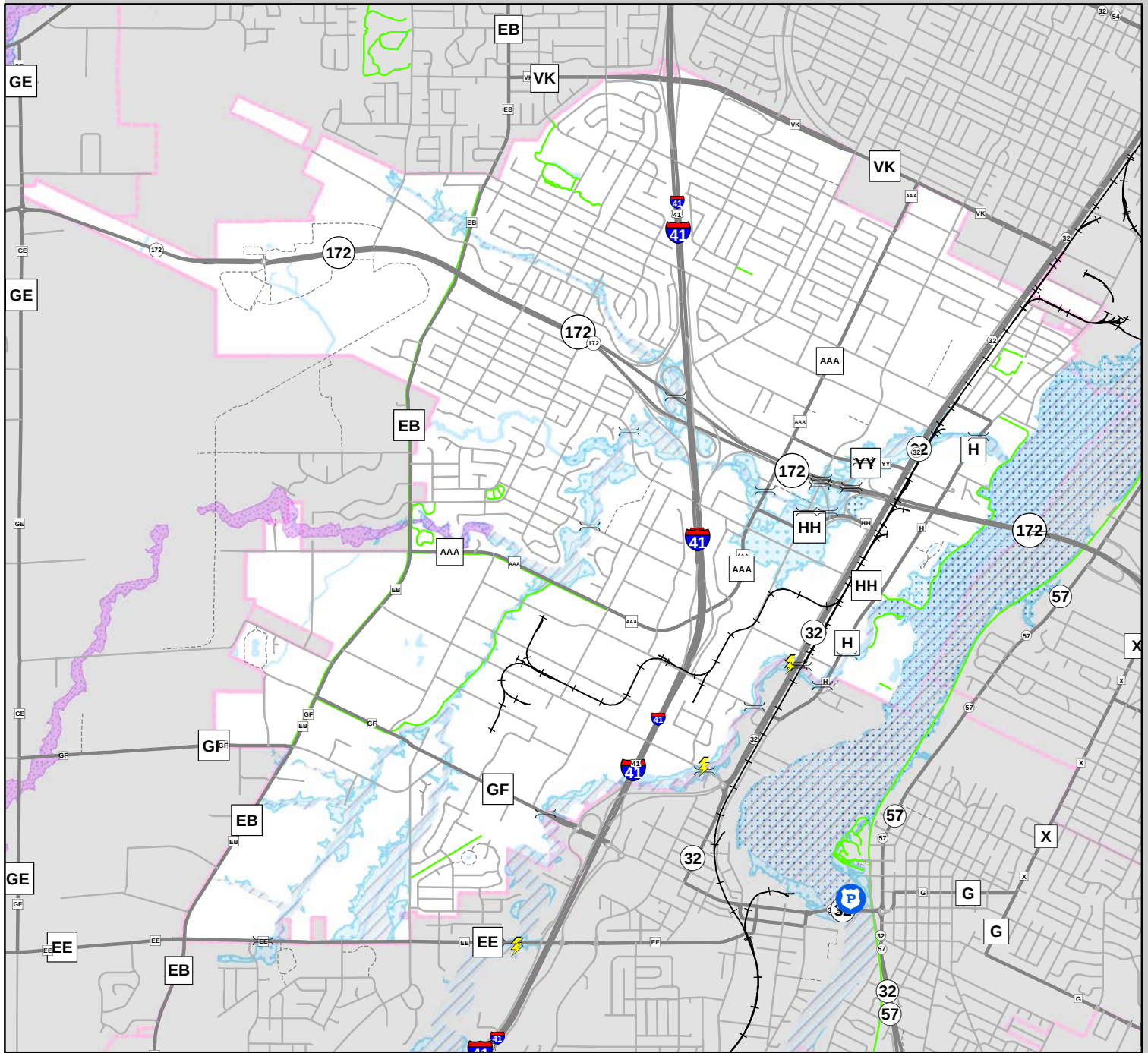


0 0.3 0.6  
Miles



# Brown County Critical Facilities within 100 Year Floodplain

## Village of Ashwaubenon



Map 3.02

### Legend

- |  |                |                                                                    |
|--|----------------|--------------------------------------------------------------------|
|  | Other Landmark | <b>Flood Hazard</b>                                                |
|  | Utility        | Zone A (100 year floodplain, No Base Flood elevation determined)   |
|  | Bridge         | Zone AE (100 year floodplain with Base Flood Elevation determined) |
|  | Police Station | Floodway Areas in Zone AE                                          |



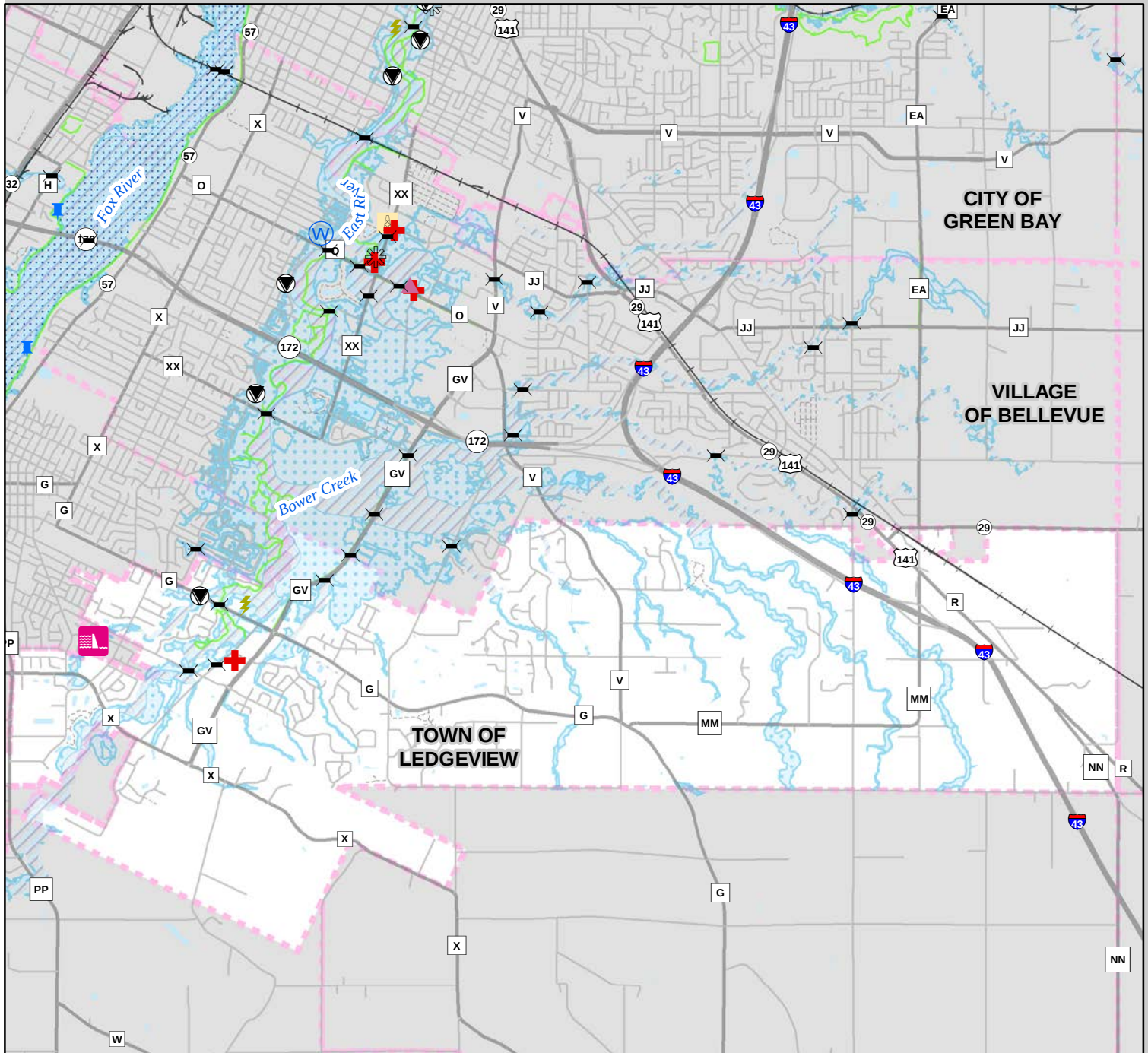
0 0.5 1  
Miles

Source: Brown County Land Information Office, 2019

This map is neither a legally recorded map or a survey, and is not intended to be used as either. It is a compilation of records, information, and data to be used for reference purposes only. Brown County is not responsible for any inaccuracies herein contained.

# Brown County Critical Facilities within 100 Year Floodplain

## Town of Ledgeview



Map 3.03

### Legend

#### Critical Facilities

- Bridges
- Clinics
- Dams
- Docking Facilities; Docking facilities

- Electric Power Plants; Electric Power Substations; Major Electric Power Transmission Lines R/W
- Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station

- Police/Fire Stations/Offices
- Pre-School/Day Care
- Radio/Television Stations
- Water Supply Booster/Pumping Stations; Water Supply Wells

#### Flood Hazard Areas

- Zone A (100 year floodplain, No Base Flood elevation determined)
- Zone AE (100 year floodplain with Base Flood Elevation determined)
- Floodway Areas in Zone AE



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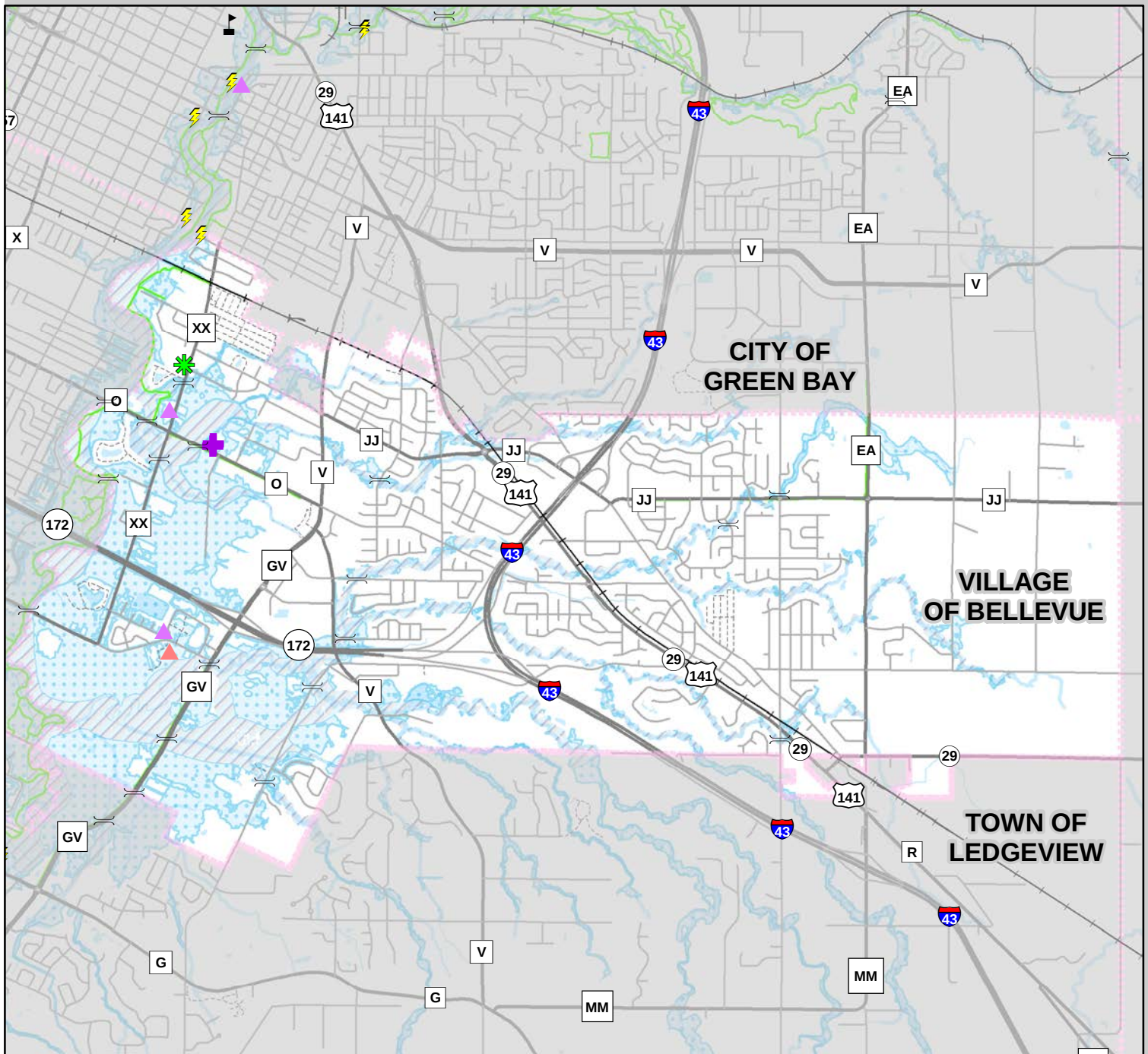
0 0.5 1  
Miles

Source: Brown County Land Information Office, 2019



# Brown County Critical Facilities within 100 Year Floodplain

## Village of Bellevue



Map 3.04

### Legend

- |                                                                                    |            |                                                                                                                                                        |
|------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Business   | <b>Flood Hazard</b>                                                                                                                                    |
|  | Adult Care |  Zone A (100 year floodplain, No Base Flood elevation determined)   |
|  | Child Care |  Zone AE (100 year floodplain with Base Flood Elevation determined) |
|  | School     |  Floodway Areas in Zone AE                                          |
|  | Utility    |                                                                                                                                                        |
|  | Bridge     |                                                                                                                                                        |
|  | EMS        |                                                                                                                                                        |



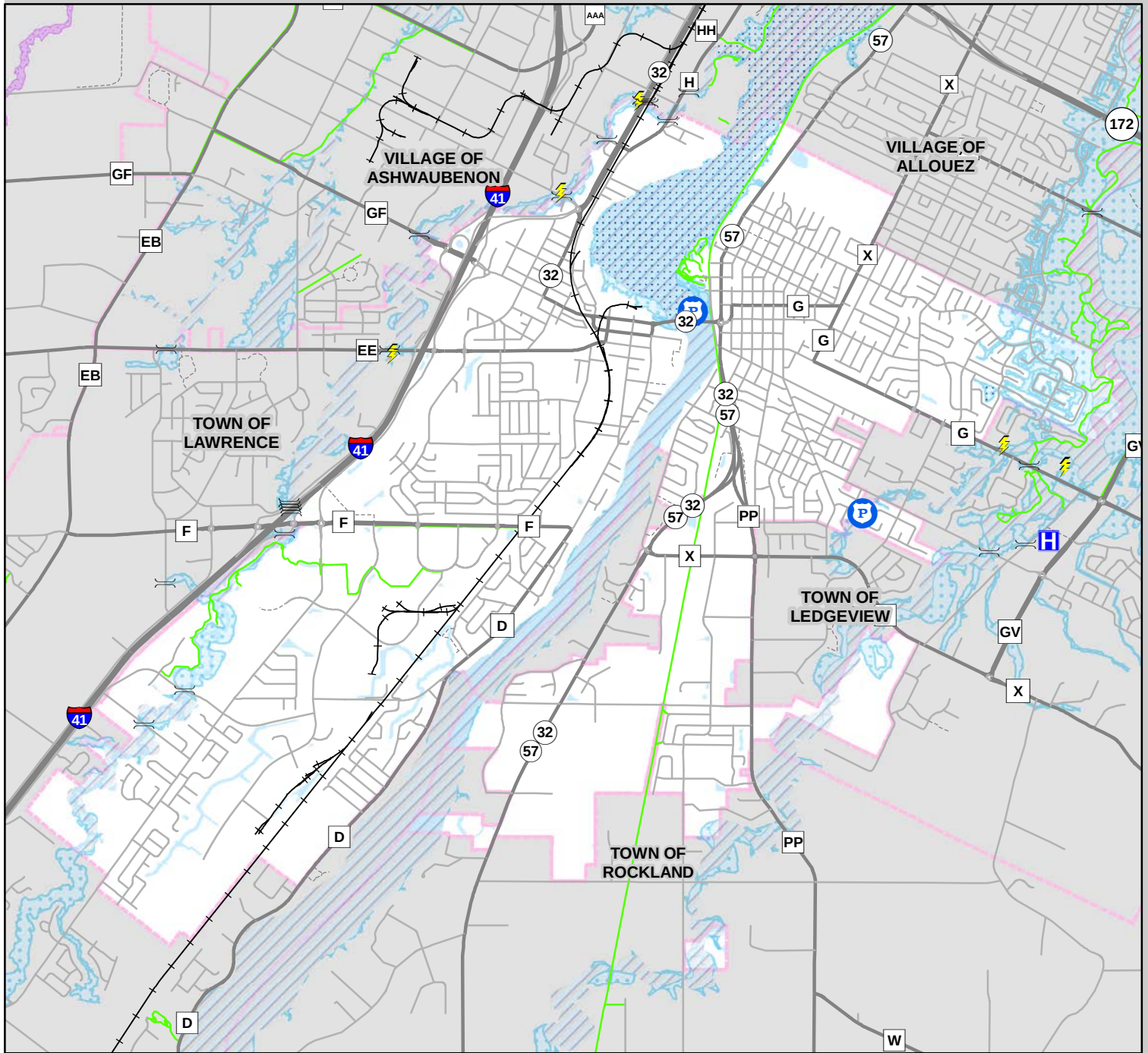
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## City of De Pere



Map 3.05

### Legend

-  Hospital/Clinic
-  Other Landmark
-  Utility
-  Bridge
-  Police Station

### Flood Hazard Areas

-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



0 0.5 1  
Miles

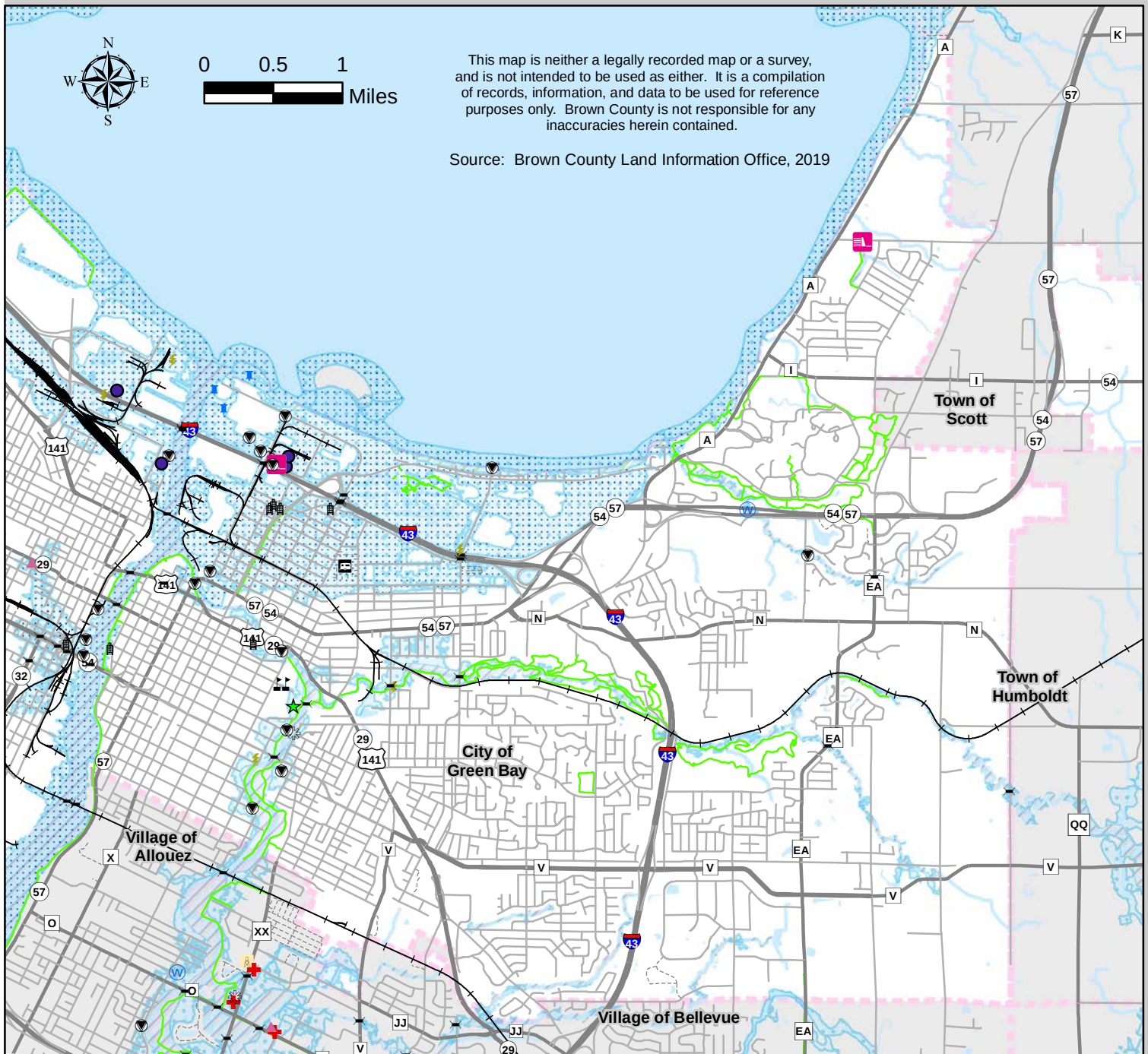
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Source: Brown County Land Information Office, 2019



# Brown County Critical Facilities within 100 Year Floodplain

## City of Green Bay East



### Legend

#### Critical Facilities

-  Administrative Buildings
-  Bridges
-  Clinics
-  Dams
-  Docking Facilities; Docking facilities

-  Electric Power Plants; Electric Power Substations; Major Electric Power Transmission Lines R/W
-  Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station
-  Mobile Home Park
-  Other Liquid Fuel Substations; Other Liquid Fuel Terminal Plants

-  Police/Fire Stations/Offices
-  Pre-School/Day Care
-  Radio/Television Stations
-  School; Secondary Schools
-  Sports stadium / arena
-  Water Supply Booster/Pumping Stations; Water Supply Wells

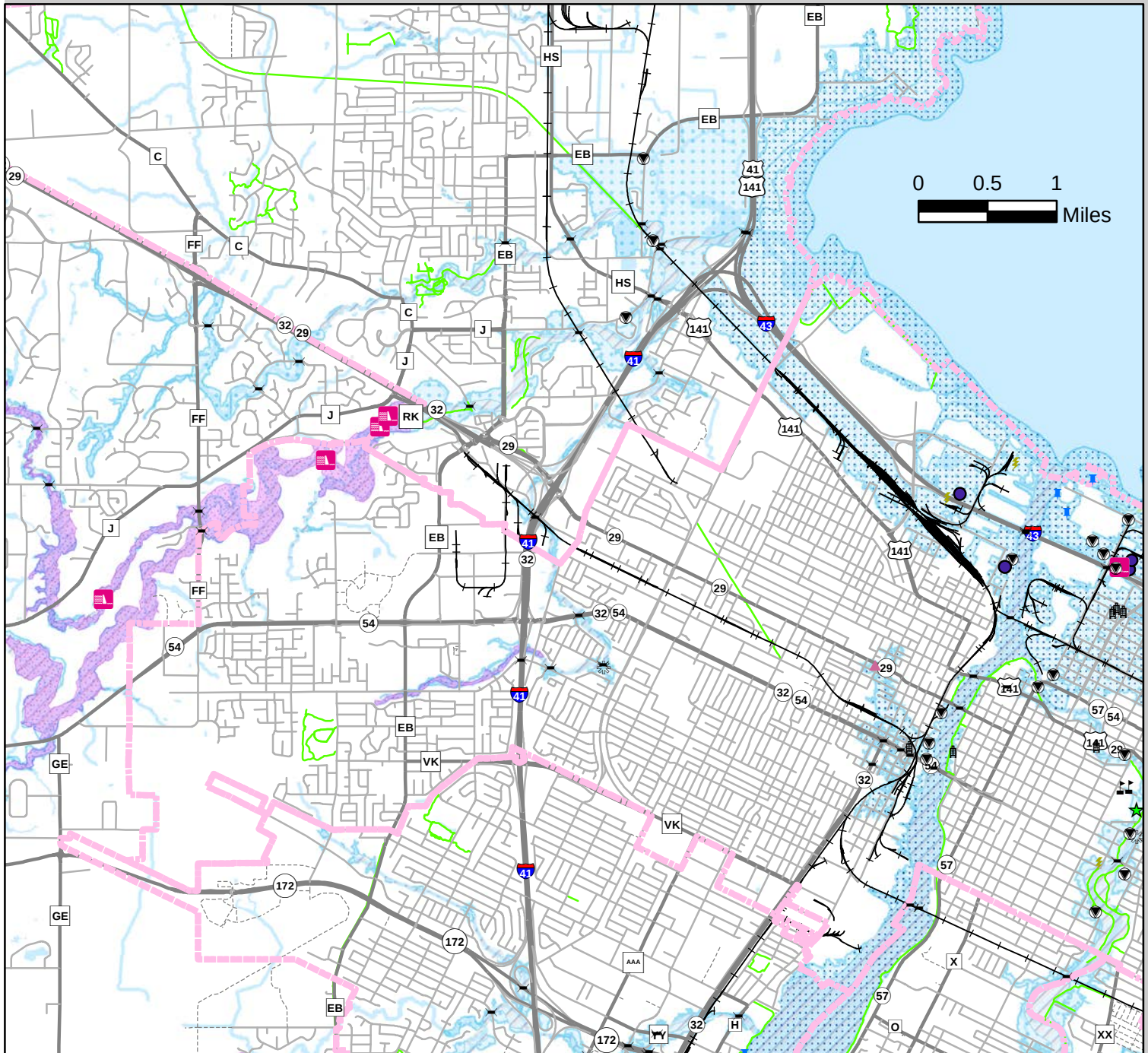
#### Flood Hazard Areas

-  AO,
-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



# Brown County Critical Facilities within 100 Year Floodplain

## City of Green Bay West



Map 3.07

### Legend

#### Critical Facilities

-  Administrative Buildings
-  Bridges
-  Dams
-  Docking Facilities; Docking facilities
-  Electric Power Plants; Electric Power Substations; Major Electric Power Transmission Lines R/W
-  Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station

-  Other Liquid Fuel Substations; Other Liquid Fuel Terminal Plants
-  Police/Fire Stations/Offices
-  Pre-School/Day Care
-  School; Secondary Schools
-  Sports stadium / arena

#### Flood Hazard Areas

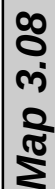
-  AO,
-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



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Source: Brown County Land Information Office, 2019

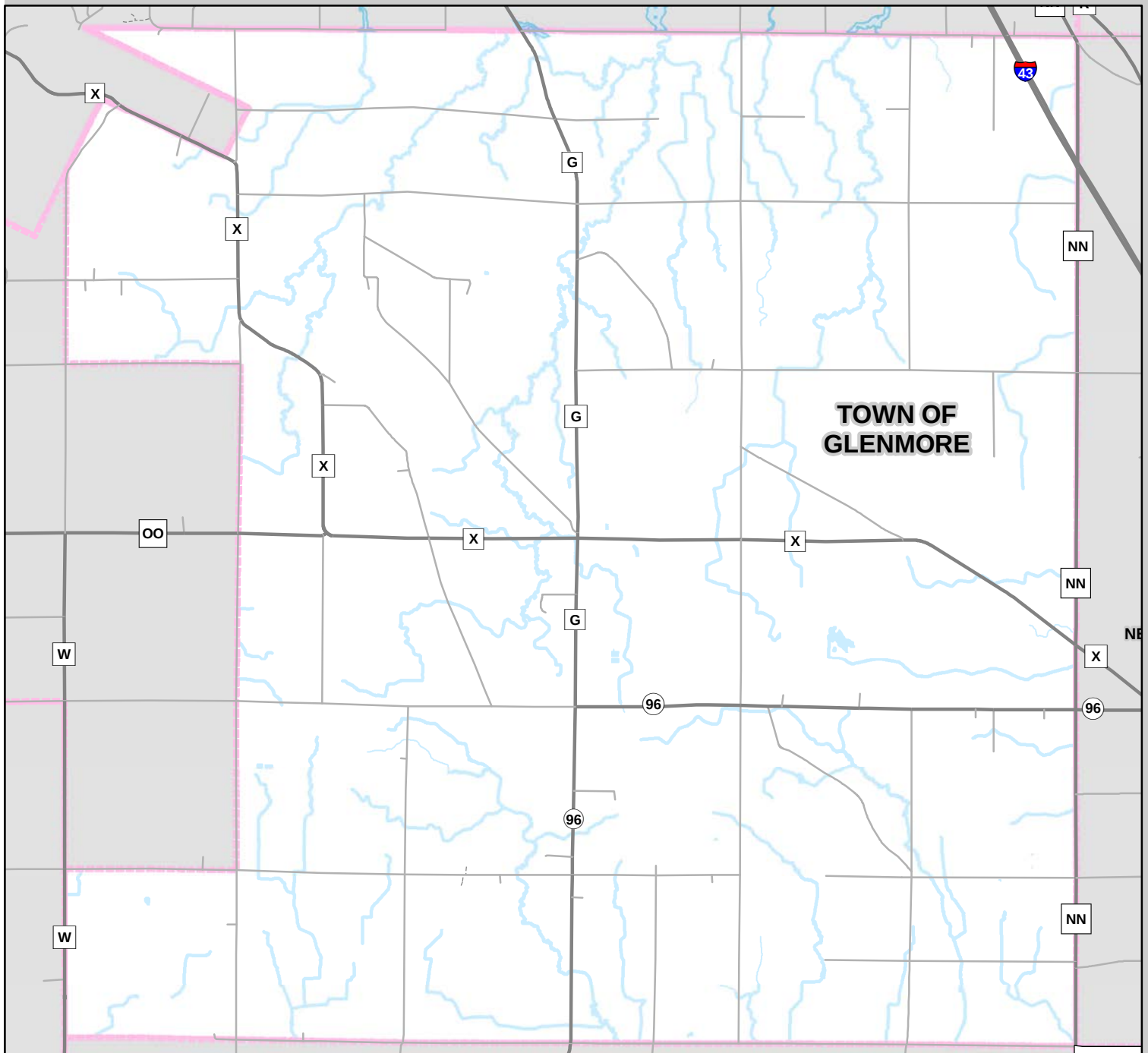
Town of Eaton, Town of New Denmark, Village of Denmark





# Brown County Critical Facilities within 100 Year Floodplain

## Town of Glenmore



Map 3.09

### Legend

#### Flood Hazard Areas

-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE

**No Critical Facilities in the  
Town of Glenmore are within  
the 100 year floodplain**



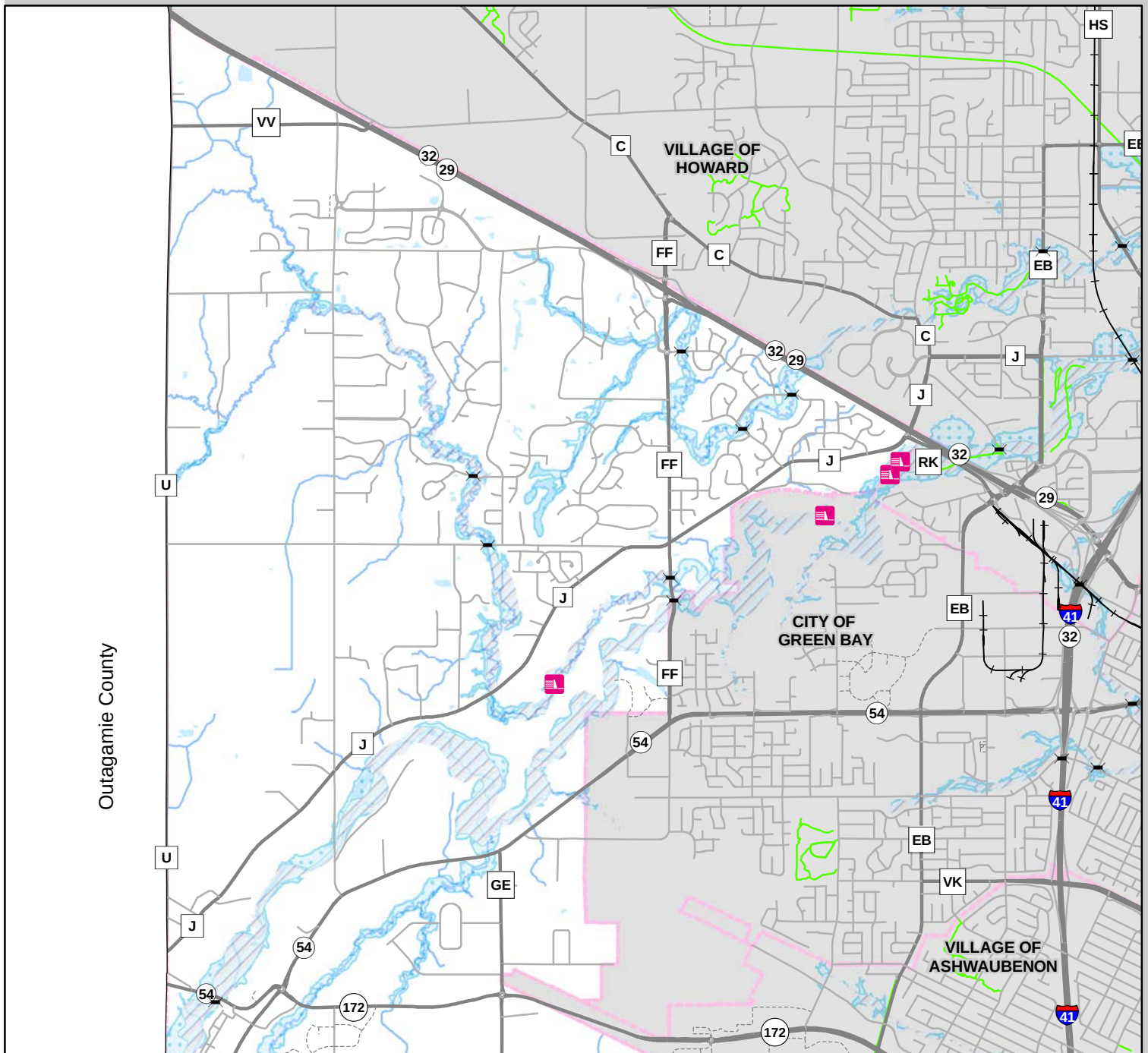
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Village of Hobart North



Map 3.10

### Legend

#### Critical Facilities Flood Hazard

-  Bridges
-  Dams
-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



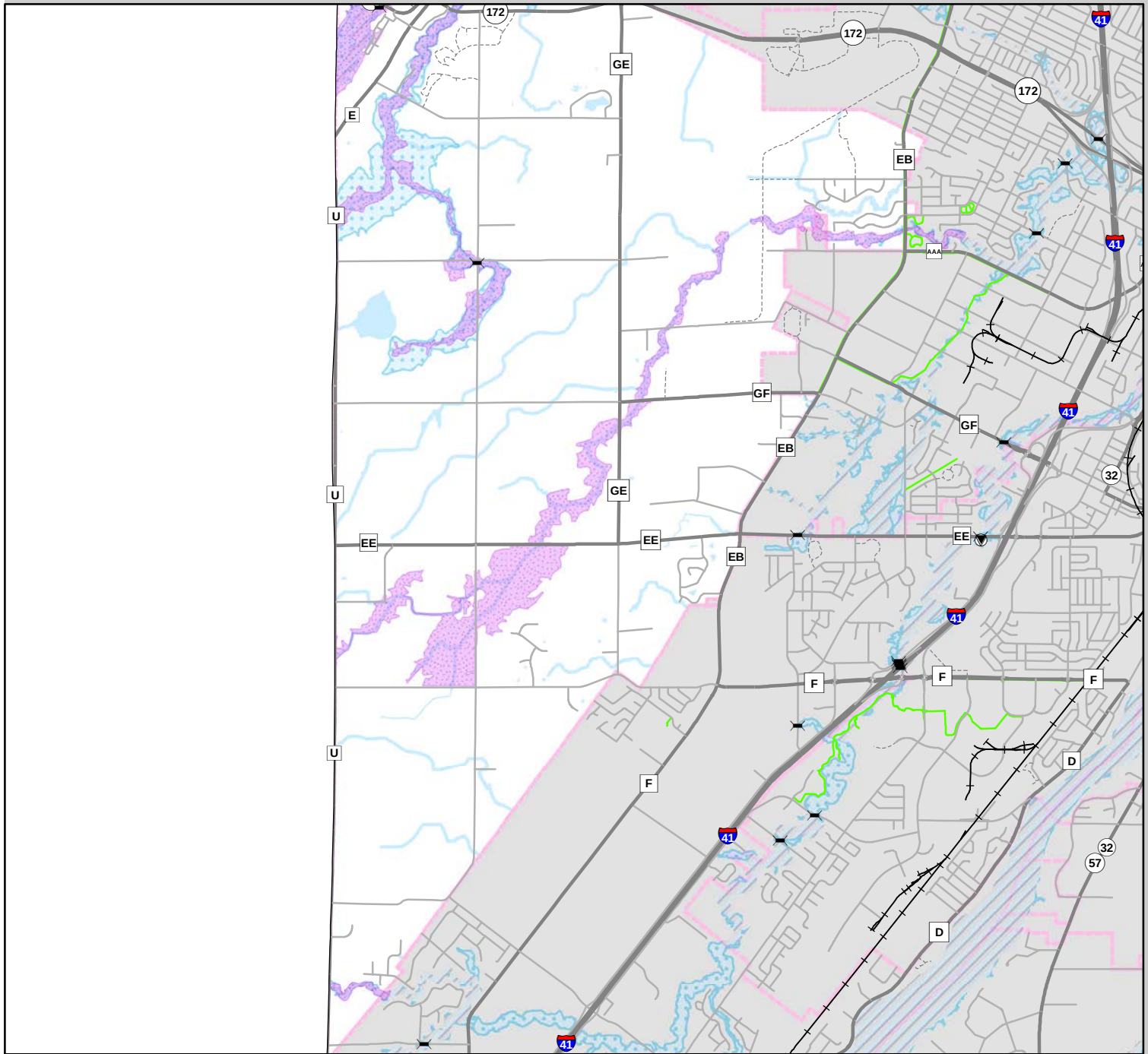
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Village of Hobart South



Map 3-11

### Legend

#### Critical Facilities

-  Bridges
-  Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station

#### Flood Hazard Areas

-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



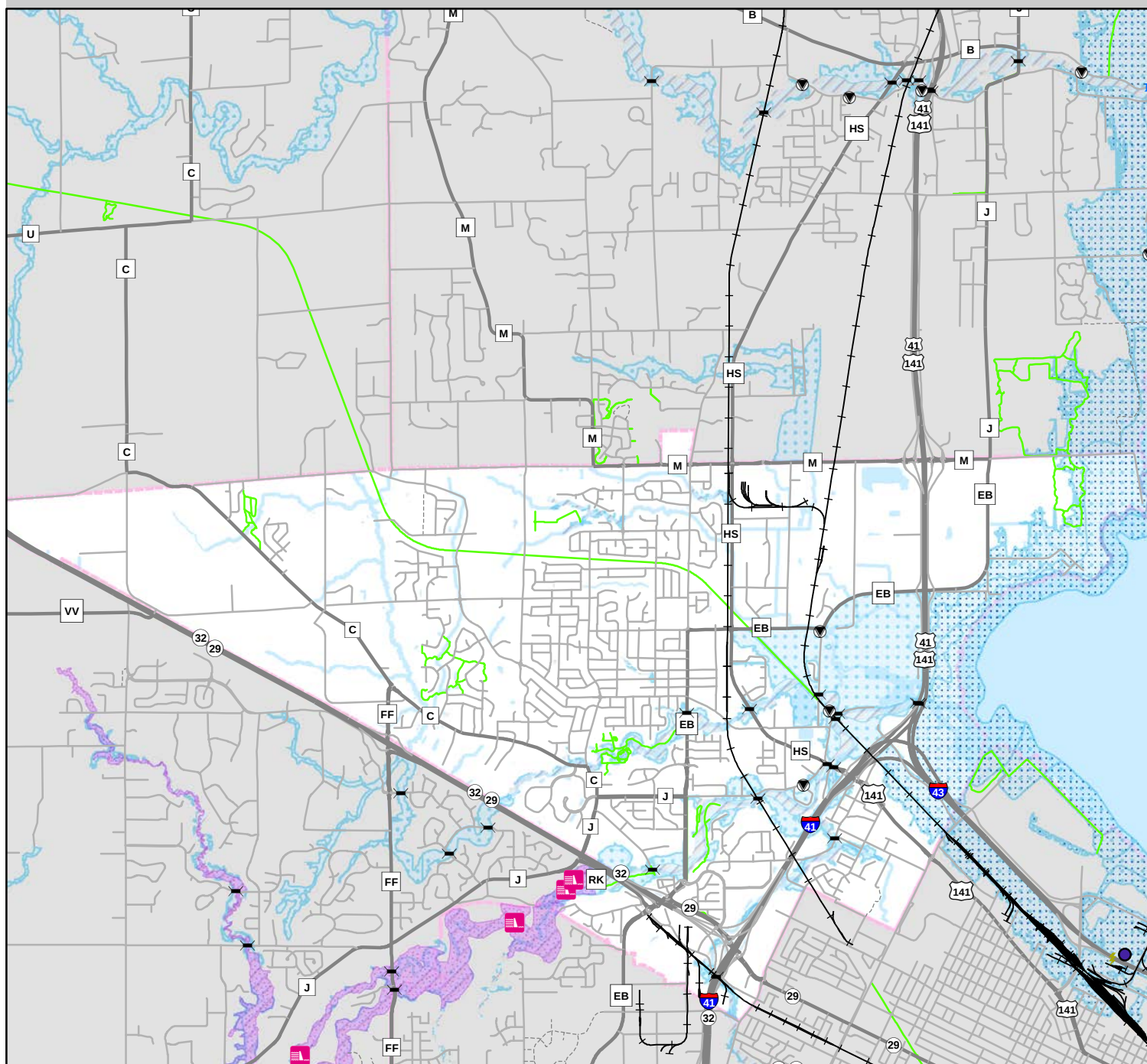
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Miles

