2040 Brown County Urban Service Area Water Quality Plan

Approved - Brown County Planning Commission – February 1, 2023

Approved – Wisconsin Department of Natural Resources

2040

Brown County Urban Service Area

Water Quality Plan

and Amendment Process Update

Brown County Planning Commission
Planning and Land Services Department
305 E. Walnut Street, Room 320
Green Bay, WI 54301

Adopted by BCPC Board of Directors: February 1, 2023

Approved by WDNR: _____

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Chapter 1: Plan Overview

Introduction

This areawide water quality urban service plan replaces the *2040 Brown County Sewage Plan,* which was completed, approved, and adopted in 2015.

Areawide water quality urban service plans are a formal element of state areawide water quality management plans and are developed to create a logical structure for wastewater treatment on a metropolitan area level. The sewer service area planning process is designed to anticipate a community's future wastewater treatment needs and helps protect communities from adverse water quality impacts by developing cost effective and environmentally sound 20 year sewerage system growth plans.

The federal Clean Water Act of 1972 required states to develop comprehensive areawide water quality management plans addressing water quality problems and is the federal government's primary law for protecting the nation's waters. To meet the federal law, the State of Wisconsin established a water quality management planning process, which is guided by state Administrative Rule NR 121. Brown County's water quality planning history and additional information about the Clean Water Act will be found in Appendix B.

Urban service plans, and their subsequent updates, are prepared by local or regional planning agencies under contract with the Wisconsin Department of Natural Resources. This plan considers existing documents and other planning efforts, which will be referenced where applicable.

Purpose

A sewer service area plan identifies existing sewered areas as well as adjacent land most suitable for new development. Sewer service area planning is not intended to restrict a community's growth, obligate wastewater treatment plants to provide sewer throughout the planning boundary or affect community annexation policy. Planning accommodates future growth, while at the same time consolidating wetland, shoreland and floodplain protection programs within a community based plan for sewered development. Sewer service area plans incorporate and support local land use plans, employment trends and development trends. Land needs, commercial/industrial uses and residential uses are projected and accounted for in the process. Property owners and local governments within the sewer service area benefit from environmentally safe, low maintenance and cost effective wastewater treatment. Community sanitary districts benefit by identifying the wastewater system improvements necessary to meet future growth projections.

A properly prepared sewer service area plan is intended to ensure that the provision of public sanitary sewer service is accomplished in a cost effective and environmentally sound manner, in conformance with local, county, regional, state, and federal plans, rules, and regulations.

The benefits of sewer service area planning are numerous and include, but are not limited to:

- Identifying the wastewater collection and treatment needs of local communities and regions.
- Providing efficient and environmentally sound sewage collection and treatment systems.
- Identifying potential onsite sewage disposal problem areas.
- Protecting lakes, streams, wetlands, and groundwater sources from potential pollution associated with sewered development.

- Providing the state and local communities a way to plan for future growth and development rather than reacting to it and the increased demands for wastewater treatment after the fact.

Review Authority

The legal authority for sewer service area planning is derived from federal and state water pollution control legislation. Brown County is a governor designated complex growth area, and the Brown County Planning Commission is a contract agency with the Wisconsin DNR for the Fox Valley Water Quality Planning Area. Through this arrangement, Brown County has been contracted by the DNR to review the following:

- Wastewater Facility Plans
- Sanitary Sewer Extensions (Water Quality Management letters)
- Large Private Onsite Wastewater Treatment Systems
- Area Wide Water Quality Management Reviews
- Sewer Service Area Amendments
- Environmentally Sensitive Area Amendments
- Water Quality related technical assistance, information, and education
- Subdivision erosion control and storm water management plans
- Certified Survey Map erosion control and storm water management plans
- Sewer Service Area Amendment erosion control and storm water management plans
- Environmentally Sensitive Area Amendment erosion control and storm water management plans
- Sewer Extension Plans and pre construction conferences related to erosion control and storm water management facilities
- Onsite inspections, education, and monitoring related to erosion control and storm water management

Plan Goals and Objectives

The Brown County Urban Service Area Water Quality Plan has been developed in coordination with the comprehensive plans for the municipalities with sewer service in Brown County. To complement that, the following goals and objectives are intended to help guide the plan update, and to provide clarification when questions arise once the plan has been approved and is being implemented.

Goals represent common community ideals and provide a desired future vision. Objectives are specific markers in pursuit of a given goal and help determine the progress of working towards that goal. Revisiting the objectives over time helps determine how well the plan has met its goals, and/or where there are opportunities for improvement. The corresponding policies are the specific measures to follow to realize the plan's objectives and ultimately its goals. When questions arise on how to implement the plan, the policies should help guide the conversation and resulting decision making.

The following goals, objectives, and policies were developed through the previous updates of the Brown County Urban Service Area Water Quality Plan (formerly known as the Brown County Sewage Plan) and have been revised in this plan for clarity and to better align with the Areawide Water Quality Management Plan requirements in Wisconsin Administrative Code NR 121. Also, the goals and objectives have all been moved to this chapter to place them in one section and to establish them from the outset. Previously they were in the Sewer Service Areas, Environmentally Sensitive Areas, and Implementation chapters, respectively.

Sewer Service Area Goals and Objectives

Goal #1 – Sewer service areas in Brown County will be consistent with recommendations and future land use maps of local, regional, and state comprehensive plans.

Goal #1 Objectives

1. **Incorporate the findings and recommendations of local, regional, and state plans and planning efforts pertaining to land use, development, environmental protection, and the provision of sanitary sewer service into the sewer service area planning process to the greatest extent possible.**

Policies

a) Encourage consistency between the sewer service area planning process and local and regional comprehensive plans.

b) Encourage consistency between the sewer service area planning and facility planning processes.

c) Encourage consistency between the sewer service area planning process and local and regional conservation by design, traditional neighborhood design, concurrency of services, and urban service area recommendations.

Goal #2 – Sewer service areas in Brown County will be adequately planned for.

Goal #2 Objectives

1. **Incorporate current, projected, and planned rates of growth and development within delineated sewer service areas.**

Policies

a) Population growth and residential, commercial, and industrial projections that are reflective of actual growth and development rates shall be utilized in the sewer service area planning process.

b) Population growth and residential, commercial, and industrial development, wastewater flows and loadings, and sewer service areas shall be identified for a 20 year time span.

2. **Consider market factors and wastewater treatment facility capabilities in the determination of the size and location of sewer service areas.**

Policies

a) Sewer service areas located outside the planning area but tributary to sewage treatment facilities within the planning area shall abide by similar objectives, policies, standards, and criteria as those set forth in this plan.

b) The suitability and appropriateness of lands located within and adjacent to identified sewer service areas shall be identified for sewered development considering existing trends and information.

c) Sewer service area planning shall occur concurrently with and shall be consistent with facility planning.

d) Sewer service areas shall not be sized or located in a manner which would contribute to a violation of a wastewater treatment facility's permit conditions.

Goal #3 – Brown County will have cost-effective, environmentally-sound, and socially-responsible wastewater collection and treatment systems.

Goal #3 Objectives

1. **Exclude from sewer service areas the major areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints.**

Policies

a) Urban development should be directed to suitable land and discouraged on unsuitable land, such as floodplains, wetlands, areas of high groundwater, steep slopes, prime wildlife habitat, unique scientific areas, and areas of historical or archeological significance.

b) The development of environmentally sensitive areas should be discouraged.

c) Designs and plans for new development should preserve open spaces for public use, complement the existing landscape, and conserve energy and natural resources.

d) Areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints (environmentally sensitive areas) are to be included in the sewer service area but identified as unbuildable.

2. **Formulate sewerage assessment policies that encourage compact development and discourage inefficient and uneconomical unsewered growth and development.**

Policies

a) Sewer service extensions should be contiguous with existing sewer service areas.

b) Long extensions across undeveloped property should be avoided.

c) Future development within the planning area should be encouraged in infill areas able to provide the necessary urban services.
d) New urban development served by onsite sewage disposal systems should be discouraged in areas planned to receive sanitary sewer service during the life of this plan.
e) Urban sprawl in the form of unplanned development that is not contiguous, low density, scattered, and inefficiently served should be discouraged.

3. Stage the installation of sanitary sewer facilities.

Policies

a) Sewerage extensions and treatment facilities should be planned so that they can be installed incrementally as needed in a cost effective manner.
b) Facilities should be sized for design year population equivalents.
c) Long extensions across undeveloped property should be avoided.

4. Environmentally-sound onsite wastewater treatment disposal systems can be considered for proposed development where offsite wastewater treatment is not feasible.

Policies

a) Onsite sewage disposal problem areas shall be considered and incorporated into the sewer service area planning process.
b) When the proposed development conforms with local and area planning efforts, and offsite wastewater treatment is not feasible, implementing appropriate onsite sewage disposal systems should be encouraged.
c) Onsite sewage disposal treatment alternatives shall be considered and incorporated into the sewer service area planning process.
d) Development should only be permitted in those areas where safe onsite sewage disposal systems and private wells meeting current groundwater standards can be accommodated.

Environmentally Sensitive Area Goal and Objectives

Goal – Brown County will protect and enhance natural resources for the propagation of fish and aquatic life, wildlife, recreation, agriculture, industry, and for public water supply.

Goal Objectives

1. Manage water quality and improve surface and groundwater quality in accordance with the Clean Water Act.

Policies

a) Wetlands should be preserved as an essential component of the hydrologic system.
b) Lakeshore and streambank erosion should be minimized.
c) Natural drainage patterns and measures should be promoted to enhance water quality.
d) The Brown County Urban Service Area Water Quality Plan shall require erosion control and stormwater management plans as part of any sewer service extension proposal where they are not already required.
e) The Brown County Urban Service Area Water Quality Plan shall require the establishment of buffers around important natural resource features, as defined in Chapter 5.
f) Best management practices and measures which will reduce pollutant loadings from nonpoint sources, and which consider the impact of the practice upon both surface and groundwater quality shall be identified when considering mitigation of proposed development related to

proposed sanitary sewer extensions and possible development impacts from proposed ESA amendments.

g) The Brown County Municipal Separate Storm Sewer System (MS4) Permit shall be maintained and updated to retain the quality of surface storm water to the maximum extent possible.

2. Use the Urban Service Area Water Quality Plan update process to protect water resources.

Policies

a) The Brown County Sewage Plan shall be reviewed, updated, and revised as necessary to ensure continued protection and preservation of the waters of the U.S. and the state, but at least reviewed every five years.

b) The Brown County Sewage Plan shall identify and control, to the greatest extent feasible, agriculture, silviculture, and construction related nonpoint sources of pollution.

c) Environmentally sensitive area definitions in the Brown County Urban Service Area Water Quality Plan will be reviewed and updated as needed based on the best and most current information available, including, but are not limited to, wetlands, shorelands, floodways, floodplains, steep slopes, karst features, highly erodible soils, and other limiting soil types, groundwater recharge areas, areas identified in the *Wisconsin Land Legacy Report*, areas identified in the *Wisconsin Natural Heritage Inventory*, and other such areas.

3. Use the Brown County Urban Service Area Water Quality Plan in conjunction with other applicable regulations and requirements to protect natural resources.

Policies

a) Shoreland development shall meet standards set forth in Wisconsin NR 115 and Brown County Code of Ordinances Chapters 10 and 22 to ensure the maintenance of safe and healthful conditions, the prevention and control of water pollution, the protection of spawning grounds for fish and aquatic life, the control of building sites, the placement of structures and land uses, and the preservation of shore cover and natural beauty.

b) Development in floodplains shall meet standards set forth in Wisconsin NR 116 and Brown County Code of Ordinances Chapter 22 for appropriate floodplain districts. No unauthorized structure or fill shall be allowed to encroach upon and obstruct the flow of water in any stream channel or floodway.

c) All wetlands and their ecological functions shall be maintained unless documentation is provided that a wetland disturbance is unavoidable and appropriate mitigation will be provided and all other necessary approvals granted.

4. A consistent and concise environmentally sensitive area definition shall be established.

Policies

a) Environmentally sensitive area definitions established in the Brown County Sewage Plan shall be repeated in the Brown County Land Division and Subdivision Ordinance.

b) The best possible detailed and up to date mapping of environmentally sensitive areas shall be provided in accessible locations, including the Brown County Sewage Plan and GIS mapping.

c) Accurately updated and verified environmentally sensitive areas shall be demonstrated on recorded plat and certified survey maps in Brown County.

5. **Address water quality management issues in an economically efficient and environmentally sound manner.**

Policies

a) The Brown County Sewage Plan shall set forth an environmentally sensitive area concept and definition, which encourages countywide applicability.

b) The use of environmentally sensitive areas for mutually compatible uses such as environmental protection, public recreation, and storm water management shall be allowed and encouraged.

Implementation Goal and Objectives

Goal – The Brown County public, communities, and local governmental units will have opportunities to participate in the Brown County Urban Service Area plan implementation and updates.

Goal Objectives

1. **The plan will include procedures and mechanisms for intergovernmental cooperation and public participation.**

Policies

a) Establish and maintain the relationship of the sewer service area planning process to the Oneida Tribe of Indians of Wisconsin and to those communities located outside of Brown County but within the planning area.

b) Work closely with communities, sanitary districts, utility districts, and sewerage districts in providing data and planning expertise during the development of facility plans.

c) Assist communities, sanitary districts, utility districts, sewerage districts, and private homeowners in procuring financial assistance through the "Wisconsin Fund" and "Clean Water Fund."

d) Evaluate, on a case by case basis, the economic and environmental impacts of proposed regional sewerage service alternatives on existing Brown County sewerage facilities.

e) Coordinate, evaluate, and monitor the actions of local and state authorities on adherence to county land use goals, objectives, and policies.

2. **Brown County will collaborate with other governmental entities and organizations to ensure that current best practices are being implemented.**

Policies

a) Collaborate with other planning agencies in complex growth areas on current issues that arise during plan implementation.

b) Cooperate with planning agencies in complex growth areas to identify appropriate technologies for each wastewater treatment facility.

Planning Process

A sewer service area plan is usually developed locally by a regional planning commission (in this case, the Brown County Planning Commission) with oversight from the Wisconsin Department of Natural Resources. Input from local communities, sanitary districts, sewerage districts, and utility districts are obtained so that insight on local growth and wastewater treatment issues can be reflected in the plan. However, while the WDNR and the BCPC attempt to achieve a consensus of the affected local units of government on the formulation of the goals, objectives, and policies of the sewer service area plan, in some cases unanimous support may not be achieved. In those cases, the WDNR and the BCPC will have to weigh the positions of the affected parties and make a final recommendation concerning the issues involved based upon cost effectiveness and environmental impact.

Sewer service area plans use 20 year population projections, local development trends and density standards, and an inventory of environmentally sensitive areas (ESAs) to project and evaluate the wastewater collection and treatment needs of the area for the next 20 years. Sewer service area plans also rely upon local comprehensive plans and local employment and development trends to project the future residential, commercial, and industrial land needs of the community. This information, together with an identification of ESAs, determines the boundaries of the sewer service areas.

Once the BCPC and the WDNR approve the county sewage plan/sewer service area plan, that plan becomes an element of the areawide water quality management plan. A similar process is also undertaken for facility plans for publicly owned wastewater treatment plants. Subsequently, all new facility plans, and sanitary sewer extensions must conform with the areawide water quality management plan and the sewer service area element of that plan.

Like other long range plans, county sewage and sewer service area plans should periodically be reviewed to ensure that they continue to properly reflect local and regional objectives and needs. This review should occur on at least a five to ten year basis or even sooner if warranted by local growth and development pressures and trends. If an update is necessary, the process noted above is undertaken once again. Amendments to the plan are also possible. Amendments are intended to address unanticipated situations that, while worthy of consideration, do not warrant a comprehensive update of the entire plan. With amendments, any inclusion of additional lands to a sewer service area must be documented and justified and any ESA lands identified and set aside from development.

Related Plans

A series of plans help protect and improve water quality. These plans work together and are implemented at different governmental levels to achieve the water quality goals. The Brown County Sewage Plan is just one part of this. The following description shows how it fits in this context.

As part of section 303(e) of the Clean Water Act, the Wisconsin DNR is required to develop a Continuing Planning Process (CPP) Plan. The state CPP describes the state's water quality management and planning activities. The CPP coordinates all aspects of water pollution control to ensure the state makes progress toward protecting and preserving water quality. The CPP also provides the high level view of how decisions are made, how programs relate and how the public is involved.

The other following plans are an extension of the CPP:

- **Areawide Water Quality Management Plan (AWQMP)** – The AWQMP is a compilation of the guidance and programs the DNR uses to implement Clean Water Act requirements and provides structure and foundation on which implementation activities are attached, including the Sewer Service Area Plans.
- **Watershed Plans (formerly called "Basin Plans")** – These plans document and summarize the condition and health of water resources within an area. They also include existing conditions in the watershed, including demographics, land use, and water quality standards. They identify ecological restoration and remediation priorities and goals and recommend specific management actions.
- **Sewer Service Area Plans** – The Brown County Sewage Plan falls under this category. Sewer Service Area Planning is designed to anticipate a community's future needs for wastewater treatment. These plans fall in "designated" and "non designated areas" (Brown County is a designated area), and the areas are specified by NR 121, Wis. Adm. Code.

Through the DNR, there are water quality related plans that gather data, highlight issues, and establish water quality goals for smaller geographic areas.

Targeted Watershed Assessments (TWA) – These are statewide study designs that are a watershed approach to gathering baseline data and blends baseline work with targeted and effectiveness monitoring. The following TWAs are all or partly in the planning area:

- Upper East River Targeted Watershed Assessment (TWA)
- Apple Duck Ashwaubenon West Plum TWA
- Plum – Kankapot Creeks TWA

Nine Key Element Watershed Plans – Watershed plans consistent with EPA's nine key elements provide a framework for improving water quality in a holistic manner within a geographic watershed. The nine elements help assess the contributing causes and sources of nonpoint source pollution, involve key stakeholders, and prioritize restoration and protection strategies to address water quality problems. Nine key element plans in the planning area include:

- Red River/Sturgeon Bay Nine Key Plan
- Kewaunee River Nine Key Plan
- Branch River Nine Key Plan
- Plum & Kankapot Creeks Nine Key Plan
- Lower East River Nine Key Element Watershed Plan
- Ashwaubenon and Dutchman Creeks Nine Key Plan
- Lower Fox River Nine Key Plan

Recent Significant Community Changes

While most communities in the study area have continued to develop, no communities have incorporated into villages or cities since the preparation of the previous *2040 Brown County Sewage Plan* in 2015. Chapter 2 will further discuss population changes and growth.

Chapter 2: Planning Area

The planning area selected for the Brown County sewage plan update is shown on Map 1. As shown in Table 2 1, it encompasses 643.3 square miles and includes all of Brown County, as well as adjacent portions of Kewaunee, Oconto, Outagamie, and Shawano Counties. Within this area lie 2 cities, 9 villages, and 15 towns.

The planning area includes lands located outside of Brown County due to the existing and planned sewage collection, treatment, and disposal needs of the unincorporated communities of Dyckesville and Oneida and the Villages of Pulaski and Wrightstown. However, it does not include the Village of Luxemburg in Kewaunee County. Although the village's wastewater is treated by NEW Water, the responsibility for its sewer service area planning lies with plans developed by the Bay Lake Regional Planning Commission (see *Village of Luxemburg Sewer Service Area Plan*).

Physical Setting

The planning area is in the northeast portion of the State of Wisconsin adjacent to the Bay of Green Bay. Kewaunee County lies immediately to the east, Manitowoc County and Calumet County to the south, Outagamie County and Shawano County to the west, and Oconto County and the Bay of Green Bay to the north.

Geology

The bedrock within the planning area was formed during the Precambrian and Paleozoic eras. The underlying Precambrian bedrock is 1.5 billion years old. There are no known outcrops or exposures of this bedrock in Brown County. Overlying the Precambrian bedrock is Paleozoic bedrock, which is 375 to 600 million years old. Exposures of the Paleozoic bedrock are found along the Niagara Escarpment, within several larger quarries, and along some of the planning area's waterways.

The Paleozoic bedrock is sedimentary in origin and formed at the bottom of ancient shorelands and seas. Over time and under pressure, the deposits of sands, silts, and clays transformed into sandstone, limestone, dolomite, and shale. Over the past 350 million years, erosion removed much of the younger rock units so that today the youngest that remain are the Alexandrian and Niagaran dolomites located in the eastern portion of the planning area. The boundary between this bedrock and the next oldest period of bedrock can be seen along the Niagara Escarpment.