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Source: Brown County Land Information Office, 2019



# Village of Howard



### Legend

## Critical Facilities

-  Bridges
-  Dams
-  Docking Facilities;  
Docking facilities

- ⚡ Electric Power Plants; Power Substations; Electric Power Transmission Lines R/W
- 🚰 Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station
- 🛢️ Liquid Fuel Substations and Fuel Terminal Plants

## Flood Hazard Areas

- Zone A (100 year floodplain, No Base Flood elevation determined)
- Zone AE (100 year floodplain with Base Flood Elevation determined)
- Floodway Areas in Zone AE



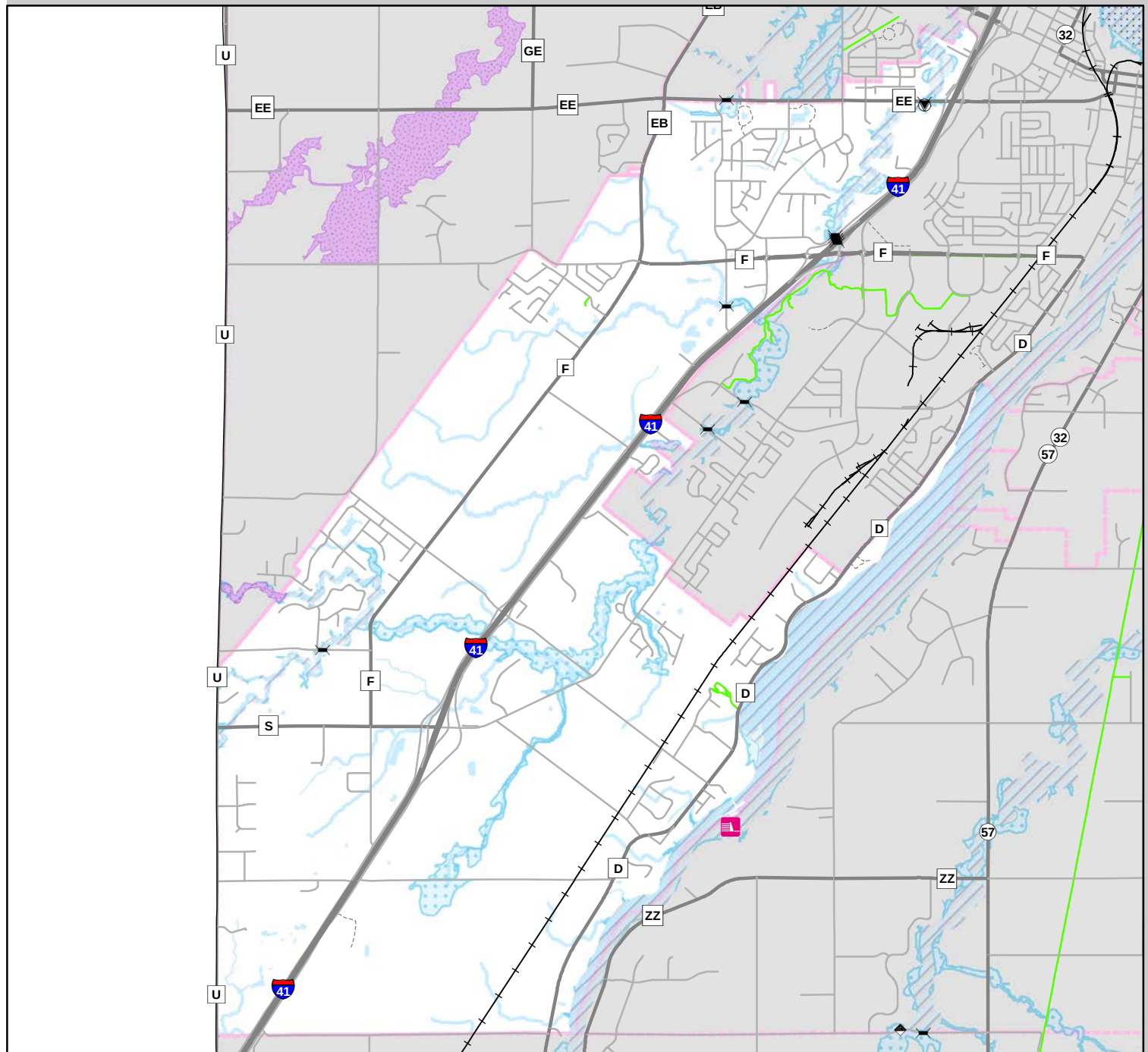
A horizontal scale bar with three segments. The first segment is black, the second is white, and the third is black. Above the bar are the numbers 0, 0.5, and 1. To the right of the bar is the word "Miles".

This map is neither a legally recorded map or a survey, and is not intended to be used as either. It is a compilation of records, information, and data to be used for reference purposes only. Brown County is not responsible for any inaccuracies herein contained.

Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Town of Lawrence



Map 3-13

### Legend

#### Critical Facilities

-  Bridges
-  Dams
-  Flooding Site
-  Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station

#### Flood Hazard Areas

-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



0 0.5 1  
Miles

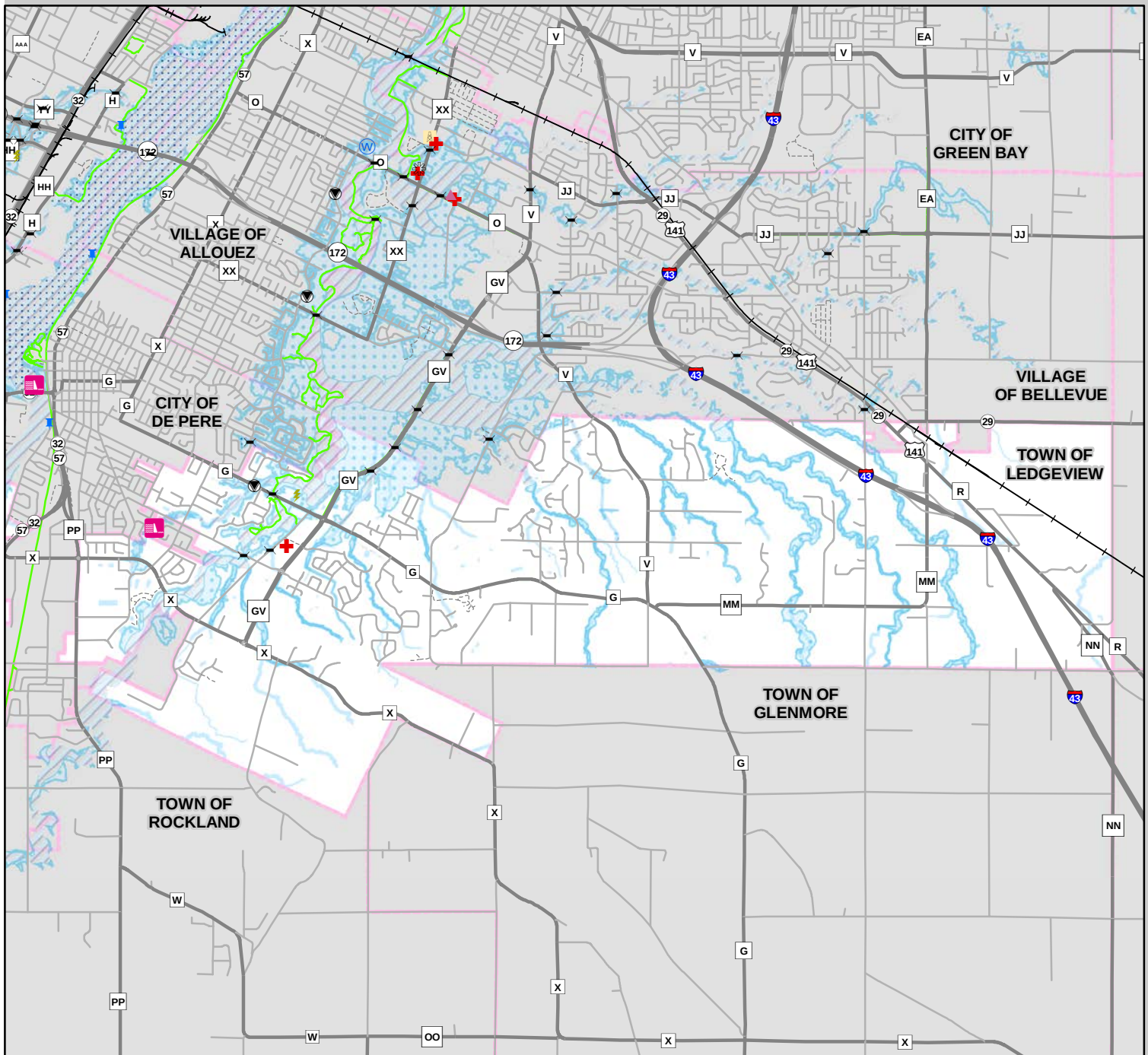
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Source: Brown County Land Information Office, 2019



# Brown County Critical Facilities within 100 Year Floodplain

## Town of Ledgeview



Map 3-14

### Legend

#### Critical Facilities

- ✕ Bridges
- ✚ Clinics
- 🏰 Dams
- ⚓ Docking Facilities; Docking facilities

- ⚡ Electric Power Plants; Power Substations; Electric Power Transmission Lines R/W
- 🚰 Lift Station; Sanitary Lift Station; Sewage Treatment Plants; Sewer Lift Station; Storm Lift Station
- 🚒 Police/Fire Stations/Offices



Pre-School/Day Care



Radio/Television Stations



Water Supply Booster/Pumping Stations; Water Supply Wells

#### Flood Hazard Areas



Zone A (100 year floodplain, No Base Flood elevation determined)



Zone AE (100 year floodplain with Base Flood Elevation determined)



Floodway Areas in Zone AE



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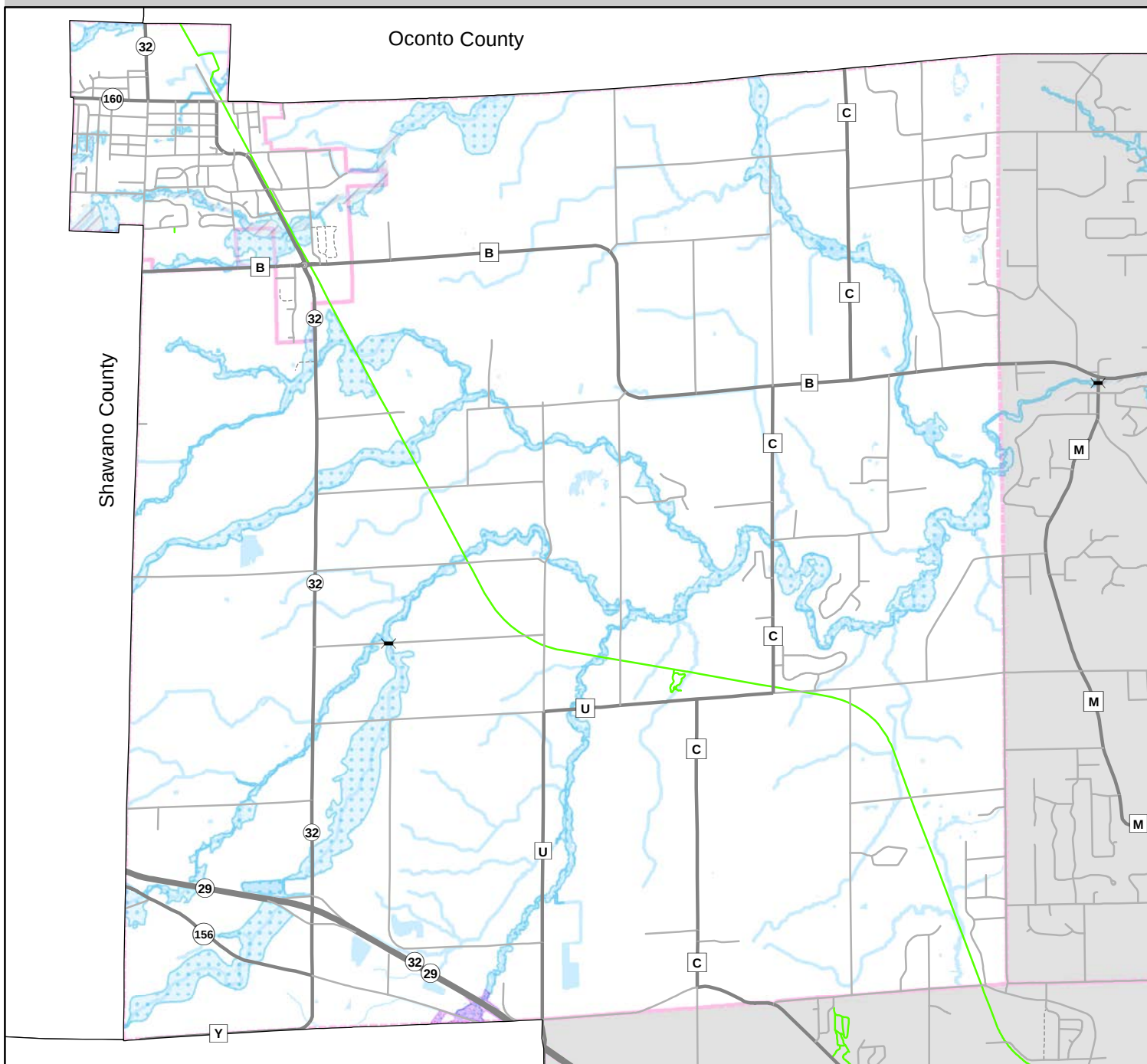
0 0.5 1  
Miles

Source: Brown County Land Information Office, 2019



# Brown County Critical Facilities within 100 Year Floodplain

## Village of Pulaski and Town of Pittsfield



Map 3-15

### Legend

#### Critical Facilities Flood Hazard

-  Bridges
-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



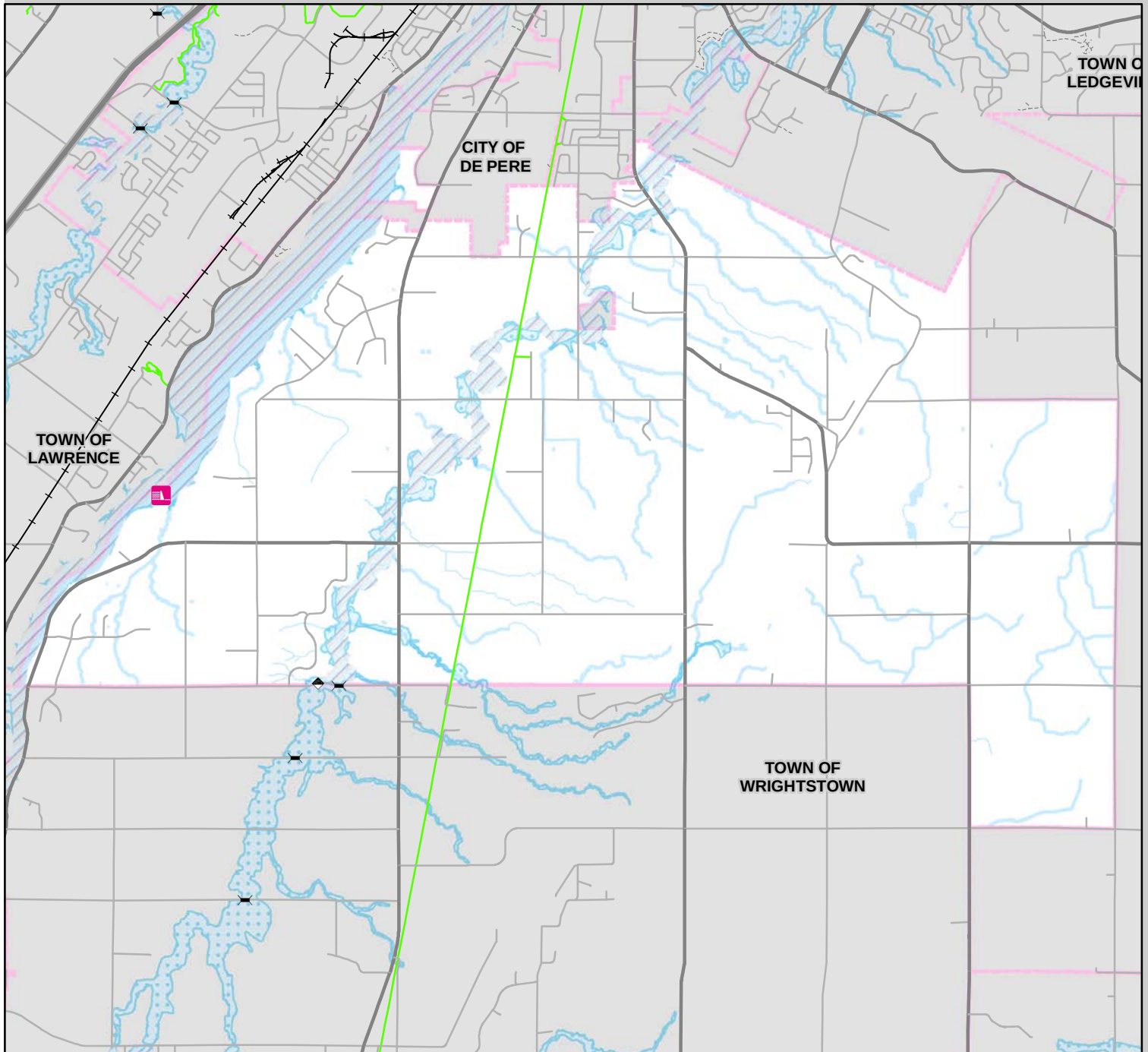
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Town of Rockland



Map 3-16

### Legend

#### Critical Facilities

-  Bridges
-  Dams
-  Flooding Site

#### Flood Hazard Areas

-  Zone A (100 year floodplain, No Base Flood elevation determined)
-  Zone AE (100 year floodplain with Base Flood Elevation determined)
-  Floodway Areas in Zone AE



0 0.5 1  
Miles

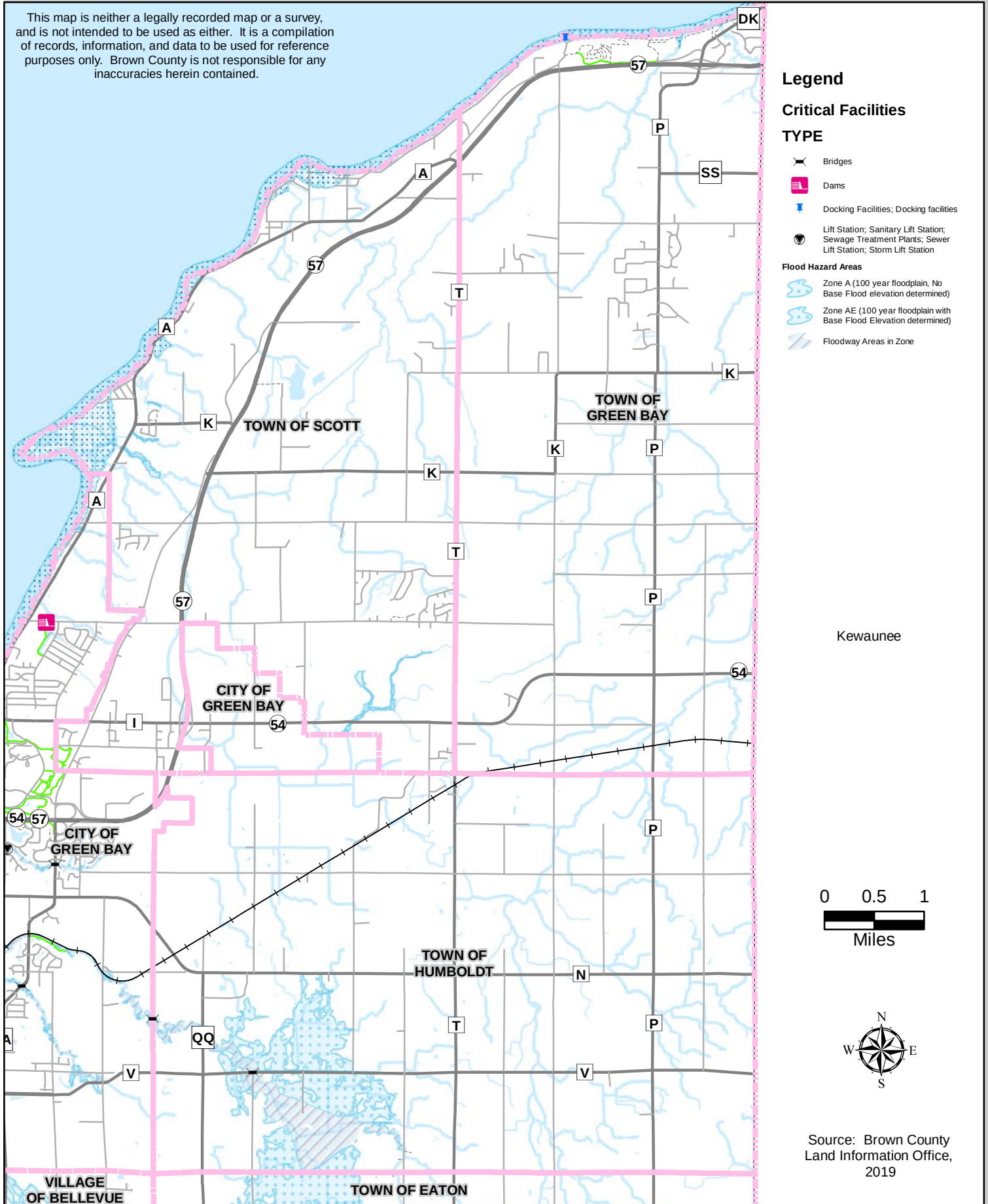
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Town of Green Bay, Town of Scott, Town of Humboldt

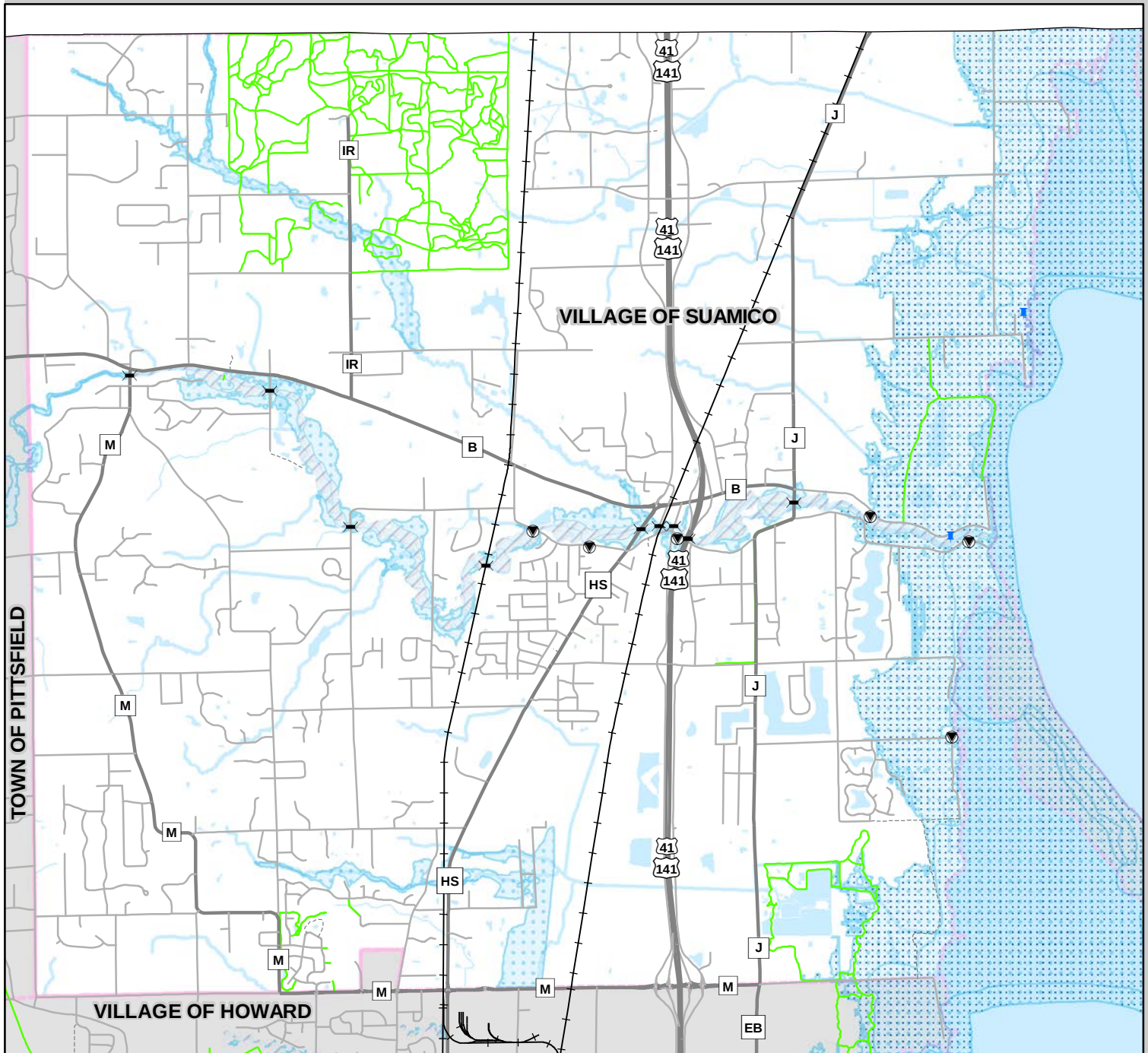
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# Brown County Critical Facilities within 100 Year Floodplain

## Village of Suamico



### Legend

#### Critical Facilities

-  Bridges
-  Docking Facilities;  
Docking facilities
-  Lift Station; Sanitary Lift  
Station; Sewage  
Treatment Plants; Sewer  
Lift Station; Storm Lift  
Station

#### Flood Hazard Areas

-  Zone A (100 year  
floodplain, No Base Flood  
elevation determined)
-  Zone AE (100 year  
floodplain with Base  
Flood Elevation  
determined)
-  Floodway Areas in Zone  
AE



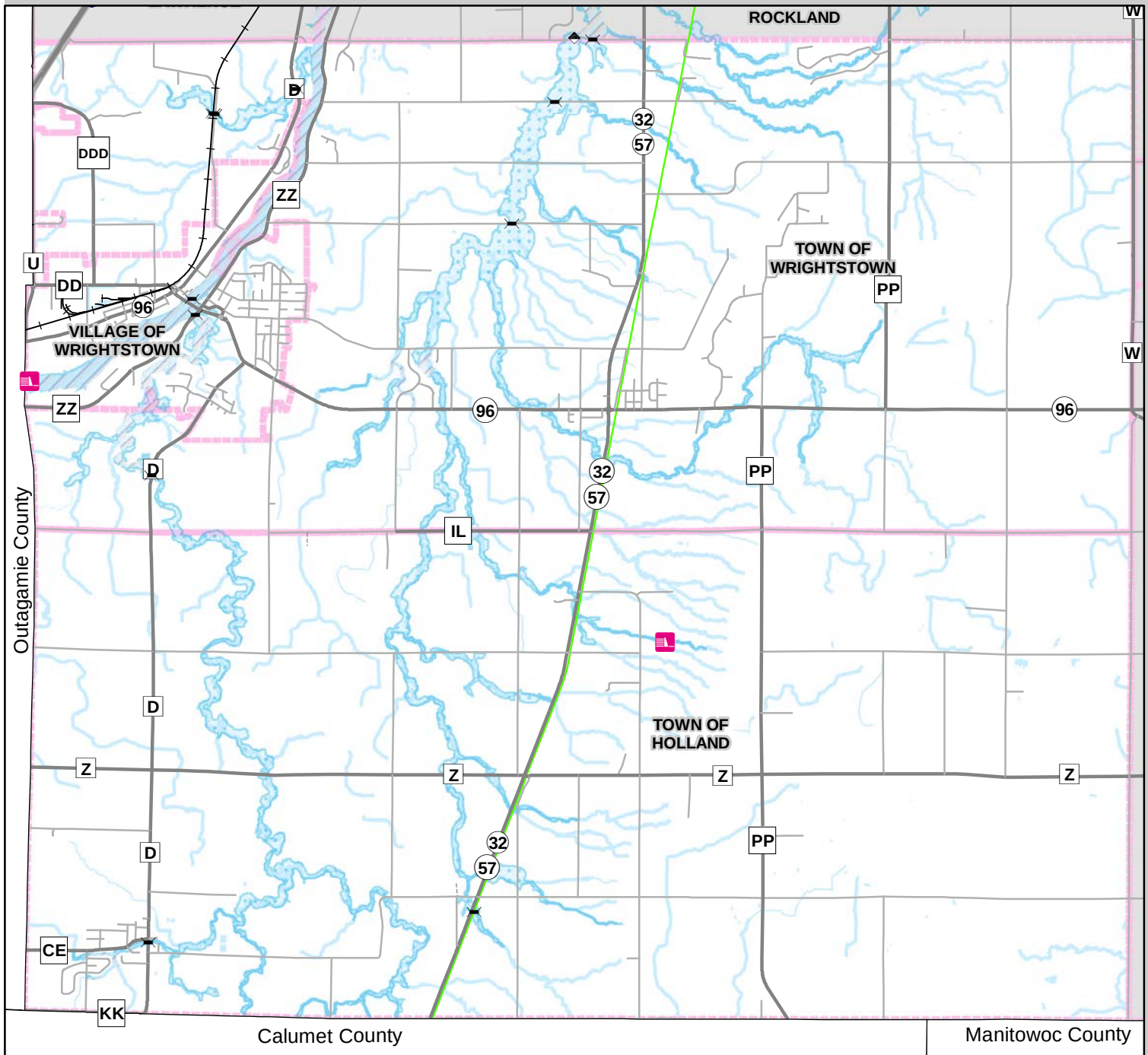
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Source: Brown County Land Information Office, 2019

# Brown County Critical Facilities within 100 Year Floodplain

## Village of Wrightstown and Towns of Wrightstown and Holland



### Legend

#### Critical Facilities

- Bridges
- Dams
- Flooding Site

#### Flood Hazard Areas

- Zone A (100 year floodplain, No Base Flood elevation determined)
- Zone AE (100 year floodplain with Base Flood Elevation determined)
- Floodway Areas in Zone AE



0 0.5 1  
Miles

This map is neither a legally recorded map or a survey, and is not intended to be used as either. It is a compilation of records, information, and data to be used for reference purposes only. Brown County is not responsible for any inaccuracies herein contained.

Source: Brown County Land Information Office, 2019

### ***Public Health***

While health problems associated with flooding are often not reported, three general types of health hazards accompany floods. The first hazard comes from the water itself. Floodwaters carry whatever was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where livestock are kept can contribute polluted waters to the receiving streams. Floodwaters saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, raw sewage can flow from the facility. Infiltration and lack of treatment lead to overloaded sewer lines, which back up into low-lying areas and some homes. Raw sewage can be a breeding ground for bacteria, such as *E. coli* and other disease causing agents.

The second type of health hazard is presented after floodwaters have receded. Stagnant pools become breeding grounds for mosquitoes, and wet areas of a building that have not been thoroughly cleaned, propagate mold and mildew. A building that is not cleaned properly is especially a health hazard for small children and the elderly. Health hazards occur when heating ducts in a forced-air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and are breathed in by the occupants. If the water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third health hazard occurs from the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and the uninsured. The resulting stress on those impacted takes its toll in the form of aggravated physical and mental health problems. In some cases, stress-induced hypertension, heart disease and certain cancers have been linked with traumatic events.

### ***Safety***

A frequent cause of flood fatalities occur from drowning, which can occur when a vehicle is swept into deep water and the occupants become trapped in the vehicle. Flood victims have frequently put themselves in harm's way by ignoring warnings about travel or by believing that a washed out bridge is still intact.

People have died of heart attacks from exertion during their efforts to minimize the effect of the flood. Electrocution can cause deaths during a flooding event, claiming lives in flooded areas that carry a live current created when electrical components short out. Floods can damage gas lines, floors, and stairs, creating secondary hazards such as gas leaks, unsafe structures and fires. Fires are especially damaging in areas made inaccessible to firefighting equipment by high water or flood-related road or bridge damage.

### ***Infrastructure***

Infrastructure flooding impacts include damage to roads and bridges, and sewer, water, and electrical systems. Localized infrastructure impacts include street, road,

and shoulder washouts; culvert damage; storm sewer and sanitary sewer failures; public utility damage; damage to emergency vehicles; and trail and road damage in parks. Much of this damage could lead to public service interruptions.

### **Transportation Route Interruptions**

Loss of road access is a major flood ramification that affects all residents and businesses within the region, not just those who own property in the floodplain. Oftentimes, the inability to travel freely is only temporary, perhaps lasting several hours. The loss of transportation may last months after the disaster. When roads, bridges, or railroads are washed out by a flood, it can be weeks or months before they are repaired and usable.

A key evacuation consideration is an evaluation of the roads that have the potential for flooding and remaining submerged for long periods. This will determine how emergency personnel will enter the area to begin rescue operations and to deliver vital goods and services to residents of the area affected.

A review of the Flood Insurance Rate Map and Brown County's critical facility layer identified 113 bridge or other stream crossing sites that could potentially become inundated during a base flood. A listing of the 1 bridge or other stream crossing sites that could potentially become submerged during a base flood is listed below.

A bridge does not have to be inundated to be damaged or to cut off an evacuation route. In some cases, the bridge is above water but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous for a person utilizing a flooded road assuming passage is possible because the bridge is still intact.

In addition to the bridges within the floodplain, there are bridges and culverts in areas that are not included in the Flood Insurance Rate Map 100-year flood zones. Most of these areas are located along small tributary streams or are in areas that have not undergone a detailed flood study.

| <b>Table 3.3: Bridge Crossings in the 100-Year Floodplain, Brown County, Wisconsin</b> |                         |                   |
|----------------------------------------------------------------------------------------|-------------------------|-------------------|
| <b>Municipality</b>                                                                    | <b>Street</b>           | <b>Water Body</b> |
| Municipality *                                                                         | Street                  | Water Crossing    |
| City of Green Bay                                                                      | 7th Street              | Unnamed Tributary |
| Village of Ashwaubenon                                                                 | Ashwaubomay Park        | Ashwaubenon Creek |
| Village of Hobart                                                                      | Brookwood Circle        | Trout Creek       |
| City of Green Bay                                                                      | Chantel Street          | Unnamed Tributary |
| Village of Ashwaubenon                                                                 | Circle Drive            | Dutchman Creek    |
| City of De Pere                                                                        | Creamery Road           | Ashwaubenon Creek |
| Village of Ashwaubenon                                                                 | CTH AAA/S Oneida Street | Dutchman Creek    |
| Town of Holland                                                                        | CTH D                   | Unnamed Tributary |
| Town of Wrightstown                                                                    | CTH D/Lost Dauphin Road | Apple Creek       |
| Town of Wrightstown                                                                    | CTH D/Plum Road         | Plum Creek        |
| City of Green Bay                                                                      | CTH EA/S Huron Road     | Baird Creek       |

|                        |                          |                   |
|------------------------|--------------------------|-------------------|
| Town of Lawrence       | CTH EE/Grant Street      | Unnamed Tributary |
| Village of Hobart      | CTH FF/Hillcrest Drive   | Duck Creek        |
| Village of Hobart      | CTH FF/Hillcrest Drive   | Trout Creek       |
| Town of Morrison       | CTH G/Dickinson Road     | Branch River      |
| Town of Morrison       | CTH G/Dickinson Road     | Branch River      |
| Village of Ashwaubenon | CTH GF/W Main Avenue     | Ashwaubenon Creek |
| Village of Bellevue    | CTH GV                   | Unnamed Tributary |
| Town of Ledgeview      | CTH GV                   | Unnamed Tributary |
| Town of Ledgeview      | CTH GV                   | Unnamed Tributary |
| City of De Pere        | CTH H/Fort Howard Avenue | Ashwaubenon Creek |
| Village of Ashwaubenon | CTH H/S Broadway         | Dutchman Creek    |
| Village of Suamico     | CTH HS                   | Suamico River     |
| Village of Howard      | CTH HS/Velp Avenue       | Unnamed Tributary |
| Village of Howard      | CTH HS/Velp Avenue       | Duck Creek        |
| Village of Howard      | CTH HS/Velp Avenue       | Beaver Dam Creek  |
| Village of Suamico     | CTH J/Lakeview Drive     | Suamico River     |
| Town of New Denmark    | CTH KB                   | Neshota River     |
| Village of Suamico     | CTH M                    | Suamico River     |
| Village of Allouez     | CTH O/Allouez Avenue     | East River        |
| Village of Bellevue    | CTH O/Allouez Avenue     | Unnamed Tributary |
| Village of Bellevue    | CTH O/Allouez Avenue     | East River        |
| Town of Humboldt       | CTH V/Finger Road        | Baird Creek       |
| Village of Bellevue    | CTH V/Lime Kiln Road     | Unnamed Tributary |
| Village of Bellevue    | CTH XX/Bellevue Street   | Unnamed Tributary |
| Village of Wrightstown | CTH ZZ/Washington Street | Plum Creek        |
| Village of Bellevue    | Daly Drive               | Unnamed Tributary |
| City of Green Bay      | Danz Avenue              | Baird Creek       |
| Village of Bellevue    | Dorset Drive             | Unnamed Tributary |
| City of Green Bay      | E Mason Street           | East River        |
| Town of Holland        | Fox River Trail          | East River        |
| Village of Bellevue    | Glenmore Road            | Unnamed Tributary |
| Town of Lawrence       | Grant Street/CTH EE      | Ashwaubenon Creek |
| Village of Bellevue    | Guns Street              | Unnamed Tributary |
| Village of Ashwaubenon | Hansen Road              | Dutchman Creek    |
| Village of Bellevue    | Hazen Road               | Unnamed Tributary |
| Town of Morrison       | Hill Road                | Branch River      |
| Village of Ashwaubenon | Holmgren Way             | Dutchman Creek    |
| City of De Pere        | I41 NB                   | Ashwaubenon Creek |
| Village of Howard      | I41 SB                   | Beaver Dam Creek  |
| City of De Pere        | I41 SB                   | Ashwaubenon Creek |
| City of De Pere        | I41 SB (Off Ramp)        | Ashwaubenon Creek |



|                        |                    |                               |
|------------------------|--------------------|-------------------------------|
| City of Green Bay      | I43                | Fox River                     |
| Village of Hobart      | Indian Trail       | Unnamed Tributary             |
| Village of Bellevue    | Klondike Road      | Sorenson Creek                |
| Village of Howard      | Lakeview Drive     | Unnamed Tributary             |
| Town of New Denmark    | Langes Corner Road | Neshota River                 |
| Town of Ledgeview      | Ledgeview Road     | East River                    |
| CITY OF DE PERE        | Main Avenue        | Fox River                     |
| City of De Pere        | Main Avenue        | Fox River                     |
| City of Green Bay      | Main Street        | Fox River                     |
| Town of Wrightstown    | Mallard Road       | East River                    |
| Town of New Denmark    | Maribel Road       | Neshota River                 |
| Village of Howard      | Memorial Drive     | Beaver Dam Creek              |
| Town of Lawrence       | Mid Valley Drive   | Ashwaubenon Creek             |
| City of Green Bay      | N Henry Street     | Baird Creek                   |
| City of Green Bay      | N Huron Road       | Unnamed Tributary             |
| Village of Hobart      | Navajo Trail       | Unnamed Tributary             |
| Town of Lawrence       | Noah Road          | S Branch of Ashwaubenon Creek |
| Village of Bellevue    | Ontario Road       | Unnamed Tributary             |
| Town of New Denmark    | Park Road          | Neshota River                 |
| Village of Ashwaubenon | Parkview Road      | Ashwaubenon Creek             |
| Town of Wrightstown    | Partridge Road     | East River                    |
| City of Green Bay      | Pedestrian Bridge  | East River                    |
| Village of Bellevue    | Pedestrian Bridge  | East River                    |
| Village of Ashwaubenon | Pilgrim Way/CTH YY | Dutchman Creek                |
| Town of Lawrence       | Quarry Park Drive  | Hemlock Creek                 |
| Village of Allouez     | Railroad           | East River                    |
| Village of Allouez     | Railroad           | Fox River                     |
| Village of Allouez     | Railroad           | Fox River                     |
| Village of Howard      | Railroad           | Duck Creek                    |
| Village of Howard      | Railroad           | Duck Creek                    |
| Village of Suamico     | Railroad           | Suamico River                 |
| City of Green Bay      | Railroad           | Fox River                     |
| Town of Wrightstown    | Railroad           | Apple Creek                   |
| Village of Howard      | Riverview Drive    | Duck Creek                    |
| Town of Wrightstown    | Rosin Road         | Apple Creek                   |
| Town of Humboldt       | S Northview Road   | Baird Creek                   |
| Village of Hobart      | seminole Trail     | Unnamed Tributary             |
| Village of Suamico     | Side Street        | Suamico River                 |
| City of De Pere        | Southbridge Road   | Ashwaubenon Creek             |
| Village of Suamico     | St Pats Road       | Suamico River                 |
| Village of Ashwaubenon | STH 172            | Unnamed Tributary             |

|                        |                             |                   |
|------------------------|-----------------------------|-------------------|
| Village of Ashwaubenon | STH 172                     | Fox River         |
| Village of Ashwaubenon | STH 172 EB                  | Dutchman Creek    |
| Village of Ashwaubenon | STH 172 WB                  | Dutchman Creek    |
| City of Green Bay      | STH 54/East Mason           | Fox River         |
| Village of Hobart      | STH 54/W Mason St           | Duck Creek        |
| Village of Wrightstown | STH 96/Broadway Street      | Fox River         |
| Village of Suamico     | Stream Road                 | Suamico River     |
| Town of Pittsfield     | Town Hall Road              | Unnamed Tributary |
| Village of Bellevue    | Town Hall Road              | Spring Creek      |
| Village of Hobart      | Trout Creek Road            | Trout Creek       |
| Village of Howard      | US41/US141                  | Duck Creek        |
| Village of Howard      | US41/US141                  | Duck Creek        |
| Village of Suamico     | US41/US141 NB               | Suamico River     |
| Village of Suamico     | US41/US141 SB               | Suamico River     |
| Village of Ashwaubenon | Vanderperren Way (Off Ramp) | Dutchman Creek    |
| Village of Hobart      | W Adam Drive                | Unnamed Tributary |
| Village of Suamico     | W Deerfield Avenue          | Suamico River     |
| City of Green Bay      | Walnut Street               | Fox River         |
| Town of Morrison       | Wayside Road                | Branch River      |
| Town of Wrightstown    | Wrightstown Road            | East River        |

Source: Brown County Planning Commission via GIS analysis

## ***Economic***

### **Business and Industry Disruptions**

Flooding damage to businesses and industry is not as easy to identify as critical facilities. Even minor damage may result in businesses or industry closures. Businesses or industry damages or disruptions may also include loss of inventories, inaccessibility to customers or employees, and often times, employees are busy protecting or cleaning up their flooded homes and are unable to come to work

### **Farming**

According to the 2010 Brown County Land Use Inventory, approximately 49.5 percent of Brown County is agricultural use. Brown County updated the land use inventory in 2019 which indicated that there was a slight reduction in the amount of agricultural land (48.2 percent). Crop damage and loss often occurs due to flooding, which leads to large financial losses and loss of projected income to the agricultural community.

### **Tourism**

The tourism industry can be impacted by natural disasters such as a flood. Most notable is a recent story on Wisconsin Public Radio from September of 2018, which discussed and noted the impacts of heavy rains across the state. Heavy rains and high lake and stream levels lead to the closure of outdoor recreation facilities (parks & trails) road closures that disrupted trade.

Other industries that are oftentimes negatively impacted include boating/charter fishing, golfing, and eco-tourism. Boating and charter fishing would be impacted because of the relatively unstable conditions on Lake Michigan and on area rivers making this activity unsafe. Golfing would be impacted because of anticipated erosion, flooding, and other damage on area golf courses. Eco-tourism visitors are seeking outdoor interaction with nature, which may be unwelcoming after flooding due to inaccessibility in many saturated areas. Transportation to tourist destinations in the area could also be impacted, and hotels and restaurants could sustain damage under severe flooding conditions.

### ***Other***

Public expenditures on flood fighting, sandbags, fire, and police calls, clean up, and on repairs to damaged public property affect all residents of the planning area, not just those in the floodplain. Federal assistance is not always available for smaller, more localized floods, and it cannot be counted on in the future. In addition, public agencies are required to purchase insurance on flood prone buildings. The amount of insurance that should be carried is deducted from disaster assistance payments.

### **Areas at Greatest Risk**

The area inundated by the base flood is the “base floodplain.” FEMA maps (called Flood Insurance Rate Maps, or FIRMs) also call this the Special Flood Hazard Area, or “A Zone.”

Areas affected by flood hazards in the planning area include areas adjacent to rivers, creeks, lakes and other bodies of water. These bodies of water include The Bay of Green Bay; Fox River; East River, Suamico River, Duck Creek, Ashwaubenon Creek, Plum Creek, Dutchman Creek, Lily Lake, Middle Lake, Third Lake; and numerous other small rivers and streams.

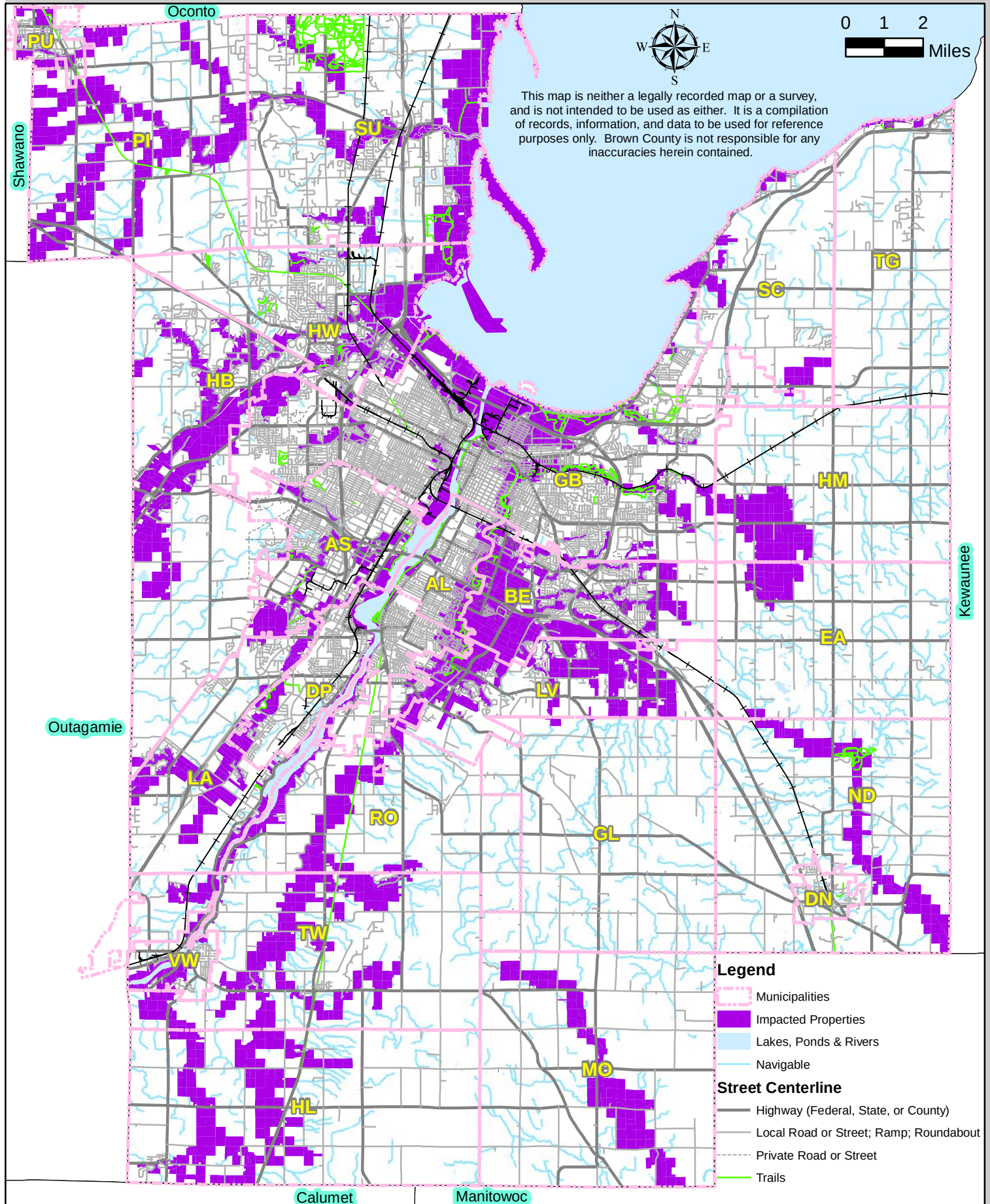
The central part of the floodplain is referred to as the “floodway.” The floodway is the channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood. Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. The remainder of the floodplain is called the “fringe,” where water may be shallower and slower.

Floodplains (including floodways and flood fringes) are subject to special development regulations, as explained at the end of this section. The following maps highlight the location and breadth of properties susceptible to the 100 year or 1 percent storm event.

# Property Impacted by the 0.2 Percent (500 year) Flood

## Brown County All Hazard Mitigation Plan

Brown County, WI

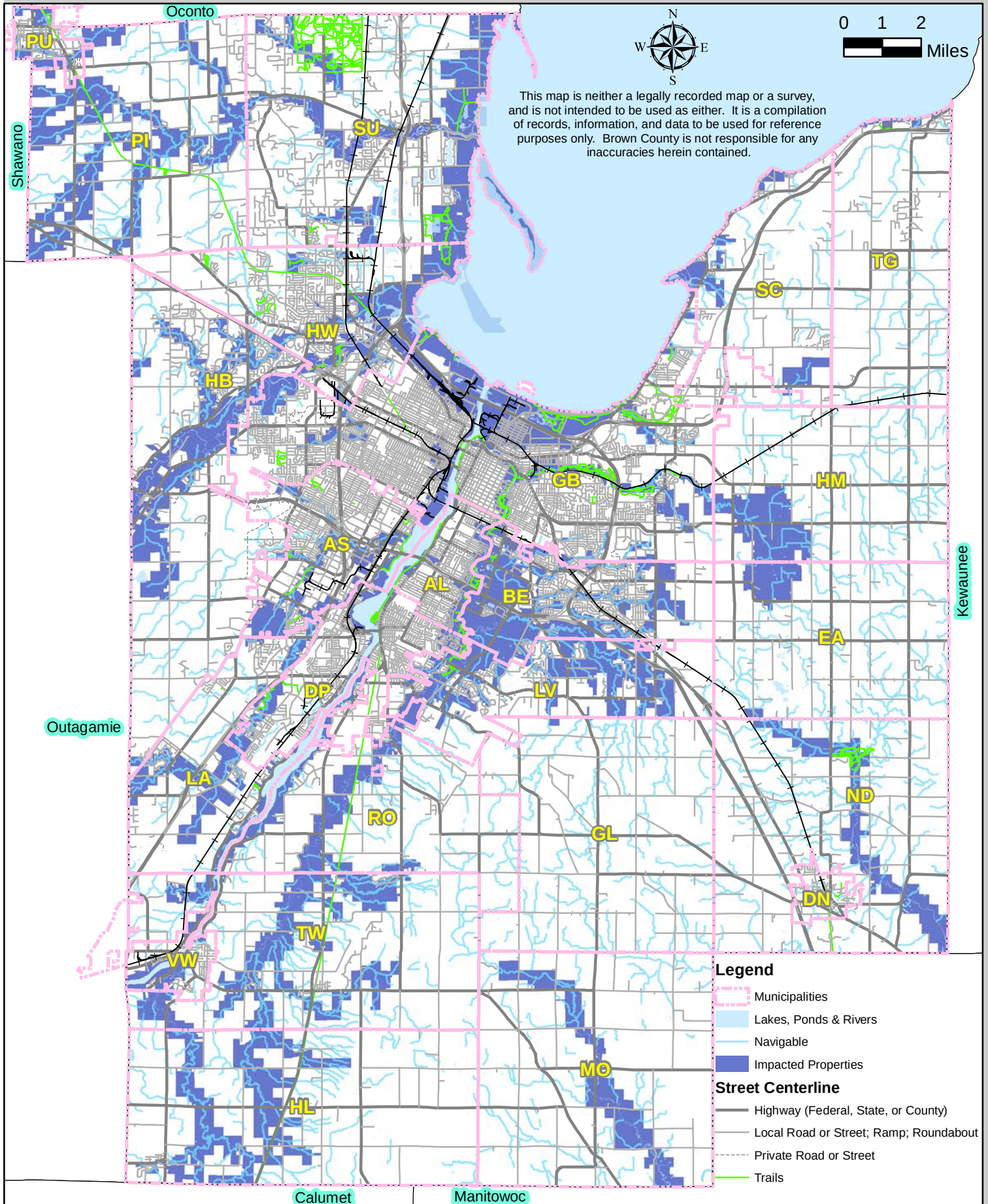




# Property Impacted by the 1 Percent (100 year) Flood

## Brown County All Hazard Mitigation Plan

Brown County, WI



### **Impact to Existing and Future Buildings**

The cities of Green Bay and De Pere; the villages of Ashwaubenon, Allouez, Bellevue, Hobart, Howard, Suamico, and the towns of Lawrence, Ledgeview, Pittsfield, and Scott each had buildings on over 300 parcels potentially impacted by the base flood. The following table provides a breakdown of all Brown County communities and the number of impacted parcels and the total value based on those parcels. There are numerous vacant parcels located within the base floodplain that have potential for development that would be subject to floodplain zoning restrictions.

| <b>Table 3.4: Potential Flood Impact Based on FEMA Flood Mapping</b> |                         |                           |
|----------------------------------------------------------------------|-------------------------|---------------------------|
| <b>Municipality</b>                                                  | <b>Parcels Impacted</b> | <b>Total Value*</b>       |
| City of De Pere                                                      | 653                     | \$232,937,900.00          |
| City of Green Bay                                                    | 4059                    | \$786,842,600.00          |
| Town of Eaton                                                        | 42                      | \$4,029,200.00            |
| Town of Glenmore                                                     | 5                       | \$855,100.00              |
| Town of Green Bay                                                    | 192                     | \$52,827,100.00           |
| Town of Holland                                                      | 223                     | \$24,175,400.00           |
| Town of Humboldt                                                     | 101                     | \$8,996,300.00            |
| Town of Lawrence                                                     | 481                     | \$125,025,700.00          |
| Town of Ledgeview                                                    | 811                     | \$287,292,300.00          |
| Town of Morrison                                                     | 94                      | \$9,253,300.00            |
| Town of New Denmark                                                  | 88                      | \$8,657,700.00            |
| Town of Pittsfield                                                   | 321                     | \$44,117,300.00           |
| Town of Rockland                                                     | 167                     | \$49,345,600.00           |
| Town of Scott                                                        | 343                     | \$75,049,000.00           |
| Town of Wrightstown                                                  | 287                     | \$35,056,800.00           |
| Village of Allouez                                                   | 729                     | \$125,655,700.00          |
| Village of Ashwaubenon                                               | 563                     | \$328,626,900.00          |
| Village of Bellevue                                                  | 1249                    | \$426,431,700.00          |
| Village of Hobart                                                    | 466                     | \$93,457,600.00           |
| Village of Howard                                                    | 783                     | \$185,785,300.00          |
| Village of Pulaski                                                   | 178                     | \$28,291,300.00           |
| Village of Suamico                                                   | 765                     | \$128,553,900.00          |
| Village of Wrightstown                                               | 159                     | \$21,805,300.00           |
| <b>Total</b>                                                         | <b>12759</b>            | <b>\$3,083,069,000.00</b> |

\*Values are based on 2019 Brown County tax parcels total value

Brown County is the third fastest growing county in the State of Wisconsin as a percentage of population growth<sup>9</sup>. According to Wisconsin Department of Administration calculations, the Brown County population is expected to grow by 41,730 residents between the years 2020 and 2040. Based on an average of 2.46 persons per household, these new residents will need an additional 16,963 housing units within the 20-year time period. The result will be a need for more than 8,482 acres for new residential development with an average lot size of one-half acre. The fastest growing communities within this planning period are the Towns of Ledgeview and Lawrence and the Village of Hobart. Future acreage calculations, based on residential land use projections, were also made for future commercial and industrial development in the county. By 2040, there will be a need for an additional 758 acres for commercial businesses and another 1,022 acres for industrial operations. In comparison, the county will continue to lose agriculture land to accommodate these other land uses. It is expected that Brown County will lose approximately 10,494 acres of farmland during the same time period<sup>10</sup>. With Brown County's rapid growth in residential, business, and public facilities (structures and recreational areas), some of the development will occur in areas susceptible to flooding. The flood-plain designation does not eliminate construction but defines the risks of having a 26 percent chance of experiencing a flood during the life of a 30-year mortgage compared to a 9 percent chance of a fire.

Flood-risk maps for Brown County were reviewed by residents and local officials, and then approved by the Brown County Board of Directors in 2009. The maps are the result of five years of work by the Federal Emergency Management Agency and Wisconsin Department of Natural Resources, which were directed by the U.S. Department of Homeland Security to modernize flood-risk maps into a countywide format. The updated maps from 2009 were used as a tool to prepare this hazards mitigation plan. The maps reflect the best information available in identifying high-risk areas within each community. Any changes to the floodplain maps during the review process will impact critical facilities and flood-risk assessment for future development in the county. Map revisions will be noted and incorporated during the updating of this hazards mitigation plan.

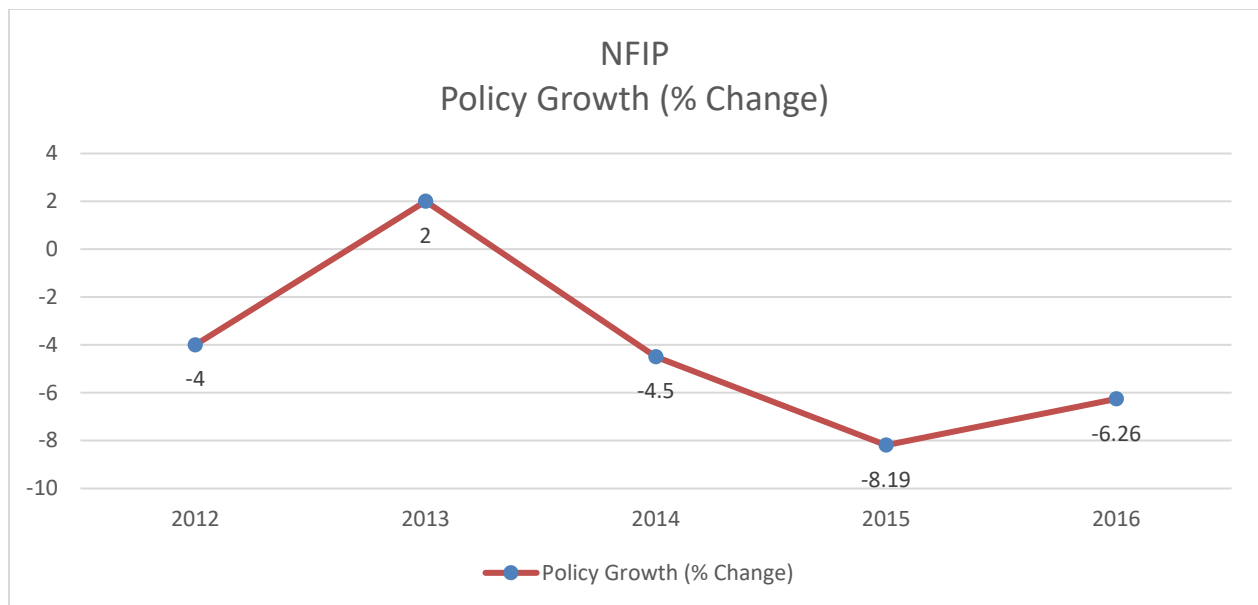
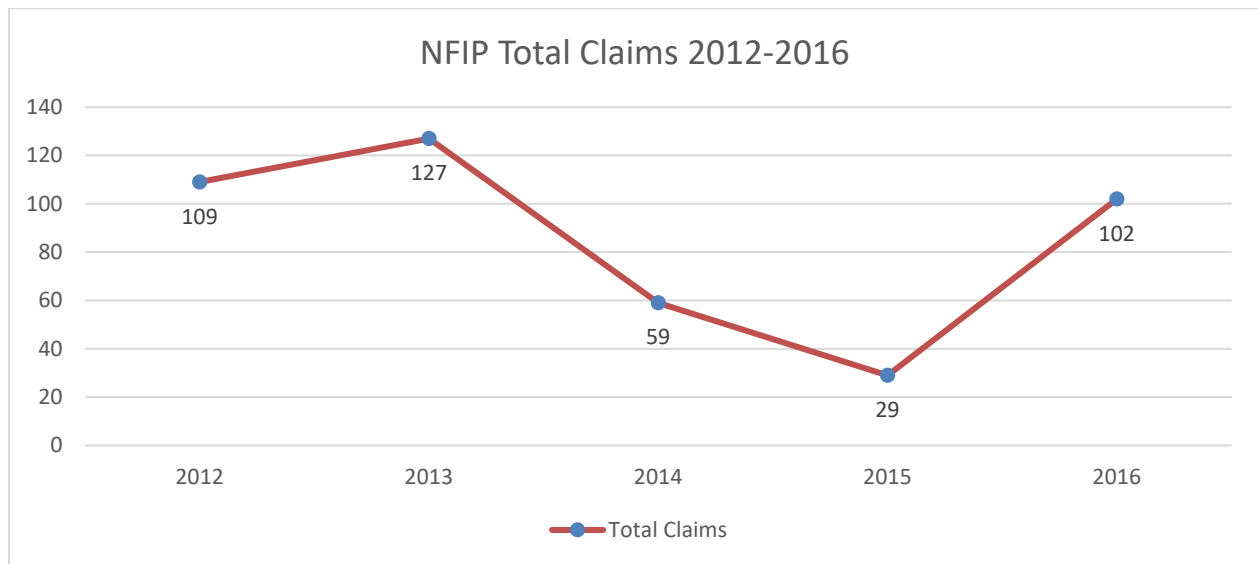
A majority of the county's floodplains can be found along the southern rim on the bay of Green Bay of Lake Michigan (densely developed areas of the county) and along the East River and other smaller tributaries in the Village of Bellevue and the Town of Ledgeview where development is occurring at a fast pace. The 2009 FEMA maps have not seemed to have had any effect on the pace of development in areas designated as floodplains over the last 10 years. Given these trends/observations, it is estimated that there will still be significant growth in and adjacent to flood-prone areas. The improved value of structures located in designated floodplains was over \$2.3 billion in 2019. With continued residential, commercial, and industrial development occurring in Brown County, there is potential for an increase in the value of existing buildings within these areas due to redevelopment efforts.

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<sup>9</sup> Brown County Population: <http://worldpopulationreview.com/us-counties/wi/>

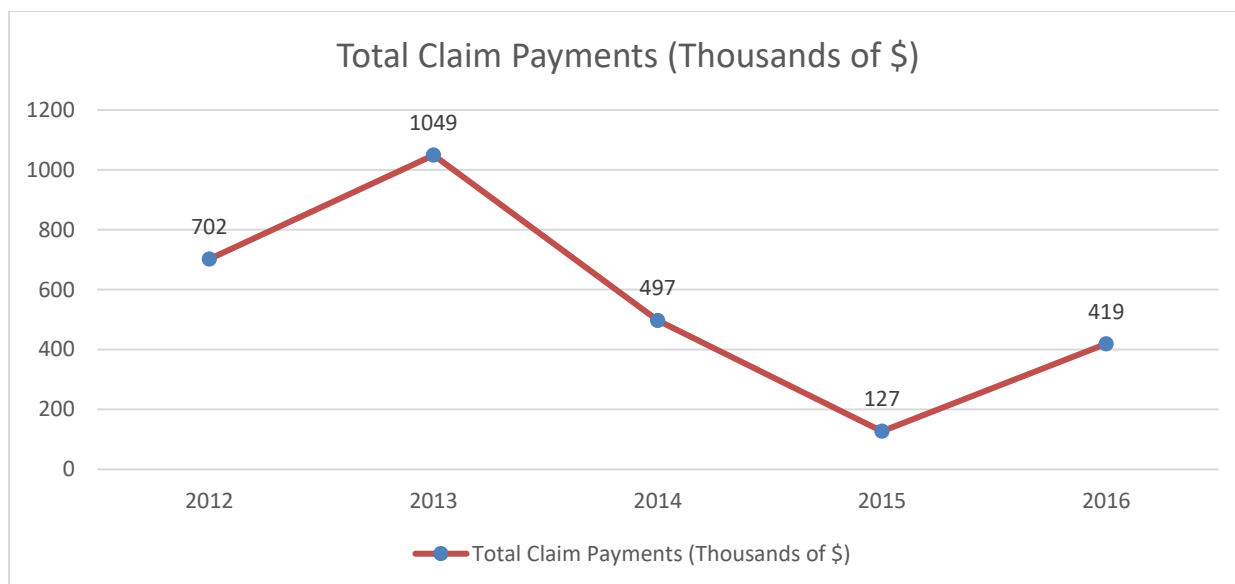
<sup>10</sup> Brown County Comprehensive Plan Update 2020

A review of FEMA NFIP claim data revealed that the state of Wisconsin had an average of 85 claims on an annual basis from 2012-2016. During this same time period the number of policies and the total claim payments typically declined with the exception of 2013 where both saw growth<sup>11</sup>.



<sup>11</sup> FEMA.gov – Policy and Claim Statistics for Flood Insurance





### **Repetitive Loss Properties**

Repetitive loss properties are those that have sustained flood damage on two or more separate occasions over a ten-year period and the cost of repairs from the flood damage meets or exceeds 25 percent of the market value of the property before the damage occurred.

Brown County has 12 repetitive loss properties which vary in use from residential to commercial. Due to privacy concerns the data has been generalized by community in the following table and the property locations were used to derive values from the Brown County Treasurer office.

| <b>Community</b> | <b># of Properties</b> | <b>Total Improved Value*</b> | <b>Total Value*</b> |
|------------------|------------------------|------------------------------|---------------------|
| V of Ashwaubenon | 1                      | 138,500                      | 195,300             |
| C of Green Bay   | 7                      | 497,700                      | 645,000             |
| V of Howard      | 2                      | 173,000                      | 218,500             |
| V of Suamico     | 1                      | 92,100                       | 128,700             |
| T of Holland     | 1                      | 141,400                      | 180,900             |

\*Values based on 2020 tax information – Brown County Treasurer's Office.

### **Relationships to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

**Fire.** Fire can occur due to compromised infrastructure such as electrical and natural gas systems. In addition, fire trucks are unable to pump water if floodwaters are deep enough to reach the tailpipe of the truck.

**Hazardous Materials.** Hazardous material releases can occur due to improper storage of materials in floodplains.

**Infectious Disease.** Infectious disease outbreaks are possible during prolonged flood events in areas sensitive to disease vectors.

Wastewater Treatment Plant Failure. Wastewater treatment plant failure can occur if facilities are not adequately protected from flooding, excessive clearwater inflow and infiltration into the system, or protection is weakened.

Transportation Disruption. Disruptions of transportation routes via roads, bridges, railroads, and water can be disrupted due to inundation and/or substantial flow velocities.

Power Outages. Power outages can occur if portions of the electrical grid are damaged by floodwaters.

### **Plans and Programs**

Emergency Operations Plan. The *Brown County Emergency Operations Plan* outlines procedures for the County in response to a variety of hazards. During a flood event the Emergency Management Director works with local officials to ensure public health and safety and maintain transportation routes.

National Flood Insurance Program (NFIP). In 1968, Congress created the National Flood Insurance Program in response to the rising costs of taxpayer funded disaster relief. The Federal Emergency Management Agency (FEMA), Mitigation Division manages the NFIP, and oversees the floodplain management components of the program, with state coordination through the Wisconsin DNR.

National Weather Service. The National Weather Service in Green Bay provides weather, hydrologic, and climate forecasts and warnings for northeastern Wisconsin.

Sewer Service Area Review. Development in floodplains, wetlands, and other environmentally sensitive areas has been limited through such mechanisms as the sewer service extension review process.

Floodplain Ordinance. Brown County regulates development within the floodplain through its Floodplain Ordinance. The Floodplain Ordinance, which is Chapter 23 of the Brown County Code of Ordinances, can be found in Appendix E. This ordinance can be a useful tool in keeping inappropriate development out of many flood hazard zones in the planning area. Floodplain overlay zoning ordinances (where they exist in local jurisdictions within the planning area) can also help to deter development in flood hazard zones.

### **Provisions of Plans and Policies that Regulate Development**

Various local comprehensive plans produced for local communities in Brown County have addressed regulation of development in floodplains, watersheds, and natural resource areas in various ways. Most of these plans addressed this in their goals, objectives, and policies in the natural resources chapter (or equivalent) in the plan; and through the general plan design chapter of the plan.

Brown County addresses regulation of development in floodplains, watersheds, and natural resource areas in the 2004 Brown County Comprehensive Plan. The following is a list of communities in Brown County with a comprehensive plan and the year of plan adoption:

|                     |      |                        |      |
|---------------------|------|------------------------|------|
| Town of Eaton       | 2012 | Village of Allouez     | 2015 |
| Town of Glenmore    | 2016 | Village of Ashwaubenon | 2016 |
| Town of Green Bay   | 2019 | Village of Bellevue    | 2012 |
| Town of Holland     | 2019 | Village of Hobart      | 2006 |
| Town of Humboldt    | 2006 | Village of Howard      | 2012 |
| Town of Lawrence    | 2016 | Village of Suamico     | 2016 |
| Town of Ledgeview   | 2015 | Village of Pulaski     | 2017 |
| Town of Morrison    | 2016 | Village of Denmark     | 2020 |
| Town of New Denmark | 2020 | Village of Wrightstown | 2016 |
| Town of Pittsfield  | 2019 | City of De Pere        | 2010 |
| Town of Scott       | 2006 | City of Green Bay      | 2002 |
| Town of Wrightstown | 2018 |                        |      |

The Brown County Planning Commission (BCPC) has tools to limit development within the FEMA flood hazard zones in the planning area. BCPC develops sewer service area plans for Brown County Sewer Service Area and takes into account preservation of natural features and minimization of future development in flood hazard areas near bodies of water. BCPC reviews proposals for development in Brown County for consistency with the sewer service area plan.

### **Gaps and Deficiencies**

As detailed above, some structures that are susceptible to repetitive loss remain in the floodplain placing the structures at high risk of total loss. Filling within the floodplain for land reclamation is also an issue that continues to be of concern. As state and federal funds become available, Brown County should work with local municipalities to purchase floodplain structures and advocate for limiting or banning the filling of floodplain areas.

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## **Tornadoes/High Winds**

A tornado is characterized by a rapidly rotating column of air spawned by a cumulonimbus cloud. When a tornado forms and drops to the ground, it can create significant damage and loss of life. A tornado is a relatively short-lived storm and is nearly always visible as a funnel, although its lower end does not always necessarily touch the ground. Wind speeds vary greatly in tornados and are hard to measure. However, more sophisticated measuring tools are being developed and climatologists and meteorologists know that wind speeds within a tornado can be between 40 and 300 plus miles per hour.

A tornado path averages about five miles and will typically last about 10 minutes in length. The width of a tornado can vary greatly from about 300 feet all the way up to a mile or more in width<sup>12</sup>. Some thunderstorm complexes can have formed groups of two or more funnels traveling together. On average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 miles per hour have been recorded.



**Figure 3 Source: American Museum of Natural History**

Table 3.4 shows the Enhanced Fujita Scale, which has been recognized as the acceptable tornado magnitude measurement rating. In 2007 the Fujita scale was updated to the Enhanced F Scale (EF Scale) for operational use in the United States<sup>13</sup>. The EF Scale accounts for different degrees of damage that occur with different types of structures, as well as damage to things other than structures. The scale was revised to reflect better examinations of tornado damage surveys to align wind speeds more closely with associated storm damage.

The destructive power of a tornado results primarily from high wind velocities and sudden changes in pressure. Since tornadoes are generally associated with severe storm systems, they are usually accompanied by other “hazardous” conditions including; hail, torrential rain, and intense lightning. Depending on their intensity, tornadoes can uproot trees, down power lines and destroy buildings. Flying debris can cause serious injury and death. Tornado damage is categorized by determining damage to structures and other features such as described in the following figure.



**Figure 4 Source: National Weather Service - Tuscaloosa-Birmingham Tornado**

<sup>12</sup> <https://www.encyclopedia.com/earth-and-environment/atmosphere-and-weather/weather-and-climate-terms-and-concepts/tornado>

<sup>13</sup> <http://www.spc.noaa.gov/fag/tornado/f-scale.html>



**F0 Light:** Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.



**F1 Moderate:** Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored mobile homes are overturned, attached garages may be destroyed.



**F2 Considerable:** Roof structures are damaged, mobile homes are destroyed, debris becomes airborne (**missiles** are generated), large trees are snapped or uprooted.



**F3 Severe:** Roofs and some walls are torn from structures, some small buildings are destroyed, non-reinforced masonry buildings are destroyed, most trees in forest are uprooted.



**F4 Devastating:** Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.



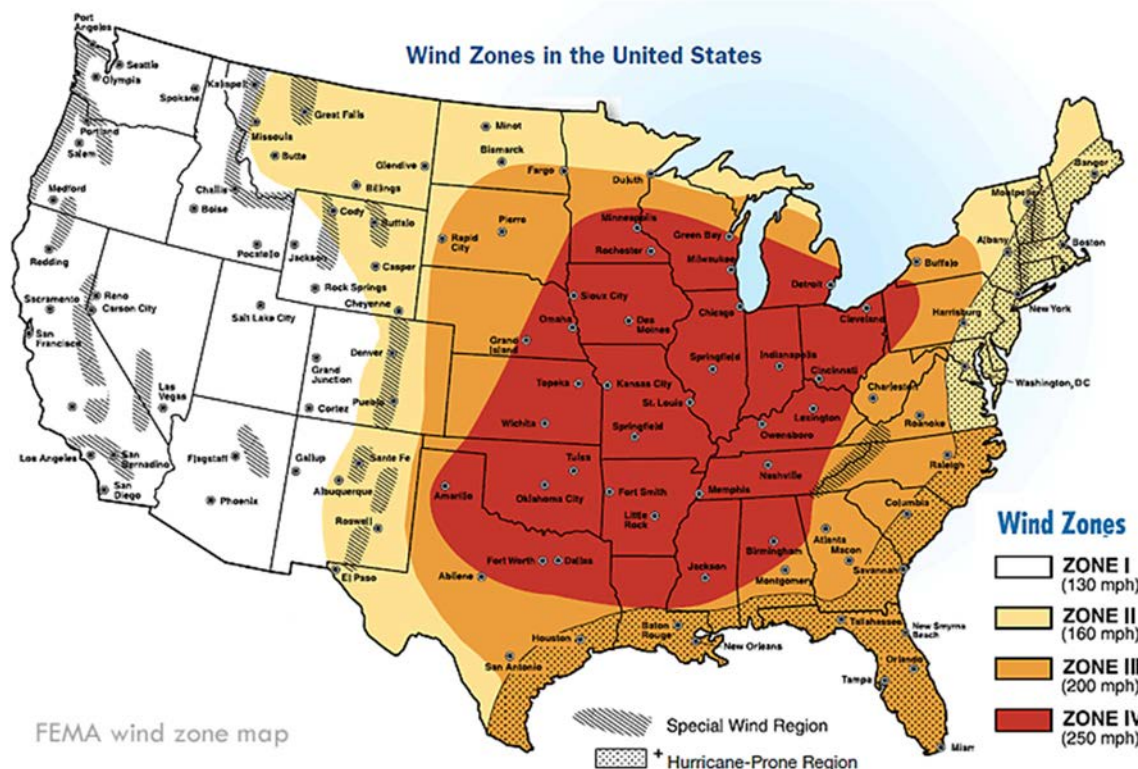
**F5 Incredible:** Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized missiles become airborne, trees are completely debarked.

F0, F1, AND F2 IMAGES COURTESY OF ANDREW DEVANAS, FLORIDA DIVISION OF EMERGENCY MANAGEMENT  
F3, F4, AND F5 IMAGES COURTESY OF NOAA, NATIONAL SEVERE STORMS LABORATORY (NSSL)

Figure 5 Source: FEMA, Understanding the Hazards



Based on 50 plus years of tornado history and more than 100 years of hurricane history, the United States has been divided into four zones that geographically reflect the number and strength of extreme windstorms. FEMA Wind Zone IV, which includes most of the southern two-thirds of Wisconsin, has experienced the most and the strongest tornado activity that has affected the entire U.S., with wind speeds of up to 250 miles per hour being recorded at some point. This zone includes the entirety of Brown County.



Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes (commonly known as "tornado alley"), which extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Generally, the southern and western portions of Wisconsin have a higher frequency of tornadoes; however, every county in Wisconsin is susceptible to tornado damage. Tornadoes have occurred in Wisconsin in every month except February.

Wisconsin's tornado season runs from the beginning of April through September. The most severe tornadoes statewide typically occur during the months of April, May and June. Many tornadoes strike in late afternoon or early evening. However, tornadoes have occurred during other times of the day. Personal property damage, deaths and injuries have and will continue to occur due to tornado events in Wisconsin.

### History

According to National Weather Service, a department of NOAA, Brown County has experienced 28 tornadoes since data was kept in 1950. The following map is a state wide count of Tornado activity in the state of Wisconsin since 1844 through 2014.