The Niagara Escarpment is a unique landscape feature which runs through Brown County and Northeast Wisconsin. The sickle shaped cuesta (bedrock ridge) runs 650 miles from southeastern Wisconsin along Lake Michigan, through Lake Huron on a peninsula, through southeastern Canada and into New York between Lake Ontario and Lake Erie. The erosion resistant dolomite cap overlies weaker, more easily eroded, and weathered shale rocks, leaving the series of cliffs[1].

The other unique feature of the Niagara Escarpment in Brown County is the Red Banks Alvar, a rare habitat type found in few places across the globe. Alvar characteristics include thin, discontinuous soils over

[1] Anderson, Craig, E. Epstein, W. Smith, N. Merryfield. *The Niagara Escarpment – Inventory Findings 1999-2001 and Considerations for Management.* Natural Heritage Inventory Program, Bureau of Endangered Resources, WDNR. https://dnr.wi.gov/files/PDF/pubs/er/ER0801.pdf.

horizontal limestone or dolomite beds, meaning little to no topsoil on top of a rock layer. The Alvar includes bare rock pavement, few trees, and prairie type plants[2].

Niagara Escarpment in Fish Creek, Door County. *Source: BCPC Staff*

Topography

The planning area has been greatly influenced by glacial action and the area's underlying bedrock. The area is generally characterized by gently sloping topography. The thick, prominent Niagara limestone that underlies the eastern part of the planning area gave rise to the eastern ridges of Wisconsin and scouring by glacial ice has resulted in the removal of glacial material in some areas and the deposition of such materials in other areas. The bedrock formations also strongly influenced the drainage patterns in this area.

[2] Id. P 9. More interactive information shown at: https://storymaps.arcgis.com/stories/90514c629c2a4f8eb13d6a2bc990cc3e.

Map 1: Planning Area

2040 Brown County Urban Service Area Water Quality Plan

Legend

- Adjacent Counties
- Municipalities
- Surface Water
- Streams
- 2022 DNR Designated Wetlands

0 1¼ 2½ 5 Miles

N W E S

Data Sources:
Wetlands - WDNR
Other Data - Brown County Planning Commission

Disclaimer: All data portrayed on this map is approximate. If development activity is proposed in or near a shaded area, the municipality and Brown County Planning and Land Services - Planning Division should be contacted. It is the responsibility of the property owner to determine if there are any regulated environmental features (wetlands, floodplains, streams, etc.) on the property prior to development. No warranties are implied.

Table 2-1: Planning Land Area and Water Area

Municipality	Land Area in Square Miles	Water Area in Square Miles	TOTAL
City of De Pere	12.77	0.96	13.73
City of Green Bay	46.12	1.24	47.36
Village of Allouez	5.27	0.67	5.94
Village of Ashwaubenon	12.86	0.52	13.38
Village of Bellevue	14.48	0.15	14.63
Village of Denmark	1.97	0.00	1.97
Village of Hobart	33.11	0.33	33.44
Village of Howard	18.44	0.51	18.95
Village of Pulaski	2.85	0.00	2.85
Village of Suamico	35.75	23.06	58.81
Village of Wrightstown	4.54	0.29	4.83
Town of Eaton	24.33	0.25	24.58
Town of Glenmore	34.85	0.04	34.89
Town of Green Bay	22.1	0.06	22.16
Town of Holland	36.0	0.07	36.07
Town of Humboldt	24.0	0.07	24.07
Town of Lawrence	15.93	0.77	16.7
Town of Ledgeview	17.12	0.26	17.38
Town of Morrison	36.43	0.15	36.58
Town of New Denmark	34.4	0.19	34.59
Town of Oneida (Part in Outagamie County)	0.98	0.02	1.0
Town of Pittsfield	32.1	0.24	32.34
Town of Red River (Part in Kewaunee County)	0.8	0.00	0.8
Town of Rockland	21.76	0.65	22.41
Town of Scott	18.24	0.23	18.47
Town of Wrightstown	33.0	0.34	33.34
Total Square Miles	**543.9**	**9.02**	**552.92**

Source: United States Bureau of the Census, Brown County Planning Commission

The western two thirds of the planning area is associated with the roughly four mile wide Fox River Valley, a continuation of the same depression forming Green Bay. This area slopes gently northeastward from Lake Winnebago in east central Wisconsin, drains to Green 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 Green Bay had been covered by the bay. Most streams in the area flow northeastward to Green 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 the Wrightstown area.

Forming the eastern boundary of the Fox River Valley is the Niagara Escarpment, which rises relatively abruptly as high as 200 to 250 feet above the valley floor. The Niagara Escarpment was formed by the erosion of older, softer bedrock underlying harder, more resistant bedrock and has been accentuated by the scouring action of glaciers. East of and alongside most of the escarpment is a narrow strip of level land. East of that is generally a slightly rolling plain which drains east and southeast toward Lake Michigan. The headwaters of several streams that drain to Lake Michigan are located within this area. However, gaps in the 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 in places has many small, wet depressions.

Due to its location between two lobes of the last glacier to advance through Wisconsin, the southeastern portion of the planning area is extremely 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 planning area ranges from 600 feet to 1,000 feet above sea level. The low point in Brown County, at an elevation of about 580 feet, is in the City of Green Bay where the mouth of the Fox River enters the Bay of Green Bay. The highest point in Brown County is in the Town of Holland, southeast of the unincorporated community of Greenleaf, at an elevation of about 1,020 feet.

Soils

Most of the soils in the planning area formed in glacial till and lake sediment that were high in clay. The characteristic soils are slowly permeable clay loam to clays. These soils have slight to moderate limitations for farming, with wetness and tilth the greatest management concerns. The slow permeability and a relatively high shrink swell potential also impose moderate to severe limitations for many residential and industrial related uses, including road construction and conventional septic system siting.

The planning area also has areas of loamy or sandy glacial till, outwash sand and gravel, and lacustrine sediments. These soils are generally friable and have moderate to rapid permeability. These conditions create slight to moderate limitations for farming and most residential and industrial uses.

Groundwater

Groundwater is available in the planning area from three general sources: The sandstone aquifer, the Niagara dolomite aquifer, and the shallow sand and gravel aquifers. The only rock units that contain little or no recoverable water are the Maquoketa Formation and Precambrian granite.

Most municipal water systems in the planning area obtain water from Lake Michigan via pipelines constructed in the mid 1950s and 2000s. The remainder of the planning area obtains water from the sandstone aquifer, as well as shallow sand and gravel aquifers.

The communities with municipal water systems include the Cities of De Pere and Green Bay, the Villages of Allouez, Ashwaubenon, Bellevue, Denmark, Hobart, Howard, Pulaski, Suamico, and Wrightstown, and the Towns of Lawrence, Ledgeview, Morrison, Scott, and Wrightstown. All the villages except for Hobart and Suamico have their municipal water systems extending throughout most of the community. Those two villages have municipal water systems limited to population centers in those municipalities.

Surface Water

Within the State of Wisconsin, waterways are generally governed as a component of the State's Public Trust Doctrine, as described in Article IX Section 1 of the Wisconsin Constitution and interpreted over time by Wisconsin courts and the state Attorney General's office. According to the Wisconsin Department of Natural Resources (WDNR), the public trust doctrine declares that all navigable waters are "common highways and forever free," and are held in trust by the WDNR for the public. As a result of subsequent citizen action and court decisions, "*…the public interest, once primarily interpreted to protect public rights to transportation on navigable waters, has been broadened to include protected public rights to water quality and quantity, recreational activities, and scenic beauty."*

"Wisconsin's Public Trust Doctrine requires the state to intervene to protect public rights in the commercial or recreational use of navigable waters. The WDNR, as the state agent charged with this responsibility, can do so through permitting requirements for water projects, through court action to stop nuisances in navigable waters, and through statutes authorizing local zoning ordinances that limit development along navigable waterways. The court has ruled WDNR staff, when they review projects that could impact Wisconsin lakes and rivers, must consider the cumulative impacts of individual projects in their decisions. In the 1966 Wisconsin Supreme Court Case, Hixon V. PSC, the justices wrote in their opinion the following: "A little fill here and there may seem to be nothing to become excited about. But one fill, though comparatively inconsequential, may lead to another, and another, and before long a great body may be eaten away until it may no longer exist. Our navigable waters are a precious natural heritage, once gone, they disappear forever."

Fox River / Bay of Green Bay

Except for portions of southern and eastern Brown County, most of the surface water, including major rivers such as the Fox River, East River, Duck Creek, and the Suamico River, flows into the Bay of Green Bay. The Fox River flows in a northeasterly direction through the approximate middle of Brown County.

Due to past point source pollution, the 22 square miles of southern Green Bay and the last seven miles of the Fox River (downstream from the De Pere Dam to the mouth) have been designated as an Area of Concern (AOC) under the United States – Canada Great Lakes Water Quality Agreement. According to the U.S. Environmental Protection Agency, an AOC is a geographic area within the Great Lakes, *"…that fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life.*" The area required priority attention from contaminated sediment, poor water quality, and lost or altered habitat. As a result, eleven beneficial use impairments describing the area's problems were assigned. These impairments have come from both point and non point source pollution.

In addition to being designated as an AOC, the Lower Fox River (defined as the river stretch between the Lake Winnebago outlet through the Lower Bay of Green Bay) is listed on the federal "303(d)" impaired waters list due to excessive total phosphorus (TP) and total suspended solids (TSS) loadings from nonpoint sources. Excessive TP and TSS loadings cause low dissolved oxygen levels, degraded habitat, and poor water quality. According to the U.S. Environmental Protection Agency, nonpoint source pollutants may include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas.
- Oil, grease, and toxic chemicals from urban runoff (streets, parking lots, roofs) and energy production.
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks.
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.

The Lower Green Bay Remedial Action Plan (RAP), first developed in 1987, includes the Fox River below the De Pere Dam and the lower bay south of a line between Long Tail Point and Point au Sable. The RAP identified a total of 11 use impairments and two suspected use impairments and identifies opportunities to mitigate some of these issues. For example, the restoration of the Cat Island Chain of Islands in the Lower Bay to hold clean dredge materials and create an expanse of aquatic and wildlife habitat was a concept first discussed in the RAP. Reversing the hypereutrophic (high levels of silt, algae, and other non point source pollutants) conditions in the river and bay is a top priority for the AOC and the RAP set the stage for the development of a Total Maximum Daily Load (TMDL) report for the Lower Fox River.

On May 18, 2012, the U.S. Environmental Protection Agency approved the *Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay*. A TMDL is required under the Clean Water Act for all 303(d) impaired waters. According to the TMDL, 63.0 percent of the sources of total phosphorus and 97.6 percent of the total suspended solids within the Lower Fox River Basin are from nonpoint sources, such as residential yards, streets, parking lots, farm fields, and barnyards. Proper management of Brown County's shoreland zones and environmentally sensitive areas will be a critical component of reducing total phosphorus and total suspended solids to attain the goals identified in the TMDL.

The *TMDL and Watershed Management Plan* for the Lower Fox River Basin and Lower Green Bay restoration goals include[3]:

- *Reduce excess algal growth*. Aesthetic reasons aside, reducing blue green algae will reduce the risks associated with algal toxins to recreational users of the river and bay. In addition, a decrease in algal cover will also increase light penetration into deeper waters of the bay.
- *Increase water clarity in Lower Green Bay*. Achieving an average Secchi depth measurement of at least 1.14 meters will allow photosynthesis to occur at deeper levels in the bay, as well as improve conditions for recreational activities such as swimming.
- *Increase growth of beneficial submerged aquatic vegetation in Lower Green Bay*. This will help reduce the re suspension of sediment particles from the bottom of the bay up into the water column, which will increase water clarity.

[3] *Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay.* March 2012. https://dnr.wisconsin.gov/topic/TMDLs/LowerFox/index.html.

- *Increase dissolved oxygen levels.* This will better support aquatic life in the tributary streams and main stem of the Lower Fox River.
- *Restore degraded habitat.* This will better support aquatic life.

To work towards achieving these goals, the *TMDL* sets numeric targets for TP and TSS for the tributary streams and main stem of the Lower Fox River

During the early spring snowmelt period or immediately following spring and summer rainstorms, the effect of nonpoint sources of pollution becomes very apparent in the Fox River. The water turns dark brown, loaded with suspended solids which carry excess nutrients and other pollutants from a multitude of nonpoint sources. The solids are carried into the lower bay and as the water flow slows, the solids drop out of the water column and are deposited in the lower bay. The photo documenting a Fox River sediment plume was taken in April 2011.

Although the excess total phosphorus and total suspended solids generally enter the bay from the Fox River, tributaries to the Fox River and those that drain directly into the Bay of Green Bay also contributes significant nonpoint source pollution loads. Specifically, additional 2020 303(d) listed rivers and streams within Brown County and their subject pollutants include Branch River (Polychlorinated biphenyls (PCBs)), Dutchman Creek (TP and Ammonia), East River (TP, TSS, and Unspecified Metals), Lower Fox River (PCBs, TP and TSS), Green Bay inner bay and shoreline (PCBs, TP and TSS), Kewaunee River (PCBs and TP), Neshota River (TP), School Creek (TP), and Twin Hill Creek (TP).

Brown County also has waters that in 2020 were listed as Restoration Waters, which are impaired waters with a restoration plan in place. These waters include Apple Creek (TP and TSS), Ashwaubenon Creek (TP and TSS), Baird Creek (TP and TSS), Bower Creek (TP and TSS), Duck Creek (TP and TSS), Dutchman Creek (TP), East River (TP and TSS), Fox River (TP and TSS), Green Bay inner bay and area of concern (TP and TSS), and Plum Creek (TP and TSS)[4].

Brown County and other partners have continued to address water quality and improve conditions in the Fox River, and ultimately the Bay of Green Bay and Lake Michigan. These include agricultural conservation efforts like agricultural producers working with Brown and Outagamie County Land and Water Conservation Departments, the Natural Resource Conservation Service, and the University of Wisconsin Extension in the Lower Fox Demonstration Farms Network to implement and showcase conservation practices to reduce phosphorus runoff. Over the last decade, the Brown County Planning Commission has also worked on improving water quality with Wisconsin Coastal Management Program grants, including creating educational materials around development in sewer service areas and environmentally sensitive areas, and working on a Nine Key Elements Plan for Baird Creek. The Brown County Land and Water Conservation Department has also overseen the development of other 9 Key Element Plans for subwatersheds in the Lower Fox River Basin[5].

Another water quality improvement initiative for the Lower Fox River and the Bay of Green Bay is an effort led by NEW Water, the Green Bay Metropolitan Sewerage District's brand. This is watershed adaptive management to help achieve compliance with phosphorus and TSS permit requirements. In working with WDNR, NEW Water has selected an Action Area to reduce TP and TSS loads. The Adaptative Management

[4] Since Wisconsin's 303(d) list is updated more frequently than this plan, refer to the DNR's website for the most current information: https://dnr.wisconsin.gov/topic/SurfaceWater/ConditionLists.html.

[5] For the most current status on Nine Key Element Plans in the Lower Fox River Basin TMDL, refer to this link: https://dnr.wisconsin.gov/sites/default/files/topic/TMDLs/NineKeyElementPlanImplementationStatus.pdf.

area includes the Ashwaubenon Creek and Dutchman Creek (ACDC), and NEW Water will work to improve water quality in these watersheds at a lower cost compared to NEW Water's treatment facilities to meet its wastewater discharge permit[6].

Despite continued pollution related challenges, a significant part of Brown County's identity is defined by the Fox River and Bay of Green Bay. Improving the quality of the water of these features through proper urban and agricultural shoreland management along the innumerable tributaries will ensure the surface water quality of the bay and river does not degrade, but rather, continues to improve. The health of the Fox River, Bay of Green Bay, and other rivers, creeks, and streams tributary to them have a profound impact on the regional economy.

Although much work remains to be done around nonpoint source pollution, since the advent of the Clean Water Act, the waters of the Fox River and lower bay have improved to the point where it is now a world class walleye fishery, hosting anglers from throughout the United States during the spring spawning run. The Bay of Green Bay is now a well known location for trophy sized northern pike, muskellunge, and smallmouth bass. According to the American Sportfishing Association from 2018 estimates, sport fishing in Wisconsin's Eighth Congressional District (NE Wisconsin) provided $189.8. million in economic impact[7]. By continuing to improve the water quality of the Fox River and Bay of Green Bay, Brown County can continue to capture its share of this economic resource.

Other Surface Water Features

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

Lily Lake

Lily Lake is a 43 acre seepage lake that is up to 21 feet in depth at its deepest point. The entire shoreline is buffered by woodlands and wetlands and contains a county park at its northern end.

Due to the generally shallow nature of the lake, periodic winterkills of fish have occurred during severe winters with extended cold snaps and heavy snow, most recently during the winter of 2013 2014. Brown County utilizes an aerator to maintain dissolved oxygen levels during the winter months. However, an aerator can only maintain dissolved oxygen levels near it, and during especially severe winters may not be adequate to prevent winterkill in other parts of the lake. According to the Wisconsin Lakes Book, the lake contains northern pike, largemouth bass, and panfish. The lake is popular for day fishing trips either from the fishing docks or from a non motorized (except electric trolling motor) watercraft. The lake is also popular with kayakers, canoeists, and bird watchers.

From 2006 through 2009, the Brown County Planning Commission, with funding provided from the Wisconsin Department of Natural Resources, prepared a series of reports about Lily Lake. The reports started from a watershed perspective, with the final report focusing exclusively on Lily Lake and its water, vegetative, and fishery characteristics. The series of reports found that Lily Lake is becoming more eutrophic in nature due to increasing aquatic vegetation and increasing dissolved phosphorus levels. The

[6] NEW Watershed Program: Ashwaubenon Creek and Dutchman Creek. https://www.newwater.us/programs/watershed.
[7] American Sportfishing Association. Economic Impacts of Recreational Fishing – Wisconsin: https://asafishing.org/state reports/economic impacts of recreational fishing wisconsin/.

report recommends the installation of stormwater management facilities at the parking lot and boat launch to capture stormwater runoff rather than running directly down the boat launch and into the lake. Additional recommendations include:

- Replicating the study every 5 to 10 years to determine whether the lake is continuing to become more eutrophic in nature.
- Install rain gardens in the picnic area to capture overland sheet flow of stormwater before it reaches the lake.
- Monitor the lake for the introduction of new exotic, invasive plant species.
- Establish a boat washing facility to remove invasive plants from boats and trailers.
- Developing an educational kiosk to inform visitors of the Lily Lake fishery and aquatic vegetation.

The Brown County Planning Commission has not updated the study since the initial reports.

Middle Lake

Middle Lake is a seven acre seepage lake located immediately south of Lily Lake, separated by approximately 450 feet of wooded wetlands. The northern shoreline is within the boundaries of Lily Lake County Park, while the southern shoreline is parceled into two separate residential lots. The entire shoreline of Middle Lake, including the privately held lands, is heavily wooded due to the wetlands that surround it. Since wetlands surround Middle Lake, there is currently no improved public access to the lake. The maximum depth of Middle Lake is seven feet.

Third Lake

Third Lake is a six acre seepage lake and is the southernmost lake in the Lily Lake system, lying approximately 1,200 feet to the southwest of Middle Lake. All the shoreline of Third Lake is in private ownership, however, as with Middle Lake, Third Lake is surrounded by a heavily wooded wetland, providing a buffer to impacts from neighboring residential and agricultural activities. Third Lake has an intermittent tributary that drains the lake from its southern end, eventually reaching the Neshota River. The maximum depth of Third Lake is 15 feet.

Duck Creek

Duck Creek flows over 33 miles through Brown County and into the Green Bay. The creek starts in Outagamie County and flows through Villages of Hobart and Howard. Duck Creek is made up of three subwatersheds – Upper, Middle, and Lower Duck Creek. The Oneida Creek and Trout Creek are also tributaries to the watershed. The slow moving stream is classified as a Warm Water Sport Fishery. Agricultural and limited rural development are located along most of it, although significant amounts of urban development outside its floodway and wetlands are present in the Village of Howard and the extreme northeastern portion of the Village of Hobart. Key threats to the health of this waterway are sedimentation due to erosion from construction sites and farm fields and excessive nutrients caused by nonpoint source pollution due to storm runoff from lawns, farms, and other sources.