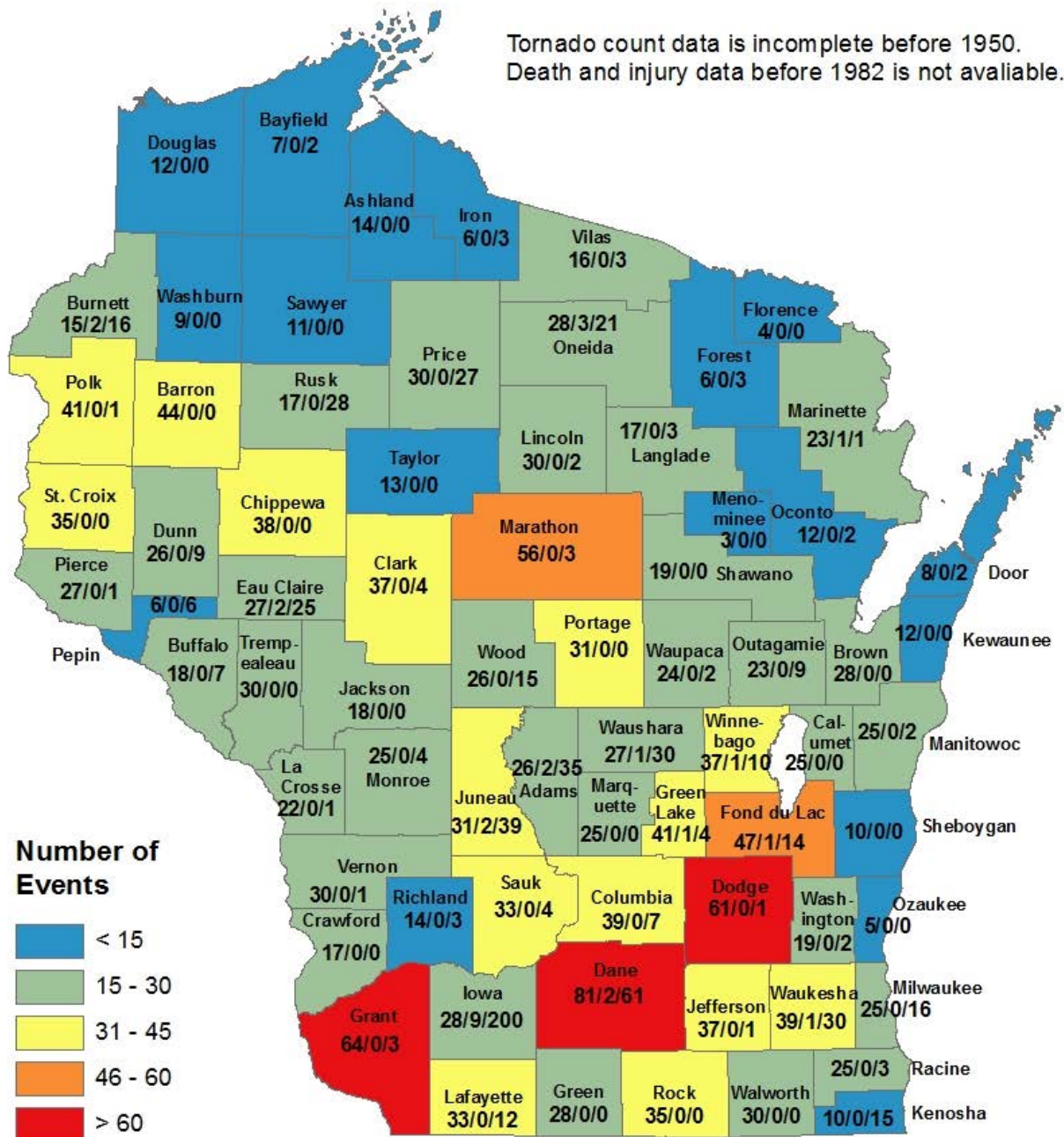


# Wisconsin Tornado Events 1844 - 2014

# Events / # Deaths / # Injuries



Tornado count data is incomplete before 1950.  
Death and injury data before 1982 is not available.



## **Tornadoes 1990-Present**

### ***May 16, 1992***

The F1 tornado was 1 mile long and 100 yards wide and caused 250,000 dollars in property damage.

### ***June 17, 1992***

The F0 tornado was 23 yards wide.

### ***June 23, 2004***

The F0 tornado was 10 yards wide and occurred in Green Bay.

### ***August 18, 2005***

The F1 tornado was 1 mile long and 100 yards wide and caused 10,000 dollars in property damage in Wrightstown.

### ***September 13, 2005***

The F0 tornado was 2 miles long and 50 yards wide and caused 5,000 dollars in property damage in De Pere.

### ***August 20, 2010***

The EF1 tornado touched down 2 miles southeast of Greenleaf, where several trees were snapped and uprooted. The tornado then destroyed a relatively new barn. Pieces of the barn were strewn over 100 yards from the site. About 50 to 100 yards on either side of the damaged barn small outbuildings and trees were untouched. The tornado, estimated to be approximately 75 feet wide, continued east-northeast to another farm and heavily damaged another building. Large parts of the metal roof were thrown over 200 yards. Numerous trees along the path were snapped or uprooted. Estimated maximum winds were 90 mph.

The tornado was on the ground for 1.28 miles before dissipating just north of the Holland State Wildlife Area.



***April 10, 2011***

A brief tornado touched down about a mile and a half south of Greenleaf. The tornado damaged the tops of two silos then ripped the roof off a barn. Average path width was 75 yards.

***August 6, 2013***

The EF0 tornado that developed 2.7 miles east-northeast of Mackville in Outagamie County at 12:40 am CDT moved into Brown County, entering near Highway 41, 1.8 miles northwest of Wrightstown. The tornado first hit the Apple Creek Campground, snapping 50 trees and knocking over two camping trailers. As the tornado moved across the southern part of the county, at least 70 homes sustained at least minor damage, many from fallen trees. A large, free-standing garage was heavily damaged when the tornadic winds blew in two garage doors, causing the roof to be ripped off. The tornado proceeded on to Manitowoc County. Average path width of the tornado in Brown County was 175 yards and the tornado was on the ground for 15.22 miles.

***August 6, 2013***

This tornado is associated with the above tornado, however, the storm, at one point, produced winds that caused enough damage that it was upgraded to an EF1. The tornado dissipated about 3 miles west of Morrison. The average path width of the tornado in Brown County was 125 yards and was on the ground for 7.84 miles.

***August 6, 2013***

The EF1 tornado that touched down in Outagamie County, 3.5 miles east of Greenville, briefly moved across far southwest Brown County near Holland. A few trees were knocked over by the tornado in Brown County. The average path width was 150 yards and was on the ground for 1.48 miles before moving into Calumet County.

***August 6, 2013***

A EF1 tornado formed in eastern Brown County and moved east-southeast into Kewaunee County. A couple dozen trees were damaged and uprooted before it moved into Kewaunee County. Average path width in Brown County was 75 yards and the tornado was on the ground for 5.53 miles.

***June 15, 2015***

A weak, brief tornado produced very minor (EF0) damage near Glenmore, about eight miles southeast of Green Bay. A swing set was toppled, and a small metal shed was pushed 20 feet. The tornado was approximately 25 yards wide and was on the ground for 0.35 miles.

***June 14, 2017***

A weak tornado caused minor tree damage. Average path width in Brown County was 50 yards and the tornado was on the ground for 1.21 miles.

Storm Events Source: NOAA Storm Events Database – Tornadoes

**Funnel Clouds and Waterspouts 1990-Present**

***July 5, 1994***

A funnel cloud was reported in Denmark at 3:40pm on July 5, 1994.

***July 29, 1996***

Numerous cold-air funnels were observed around Green Bay, especially southeast of the city. A couple of the funnel clouds could be seen from the Green Bay National Weather Service office.

***August 31, 1996***

Weak thunderstorms developing along a lake breeze boundary spawned several funnel clouds in the Bellevue and Langes Corners areas. The funnel clouds prompted approximately 150 calls to the Brown County sheriff department.

***July 7, 2010***

A funnel cloud was spotted near Interstate 43 just north of Denmark.

***April 10, 2011***

A funnel cloud was spotted at Cooperstown Road near Denmark.

***June 15, 2015***

A funnel cloud was observed near Shirley, Town of Glenmore, as it moved southeast.

***June 17, 2017***

A narrow funnel cloud formed north of Denmark in eastern Brown County. The funnel was visible from other nearby counties.

Storm Events Source: NOAA Storm Events Database – Funnel Clouds & Waterspouts

### **High Winds/Strong Winds 1990-Present**

***April 6, 1997***

A strong cold front ushered in wind gusts over 50 mph across much of northeast Wisconsin. Winds were measured as high as 54 mph in Green Bay. Many trees were reported down, signs were blown over and power was lost in several locations across northeast Wisconsin. A few houses sustained damage from fallen trees. The high wind event caused 149,000 dollars over property damage over a 22-county area.

***March 9, 1998***

Strong winds developed as a winter storm, which brought snow to northeast and central Wisconsin, moved away from the state. Official wind gusts reached 45 mph in Green Bay. The strong winds knocked some power poles down and blew tree limbs onto power lines, causing power outages. The wind also whipped the new snow around, producing low visibilities. The high wind event caused 15,000 dollars in property damage over a 9-county area.

***July 28, 1998***

Strong winds, which developed from a strong pressure difference in the wake of a departing thunderstorm complex, produced damage across parts of central and east central Wisconsin. Trees and power lines were knocked down in many locations. Significant wind damage to structures appeared to be limited to Outagamie and Brown counties. In West De Pere, a storage building collapsed and the roof was taken off about half of another storage building. A tree fell onto a house in De Pere, crashing through a bedroom window. Other measured wind gusts included 55 mph in Green Bay. The high wind event caused 30,000 dollars in property damage across a 13-county area.

***November 10, 1998***

An intense area of low pressure moved across the Midwest on November 10, 1998, producing very high winds, rain, and snow across the region. The low, which tracked from central Iowa to western Lake Superior, resulted in record minimum pressures in Iowa and Minnesota and an unusually widespread high wind event across Wisconsin. The strong winds lasted for much of the day. Trees, street signs and power poles were damaged or destroyed by the strong winds across northeast, central and north central Wisconsin. Numerous semi-trailers were blown over on area highways, necessitating the closure of the Tower Bridge (Interstate 43) in Green Bay. Trees and power poles were blown down in many locations across the region. The wind was also responsible for numerous power outages across the region. Some areas were without power for nearly 3 days. A strong gust of 65 mph was recorded in Suamico, and one of 63 mph was recorded in Green Bay. The high wind event caused 1,000,000 dollars in property damage across a 22-county area.

***March 17, 1999***

Strong west to northwest winds developed across much of Wisconsin as an intense area of low pressure moved from southern Lake Superior to near Lake Huron. The strong winds began in the early afternoon of the March 17, 1999 and continued until very early on the 18th. Numerous gusts near 50 mph were recorded across central and east central Wisconsin including 48 mph in Green Bay. Strong winds in Green Bay knocked out electricity to 3,200 homes and downed a large tree limb along a busy street.

***December 26, 1999***

Strong winds developed behind a cold front as the front moved through Wisconsin. Numerous gusts in the 40 to 50 mph range were recorded across north central, northeast, central, and east central Wisconsin.

***March 25, 2000***

Strong winds blew as sinking air behind a cold front brought stronger winds from higher levels of the atmosphere down to the surface. Sustained winds were mainly 30 to 40 mph with gusts in the 40 to 50 mph range.

***April 5, 2000***

Strong winds blew across central and east central Wisconsin behind a strong cold front. Sustained winds were mainly in the 25 to 35 mph range.

***April 20, 2000***

A tight surface pressure gradient caused strong winds to blow across northeast and east central Wisconsin. Sustained winds were mainly in the 25 to 35 mph range with some gusts over 45 mph.

***June 21, 2000***

Strong winds behind a cold front caused broken tree limbs and branches to fall onto power lines. Between 2,000 and 3,000 customers lost electrical power in parts of central and east central Wisconsin. Strong winds downed five small trees at the Green Bay Botanical Garden. Peak gusts were in the 35 mph to 45 mph range across the 15-county area.

***February 25, 2001***

Strong winds developed across central and east central Wisconsin on the backside of an intense winter storm system that was moving away from the state. A 44 mph wind gust was recorded in Green Bay.

***April 7, 2001***

A strong low-pressure system dragged an occluded front through Wisconsin as the low moved northeast across Minnesota. High winds behind the front downed numerous trees, tree limbs and power poles across central, east central, and northeast Wisconsin.

***October 25, 2001***

An area of low pressure intensified as it moved toward the upper Great Lakes, producing strong winds across northeast. The strong winds began in northeast Wisconsin on the morning of October 25, 2001 and continued throughout most of the morning of the 26th. Several tractor-trailers were overturned in the Fox River Valley as the strong winds blew. A 45 mph wind gust was recorded in Green Bay. Heavy, wet snow caused tree branches to break across north central Wisconsin.

***December 5, 2001***

A powerful cold front moved through central and eastern Wisconsin during the late afternoon and evening. Gusty winds accompanied showers and thunderstorms ahead of the front and continued as cold air moved into the region after the frontal passage. The strong winds behind the front downed trees and power lines across northeast and north central Wisconsin, knocking out power to about 4,000 customers.

***February 11, 2002***

An intense low-pressure system moved across southern Canada bringing colder air into Wisconsin. Gusts of 40 mph or higher were reported at several locations from the evening of the February 11, 2002 into the morning hours of the 12th. Strong winds blew a light pole onto power lines in Green Bay, causing 2,600 customers to lose electrical service.

***March 9, 2002***

Strong winds developed across northeast Wisconsin in the wake of a departing low-pressure system. Wind gusts over 40 mph were common during the afternoon and evening of the March 9, 2002 into the early morning hours of the 10th. High winds knocked down tree limbs and power poles causing numerous power outages. Gusts to 54 mph were recorded in Green Bay.

***May 9, 2002***

A cold front passed through Wisconsin as low pressure over the northern part of the state strengthened and moved toward southern Ontario. Strong west winds developed as the low intensified. Gusts of 45 mph or higher were reported at several locations. A 46 mph wind gust was recorded in Green Bay. The strong winds downed trees that blocked roads and knocked down utility lines.

***November 30, 2002***

Very cold air, behind a strong cold front, traveling over the warmer waters of Lake Superior caused heavy lake effect snow showers. Winds behind the front were strong during the morning and early afternoon hours. A 44 mph wind gust was recorded in Green Bay.

***October 11, 2003***

Strong winds that accompanied a cold front downed a few trees and some power lines in parts of central and east central Wisconsin. The high wind event caused 9,000 dollars in property damage over a 3-county area.

***November 13, 2005***

Strong south to southwest winds developed as a deep low-pressure system moved across northwest Wisconsin and Lake Superior. The winds caused scattered power outages, broke tree branches and tore shingles from roofs. Wind speeds of 64 mph were recorded in Bellevue. The high wind event caused 2,500 dollars in property damage over a 3-county area.

***May 11, 2006***

An unusually strong low-pressure system for the month of May moved north across Michigan and produced heavy rain and high winds in northeast and north central Wisconsin. The high winds downed power lines, and knocked down and uprooted trees. In Brown County around 800 customers lost power and one house was damaged when a tree fell on it. The heavy rainfall that accompanied the high winds resulted in some lowland flooding in the town of Ledgeview. The high wind event caused 39,000 dollars in property damage over a 4-county area.



***May 17, 2008***

Strong winds caused rafters to collapse at a construction site in Green Bay. A worker, who was setting the rafters at a Habitat for Humanity home, was injured around 1140 AM CST. The ASOS at Austin Straubel International Airport recorded

***February 10, 2009***

As an occluded front passed through Wisconsin, winds as high as 55 mph occurred at isolated locations in the east-central part of the state. The strong winds tore shingles from a house and a church in Brown County.

***October 26, 2010***

A number of trees were knocked down throughout the county, some falling on homes and cars. One tree fell through a home and severely damaged the building.

***October 14, 2014***

Strong winds blew across east central Wisconsin, producing several measured gusts around 50 mph, as low pressure passed east of the state. The winds associated with the low may have been enhanced by a gravity wave. The strong winds downed numerous trees, branches, and power lines. More than 14,000 customers were without power at the height of the event.

***December 23, 2015***

Widespread winds of 35 to 45 mph affected central, north central, and east central Wisconsin. The strong winds blew down some trees, numerous tree branches were knocked down and thousands lost power. Some of the strongest wind gusts included: 59 mph near Whitefish Dunes State Park (Door Co.), 52 mph at Algoma (Kewaunee Co.), 51 mph in Green Bay (Brown Co.), and 46 mph near Appleton (Outagamie Co.).

**February 24, 2019**

A fierce, late-winter storm produced heavy snow, freezing rain, and high winds across much of central and northern Wisconsin on February 23-24 as an area of low pressure rapidly deepened across the Great Lakes. The combination of ice, snow, and strong winds caused power outages and tree damage in many locations. Measured wind gusts in the 50 mph to 60 mph range were recorded at many locations, including: 60 mph in Green Bay (Brown Co.); 58 mph in Wausau (Marathon Co.); 57 mph in Kewaunee (Kewaunee Co.); 56 mph in Omro (Winnebago Co.); 53 mph near Zittau (Winnebago Co.), near Monico (Oneida Co.), in Marshfield (Wood Co.), and in Rhinelander (Oneida Co.); 52 mph in Wisconsin Rapids (Wood Co.) and in Manitowoc (Manitowoc Co.); and 51 mph in Appleton (Outagamie Co.) and in Wautoma (Waushara Co.).

Storm Events Source: NOAA Storm Events Database – Strong Winds & High Winds

**Vulnerability**

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes, an area better known as "tornado alley." According to NOAA's National Climatic Data Center, this area extends northeastward from Oklahoma into Iowa and then across to Michigan and Ohio. Generally, the southern and western portions of the state have been subject to a higher frequency of tornadoes; however, every county is susceptible to a tornado related disaster.

In considering other tornado-like occurrences, which includes waterspouts, funnel clouds, and high winds, on average. Brown County has had 28 verified tornadoes over the 69-year period from 1950 through 2019, or an average of about one tornado every two and a half years.

Tornadoes have no defined hazard area within Brown County and events do not follow or have a specific area of increased frequency.

**Impacts**

The following describes the various impacts that tornadoes have on the county.

***Critical Facilities***

Hospitals can see increases in patient load following tornadoes. Schools can sustain damage, and if they do not sustain damage, they often function as temporary shelters in the aftermath of tornadoes. Police and fire departments often see an increased workload during and after tornadoes.

Any critical facility in the county is capable of being hit. However, schools are a main concern for two reasons: (1) they have large numbers of people present, either during school or as a storm shelter; and (2) they have large span areas, such as gyms and theaters.

### ***Public Health***

The major health hazard from tornadoes involves physical injury from flying debris or being in a collapsed building or mobile home. Based on national statistics approximately 1000 tornadoes occur in the United States every year<sup>14</sup>. The 1000 tornadoes cause an average of 1,500 injuries and 80 deaths<sup>15</sup>.

Flying debris is most typically the main culprit of both injuries and deaths associated with tornadoes while people becoming airborne due to the wind is also a factor. Following a tornado, damaged buildings are a potential health hazard due to instability, electrical system damage, gas leaks, and hazardous materials. Sewage and water lines may also be damaged from tornadoes.

### ***Safety***

Although tornadoes in the county have not been the cause of any deaths, as mentioned above, tornadoes can and do kill about 80 people a year within the US. There were approximately 24,478 tornadoes<sup>16</sup> causing thousands of fatalities in the United States from 2000 to 2018. Of the 24,478 tornadoes, 382 were considered killer tornadoes<sup>17</sup> of which five were in the State of Wisconsin with none of the five occurring in Brown County. The number of people who live in mobile homes is far smaller than the number of people who live in permanent homes. However, mobile home deaths represent over 38 percent of the totals deaths sustained from tornado events. Due to their vulnerability, this plan has

### ***RV Parks and Campgrounds***

Brown County is home to four facilities open to RVs and/or campers; Apple Creek Campground, Bay Shore Park, Brown County Fairgrounds, and Shady Acres Campsites. Apple Creek Campground has 152 sites, Bay Shore Park has 88 sites, the Brown County Fairgrounds can accommodate 50 RV sites, and Shady Acres Campsites can accommodate 25 big rig and tent sites.

Although RVers and campers are encouraged to own a NOAA weather radio, in the event of severe weather, the county parks department will notify patrons of the Brown County owned and operated sites of the situation.

### ***Infrastructure***

Similar to severe thunderstorms, street signs are frequently in disrepair after tornadoes, and debris often litter streets and highways following a tornado, requiring clean up. Downed trees and power lines caused by tornadoes can be problematic in terms of impacting infrastructure (transportation) as well as critical facilities.

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<sup>14</sup> Annual Disaster/Death Statistics for US Storms - <https://www.depts.ttu.edu/nwi/research/DebrisImpact/Reports/DDS.pdf>

<sup>15</sup> [www.nssl.noaa.gov](http://www.nssl.noaa.gov)

<sup>16</sup> NOAA Storm Prediction Center - <https://www.spc.noaa.gov/climo/online/monthly/newm.html#2000>

<sup>17</sup> NOAA Storm Prediction Center - <https://www.spc.noaa.gov/climo/torn/fatalmap.php#viewDiv>

## **Buildings**

Although tornadoes strike at random making all buildings vulnerable, there are three types of structures that are most likely to suffer damage. These structure types include mobile homes, homes constructed on crawlspaces (because they are more susceptible to lift), and buildings with large spans (such as airplane hangars, gymnasiums and factories).

Structures within the direct path of a tornado vortex are often reduced to rubble. However, structures adjacent to the path of the tornado are often severely damaged by high winds flowing into the tornado vortex (these winds are known as inflow winds). It is here, adjacent to the tornado's path, where the building type and construction techniques are critical to the structure's survival.

According to research conducted by FEMA following an unusually destructive tornado in May of 1999 in parts of Kansas and Oklahoma<sup>18</sup>, failure for many residential structures occurred where residential framing was attached to the foundation or when nails were the primary connectors between the roofing and the walls. The study also found that roof geometry plays a significant role in a building's performance. The research further indicated that the failure of garage doors, commercial overhead doors, residential entry doors, or large windows caused a significant number of catastrophic building failures. Finally, this research found that manufactured homes built upon permanent foundations performed better than those that were not on solid foundations.

## ***Economic***

The major impact of a tornado on the local economy is damage to businesses and infrastructure. A heavily damaged business, especially one that was barely making a profit, often times must close due to the loss.

Infrastructure damage is usually limited to above ground utilities, such as power lines. Damage to utility lines can usually be repaired or replaced relatively quickly. Damage to roads and railroads is usually localized; if these facilities cannot be repaired promptly, alternate transportation routes are usually available.

Public expenditures include police and fire department calls, search and rescue, shelters, and emergency protection measures. The largest public expenses are for repairs to public facilities and clean up and disposal of debris. Most public facilities are insured, so the economic impact on the local treasury is likely to be small. However, clean up and disposal can be a larger problem, especially if there is limited landfill capacity near the damage site.

The agricultural sector can also experience economic losses as winds in excess of 39 miles per hour can damage crops during the growing season.

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<sup>18</sup> Midwest Tornadoes of May 3, 1999 Observations, Recommendations, and Technical Guidance

### ***Other***

Clean up and disposal after a tornado can pose health and safety risks to emergency responders and recovery workers. During cleanup activities physical, chemical and biological hazards may be present. Challenges faced by emergency response and recovery workers include electrocution, falls, chemical hazards, fire, and physical hazards associated to injury from falling or flying debris, among others.<sup>19</sup>

### **Areas at Greatest Risk**

Tornadoes have no defined hazard area within Brown County, however, mobile homes are at greatest risk during tornadoes and high winds. An F1 tornado might cause minor damage to a site-built house; but could do significant damage to a manufactured home, especially an older model or one that is not connected to anchors.

RV Parks, campgrounds, and marinas are also at significant risk from tornadoes and high winds.

### **Potential Losses**

The “worst case scenario” when considering a tornado event in Brown County would be the loss of a life. Through detailed and accurate weather forecasting and better warning systems, the likelihood of there being any loss of life from a tornado has decreased, however, it is still possible that people could die. Other scenarios that would cause extreme or worst case scenarios include a direct hit on the Brown County Emergency Management Center. If there were damage or disruption to the emergency management center communication equipment it would severely impair the response to a disaster.

Due to the vulnerability of manufactured homes, a direct hit at one of the mobile home communities in the county would likely include a significant amount of damage and an increased chance for serious injuries and death. Mobile home parks are shown as land use code 180 on Brown County’s land use inventory completed in 2019.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding. Heavy rain and thunderstorms can cause flooding that can disrupt emergency response, transportation, and communication before, during, or after a tornado. Flooding can further exacerbate the aftereffects of a tornado that has caused property damage, loss of life, and personal injury. Flooding can further disrupt transportation, communication, and emergency services, and threaten public health and safety. Essential public infrastructure and services such as power, water supply systems and sanitary systems can be compromised as well.

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<sup>19</sup> Centers for Disease Control and Prevention: Emergency Response Resources:  
<https://www.cdc.gov/niosh/topics/emres/tornado.html>

## **Plans and Programs**

Emergency Operations Plan. The *Brown County Emergency Operations Plan* outlines procedures for the County in response to a variety of hazards. During the course of a flood event in Brown County, the Emergency Management Director works with local officials to ensure public health and safety and maintain transportation routes.

Severe Storm Spotters Network. This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar reports. Brown County has several trained severe weather spotters, many of whom report directly to their respective public safety offices when severe weather is observed.

Tornado Warning System. Most of the cities and villages in Brown County have emergency sirens to warn residents in the event of a tornado. There are a total of 60 (as of November 2019) tornado sirens in the county. The Brown County Public Safety Communications center is responsible for testing and activating the systems. A map of the siren locations and their associated sound shed can be seen on the following page.

Shelter Opening Plan. Emergency Support Function (ESF) 8 addresses the procedures for opening shelters.

## **Gaps and Deficiencies**

A significant number of homes in the county lack basements that would provide shelter in the event of a tornado or damaging winds from a severe thunderstorm. If there is a residential, commercial, or industrial facility that does not have a basement they should develop an action plan that include directions for individuals to take shelter.

Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations.

A majority of the power lines in the county are above ground and subject to damage from wind and falling tree limbs. There are community requirements to manage trees near power lines and the larger lines typically have large easements that keep trees far enough away to reduce the chance of damage during tornados and high wind events.

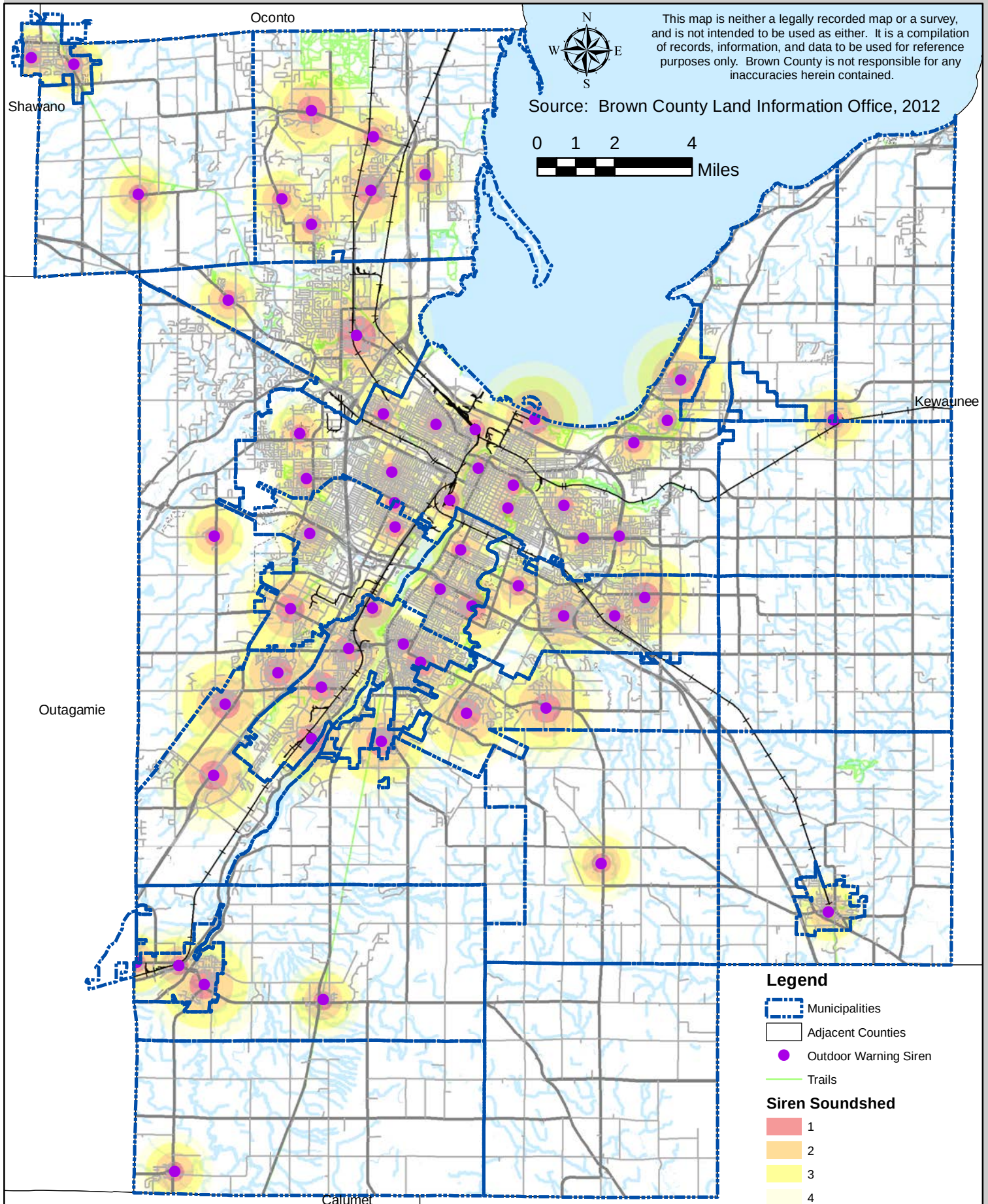
Not all of the county's 60 tornado siren systems have a generator that will enable them to work during a power failure.



# Outdoor Warning Sirens

## Brown County All Hazard Mitigation Plan

Brown County, WI



## **Lightning and Thunderstorms**

Lightning, which occurs during all thunderstorms, can strike anywhere. Generated by the buildup of charged ions in a thundercloud, the discharge of a lightning bolt interacts with the best conducting object or surface on the ground. The air in the channel of a lightning strike reaches temperatures higher than 50,000 degrees Fahrenheit. The rapid heating and cooling of the air near the channel causes a shock wave that produces thunder. The death toll from lightning strikes is relatively low; however, a sizeable percentage of fires are the result of a lightning striking structures, woodlands, grassy areas, or even industrial sites containing highly combustible substances.

Thunderstorms are most likely to happen in the spring and summer months and during the afternoon and evening hours but can occur throughout the year and at all hours. The biggest threats from thunderstorms are flash flooding and lightning. In most cases, flash flooding occurs in small drainage areas where water quickly accumulates before it drains to the floodplains. When taken together, these local drainage problems can be as great a problem as flooding in the mapped floodplains. Other threats from thunderstorms include downburst winds, high winds, hail, and tornadoes.



The National Severe Storms Laboratory identifies a thunderstorm as severe if any of the following conditions are met: wind gusts in excess of 57.5 miles per hour, hail one inch or greater, and or if it produces a tornado<sup>20</sup>. Compared with other atmospheric hazards (such as tropical cyclones and winter low-pressure systems), individual thunderstorms affect relatively small geographic areas. The average thunderstorm system is approximately 15 miles in diameter, covers 75 square miles, and lasts less than 30 minutes at a single location. However, weather monitoring reports indicate that coherent thunderstorm systems can travel intact for distances in excess of 600 miles.

### **History**

According to the National Climatic Data Center, Brown County has experienced 14 significant lightning events and 103 significant thunderstorm wind events since January 1, 1990.

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<sup>20</sup> <https://www.denmarkw.nssl.noaa.gov/education/svrwx101/thunderstorms/>



## **Lightning**

| <b>Table 3.6: Lightning Strike Events since January 1990, Brown County, WI</b> |             |               |                 |                    |                        |
|--------------------------------------------------------------------------------|-------------|---------------|-----------------|--------------------|------------------------|
| <b>Location</b>                                                                | <b>Date</b> | <b>Deaths</b> | <b>Injuries</b> | <b>Crop Damage</b> | <b>Property Damage</b> |
| Green Bay                                                                      | 7/29/96     | 0             | 0               | 0                  | \$20,000               |
| Green Bay                                                                      | 6/29/97     | 0             | 0               | 0                  | \$20,000               |
| Green Bay                                                                      | 9/16/97     | 0             | 0               | 0                  | \$10,000               |
| De Pere                                                                        | 6/25/98     | 0             | 0               | 0                  | -                      |
| Holland                                                                        | 6/25/98     | 0             | 0               | 0                  | -                      |
| Green Bay                                                                      | 6/6/99      | 0             | 0               | 0                  | \$100,000              |
| Green Bay                                                                      | 7/31/99     | 0             | 0               | 0                  | \$40,000               |
| Ashwaubenon                                                                    | 7/8/00      | 0             | 0               | 0                  | -                      |
| Green Bay                                                                      | 9/14/04     | 0             | 0               | 0                  | -                      |
| Denmark                                                                        | 5/30/06     | 0             | 0               | 0                  | -                      |
| Green Bay                                                                      | 4/6/10      | 0             | 0               | 0                  | \$500                  |
| Little Rapids                                                                  | 7/25/12     | 0             | 0               | 0                  | \$5,000                |
| Allouez                                                                        | 9/4/14      | 0             | 0               | 0                  | \$15,000               |
| Suamico                                                                        | 8/2/15      | 0             | 0               | 0                  | \$25,000               |
| <b>Total</b>                                                                   |             | 0             | 0               | 0                  | \$280,500              |

Source: NOAA National Climatic Data Center; June, 2019.

## **Thunderstorm Wind**

| <b>Table 3.7: Thunderstorm Wind Events, Brown County, WI</b> |             |                  |               |                 |                        |                    |
|--------------------------------------------------------------|-------------|------------------|---------------|-----------------|------------------------|--------------------|
| <b>Location</b>                                              | <b>Date</b> | <b>Magnitude</b> | <b>Deaths</b> | <b>Injuries</b> | <b>Property Damage</b> | <b>Crop Damage</b> |
| <b>BROWN COUNTY</b>                                          | 9/9/1991    | 0                | 0             | 0               | 0                      | 0                  |
| <b>BROWN COUNTY</b>                                          | 6/17/1992   | 0                | 0             | 0               | 0                      | 0                  |
| <b>GREEN BAY</b>                                             | 4/24/1994   | 0                | 0             | 0               | 50000                  | 0                  |
| <b>GREEN BAY</b>                                             | 4/24/1994   | 0                | 0             | 0               | 50000                  | 0                  |
| <b>ALLOUEZ</b>                                               | 7/23/1994   | 0                | 0             | 0               | 5000                   | 0                  |
| <b>BELLEVUE</b>                                              | 7/23/1994   | 52               | 0             | 0               | 500000                 | 0                  |
| <b>DENMARK</b>                                               | 7/23/1994   | 0                | 0             | 0               | 5000                   | 5000               |
| <b>NEW FRANKEN</b>                                           | 7/31/1995   | 0                | 0             | 0               | 0                      | 0                  |
| <b>GREEN BAY</b>                                             | 8/11/1995   | 52               | 0             | 0               | 0                      | 0                  |
| <b>GREEN BAY</b>                                             | 8/11/1995   | 52               | 0             | 0               | 0                      | 0                  |
| <b>GREEN BAY</b>                                             | 5/21/1996   | 51               | 0             | 0               | 0                      | 0                  |
| <b>GREEN BAY</b>                                             | 8/7/1996    |                  | 0             | 0               | 2000                   | 0                  |
| <b>PULASKI</b>                                               | 8/25/1996   |                  | 0             | 0               | 1000                   | 0                  |
| <b>SUAMICO</b>                                               | 8/25/1996   |                  | 0             | 1               | 10000                  | 0                  |
| <b>ANSTON</b>                                                | 6/25/1998   |                  | 0             | 0               | 3000                   | 0                  |
| <b>SUAMICO</b>                                               | 6/25/1998   |                  | 0             | 0               | 10000                  | 0                  |
| <b>HOWARD</b>                                                | 6/25/1998   |                  | 0             | 0               | 1000                   | 0                  |
| <b>SUAMICO</b>                                               | 6/25/1998   | 61               | 0             | 0               | 0                      | 0                  |
| <b>SUAMICO</b>                                               | 6/25/1998   | 50               | 0             | 0               | 1000                   | 0                  |
| <b>HOWARD</b>                                                | 9/26/1998   | 50               | 0             | 0               | 0                      | 0                  |

|                         |            |    |   |   |        |   |
|-------------------------|------------|----|---|---|--------|---|
| ASHWAUBENON             | 6/6/1999   | 54 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 6/6/1999   | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 6/6/1999   | 50 | 0 | 0 | 0      | 0 |
| DE PERE                 | 6/6/1999   | 50 | 0 | 0 | 0      | 0 |
| CHAMPION                | 6/6/1999   | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 7/30/1999  | 50 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 4/23/2001  | 50 | 0 | 0 | 0      | 0 |
| CHAMPION                | 6/30/2001  | 50 | 0 | 0 | 0      | 0 |
| DE PERE                 | 9/7/2001   | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 9/7/2001   | 50 | 0 | 0 | 0      | 0 |
| COUNTYWIDE              | 7/30/2002  | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 8/6/2003   | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 8/21/2003  | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 8/27/2004  | 52 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 10/23/2004 | 52 | 0 | 0 | 0      | 0 |
| ALLOUEZ                 | 6/7/2005   | 55 | 0 | 0 | 0      | 0 |
| BELLEVUE                | 6/10/2005  | 57 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 6/11/2005  | 50 | 0 | 0 | 0      | 0 |
| HOWARD                  | 9/13/2005  | 55 | 0 | 0 | 0      | 0 |
| WRIGHTSTOWN             | 9/13/2005  | 56 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 9/13/2005  | 70 | 0 | 0 | 50000  | 0 |
| DE PERE                 | 9/13/2005  | 65 | 0 | 0 | 30000  | 0 |
| GREEN BAY               | 9/13/2005  | 59 | 0 | 0 | 50000  | 0 |
| SUAMICO                 | 5/28/2006  | 50 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 7/24/2006  | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 7/30/2006  | 55 | 0 | 0 | 0      | 0 |
| CHAMPION                | 7/30/2006  | 50 | 0 | 0 | 0      | 0 |
| DE PERE                 | 9/8/2006   | 52 | 0 | 0 | 0      | 0 |
| ASHWAUBENON             | 7/5/2007   | 52 | 0 | 0 | 0      | 0 |
| SUAMICO                 | 7/18/2007  | 52 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 7/18/2007  | 70 | 0 | 0 | 237000 | 0 |
| GREEN BAY               | 4/25/2008  | 52 | 0 | 0 | 0      | 0 |
| DE PERE NICOLET<br>ARPT | 6/12/2008  | 56 | 0 | 0 | 0      | 0 |
| DENMARK                 | 6/12/2008  | 52 | 0 | 0 | 0      | 0 |
| ASKEATON                | 7/12/2008  | 52 | 0 | 0 | 1000   | 0 |
| (GRB)STRAUBEL FLD<br>GR | 7/29/2008  | 50 | 0 | 0 | 0      | 0 |
| GREEN BAY               | 7/14/2010  | 52 | 0 | 0 | 0      | 0 |
| BELLEVUE                | 8/20/2010  | 54 | 0 | 0 | 0      | 0 |
| GREENLEAF               | 8/20/2010  | 74 | 0 | 0 | 0      | 0 |
| ASKEATON                | 4/10/2011  | 61 | 0 | 0 | 0      | 0 |

|                |           |    |   |   |       |   |
|----------------|-----------|----|---|---|-------|---|
| GREEN BAY      | 5/22/2011 | 52 | 0 | 0 | 0     | 0 |
| CORMIER        | 5/22/2011 | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 7/18/2011 | 52 | 0 | 0 | 10000 | 0 |
| WRIGHTSTOWN    | 9/2/2011  | 68 | 0 | 0 | 10000 | 0 |
| CORMIER        | 9/2/2011  | 50 | 0 | 0 | 0     | 0 |
| KUNESH         | 9/2/2011  | 50 | 0 | 0 | 0     | 0 |
| FLINTVILLE     | 9/2/2011  | 50 | 0 | 0 | 0     | 0 |
| KUNESH         | 7/9/2012  | 56 | 0 | 0 | 0     | 0 |
| DENMARK        | 8/7/2013  | 51 | 0 | 0 | 0     | 0 |
| CORMIER        | 8/21/2013 | 70 | 0 | 0 | 50000 | 0 |
| ASHWAUBENON    | 8/21/2013 | 54 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 9/7/2013  | 52 | 0 | 0 | 0     | 0 |
| BELLEVUE       | 9/7/2013  | 52 | 0 | 0 | 0     | 0 |
| SUAMICO        | 7/13/2015 | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 7/18/2015 | 52 | 0 | 0 | 0     | 0 |
| DENMARK        | 7/18/2015 | 52 | 0 | 0 | 0     | 0 |
| ASHWAUBENON    | 8/14/2015 | 56 | 0 | 0 | 6500  | 0 |
| GREEN BAY      | 8/14/2015 | 56 | 0 | 0 | 6500  | 0 |
| ASHWAUBENON    | 8/14/2015 | 54 | 0 | 0 | 0     | 0 |
| DE PERE        | 8/14/2015 | 52 | 0 | 0 | 3000  | 0 |
| SUAMICO        | 8/14/2015 | 52 | 0 | 0 | 5000  | 0 |
| CORMIER        | 8/14/2015 | 52 | 0 | 0 | 7000  | 0 |
| GREEN BAY      | 6/5/2016  | 52 | 0 | 0 | 0     | 0 |
| WRIGHTSTOWN    | 6/5/2016  | 52 | 0 | 0 | 0     | 0 |
| ASHWAUBENON    | 6/5/2016  | 52 | 0 | 0 | 75000 | 0 |
| DE PERE        | 6/10/2016 | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 7/21/2016 | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 5/17/2017 | 52 | 0 | 0 | 0     | 0 |
| LITTLE RAPIDS  | 6/14/2017 | 56 | 0 | 0 | 0     | 0 |
| DE PERE        | 6/14/2017 | 61 | 0 | 0 | 10000 | 0 |
| ALLOUEZ        | 6/14/2017 | 52 | 0 | 0 | 0     | 0 |
| BAY SETTLEMENT | 6/14/2017 | 52 | 0 | 0 | 0     | 0 |
| PULASKI        | 6/14/2017 | 56 | 0 | 0 | 0     | 0 |
| ANSTON         | 7/15/2017 | 52 | 0 | 0 | 0     | 0 |
| ASHWAUBENON    | 7/15/2017 | 56 | 0 | 0 | 1000  | 0 |
| PULASKI        | 7/18/2017 | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 7/1/2018  | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 7/1/2018  | 52 | 0 | 0 | 10000 | 0 |
| ASHWAUBENON    | 7/1/2018  | 52 | 0 | 0 | 0     | 0 |
| GREEN BAY      | 8/27/2018 | 52 | 0 | 0 | 0     | 0 |
| DE PERE        | 8/28/2018 | 52 | 0 | 0 | 5000  | 0 |

|                 |           |    |   |   |      |   |
|-----------------|-----------|----|---|---|------|---|
| <b>SUAMICO</b>  | 9/17/2018 | 52 | 0 | 0 | 0    | 0 |
| <b>BELLEVUE</b> | 9/17/2018 | 50 | 0 | 0 | 5000 | 0 |

Source: NOAA National Climatic Data Center; June 2019.

## **Vulnerability**

One hundred and seventeen lightning and/or thunderstorm wind events have occurred in Brown County between 1990 and February of 2019. As with many places around the US, Brown County residents are susceptible to lightning strikes and thunderstorm wind events. Trees and taller structures such as buildings and communication towers are most susceptible to lightning strikes.

## **Impacts**

The following describes the various impacts that lightning and thunderstorms have on the county.

### ***Critical Facilities***

Hospitals can see increases in patient load with storms that produce cloud to ground lightning strikes. Schools can sustain damage, and if they do not sustain damage, they can function as temporary shelters in the aftermath of severe thunderstorms. Police and fire departments often see an increased workload during and after lightning storms and/or severe thunderstorms. Emergency operations can be disrupted as lightning storms and thunderstorms can affect radio communications, taking into consideration that antennas are a prime target for lightning.

### ***Public Health***

No health implications are attributable to lightning and thunderstorms. There is the potential for tetanus and other diseases that may arise from injuries sustained while navigating or cleaning up damaged property. In the case of lightning storms, when lightning strikes a person, serious burns or death are common outcomes. For those who survive a lightning strike, their injuries can possibly lead to permanent disabilities. Many lightning strike survivors suffer serious, long-term effects, including memory loss, sleep disorders, depression and fatigue.

### ***Safety***

Lightning and thunderstorms rarely cause loss of life and or injuries. From 1990 through February of 2019, lightning has been responsible for zero deaths and zero injuries in Brown County<sup>21</sup>. High winds associated with a storm can injure and kill people. Thankfully, since 1990 there has only been one reported injury and zero deaths reported<sup>22</sup>.

Most lightning and thunderstorm deaths can be prevented through safe practices. The first step to avoid injuries and death is to understand what a severe thunderstorm watch is and secondly, what a severe thunderstorm warning is. The following is a description of both a severe thunderstorm watch and a severe thunderstorm warning.

<sup>21</sup> NOAA Storm Events Database – Lightning

<sup>22</sup> NOAA Storm Events Database – Thunderstorm Wind

- Severe Thunderstorm Watch - Severe thunderstorms are possible in and near the watch area. Stay informed and be ready to act if a severe thunderstorm warning is issued.
- Severe Thunderstorm Warning - Severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property.

If a thunderstorm is in the area the best action to take is seeking shelter inside a building. A building will provide protection against the majority of the possible hazards associated with a thunderstorm that have the potential to cause bodily harm.

### ***Infrastructure***

Street signs often face disrepair after severe thunderstorms, and debris often litters streets and highways requiring some clean up. Downed trees caused by lightning and thunderstorms can also cause property damage and be problematic for transportation.

#### **Buildings**

Damage to mobile homes from thunderstorms is possible and can be significant. Garages are also frequently damaged by thunderstorms. Wind and water damage can result when windows are broken by flying debris or hail. Lightning can cause direct damage to structures (especially those without lightning protection systems) and can set off fires that may lead to further damage.

### ***Economic***

Thunderstorms can have an impact on many sectors of the economy including agriculture, private businesses, and government services. While damage is usually not significant, some storms can cause costly repairs.

Crop damage from lightning and thunderstorms occurs quite frequently. While typically not significant, anything from high winds, hail, or flooding can impact a field or part thereof. Agricultural buildings and livestock are also susceptible to thunderstorm damage depending on the severity of the storm.

Impacts to businesses from lightning and thunderstorms can include damage to the main structure or to ancillary structures and signs. A business may be impacted by transportation limitations due to road closures as well.

Thunderstorms can also affect utilities. Power lines, transformers, and the poles supporting power lines can be knocked out by lightning or knocked down by wind and debris. Telephone lines and radio communications can be disrupted as well.

Transportation facilities such as airports, shipping ports, and roads can be negatively impacted by thunderstorms. Airplanes can be delayed for takeoff when thunderstorms are present and diverted to nearby airports for landing. There is potential for an airplane to crash when hit by downbursts or lightning. Shipping ports could also experience issues with high winds and lightning affecting tall structures. Thunderstorms can knock trees and branches into the road and if strong enough, may knock down power lines which can make roads impassable.

### **Areas at Greatest Risk**

Based on review of the historic patterns of lightning and thunderstorms, there are no specific jurisdictions that have unusual risks (meaning higher than average for the entire county). The events are relatively uniform throughout Brown County.

### **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Lightning and thunderstorms can occur anywhere in Brown County.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard including the following:

Flooding. Thunderstorms can cause flooding that can disrupt emergency response, transportation and communication.

Lightning - Lightning can cause property damage, loss of life, and personal injury, disrupt transportation, communication, and emergency services, and threaten public health and safety, as well as pose significant threat to essential public infrastructure and services such as power, water supply systems and sanitary systems.

Hailstorms. Lightning and thunderstorms are often accompanied by hailstorms. Hail can cause significant property damage including total destruction of a roof, vegetation loss, and vehicular damage.

### **Plans and Programs**

Severe Storm Spotters Network. This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar reports. Brown County has several trained severe weather spotters, many of whom report directly to their respective public safety offices when severe weather is observed.

### **Gaps and Deficiencies**

Redundancy is needed on communications towers.

Local radio and television stations do provide warnings but are effective only if viewers are tuned to one of the local stations.

Most of the power lines in the county are above ground and are subject to damage from wind and falling tree limbs. There are community requirements to manage trees near power lines.

## Winter Storms

Winter storms in Wisconsin are caused by Canadian and Arctic cold fronts that push cold arctic air deep into the interior of the United States. These storms can vary in size and strength, and can include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow conditions. Winter storms can include extremely cold temperatures accompanied by strong winds that result in wind chills dangerous enough to cause bodily injury such as frostbite, hypothermia, and death. Winter storms can occur as a single event or they can combine with other events to create multi hazard storms. For example, a moderate snowfall could create severe conditions if it were followed by a freezing rain and extremely cold temperatures. The aftermath of a winter storm can impact a community or region for weeks, and even months.



A variety of weather phenomena and conditions can occur during winter storms. For purposes of classification, the following are National Weather Service approved descriptions of winter storm elements:

*Heavy Snowfall* – the accumulation of six or more inches of snow in a 12-hour period, or eight or more inches in a 24-hour period.

*Winter Storm* – the occurrence of heavy snowfall accompanied by significant blowing snow, low wind chills, sleet or freezing rain.

*Blizzard* – the occurrence of sustained wind speeds in excess of 35 miles per hour accompanied by heavy snowfall or large amounts of blowing or drifting snow.

*Ice Storm* – an occurrence where rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground.

*Freezing drizzle/freezing rain* – the effect of drizzle or rain freezing upon impact on objects that have a temperature of 32 degrees Fahrenheit or below.

*Sleet* – solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces.

*Wind chill* – an apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.<sup>23</sup>

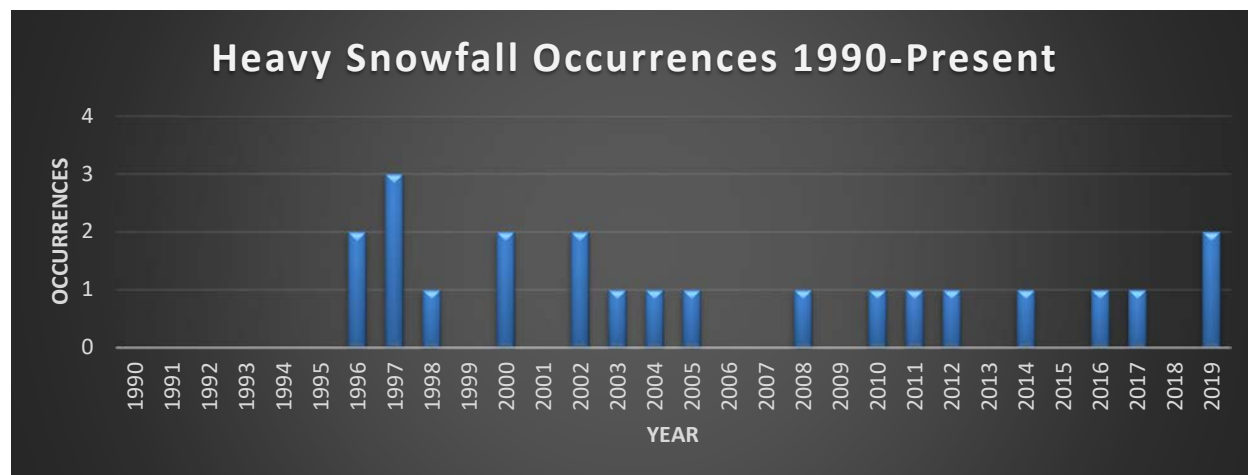
Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls producing at least eight to ten inches of accumulation fluctuate in their occurrence. As shown in the graph below, there are years

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<sup>23</sup> National Weather Service



where no heavy snowfalls occurred while other years the occurrences were between one and three times.



True blizzards do occur in Wisconsin and have the potential to take a life. Oftentimes, blizzard conditions exist during heavy snowstorms when gusty winds cause severe blowing and drifting of snow. The state of Wisconsin experience 259 blizzard events since January of 1990. During the same time period, Brown County experienced 7 blizzard events<sup>24</sup>.

Table 3.8: Brown County  
Blizzard Events

|            |
|------------|
| 1/29/1996  |
| 1/2/1999   |
| 2/16/2006  |
| 12/8/2009  |
| 12/11/2010 |
| 12/28/2015 |
| 4/15/2018  |

Both ice and sleet storms can occur at any time throughout the winter season from October into April. Early- and late-season ice and sleet storms generally occur in northern Wisconsin, however, the majority of these storms occur in the southern part of the state. During these events, if the storm produces a half inch of rain that freezes on trees and utility wires, extensive damage can occur especially if accompanied by winds that compound the effects of the added weight of the ice.

Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property and loss of life. This can occur when the heavy snow or accumulated ice causes structural collapse of buildings, downs power lines, severely affects electrical power distribution, cuts off people from assistance or services, and severely impacts travel conditions. Difficult and dangerous driving conditions caused by winter storms can result in large numbers of traffic accidents where motorists suffer varying injuries and possible death. These winter storm deaths are not accounted for in the statistics maintained by the National Climatic Data Center.

## History

According to National Climatic Data Center, Brown County has experienced 57 winter storm events since January 1, 1990. These events included Blizzards, Winter Storms, and Winter Weather events.<sup>25</sup>

<sup>24</sup> NOAA Storm Event Database - Blizzard

<sup>25</sup> NOAA Storm Event Database - Blizzards, Winter Storms, and Winter Weather



### **Vulnerability**

On average, over the past 29 years (since 1990), Brown County has typically experienced about two significant winter storm events per year. Some areas in Wisconsin are more vulnerable to winter storms including northern portions of the state as well as areas adjacent to the shore of Lake Michigan. These areas often have higher moisture content from the Great Lakes which can produce prolonged winter storm events. Data collected by the national weather service was compiled to show the average snowfall across Wisconsin in the following map.

### **Impacts**

The following describes the various impacts that winter storms have on the county.

#### ***Critical Facilities***

Town and county road crews have an increased burden during and winter months. In some cases, winter storms can be so severe that these crews have to be called off the roads for safety purposes.

During winter storm events, hospitals and clinics may see and treat patients for frostbite, vehicular accident injuries, injuries associated with slips and falls, and injuries resulting from the shoveling of heavy snow (heart attacks). As is the case for any business, hospital and clinic employees may have difficulty getting to work because of the storm, which increases the workload for the staff who is already there (double shifts, etc.).

Police and rescue crews also see more activity during winter storms. More vehicular accidents require more resources from the County Sheriff and local Police departments and if there are injuries involved, it also required EMT's to respond as well. Utility and telephone companies have to respond to downed electrical and telephone lines, especially in the case of ice storms. And, schools may need to have early dismissal or cancel classes altogether.

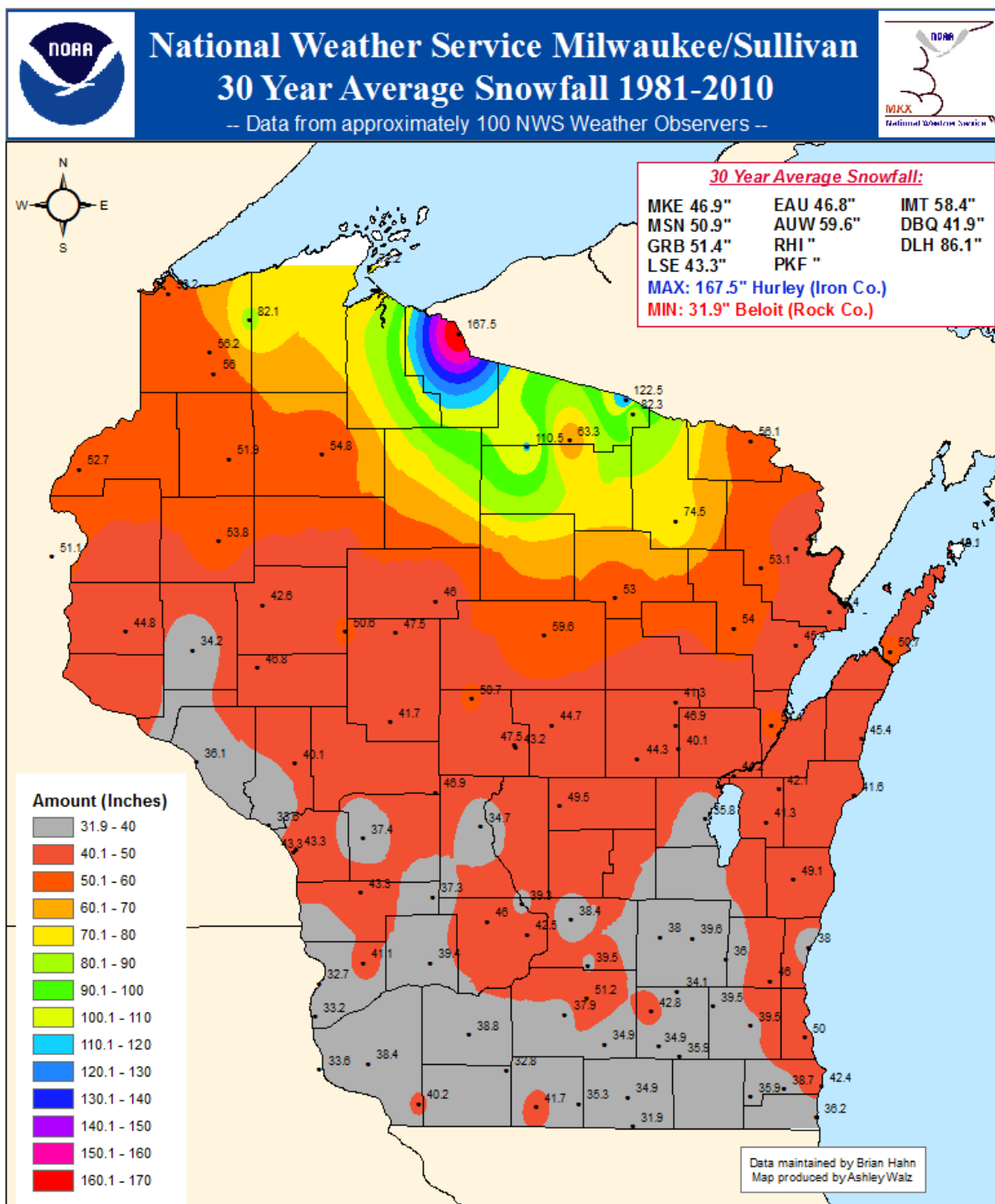


Figure 6 Source: Wisconsin State Climatology Office

### ***Public Health***

Most injuries caused by winter storms result from vehicle accidents. Frostbite and hypothermia occur frequently when these storms combine with extreme cold (these health concerns are discussed more under the extreme cold hazard). Heart attacks and back injuries from shoveling snow are also a public health concern.

Mental health is also a concern during the winter months. Many people that live in the Great Lakes region experience the known seasons including summer, spring, fall, and winter. There are individuals that suffer from depression during the winter months due to the lack of natural light and long hours spent indoors. This condition is known as Seasonal Affective Disorder. For many people the winter months make it harder to get outdoors and exercise regularly. Exercise is well known amongst health and wellness professionals to have positive effects both physically and mentally. Without exercise it can be hard to find healthy ways to relieve stress.

### ***Safety***

Winter storms can produce weather related hazards, including hazardous driving and walking conditions and injuries from shoveling snow. In some winter storm events, extreme cold from low temperatures, wind chill, and loss of heat due to power outages can create safety concerns. There are a number of agencies including the Centers for Disease Control and Prevention (CDC) that provide information on how to stay safe in the cold and how to improve your chances of survival in the event that someone may get stranded in cold.

### ***Infrastructure***

The major impacts of winter storms on infrastructure are to utilities and roads. Power lines and tree limbs can be coated with heavy ice in some winter storms, resulting in disrupted power and telephone service, often for days. Cable and satellite television services can also be negatively impacted in certain winter storm events. In the case of transportation, even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

#### ***Buildings***

Occasionally, heavy snow or accumulated ice will cause structural collapse of buildings (particularly roofs), but most buildings are now constructed with low temperatures, snow loads, and ice storms in mind. Despite the changes to requirements for new construction, older buildings may still be susceptible to winter conditions as was seen in 2018 when a massive snow storm caused several structural roof failures in Brown County.

It should be noted that new construction that utilizes new materials and construction methods is typically more energy efficient and helps to minimize the effects of extreme winter weather.

### ***Economic***

Loss of power often means that businesses and manufacturing concerns must close down. Loss of access due to snow or ice covered roads can have a similar effect, especially when trucks cannot travel on major thoroughfares to make “just in time”

deliveries to businesses and industries in the county. The effects are particularly difficult when the storm is widespread.

Typically, crops are either not planted or are harvested and are not at risk of winter storms. However, farmers that own large numbers of livestock can be negatively impacted by winter weather if it is extreme or if it occurs over a long period of time.

### **Areas at Greatest Risk**

Winter storms have no defined hazard area within the county. The events are relatively uniform throughout Brown County.

### **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Winter storms can occur anywhere in Brown County.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Extreme Cold. Extreme cold and wind chill effects can greatly exacerbate any winter storm event.

Flooding. Heavy snows and snowmelt can cause flooding that can disrupt emergency response, transportation, and communication.

### **Plans and Programs**

Wind Chill Warnings. The local radio and TV media in concert with the National Weather Service issues a wind chill warning when temperatures are -40° F or lower for a period longer than three hours. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor.

School Closings. The county's school districts have a policy of closing schools when the National Weather Service issues a wind chill warning or when snow accumulations create unsafe travel conditions. Information is typically gathered from transportation providers, Brown County Highway Department, and weather service providers to assist in making the school closure determinations. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am. Some school districts have an automated phone system that contacts the homes of students as well.

### **Gaps and Deficiencies**

Winter storms are typically longer events lasting several hours or even multiple days that are easier to predict and plan for. Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations.

A majority of the power lines in the county are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines.

## **Storm Water Flooding**

The waterways and storm water drainage systems provide essential flood protection. Storm water drainage systems cope well with most storms. However, occasionally storms can cause the storm water infrastructure to be overwhelmed and unable to manage all of the water. These types of events are characterized as flash floods. Flash floods are storm events that include a large amount of rain fall in a localized area over a very short period.

Most stormwater drains and pipe systems are not designed to accommodate a large storm event. The WDNR identifies that peak flow rates be based on the 2-, 10-, and 100- year storm events.<sup>26</sup> Most stormwater facilities are designed around the 10 year storm event with a check of the 25-year event.<sup>27</sup> A 10-year event does not mean that a storm of this magnitude will only occur once every 10 years but rather that there is a 10 percent chance that a storm of that magnitude can occur. Localized stormwater flooding can be exacerbated if drains in the area are blocked. It is important to keep the drainage system clear of litter and debris to avoid blocked drains. This is also necessary to protect and improve the health of Brown County's waterways.



**Figure 7 Source: Greatlakesresilience.org**

Today, new developments and redevelopments incorporate storm water management measures such as storm water detention and retention basins that provide greater flood protection. Detention basins slow the flow of storm water being carried in the drainage system by storing it for a time, while retention basins (i.e. ponds) hold water during most of the year. Detention basins can also function as parks and playing fields.

Storm water flooding is not always reported, and it can be very localized. Because of this, the NOAA Storm Events Database does not keep statistics on this type of event.

### **History**

The history of stormwater flooding has not been tracked in the past and is often reported as a flash flood event or a flood. Because of the lack of reporting/record keeping of these types of events, anecdotally, it is known that these types of events do occur and can occur on a fairly frequent basis. However, the severity of the event is extremely variable due to numerous factors.

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<sup>26</sup> WDNR, Technical Design Guidelines for Storm Water Management Practices, <https://dnr.wi.gov/topic/stormwater/documents/StormwaterManual2-TechnicalDesign.pdf>

<sup>27</sup> BC Highway Department referencing the WisDOT Facilities Design Manual (FDM)

## **Vulnerability**

There are several areas throughout Brown County that are susceptible to recurrent storm water flooding. Many of these areas are noted by local public works and highway departments with signage to warn drivers of potential high water problems during heavy rain events. None of the Steering Committee members or community officials deemed storm water flooding to be a significant risk to residents or visitors. Street and ditch flooding after heavy rains have historically caused little damage or traffic disruption in the past.

## **Impacts**

The following describes the various impacts that storm water flooding has on the county.

### **Critical Facilities**

The most vulnerable facilities during a stormwater flood include roadway and transportation interruptions and stormwater facility degradation caused by erosion.

### **Public Health**

There is not much of a public health risk as the situation is usually alleviated quickly and any cases of prolonged standing water would be rare.

### **Safety**

Some stormwater flooding may include swift moving water. Driving through moving/flowing water should never be attempted and is a serious safety risk. Electrocution could occur from a building experiencing storm drain backup flooding and electrical wires or appliances short out and carry current through standing water. Fire is also a possible byproduct that can cause injuries.

### **Infrastructure**

Erosion damage to roads can occur from storm water flooding, especially if the storm water facilities in the area are defective.

### **Economic**

Clean up and replacement of damaged items can be costly after a building has experienced storm drain backup flooding.

Maintenance of roads and parking lots after storm water flooding damage can be costly.

## **Areas at Greatest Risk**

The areas at greatest risk for storm water flooding are older parts of urban areas that have aging or undersized infrastructure and bridges and roads at the town level as they often do not have storm water facilities. Additional areas of concern are those that have waterways that have not been studied for flooding potential.

### **Estimation of Potential Losses**

No estimation of potential losses can be derived as the hazard area is vaguely defined.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Fire. Fire can occur due to infrastructure compromise of electrical and natural gas systems.

Transportation Disruption. Disruptions of transportation routes can be disrupted due to standing water in roadways.

### **Plans and Programs**

Repair and Maintenance. Repair and maintenance is performed by Brown County and the local municipalities on areas that experience storm water flooding damage. The urbanized area communities are also required to submit an annual Municipal Separate Storm Sewer System (MS4) permit to the DNR each year. This permit requires that stormwater facilities are inventoried and checked annually for needed maintenance.

Storm Drain Cleaning Program. Many of the communities in Brown County have some type of storm drain cleaning program that involves utilizing a vacuum to remove debris from storm drains in the fall of each year.

WisDOT Flood Mitigation Program. Wisconsin Department of Transportation assists local governments with replacing or improving roads and roadway structures that have had major damage caused by flooding, by providing help to defray the costs of repairing any public highway, street, alley, or bridge not located on the State Trunk Highway system.

### **Gaps and Deficiencies**

There is a need to correct defective storm water facilities to prevent infrastructure damage. Correcting damaged storm water facilities is difficult due to most of the facilities being buried. This makes them difficult to thoroughly inspect. There is also a need to improve preventative measures such as cleaning storm drains to maximize their ability to manage storm water as designed. Municipalities within the urbanized area have permits with the Wisconsin Department of Natural Resources to address municipal storm water through storm water permits. The permits cover monitoring outfalls for contamination, setting up ordinances and procedures to address illicit discharges, and a program to clean clogged and damaged storm drains. Brown County and the City of Green Bay, for example, check stormwater outfalls under their jurisdiction at least once every five years.



# Extreme Cold

Dangerously cold conditions can be the result of extremely cold temperatures, or the combination of cold temperatures and high winds. Wind chill is defined as “a still-air temperature that would have the same cooling effect on exposed human skin as a given combination of temperature and wind speed”<sup>28</sup>. When wind blows across the skin, it removes the insulating layer of warm air adjacent to the skin. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Extreme cold events are most likely during the months of January and February.

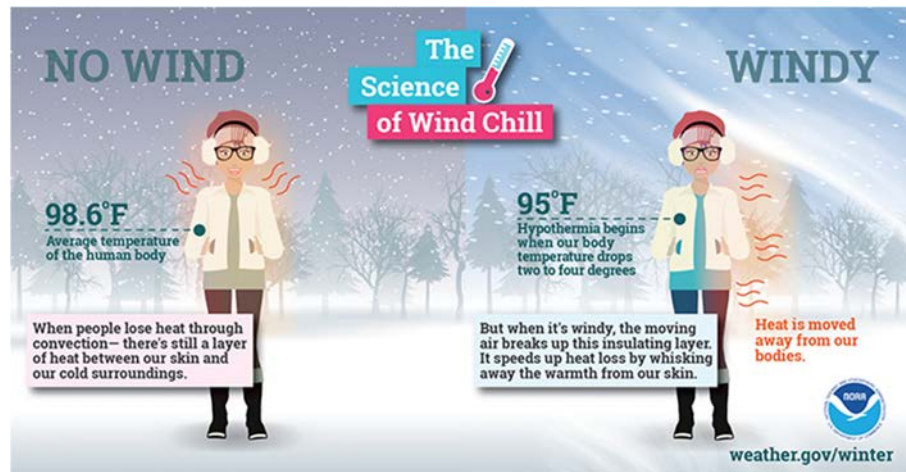


Figure 8 Source: Weather.gov/winter

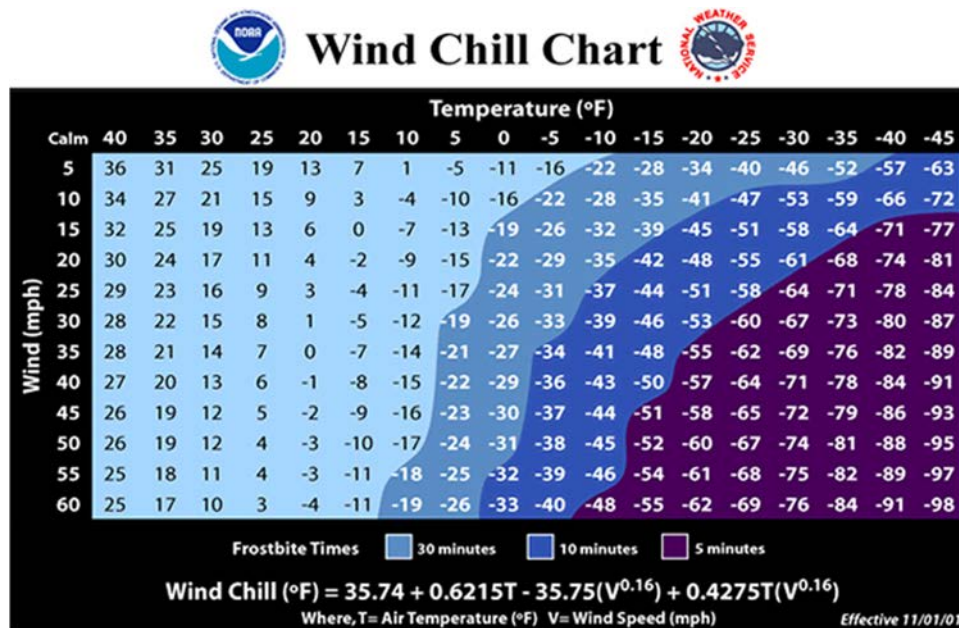


Figure 9 Source: National Weather Service, Wind Chill Chart

<sup>28</sup> Wind Chill : <https://www.merriam-webster.com/dictionary/windchill>

## History

According to National Climatic Data Center, Brown County has experienced four extreme cold/wind chill events and 14 cold/wind chill events since January 1, 1990.

### ***January 30, 1996***

Bitter cold arctic air settled in across central and northeast Wisconsin. Record low temperatures were set in a few locations.

### ***February 1, 1996***

At least 20 record low temperatures were set across central and northeast Wisconsin during the early part of February, as a frigid arctic air mass remained entrenched across the area. The cold weather resulted in a hypothermia-related death in Green Bay on the first day of the month. Temperatures dropped to colder than 40 degrees below zero in parts of north central Wisconsin. Temperatures remained below zero for 137 hours straight in Green Bay. The cold weather was responsible for numerous school closures, stalled vehicles, frozen pipes, and broken water lines. Electrical and telephone outages occurred due to snapped wires and lines. Extreme cold temperatures combined with west winds of 10 to 15 mph to produce wind chill readings in the 50 to 70 degree below zero range on February 2, 1996.

### ***June 7 & 8, 1998***

Record low temperatures were set in Green Bay two mornings in a row, and in Appleton on three mornings. A low of 37 degrees F was reached on the morning of June 7. The next morning, the mercury dropped to 36 degrees F.

### ***June 14, 1999***

Temperatures dropped into the upper 20s and 30s overnight across much of north-central and northeast Wisconsin.

### ***October 4, 1999***

The low temperature at Austin Straubel International Airport in Green Bay was 25 degrees. This tied the record low that was set in 1989.

***July 18, 2000***

The high temperature of 58 degrees in Green Bay (Brown Co.) on the 18th tied the record for the lowest maximum temperature for the month that was set on July 11, 1917. It also broke the record for the lowest maximum temperature for July 18th, set in 1924. The low temperature of 46 degrees tied the record low for the date, set in 1956.

***July 23, 2000***

The low temperature at Green Bay (Brown Co.) of 46 degrees tied the record low for the 23rd, set in 1985.

***February 17, 2006***

A bitter cold air mass settled over the Western Great Lakes region on the February 17 and 18, 2006. On the morning of the 18th, temperatures dropped into the 15 below to 20 below zero range across east central Wisconsin, 18 below to 24 below zero across central Wisconsin, and 22 below to 27 below zero across northern Wisconsin. The cold temperatures combined with west winds of 5 to 15 mph to produce extremely cold wind chill readings. Green Bay recorded a wind chill of -41.

***January 30, 2008***

After an arctic front passed through the area, air temperatures fell into the 10 below to 20 below zero range and west winds increased to speeds of 20 to near 40 mph. The combination of cold temperatures and strong winds produced wind chills of 40 below to near 50 below zero across most of the area.

***February 10, 2008***

Strong northwest winds behind a departing low pressure system brought cold air into Wisconsin. Temperatures fell into the 10 below zero to 20 below zero range at most locations overnight and combined with 15 to 30 mph winds, with gusts as high as 40 mph, to produce bitter cold wind chills.

***January 24, 2009***

Northwest winds between a departing cold front and an approaching high pressure system brought much colder air into the area. Low temperatures ranged from the single digits below zero from the Fox Valley east to Lake Michigan, to the teens below zero in north-central and parts of central Wisconsin. Wind chills across the area were mostly in the 20 below zero to 30 below zero range. There were two fatalities due to hypothermia during the morning of the 24th.

***January 20, 2013***

Brisk northwest winds brought bitterly cold arctic air into Wisconsin. A Green Bay man died of hypothermia outside his home early on the morning of January 21st. Temperatures were in the single digits with wind chills of 10 below to 15 below zero.

***January 6, 2014***

A bitterly cold arctic air mass, the coldest to impact the region in years, spread across the area following the passage of a cold front. Temperatures fell to lows in the 16 below to 32 below zero range. The cold temperatures, combined with west winds of 10 to 20 mph, produced wind chills in the 40 below to 55 below zero range.

***January 27, 2014***

High pressure over the Plains and upper level flow from the Canadian Plains brought extremely cold temperatures and wind chills to the area. Temperatures fell to lows in the 15 below to 28 below zero range. West winds of 10 to 20 mph combined with the frigid air to produce wind chills in the 35 below to 45 below zero range.

***January 10, 2016***

Wind chills at Green Bay were generally in the 20 below to 23 below zero range from late on the night of January 10th through early morning January 11th. One death was associated with the cold weather when a woman was found outside of a Green Bay tavern the following morning.

***January 2, 2018***

Subzero low temperatures, highs mainly in the single digits, and wind chills in the 20 below to 34 below zero range were common during the first week of January. Two people died of exposure. One of them died outside her Green Bay (Brown Co.) home. It is believed that the Green Bay woman tripped and hit her head while looking for her keys.

***January 29, 2019***

Cold air moved into northern Wisconsin as a strong low pressure system departed and high pressure over the Plains moved toward the region. Low temperatures on the morning of January 30th were mainly in the -15F to -30F range and wind chills mostly -35 to -55. Temperatures across the area remained below zero throughout the day on the 30th. Schools and many businesses closed, public transportation suspended or curtailed service, and the U.S. Postal Service even suspended deliveries due to the bitter cold.

Storm Events Source: NOAA Storm Events Database – Extreme Cold/Wind Chill & Cold/Wind Chill

**Vulnerability**

Typically, an extreme cold episode affects Brown County once every couple of years, however; more recently it appears that extreme cold/wind chill events are becoming more common with nearly one event each year since 2013. Extreme cold episodes also tend to be a regional phenomenon in that the episode affects much of the northeastern region of Wisconsin on nearly all of the occasions in which the episodes affected Brown County.

**Impacts**

The following describes the various impacts that extreme cold events have on the county.

***Critical Facilities***

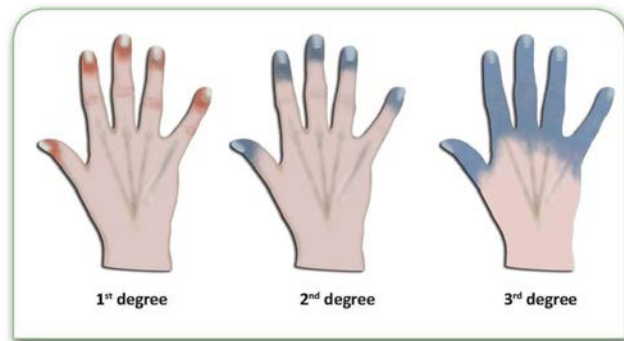
All buildings, including critical facilities, will have an increased demand for heat fuels during an extreme cold event. Increased demand will impact local natural gas energy utilities serving the planning area. Hospitals and clinics may see patients suffering from exposure and emergency shelters may take in additional patrons. Area schools may cancel classes or call for early dismissal in extreme cold events. Water lines may burst forcing water utilities to repair damaged water mains. Local fire departments and rescue services may also deal with direct or indirect consequences of the extreme cold event.

### ***Public Health***

Exposure to cold temperatures can cause serious and/or life threatening conditions. Some of these conditions include frostbite or hypothermia and can become life threatening.

Hypothermia can occur when someone is exposed to cold temperatures or low wind chills. When someone experiences hypothermia, their body will begin to lose heat faster than it can be produced. Hypothermia is clinically significant when the body temperature is below 95 degrees. Severe hypothermia occurs when the body's temperature drops below 85 degrees, resulting in unconsciousness. When body temperatures drop too low, the brain may be affected, making the victim unable to think clearly or lose ambulation. Most often, hypothermia occurs at very cold temperatures, but can occur even at cool temperatures (above 40 degrees) if a person becomes chilled from rain, sweat or submersion in cold water. Victims of hypothermia are most often elderly people with inadequate food, clothing or heating; babies sleeping in cold bedrooms; children left unattended; adults under the influence of alcohol; mentally ill persons; and people who remain outdoors for long periods (such as the homeless). In cases of hypothermia, if help does not come, death is imminent. Great care is needed to properly re-warm victims with even mild cases of hypothermia.

Frostbite is an injury to the body that is caused by the freezing of body tissue. When exposed to the cold for extended periods of time, parts of the body are susceptible to the formation of ice crystals within the soft tissue. Frostbite is characterized similar to burns (degrees) and will cause a loss of feeling and color in affected areas. It most often affects the nose, ears, cheeks, chin, fingers or toes, all of which are extremities that experience circulation difficulties. Frostbite can permanently damage the body, and severe cases can lead to amputation.



**Figure 10 Source: UIAA, Mountain Skills: How**

### ***Safety***

In addition to the health risks directly related to exposure to cold temperatures, Brown County residents are also susceptible to other risks associated with extremely cold temperatures. For example, residents may be in danger of extreme cold due to power failures, inadequate maintenance of heating systems (mechanical failure), or inability to pay gas and electric bills. The risks of household fires and carbon monoxide poisoning can also increase when people begin to use space heaters and fireplaces to stay warm.

### ***Infrastructure***

Public domain water pipes can burst in extreme cold conditions, which can also ruin the street above the water pipes. In addition, damage to fiber optic cables can occur

during extreme cold episodes, which can negatively affect commerce and hospitals in the planning area.

It is possible that extreme cold conditions combined with low lake levels might have led to the freezing of the water intake pipe in Lake Michigan in early 2004. Now, with historic high levels of water in Lake Michigan, a deep freeze could cause new issues.

### **Buildings**

Extreme cold conditions can result various issues for buildings. Many of the issues such as problems with heating elements and frozen pipes have been addressed in previous sections.