East River

The East River is a 14.0 mile long major tributary of the Fox River. The river is navigable and flows northward 39 miles from its headwaters in northern Calumet County to one mile upstream of the Bay of Green Bay/Fox River mouth and is east of and generally parallel to the Fox River. In Brown County, it extends about 33 miles from the Brown County/Calumet County border east of STH 32/57 to its downstream end at the Fox River one mile south of the Bay of Green Bay, draining about 148 square miles of the county. The East River is a very shallow river system and very flood prone. The water is sluggish,

hard, and very turbid (cloudy with suspended soil). The northernmost third of the river is classified as a Warm Water Sport Fishery. While urban development is adjacent to approximately the northern third of the stream, agricultural lands are adjacent to the remainder of the stream. Many of its banks have been pastured and are badly eroded. Sediments have blanketed the streambed (filling in pools and riffles), thereby degrading habitat for fish species and associated fauna. The East River continues to be exposed to many adverse environmental impacts, including sedimentation, excessive nutrient inputs, low levels of dissolved oxygen for a Warm Water Sport Fishery, in stream habitat loss, cropland erosion, and barnyard runoff, excessive suspended solids (leading to turbidity), and fish kills due to nonpoint source pollution. For these reasons, the East River has also been identified as an Impaired Water.

In 1987, the East River was designated as a priority watershed under the Wisconsin Nonpoint Source Water Pollution Abatement Program. Subsequently in March 1993, a report titled "Nonpoint Source Control Plan for the East River Priority Watershed Project" was prepared by a consortium of state, county, and local agencies. The intent of the plan is to guide the implementation of nonpoint source control measures within the East River watershed and to provide the basis for the WDNR to enter cost share and local assistance grants to implement water quality improvement measures. The plan's implementation recommendations, including education, installation of vegetative buffer strips, and other techniques, should continue to be implemented throughout the East River Watershed to continue the East River's improvement in overall water quality.

More recently, in 2016 the Brown County Land and Water Conservation and Outagamie County Land Conservation Departments prepared the "Nonpoint Source Implementation Plan for the Upper East River Watershed", and in 2018 the "Lower East River Nonpoint Source Watershed Implementation Plan. Both plans provide a framework to improve water quality to meet the TMDL limits for total phosphorus and sediments, and other associated water quality improvements.

Suamico River

The Suamico River is a major river in northwestern Brown County and drains to the bay. As a navigable river, it flows eastward 16 miles from its headwaters in Shawano and Outagamie Counties to the bay in the Village of Suamico. In Brown County, it is a sluggish, hard water, and very turbid stream. The easternmost portion of the river is classified as a Warm Water Sport Fishery with bottom materials comprised of sand and silt. The remainder is classified as a Full Fish and Other Aquatic Life Water with bottom materials comprised of rubble and gravel. Agricultural and rural residential land uses are adjacent to most of the stream. The Suamico River continues to be impacted by nonpoint source pollutants including fine sediments carried by stormwater and excess phosphorus.

Branch River

The 16.6 mile long Branch River begins in southeastern Brown County and flows to the southeast, eventually joining the Manitowoc River, flowing into Lake Michigan in Manitowoc. The Branch River is a sluggish, hard water, turbid stream. Bottom materials largely consist of silt, sand, and gravel. The river flows through primarily agricultural areas of southeastern Brown County and northwestern Manitowoc County, and therefore, is occasionally negatively affected by nonpoint source agricultural runoff.

Neshota River

The 14.2 mile long Neshota River begins at its headwaters in the Town of Ledgeview in central Brown County and flows to the southeast, into the West Twin River and Lake Michigan in Two Rivers. The Neshota River is a sluggish, hard water, turbid stream. Bottom materials consist of silt, rubble, and gravel. Although

its shoreline is largely wooded, its small tributaries, and therefore, the Neshota River are negatively affected by fine sediments carried by stormwater and other nonpoint source pollutants.

In addition to the above referenced rivers, there are several smaller creeks that provide critical aquatic and shoreland habitat in Brown County, including:

- South Branch of the Little Suamico River: 3.5 miles long, fair fish & aquatic life.
- Middle Branch of the Little Suamico River: 9.0 miles long, fair fish & aquatic life.
- North Branch of the Little Suamico River: 5.0 miles long, unknown fish & aquatic life.
- Little Suamico River, 23.8 miles long, unknown fish & aquatic life.
- Trout Creek: 12.8 miles long, poor fish & aquatic life.
- Plum Creek: 16.5 miles long, poor fish & aquatic life.
- Dutchman's Creek: 16.0 miles long, poor fish & aquatic life.
- Ashwaubenon Creek: 15.0 miles long, poor fish & aquatic life.
- North Branch Ashwaubenon Creek: 7.0 miles long, unknown fish & aquatic life.
- South Branch Ashwaubenon Creek: 6.0 miles long, unknown fish & aquatic life.
- Baird Creek: 13.1 miles long, poor fish & aquatic life.
- Bower Creek: 13.0 miles long, poor fish & aquatic life.
- Wequiock Creek: Unknown fish & aquatic life.
- King Creek: 5.7 miles long, unknown fish & aquatic life.
- Denmark Creek: 16.0 miles long, poor fish & aquatic life.
- Apple Creek: 23.9 miles long, poor fish & aquatic life.
- Bay Beach Lagoons: Manmade 49.8 acre lakes, unknown fish & aquatic life.
- Beaver Dam Creek: 5.8 mile long, unknown fish & aquatic life.
- Dead Horse Bay: 28.8 acre bay, unknown fish & aquatic life.
- Devils River: 9.8 miles long, unknown fish & aquatic life.
- Gilson Creek: 3.6 miles long, unknown fish & aquatic life but a Class I trout stream.
- Inner Bay of Green Bay: 13,867.4 acre bay, poor fish & aquatic life.
- Haller Creek: 6.28 miles long, unknown fish & aquatic life but a Class II trout stream.
- Hemlock Creek: 7.0 miles long, unknown fish & aquatic life.
- Kewaunee River: 11.5 miles long, good fish & aquatic life.
- Mud Creek: 10.4 miles long, unknown fish & aquatic life.
- Peats Lake: 248 acre bay, unknown fish & aquatic life.
- Potter Creek: 8.6 miles long, suspected poor fish & aquatic life.
- Scarboro Creek: 8.0 miles long, unknown fish & aquatic life.
- School Creek: 8.5 miles long, unknown fish & aquatic life.
- Trout Creek: 12.77 miles long, poor fish & aquatic life.
- Twin Hill Creek: 5.9 miles long, unknown fish & aquatic life.

Drainage

The planning area is located within the Great Lakes St. Lawrence drainage basin. Approximately one fourth of the area is drained by streams tributary to Lake Michigan. The remainder of the area is drained by streams tributary to Green Bay and through Green Bay to Lake Michigan. As shown on Map 2, portions of four river basins and ten watersheds are located within the planning area.

Lower Fox River Basin

About 311.2 square miles, or about 58 percent of the planning area, is located within the Lower Fox River Basin. Portions of the Apple and Ashwaubenon Creeks Watershed, the Duck Creek Watershed, the East

River Watershed, and the Plum Creek Watershed are located within the planning area. These lands generally drain northeastward to Green Bay.

The East River Watershed encompasses about 203.0 square miles, or about 38 percent of the planning area. Major streams within this area include the East and Fox Rivers and Baird and Bower Creeks.

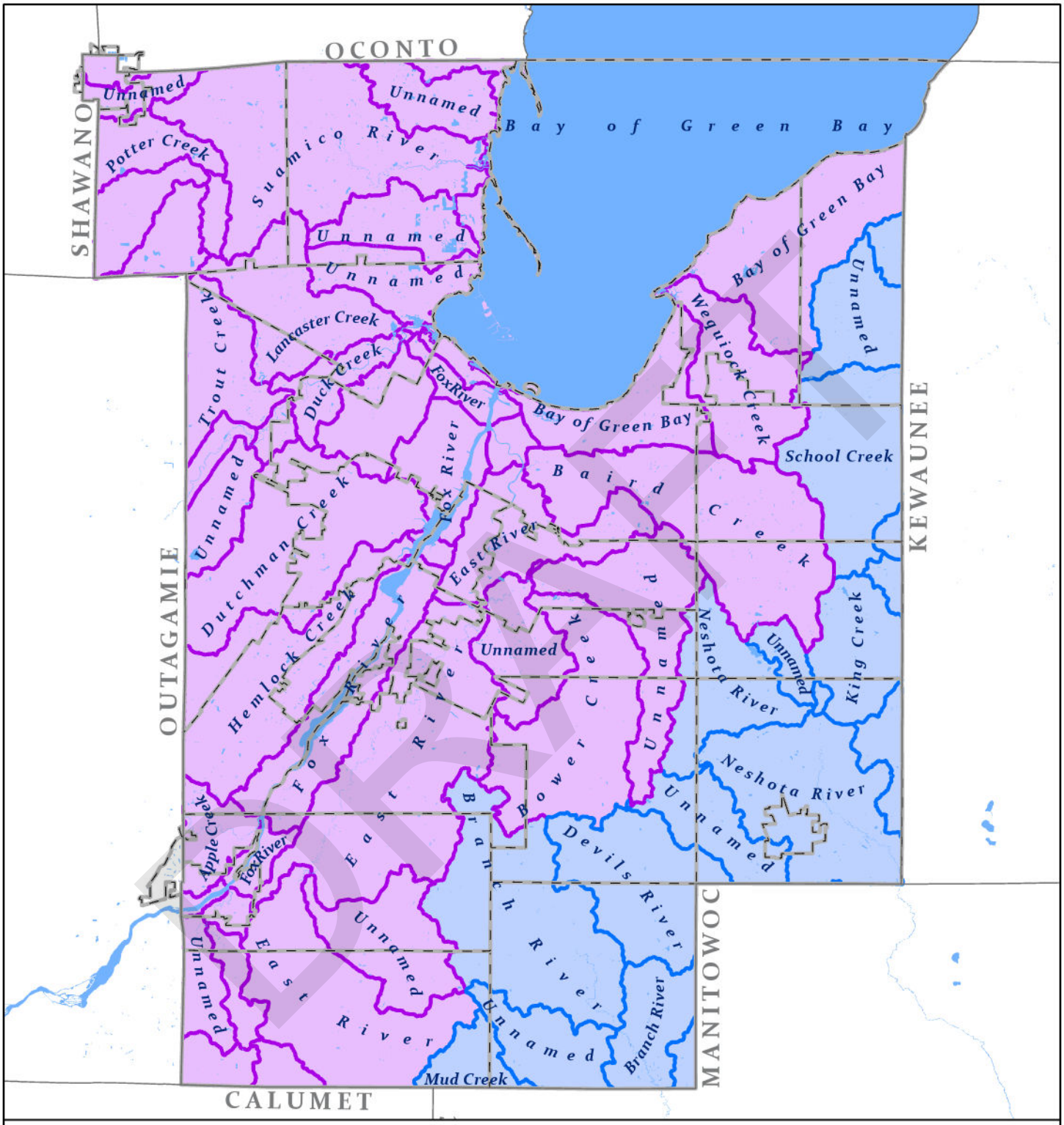
The Apple and Ashwaubenon Creeks Watersheds encompass about 47.0 square miles, or about 9 percent of the planning area. Major streams within this area include Apple, Ashwaubenon, and Dutchman Creeks.

The Plum Creek Watershed encompasses about 13.3 square miles, or about 2 percent of the planning area. Major streams within this area include Plum Creek.

The Duck Creek Watershed encompasses about 47.9 square miles, or about 9 percent of the planning area. Major streams within this area include Duck and Trout Creeks.

Map 2: Drainage Area

2040 Brown County Urban Service Area Water Quality Plan



Legend

- Adjacent Counties
- Municipalities
- Surface Water

Drainage Area

- Bay of Green Bay
- Lake Michigan

N W E S

0 1¼ 2½ 5 Miles

Data Sources:
Brown County Planning Commission

Disclaimer: All data portrayed on this map is approximate. If development activity is proposed in or near a shaded area, the municipality and Brown County Planning and Land Services - Planning Division should be contacted. It is the responsibility of the property owner to determine if there are any regulated environmental features (wetlands, floodplains, streams, etc.) on the property prior to development. No warranties are implied.

Twin-Door-Kewaunee River Basin

About 114.9 square miles, or about 21 percent of the planning area, is located within the Twin Door Kewaunee River Basin. Portions of the Kewaunee River Watershed, the Red River and Sturgeon Bay Watershed, and the West Twin River Watershed are located within the planning area. The lands within the Kewaunee River Watershed and the West Twin River Watershed generally drain southeastward to Lake Michigan, while the lands within the Red River and Sturgeon Bay Watershed generally drain northwestward to Green Bay.

The West Twin River Watershed encompasses about 74.8 square miles, or about 14 percent of the planning area. Major streams within this area include the Devils and Neshota Rivers and King Creek.

The Kewaunee River Watershed encompasses about 27.3 square miles, or about five percent of the planning area. The stream within this area is School Creek.

The Red River and Sturgeon Bay Watershed encompasses about 12.8 square miles, or about two percent of the planning area. Major streams within this area include Red River and Gilson and Macco Creeks.

Upper Green Bay Basin

About 69.2 square miles, or about 13 percent of the planning area, is located within the Upper Green Bay Basin. A portion of the Suamico and Little Suamico Rivers Watershed is located within the planning area. These lands generally drain eastward to Green Bay. The Suamico River is the major stream in this area.

Manitowoc River Basin

About 41.9 square miles, or about eight percent of the planning area, is located within the Manitowoc River Basin. Portions of the Branch River Watershed and the Lower Manitowoc River Watershed are located within the planning area. These lands generally drain southeastward to the Manitowoc River just west of the City of Manitowoc.

The Branch River Watershed encompasses about 40.0 square miles, or about seven percent of the planning area. The Branch River is the major stream within this area.

The Lower Manitowoc River Watershed encompasses about 1.9 square miles, or about one percent of the planning area. A major stream within this area is Mud Creek.

Vegetation

Vegetation is largely determined by the interaction of humans, climate, soil, and slope. In turn, vegetation determines what forms of animal life will be present, which then can modify the micro environment and local vegetation. A region's vegetation can be broken down into various types of plant communities. Each plant community is a grouping of plant species that has adapted to the local environmental conditions. Groupings of plant species are often found to reoccur throughout a region. In general, these groupings will possess certain dominant species but will rarely occur in pure stands. There are typically no discrete boundaries between plant communities, and where such boundaries do occur, an abrupt change in topography, soil type, or man made change is present.

If left under natural conditions, most upland areas in the planning area would be vegetated with hardwood forests. Such areas that had been previously cleared but allowed to return to a "natural state" will experience a succession of varied plant growth. This succession can include an initial invasion of hardy annual weeds followed by perennial species, such as woody shrubs and pioneer trees. Next appears more

shade tolerant tree species, and a forest begins to be established. Over time, the local soil is built up with humus, and if the area remains undisturbed, the forest will eventually reach a climax state. Within the planning area, a climax forest is a mature hardwood forest often dominated by sugar maple, basswood, hemlock, and American beech. These once dominated the area's landscape.

The other major historic plant communities within the planning area were the inland and coastal wetlands. These wetlands were commonly located on organic soils of ancient glacial lake basins and drainageways, along the floodplains of rivers and streams, and along the shore of Green Bay. The wetland community type depended upon vegetation and water depth and included seasonally flooded basins, inland fresh meadows, shallow freshwater marshes, deep freshwater marshes, open fresh water, shrub swamps, wooded swamps, and bogs.

Wetlands are thought to have once been widespread throughout the planning area, after the retreat of the last glacier and prior to human habitation of the area. These wetlands were most likely quite extensive within both the northern and southern portions of the planning area but less so within the central portion of the planning area. The few wetlands that remain today are scattered throughout the planning area, with the largest remaining wetland complex located along the west and southwest shore of Green Bay. Smaller wetland complexes are in the southeastern and northeastern portions of the planning area.

The planning area has few, if any, climax plant communities left. Most areas were either burned by native Indians or by fires during times of drought, lumbered by early settlers, or cleared for agriculture. Today, woodlands are much less extensive, less ecologically diverse, and more disturbed. They typically consist of isolated stands of successional stages of woody growth or mature second growth. The largest remaining areas of upland woodlands are in the northern portion of the planning area.

Existing Population

The current estimated population residing in the planning area is 269,827 people, as shown in Table 2 2. This also includes a small amount of people living in Outagamie and Kewaunee County.

Reviewing the planning area's population data from 1980 up through the estimated 2020 data shows increases for almost all communities. While some of the more rural towns have seen slower growth, the towns and villages closer to the urban area with available development area have seen significant growth during that time. In the last ten years the most dramatic growth happened in the Villages of Hobart, Howard, and Suamico, and in the Towns of Lawrence and Ledgeview.

The Wisconsin Department of Administration estimated Brown County as the fourth fastest growing county between 2010 2020, adding over 16,800 people. Also, the Village of Hobart and Towns of Lawrence and Ledgeview were in the top ten fastest growing communities in Wisconsin from 2010 2020 (first, third, and seventh, respectively)[8].

[8] Population and Housing Unit Estimates. State of Wisconsin Department of Administration. January 1, 2020 Final Population Estimates. https://doa.wi.gov/Pages/LocalGovtsGrants/Population_Estimates.aspx.

Table 2-2: Planning Area Historic Population

Municipality	Census Population					Numerical Change					Percent Change				
	1980	1990	2000	2010	2020	1980-1990	1990-2000	2000-2010	2010-2020	1980-2020	1980-1990	1990-2000	2000-2010	2010-2020	1980-2020
City of De Pere	14,892	16,594	20,559	23,800	25,410	1,702	3,965	3,241	1,610	10,518	11.4%	23.9%	15.8%	6.8%	63.4%
City of Green Bay	87,899	96,466	102,313	104,057	107,395	8,567	5,847	1,744	3,338	19,496	9.7%	6.1%	1.7%	3.2%	20.2%
Village of Allouez	14,882	14,431	15,443	13,957	14,156	-451	1,012	-1,486	199	-726	-3.0%	7.0%	-9.6%	1.4%	-5.0%
Village of Ashwaubenon	14,486	16,376	17,634	16,963	16,991	1,890	1,258	-671	28	2,505	13.0%	7.7%	-3.8%	0.2%	15.3%
Village of Bellevue	4,101	7,541	11,828	14,570	15,935	3,440	4,287	2,742	1,365	11,834	83.9%	56.8%	23.2%	9.4%	156.9%
Village of Denmark	1,475	1,612	1,958	2,123	2,408	137	346	165	285	933	9.3%	21.5%	8.4%	13.4%	57.9%
Village of Hobart	3,765	4,284	5,090	6,182	10,211	519	806	1,092	4,029	6,446	13.8%	18.8%	21.5%	65.2%	150.5%
Village of Howard	8,240	9,874	13,546	17,399	19,950	1,634	3,672	3,853	2,551	11,710	19.8%	37.2%	28.4%	14.7%	118.6%
Village of Pulaski	1,875	2,200	3,013	3,321	3,650	325	813	308	329	1,775	17.3%	37.0%	10.2%	9.9%	80.7%
Village of Suamico	4,003	5,214	8,686	8,686	12,820	1,211	3,472	0	4,134	8,817	30.3%	66.6%	0.0%	47.6%	169.1%
Village of Wrightstown	1,169	1,262	1,934	2,676	2,895	93	672	742	219	1,726	8.0%	53.2%	38.4%	8.2%	136.8%
Town of Eaton	1,106	1,128	1,414	1,508	1,662	22	286	94	154	556	2.0%	25.4%	6.6%	10.2%	49.3%
Town of Glenmore	1,046	1,057	1,187	1,135	1,045	11	130	-52	-90	-1	1.1%	12.3%	-4.4%	-7.9%	-0.1%
Town of Green Bay	1,106	1,292	1,772	2,035	2,197	186	480	263	162	1,091	16.8%	37.2%	14.8%	8.0%	84.4%
Town of Holland	1,268	1,237	1,339	1,519	1,559	-31	102	180	40	291	-2.4%	8.2%	13.4%	2.6%	23.5%
Town of Humboldt	1,281	1,334	1,338	1,311	1,299	53	4	-27	-12	18	4.1%	0.3%	-2.0%	-0.9%	1.3%
Town of Lawrence	1,431	1,328	1,548	1,548	6,306	-103	220	0	4,758	4,875	-7.2%	16.6%	0.0%	307.4%	367.1%
Town of Ledgeview	1,535	1,568	3,363	3,363	8,820	33	1,795	0	5,457	7,285	2.1%	114.5%	0.0%	162.3%	464.6%
Town of Morrison	1,565	1,493	1,651	1,651	1,689	-72	158	0	38	124	-4.6%	10.6%	0.0%	2.3%	8.3%
Town of New Denmark	1,420	1,370	1,482	1,482	1,562	-50	112	0	80	142	-3.5%	8.2%	0.0%	5.4%	10.4%
Town of Oneida (Outagamie County)*	619	683	708	753	579	64	25	45	-174	-40	10.3%	3.7%	6.4%	-23.1%	-5.9%
Town of Pittsfield	2,219	2,165	2,433	2,433	2,791	-54	268	0	358	572	-2.4%	12.4%	0.0%	14.7%	26.4%
Town of Red River (Kewaunee County)*	567	557	585	594	508	-10	28	9	-86	-59	-1.8%	5.0%	1.5%	-14.5%	-10.6%
Town of Rockland	882	974	1,522	1,522	1,775	92	548	0	253	893	10.4%	56.3%	0.0%	16.6%	91.7%
Town of Scott	1,929	2,044	3,712	3,712	3,636	115	1,668	0	-76	1,707	6.0%	81.6%	0.0%	-2.0%	83.5%
Town of Wrightstown	1,705	1,750	2,013	2,221	2,578	45	263	208	357	873	2.6%	15.0%	10.3%	16.1%	49.9%
Total	**176,466**	**195,834**	**228,071**	**240,521**	**269,827**	**19,368**	**32,237**	**12,450**	**29,306**	**93,361**	**11.0%**	**16.5%**	**5.5%**	**12.2%**	47.7%

*Year 2020 population counts for the portion of those towns located within the planning area but outside Brown County were determined by Census Block approximation and extrapolating the population relationship within those towns between the planning area to the total population for each.