### **Economic**

Economic impacts of extreme cold events can include lack of motivation to participate in the local economy unless necessary during the event. Utility bills following the event will also be higher, which will give consumer less ability to purchase discretionary goods about a month after the event (unless that consumer is on a monthly even payment plan with the local utility). If area school districts need to call off school early on extremely cold days, there may be expenses involved with early busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Non-profit organizations will incur expenses in the provision of emergency shelters. The private sector incurs economic losses and production decreases during an extreme cold event.

### **Areas at Greatest Risk**

Extreme cold events have no defined hazard area within the planning area. The events are relatively uniform throughout Brown County.

### **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Extreme cold events can occur anywhere in Brown County.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Winter Storms. Winter storm events will exacerbate extreme cold conditions.

### **Plans and Programs**

Heating Moratorium. A Wisconsin rule, adopted in 1984, prohibits utilities from disconnecting natural gas and electric service during the winter months, between November 1 and April 15.

School Closings. The county's school districts have a policy of closing schools when the National Weather Service issues a wind chill warning or when snow accumulations create unsafe travel conditions. Information is typically gathered from transportation providers, Brown County Highway Department, and weather service providers to assist in making the school closure determinations. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am. Some school districts have an automated phone system that contacts the homes of students as well.



Wind Chill Warnings. The local radio and TV media in concert with the National Weather Service issue a wind chill warning when temperatures are negative 30° F or lower. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor.

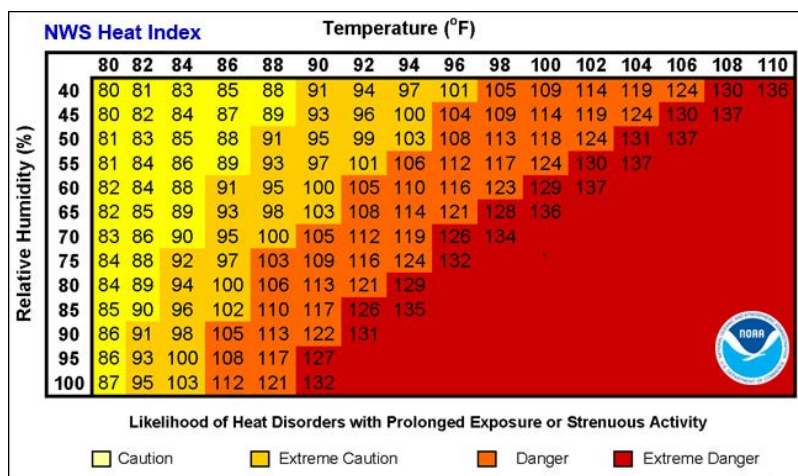
### Gaps and Deficiencies

- Not all school districts have a transportation manager providing information on current weather and road conditions.
- Local radio and television stations do provide warnings but, are effective only if viewers are tuned to one of the local stations.
- A majority of the power lines in the county are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines.
- Residents that have had their heat disconnected prior to the heating moratorium beginning on November 1 must make arrangements with their local utility to pay outstanding bills in order to have their service restored. If a consumer has not made arrangements to pay an outstanding bill, the utility is not required to provide heat until an agreed-upon payment schedule has been reached.
- Residents could be without needed heating during any out-of-season cold spells that occur between April 16 and October 31.

## Extreme Heat

Extreme heat is responsible for an average of 658 deaths per year (1999-2009)<sup>29</sup> in the US, making heat the number one weather killer in this country. Extreme heat and humid weather can create significant risks for people, particularly the elderly who may lack air conditioning or proper insulation or ventilation in their homes. Animals are also at risk during extended periods of heat and humidity.

The National Weather Service will issue a Heat Advisory when the Heat Index ranges from 105 to 114 degrees during the day and remains at or above 80 degrees at night, during a 24-hour period. The following Heat Index Chart displays the National Weather Service Heat Index. The heat index combines the effects of heat and humidity to reflect the risk of warm weather to animals and people. When heat and humidity combine to reduce the amount of



<sup>29</sup> American Public Health Association, Differences in Heat-related Mortality by Citizenship

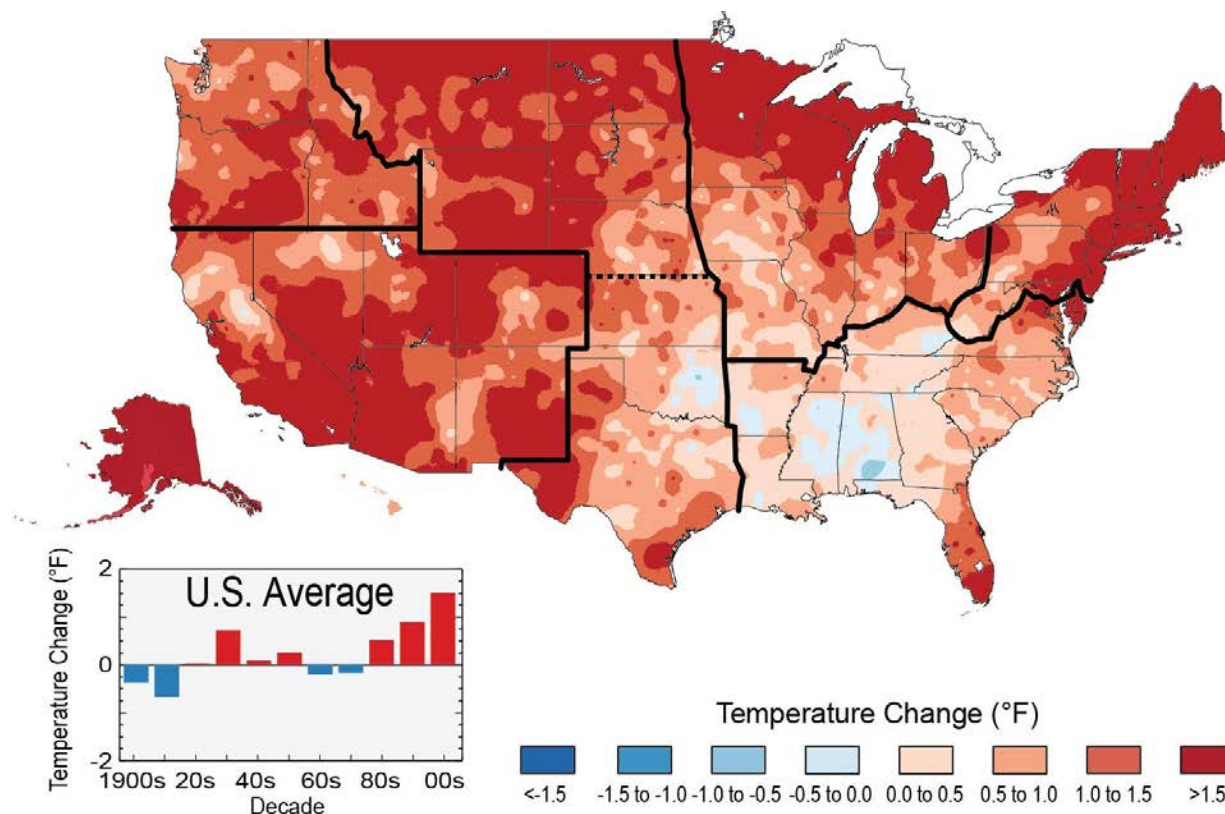


evaporation of sweat from the body, outdoor activity becomes dangerous even for those in good shape. The index measures the apparent temperature in the shade. People exposed to the sun would experience an even higher apparent temperature. A heat index of 105 is considered dangerous and prolonged exposure can result in heat stroke, heat exhaustion, and heat cramps. People are reminded to use extreme caution when the heat index is between 95 and 105.

Based on the NOAA Storm Events Database, Wisconsin has had 12 deaths due to excessive heat since January 1, 1990. During the same time period, Brown County has not reported a death due to excessive heat.

## History

According to NOAA Storm Events Database, Brown County has experienced six “extreme heat” events and 10 “heat” events since January 1, 1990. Meteorologists and climate scientists have been keeping track of temperatures in the U.S. for over a century. Over this period of time data shows that the average temperatures recorded across the U.S. are increasing, however, “quantifying long-term increases of temperature in a single number is challenging because the increase has not been constant over time. The increase can be quantified in a number of ways, but all of them show significant warming over the U.S. since the instrumental record began in 1895. For example, fitting a linear trend over the period 1895 to 2012 yields an increase in the range of 1.3 to 1.9°F.”<sup>30</sup> This trend is depicted in the map below.



<sup>30</sup> <https://nca2014.globalchange.gov/report/our-changing-climate/recent-us-temperature-trends>

The following list identifies the previously mentioned “extreme heat” and “heat” events in Brown County since January 1, 1990.

***February 25-27, 1998***

Record high temperatures were set at Green Bay on the 25th (47 degrees) and the 26th (54 degrees).

***May 19, 1998***

Temperatures typical of mid-summer affected much of central and northeast Wisconsin in mid-May. Green Bay (Brown Co.) recorded a record-tying 88 degree maximum on the 19th. The balmy weather caused pavement to pop on freeways around Green Bay

***November 29, 1998***

Record high temperatures were set across much of central and northeast Wisconsin late in the month. One of the warmest readings included Green Bay (Brown Co) at 63 degrees.

***February 11, 1999***

Southerly winds ahead of an approaching cold front brought unseasonably warm and moist air into Wisconsin. Much of central and northeast Wisconsin still had snow on the ground and the warm, moist air moving over the snow-covered ground resulted in widespread dense fog. Near zero visibility was common across much of central and northeast Wisconsin, resulting in numerous vehicular accidents. A new record high temperature was set in Green Bay (58 degrees).

***July 23, 1999***

Over one week of hot and very humid conditions across northeast Wisconsin resulted in numerous heat related illnesses and three deaths (none in Brown County) due to excessive heat. The heat caused concrete on many roads to buckle.

***November 8 & 9, 1999***

Record high temperatures were set across central and east-central Wisconsin on November 8th and 9th. Green Bay (Brown County) set new record highs of 69 degrees on the 8th and 74 degrees on the 9th. The 74 degrees reached on the 9th tied the record for the highest November temperature in Green Bay.

***November 13, 1999***

Record high temperatures were set across central and east-central Wisconsin on November 13th. Green Bay (Brown County) set a new record high of 67 degrees.

***February 25, 2000***

Green Bay (Brown Co.) set new record high temperatures of 49 degrees on the 25th and 61 degrees on the 26th. The 61 degree reading was the warmest ever recorded in Green Bay during the month of February.

***February 29, 2000***

The temperature reached 59 degrees in Green Bay (Brown County) which set a new record high.

***March 4, 2000***

Record high temperatures were set or tied in Green Bay (Brown Co.) on the 4th (57 degrees), the 5th (57 degrees), the 6th (69 degrees), the 7th (78 degrees), the 8th (74 degrees) and the 9th (56 degrees). The new record high of 78 degrees on the 7th was the second warmest March day ever in Green Bay and their new record high of 74 degrees on the 8th was the fifth warmest March day ever.

***March 23, 2000***

Green Bay (Brown County) tied their record high temperature of 65 degrees that was set in 1939.

***November 1, 2001***

The average temperature (43.4 degrees) for the month set the record in Green Bay.

***July 31, 2006***

Temperatures in the 90's to around 100 degrees combined with dew points in the 60's and lower 70's to produce heat index values approaching 110 during the afternoon hours. Several people in Green Bay (Brown Co.) were treated for heat exhaustion at local hospitals.

***July 3, 2012***

A hot air mass settled over Wisconsin in early July, bringing highs of 100 degrees or hotter to central Wisconsin from July 4th through July 6th. Relative humidity was relatively low, but heat indices still managed to reach the 100 and 110 range.

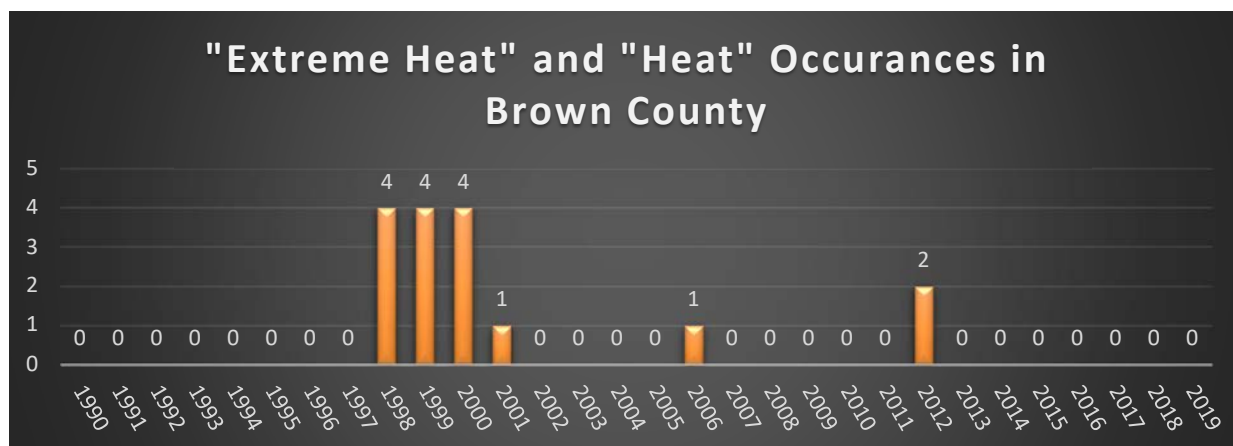
***July 16, 2012***

Hot temperatures returned to central and east central Wisconsin during the middle of the month. High temperatures were mainly in the 90s but heat index values topped out at 95 to 105.

Storm Events Source: NOAA Storm Events Database – Heat & Excessive Heat

**Vulnerability**

Based on past observations, it is likely that one to two “extreme heat” or “heat” episodes will affect Brown County in any given year. These heat episodes tend to be a regional event in that they affect much of the northeastern part of Wisconsin on nearly all of the occasions in which they affected Brown County. Heat related episodes tend to be broader geographically and can vary slightly due to local geographical features such as Lake Michigan. Lake Michigan tends to keep the areas along the lakeshore cooler throughout the year and these locations may not experience the same conditions as others located about 5-10 miles away from the shoreline.



## Impacts

The following describes the various impacts that extreme heat events have on the county.

### *Critical Facilities*

Utilities companies may experience increases in services during extreme heat episodes. Episodes such as the power grid collapse in the northeastern United States and in eastern Canada in the summer of 2003 serve as an example of how devastating a grid collapse can be during a heat event. For many people, summer is the season when people plan their outdoor adventures and it should be no surprise that the incidents of heat related health issues increases. During heat events rescue services, hospitals, and clinics may experience increased demand due to heat related illnesses including heat exhaustion and heat stroke. In some unique scenarios, the use of emergency shelters may be required during a heat event, however, these are rare. Finally, there is usually increased water demand during heat events both for human consumption as well as for lawn watering.

### *Public Health*

Large numbers of persons can experience serious illnesses and ailments during a heat event. The most common of these illnesses include heat cramps, heat exhaustion and heat (sun) stroke. Symptoms of heat cramps include painful spasms usually occurring in the leg and abdominal muscles, along with heavy sweating. Symptoms of heat exhaustion include<sup>31</sup>:

- Cool, moist skin with goose bumps when in the heat
- Heavy sweating
- Faintness
- Dizziness
- Fatigue
- Weak, rapid pulse
- Low blood pressure upon standing
- Muscle cramps
- Nausea
- Headache

<sup>31</sup> Heat Exhaustion Symptoms: <https://www.mayoclinic.org/diseases-conditions/heat-exhaustion/symptoms-causes/syc-20373250>

Symptoms of heat/sun stroke include<sup>32</sup>:

- High body temperature. A core body temperature of 104 F (40 C) or higher, obtained with a rectal thermometer, is the main sign of heatstroke.
- Altered mental state or behavior. Confusion, agitation, slurred speech, irritability, delirium, seizures and coma can all result from heatstroke.
- Alteration in sweating. In heatstroke brought on by hot weather, your skin will feel hot and dry to the touch. However, in heatstroke brought on by strenuous exercise, your skin may feel dry or slightly moist.
- Nausea and vomiting. You may feel sick to your stomach or vomit.
- Flushed skin. Your skin may turn red as your body temperature increases.
- Rapid breathing. Your breathing may become rapid and shallow.
- Racing heart rate. Your pulse may significantly increase because heat stress places a tremendous burden on your heart to help cool your body.
- Headache. Your head may throb.

Heat stroke is a medical emergency, while heat exhaustion requires medical attention if persistent. Sunburn is also a common issues associated with extended exposure to the sun. Symptoms of sunburn include skin redness and pain, possible swelling, blisters, fever and headaches.

In addition to these common heat related illnesses, Brown County residents may be exposed to levels of ground-level ozone (smog) which exceeds the federal standard. Albeit, meteorological conditions must be correct for this to occur. Ozone can induce the following:

- Induction of respiratory symptoms,
- Decrements in lung function,
- Inflammation of airways.

Respiratory symptoms can include:

- Coughing,
- Throat irritation,
- Pain, burning, or discomfort in the chest when taking a deep breath,
- Chest tightness, wheezing, or shortness of breath.

In addition to these effects, evidence from observational studies strongly indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity<sup>33</sup>. People with respiratory problems are at increased risk, but even healthy people who are active outdoors can be affected when ozone levels are high. Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors in the summer is at risk, particularly children and individuals who are active outdoors.

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<sup>32</sup> Heat Stroke Symptoms: <https://www.mayoclinic.org/diseases-conditions/heat-stroke/symptoms-causes/syc-20353581>

<sup>33</sup> Ozone Symptoms: <https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population>

### ***Safety***

The safety impacts of heat related events mirror the potential health impacts. Simple safety precautions should be practiced during heat events including public service announcements across all forms of media and preventative planning for the young and elderly populations who are most susceptible to excessive heat.

### ***Infrastructure***

There are not many impacts associated with extreme heat on publicly owned infrastructure. However, one impact that extreme heat can have on publicly owned infrastructure is pavement buckling. In some cases, such as those that occurred on STH 29 in 2012 that sent a vehicle flying into the air at a high rate of speed, emergency repairs may be required immediately. Another notable but not critical is a potentially higher demand for water recreation in city parks and at beaches along Lake Michigan and other swimming venues (pools, inland lakes, etc.).

### ***Buildings***

While there are no direct impacts on buildings, periods of excessive heat can affect the ability of buildings to be comfortable and safe for human habitation if they are not equipped with air conditioning. Periods of excessive heat can result in high electrical consumption and put a strain on air conditioning units requiring them to run longer and more often to keep the building cool.

### ***Economic***

There are numerous economic impacts including but not limited to; higher electrical prices due to increased demand, crop losses, infrastructure failure, tourism loss, and increased demands for medical treatment. Local, county, and state governments may incur expenses when repairing streets due to buckling and lose out on tax revenue associated with crop loss and decreased tourism. Non-profit organizations may also incur expenses if emergency shelters are activated.

A less tangible but equally important consideration is the loss in productivity amongst laborers and individuals who work in a non-climate controlled environment. These workers are at increased risk of the aforementioned health impact associated with heat as well as the potential of death. Between 1992 and 2016, excessive heat killed 783 US workers and seriously injured 69,374<sup>34</sup>.

### **Areas at Greatest Risk**

Extreme heat usually occurs throughout the entire planning area.

### **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Extreme heat events can occur anywhere in Brown County.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

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<sup>34</sup> Bureau of Labor Statistics

Drought. Extended high temperatures can result in drought.

Wildfire. Dry, hot conditions can increase the risk for wildfires.

### **Plans and Programs**

Heat Advisories. The local radio and TV media in concert with the National Weather Service issues a heat advisory when the combination of temperature and humidity create risks for people and animals. In the state of Wisconsin, a heat index of 100 or more warrants a heat advisory. Advisories can also be issued if the expected heat index is expected to be 95 to 99 degrees for four consecutive days or more. An excessive heat warning is issued when daytime heat index values are expected to reach 105 or higher and nighttime values will be 75 degrees or higher for a 48 hour period<sup>35</sup>.

School Closings. The county's school districts have a policy of closing summer schools when the National Weather Service issues a heat index warning. Local television and radio stations partner with the districts to make sure the announcements are out by 5:30 am.

Cooling Site/Shelter. The County does not have a designated cooling shelter; however, a cooling shelter may be made available through partnerships with organizations like the Red Cross and the Salvation Army/211. The authorization to open a cooling center would be determined by the Brown County Health and would require conditions to meet or exceed heat indices of 100 or more for multiple days with warm night.

### **Gaps and Deficiencies**

Not all school districts have a transportation manager providing information on current weather conditions, however, heat events can usually be predicted by meteorologists and can be planned for in advance.

Although Wisconsin requires utilities to provide residents heating between November 1 and April 15, there is no guarantee that residents will have access to cooling during times of extreme heat.

Cooling systems are lacking in many elderly housing developments.

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## **Fog**

Fog is a hazard that should not be discounted. Fog is a cloud consisting of minute droplets or ice crystals that touches the ground. In order for fog to form, dust or some other air pollutant needs to be in the air. The water vapor then condenses around these solid particles to form fog. Airport delays, automobile accidents, shipwrecks, and plane crashes can be attributed to fog. Fog is responsible for an average of over \$1,000,000 in property damage, dozens of injuries, and several deaths every year throughout the U.S. The financial cost of transportation delays, although not collected or calculated, are thought to be substantial.

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<sup>35</sup> Extreme Heat Toolkit, Wisconsin Climate and Health Program - <https://www.dhs.wisconsin.gov/publications/p0/p00632.pdf>



Fog can occur almost anywhere and during any season. There are certain locations that, due to geographical features such as the presence of hills and valleys, water, and vegetation, are more likely to experience fog. Seasonal shifts in temperatures also impact the presence and frequency of fog. Furthermore, not all fog is the same.

Fog is classified based on how it forms, which is often related to where it forms. The following are the four most common types of fog:



Figure 12 Source: WAOW

- **Advection fog** forms when warm, moist air passes over a cool surface. This process is called advection, a scientific name describing the movement of fluid. In the atmosphere, the fluid is wind. When the moist, warm air makes contact with the cooler surface air, water vapor condenses to create fog. Advection fog shows up mostly in places where warm, tropical air meets cooler water. This type of fog is most commonly found near the oceans, however, locally, this type of fog can occur along the shores of the Great Lakes and the Bay of Green Bay.
- **Freezing fog** happens when the liquid fog droplets freeze to solid surfaces. Mountaintops that are covered by clouds are often covered in freezing fog. As the freezing fog lifts, the ground, the trees, and even objects like spider webs, are blanketed by a layer of frost. The white landscapes of freezing fog are common in places with cold, moist climates.
- **Radiation fog** forms in the evening when heat absorbed by the Earth's surface during the day is radiated into the air. As heat is transferred from the ground to the air, water droplets form. Also known as "ground fog" it usually forms at night and typically does not reach as high as any of the clouds overhead. Fog that is said to "burn off" in the morning sun is radiation fog.
- **Valley fog** forms in mountain valleys, usually during winter. Valley fog develops when mountains prevent the dense air from escaping. The fog is trapped in the bowl of the valley. This type of fog is rare in Wisconsin and especially rare in Brown County as the topography does not lend itself to the formation of valley fog.<sup>36</sup>

The National Weather Service forecasts fog and issues dense fog advisories when visibility is decreased to less than one quarter of a mile. These advisories alert travelers to potentially dangerous conditions. Traveling in fog will often require reduced speed and an increased level of preparedness. At night, traveling in fog is especially dangerous because darkness combines with fog to further reduce visibility. In addition, light from automobile headlights and other navigational lights is scattered off the water droplets of the fog, limiting sight to only a short distance. In response to this problem, automobiles are often equipped with specially designed lights that illuminate a usually dry (and therefore clear) area just above the roadway surface.

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<sup>36</sup> Fog types, National Geographic - <https://www.nationalgeographic.org/encyclopedia/fog/>

## History

According to National Climatic Data Center, Brown County has experienced 12 fog events since January 1, 1990.

### ***March 18, 1996***

Dense fog reduced visibilities to one-quarter mile or less across a large portion of northeast and east central Wisconsin.

### ***May 9, 1996***

Dense fog reduced visibilities to one-quarter mile or less across most of central and east central Wisconsin.

### ***June 10, 1996***

Dense fog affected parts of northeast and east central Wisconsin, especially near the Bay of Green Bay and Lake Michigan. The Fox Valley was also affected by the thick fog, which reduced visibilities to one-quarter mile or less at times.

### ***September 6, 1996***

Dense fog affected most of northeast and east central Wisconsin, reducing visibilities to one-quarter mile or less.

### ***September 21, 1996***

Dense fog dropped visibilities to one-quarter mile or less across east central Wisconsin.

### ***October 16, 1996***

Dense fog developed across most of central, northeast, and east central Wisconsin, reducing visibilities to one-quarter mile or less.

### ***October 21, 1996***

Dense fog reduced visibilities to one-quarter mile or less across most of northeast and east central Wisconsin.

***January 2, 1997***

Dense fog reduced visibilities to one-quarter mile or less across much of northeast, central, and east central Wisconsin. A warm air advection over the top of snow-covered ground led to the fog development.

***March 1, 1997***

Dense fog enshrouded much of central and northeast Wisconsin, reducing visibilities to one-quarter mile or less.

***December 12, 1999***

Dense fog reduced visibilities to near zero over much of north central, northeast, central, and east central Wisconsin. Moisture, trapped near the surface by weak high pressure, combined with cool temperatures and light winds to form widespread dense fog.

***January 9, 2000***

A warm front moving north through Wisconsin brought warm and moist air to central and east central Wisconsin. The snow-covered ground cooled the moist air, resulting in widespread dense fog that first developed in the Fox Valley early in the morning of the January 9, 2000 and then overspread most of central and east central Wisconsin by evening. The fog began to dissipate a bit shortly after midnight on the 10th.

***February 24, 2000***

Moisture from rainfall and melting snow combined with light winds to produce widespread dense fog across most of northeast Wisconsin.

## **Vulnerability**

Twelve fog events occurred between 1990 and April of 2019, which covers nearly 30 years. Fog is not reported and recorded in the storm events database nearly as often as it occurs. As previously mentioned, fog can be extremely localized and can vary in density based on the conditions present which can drastically change conditions every 100 feet.

It is probable that residents living in Northeast Wisconsin and more specifically, Brown County, will experience fog on an annual basis. For individuals that live and travel near Lake Michigan, that likelihood increases.

## **Impacts**

The following describes the various impacts that fog events have on the county.

### ***Critical Facilities***

Law enforcement will likely respond to accidents more frequently during fog events also increasing the likelihood that hospitals and clinics treat individuals injured in said accidents. Rescue services will also see an increase in service requests if accidents occur. Municipal public works and county highway departments may need to perform emergency repairs to infrastructure resulting from crashes during the fog event. Schools may also see schedule disruptions due to slower bus service.

In winter fog events, utility companies may need to repair above ground lines if weighted down by the freezing fog accumulation.

Austin Straubel International Airport and other area airports can experience flight delays and cancellations during certain fog events.

Ships entering the Bay of Green Bay will need to proceed with extra caution during fog events. The shipping channel and some of the bridges on the Lower Fox River are narrow requiring precise navigation with visibility playing a key role.

### ***Public Health***

Most injuries caused by fog events result from vehicle accidents. Few other public health impacts occur during fog events.

### ***Safety***

The main safety concern associated with fog are injuries from traffic accidents. Freezing fog can also create hazardous walking and driving conditions if the fog condenses on contact with objects and accumulates into ice. Although rare, ship wrecks and plane crashes are also concerns that could have serious impacts to the public's health and safety as well as to the economy.

### ***Infrastructure***

The main impact on infrastructure from a fog event is when accidents occur on the roadways. Accidents can cause damage to the roadway, guardrails, signs, and possibly to bridges and overpasses. In the event that an accident occurs, emergency personnel and law enforcement officers may need to reroute motorists to bypass the accident site. Power lines and tree limbs can also become problematic during winter fog events. Branches and power lines that cross or overhang the roadways can be weighted down and even fall into the roadway.

## **Buildings**

There are no direct impacts to buildings from a fog event, except under certain winter circumstances, when freezing of power lines can occasionally lead to disruptions in power to buildings.

## ***Economic***

There are economic costs associated with accidents caused by fog. Vehicular accidents usually involve property damage, and some vehicular accidents during fog events involve injuries and/or fatalities. All of these consequences to vehicular accidents have costs both to the individual involved and to society. Fog events can also cost businesses in lost time involving late workers and/or late shipments. If area school districts need to delay school during a fog event, there may be expenses involved with delayed busing and with paying staff for a full day while only having the benefit of a partial day of instruction. Airline delays due to fog have economic impacts for travelers as well as for commerce. There are additional economic impacts if the fog event occurs in conjunction with the icing of power lines in cases where the power lines are damaged, and residents lose power.

## **Areas at Greatest Risk**

Areas of Brown County situated along the Bay of Green Bay and in river valleys and other low-lying areas can be at greater risk for fog under certain meteorological conditions. However, no portion of the planning area is free of the possibility of experiencing fog.

## **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Fog events can occur anywhere in Brown County.

## **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Winter Storms. Winter storm conditions with freezing rain and icy roads can mix with fog to create deadly roadway conditions.

## **Plans and Programs**

Fog Warning Signs. Flashing signals or fog warning signs are in place on roads within Brown County that are known to be prone to fog.

NOAA Weather Radio Program. Brown County has a NOAA Weather Radio purchasing program in place that encourages and assists residents in acquiring a weather radio.

Local News Stations. Local news stations can predict and issue fog advisories. These advisories can help inform people of the potential for fog before traveling.

## **Gaps and Deficiencies**

Local radio and television stations provide warnings but are effective only if tuned to one of the local stations.

Fog warning signs may be ineffective if drivers are traveling at an unsafe speed for the weather conditions.

# Hailstorms

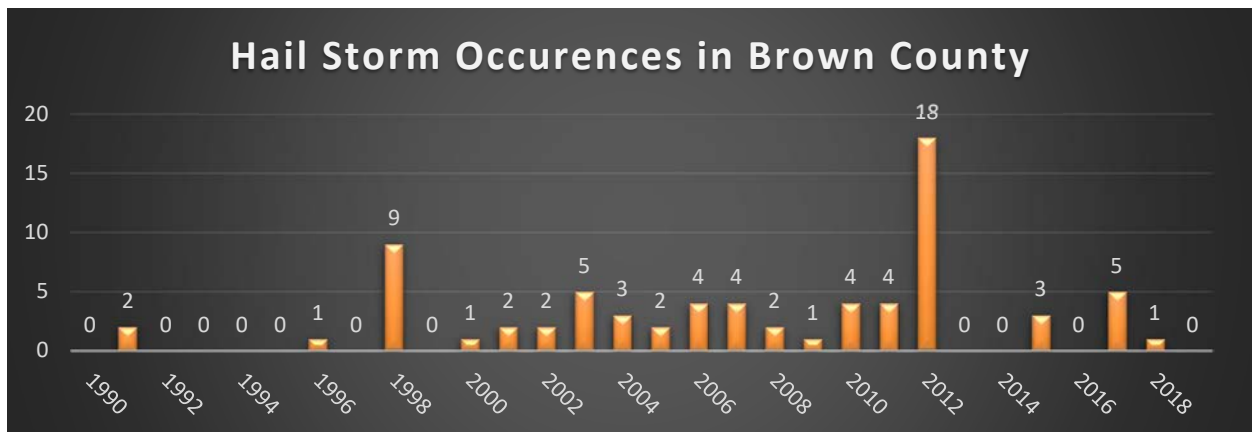
Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice<sup>37</sup>. Frozen droplets gradually accumulate on the ice crystals until they develop sufficient weight and fall as a solid piece of ice as shown to the right. The size of hailstones is a direct function of the severity and size of the storm. Significant damage usually does not result until the hailstones reach 1.5 inches in diameter, which occurs in less than half of all hailstorms. The majority of hail events in Wisconsin range from pea-sized to golf ball-sized however, it is possible that, given the right conditions, larger hail could develop.



Figure 13 Source: theweathernetwork.com

## History

According to the National Climatic Data Center, Brown County has experienced 73 hail events since January 1, 1990. As shown in the following tables, hail storms do occur frequently in Brown County.



<sup>37</sup> <https://www.nssl.noaa.gov/research/hail/>

| Table 3.9: Hail Storm Details              |           |              |                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------|-----------|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Location                                   | Date      | Size of Hail | Storm Description                                                                                                                                                                                                                                                                                                                                            |
| UNKNOWN                                    | 5/28/1991 | 0.75         |                                                                                                                                                                                                                                                                                                                                                              |
| UNKNOWN                                    | 5/28/1991 | 2.38         |                                                                                                                                                                                                                                                                                                                                                              |
| PULASKI                                    | 9/21/1996 | 0.75         |                                                                                                                                                                                                                                                                                                                                                              |
| WRIGHTSTOWN & GREENLEAF                    | 3/29/1998 | 2.75         | Two prolific hail-producing thunderstorms dropped hail as large as baseballs and grapefruits across parts of central and east-central Wisconsin during the late morning and afternoon of March 29. Total damage to property from the storms in Waushara, Winnebago, Outagamie, Brown and Calumet counties topped \$10 million. Cash crop damage was minimal. |
| WRIGHTSTOWN                                | 5/31/1998 | 0.88         | A series of thunderstorms roared across the area late on May 30 and early on the 31st, causing about \$1.8 million dollars in damage and injuring two people. Two tornadoes were also reported.                                                                                                                                                              |
| BELLEVUE                                   | 9/1/1998  | 0.75         | Thunderstorms with strong winds and hail moved across central and northeast Wisconsin. A few trees were knocked down across the region. Wind-driven hail caused minor damage.                                                                                                                                                                                |
| HOWARD, GREEN BAY, BELLEVUE, & ASHWAUBENON | 9/26/1998 | 1.75-0.88    | Numerous thunderstorms with large hail, heavy rain and strong winds rumbled across northern and east-central Wisconsin during the early morning of September 26. Brown County was hit hard. Local flooding in Howard occurred after 3 inches of rain fell in only 2 hours, accompanied by large hail and strong winds.                                       |
| GREEN BAY                                  | 7/13/2000 | 1.25         | The storms downed trees and power lines and dropped large hail as they moved through northeast Wisconsin.                                                                                                                                                                                                                                                    |
| NEW FRANKEN                                | 6/16/2001 | 0.75         | Thunderstorms developed across northern Wisconsin as a weak cold front and an upper level disturbance moved across the state. Some of the thunderstorms downed trees and power lines and produced large hail.                                                                                                                                                |
| GREEN BAY                                  | 8/9/2001  | 0.88         | Severe thunderstorms, associated with a strong cold front, moved across east-central and northeast Wisconsin during the early afternoon hours. Winds from the storms downed trees and power lines, causing 6,700 customers to lose electricity.                                                                                                              |

|                         |            |      |                                                                                                                                                                                                                                                                                                                    |
|-------------------------|------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WRIGHTSTOWN             | 5/6/2002   | 0.88 | A low pressure system over southeast Minnesota moved east across central Wisconsin during the late afternoon and early evening hours. Severe thunderstorms developed in the unstable air near the intersection of a warm front and a cold front. There were numerous reports of large hail and some funnel clouds. |
| DE PERE                 | 5/30/2002  | 1.5  | Severe thunderstorms moved through northeast and east-central Wisconsin ahead of an approaching cold front. Dime size to golf ball size hail fell as the storms moved through the area.                                                                                                                            |
| PULASKI & FLINTVILLE    | 4/15/2003  | 0.88 | Severe thunderstorms developed north of a strong cold front. Temperatures dropped as much as 30 degrees in one hour in some areas as the front moved south across Wisconsin. The hail produced ranged from dime size at numerous locations to as large as a tennis ball.                                           |
| GREEN BAY               | 8/2/2003   | 0.75 | Low pressure and unstable air over Wisconsin led to the development of thunderstorms. The storms moved very slowly, resulting in heavy rainfall in some areas. Flooding and large hail was reported with these storms.                                                                                             |
| PULASKI & SUAMICO       | 8/28/2003  | 0.75 | Thunderstorms developed ahead of a warm front that moved north across Wisconsin. Dime size hail fell for 10 minutes one mile east of Pulaski.                                                                                                                                                                      |
| WRIGHTSTOWN             | 7/13/2004  | 0.75 | Thunderstorms developed in moist and unstable air as a cold front and upper level trough moved through northeast Wisconsin. Tennis ball size hail was reported in Manitowoc County.                                                                                                                                |
| ASHWAUBENON & GREEN BAY | 10/23/2004 | 0.88 | A front made its way through Wisconsin as a strong low pressure system moved across the northwest part of the state. Severe thunderstorms developed in a moist air mass ahead of the front. Nickel size hail fell in Ashwaubenon.                                                                                  |



|                  |           |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-----------|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASHWAUBENON      | 5/6/2005  | 0.75 | Thunderstorms developed in east central Wisconsin as moisture interacted with a trough that moved into the area. The storms produced a tornado, numerous reports of large hail and torrential rain.                                                                                                                                                                                                                                                                 |
| GREEN BAY        | 6/7/2005  | 1    | Thunderstorms developed in the vicinity of a warm front that lifted north through the state during the afternoon and early evening hours. High winds downed trees, power lines and large branches in several locations in central and northeast Wisconsin and there were several reports of large hail.                                                                                                                                                             |
| DE PERE          | 6/21/2006 | 1    | Thunderstorms that moved through Brown County during the morning produced quarter-size hail in De Pere.                                                                                                                                                                                                                                                                                                                                                             |
| HOWARD           | 6/28/2006 | 0.88 | Scattered thunderstorms produced penny to nicked size hail in northeast Wisconsin.                                                                                                                                                                                                                                                                                                                                                                                  |
| PULASKI          | 7/24/2006 | 1.25 | Half dollar size hail fell 3 miles west of Ashwaubenon and there were several reports of penny to quarter size hail across the area.<br><br>An apparent wet microburst occurred in Brown County when extremely heavy rain fell as a 50 knot south wind was measured at the National Weather Service in Green Bay. Two airplanes at the airport sustained damage. Trees and tree limbs were knocked down in the Green Bay, De Pere and Hobart areas of Brown County. |
| BELLEVUE         | 8/23/2006 | 0.88 | As thunderstorms made their way across northeast Wisconsin some of the storms produced hail as large as a quarter.                                                                                                                                                                                                                                                                                                                                                  |
| SUAMICO          | 6/20/2007 | 1    | The southeast-moving storms produced copious amounts of large hail, up to golf ball size, high winds that downed trees and power lines, and a funnel cloud.                                                                                                                                                                                                                                                                                                         |
| HOWARD & SUAMICO | 7/5/2007  | 0.88 | An upper trough initiated convection in northeast Wisconsin. Outflow from these storms initiated additional severe thunderstorms.                                                                                                                                                                                                                                                                                                                                   |
| NICOLET ARPT     | 10/5/2007 | 0.88 | Pulse thunderstorms that developed in unstable air across northeast Wisconsin produced isolated severe weather.                                                                                                                                                                                                                                                                                                                                                     |

|                                       |           |              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-----------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| WRIGHTSTOWN                           | 6/28/2008 | 1            | Thunderstorms developed as winds in the upper atmosphere brought colder air over Wisconsin, causing the air mass to become unstable. Some of the storms produced large hail.                                                                                                                                                                                                                                                                |
| (GRB)STRAUBEL<br>FLD GR               | 7/29/2008 | 0.75         | Thunderstorms developed in unstable air ahead of a cold front that pushed east across Wisconsin. The storms produced large hail, wind damage and three weak tornadoes.                                                                                                                                                                                                                                                                      |
| NICOLET ARPT                          | 6/14/2009 | 0.88         | Thunderstorms, associated with a passing cold front, produced nickel size hail near De Pere. The hail was mainly 0.50 inch to 0.75 inch diameter and partially covered the ground.                                                                                                                                                                                                                                                          |
| ALLOUEZ, GREEN<br>BAY, & BELLEVUE     | 8/20/2010 | 1.5          | Severe storms with heavy rains, hail, high winds, and a tornado, moved across the Fox Valley and Green Bay late in the afternoon. Hail over an inch in diameter fell in Green Bay and De Pere. Intense rains caused flooding in Green Bay.                                                                                                                                                                                                  |
| NEW ROME                              | 4/10/2011 | 1            | Thunderstorms developed along and ahead of a cold front as it encountered moist and unstable air across Wisconsin. Fifteen twisters affected the state as a strong spring storm moved across the western Great Lakes. In addition to the tornadoes, the lines of thunderstorms that developed produced plenty of straight line wind damage and large hail. The largest hail reported was baseball size near Winneconne in Winnebago County. |
| CORMIER,<br>WRIGHTSTOWN,<br>& ALLOUEZ | 5/22/2011 | 1.5-<br>0.88 | Severe thunderstorms produced high winds, large hail, and a tornado across central and northeast Wisconsin on May 22, 2011.                                                                                                                                                                                                                                                                                                                 |
| HOWARD                                | 5/3/2012  | 0.88         | Thunderstorms developed over northeast Iowa Wednesday evening before tracking over east central Wisconsin overnight on May 2nd into the morning of May 3rd. Heavy rain produced flooding along with hail up to nickel size.                                                                                                                                                                                                                 |

|                                                                           |           |           |                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------|-----------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CORMIER, ASHWAUBENON, PREBLE, KOLB, ALLOUEZ, DE PERE, & SHIRLEY           | 6/22/2012 | 1.00-0.75 | Thunderstorms that developed in response to an upper level disturbance produced isolated large hail and heavy rainfall as they moved through east-central Wisconsin.                                                                                                                                                 |
| KUNESH                                                                    | 7/9/2012  | 0.75      | Scattered strong thunderstorms developed over northeast Wisconsin due to an upper air disturbance and an unstable air mass. One of the storms produced wind damage near Pulaski and Pittsfield.                                                                                                                      |
| CORMIER, GREEN BAY, SUAMICO, BELLEVUE, MORRISON, WRIGHTSTOWN, & GREENLEAF | 7/30/2012 | 2.5-0.75  | An upper level disturbance and a cold front interacting with an unstable air mass resulted in the formation of thunderstorms. The strongest storms produced hail as large as tennis ball size and wind gusts to 60 mph.                                                                                              |
| SUAMICO & ASHWAUBENON                                                     | 8/2/2015  | 1.75      | Another round of severe thunderstorms with large hail and damaging straight-line winds affected parts of central and northeast Wisconsin during the afternoon of August 2nd. Some of the first severe storms of the event developed just north of Green Bay and produced hail in excess of three inches in diameter. |
| PULASKI                                                                   | 8/14/2015 | 1.75      | Storms produced heavy rainfall that caused minor urban flooding, damaging winds that downed trees and power lines, and hail up to golf ball size across eastern Wisconsin.                                                                                                                                           |
| GREEN BAY & BELLEVUE                                                      | 8/10/2017 | 1.25-0.75 | Scattered thunderstorms developed when a cold front encountered moderately unstable air. The strongest storms contained heavy rain, large hail, and wind gusts of 40 to 50 mph. The largest reported hail was half dollar size in Green Bay.                                                                         |
| DENMARK                                                                   | 7/30/2018 | 0.75      | Thunderstorms in east-central Wisconsin produced penny size hail in Denmark.                                                                                                                                                                                                                                         |

Source: NOAA National Climatic Data Center; July, 2019

### **Vulnerability**

Seventy-three hail events occurred between 1990 and April of 2019. Hail can impact any part of Brown County and most of the reported damage from hail storms occurs to; buildings, vehicles, infrastructure, and agricultural crops. As noted in some of the storm descriptions in the table above, hail damage can become extremely costly with reports of damage in the millions of dollars.