Source: United States Bureau of the Census

Existing Wastewater Collection, Treatment, and Disposal Systems

Both onsite and offsite wastewater collection, treatment, and disposal systems are utilized within the planning area. Offsite systems are typically located within the urban and urbanizing portions of the planning area, while onsite systems are generally located in the rural portions. Both cities, all nine villages, and 11 of the 15 towns within the planning area provide offsite wastewater collection, treatment, and disposal. Also, the cities and villages typically provide such service to their entire community, while the towns provide this service to only a portion of their community. Within the 11 towns, three (the Towns of Lawrence, Ledgeview, and Scott) have created town wide utility districts. The remaining eight towns have created sanitary districts that take up only a portion of their community.

Offsite systems generally have a wastewater treatment plant and its associated interceptor sewers, forcemains, lift stations, and gravity sewers. The entire system may be owned and operated by one entity, such as in the case of the Village of Wrightstown, or the wastewater treatment plant and the interceptor sewer system may be owned and operated by one entity, such as NEW Water and the local collection system is owned and operated by the local unit of government.

The largest offsite system is owned and operated by the Green Bay Metropolitan Sewerage District and extends into portions of 15 communities (Table 2 3). The Town of Rockland is also currently annexed into the NEW Water service area, but is not a current customer, and no service is provided there at this time.

Table 2-3: NEW Water Customers

City of De Pere	Village of Pulaski
City of Green Bay	Village of Suamico
Village of Allouez	Town of Ledgeview Sanitary District No. 2
Village of Ashwaubenon	Town of Lawrence – Utility District
Village of Bellevue	Pittsfield Sanitary District No. 1
Village of Hobart	Scott Municipal Utility (including the Town of Scott, portions of the Town of Humboldt, and the Town of Green Bay)
Village of Howard	Dyckesville Sanitary District (includes portions of the Town of Green Bay and the Town of Red River)
Village of Luxemburg (outside of Brown County Sewage Plan planning area)	

Onsite systems consist of conventional onsite waste systems, alternative onsite waste systems (usually mound systems), and holding tanks. The systems are typically located within the rural portions of the planning area. Exceptions include urban or suburban portions of both the Cities of Green Bay and De Pere, the Villages of Bellevue, Hobart, Howard, and Suamico, and the Towns of Green Bay, Lawrence, Ledgeview, Red River, Rockland, and Wrightstown, which have areas also served by public offsite systems.

Offsite Systems

Within the planning area, most communities with wastewater treatment plants completed an upgrade of their treatment facilities under the United States Environmental Protection Agency (USEPA) Construction Grants Program in the late 1970s and early 1980s. Since then, every plant has also completed modifications to meet new and more stringent water quality standards. Additionally, three plants (the Village of Suamico, the unincorporated community of Oneida, and the Royal Scott Sanitary District) have abandoned their facilities and connected via forcemain to NEW WATER facilities. The Village of Pulaski constructed a new wastewater treatment plant in 1992 1993 and still maintains wastewater treatment facilities. The facility is a lagoon system that discharges waste via a forcemain to NEW WATER. The village is also in the process of sludge removal and aeration, and plant upgrades in the summer and fall of 2021. The Village of Luxemburg also still operates a lagoon system, and then connects to NEW WATER via a forcemain.

Table 2 3 shows the extent of the offsite wastewater collection, treatment, and disposal systems within the planning area. About 36 percent of the planning area (205 square miles) is located within one or another of the 23 sanitary districts and 1 metropolitan sewerage district. In addition, about 165.6 square miles, or about 29.7 percent of the planning area, is located within the *Brown County Urban Service Area Water Quality Plan's* 25 adopted sanitary sewer service areas.

This chapter discusses the wastewater collection and treatment facilities for the presently sewered areas. There are seven publicly owned wastewater treatment plants within the planning area.

NEW Water - Green Bay Metropolitan Sewerage District Wastewater Treatment Plant

NEW Water operates two wastewater treatment plants in Brown County, the Green Bay Facility (GBF) and the De Pere Facility (DPF). The GBF was originally constructed in 1935 and was one of the first wastewater treatment plants (WWTP) constructed within Brown County. The GBF is an activated sludge treatment plant designed to treat domestic and industrial wastes with a design capacity of 55.3 million gallons per day (mgd) on an average annual flow basis. Treated effluent is discharged to the Fox River.

The current GBF was constructed during the mid 1970s and was upgraded in 1990. The 1990 process changes included the addition of two new clarifiers, two additional aeration basins, and an improved solids handling system. Other improvements included retrofitting many parts of the plant to accommodate new processes, such as improved ammonia removal (nitrification) and de chlorination. To address the removal of more phosphorous, the district incorporated the biological nutrient removal process (BNR) as part of the plant's expansion and upgrade. Septage , sludge , and grease receiving sites were also constructed and put into service in March of 1994.

The DPF is an activated sludge treatment plant designed to treat domestic and industrial wastes with a design capacity of 14.6 mgd on an average flow basis. Treated effluent is discharged to the Fox River and sludge is pumped to the GBF for disposal through incineration. The DPF was originally built in 1937 and was upgraded in 1979. In 2008, NEW WATER reached an agreement with the City of De Pere that included NEW WATER taking over ownership and operation of the DPF. In 2009, the DPF was upgraded to connect the DPF with the GBF to enable remote operation and to consolidate the biosolids processing at the GBF. Interplant forcemains were constructed to transfer some of the wastewater and all the waste activated sludge from the DPF to the GBF.

NEW WATER acts as a wastewater treatment wholesaler for an estimated population of 236,474 people (see Tables 2 4 and 2 5) and encompasses 285.0 square miles. The NEW WATER communities are listed in Table 2 3. In addition, portions of the Town of Oneida in Outagamie County and the Towns of Green Bay, Pittsfield, Red River (in Kewaunee County), and Scott are included also. Wastewater from parts of the Villages of Ashwaubenon and Hobart and parts of the Towns of Ledgeview, and Lawrence, are treated at the NEW WATER plant in De Pere. The NEW WATER WWTP accepts significant industrial processed wastes from within the service area and has an industrial pretreatment program in place.

Table 2-4: Estimated Population Within the NEW Water Green Bay WWTP Service Area

Municipality	2000 Population* within each Municipality's Sewer Service Area			2020 Population Within Each Municipality's Sewer Service Area		
	Sewered	Non-Sewered	Total	Sewered	Non-Sewered	Total
City of Green Bay	102,013	300	102,313	107,048	347	107,395
Village of Allouez	15,443		15,443	14,156	0	14,156
Village of Ashwaubenon	6,700		6,700	6,457	0	6,457
Village of Bellevue	11,328	500	11,828	15,166	276	15,442
Village of Hobart	1,971	2,269	4,240	5,037	446	5,483
Village of Howard	12,889	657	13,546	19,130	820	19,950
Village of Pulaski	3,013		3,013	3,632	18	3,650
Village of Suamico**	3,373	452	3,825	7,194	306	7,500
Town of Green Bay*	362	1,410	1,772	457	43	500
Town of Humboldt	90	230	320	390	10	400
Town of Pittsfield*	300	2,133	2,433	256	0	256
Town of Red River	265	320	585	468	40	508
Town of Scott	2,712	1,000	3,712	2,061	51	2,112
Total	**158,299**	**9,271**	**167,570**	**181,452**	**2,357**	**183,809**

Note: Basin populations will not equal the total 2020 Brown County population because areas will fall outside of the basin, including portions of some of the municipalities listed in these tables.

*2000 populations included entire municipalities in the tabulations, where the 2020 populations are estimates of people only living within the SSAs within the NEW WATER Green Bay Basin, which accounts for some of the differences between the totals for the two years.

**The Village of Suamico was not in the NEW WATER Green Bay basin in 2000. The village's (then town's) population shown for 2000 was served by the Town of Suamico Sanitary District.

Table 2-5: Estimated Population Within the NEW Water De Pere WWTP Service Area

Community	2000 Population			2020 Population		
	Sewered	Non-Sewered	Total	Sewered	Non-Sewered	Total
City of De Pere (Total)	20,059		20,059	24,373	195	24,568
Town of Rockland (Partial)					162	162
Village of Ashwaubenon (Total)	13,594		13,594	10,534		10,534
Village of Bellevue (Partial)**				484	9	493
Village of Hobart (Partial)	850		850	973	223	1,196
Town of Lawrence (Total)	400	1,148	1,548	5,885	421	6,306
Town of Ledgeview (Total)	2,006	1,357	3,363	8,634	186	8,820
Town of Oneida (Total)*	543		543			0
Total	**37,452**	**2,505**	**39,957**	**57,927**	**1,195**	**52,079**

*The Town of Oneida (Outagamie County) was only part of the NEW WATER De Pere Basin in 2000. While its population is currently sewered, it is no longer served by NEW Water, so it is not included in the 2020 population.
**The Village of Bellevue was only within the NEW WATER Green Bay WWTP Service Area in 2000, which is why no total is shown for that year. The portion of Bellevue was not served by the De Pere plant until an annexation occurred later (after 2000).

Table 2-6: Estimated Population Tributary to Other Publicly Owned Wastewater Treatment Plants in the Planning Area

Community	2000 Population			2020 Population		
	Sewered	Non-sewered	Total	Sewered	Non-sewered	Total
Village of Denmark (all)	1,958	0	1,958	2,391	17	2,408
Village of Wrightstown (all)[1]	1,876	58	1,934	2,887	8	2,895
Town of Holland (portion)[2]	400	0	400	563	11	574
Town of Morrison (portion)[3]	400	0	400	400	24	424
Town of Oneida (Outagamie)*	0	0	0	576	10	586
Town of Wrightstown #1 (portion)[4]	628	0	628	531	36	568
Total	**5,262**	**58**	**5,320**	**7,348**	**107**	**7,455**

*Town of Oneida was part of the De Pere WWTP Service Area in 2000
[1] This assumes that 97 percent of future growth within the Village of Wrightstown will be sewered.
[2] This assumes that 72 percent of future growth within the Town of Holland will be sewered.
[3] This assumes that 23 percent of future growth within the Town of Morrison will be sewered.
[4] This assumes that 9 percent of future growth within the Town of Wrightstown will be sewered.

Since the last update of the county sewage plan, NEW WATER has:

- Consolidated operations in the region to take over ownership and operation of the City of De Pere wastewater treatment facility.
- Prepared for future expansions with the annexation of additional lands within the Town of Red River in Kewaunee County.
- Prepared a Solids Management Facility Plan in 2011 which upgraded it solids processing through the Resource Recovery and Electrical Energy (R2E2) project
- West Side Interceptor Relocation projects to accommodate expansion of I 43.
- Development of the Interceptor Master Plan to provide a long term strategy to meet its customer's interceptor conveyance needs at an acceptable level of risk at the lowest life cycle costs.
- Installation of backup generators at both facilities to ensure continuous service during power outages.
- R2E2 (Resource Recovery and Electrical Energy) solids handling facility went online.
- Pursuing Adaptive Management option as an alternative compliance option to achieve permit compliance at the lowest cost for total suspended solids and phosphorus. The Adaptive Management program is working to establish best management practices on primarily agricultural lands to reduce suspended solids and phosphorus contributions in the Fox River watershed.
- Development of a Facilities Plan to take a comprehensive look at liquids process needs at NEW Water facilities.

In 2021, NEW Water was honored by the National Association of Clean Water Agencies with a Platinum Award for achieving 100% permit compliance for 18 consecutive years at its Green Bay Facility, and for 9 years at its De Pere Facility. Additionally, according to its 2019 Compliance Maintenance Annual Report (CMAR) NEW WATER met its permit conditions.

In 2022, NEW Water began working on an updated facility plan to meet future population growth. That update was not yet complete at the time of this document's drafting.

Village of Denmark Wastewater Treatment Facility

The Village of Denmark Wastewater Treatment Facility (WWTF) was originally constructed in 1917. The current facility was constructed in 1980, and its last major upgrade was in 1993. The changes in 1993 consisted of the construction of a trickling filter, septage receiving facilities, dichlorination facilities, digester mixing equipment, a supplemental air system for the RBC system and increased sludge storage facilities. Most recently in 2017, the village replaced both the primary and secondary clarifier drive units and the secondary clarifiers were rehabilitated. The WWTF is a biological treatment plant designed to treat domestic and industrial wastes. Effluent is discharged to the Denmark Creek. Sludge disposal is accomplished through land application.

The village is required to reduce effluent chloride concentrations to meet its Wisconsin Pollutant Discharge Elimination System (WPDES) permit target values. To reduce those concentrations the village

has implemented a new water softener discharge ordinance and revised the existing sewer use ordinance impacting industrial users. The village is also required to reduce effluent phosphorus concentrations. Village staff are working with engineers to determine the best method to use to meet the upcoming phosphorus limits.

The existing sewer service area consists of most of the Village of Denmark. No major changes have occurred since the last update of the county sewage plan.

According to its 2019 Compliance Maintenance Annual Report (CMAR), last updated on June 22, 2020, the Village of Denmark Wastewater Treatment Facility met its permit conditions.

Village of Wrightstown Sewer and Water Utility

The Village of Wrightstown Sewer and Water Utility was originally constructed in 1948. The plant was constructed in 1980, and its last major upgrade was in 1998. With aging plant components and a growing population, the village completed a comprehensive facilities plan in 2006. The plan recommended constructing a new plant, which was completed in 2009 on the adjacent site to the then existing plant.

The sewer and water utility are an activated sludge treatment facility. As the water is treated, the pollutants are removed and collected. The resulting biosolids are put through an oxidation process to kill pathogens and reduce odor. The stabilized biosolids are used as fertilizer on local farm fields. The treated water is discharged to the Fox River.

The village's 2019 Compliance Maintenance Annual Report (CMAR), last updated on May 11, 2021, shows the village's treatment plan met its permit conditions in 2019.

Town of Holland Sanitary District No. 1 Wastewater Treatment Facility

The Holland Sanitary District No. 1 Wastewater Treatment Facility (WWTF) was originally constructed in 1964. The current plant was constructed in 1977, and its last major upgrade was in 2000. Such changes included a fine bar screen for the raw sewage pumps, construction of a mixed and aerated equalization base, with a chemical addition backup, a new fine bubble aeration and plug flow aeration, an aeration diffuser addition to the onsite storage tank which was converted to an aerobic digester, addition of a belt filter press for sludge dewatering, and construction of a 180 day sludge storage building.

The WWTF is an activated sludge treatment facility. Effluent is discharged to an unnamed tributary of Plum Creek. Sludge disposal is accomplished through land application.

Prior to its recent upgrade, the WWTF frequently exceeded its design flow capacity, its design BOD loading capacity, and its effluent permit levels for BOD, TSS, and phosphorus. The problems have been attributed to influent loading fluctuations and occasional toxicity episodes. Plans have begun for another facility upgrade and hydraulic resizing.

According to its 2019 Compliance Maintenance Annual Report (CMAR), last updated on June 29, 2020, the Town of Holland District No. 1 Wastewater Treatment Facility met its permit conditions. However, the average monthly effluent quality exceeded the maximum design flow during June 2019.

Town of Morrison Sanitary District No. 1

The Town of Morrison WWTP is an activated sludge treatment facility. The Morrison WWTP was constructed in 1994. Effluent is discharged to an unnamed tributary of the Branch River. Sludge is disposed

of on surrounding agricultural lands. The existing sewer service area includes a portion of the Town of Morrison. A comprehensive facilities plan was prepared in 1985 and amended in 1986, 1988, and 1991.

According to its 2020 Compliance Maintenance Annual Report (CMAR), last updated on May 27, 2021, the Town of Morrison Sanitary District No. 1 WWTP met its permit conditions. The average monthly BOD loadings exceeded the maximum design flow during March.

Town of Wrightstown Sanitary District No. 1 (Greenleaf)
The Greenleaf WWTP was originally constructed in 1962. The plant was constructed in 1995. The wastewater facility is an activated sludge treatment facility. Effluent is discharged to a tributary of the East River. Sludge disposal is accomplished by land application onto surrounding agricultural lands.

According to its 2020 Compliance Maintenance Annual Report (CMAR), last updated on June 10, 2021, the Town of Wrightstown Sanitary District No. 1 WWTP met its permit conditions.

Private Onsite Wastewater Systems

Private onsite wastewater systems are those which store, treat, or dispose of wastewater (or perform a combination of these functions) on the site at which the wastewater is generated. Onsite wastewater systems are used in those areas that are not served by offsite systems. Within the planning area, this includes the Towns of Eaton, Glenmore, and New Denmark, and portions of the Towns of Green Bay, Holland, Humboldt, Lawrence, Ledgeview, Morrison, Oneida, Pittsfield, Red River, Rockland, Scott, and Wrightstown. Approximately 60 percent of the planning area is served by onsite wastewater systems. Small portions of the City of Green Bay and the Villages of Ashwaubenon, Howard, and Wrightstown and larger portions of the Villages of Bellevue, Hobart, Suamico, and the Towns of Lawrence, Ledgeview also contain widely scattered onsite wastewater systems.

The planning area continues to experience rapid growth in many of its rural communities. Many of these communities, including portions of the Village of Hobart and Suamico, and the Towns of Green Bay, Lawrence, Ledgeview, Pittsfield, and Rockland, have experienced significant suburban growth utilizing onsite systems. This growth is accompanied by an increasingly important need to properly treat and dispose of wastewater. Brown County Zoning Department staff estimates that 11,300 onsite systems exist countywide. These systems represent the options to accommodate development where public sewer does not exist.

Wastewater Treatment Capacity Analysis

This section analyzes the current treatment capacity of wastewater treatment facilities in Brown County. Table 2 7 details the current conditions of the treatment facilities in Brown County, and Table 2 8 calculates the estimated future flows based on the 2040 population projections summarized in this chapter.

Table 2-7: Wastewater Treatment Plants in Brown County

Wastewater Treatment Plant	Original Date Constructed	Current Date Constructed	Treatment Type	Sludge Disposal	Receiving Water	Design Flow (mgd)	Average Flow (mgd)
NEW Water Green Bay Metropolitan Sewerage District	1935 1937	Mid 1970's	Activated Sludge	Incineration	Fox River Mouth	69.9	48.1
Village of Denmark	1917	1980	Rotating Biological Contact	Land Application	Denmark Creek, tributary to Neshota River	0.73	0.52
Village of Wrightstown	1948	2009	Activated Sludge	Land Application	Fox River	0.601	0.281
Town of Holland Sanitary District	1964	1977	Activated Sludge	Land Application	Tributary to Plum Creek	0.46	0.26
Town of Morrison Sanitary District		1994	Activated Sludge	Land Application	Tributary to Branch River	0.06	0.05
Town of Oneida (Outagamie County)							
Town of Wrightstown Sanitary District #1	1962	1995	Activated Sludge	Land Application	Tributary to East River	0.13	0.05

Table 2-8: Projected Wastewater Treatment Flows in Brown County

Wastewater Treatment Plant	Existing Design Flow (mgd)	Average 2022 Flow (mgd)	Projected 2040 Population	Population Change Between 2020 and 2040	Projected Additional WWTF Flow (mgd) Based on 2040 Pop. Growth	Estimated 2040 WWTF Flow (mgd) with 2040 Projections	Available WWTF Capacity (mgd) with 2040 Pop. Projections (existing design flow – estimated 2040 flow)
NEW Water Green Bay Metropolitan Sewerage District*	69.9	48.1	314,780	61,977	6.20	54.30	15.60
Village of Denmark	0.73	0.52	3,143	735	0.07	0.59	0.14
Village of Wrightstown	0.601	0.281	4,075	1,180	0.12	0.40	0.20
Town of Holland Sanitary District	0.46	0.26	1,819	260	0.03	0.29	0.17
Town of Morrison Sanitary District	0.06	0.05	1,817	128	0.01	0.06	(0.00)
Town of Oneida (Outagamie County)							
Town of Wrightstown Sanitary District #1	0.13	0.05	3,500	605	0.06	0.11	0.02

*The NEW Water GBMSD WWTF flows include populations of both the Green Bay and De Pere Basins.

The projected flows calculated in Table 2 8 come from the following applied to each community using NEW Water – Green Bay WWTF as an example:

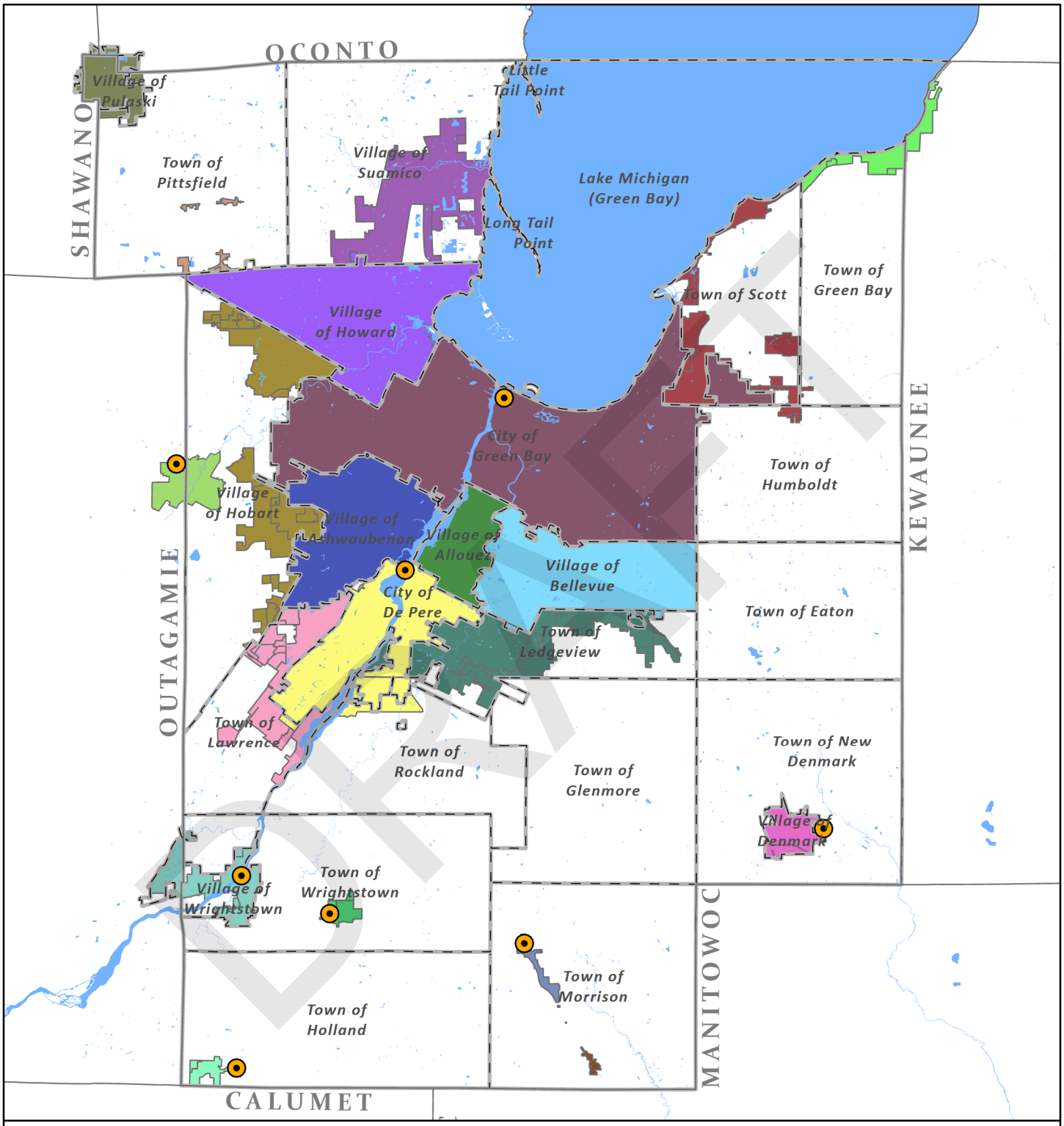
An estimated population change for the Green Bay WWTF basin between 2020 and 2040 is an additional 61,977 people. For the calculation, a basic 100 gpd was assumed for urban residential sources[9].
61,977 x 100 gpd = 6,197,700 gpd (gallons per day)
6,197,700 gpd / 1,000,000 = 6.19 mgd (millions of gallons per day)
The flow between 2020 and 2040 is estimated to grow by 6.2 mgd.

Recommendations

As discussed in Chapter 4 – Sewer Service Areas in the section *Wastewater Treatment Plant Loading, Design Capacity, and WDPES Permit Conditions,* both the Town of Morrison Sanitary District and the Town of Wrightstown Sanitary District #1 will be near or at wastewater treatment design capacity based on the 2040 population and flow projections here. Both sanitary districts will need to continue to monitor capacity and closely watch development activity in those areas to determine if/when facility upgrades are necessary to continue to meet permit requirements.

[9] Metcalf & Eddy, AECOM. 2014. "Wastewater Engineering: Treatment and Resource Recovery." New York: McGraw Hill Education. Chapter 3, p. 188.

Map 3: Existing Sewer Service Areas and Wastewater Treatment Facilities
2040 Brown County Urban Service Area Water Quality Plan



Legend

- Waste Water Treatment Plants
- Sewer Service Areas (SSA)
- SSA Boundary
- Allouez
- Ashwaubenon
- Bellevue
- De Pere
- Denmark
- Dyckesville/Red River
- Green Bay
- Hobart
- Holland
- Howard
- Lawrence
- Ledgeview
- Morrison
- Morrison (Wayside)
- Oneida
- Pittsfield
- Pulaski
- Scott
- Suamico
- Village of Wrightstown
- Wrightstown #1-Greenleaf
- Adjacent Counties
- Municipalities
- Surface Water

N W E S

0 1¼ 2½ 5 Miles

Data Sources:
Brown County Planning Commission

Disclaimer: All data portrayed on this map is approximate. If development activity is proposed in or near a shaded area, the municipality and Brown County Planning and Land Services - Planning Division should be contacted. It is the responsibility of the property owner to determine if there are any regulated environmental features (wetlands, floodplains, streams, etc.) on the property prior to development. No warranties are implied.

Chapter 3: Municipality Acreage Allocations

History

NR 121 requires the acreage allocation plan component, and that it is based on anticipated residential needs to determine the sewer service area delineation. The population projections are to be derived from data generated by the Wisconsin Department of Administration.

In Brown County individual municipalities have been assigned an acreage allocation, based on that area's population, population projection, proposed growth, and environmental features.

In this plan update each municipality's acreage calculation method includes the following elements factored into each municipality's acreage allocation:

- 2020 Census population
- 2040 population projection based on WDOA's population projection method (Table 3 1)
- Gross needed housing stock
- Net needed housing stock (includes existing housing stock vacancy rate)
- Gross needed commercial and industrial area (per comprehensive plans)
- Sewered lot size (three houses/acre, or approximate sewered lot size of 0.3 acres)
- Market flexibility factor – This is used because realistically not every property available in the planning area is developable or desirable.

The above was used to establish the base acres that would be needed for each municipality, should each municipality develop and increase in population at the rate projected at the time of the writing of this plan.

Environmental and Right-of-Way Credits

In the 2002 plan, a credit was awarded to each municipality based on the amount of environmentally sensitive areas (ESAs) located within each municipality. A general credit allocation was also awarded for proposed rights of way.

The 2015 plan did not calculate credits because some ESAs are approximate and proposed rights of way are unknown. The plan would award credits at the time of any amendment request since the acres for ESA's and right of way could be more accurately calculated then.

This plan has calculated the ESAs and ROWs in proposed SSA areas to be added through this plan update. Those ESA and ROW areas will be credited to the SSA allocation total for future expansion. When municipalities request future amendments, any credits in those proposals will be credited for the individual project.

Acres Proposed to be added as Part of this Sewage Plan

The following pages represent the acreage allocations for each municipality located within Brown County. Each chart shows the municipality's population, methodology, and total acreage allocation assigned. The included maps reference existing sanitary districts, existing sewer service areas, and approximate environmentally sensitive areas. The acreage allocation can be updated as population

projections are updated, and amendments occur. The ESAs on the map should be used for reference only as some ESAs are approximates. The most up to date version of the sewer service area map can be viewed online at Brown County's official GIS Map, BrownDog:

https://www.browncountywi.gov/departments/planning and land services/land information office/.

Sewer Service Acreage Calculations

The tables on the following pages all contribute to the SSA allocation ultimately shown in Table 3 4. The equation is worked out as follows:

1. Table 3 1 establishes the population projections for all the different communities.
2. Table 3 2 takes the population projections from Table 3 1 and calculates the net residential acreage needed for each municipality. Each municipality has different parameters based on specific community characteristics. Each community's future residential acreage needed is calculated from these individual characteristics.
3. In Table 3 3, the "Total Year 2020" column group shows the existing residential acreage, and the ratios of the other land use types relative to residential land. In the "Incremental Year 2040" column group, the residential land total comes from Table 3 2. The remaining land use groups use the corresponding land use ratio from the "2020" side of the table multiplied with the 2040 residential land needed. In the columns shaded blue, the totals come from that respective municipality's comprehensive plan and its future land use map. Those totals are generated from those maps to account for the planned area of that land use type. The columns at the far right (when looking at the table horizontally) are the gross sewer service area totals, and then the totals calculated with a market flexibility factor to account for real world variability.

Table 3-1: Population Projections	Decennial Census Population			Population Projections			
Sewer Service Area*	**2000**	**2010**	**2020**	**2025**	**2030**	**2035**	**2040**
Allouez	15,443	13,957	14,156	14,256	14,355	14,455	14,554
Ashwaubenon	17,634	16,963	16,991	17,005	17,019	17,033	17,047
Bellevue	11,828	14,570	15,935	17,303	18,671	20,039	21,407
Village of Denmark	1,958	2,123	2,408	2,592	2,776	2,959	3,143
De Pere	20,559	23,800	25,410	27,025	28,641	30,256	31,871
Dyckesville							
Town of Green Bay	1,772	2,035	2,197	2,344	2,491	2,637	2,784
Town of Red River	1,501	1,393	1,374	1,338	1,301	1,265	1,228
City of Green Bay	102,313	104,057	107,395	109,500	111,605	113,710	115,815
Hobart	5,090	6,182	10,211	12,499	14,786	17,074	19,361
Holland	1,339	1,519	1,559	1,624	1,689	1,754	1,819
Howard	13,546	17,399	19,950	22,189	24,428	26,666	28,905
Lawrence	1,548	4,284	6,306	8,001	9,696	11,391	13,086
Ledgeview	3,363	6,555	8,820	10,751	12,681	14,612	16,542
Morrison	1,651	1,599	1,689	1,721	1,753	1,785	1,817
New Franken (Humboldt)	1,338	1,311	1,299	1,286	1,274	1,261	1,248
Oneida	4,001	4,554	4,579	4,730	4,881	5,031	5,182
Pittsfield	2,433	2,608	2,791	2,926	3,062	3,197	3,332
Pulaski	3,013	3,321	3,650	3,892	4,133	4,375	4,616
Rockland	1,522	1,734	1,775	1,849	1,922	1,996	2,069
Scott	3,712	3,545	3,636	3,751	3,866	3,981	4,096
Suamico	8,686	11,346	12,820	14,222	15,624	17,026	18,428
Village of Wrightstown	1,934	2,676	2,895	3,190	3,485	3,780	4,075
Town of Wrightstown #1	2,013	2,221	2,578	2,809	3,039	3,270	3,500
Totals	**228,197**	**249,752**	**270,424**	**286,799**	**303,174**	**319,550**	**335,925**

Table 3-2: SSA Residential Calculations

Sewer Service Area*	2040 Population Projection	2020 Population Count	Incremental Population	Sewered Development Ratio**	Sewered Population Allocation	Persons Per Household (2020)	Occupied Sewered Households	Vacancy Rate	Total Sewered Households	Housing Units per Acre#	Net Residential Acreage
Allouez	14,554	14,156	398	1	398	2.54	157	1.03	161.39	5.8	27.83
Ashwaubenon	17,047	16,991	56	1	56	2.1	27	1.05	28.00	4.4	6.36
Bellevue	21,407	15,935	5,472	1	5,472	2.19	2,499	1.05	2,623.56	3.9	672.71
Village of Denmark	3,143	2,408	735	1	735	2.43	302	1.04	314.57	4.4	71.49
De Pere	31,871	25,410	6,461	1	6,461	2.47	2,616	1.03	2,694.26	4.4	612.33
Dyckesville***	4,012	3,571	441	0.24	106	2.21	48	1.13	54.12	2.1	25.77
City of Green Bay	115,815	107,395	8,420	1	8,420	2.35	3,583	1.04	3,726.30	4.4	846.89
Hobart	19,361	10,211	9,150	0.65	5,948	2.4	2,478	1.05	2,602.03	1.5	1,734.69
Holland	1,819	1,559	260	0.073	19	2.68	7	1.03	7.29	4.4	1.66
Howard	28,905	19,950	8,955	0.98	8,776	2.35	3,734	1.03	3,846.46	4	961.61
Lawrence	13,086	6,306	6,780	0.93	6,305	2.58	2,444	1.04	2,541.71	3.6	706.03
Ledgeview	16,542	8,820	7,722	0.9	6,950	2.7	2,574	1.04	2,676.96	3.6	743.60
Morrison	1,817	1,689	128	0.12	15	2.71	6	1.03	5.84	0.7	8.34
New Franken (Humboldt)	1,248	1,299	(51)	0.43	(22)	2.42	(9)	1.02	(9.24)	4.4	(2.10)
Oneida****	5,182	4,579	603	0.13	78	3.03	26	1.01	26.13	1.5	17.42
Pittsfield	3,332	2,791	541	0.12	65	2.6	25	1.02	25.47	2	12.73
Pulaski	4,616	3,650	966	1	966	2.3	420	1.06	445.20	3.9	114.15
Rockland	2,069	1,775	294	0		2.79		1.03		3.6	
Scott	4,096	3,636	460	0.56	258	2.34	110	1.06	116.69	2.9	40.24
Suamico	18,428	12,820	5,608	0.6	3,365	2.62	1,284	1.03	1,322.80	4.4	300.64
Village of Wrightstown	4,075	2,895	1,180	1	1,180	2.75	429	1.04	446.25	3.1	143.95
Town of Wrightstown #1	3,500	2,578	922	0.12	111	3.3	34	1.02	34.20	3.1	11.03
TOTAL	335,925	270,424	65,501		55,661		22,793		23,690.00		7,057.38

*The communities listed are within a SSA. Rockland is adjacent to the De Pere SSA. The population projections are for the entire municipality. The sewered ratio reflects the entire municipality, and shows how many new parcels are receving sewer service versus having an onsite sanitary system.

**The sewered development ratio was calculated from 2017-2021land division records.

***The Dyckesville SSA includes portions of both the Town of Green Bay and Town of Red River. Population has been calculated for only the portions of both towns in the SSA. The persons/household is an average of both areas.

****The Oneida SSA is in both Brown and Outagamie County. The Oneida sewered development rate was calculated comparing the estimated SSA population to the town's entire population.

#Housing units per acre was determined for each municipality based on current zoning ordinance and minimum lot size for predominant residential zone where future growth would occur. The density would be the maximum current allowable density in each municipality.

Vancancy rate calculated from 2020 Census data.

Table 3-3: SSA Acreage Allocation Formula

Sewer Service Area	Total Year 2020							Incremental Year 2040							Future Gross SSA Lands	Market Flexibility Factor	Future Net SSA Lands
	Residential Land Total	Comm. Land Ratio	Indust. Land Ratio	Transp. Land Ratio	Utility Land Ratio	Inst./Gov. Land Ratio	Park Land Ratio	Residential Land	Comm. Land	Indust. Land	Transp. Land	Util. Land	Inst./Gov Land	Park Land			
Allouez	1,445	0.04	0.00	0.22	0.00	0.11	0.11	27.8	1	0	6	0	3	3	41.2	0.75	31
Ashwaubenon	1,807	0.19	0.10	0.31	0.01	0.04	0.07	6.4	32	24	2	0	0	0	65.2	0.75	49
Bellevue	2,153	0.09	0.04	0.29	0.01	0.04	0.07	672.7	364	304	195	6	26	47	1,613.4	0.75	1,210
Denmark	279	0.06	0.09	0.27	0.02	0.07	0.12	71.5	87	6	20	1	5	8	198.8	0.75	149
De Pere^	2,434	0.08	0.14	0.23	0.01	0.06	0.08	612.3	74	750	141	3	34	47	1,660.9	0.75	1,246
Dyckesville*	486	0.02	0.01	0.37	0.01		0.11	25.8	1	0	9	0		3	39.1	0.75	29
Green Bay^	8,683	0.06	0.09	0.25	0.04	0.06	0.11	846.9	228	1,690	211	37	50	96	3,158.7	0.75	2,369
Hobart	1,834	0.03	0.06	0.17	0.00	0.01	0.11	1,734.7	55	100	290	4	22	192	2,398.1	0.75	1,799
Holland	148	0.04	0.07	0.44	0.00	0.02	0.04	1.7	0	51	1	0	0	0	53.8	0.75	40
Howard	2,738	0.08	0.08	0.28	0.01	0.04	0.08	961.6	213	356	272	8	40	77	1,927.8	0.75	1,446
Lawrence	1,007	0.06	0.07	0.23	0.00	0.03	0.01	706.0	977	425	159	3	22	4	2,297.1	0.75	1,723
Ledgeview	1,996	0.03	0.07	0.16	0.01	0.03	0.09	743.6	129	49	116	4	23	68	1,131.7	0.75	849
Morrison	112	0.04	0.01	0.44	0.01	0.04	0.02	8.3	0	0	4	0	0	0	13.0	0.75	10
New Franken (Humboldt)	37	0.01		0.81		0.00		(2.1)	165	61	(2)		(0)		221.8	0.75	166
Oneida**	320	0.01	0.00	0.21	0.10	0.15	0.07	17.4	0	0	4	2	3	1	26.8	0.75	20
Pittsfield	122		0.10	0.12	0.01	0.08	0.13	12.7	697	129	2	0	1	2	843.5	0.75	633
Pulaski	427	0.07	0.12	0.19	0.01	0.09	0.13	114.2	81	145	21	1	10	14	386.7	0.75	290
Rockland***	128		0.01	0.48	0.01		0.04									0.75	
Scott	832	0.03	0.01	0.14	0.00	0.04	0.13	40.2	1	108	6	0	2	5	161.7	0.75	121
Suamico	1,646	0.04	0.03	0.16	0.00	0.05	0.15	300.6	60	522	49	1	15	46	995.3	0.75	746
Wrightstown****	402	0.03	0.08	0.27	0.01	0.05	0.07	144.0	74	287	39	2	8	11	564.3	0.75	423
Wrightstown #1	149	0.02	0.03	0.16	0.02	0.02	0.05	11.0	7	0	2	0	0	1	21.2	0.75	16
TOTAL	29,182							7,057	3,245	5,007	1,547	73	265	626	17,820		13,365

*The Dyckesville SSA includes both the Town of Green Bay and the Town of Red River.