## **Impacts**

The following describes the various impacts that hail events have on Brown County.

### ***Critical Facilities***

Hail can inflict severe damage to buildings, mainly the roofs, windows and siding, depending on hailstone size and winds.

### ***Public Health***

Hail is unlikely to cause any public health concerns.

### ***Safety***

As noted in the storm reports since 1990, hail can cause injuries but rarely causes anything more than minor injuries.

### ***Infrastructure***

#### **Buildings**

Hail can inflict severe damage to roofs, windows and siding, depending on hailstone size and winds.

### ***Economic***

Costly hailstorms are increasing in the United States, with the average year now accumulating between \$8 and \$10 billion in damage. Additionally, hailstorms account for 70 percent of insured loss from severe storms. In 2017 alone, there were two \$2 billion hailstorms, one in Denver and the other in Minneapolis<sup>38</sup>. Most of the cost incurred is to vehicle and building damage, however, damage to agricultural crops can be costly as well. Taller crops, such as corn are particularly vulnerable to hail.

## **Areas at Greatest Risk**

Based on review of the historic hailstorm patterns, there are no specific areas with higher than average risks in Brown County. The events occur relatively uniformly throughout the county.

## **Estimation of Potential Losses**

No estimation of potential losses can be derived as there is no defined hazard area. Hailstorms can occur anywhere in Brown County.

## **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Lightning and Thunderstorms. Lightning and thunderstorms often accompany hailstorms, increasing the damage potential to the planning area.

## **Plans and Programs**

Severe Storm Spotters Network. This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to identify, evaluate, and report severe weather events to the NWS. Brown County has several trained severe weather

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<sup>38</sup> Washington Post – August 8, 2018

spotters, many of whom report directly to their respective public safety offices when severe weather is observed.

### **Gaps and Deficiencies**

Local radio and television stations do provide warnings but are only effective only if viewers are tuned to one of the local stations.

A majority of the power lines in the county are above ground and subject to damage from ice, wind, and falling tree limbs. There are community requirements to manage trees near power lines.

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## **Dam Failure Flooding**

There are 50 dams of various sizes located throughout Brown County according to the “Dam Safety” data received from WDNR in 2019. The definition of a dam is any artificial barrier in or across a watercourse which has the primary purpose of impounding or diverting water and includes all appurtenant works, such as a dike, canal or powerhouse<sup>39</sup>. Of the county’s dams, 18 were owned by the county or a local municipality; one was owned by the WDNR, one by the Army Corp. of Engineers, two by Northwestern Wisconsin Technical College; two by the Wisconsin Department of Transportation, and the remaining dams were owned by individuals or private entities. The WDNR regulates the permitting of new dam construction, repairs, reconstruction, ownership transfers, water levels, and abandonment.

A dam with a structural height of over 6 feet and impounding 50 acre-feet or more, or having a structural height of 25 feet or more and impounding more than 15 acre-feet is classified as a large dam.

Dams are classified as Low, Significant, or High Hazard. A dam is assigned a rating of High Hazard when its failure would put lives at risk. The hazard rating is not based on the physical attributes, quality or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail.

### **History**

There is no significant hazard history for any dams in Brown County.



**Figure 14: Lake Delton Dam Failure**  
**Source: wiscnews.com**

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<sup>39</sup> WDNR Dam Safety: <https://dnr.wi.gov/topic/dams/>

## Vulnerability

Of the 52 dams within the county, there are five large dams with one having a “high” hazard rating, two have a “significant” hazard rating, and the final two have a “low” hazard rating. As shown in the table below, the Lamers Pond Dam in the Village of Ashwaubenon serving the Dutchman’s Creek Tributary is the lone dam in Brown County with a “high” hazard rating. Please see Chapter 2 for more information on the *Emergency Action Plan* prepared for this dam.

**Table 3.10: Brown County Dams with Hazard Ratings**

| Dam Name                    | Dam Size | Hazard Rating |
|-----------------------------|----------|---------------|
| Lamers Pond                 | LARGE    | H             |
| Macco Pond                  | LARGE    | L             |
| Pouwels                     | SMALL    | L             |
| Colwitz                     | SMALL    | L             |
| Koerner                     | SMALL    | L             |
| Imig                        | SMALL    | L             |
| Upper Pamperin Park         | SMALL    | L             |
| Lower Pamperin Park         | SMALL    | L             |
| Blazie Investments          | LARGE    | L             |
| Oneida Golf And Riding Club | SMALL    | L             |
| Heritage Hill Pond          | SMALL    | L             |
| Little Kaukauna             | LARGE    | S             |
| De Pere                     | LARGE    | S             |

Hazard ratings are determined based on an assessment of the existing land use downstream of the dam.

Source: WDNR

The areas vulnerable to dam failure flooding include those locations within the hydraulic shadow of the dam. The hydraulic shadow of the dam is the area of land downstream from a dam that would be inundated by water upon failure of the dam during the regional flood.

## Impacts

The following describes the various impacts that wildland fires have on the county.

### ***Critical Facilities***

There are no critical facilities vulnerable to flooding if the Lamers Pond Dam were to fail.

### ***Public Health***

Three types of health concerns could accompany dam failure flooding. The first hazard comes from the water itself in the form of illnesses resulting from contaminants carried in the water.

The second type of health hazard comes from the creation of stagnant pools which provide habitat for vectors and the production of mold spores.

The third health hazard is the long-term psychological impact of having experienced the destruction of a flood due to dam failure. This type of hazard can happen suddenly

and without warning leading to extreme levels of stress and possible anxiety in the future.

### ***Safety***

During a dam failure flooding event a massive amount of water is released all at once. When a large volume of water begins moving it can move large objects like cars and destroy structures. This can be dangerous for everyone and everything in the path of the water. Floods of this nature can also cause damage to utilities such as power and gas lines creating secondary hazards such as electrocution and gas leaks, unsafe structures and possibly fires.



**Figure 15:**  
**Lake Delton, WI Dam Failure Flood Damage**  
**Source: Twincities.com**

### ***Infrastructure***

Infrastructure impacts of flooding from a dam failure include impacts to roads, bridges, sewer and water line damage, and electrical and gas lines.

### ***Economic***

Floods from dam failures cause wide sweeping damage and the economic impacts can be at a scale that is in-comprehensible. Everything from infrastructure damage noted above to private property damage and agricultural loss can add up quickly. The economic impact however, is directly proportional to the size of the dam and its hazard rating. A dam with a higher rating has the potential to cause more damage and even take lives.

### ***Other***

Public expenditures spent on clean up and on repairs to damaged infrastructure and public property affect all residents of the planning area, not just those in the shadow of the dam.

## **Areas at Greatest Risk**

The areas of greatest risk from dam failure are those areas within the hydraulic shadow of the dam of the large Lamers Pond Dam in the Village of Ashwaubenon, which has a “high” hazard rating.

The Little Kaukauna Dam in Little Rapids (Town of Lawrence) and the De Pere dam are both large dams with “significant” hazard ratings that present a noteworthy risk potential.

## **Estimation of Potential Losses**

The hydraulic shadow for the Lamers Pond Dam in Ashwaubenon encompasses one residential structure with a total assessed valuation of \$195,300 (tax year 2020).

For the Little Kaukauna Dam in Little Rapids (Town of Lawrence) and the De Pere dam, no estimation of potential losses can be derived without a defined hazard area as the hydraulic shadow of the dam delineations are confidential and unavailable.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flood. Inundation of floodplain areas or possibly a larger area would occur if the dam or levee structures fail.

Fire. Fire can occur due to compromised electrical and natural gas infrastructure.

Hazardous Materials. Hazardous material releases can occur due to improper storage of materials in flood prone areas.

Infectious Disease. Infectious disease outbreaks are possible during prolonged flood events where floodwaters can support disease vectors.

Transportation Disruption. Destruction or disruptions to transportation routes roads, bridges, railroads, and by river navigation can be disrupted due to inundation and/or substantial flow velocities.

Power Outages. Power outages can occur if portions of the electrical grid are compromised by floodwaters. The power outages may be longer than those incurred from high winds due to the floodwaters needing time to recede.

### **Plans and Programs**

Regulation of Dams and Bridges. Chapter 31 of the Wisconsin Statutes, created in 1917 under the Water Power Law, was developed to ensure that dams are safely built, operated and maintained. NR 333 of the Administrative Code provides design and construction standards for large dams, and NR 335 (Wis. Admin. Code) covers the administration of the Municipal Dam Grant Program and the Dam Removal Grant Program. Wisconsin DNR is responsible for administration of these regulations. Chapter 31 covers dam construction, permitting, safety, operation and maintenance. It also covers alteration or repair of dams, dam transfer and removal, and water level and flow control.

Municipal Dam Grant Program. The Municipal Dam grant program provides a cost-sharing opportunity for eligible engineering and construction costs for dam maintenance, repair, modification or abandonment and removal up to a maximum of \$400,000. More information can be found at: <https://dnr.wisconsin.gov/aid/DamMunicipal.html>

NOAA Weather Radio Program. Brown County has a NOAA Weather Radio purchasing program in place that encourages and assists residents in acquiring a weather radio.

### **Gaps and Deficiencies**

Many of the dams in Wisconsin were built in the late 1800s and early 1900s. Over time, water pressure, weathering, and animal activity will slowly break down a dam. Dams need constant maintenance and repairs. If dams are allowed to naturally degrade, they have a greater risk for problems such as sudden breaks.



## **Fires (Forest and Wildland)**

A wildland fire is any non-structure fire, other than prescribed fire, that occurs in the wildland<sup>40</sup>. Typical causes of these fires are lightning, human carelessness, or arson. Wildland fires can occur at any time of the year and during any time of the day if conditions are right. The primary factors/conditions that contribute to a wildland fire are land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation. Generally, fires are more likely to occur when vegetation is dry from a winter with little snow or a spring and summer with sparse rainfall. In recent times, development of homes and other structures in areas of highly flammable vegetation have caused an increase in wildfire danger. This condition is known as the wildland-urban interface (WUI).

The WUI is the zone/area where structures and other human developments meet, or intermingle with, undeveloped wildlands. Therefore, the WUI fire interface is any point where the fuel feeding a wildfire changes from natural (wildland) fuel to man-made (urban) fuel<sup>41</sup>.



**Figure 16 Source: Ethan Miller**

If preventative measures are not taken the chances of a wildland fire increase. If a wildland fire develops, it can turn into an emergency or even a disaster if not caught early. Fires threaten lives, resources, and property. In addition, fires can affect livestock and other domesticated pets.

### **History**

The Wisconsin Department of Natural Resources no longer maintains data on wildland fires. However, according to local fire fighters, wildland fires are a frequent occurrence throughout the county, primarily in the spring of the year when the snow has melted and the vegetation is dry and yet to begin growing. Other times of the year can be subject to wildland fires due to drought conditions or through human actions such as the burning of refuse or yard waste. Fire departments serving the fringe of the Green Bay Metro Area and rural departments have been upgrading equipment to better combat these types of fires.

Since January of 1990, there have been no major incidences of wildland fires in the county. According to Steering Committee members, small fires have claimed some structures, however, vegetation and wildlife habitat have been the primary impact areas.

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<sup>40</sup> National Park Service, Fire and Fuels Management: Definitions, Ambiguous Terminology and References

<sup>41</sup> National Park Service, Fire and Fuels Management: Definitions, Ambiguous Terminology and References

## **Vulnerability**

Brown County is not extensively forested and does not contain the hazards and risks necessary to warrant intensive fire protection. Therefore, there are no Wisconsin DNR ranger stations or suppression resources located in the county.

According to the U.S. Forest Service Wildland Fire Assessment System, Brown County regularly falls within a low fire danger class. A low rating indicates that “Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting<sup>42</sup>.”

Overall, the probability of a naturally occurring wildland fire is low for the entire county. However, the probability that at least one wildland fire will occur in the county remains high because local ordinances, typically in rural communities, allow for burning to occur on private property.

## **Impacts**

The following describes the various impacts that wildland fires have on the county.

### ***Critical Facilities***

Police, fire, and emergency response departments are greatly affected by wildland fires incurring increased workloads during and after events. Hospitals may see patients with burn related injuries and/or suffering from the effects of smoke inhalation. Schools, if not affected by a fire, could potentially be used as a temporary shelter for individuals that cannot return to their homes. All critical facilities located in the path of a wildland fire can be affected if the facility cannot be protected by fire suppression efforts.

### ***Public Health***

Wildland fires can lead to various injuries and even fatalities. Most individuals affected by wildland fires suffer from injuries related to burns and smoke inhalation.

### ***Safety***

Wildland fires present a serious threat to public safety. Residential areas and other locations that may be at risk of experiencing wildland fires are typically evacuated to ensure the safety of the public.

### ***Infrastructure***

A wildfire has the potential to impact a wide variety of public infrastructure including; traffic lights, railroad crossings, street signage, communication and power transmission structures, and if the fire is hot enough, pavement/asphalt can be damaged.

### ***Buildings***

The potential for property damage and structural losses increases as more development occurs in wooded areas and as human activity increases in recreational

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<sup>42</sup> USFS – Wildland Fire Assessment System (WFAS): <https://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/class-rating-fire-potential-danger-51>

areas. Homes and other structures on wooded lots and near the urban rural interface are at higher risk. This risk increases when buildings are surrounded by fuel sources such as unmowed grass, unraked leaves, flammable vegetation, and dead branches. If a wildfire does reach a structure, building materials that may melt or ignite can increase the risk of a structural loss.

Residential housing is typically the most dominant type of structure at the urban rural interface. Though many parts of a home can be affected by wildfire damage, the roof is the most exposed portion of the building and is more at risk from flying embers. Attics may also be affected by airborne embers that enter through open eaves and vents. Structures attached to homes, such as decks, garages, and fences, can ignite and lead to the fire engulfing a home.

### ***Economic***

Wildland fires can have an impact on the economy causing thousands of dollars in damages to both public and private property. Direct costs associated with wildland fires include the salvage and removal of downed timber and debris and any necessary restoration of the burned area. Wildland fires can also have a significant impact on local agriculture. Fires can destroy entire fields of crops as well as harm the soil and waterways. Soil exposed to intense heat may lose its capability to absorb moisture and support life.

### **Areas at Greatest Risk**

Brown County contains approximately 79,122 acres of natural areas, including forests, wetlands, and floodplains. Of these, few contain timbers that are very susceptible to burning. Therefore, lands covered in grass fuels pose the highest risk for the planning area. Furthermore, grasslands that abut heavy residential development present an even greater danger, especially when residents practice unapproved outdoor burning of leaves, garbage and other items of which they wish to dispose of by incineration. The likelihood that any wildland fire in Brown County would be catastrophic is low as most susceptible areas lack enough acreage to allow for continuous burning.

### **Estimation of Potential Losses**

Estimating the potential loss to a wildland fire is impossible. To help prevent a scenario where a wildland fire could start and grow to a catastrophic degree will require a combination of education and enforcement efforts at the local level.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding and Erosion. Major wildfires can destroy ground cover, which can lead to heavy erosion and loss of vegetation. If heavy rains follow a wildland fire, flash floods, landslides and mudflows can occur. The preservation of vegetation is essential in deterring flooding during heavy rainfalls or spring runoff.

Hazardous Materials. Major wildfires that reach structures that contain hazardous materials can lead to explosions or rupturing of storage structures that can release hazardous materials that can impact the soil, ground water, surface water, and air quality.

## **Plans and Programs**

Fire Districts/Departments. Brown County is served by 33 fire departments, including the Austin Straubel Airport Fire Department. Each department is responsible for wildfires within their department boundaries. However, many fire departments have mutual aid agreements which allows them to work together on larger fires, including a wildfire if it were to occur.

Fire Department Wildland Training. Wisconsin DNR - Division of Forestry provides free wildland fire training to fire departments in cooperative fire protection areas of Wisconsin. Brown County is within a cooperative fire protection area.

Zoning. The zoning departments, which include building inspectors, regulate the development of new housing. The departments oversee enforcing safety restrictions including setbacks, lot coverage, depth, and structure height. In addition, the Unified Building Code sets standards for roofing. The building inspector is responsible for inspecting residential structures, while the fire marshal inspects commercial structures for potential fire hazards.

Fire Mutual Aid Agreements. There are formal mutual aid agreements between all fire departments in Brown County. The county has become a Mutual Aid Box Alarm System (MABAS) organization (Division 112). As a MABAS agency, Brown County fire departments will agree to standards of operation, incident command, minimal equipment staffing, safety, and on-scene terminology. MABAS agencies, regardless of their geopolitical origin, can work together seamlessly on any emergency scene. All MABAS agencies operate on a common radio frequency, Interagency Fire Emergency Radio Network (IFERN) and are activated for response through protocols developed to meet local risk needs. MABAS also provides mutual aid station coverage to a stricken community when their Fire/EMS resources are committed to an incident for an extended period.

## **Coastal Hazards**

Coastal hazards are natural hazards affecting the Wisconsin Great Lakes shoreline. Coastal areas in Brown County are specific to areas along the Bay of Green Bay. According to the Wisconsin Coastal Management Program of the National Oceanic and Atmospheric Administration, the coastal hazards of concern include:



**Figure 17 Green Bay**  
**Source: US Navy**

- Erosion of coastal bluffs, banks, beaches and near shore lake beds (including erosion from freezing and thawing of lake ice);
- Flooding from upland runoff, high lake levels and storm-induced surge (temporary water level changes); and
- Damage to shoreline structures from storm waves.

In addition, Brown County has experienced property damage from rising water levels in the Fox River and East River due to heavy rain events and coastal flooding events that occur when wind conditions push water into the bay causing coastal wave run-up. The worst scenarios occur when great lake levels are high and a storm pushes in from the northeast. This scenario presents a triple threat where the rain and wind produced by the storm combined with the high lake levels creates both coastal flooding as well as flash flooding along the major waterways.

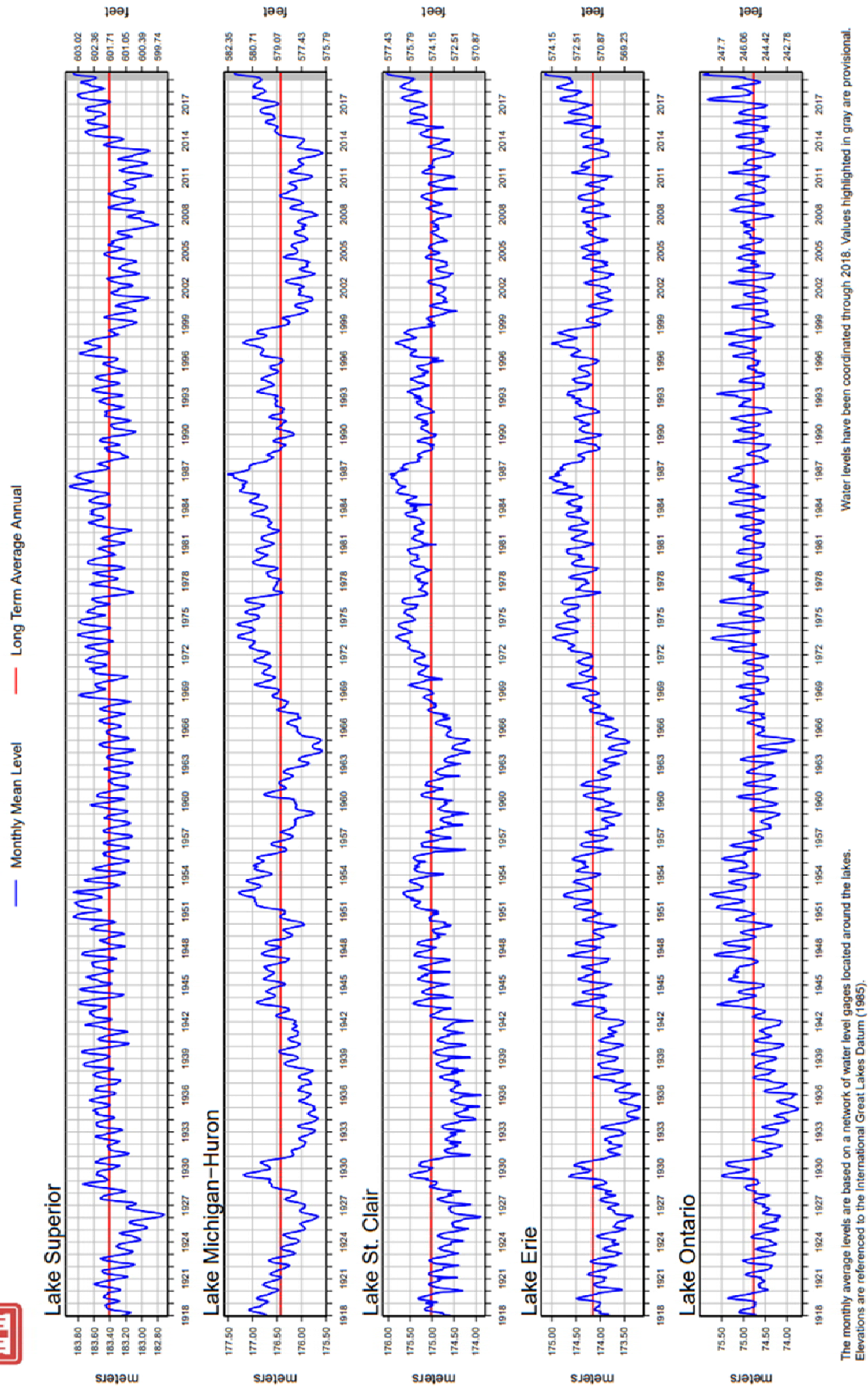
### ***Effects of Fluctuating Lake Water Levels***

Since about 2014, water levels on the Great Lakes have been trending toward record highs. The water levels on the Great Lakes have been recorded since the early 1900's. While we are currently experiencing water levels approaching records, the data shown in the following graphic from the US Army Corps of Engineers suggests the water levels fluctuate by as much as two feet.





## Great Lakes Water Levels (1918–2019)



The monthly average levels are based on a network of water level gages located around the lakes. Elevations are referenced to the International Great Lakes Datum (1985).

Water levels have been coordinated through 2018. Values highlighted in gray are provisional.

When water levels are high, properties adjacent to the water are at a heightened risk of multiple types of flooding and coastal and streambank erosion. Waves during high water levels are capable of undercutting shoreline and creating unstable conditions along bluffs and possibly along roadways or private property. Conversely, when the water level is low, wave energy dissipates as waves break along the exposed beach instead of the shoreline.

The fluctuations in the water level can have an impact on development adjacent the water. It is important for Brown County communities to consider this when development is proposed on or near the bank of waterways and along the shoreline of the Bay of Green Bay.

### ***Coastal Ice Effects***

Properties adjacent to the Bay of Green Bay are susceptible to events known as ice shoves. Ice shoves occur when the wind pushes ice on to shore. The ice, when pushed/piled up on shore, can damage structures, destroy vegetation, and move sand or stones from beaches.

As shown in the image to the right, ice shoves are typically isolated events and do not impact large areas. The right conditions are also required to produce these ice shoves and their occurrence is infrequent.



**Figure 18 Source: The Door County Pulse**

Coastal ice may also impact small streams if they become blocked by ice jams. The confined backwater builds up a hydrostatic head that may cause a breach in the stream bank or cut a new outlet through the lake bank, with possible damage to structures built near the stream or lake bank. Ice jams blocking stream outlets may cause backwater with resulting inundation of low-lying inland areas.

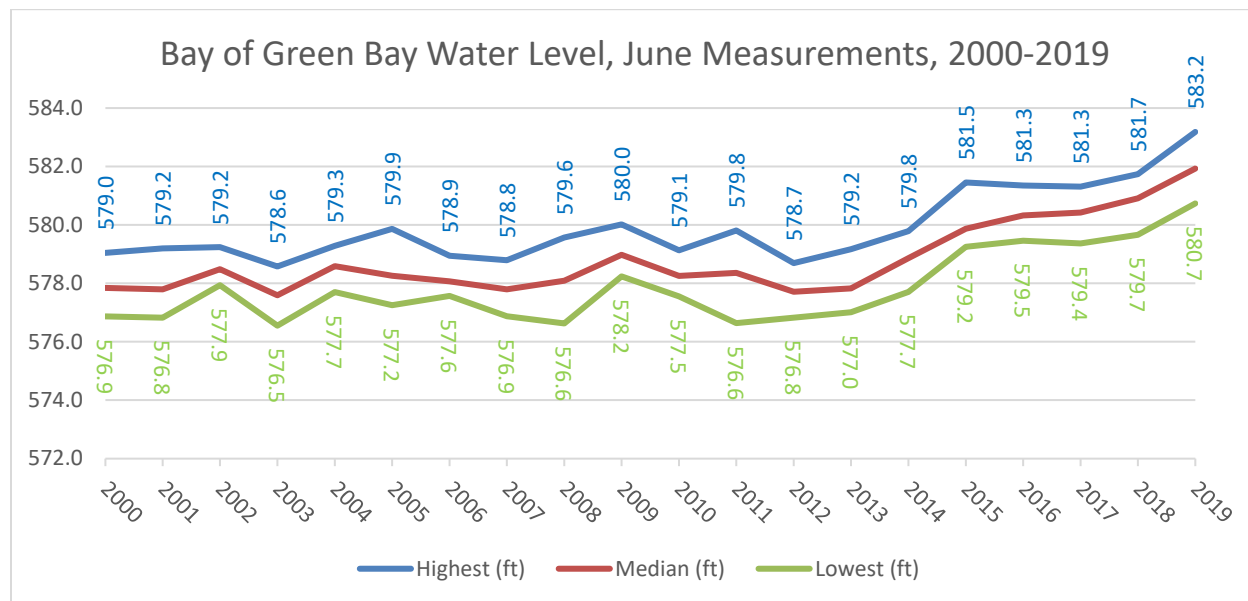
### **History**

#### ***Lake Water Levels***

The previous chart details the annual mean water level for all of the Great Lakes. This graph, while helpful in understanding the water levels over time, does not capture the high or low water levels throughout the year. Because high water levels pose the greatest threat to human life and habitation, data was collected from the month of June, which is most often the month with the highest water levels, dating back to 2000. The graph below shows the water levels measured in the Bay of Green Bay. During this 19 year span, the lowest water level was recorded in 2005 (576.5 feet) while the highest level occurred in 2019 at 583.2 feet. This is a difference in 6.7 feet.

There is a trend beginning in 2012 and continuing through 2019. Water levels have been relatively consistent from 2000 to 2012 with the recorded high dropping 0.3 feet. However, since 2012 there has been a steady increase in water levels. Conditions that have contributed to the increasing water levels include a combination of above average annual precipitation, above average snow accumulation, and below average winter temperatures that freeze more of the great lakes thereby reducing evaporation during the winter months. The current lake levels are within inches of the record set in 1986.

It is important to note that even during periods of lower water levels; severe storms can result in flooding.



Source: NOAA Tides and Currents; August, 2019

## Vulnerability

All coastal counties in Wisconsin are vulnerable to erosion, flooding, and damage to shoreline structures. More specifically, the communities adjacent to the Bay of Green Bay including the Villages of Howard, Suamico, the City of Green Bay, and the Towns of Scott and Green Bay are at risk of coastal flooding. For communities that do not share a border with the Bay of Green Bay but that do have a border with the Fox River and the East River, flooding is a concern and can be a result of the high water levels in the Bay of Green Bay.

## Impacts

The following describes the various impacts that coastal hazards have on the county.

### Critical Facilities

Of the 1,223 critical facilities located in Brown County, 44 are located within the FEMA coastal run-up zone associated with the Bay of Green Bay and the Lower Fox River.

### Public Health

Coastal hazard events may result in contaminants such as raw sewage containing E. coli to be washed into Green Bay/Lake Michigan. When these events occur public health concerns for swimmers and other patrons increases. It may be necessary to



close swimming areas and to provide public notices informing the public of the potential for health risks.

### ***Safety***

Coastal hazards present a public safety concern for boaters, swimmers, and near-shore visitors or residents during severe weather and high water conditions.

### ***Infrastructure***

Coastal hazards such as bluff erosion and coastal flooding can cause damage to private property and public infrastructure such as roadways and other facilities.

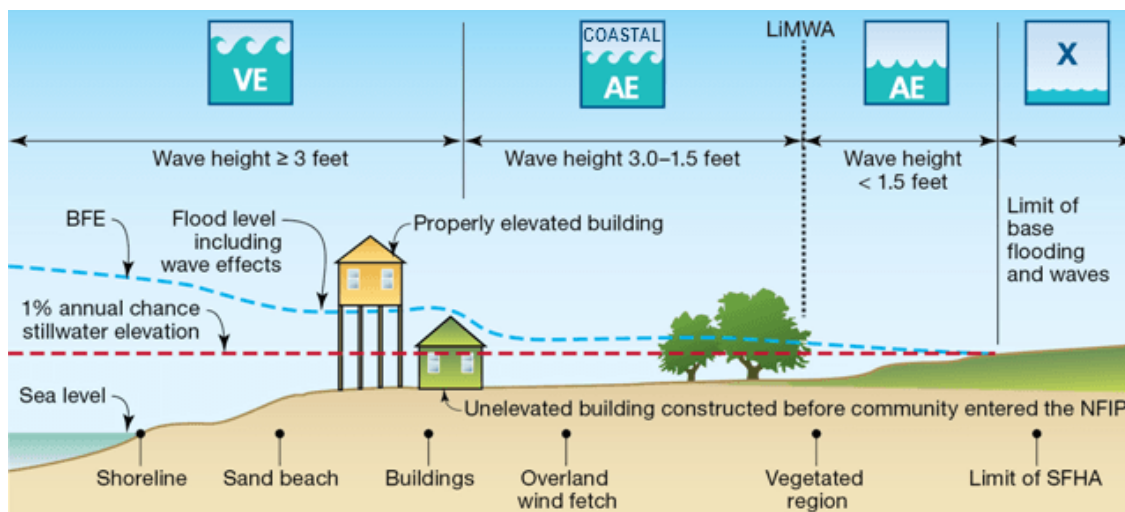
### ***Economic***

Coastal hazards can cause significant financial losses. Beach erosion, coastal flooding, and bluff failures are all possible around the great lakes.

Water level fluctuations in Green Bay/Lake Michigan significantly affect the revenues of the shipping industry. Commercial carriers' revenues decrease during periods of low water levels because shipping is dependent on the amount of draft available in shipping channels. When the draft is reduced, the amount of cargo must also be reduced. Economic losses also arise from restricted marina and launch traffic for charter boats, pleasure boats, commercial fishing, and sport fishing when lake levels are low. Although dredging can improve access to the lakes, it is often damaging to the aquatic environment and very costly.

### **Areas at Greatest Risk**

The areas at greatest risk include those that are identified on the FEMA Flood Maps as either within the 100 year or 1 percent chance flood zone and areas adjacent to the water that include steep slopes that are often prone to erosion and degradation. There are parts of the Bay of Green Bay that have coastal run-up zones. Flooding in those areas is described in the graphic below.



**Figure 19 Source: The City of Portsmouth**

## Estimation of Potential Losses

Coastal Flooding and Bluff Erosion. Coastal flooding and bluff erosion can cause significant financial losses to homes, business, government facilities, and public infrastructure. Estimating the potential losses would be nearly impossible due to the unpredictable nature of coastal flooding. To estimate the potential losses, Brown County utilized the FEMA “wave run-up zone” to identify areas where coastal flooding could occur. The primary coastal communities accounted for nearly 700 million dollars in value that can be impacted.

| Table 3.11: Estimate value in Coastal Flood Areas |                  |               |
|---------------------------------------------------|------------------|---------------|
| Municipality                                      | Parcels Impacted | Total Value*  |
| City of Green Bay                                 | 2725             | \$567,249,600 |
| Town of Green Bay                                 | 192              | \$52,827,100  |
| Town of Scott                                     | 306              | \$7,059,660   |
| Village of Howard                                 | 162              | \$16,713,600  |
| Village of Suamico                                | 414              | \$57,630,300  |
| Total                                             | 3799             | \$701,480,260 |

Source: Brown County Tax Records combined with GIS analysis of FEMA data.

Low Lake Levels. A 1,000-foot long vessel forfeits 270 tons of cargo for each one-inch reduction in draft. The loss of one foot of water means a typical 1,000-foot iron ore carrier would lose 3,240 tons of cargo. The ship would have to make 2.5 extra trips to make up the difference over the season, costing the shipping company tens of thousands of dollars (Lake Carrier’s Association/Army Corps of Engineers, 1999).

## Relationship to Other Hazards - Cumulative Effects

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Flooding. Flooding of tributaries to Green Bay/Lake Michigan could exacerbate flooding and coastal erosion in those areas.

Drought. Drought conditions over much of the Great Lakes area could lower lake levels decreasing the ability to ship materials through the port of Green Bay.

## Plans and Programs

Shoreland Management Program: The shoreland program is a partnership between state and local government that requires the adoption of county shoreland zoning ordinances to regulate development near navigable lakes and streams in compliance with statewide minimum standards.

Brown County Subdivision Ordinance: The Brown County Subdivision Ordinance regulates land divisions throughout the county with the exception of the City of Green Bay and the City of De Pere, each of which have their own land division review. The Brown County Subdivision Ordinance incorporates the identification of natural resource features critical to the protection of water quality. Development is prohibited within these natural resource features and their associated setbacks as identified by the Brown County Subdivision Ordinance.

Wisconsin Coastal Management Program (WCMP): WCMP oversees the management of the state's coastal resources and strives to maintain a balance between preservation and economic needs.

WCMP Grant Program: WCMP provides grants to encourage the management and protection of the state's coastal resources and increase public access to the Great Lakes.

NOAA Weather Radio Program: Brown County has a NOAA Weather Radio purchasing program in place that encourages and assists residents in acquiring weather radios.

### Gaps and Deficiencies

Development adjacent to water features like the Bay of Green Bay and many of the waterways that drain into it are under constant development pressure. The development adjacent to these water features are at an increased risk of flooding and where steep slopes are present, bank or bluff erosion.

Historical information on coastal hazards is not complete or easily available to emergency management planners in coastal communities.

Riprap is often viewed as an effective tool/solution to manage bluff erosion. However, riprap shifts due to the force of the water and can still be undermined if the water overtops the riprap or if the riprap is damaged and not repaired quickly.

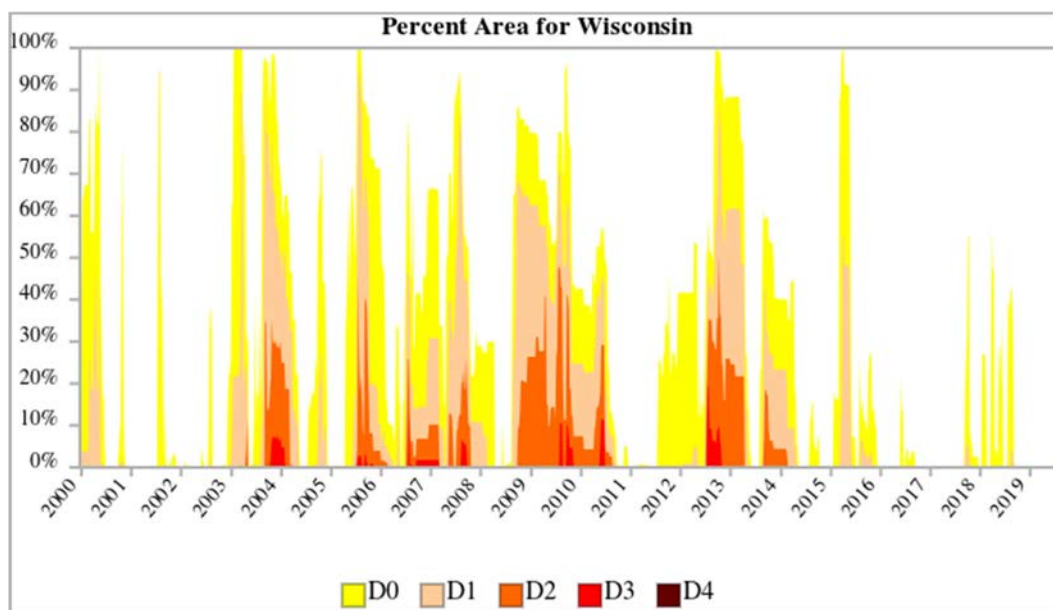
## Drought

Drought is a complex phenomenon which is difficult to monitor and define. It is a creeping phenomenon that slowly sneaks up and impacts many sectors of the economy, and operates on many different time scales. As a result, the climatological community has defined four types of drought: 1) meteorological drought, 2) hydrological drought, 3) agricultural drought, and 4) socioeconomic drought. Meteorological drought happens when dry weather patterns dominate an area. Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels, usually after many months of meteorological drought. Agricultural drought happens when crops become affected. And socioeconomic drought relates the supply and demand of various commodities to drought. Meteorological drought can begin and end rapidly, while hydrological drought takes much longer to develop and then recover.<sup>43</sup>

|                                                                                     |                                                                                                                                                                                                                         |                  |               |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|
|  | <b>D0 - Abnormally Dry</b> <ul style="list-style-type: none"> <li>Short-term dryness slowing planting, growth of crops</li> <li>Some lingering water deficits</li> <li>Pastures or crops not fully recovered</li> </ul> | 0.0%<br>of State | 0.0%<br>D0-D4 |
|  | <b>D1 - Moderate Drought</b> <ul style="list-style-type: none"> <li>Some damage to crops, pastures</li> <li>Some water shortages developing</li> <li>Voluntary water-use restrictions requested</li> </ul>              | 0.0%<br>of State | 0.0%<br>D1-D4 |
|  | <b>D2 - Severe Drought</b> <ul style="list-style-type: none"> <li>Crop or pasture loss likely</li> <li>Water shortages common</li> <li>Water restrictions imposed</li> </ul>                                            | 0.0%<br>of State | 0.0%<br>D2-D4 |
|  | <b>D3 - Extreme Drought</b> <ul style="list-style-type: none"> <li>Major crop/pasture losses</li> <li>Widespread water shortages or restrictions</li> </ul>                                                             | 0.0%<br>of State | 0.0%<br>D3-D4 |
|  | <b>D4 - Exceptional Drought</b> <ul style="list-style-type: none"> <li>Exceptional and widespread crop/pasture losses</li> <li>Shortages of water creating water emergencies</li> </ul>                                 | 0.0%<br>of State |               |

<sup>43</sup> NOAA: Definition of Drought - <https://www.ncdc.noaa.gov/monitoring-references/dyk/drought-definition>

Brown County has not experienced prolonged periods (lasting more than 2 months) without rainfall in the last 25 years. Brown County agriculture, the sector of the economy most susceptible to drought, has never experienced a total crop failure from drought. Some issues have arisen where private wells failed, requiring the affected parties to re-drill to reliable aquifers. To date, no other activities, areas, or infrastructure, including public water supply, have been affected by drought in the county.