**The Oneida SSA includes both portions of the Village of Hobart and the Town of Oneida (Outagamie County). The Hobart portion in the Oneida SSA was not counted towards the Hobart SSA total.

***A far northern portion of the Town of Rockland is in the De Pere SSA. By available permit data, these residential areas still have onsite sanitary systems.

****The Wrightstown SSA acreage allocation includes lands in Outagamie County.

^The Cities of Green Bay and De Pere have future business/industrial park land uses included in the industrial land use category.

The blue-highlighted cells in the commercial and industrial land columns were tallied from the municipal future land use map areas since more land was identified than what would have been shown with the land ratios.

Summary of Acreage Allocations by Municipality

The following table summarizes the acreage allocation for each municipality along with the areas to be added to the Sewer Service Area as part of this Sewage Plan, environmentally sensitive area (ESA) and right of way (ROW) credits, and the remaining acres allocated to each municipality for future amendments. Tables that identify how the acreage allocation was established for each municipality is included earlier in this chapter. On the following page is a map of all the SSAs in Brown County. Maps for individual municipalities are in Appendix A at the end of this document.

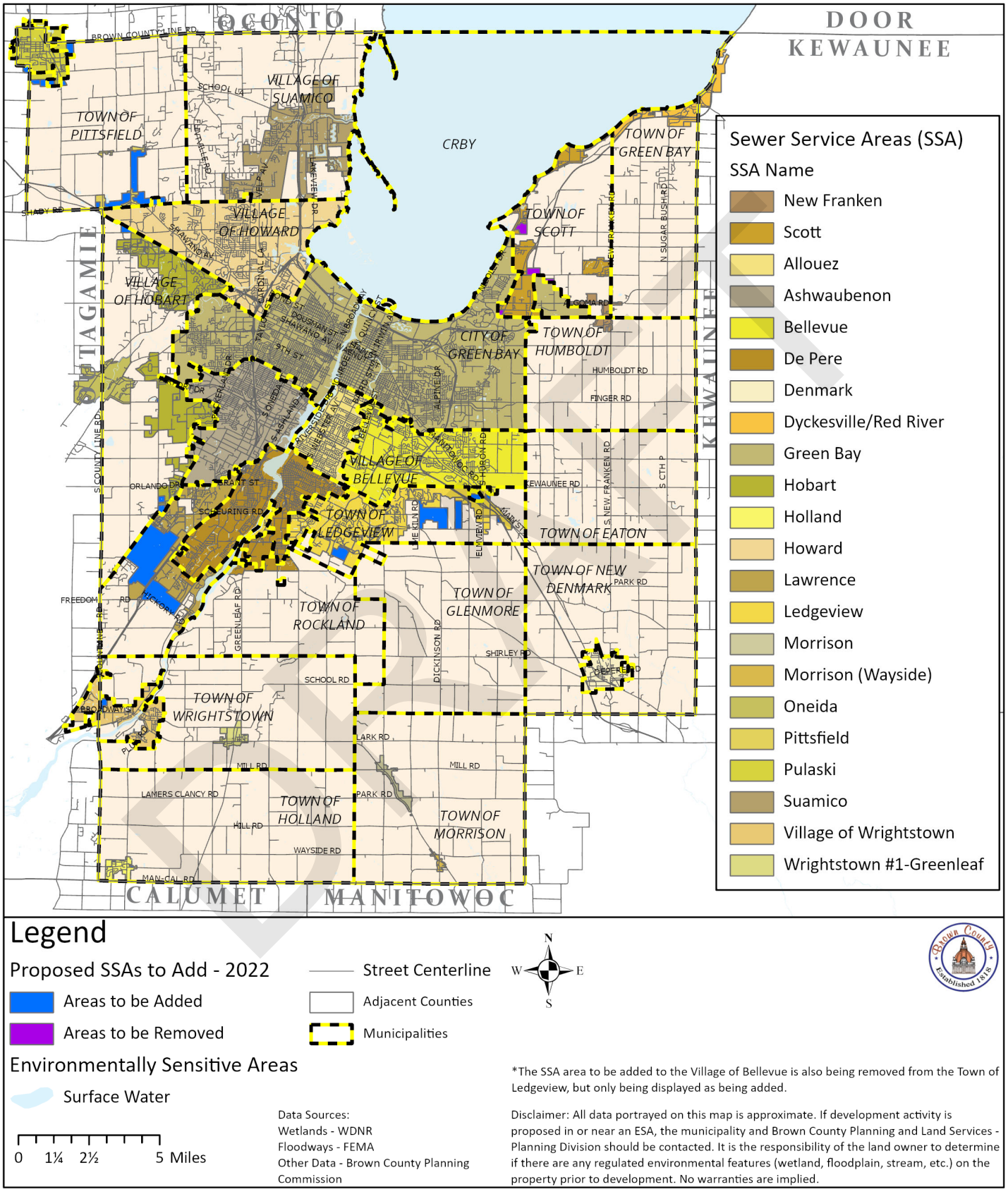
Table 3-4: SSA Acreage to be Added Through the Plan Update

Municipality	2022 Acreage Allocation to Year 2040	Acreage to be Added as Part of this Sewage Plan (Subtracted from the Allocation)	Credit Acres for ROW Areas	Credit Acres for ESA Areas	Remaining Acreage for future Amendments
C. De Pere	1,246				1,246
C. Green Bay	2,369				2,369
V. Allouez	31				31
V. Ashwaubenon	49				49
V. Bellevue**	1,210	(63)		25	1,172
V. Denmark	149				149
V. Hobart	1,799	(144)	43	15	1,713
V. Howard	1,446	(40)		6	1,412
V. Pulaski	290	(276)	6	20	40
V. Suamico	746				746
V. Wrightstown	423	(57)	4	6	376
T. Green Bay	29				29
T. Holland	40	(5)	1	2	38
T. Humboldt	166				166
T. Lawrence	1,723	(1,872)	81	253	185
T. Ledgeview**	849	(647)	39	74	315
T. Morrison	10				10
T. New Denmark	32				32
T. Pittsfield	633	(604)	93	32	154
T. Scott*	121	(+214)	0	1	336
T. Wrightstown	16				16
T. Oneida (Outagamie County)	20				20
TOTAL	**13,397**	**(3,494)**	**267**	**434**	**10,604**

*The Town of Scott removed acreage from its SSA that are natural areas and will not be developed; that acreage has been credited back to the town's allocation.

**The Village of Bellevue has acreage added to its SSA (subtracted from its allocation) due to an annexed area from the Town of Ledgeview. This area has also been added back into the Town of Ledgeview's allocation. The Village of Bellevue does receive a credit for the ESA area within that additional SSA.

Map 3-1 SSAs Added Through Plan Update.



Chapter 4: Sewer Service Areas

The Wisconsin Department of Natural Resources is required to undertake, or to appoint another public agency to undertake, sanitary sewer service area planning within designated portions of the state and for all communities with a population greater than 10,000 people.

The most important objective of the sewer service area planning process is the preparation and update of the sewer service area plan, which shall be subject to a major review and update at least every five years (NR.121.08(2)a)). The Brown County sewage plan has two main objectives: identify existing sewered areas as well as adjacent land most suitable for new development, and to identify areas where sewers should not go: environmentally sensitive areas where development would have an adverse impact upon water quality.

NR 121 – Areawide Water Quality Management Plans Content

NR 121 – Areawide Water Quality Management Plans Content for Nonindustrial Wastewater Treatment and Collection Systems (NR 121.05 (1) (g))

The following section identifies the essential items for planning sewer service areas under item (g) in the referenced state statutes section.

1. The most cost effective regional wastewater systems for all urban areas shall be identified over a 20 year planning period based upon an analysis of alternative waste treatment system configurations. Wherever possible, applicable recommendations of approved facility plans shall be used to determine the urban area's treatment needs. This analysis shall be consistent with s. NR 110.09 (Sewage treatment facilities projects) and shall include a cost effectiveness analysis of regional versus individual treatment plans for the outlying areas including subsurface waste disposal systems. Water quality and other environmental impacts shall be considered.
2. Sewage collection system needs shall be identified through the delineation of a sewer service area for existing and proposed treatment systems for the 20 year planning period such that:
    a. The sewer service area is determined in such a fashion as to promote cost effective and environmentally sound waste collection and treatment.
    b. The sewer service areas are delineated based on a 20 year population forecast approved by the department, and municipally approved population density standards.
    c. Major areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints are to be excluded from the service area. Areas to be considered for exclusion from the sewer service area because of the potential for adverse impacts on the quality of the waters of the state from both point and nonpoint sources of pollution include but are not limited to wetlands, shorelands, floodways and floodplains, steep slopes, highly erodible soils and other limiting soil types, groundwater recharge areas, and other such physical constraints.
    d. Ten year service area boundaries may also be included in addition to the 20 year sewer service boundaries.
3. The plan shall include criteria for the construction of future treatment systems within the areawide planning area. These criteria shall be consistent with – but may be more specific or restrictive than – those contained in s. NR 110.08 (5), if warranted by regional and local considerations.

Sewer Service Area Planning Process

NR 121 states that the Wisconsin Department of Natural Resources shall reevaluate the approval status of each areawide water quality management plan for designated areas at least every five years. The Brown County Planning Commission and the DNR also recognize the importance of local input into this planning process and recommend that any revisions of the plan properly reflect local, as well as area wide, planning and development objectives. This process and frequency should help with planning for public sanitary sewer extensions, and development in Brown County can proceed in a smooth and efficient manner.

Wisconsin Administrative Code requires that all public and private sewer extensions be in conformance with the adopted sewer service area plan and that this plan be consistent with and become a part of the Areawide Water Quality Management Plan prepared by the DNR.

The Brown County Planning Commission has undertaken this effort to update and revise the County sewage plan to extend its planning horizon to the year 2040 to reflect recent state, county, local planning, and environmental initiatives and to incorporate local and regional planning and development objectives.

While updating and refining the sewer service areas within the planning area, future sewer service area needs were analyzed. The analysis considered cost effectiveness, environmental considerations, and general development trends.

Forecasts for future sewer service area needs are based on factors such as the following:

- Population projections.
- Existing housing stock and household size with existing housing vacancy rates.
- Acreage to accommodate existing and projected population and housing needs.
- Sewered lot sizes.
- Local and regional development trends.
- Local and county comprehensive plans projecting commercial development needs.
- Local and county comprehensive plans projecting industrial development needs.

The above factors were incorporated into a formula that calculates the amount of vacant developable land needed by each community for its projected sewered growth and development (see Table 3 1 for individual communities in Chapter 3 of this plan). The *Brown County Urban Service Area Water Quality Plan* intends to ensure that vacant developable land is always available to the community. As sewered development proceeds within the community and the supply of vacant developable land falls below the amount provided for by this plan, amendments can be requested by the community to replenish its SSA acreage due to development. Amendments must be submitted to the Brown County Planning Commission and DNR for review and approval. The BCPC shall always approve such amendments if conformance is maintained with the applicable goals, objectives, policies, and practices set forth in this County sewage plan and, in particular, the population projection acreage allocation formula. Additionally, those communities which currently exceed this population projection acreage allocation formula because of policies or decisions of similar previous comprehensive updates shall be allowed to continue to use their current SSA size in their determination of vacant developable land needs. However, the BCPC strongly discourages and may deny any amendment undertaken in a scattered or haphazard manner. This plan intends to avoid this practice to minimize ad hoc amendments and to encourage long range comprehensive sewer service area planning.

Once the sewer service area acreage allocation was calculated as identified in Chapter 3 for each municipality, the approved sewer service area boundaries were revised according to the following guidelines:

- Initial refinement and update of the sewer service areas were accomplished by the affected local communities, in consultation with the Brown County Planning Commission staff, based upon review of their local plans and development trends.
- Current and updated sewer service area boundaries were further refined by the Brown County Planning Commission staff to reflect existing property boundaries and physical features more accurately.
- Areas of existing development, ESAs, and lands zoned conservancy, when located within an SSA, were not counted toward the total SSA acreage allocation.

While a community's sewer service area can include less than its specified amount of vacant developable land, it generally cannot exceed that amount. Special exceptions to this practice include:

- Inclusion of additional vacant developable land to a one lot depth (approximately 250 feet) along one side of the route of a sanitary sewer located within or immediately adjacent to a road right of way when such sewer and road forms the outer limits of a compact and contiguous SSA. However, the SSA boundaries should generally follow property lot lines for easier identification of boundaries and usable/developable land.
- Inclusion of additional vacant developable land to a one lot depth (approximately 250 feet) along both sides of the route of a sanitary sewer located within or immediately adjacent to a road right of way when such sewer and road is located within an area with numerous existing and failing onsite sewage disposal systems which are to be served by the proposed sanitary sewer.
- Inclusion of additional vacant developable land for limited infill purposes in areas of widespread failing onsite sewage disposal systems.
- Inclusion of additional vacant developable land when such land has been zoned or otherwise officially designated to prohibit any further sewered development (conservancy lands, abandoned landfills, etc.).

Wastewater Treatment Plant Loading, Design Capacity, and WDPES Permit Conditions

Once the updated sewer service area was determined, the impact of eventual development of that area upon the existing and planned tributary sewerage system was reviewed. In general, a sewer service area may not be so sized or located that it would cause the tributary sewage treatment facility or its major components to exceed their design or permit, influent, effluent, flows, or loadings within the planning horizon of this plan.

This standard will be implemented on an ongoing basis by the DNR during its review and approval of facility plans. The DNR and the BCPC will continue to implement this standard during the sewer service area update and amendment process.

Loading and other permit compliance problems associated with operation and maintenance of a WWTP will be considered in the sanitary sewer extension review and approval process. For future sewer service area updates or amendments or sanitary sewer extensions to newly identified SSA lands set forth in this

plan will not be approved by the BCPC until such time as this policy and its requirements are satisfactorily addressed.

When flows or loadings from current and projected development within the SSA reach 100 percent of the design capacity of the sewage treatment facility, interceptor sewer, or lift station, the applicable SSA update or amendment shall not be approved unless the owner of the sewage treatment facility and/or sewer collection system passes a resolution indicating its intention to undertake a facility plan to address the provision of capacity for the proposed increase of sewage flow and load. The resolution should indicate the timetable for preparation and implementation of the facility plan considering existing and planned development trends within the subject community. Should such local development trends indicate that the applicable design capacity would be exceeded within five years, the facility plan must be initiated immediately.

When current flows or loadings reach 80 percent of the design capacity of the sewage treatment facility, major interceptor sewer, or lift station, the applicable SSA update, or amendment shall not be approved unless the owner of the sewage treatment facility and/or sewer collection system passes a resolution indicating its intention to undertake a facility plan to address the provision of capacity for the proposed increase of sewage flow and load. The resolution shall also indicate the timetable for preparation and implementation of the facility plan considering existing and planned development trends within the subject community. The resolution and timetable shall state that the facility plan will be initiated when or before flows or loadings reach 90 percent of the applicable design capacity.

When current flows or loadings exceed 90 percent of the design capacity of the sewage treatment facility, major interceptor sewer, or lift station, the applicable SSA update or amendment shall not be approved unless the owner of the sewage treatment facility and/or sewer collection system has completed an appropriate facility plan, received DNR approval of that plan, and commenced implementation of the plan or prepared a construction schedule (to be determined by the WDNR).

Each of these scenarios may be reviewed and reconsidered by the WDNR or the BCPC on a case by case basis. Grounds for such reconsideration may include past facility planning efforts, local development trends, and/or the severity or immediacy of the potential problem(s). Under such situations, the required studies and analyses may be waived or changed.

Sewage treatment plant owners and collection system owners should be maintaining the following information:

- Information on current flows and loadings, which can be obtained from each treatment facility's CMAR and should include data for the minimum period consisting of the prior 12 months.
- Information on future flows and loadings, which can be obtained from applicable sanitary sewer extension submittal forms or from the local community.

Where not available, such information should be determined based upon the land uses and densities set forth in the community's local comprehensive plan and upon commonly accepted wastewater flow contribution rates. Information on local development trends should be obtained from the community's local comprehensive plan.

The applicant shall provide this information to the BCPC at the time of any SSA update or amendment. Failure to provide this information may be grounds for denial of the SSA change. A summary of this information, as well as information demonstrating that the subject WWTP is currently and, with inclusion

of the subject area, will remain in conformance with its WPDES permit effluent limits, must also be provided to the BCPC at the time of the subject SSA update or amendment. This summary must include a letter signed by the owner of the WWTP indicating that the WWTP has maintained compliance with all permit limits for the previous 12 month period and, if not, why such permit limits have not been met, what corrective actions are being taken, and what effect, if any, the subject SSA amendment may have upon the permit violations. The summary shall also include a table setting forth effluent data and documentation of compliance with all permit limits. The table should also note the specific permit limits.

2040 Sewer Service Area Delineation

The final SSA delineation for each municipality in Brown County was calculated in Chapter 3 of this plan. The existing and proposed sewer service areas to be added as part of this plan are identified on maps, also in Chapter 3 of this plan. In total, 3,530.65 acres of developable land will be added to the sewer service area as part of this plan. Also, an additional 10,542.31 developable acres will remain available by the various municipalities for use in future amendments when a need for expanded sewer service areas can be justified.

The largest additions of developable acreage to the sewer service area as part of this plan will occur in the Towns of Lawrence, Ledgeview, and Pittsfield. For the first two, this is due to a continued population increase over the last decade. The Town of Pittsfield has added to its SSA based on future commercial and industrial land use around the Highway 32/29 Interchange at CTH VV. A summary of the existing and available acreage for each municipality can be found in a table at the end of Chapter 3.

When developing the sewer service area boundaries, environmental protection and cost effective provision of urban services are the key considerations for providing compact, easily serviced growth. Those undeveloped areas immediately adjacent to existing sewered development will be assumed to develop first. As the distance from the developed area increases, the priority for new growth will decrease. The delineated sewer service area represents the area that should be sufficient to accommodate the projected normal growth for the next 20 years, with some margin for allowing market conditions to operate. Unforeseen types and amounts of development are covered under the amendment section.

In updating the *Brown County Urban Service Area Water Quality Plan*, locally adopted comprehensive plans are formally acknowledged and considered in the sewer service area update process, as has been done in previous plan updates. Key components included calculating various land use need percentages when determining acreage allocations, as well as environmental protection and cost effective development. The relationship with local comprehensive plans is vital to the success of the *Brown County Urban Service Area Water Quality Plan.*

Designated Management Areas

The establishment of sewer services areas is defined by municipalities and can be used by municipalities with sanitary districts, also referred to as designated management areas (DMAs). Although acreage may have been allocated to a municipality, based on its population and development needs, establishing additional sewer service area can only be accomplished if the area is also in a sanitary district. If a municipality no longer has a designated sanitary district, as is the case with some villages and the two cities, then sewer service area can be added if it is also demonstrated that the related WWTP has capacity to accommodate the added sewer service area.

Should conflicts arise between communities regarding sewer service area planning issues, every attempt will be undertaken by the Brown County Planning Commission to encourage and support the efforts of

the affected local units of government to first resolve the situation by themselves. Unique situations and unanticipated conflicts between communities regarding sewer service area planning issues shall be resolved by the Brown County Planning Commission and the Wisconsin Department of Natural Resources in accordance with all applicable laws and regulations and the goals, objectives, and policies of this plan. Conflicts are best resolved with the full support and concurrence of all affected local units of government, not just by review and approval of both the Brown County Planning Commission and the Wisconsin Department of Natural Resources.

Of particular and most immediate concern in this regard is the possibility that communities may wish to expand their sewer service area to the same location as another adjacent community. In that scenario, the Brown County Planning Commission would recommend that the conflicts be immediately resolved by the affected communities using boundary, shared services, or other similar intergovernmental agreements. During that process, the subject area would not be included within any SSA.

If at least one of the affected communities states that such an agreement would not be feasible, the Brown County Planning Commission would first undertake a preliminary review of the status of facility planning and designated management area status within the subject area to determine if a sewer service area boundary determination could be made.

- Should the subject area be located **within a city, village, sanitary district, or utility district** and all other applicable state and county rules and regulations be met, including the goals, objectives, and policies of this county sewage plan, the requested sewer service area would be allocated to the city, village, sanitary district, or utility district within which the subject area resides. The subject city, village, sanitary district, or utility district could then proceed with a sewer service area amendment. If a management area overlaps with another municipality/management area, the jurisdiction issue should be resolved between the parties before a 208 water quality conformance review can be completed and issued for a proposed extension.

- Should the subject area be located **within an approved sewer service area** and all other applicable state and county rules and regulations be met, including the goals, objectives, and policies of this county sewage plan, the requested sewer service area would remain allocated to the community which had originally identified and received approval of the sewer service area. No amendment would be necessary unless the area is annexed by a different city, village, sanitary district, or utility district. If the area would be annexed by a different city or village, a SSA amendment would need to be completed to transfer the area between communities.

- In most other instances, the Brown County Planning Commission would request that the affected communities enter a formal negotiation/mediation process for settlement of the contested issues.

- Should the subject area be **in a sanitary district or utility district and outside of the existing municipal boundary of the requesting municipality** and the sanitary district or utility district in which the subject area resides objects to the SSA amendment request, the SSA request would not be reviewed by the Brown County Planning Commission until the requesting municipality obtains jurisdiction of the subject area either through annexation or inter municipal agreement.

The extent of the subject area for negotiation purposes would be determined by the affected sewer service area and acreage allocations for each municipality.

If at least one of the affected communities states that a boundary, shared services, or other similar intergovernmental agreement cannot be reached after attempting a formal and documented negotiation/mediation process, and at least one of the parties continues to proceed with an SSA amendment request, the Brown County Planning Commission would proceed with the sewer service area amendment review. In that event, the Brown County Planning Commission would have the option to recommend denial of the SSA amendment request until the affected communities reached an agreement. This recommendation would then be forwarded to the Wisconsin Department of Natural Resources for review and consideration.

The Brown County Planning Commission would also have the option to resolve the dispute based upon guidance contained within approved facility plans, Wisconsin Administrative Code NR 121 and the goals, objectives, and policies contained within this plan. Emphasis would be placed on cost effectiveness and environmental protection, based on which proposal better achieves both. The affected municipalities would be encouraged to provide information that includes an evaluation of alternatives that demonstrate how the municipality could extend sewer service to the subject area, when the service would be provided, the cost of sewer service, and any environmental impacts. The Brown County Planning Commission would then forward a recommendation based upon this information to the Wisconsin Department of Natural Resources for review and consideration.

This plan delineates the sewer service areas of Brown County and its immediate environs and recognizes that areas may change over time for different reasons. To accommodate reasonable and justifiable changes, this plan identifies procedures and criteria to be followed in addressing such changes. To facilitate the timely consideration of proposed sewer service area changes, a separate Amendment Application Manual has been prepared to address both major and minor SSA revisions. A summary of this process is set forth in Chapter 8.

Table 4-1: Ownership of Sewage Treatment Facilities by Sewer Service Area

Sewer Service Area	Local Components	Regional Components	WWTP
Allouez	Allouez	NEW WATER	NEW WATER
Ashwaubenon	Ashwaubenon	NEW WATER	NEW WATER
Bellevue	Bellevue	NEW WATER	NEW WATER
Denmark	Denmark	Denmark	Denmark
De Pere	De Pere	NEW WATER	NEW WATER – De Pere
Dyckesville	Dyckesville San. Dist.	NEW WATER	NEW WATER
Green Bay	Green Bay	NEW WATER	NEW WATER
Hobart	Hobart	NEW WATER	NEW WATER
Holland	Holland San. Dist.	Holland San. Dist.	Holland San. Dist.
Howard	Howard	NEW WATER	NEW WATER
Lawrence	Lawrence	NEW WATER	NEW Water De Pere
Ledgeview	Ledgeview San. Dist.	NEW WATER	NEW Water De Pere
Morrison/Wayside	Morrison San. Dist.	Morrison San. Dist.	Morrison San. Dist.
Oneida	Oneida	Oneida	Oneida
Pittsfield	Pittsfield San. Dist.	NEW WATER	NEW WATER
Pulaski	Pulaski	NEW WATER	NEW WATER
Scott	Scott Municipal Utility New Franken	NEW WATER	NEW WATER
Suamico	Suamico San. Dist.	NEW WATER	NEW WATER
Wrightstown	Wrightstown	Wrightstown	Wrightstown
Wrightstown #1 and #2	Wrightstown San. Dist. #1 Wrightstown San. Dist. #2	Wrightstown San. Dist. #1 Wrightstown San. Dist. #2	Wrightstown San. Dist. #1 Wrightstown San. Dist. #2

Chapter 5: Environmentally Sensitive Areas

Background

As identified previously in this plan, the primary purpose of the Federal Clean Water Act is to protect the nation's lakes, rivers, aquifers, and coastal areas from pollution. Two goals of the Act are to eliminate the discharge of pollutants into the nation's waters and to achieve water quality levels that are fishable and swimmable. In pursuit of these goals, Section 208 of the Clean Water Act requires that all states prepare and implement regional water quality plans which, among other things, are intended to identify and control both point and nonpoint sources of pollution.

In Wisconsin, this continuing planning process has become the Department of Natural Resources responsibility. In cooperation with regional planning commissions and local units of government, the DNR prepares and implements "water quality management plans." In 1974, in recognition of its need and importance, the Fox Valley area (which extends from Fond du Lac to Green Bay) was one of the first areas in the state designated for such planning.

With the creation of Administrative Code Chapter NR 121 (Areawide Water Quality Management Plans) in 1979, the Department of Natural Resources established the formal guidelines under which the water quality management planning process would be conducted in Wisconsin. That process included the requirement that each water quality management plan include the identification of "sewer service areas" and, within those areas, the identification of "major areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints." NR 121 also states that "areas to be considered for exclusion from the sewer service area because of the potential for adverse impacts on the quality of the waters of the state from both point and nonpoint sources of pollution include, but are not limited to, wetlands, shorelands, floodways and floodplains, steep slopes, highly erodible soils, and other limiting soil types, groundwater recharge areas, and other such physical constraints."

The Brown County Planning Commission first began to identify such areas in its 1982 county sewer service area plan and termed those areas environmental corridors. At that time, environmental corridors consisted of all navigable waters, all wetlands larger than five acres located within zoned shoreland areas, and certain large wetlands located outside zoned shoreland areas identified by the DNR. The environmental corridor definition was later revised in the 1987 county sewage plan to also include the floodways of all navigable waters. Steep slopes were added as environmentally sensitive areas in the 1995 plan. The 2002 plan further clarified steep slopes and steep slope setbacks. In 2011, the plan was updated to reflect environmentally sensitive areas that relate to shoreland zoning as best as possible, as well as inclusion of karst features, the *Wisconsin Land Legacy Report*, and the *Wisconsin's Natural Heritage Inventory*. The *Brown County Urban Service Area Water Quality Plan* was updated in 2015 with the ESA minor amendment process, and updated ESA maps.

Beginning in the 1980s, more accurate, detailed, and definitive water quality research was undertaken within Wisconsin. Such research not only identified the general status of water quality within Wisconsin but also began to identify the current trends, anticipated problems, and envisioned solutions associated with those water quality conditions. In addition, research from around the country indicated what many regulators and researchers had already suspected. Nonpoint source pollution was a growing problem, and to preserve and improve water quality, regulation of surface water, groundwater, wetlands, and adjacent uplands was necessary.

The areas adjacent to lakes, rivers, streams, floodways, and wetlands can filter pollutants from runoff, lessen downstream flooding, and maintain stream base flows. These "riparian" areas have also been shown to provide a variety of wildlife, recreation, and infrastructure opportunities. Research has indicated that proper "riparian buffers" consist of a wide strip of vegetation that prevents soil erosion, filters runoff, encourages infiltration, stabilizes stream banks, provides shade to water bodies, provides cover for wildlife, and provides recreational opportunities.

Based upon this information, the *2002 Brown County Sewage Plan*, updated in 2011 and again in 2015, further revised the environmentally sensitive area definition in response to changing federal and state rules and regulations and in response to the growing importance and need for flood studies and storm water management plans. The revised ESA definition includes refined buffers for steep slopes adjacent to surface water features, and refined ESA setbacks for wetlands, waterways, and floodways. In addition, the revised ESA definition also provides greater flexibility for the location of certain activities and uses within ESAs.

Purpose

Brown County has many scenic, unique, and sensitive natural resource areas. Some examples are the Long Tail Point islands and coastal wetlands, such as Point au Sable and Peters Marsh; the Niagara Escarpment and particularly the associated Fonferek's Glen, Kittel, Rock, Red Banks Alvar, and Wequiock Falls areas; the Big Scott Woods; the Holland Red Maple Swamp, and the Neshota River Valley. Typical natural resource features include rivers and streams and their associated shorelands and floodlands, wetlands, woodlands, prairies, wildlife habitat areas, and wet, poorly drained, and organic soils and steep slopes. The presence and quality of these natural resource features in Brown County plays a pivotal role in the quality of life of county residents.

The benefits derived from natural resource features can also contribute to the health and safety of the county. Such benefits can include:

- Recharging groundwater, which provides drinking water for many people in Brown County.
- Maintenance of surface water and groundwater quality, which helps improve drinking water supplies and recreational experiences.
- Attenuation of flood flows and stages, which decreases the risk of flood damage to adjacent property owners.
- Maintenance of base flows of streams and watercourses, which is important to the continued well being of wildlife habitat.
- Reduction of soil erosion, which is vital for the continued high productivity of the county's agricultural lands.
- Abatement of air pollution, which results in health benefits for county residents, as well as for vegetation and wildlife.
- Abatement of noise pollution, which lends itself to use as a filter or buffer between adjacent and potentially conflicting land uses.
- Favorable modification of climate, which can help moderate temperature extremes.
- Wildlife movement/migration areas and wildlife habitat.
- Protection of plant and animal diversity, which promotes healthy and thriving ecosystems able to survive change and stress.
- Protection of rare, threatened, and endangered species, thereby preserving a part of our natural heritage.

Because of the vital functions performed by these natural resource features, these areas should be preserved and protected. Also, development in these areas can lead to serious and costly problems such as failing foundations, hillside slumping, wet basements, excessive clear water infiltration into sanitary sewer systems, and poor drainage.

The destruction or deterioration of natural resource features may lead to a chain reaction of further environmental deterioration and destruction. For example:

- The destruction of ground cover may result in soil erosion, stream siltation, more rapid and higher volumes of storm water runoff, and increased flooding, as well as the destruction of wildlife habitat, loss of scenic beauty, and loss of rare, threatened, and endangered species habitats.

- The draining of wetlands may destroy fish spawning grounds, wildlife habitat, groundwater recharge areas, and the natural filtration and flood storage areas of interconnecting stream systems. The resulting deterioration of surface water quality may, in turn, lead to a deterioration of the quality of the groundwater that serves as a source of domestic, municipal, and industrial water supply and upon which low flows of rivers and streams may depend.

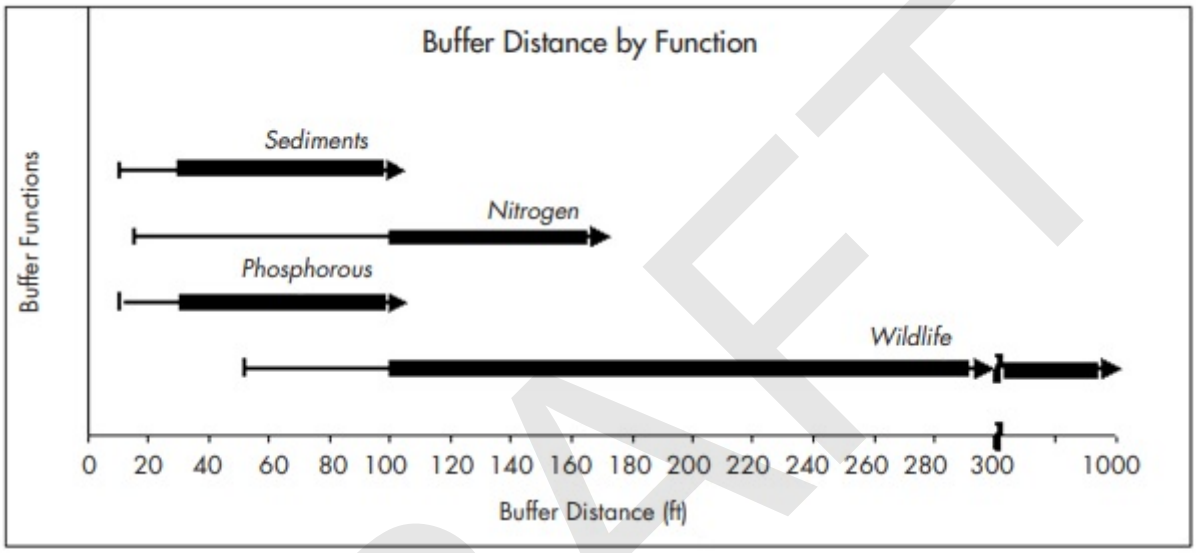
When natural resource features are located within areas of future growth, they are often developed or degraded. This has led to the continual loss of these resources over time. Although many of the problems associated with development of these natural resource features are widely known and recognized, the pressures to develop these areas have become even greater as other more easily developable lands become less prevalent within and adjacent to growing communities.

The Brown County Planning Commission has long recognized this problem and the importance of protecting and preserving these natural resource features. The 2017 2022 *Brown County Park and Outdoor Recreation Plan*, the *1979 Brown County Environmentally Significant Areas Plan*, the 2004 *Brown County Comprehensive Plan*, as well as each update of the *Brown County Sewage Plan* have all set forth goals, objectives, and policies which strive to protect the natural resource features found in the county.

Definition

Environmentally sensitive areas (ESAs) are major areas unsuitable for the installation of waste treatment systems because of physical or environmental constraints and are to be excluded from the service area. The buffers used in these ESA definitions come from the *Planner's Guide to Wetland Buffers for Local Governments*[10]. Figure 5 1 is taken from that guide and shows the effective buffer distances by function. The ESA buffers in this section were based on both the range of potentially effective buffer distances and the most effective buffer distances.

Figure 5-1: Buffer Distance by Function



Effective buffer distance for water quality and wildlife protection functions. The thin arrow represents the range of potentially effective buffer distances for each function as suggested in the science literature. The thick bar represents the buffer distances that may ***most*** *effectively accomplish each function (30 - > 100 feet for sediment and phosphorous removal; 100 - > 160 feet for nitrogen removal; and 100 - >300 feet for wildife protection. Depending on the species and the habitat characteristics, effective buffer distances for wildlife protection may be either small or large.*

Areas considered for exclusion from sewer service areas due to potential adverse impacts on water quality from both point and nonpoint source pollution include:

1. Navigable waterbodies.

a) Including lakes, rivers, streams, and ponds identified on USGS topographic maps or Brown County Geographic Information System (GIS).

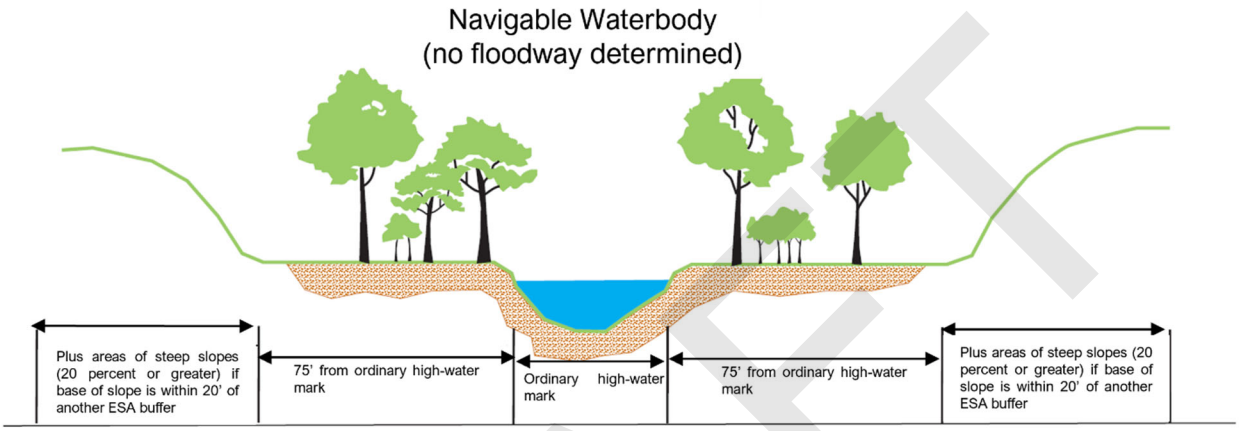
b) Land within 75 feet from the ordinary high water mark (OHWM) of navigable waterways based on Wisconsin DNR navigability determination with no flood study.

i. The 75 foot ESA setback from navigable waterways should be defined using lines that are, at minimum, parallel to the waterway. Points and straight lines with bearings and

[10] [10] *Planner's Guide to Wetland Buffers for Local Governments.* Environmental Law Institute, 2008. https://www.eli.org/research-report/planners-guide-wetland-buffers-local-governments

distances may be used to define the boundary like a meander line; however, in no instance shall resulting points and straightened lines be closer than the designated ESA width of 75 feet.

Figure 5-2: Navigable Waterbody Buffers (no floodway)



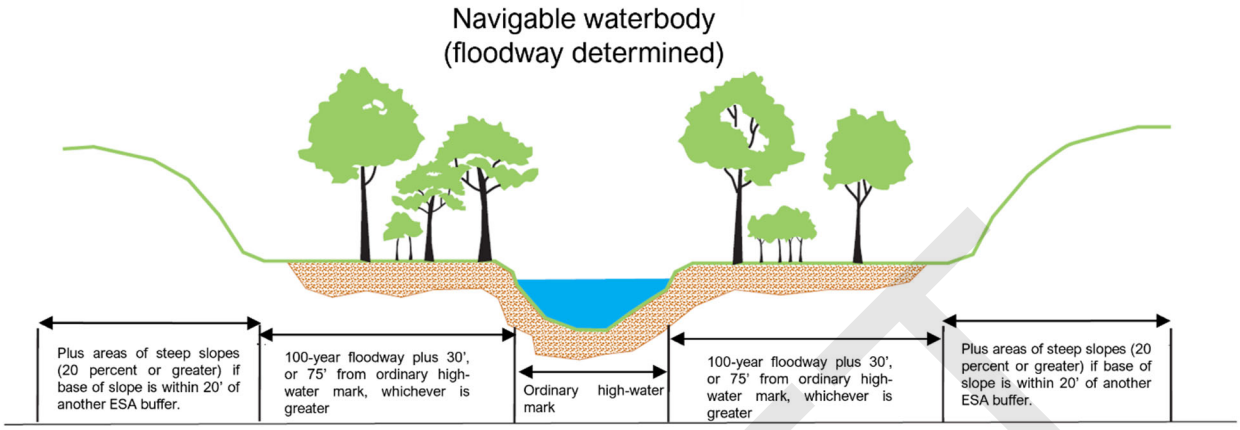
2. Floodways

a) Including floodways identified on FEMA maps, and DNR approved floodway maps and flood studies.

b) Floodway plus land within 30 feet from the floodway line, or 75 feet from the ordinary high water mark (OHWM), whichever is greater (see example 1).

i. The 30 foot ESA setback to floodways should be defined using points that are a minimum of 30 feet from the actual ESA. The points should be connected by a straight line that includes bearings and distances, like a meander line. In no instance shall the resultant straightened lines be closer than the designated ESA width.