Source: NIDIS, U.S. Drought Monitor

## History

Wisconsin is a state that is susceptible to drought. In 2000, the National Integrated Drought Information System (NIDIS) was created as a partnership between seven different federal agencies to better track and manage the impacts of drought. NIDIS collects drought information as it relates to the drought (above graph). Since NIDIS began collecting the data, Wisconsin has seen periods of drought as shown in the graph above, with the most intense event occurring in July of 2012 where 19.69% of the state reached level D3. The following is a list of the drought events recorded with NOAA's Storm Events Database.

### ***March 1, 1999***

It was a very dry month across northeast Wisconsin with numerous small grass fires. Many locations received less than a quarter inch of precipitation for the month. Green Bay not only had its driest March on record with 0.15 inch, but it was also the 6th driest month of all time. No measurable precipitation was recorded in Green Bay during the last 22 days of the month.

***July 19, 2005***

Below normal rainfall and temperatures that averaged about 5 degrees above normal for the month of July combined with below normal precipitation during the first half of the year to result in the development of drought conditions. Precipitation for the month of July was 1.98 inches below normal in Green Bay. The January through July 2005 precipitation deficit was 3.25 inches in Green Bay. The U.S. Drought Monitor began categorizing parts of east central Wisconsin as being in moderate drought (D1) on June 28, 2005, and by July 12, 2005 northeast, central, east central, and most of northeast Wisconsin had reached the moderate drought category. Central, east central, and much of northeast Wisconsin were upgraded to severe drought (D2) on July 19, 2005. Severe drought conditions remained for the rest of the month for most of the area.

***August 1, 2005***

Below normal rainfall in most areas and slightly above normal temperatures for the month of August allowed drought conditions to persist through at least the first half of the month. Precipitation for the month of August was 0.46 inch above normal in Green Bay. The January through August 2005 precipitation deficit was 2.79 inches in Green Bay. The U.S. Drought Monitor continued to categorize much of northeast and most of east central Wisconsin as being in severe drought (D2) since July. By the end of August the entire area was either in the abnormally dry (D0), or moderate drought category.

***March 1, 2013***

Despite another month of above normal precipitation across parts of Wisconsin, Brown County remained in the severe drought (D2) category throughout March 2013.

**Vulnerability**

According to NOAA records, from 1999 to 2019 four significant periods of drought affected Brown County. Drought tends to be a regional phenomenon in that it affects much of the northeastern part of Wisconsin for all of the occasions in which a drought event was reported for Brown County.

## **Impacts**

The following describes the various impacts that drought events have on the county.

### ***Critical Facilities***

There are few direct impacts on critical facilities because of drought conditions. However, droughts can trigger other natural and man-made hazards, such as wildfires and post-drought flooding, both of which can impact critical facilities.

### ***Public Health***

Drought conditions can directly affect human health. Lower levels of water in lakes and streams increase the concentration of pollutants and can lead to standing water. Dusty conditions and an increased risk of wildfires can affect those with chronic respiratory illness and can also increase risk of infection. Droughts can also pose a risk to people who get their water from a private well.<sup>44</sup>

### ***Safety***

Negative impacts on safety are similar to those imposed on public health.

### ***Infrastructure***

Droughts have the most impact on municipal water supplies. Droughts will likely cause a shortage of potable water. Additionally, other water reserves like shallow aquifers may dry up. In addition, water quality is generally an issue before and after a drought event, which places an additional burden on wastewater treatment facilities.

### ***Economic***

The State of Wisconsin is susceptible to the economic impacts of agricultural drought. Even small droughts of limited duration can significantly reduce crop growth and yields, which adversely affects farm income. Substantial drought events can lead to complete crop loss. During severe drought periods, farmers must often seek financial assistance from the government to supplement lost income.

Livestock can also be adversely affected by droughts. Lack of water can lead to animal deaths. In addition, as drought conditions are often accompanied by periods of prolonged sunshine and high temperatures, animals are at risk to overexposure and heatstroke. Death of livestock can also lead to substantial loss of income for farmers.

Drought can also affect local commercial and industrial businesses. During times of severe drought, limitations can be placed on water usage. These limitations could have a negative impact on businesses such as car washes and landscapers as their businesses rely heavily on water. Industries that utilize large amounts of water in processing materials could also face production declines.

## **Areas at Greatest Risk**

Droughts have no defined hazard area within Brown County and when a drought occurs it typically includes all of the county. Drought also tends to be a regional phenomenon in that it affects large areas at one time.

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<sup>44</sup> WI Department of Health Services, Drought and Your Health - <https://www.dhs.wisconsin.gov/climate/drought.htm>

### **Estimation of Potential Losses**

Agricultural crops are most vulnerable to losses from drought events. A “worst case scenario” would involve the total destruction of all 183,953 acres of agricultural lands in the county. In this “worst case scenario,” the total destruction of all crops would cause a loss of \$1,483,029,086.00, which is the estimated market value for farmland in Brown County at \$8,062<sup>45</sup> per acre.

### **Relationship to Other Hazards - Cumulative Effects**

Cumulative effects are the combinations of hazards that occur in relationship to another hazard.

Wildfires. Drought creates additional stress for vegetation and increases the risk of wildfires.

### **Plans and Programs**

NOAA Weather Radio Program. Brown County has a NOAA Weather Radio purchasing program in place that encourages and aids residents in acquiring weather radio.

### **Gaps and Deficiencies**

Water conservation provisions and use restrictions in times of drought are not included in county or city ordinances.

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## **MAN-MADE HAZARD PROFILES**

Hazard profiles are intended to describe the frequency, severity, and probability of future man-made hazards that could impact Brown County. These hazard profiles attempt to describe the cause and characteristics of man-made hazards, and how they could impact the population, infrastructure, and environment of the county. The potential risks are evaluated to determine their likelihood of occurrence or reoccurrence, and to gauge potential impacts to people and property. Hazard probabilities are represented as high, moderate, and low based on consensus of the steering committee after considering the anticipated economic, social, and environmental impact of each hazard.

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<sup>45</sup> AcreValue - <https://www.acrevalue.com/map/WI/Brown/?lat=44.460518&lng=-88.007465&zoom=10>



# **Fire**

## **Description of Hazard**

Structure fires are far more common than wildland fires in Brown County. Structure fires typically occur through accidental, natural, or criminal activity. Accidental fire causes include unattended cooking, improper use of or defective heating appliances, improper use of candles, the failure of electrical wiring, circuits, etc., and improper use of smoking materials, to name a few. Natural causes such as lightning strikes are also common.

Municipal fire departments are responsible for the prevention of and response to structural fires in Outagamie County. Municipal fire departments located throughout the county respond in accordance with established response procedures, while local zoning setback controls, building and fire prevention codes provide additional mitigation measures. For large fires, the responding departments will utilize the Mutual Aid Box Alarm System (MABAS) in obtaining additional resources from neighboring departments to assist with firefighting operations.



**House fire on Green Bay's east side**  
**Figure 20 Source: Green Bay Press Gazette**

## **History and Frequency**

There have been about 3200 structure fire calls in Brown County since 2015. National Fires and Losses Trends and Patterns of U.S. Fire Loss identified an estimated 1,345,500 fires in 2015, resulting in 3,280 civilian deaths, 15,700 civilian injuries, and \$14.3 billion in direct property loss. In terms of estimates of fires, fire deaths and fire injuries, the estimates are lower than they were 10 years ago. When USFA was established in 1974, annual fire deaths were estimated at 12,000. The goal was to reduce deaths by 50 percent within 25 years; that goal was met. By 2012, estimates of civilian fire deaths were at their lowest level (2,855). While the trend in fire deaths has generally leveled off, injuries and dollar loss has declined over the last 10 years.

Based on previous hazard occurrences as reported by the Brown County Dispatch, Brown County experiences an average of 530 structure fire calls every year.

## **Probability of Occurrence or Reoccurrence**

As noted in the previous Natural Hazards section, the probability of a wildland fire in Brown County is low to moderate and the likelihood that any wildland fire would be catastrophic is low.

However, the probability of a structural fire in the county is high.

## **Areas at Greatest Risk**

All developed areas are vulnerable to structure fires.



# Utility Failure

## Description of Hazard

A utility failure emergency is a disruption to the building services, usually defined as electrical power, water, natural gas and/or sewage that restricts the ability of people to safely occupy the facility. Electrical power or natural gas outages are often caused by a fuel shortage caused by an oil embargo, power failure, or natural disaster. Disruptions to the water and sewage systems are often the direct result of a natural disaster (e.g., flooding) or are indirect losses due to another failure (e.g., a power outage disrupts the pumping of water and/or sewage).

## History and Frequency

Brown County has several short power outages (i.e., lasting less than six hours) per year but does not have a history of extended power outages. The possibility always exists that a man-made or natural disaster could affect the power system for an extended period of time.

A significant utility failure has been defined as an outage event lasting 24 hours or more or involving over 1,000 people. The local utility provider for most Brown County residents was able to identify significant storm dates and the total number of customers affected. The data has limitations however, and the number of Brown County residents impacted is undetermined. The following table describes the significant storms and their impacts from storms known to impact Brown County and the surrounding areas.

| Table 3.12: Storm Related Power Disruptions, WPS |                        |                    |                            |                |                            |
|--------------------------------------------------|------------------------|--------------------|----------------------------|----------------|----------------------------|
| Storm outages start time                         | Storm outages end time | Customers affected | Company regions affected   | Type of damage | Mutual assistance received |
| <b>2015</b>                                      |                        |                    |                            |                |                            |
| April 6 @0300                                    | April 6 @1700          | 13,975             |                            |                |                            |
| June 22 @ 1100                                   | June 22 @ 2200         | 26,299             |                            |                |                            |
| August 2 @0700                                   | August 3 @0000         | 37,766             |                            |                |                            |
| August 14 @1400                                  | August 14 @2200        | 10,760             |                            |                |                            |
| November 18 @0300                                | November 19 @2200      | 30,330             |                            |                |                            |
| December 23 @2300                                | December 24 @1600      | 17,924             |                            |                |                            |
| <b>2016</b>                                      |                        |                    |                            |                |                            |
| June 5 @ 1400                                    | June 6 @ 900           | 27,948             | WPS-Eastern<br>WPS-Western | Thunderstorm   | Yes                        |
| June 10 @ 1600                                   | June 13 @ 0800         | 67,133             | All                        | Thunderstorm   | Yes                        |
| June 25 @ 1600                                   | June 26 @ 0900         | 26,721             | WPS-Northern               | Thunderstorm   |                            |
| July 12 @ 0100                                   | July 12 @ 1600         | 18,653             | WPS-Northern               | Thunderstorm   | Yes                        |
| July 21 @0500                                    | July 21 @ 1700         | 32,551             | All                        | Thunderstorm   |                            |
| Table Continued on the next page                 |                        |                    |                            |                |                            |

| Storm outages start time | Storm outages end time | Customers affected | Company regions affected              | Type of damage                      | Mutual assistance received |
|--------------------------|------------------------|--------------------|---------------------------------------|-------------------------------------|----------------------------|
| <b>2016 Continued</b>    |                        |                    |                                       |                                     |                            |
| November 18 @1400        | November 19 @1400      | 14,556             | All                                   | Wind storm                          | Yes                        |
| December 25 @1700        | December 26 @2000      | 25,211             | All                                   | Wind storm                          | Yes                        |
| <b>2017</b>              |                        |                    |                                       |                                     |                            |
| March 6 @ 2200           | March 9 @ 1600         | 98,622             | WPS-Northern<br>WPS-Western           | Wind storm                          | Yes                        |
| April 9 @ 2200           | April 10 @2300         | 17,016             | WPS-Northern<br>WPS-Western           | Thunderstorm and tornado            | Yes                        |
| April 11 @0100           | April 11 @2000         | 11,370             | WPS-Northern<br>WPS-Western           | Snow storm                          | Yes                        |
| May 17 @1400             | May 18 @1700           | 38,410             | WPS-Northern<br>WPS-Western           | Thunderstorm                        | Yes                        |
| June 10 @1000            | June 10 @2200          | 14,604             | WPS-Northern<br>WPS-Western           | Wind storm                          | No                         |
| June 11 @1000            | June 14 @1400          | 121,260            | WPS-Northern<br>WPS-Western           | Thunderstorm                        | Yes                        |
| June 14 @1400            | June 15 @2100          | 30,490             | All                                   | Thunderstorm                        | Yes                        |
| December 4 @2100         | December 5 @1800       | 17,651             | All                                   | Wind storm                          |                            |
| <b>2018</b>              |                        |                    |                                       |                                     |                            |
| April 13 @ 2100          | April 15 @ 1500        | 13,110             | WPS-Eastern<br>WPS-Western            | Wind storm/<br>blizzard             | Yes                        |
| April 17 @ 1700          | April 18 @ 1400        | 14,604             | All                                   | Thunderstorm                        | No                         |
| August 27 @ 1900         | August 28 @ 1500       | 16,532             | All                                   | Thunderstorm                        | Yes                        |
| September 20 @ 2000      | September 21 @ 2100    | 22,833             | All                                   | Thunderstorm                        | Yes                        |
| October 3 @ 1500         | October 4 @ 1000       | 13,407             | All                                   | Thunderstorm                        | No                         |
| <b>2019</b>              |                        |                    |                                       |                                     |                            |
| February 12 @ 200        | February 13 @ 1900     | 15,395             | WPS-North<br>Central                  | Snow storm                          | Yes                        |
| February 23 @ 2300       | February 24 @ 2300     | 34,097             | All                                   | Snow storm                          | Yes                        |
| May 22 @ 200             | May 22 @ 2300          | 50,097             | WPS-North<br>Central<br>WPS-Northwest | Wind storm                          | Yes                        |
| July 19 @1900            | July 26 @2300          | 170,046            | All                                   | Thunderstorms,<br>tornados, derecho | Yes                        |
| August 7 @1400           | August 7 @2300         | 21,242             | All                                   | Thunderstorms                       |                            |
| November 27 @0100        | November 29 @1800      | 50,355             | All                                   | Snow storm, wind storm              | Yes                        |
| December 1 @0300         | December 1 @2200       | 33,828             | All                                   | Snow storm, wind storm              | Yes                        |

Source: WPS

### Probability of Occurrence or Reoccurrence

In general, Brown County has a medium likelihood of utility failures occurring due to the age of some of the infrastructure and the extreme weather conditions experienced in Wisconsin. Utility failures present a high risk of damage, death, or injury due to a loss.

### **Areas at Greatest Risk**

Power outages are more likely to occur and the severity is greater in areas of higher human population (i.e., urban areas) but the loss of power to rural customers, while affecting fewer people, generally lasts longer and can be as life-threatening, especially if a person with special needs (e.g., the elderly, the young, those on special medical equipment) is involved.

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## **Hazardous Materials Spill**

### **Description of Hazard**

Brown County is concerned about the possibility of hazardous materials incidents from:

- Fixed Facility - A facility containing hazardous substances when either accidental or intentionally released cause concern for life safety and environment containment.
- Pipeline - Accidental or intentional release of natural gas from the pipeline resulting in a potential evacuation or explosion.
- Railway - Train derailment, train/vehicle collision or intentional release causing ruptured rail cars to release hazardous substances resulting in life safety and environmental concerns.
- Roadway - Vehicle accident involving hazardous chemicals in transport on the roadway resulting in life safety and environmental concerns.

Each Wisconsin County is designated as an emergency planning district and has a Local Emergency Planning Committee (LEPC) to administer the local hazardous chemical planning program under the Emergency Planning and Community Right-To Know Act, also known as SARA Title III.

The Brown County LEPC was established in 1986 to comply with the Emergency Planning Community Right to Know Act. The community right-to-know Act created new rights for members of the public and local governments to obtain information concerning potential threats in their neighborhoods involving hazardous substances.

### **History and Frequency**

Thorough communication and preparedness (i.e., planning, training and exercising) measures between stakeholders help to ensure that significant hazardous materials events are not common, but these incidents can and do occur (about 25 since 2015). Based on previous hazard occurrences as reported by Brown County dispatch, Brown County experiences approximately 4 hazardous materials incidents every year.

### **Probability of Occurrence or Reoccurrence**

In general, Brown County has a medium likelihood of hazardous materials spills occurring. Hazardous material spills present a high risk of damage, death, or injury due to the variety of materials and the way in which they can spread and impact people.

### Areas at Greatest Risk

Hazardous materials incidents have the potential to impact large parts of the county because roadways, pipelines, and railway corridors run through residential, agricultural, and commercial neighborhoods in the county. Areas of greatest risk are those areas where chemicals are stored on site or corridors through which chemicals are frequently transported. Facilities subject to SARA Title III, while concentrated in industrial areas, can also be found in business, residential, and agricultural areas.

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## Manure Spill

### Description of Hazard

A manure spill incident is a release of manure from a holding tank or pit, or from a truck while in transport to a field. Such incidents have the potential to contaminate groundwater and/or surface water. Contaminated groundwater can impact municipal and private drinking water wells.

Liquid manure stored in holding tanks or pits has a low solids content, giving it a consistency and therefore physical properties similar to that of water. As a result, liquid manure, when released in a spill, flows in the same manner as water, thereby placing surface water and conduits to groundwater at risk of contamination.



**Figure 21 Source: Minnesota Trout Forums**

According to the Wisconsin Department of Agriculture, Trade and Consumer Protection, the decomposition of manure in storage or handling systems generates gases, some of which are toxic, explosive and oxygen displacing. The most hazardous gases are hydrogen sulfide (H<sub>2</sub>S), ammonia (NH<sub>3</sub>), methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>). Dangerous levels of these gases can accumulate in and around manure management systems particularly when manure is being agitated or otherwise disturbed.

- Hydrogen sulfide levels may increase a thousand-fold during agitation. This extremely toxic gas is the most dangerous manure gas as it is colorless, heavier than air and may cause death in seconds at high concentrations. While hydrogen sulfide is commonly known for its rotten egg odor, the odor is not detectable by the human sense of smell at higher concentrations. It affects the eyes and the respiratory and central nervous systems.
- Ammonia is lighter than air, has a sharp pungent odor and at higher concentrations, it may cause permanent lung damage. Ammonia causes irritation of the eyes and respiratory tract and it is generally found in higher concentrations in poultry manure.
- Methane is highly flammable. A spark from equipment, open flames, smoking materials, faulty wiring or welding could provide an ignition source for an explosion or fire. Methane is odorless, colorless and lighter than air. By displacing air at high

concentrations, methane which is itself non-toxic, can become an asphyxiant and will cause rapid breathing, dizziness and fatigue.

- Carbon dioxide is heavier than air and will displace oxygen. Carbon dioxide exposure may result in headaches and dizziness. Death by asphyxiation is possible at high concentrations.

### **History and Frequency**

Small manure spills occur frequently and, while they can be a contributing factor to environmental degradation, they rarely immediately affect the health and safety of the general population. Based on previous hazard occurrences as reported by Brown County Land and Water Conservation, Brown County experiences between three and five manure spill incidents every year.

### **Probability of Occurrence or Reoccurrence**

Large spills of the type that are immediately and directly dangerous are rare. However, factors like increased precipitation and the concentration of Concentrated Animal Feed Operations (CAFOs) can increase the probability of a spill occurring.

Brown County has a moderately low probability of experiencing a large spill incident, but the risk to the county is moderate if it occurs.

### **Areas at Greatest Risk**

Wisconsin, like many places in the United States, is seeing the closure of traditional, small family farms and is seeing more industrial, large-scale farms opening and operating. These businesses, due to the scale of their operations, are much more likely to see the large manure quantities that require transport and storage facilities that may fail. Brown County expects, like the rest of the state, to see industrial farming increase in the future.

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## **Public Health Incidents**

### **Description of Hazard**

Public health is a community-based approach to preventing disease, prolonging life and promoting health. Public health emergencies include both those events for which public health is the primary focus (e.g., pandemic influenza) as well as those for which public health is one of many concerns (e.g., a bioterrorism incident, disease concerns related to a flood, or mental health care after a mass casualty incident).

Brown County is concerned about the possibility of loss of life due to public health incidents such as infectious disease, poor air quality and contaminated water supply. The goals of a response to pandemic influenza or another communicable disease outbreak are to limit the spread of a pandemic, treat (as possible) the disease, minimize suffering and death and sustain infrastructure and lessen the impact on the economy and the functioning of society. Brown County and other local public health departments, along with state and federal partners, work hard to prepare for the dangers of communicable diseases with comprehensive and integrated planning, training and exercises.

### **History and Frequency**

There has been 1 significant public health incident in Brown County since 2015 that has required activation of the county Emergency Operations Center (EOC). In addition to activating the county EOC, Public Health Emergency Plans have been activated to respond to events for communicable diseases (2019 Measles in Wisconsin), vaccine preventable diseases, natural disasters, contaminated water, and biological threats.

### **Probability of Occurrence or Reoccurrence**

As much of the world is experiencing, we are all at risk, but the level of risk depends largely on the amount of preventative measures the community has or is taking in relationship to health threats. Brown County has a moderate risk of public health incidents with a varying risk of death or injury if an incident does occur based on the type and timing of incident/threat, health status of the individuals and prophylaxis available for the threat.

### **Areas at Greatest Risk**

Public health incidents can impact anywhere in the county and no area is at a greater risk than another. However, some public health incidents may be exacerbated with a greater level of human-to-human contact, which occurs in more populous areas of the county.

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## **Mass Casualty**

### **Description of Hazard**

A mass casualty incident is any incident in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. Mass casualty incidents can quickly overwhelm local municipalities' capabilities and resources for responding. The definition of a mass casualty incident is determined by the responding agency, not by a hard number of victims because a mass casualty incident is one that exceeds the responding jurisdiction's ability and resources to manage it.

### **History and Frequency**

There have been no mass casualty incidents in Brown County since 2015.

Although there have been no mass casualty incidents in the county, in preparation for potential occurrences, emergency management and emergency response departments have undertaken training specific to mass casualty incidents.

### **Probability of Occurrence or Reoccurrence**

Among other potential mass casualty events, the increase in random acts of violence around the U.S. certainly cannot be ignored. Determining the probability of a mass casualty event is impossible. However, due to the recent trends an incident could occur Brown County has a low risk of a mass casualty incident.

### **Areas at Greatest Risk**

Mass casualty incidents can impact anywhere in the county and no area is at a greater risk than another.

## **Aircraft Incidents**

### **Description of Hazard**

The Austin Straubel International Airport (GRB), is located along STH 172 just west of I41 in the Villages of Ashwaubenon and Hobart. It is the fourth busiest commercial airport in Wisconsin based on 2016 FAA records for enplanements.

An aircraft incident is an occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight until all such persons have disembarked, where a person is fatally or seriously injured, the aircraft sustains damage or structural failure or the aircraft is missing or is completely inaccessible.

### **History and Frequency**

Aircraft accidents are very rare and may be caused by bad weather, mechanical failure, human error, or an intentional act of terrorism. There have been no significant aircraft incidents in Brown County since 2015.

### **Probability of Occurrence or Reoccurrence**

Brown County has a low risk of an aircraft incident.

### **Areas at Greatest Risk**

Austin Straubel International Airport, the adjacent grounds, and flight paths, are areas of greatest risk for aircraft incidents in Brown County.

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## **Terrorism/International Acts of Violence**

### **Description of Hazard**

Terrorism or Intentional Acts of Violence are defined as the use of violence or the threat of violence to cause fear and intimidation to the community and/or government. This can be accomplished using explosives, weapons, biological agents, cyber-attacks, food supply tampering, and other means.

### **History and Frequency**

Intentional acts of violence have become very common, but, for the purposes of this plan we are discussing those that are large-scale and draw a large amount of response resources and/or attention. The difference between these events and terrorism is that they may be personal in nature (e.g., school or workplace violence) versus having a political goal, as is seen in terrorism. Significant terrorism and intentional acts of violence incidents in Brown County are rare. There have been no legitimate terrorism/intentional acts of violence incidents in Brown County.

### **Probability of Occurrence or Reoccurrence**

Brown County residents are at a low risk of terrorism/intentional acts of violence incidents.

### **Areas at Greatest Risk**

Terrorism/intentional acts of violence incidents can impact anywhere in the county and no area is at a greater risk than another.

## **NATURAL HAZARDS AND CLIMATE CHANGE**

Hazard profiles provide information and predictions based on past hazard occurrence data. Climate change may make past trends unreliable sources for predicting future impacts, frequency, probability, and vulnerabilities. Climate change has and will continue to impact average annual temperatures causing increased frequency in heat waves; increased frequency and intensity of severe rainstorms; shorter, warmer winters with decreased lake ice cover; increased drought frequency, and other impacts. Based on the best information available, over the next 30-50 years, Brown County's climate will begin to resemble that of current Toledo, Ohio.<sup>46</sup>

Analysis of historical data, combined with climate model downscaling, suggests a trend towards wetter conditions and more intense rainfall. Climate models also suggest that increased winter snowpack, and late winter rainfall, may result in high regional groundwater tables and lake levels, and saturated soil conditions.<sup>47</sup>

### **Vulnerabilities**

Local and state government and private sector developers make significant investments in long-lived infrastructure that controls or is affected by storm water runoff from large rainfalls. Likewise, municipal wastewater treatment plant operators make substantial long-term investments in their system capacity that anticipates development, but not increased storm water inflow and groundwater infiltration. This infrastructure is designed using standards based on rainfall data from the latter half of the 20th century. By having assumed "stationarity" of climate in the design of our infrastructure, Brown County is now vulnerable to the potential impacts from more intense rainfall events and elevated groundwater.

In summary, our previous investment in public safety and environmental protection is at risk of being overwhelmed by precipitation impacts that are beyond those anticipated by past infrastructure designers and water resource managers.<sup>48</sup>

### **Potential Impacts**

The WICCI working groups have investigated how potential changes in Wisconsin's climate might impact natural and human systems around the state. Some potential impacts of concern for Brown County with regard to storm water management and large rainfalls include:

- Conveyance systems filled beyond capacity cause flooded homes and urban streets;
- Roadways and bridges are washed-out or become impassable;
- Groundwater flooding of property and cropland increases;



<sup>46</sup> Wisconsin Initiative on Climate Change Impacts, Interactive Mapping Tool, <http://www.wicci.wisc.edu/climate-map.php>.

<sup>47</sup> Wisconsin Initiative on Climate Change Impacts, Stormwater Working Group, <http://www.wicci.wisc.edu/stormwater-working-group.php#2>.

<sup>48</sup> Ibid



- Rural residential wellheads are contaminated by flood waters and high groundwater;
- Impoundments and storm water detention ponds fail more frequently;
- Raingardens and other bio-filtration best management practices (BMPs) fail due to saturated soil conditions;
- Increased erosion of slopes by intense rainfall events leads to high sediment and phosphorus loading to surface waters;
- Runoff of manure from fields, and accompanying fish kills, are more frequent;
- Storm water inflow and groundwater infiltration to sanitary sewers, results in untreated municipal wastewater flowing into lakes and streams.

Other potential impacts of concern for Brown County include:

- Warmer nighttime temperatures might lead to more extreme heat waves, increasing the risk for heat stroke in some populations. At the same time, observed and projected trends show fewer cold temperature extremes, which may mean reduced health risks due to exposure in the winters.
- Air pollution, increasing temperatures, changing circulation patterns, and other processes combine to increase ground-level ozone, which affects respiratory health.
- Heavy rains and flooding can overwhelm sewer and stormwater systems, leading to a rise in water pollution and the risk of waterborne diseases such as cryptosporidium and giardia.
- Changes in temperatures and precipitation could result in an increase in disease carrying insects, including ticks and mosquitoes. This means people may be at a greater risk for contracting vector-borne diseases, such as Lyme disease, West Nile encephalitis, and Zika virus.
- Changes in temperature and precipitation could affect growing seasons, crop yields, weed and pest infestations, and dairy productivity.

### **Solutions/Adaptations**

Although the impacts of climate change are already being seen in Wisconsin, there are things Brown County policymakers, business leaders, and residents can do to help reduce potential impacts from climate change. The development of climate change mitigation programs can help decrease the impacts from climate change while advancing other community priorities. Examples include implementing cost-effective clean energy policies and programs, and reducing carbon emissions. Climate change and clean energy policies and programs can reduce greenhouse gas emissions, lower energy costs, improve air quality and public health, and help achieve economic development goals. The following are some solutions or adaptations to climate change impacts that could be employed in Brown County. Many of the identified solutions/ adaptations were developed by the WICCI working groups.

- Strengthen public health response and warning systems.
- Increase energy efficiency.
- Incorporate renewable energy sources such as wind, solar, geothermal, and biomass.
- Increase vehicle fuel economy.
- Invest in clean transportation choices.
- Encourage bicycle and pedestrian transportation and expand availability options.
- Implement beach improvement projects that reduce stormwater runoff to beaches and nearshore waters and integrate natural infiltration features such as vegetated swales.
- Improve or restore natural shore protection features.
- Protect floodplains, wetlands, and other natural “green infrastructure” features that can hold flood waters and enable water infiltration.
- Implement development setbacks based on defensible scientific data.
- Relocate structures that are threatened by flooding or erosion.
- Provide education for developers, bankers, and insurance agents.
- Ongoing comprehensive planning and improved implementation of existing plans.
- Use best management practices for site design to control stormwater runoff.
- Develop plans for bluff stability enhancement, e.g. slow erosion by planting vegetation on bluffs.
- Design port and harbor infrastructure that can accommodate increased variability in lake levels, e.g. harbor slips that float.
- Use a risk/consequence approach to evaluating and modifying existing infrastructure to accommodate observed and predicted changes in climate.
- Develop and evaluate alternative tools and strategies for the design of stormwater-related infrastructure, using a collaborative process that includes climate scientists, water resource managers, design engineers, and regulators, and members of relevant business communities.

## **VULNERABILITIES**

### **Vulnerable Critical Facilities by Municipality**

The Brown County Hazard Mitigation Plan Steering Committee determined which critical facilities and infrastructure were to be addressed within this hazard's mitigation plan. Based on this list, Brown County worked with each individual community and or Non-Governmental Organizations to identify and map critical facilities. The Steering Committee and the Individuals that provided the critical facility data reviewed and confirmed the accuracy of the information. Table 3.13 summarizes the critical facilities and infrastructure by municipality. A detailed list of critical facilities and infrastructure for each community is provided in Appendix H of this plan.

**Table 3.13: Critical Facilities and Infrastructure, Brown County, Wisconsin**

| <b><u>Location</u></b> | <b><u>Number of Critical Facilities</u></b> |
|------------------------|---------------------------------------------|
| <b>Cities</b>          |                                             |
| Green Bay              | 321                                         |
| De Pere                | 68                                          |
| <b>Villages</b>        |                                             |
| Allouez                | 42                                          |
| Ashwaubenon            | 103                                         |
| Bellevue               | 94                                          |
| Denmark                | 23                                          |
| Hobart                 | 55                                          |
| Howard                 | 130                                         |
| Pulaski (part)         | 20                                          |
| Suamico                | 46                                          |
| Wrightstown            | 20                                          |
| <b>Towns</b>           |                                             |
| Eaton                  | 8                                           |
| Glenmore               | 14                                          |
| Green Bay              | 17                                          |
| Holland                | 22                                          |
| Humboldt               | 4                                           |
| Lawrence               | 41                                          |
| Ledgeview              | 43                                          |
| Morrison               | 22                                          |
| New Denmark            | 34                                          |
| Pittsfield             | 30                                          |
| Rockland               | 12                                          |
| Scott                  | 19                                          |
| Wrightstown            | 32                                          |
| <b>TOTAL</b>           | <b>1223</b>                                 |

Source: Brown County Hazard Mitigation Plan Steering Committee. Brown County Planning Commission. Brown County Land Information Office

## County Gaps and Deficiencies

- Repetitive loss properties remain an issue in the Village of Ashwaubenon, Village of Howard, Village of Suamico, and the City of Green Bay. As state and federal funds become available, Brown County and the individual municipalities will work with willing sellers to purchase floodplain structures.
- A significant number of homes in the county lack basements that would provide shelter in the event of a tornado or damaging winds from a severe thunderstorm. Moreover, in many of the nursing homes, residents are moved to an interior hall away from windows in the event of a violent storm.
- Local radio and television stations do provide warnings but are effective only if tuned to one of the local stations.
- Most power lines in the county are above ground and subject to damage from wind and falling tree limbs. Many communities have requirements to manage trees near power lines.
- There is a constant need to improve/replace defective storm water facilities to prevent infrastructure damage.
- Some communities in Brown County may need to incorporate a storm drain cleaning program.
- Not all school districts have a transportation manager providing information on current weather and road conditions.
- Residents that have had their heat disconnected prior to the heating moratorium beginning on November 1 must make arrangements with their local utility to pay outstanding bills in order to have their service restored. If a consumer has not made arrangements to pay an outstanding bill, the utility is not required to provide heat until an agreed-upon payment schedule has been reached.
- Residents could be without needed heating during any out-of-season cold spells that occur between April 16 and October 31.
- Although Wisconsin requires utilities to provide residents heating between November 1 and April 15, there is no guarantee that residents will have access to cooling during times of extreme heat.
- Cooling systems are lacking in many elderly housing developments.
- Fog warning signs may be ineffective due to lack of visibility.
- Many of the dams in Wisconsin were built in the late 1800s and early 1900s. Over time, water pressure and weathering will slowly break down a dam. Dams need constant maintenance and repairs. If dams are allowed to naturally degrade, they have a greater risk for problems such as sudden breaks during flood conditions.
- Development continues very near the Green Bay/Lake Michigan coastline putting additional homes, business, and infrastructure at risk to coastal hazards.

- Riprap to manage bluff erosion shifts the eroding force of the water from the riprapped area to the coastal areas lacking the bluff reinforcement.
- Water conservation provisions and use restrictions in times of drought are not included in county or city ordinances for those water users that rely on groundwater.

## **SUPPORTING OPERATIONS PLANS AND DOCUMENTS**

### **Plans**

### **Agency**

|                                                     |                                                                |
|-----------------------------------------------------|----------------------------------------------------------------|
| County Emergency Operations Plan                    | Brown County Emergency Management                              |
| County Disaster Plan                                | Brown County Emergency Management                              |
| County Hazard Analysis                              | Brown County Emergency Management                              |
| County Hazardous (Hazmat) Strategic Plan            | Brown County Emergency Management                              |
| County Mass Casualty Plan                           | Brown County Emergency Management                              |
| Emergency Action Plan-Lamers Dam                    | Village of Ashwaubenon                                         |
| Emergency Operations Plans                          | City of Green Bay, City of De Pere, and Village of Ashwaubenon |
| Emergency Operations Plans                          | Brown County School Districts                                  |
| Emergency Operations Plan                           | University of Wisconsin-Green Bay                              |
| Emergency Operations Plan                           | St. Norbert College                                            |
| Emergency Operations Plan                           | Oneida Nation                                                  |
| Emergency Operations Plan                           | Bellin Health                                                  |
| Emergency Operations Plan                           | Aurora Baycare                                                 |
| Emergency Operations Plan                           | St. Vincent Hospital                                           |
| Emergency Operations Plan                           | St. Mary's Hospital                                            |
| Emergency Response Plan                             | Austin Straubel International Airport                          |
| Emergency Response Plan                             | Lambeau Field                                                  |
| Green Bay Correctional Institution Disturbance Plan |                                                                |



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.4**

Consideration with possible action on a request by Ald. Lefebvre to look at varying aspects of Green Bay's license alcohol establishments with a discuss on a moratorium.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

- I. 2.3.2021 Communication

## Jaime Fuge

---

**From:** District Six  
**Sent:** Tuesday, February 2, 2021 10:38 PM  
**To:** Jaime Fuge  
**Subject:** RE: Communications

My communications ---- Protection & Policy -- To look at varying aspects of Green Bay's license alcohol establishments with a discuss on a moratorium.

---- Arts Commission -- Request that the Arts Commission involve the neighborhoods in the selection of what art will be placed in their neighborhood in the rotating art program.

Alder Lefebvre

---

**From:** Jaime Fuge [Jaime.Fuge@greenbaywi.gov]  
**Sent:** Tuesday, February 02, 2021 10:10 PM  
**To:** District Six; District Twelve  
**Subject:** Communications

Good Evening,

Please send your communications to me when you have an opportunity.

Thank you,  
Jaime



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.5**

A request by Ald. Wery to receive update, with possible action, on additional changes to the massage spa ordinance.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

I. ALD.WERY-PROTECTION&POLICY



## Jaime Fuge

---

**From:** Celestine Jeffreys  
**Sent:** Tuesday, February 2, 2021 7:51 PM  
**To:** Jaime Fuge  
**Subject:** Fwd: Communication

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

For next agenda.

Sent from my Verizon, Samsung Galaxy smartphone  
Get [Outlook for Android](#)

---

**From:** Celestine Jeffreys <Celestine.Jeffreys@greenbaywi.gov>  
**Sent:** Tuesday, February 2, 2021 7:50:39 PM  
**To:** Chris Wery <chriswery@att.net>  
**Subject:** Re: Communication

Thank you alder it will be on the next agenda.

Sent from my Verizon, Samsung Galaxy smartphone  
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---

**From:** Chris Wery <chriswery@att.net>  
**Sent:** Tuesday, February 2, 2021 6:01:54 PM  
**To:** Celestine Jeffreys <Celestine.Jeffreys@greenbaywi.gov>  
**Subject:** Communication

To: Protection and Policy

Re: Receive update, with possible action, on additional changes to the massage spa ordinance.

Alderman Chris Wery  
920-490-9282  
chriswery@att.net  
[Facebook: Alderman Chris Wery, District 8 City of Green Bay](#)



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # E.6**

A request by Ald. Brunette for discussion with possible action on forwarding the Face Covering Ordinance to the Brown County Health Department for review.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

- I. brunettecommunication

## Jaime Fuge

---

**From:** District Twelve  
**Sent:** Wednesday, February 3, 2021 9:37 AM  
**To:** Jaime Fuge  
**Subject:** RE: Communications

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

P&P: For discussion with possible action on forwarding the Face Covering Ordinance to the Brown County Health Department for review.

Jesse

---

**From:** Jaime Fuge [Jaime.Fuge@greenbaywi.gov]  
**Sent:** Tuesday, February 02, 2021 10:10 PM  
**To:** District Six; District Twelve  
**Subject:** Communications

Good Evening,

Please send your communications to me when you have an opportunity.

Thank you,  
Jaime



Report to the  
Protection and Policy Committee  
of the City of Green Bay

**MEETING DATE**

February 8, 2021

**PREPARED BY**

**AGENDA ITEM # F.I**

The Liquor Violation Report for February 8, 2021.

**BACKGROUND**

**RECOMMENDATION**

**FISCAL IMPACT**

**ATTACHMENTS**

1. Report February 8 2021
2. 20LiqVio
3. 19LiqVio