Figure 5-3: Navigable Waterbody Buffers (with floodway)



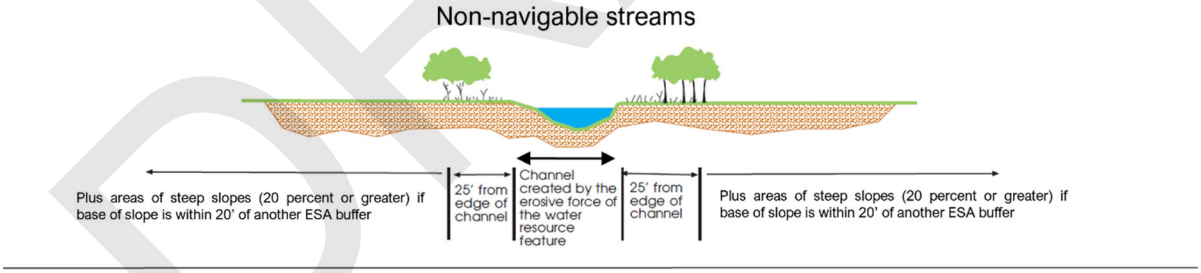
3. Non-navigable waterways

a) Waterways determined to be non navigable by the DNR.

b) Land within 25 feet from the top of bank of non navigable waterways.

i. The 25 foot ESA setback from non navigable waterways should be defined using lines that are, at minimum, parallel to the waterway. Points and straight lines with bearings and distances may be used to define the boundary, like a meander line. In no instance shall the resultant points and straightened lines be closer than the designated ESA width.

Figure 5-4: Non-navigable Streams



4. Wetlands

Wetland has the meaning given in NR 103.02 (5): "Wetlands" 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.

a) Wetlands Identified through the Wisconsin Department of Natural Resources Wetland Inventory

a. This includes both the DNR's Surface Water Data Viewer, and the same data displayed on Brown County's online GIS application. These are the areas large enough to map (polygons, not points).

i. These wetlands will have a 50 foot buffer.

ii. Because the wetland boundaries identified in the Wetland Inventory are approximate, the buffer is 50 feet to ensure that the wetland area is protected. Once a wetland has had a certified delineation, the applicable wetland buffer (listed below) would then apply.

b) Areas with Wetland Indicator Soils

a. Areas with wetland indicator soils shown on the DNR Surface Data Water Viewer will have a certified wetland delineation completed during the land division process or when sewered development is being proposed on the site. If any proposed disturbance is 50 feet or more away from the wetland indicator soils, a certified wetland delineation may not have to be completed after consideration by Brown County Planning Commission staff. For areas with wetland indicator soils that remain undelineated, the following setbacks will apply to maintain water absorption capacity for stormwater management and water quality protection.
    i. Areas larger than two acres will have a 30 foot setback.
    ii. Areas smaller than two acres will have a 10 foot setback.

c) Previously Delineated Wetlands

a. Including wetlands identified on a wetland delineation report with a supporting Wisconsin Department of Natural Resources and/or Army Corps of Engineers concurrence letter that is less than five years old.
    i. Wetlands larger than two acres in size will have a 30 foot setback.
    ii. Wetlands that are less than two acres in size will have a ten foot setback.

d) Newly Delineated Wetlands

a. Newly delineated wetlands will follow NR 151.12(5)(d), *Runoff Management - Post-construction performance standard for new development and redevelopment - Protective Areas*, which outlines the setbacks for wetlands based upon its sensitivity as identified through the wetland delineation. The categories are:
    i. Most sensitive (highly susceptible; wetlands in in areas of special natural resource interest as specified in s. NR 103.04) – 75 feet
    ii. Least sensitive (less susceptible) – 10 30 feet, which is based on 10% of the average wetland width, but no less than 10 feet nor more than 30 feet
    iii. Moderately sensitive (all others) – 50 feet
b. The ESA setback from wetlands identified under (d) a. i iii should be defined using lines that are, at minimum, parallel to the wetland. Points and straight lines with bearings and distances may be used to define the boundary like a meander line; however, in no instance shall resultant points be straightened lines that are closer than the designated ESA width.

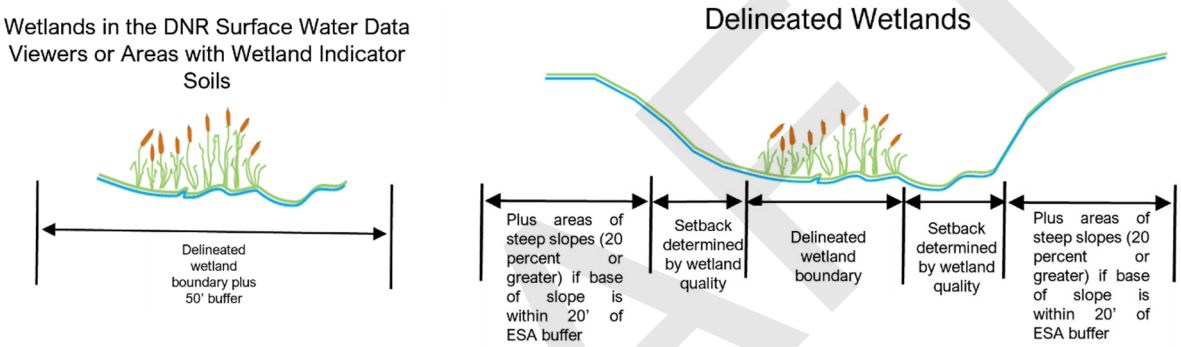
e) Low Quality Wetlands

a. A wetland determined to be low quality may be removed from the mapped ESA area provided:
    i. A certified wetland delineation that identifies it as a low quality wetland has been completed and does not contain any of the exemptions listed in Wisconsin State Statutes 281.36(4n); and
    ii. The property owner or agent has obtained a Wetland Exemption from the DNR, OR a General or Individual Permit first (and provided documentation to the BCPC).

iii. The above information will be provided to BCPC staff for review. If the request is for a property that doesn't yet have a land division record, the information will be kept on file with BCPC staff (and the wetland area will not need to be shown on any future land division document). If the change is for a property with an existing recorded land division, the change will be documented with an affidavit that is recorded with the Brown County Register of Deeds and will be attached to the affected property/CSM/subdivision.

Note: Wetland size is determined by the entire size of a wetland area. The wetlands area should not be divided into sub polygons due to parcel lines, municipality lines, or county lines.

Figure 5-5: Wetland Buffers



5. Steep Slopes

The DNR's Areawide Water Quality Management Program has defined steep slopes as any slope or gradient equal to or greater than 12 percent on any soil type. Because Brown County has a history of identifying steep slopes of 20 percent or greater as ESAs, it will continue that practice.

a) These include land within 20 feet from the top and bottom of steep slopes that are 20% or greater and that overlap with a buffer of another ESA (like wetland or navigable stream). This means the steep slope area would be considered an ESA if there is a water resource feature or related setback within 20 feet of the top or bottom of the slope (see Figure 5 6)

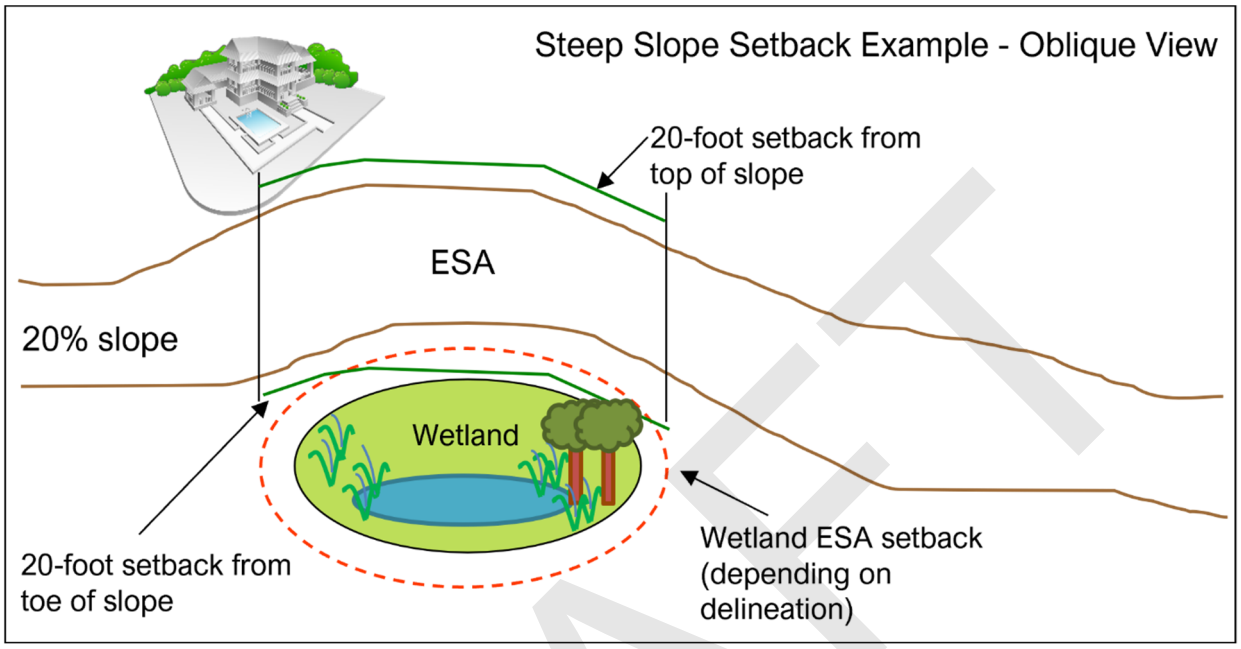
i. Cutting and filling necessary to provide proper grade for walk out basements will be permitted within a steep slope ESA setback if an ESA amendment has been provided to document the necessary analysis to show water quality is not impacted. This is in addition to any/all other required permits from the governing municipality and any relevant agencies to complete the work.

ii. The 20 foot ESA setback to steep slopes should be defined using points that are a minimum of 20 feet from the actual ESA. The points shall have bearings and distances, and shall connect with a straight line, like a meander line. In no instance shall the resultant straightened lines be closer than the designated ESA width.

iii. Artificial steep slopes created through engineering and grading, including the re engineering and re grading of stabilized artificial slopes and previously approved grading plans (such as slopes associated with ditches/roadways) are not considered ESAs. Any

work in these areas should still follow any local ordinances and include erosion control measures.

Figure 5-6: Steep Slope Setbacks



Other Significant Natural Resource Features

These include (on a case by case basis) river and stream headwaters, groundwater recharge areas, unique woodlands, high value wildlife habitat areas, geologic and natural area sites, wet and poorly drained and organic soils, and areas identified in the *Wisconsin Land Legacy Report* and where rare plants, animals, and natural communities are known to be located as identified in *Wisconsin's Natural Heritage Inventory*. Updated information regarding plant species is available online at http://dnr.wi.gov/topic/erreview/publicportal.html.

Karst features may appear to fall into this category but are not considered environmentally sensitive areas. Rather, karst features are considered land unsuitable for building and have a ten foot setback. Karst areas can include certain steep slopes such as the Niagara Escarpment, exposed and cracked bedrock, etc.

Significant Human-Made Features

The intent of the environmentally sensitive areas concept in the *Brown County Urban Service Area Water Quality Plan* is to identify, protect, and preserve natural water and water related resource features on a countywide basis. Human made water related features, such as ponds created by or as part of quarrying and storm water management or agricultural operations, are not to be identified as ESAs. However, should appropriate regulatory agencies determine that such human made features are waters of the United States or waters of the state and if developed or disturbed would pose a significant threat to water quality, the ESA criteria and restrictions set forth in this plan shall apply.

Protective Areas

Protective areas have been created and are enforced by the Wisconsin Department of Natural Resources to protect wetlands that have plant communities most sensitive to nutrient enrichment and

sedimentation. Some protective areas are more restrictive than Brown County ESAs, and some protective areas are less restrictive. The width of a protective area is based on the sensitivity of the resource to the runoff stressors (nutrients or siltation).

Per NR 151, protective areas are areas of land that commence at the top of the channel of lakes, streams, and rivers, or at the delineated boundary of wetlands, and that is the greatest of the following widths:

- As measured horizontally from the top of the channel or delineated wetland boundary to the closest impervious surface.
- Protective areas do not include land areas that do not contribute runoff to wetlands or waterways.

Natural Heritage Inventory

Established in 1985 by the Wisconsin legislature, Wisconsin's Natural Heritage Inventory program (NHI) is part of an international network of inventory programs. The NHI program is responsible for maintaining data on the locations and status of rare species, natural communities, and natural features throughout the state. Species and natural communities tracked by the Wisconsin NHI program can be found on the NHI Working List.

Natural communities where rare plants and animals on the NHI exist may also be considered ESAs. Appendix B in this plan includes lists of rare species and natural communities in the Brown County area, broken down by Township and Range. The following hyperlink connects to the most up to date inventory that is maintained by the Wisconsin Department of Natural Resources:

http://dnr.wi.gov/topic/NHI/

Environmentally Sensitive Area Summary

Tables 5 1 summarizes the ESA definitions, and Table 5 2 outlines the more specific requirements around implementation.

Table 5-1: Environmentally Sensitive Area Summary

ESA	ESA/Setback Requirement
Navigable Waterbody ESAs	**Navigable Waterbody ESA Setback Requirements**
Navigable waterways based on DNR navigability determination	Land within 75 feet from the OHWM of navigable waterways (with no flood study)*
Floodway ESAs	**Floodway ESA Setback Requirements**
Floodways identified on FEMA maps, and DNR approved floodway maps and flood studies	30 feet from the floodway line, or 75 feet from the OHWM, whichever is greater**
Non-navigable Waterway ESAs	**Non-navigable Waterway ESA Setback Requirements**
Waterways determined to be non navigable by the DNR	25 feet from non navigable waterways*
Wetland ESAs	**Wetland ESA Setback Requirements**
WDNR Wetland Inventory – Mapped Wetland Area	50 foot buffer area
Areas with wetland indicator soils (no certified wetland delineation has been completed)	50 foot buffer area
Areas with a wetland delineation completed (wetland susceptibility definitions based on **NR 151.125 – (Runoff Management) Protective areas performance standard**	• For highly susceptible wetlands, 75 feet*** • For less susceptible wetlands, 10 percent of the average wetland width, but no less than 10 feet or more than 30 feet*** • Low quality wetlands that have a certified delineation and do not contain any exemptions listed in Wisconsin State Statutes 281.36(4n), and have DNR Wetland Exemption or a General/Individual permit, do not have a wetland setback****
Steep Slope ESAs	**Steep Slope ESA Setback Requirements**
Land within 20 feet from the top and bottom of steep slopes that are 20% or greater and that overlap with a buffer of another ESA (like wetland or navigable stream).	20 feet from the top and bottom of the slopes*****
Other Significant Natural Resources	Including (on a case by case basis) river and stream headwaters, groundwater recharge areas, unique woodlands, high value wildlife habitat areas, geologic and natural area sites and wet, poorly drained, and organic soils, and areas identified in the *Wisconsin Land Legacy Report* and where rare plants, animals, and natural communities are known to be located as identified in *Wisconsin's Natural Heritage Inventory*.

* The 75 foot ESA setback from navigable waterways and 25 foot ESA setback from non navigable waterways should be defined using lines that are, at minimum, parallel to the waterway. Points and straight lines may be used to define the boundary; however, in no instance shall the resultant straightened line be closer than the designated ESA width.

** The 30 foot ESA setback to floodways should be defined using points that are 30 feet from the actual ESA. The points should be connected with a straight line that is surveyed and scaled, similar to a meander line. In no instance shall the resultant straightened line be closer than 20 feet from the actual ESA.

***The wetland boundary shall be made in accordance with NR 103.08 (1m)

****Additional information for low quality wetlands is outlined in this chapter in this chapter in Definitions, 4. Wetlands d). Low Quality Wetlands.

*****The 20 feet ESA setback to steep slopes should be defined using points that are 20 feet from the actual ESA. The points should be connected with a straight line that is surveyed and scaled, similar to a meander line. In no instance shall the resultant straightened line be closer than 15 feet from the actual ESA.

Table 5-2: Environmentally Sensitive Area Incompatible/Compatible Activity Summary

Incompatible Activities	Comment
Sewered development	This includes any structure that receives sanitary sewer service, unless it is for public land, park, or conservancy area service.
Land disturbing activities	No excavation, filling, grubbing (removing tree roots), or grading (unless the grading is part of an approved stormwater management plan). No structure with a excavated foundation is allowed.
Impervious surfaces	This includes parking areas unless it is for a public land, park, or conservancy area. Pervious surfaces may be considered in the setback area. Fences without concrete bases (continuous or individual pillars) are allowed in a setback area if they are pneumatically or manually driven in.
Drainpipe outlets	No drain outlet for undergrounded downspouts, or for any pool drainage, should discharge directly into an ESA area or setback (meaning no pipe outfall should daylight in the ESA). Downspouts may surface flow towards an ESA area.
Compatible Activities	**Comment**
Stormwater management	Stormwater management facilities (ponds, detention/retention areas, swales, etc.) may be in ESA areas, but should not appreciably harm ecological functions and should have supporting information that that location is the best fit.
Public parks and trails	Existing and future public parks and trails can be in ESA areas. Parks and open space help preserve ESAs. Future parks or park redevelopment should be designed in a way to minimize any stormwater runoff and should both complement and highlight the existing resource feature.
Public infrastructure	Public infrastructure extensions and utilities (roads, sanitary sewers, water mains, storm sewers, gas lines, and fiber optic cables) may cross ESAs to serve development located outside those ESAs. Environmentally sound public wastewater collection and treatment systems (wastewater treatment plants, interceptor sewers, forcemains, lift stations, gravity sewers, etc.).
Shoreland Zoning Exempt Structures	NR 115.05(b)1.m exempts certain structures from shoreland setbacks, including boathouses (that meet specific requirements), and open sided gazebos, decks, patios, and screen houses that also satisfy s. 59.692 (1v). These will be allowed provided they have an approved shoreland zoning permit.

For the compatible activities listed in Table 5 2, an ESA amendment shall not be required for such activities when all required permits and approvals are received, mitigation plans for any potential adverse water quality related impacts (degradation of the chemical, physical, and biological integrity of the waters of the United States and waters of the State, including loss or damage to fish and aquatic life, wildlife and recreation, and public water supplies or significant increases of pollutant loadings from point or non point sources) have been approved by the appropriate regulatory agencies, and proper prior notification of the ESA impact has been submitted to all affected agencies, including the Bureau of Water Quality of the WDNR.

To avoid the duplication of regulatory efforts, to streamline ESA amendments where possible and appropriate, and to maximize consistency between related regulatory programs, the following process

will be implemented. This process does not apply to the compatible activities noted above unless an ESA delineation or location would change because of a proposed project.

- The Northeastern Region DNR will provide the Brown County Planning Commission a copy of all applications for Chapter 30 permits, and other applicable permits.

- The Brown County Planning Commission staff will notify the Northeastern Region DNR staff of the presence of any ESAs within the proposed project. If present and anticipated to be affected by the proposed project, the Northeastern Region DNR will require the applicant to so indicate in any public notification and/or public input component associated with the permit process.

- The Brown County Planning Commission staff will notify the Northeastern Region DNR staff during the permit review period of any water quality and ESA related concerns associated with the proposed project as set forth under Wisconsin Administrative Code NR 121.

- Upon review and consideration of all appropriate information, including that submitted by the Brown County Planning Commission staff, the Northeastern Region DNR shall correspondingly approve, deny, or add conditions to the permit as appropriate and as provided by law.

- If any ESA delineation or location changes are to occur, the Northeastern Region DNR will provide a copy of any permit or approval and supplemental information, if any, to the Brown County Planning Commission.

- The Brown County Planning Commission will then prepare a summary and map outlining the change to the affected ESA, will include a copy of the permit, and will submit that information to the Northeastern Region DNR, as well as to the DNR's central office in Madison, as an official record of the change to the areawide water quality management plan.

Storm water management practices and facilities within ESAs do, however, require an ESA amendment in those instances when any element of the ESA (such as the floodway, wetland, or buffer) decreases in size.

Land that is platted by subdivision plat or certified survey map shall be subject to the ESA definition that was in effect at the time of local approval. Development or redevelopment will not be allowed within navigable waters, floodways, wetlands, and steep slopes without approval of the BCPC and the WDNR. Revisions to established ESAs and ESA setbacks, to reflect current requirements, should be made by the property owner by:

- Petitioning a Plan Correction amendment to the BCPC; and
- The property owner preparing and recording an affidavit with the Brown County Register of Deeds that demonstrates any approved revisions.

Applicability

Pursuant to the federal and state areawide water quality management planning rules and regulations previously noted in this plan, these ESA restrictions pertain only within approved sanitary sewer service areas and only to sewered development. State policy also requires that the provisions of this county sewage plan be consistent with all other elements of the areawide water quality management (WQM) plan, including nonpoint source priority watershed plans, remedial action plans, and wastewater treatment plant facility plans. Enforcement of these requirements will occur during the "WQM" or "208"

letter conformance review undertaken for all public and private sanitary sewer extensions. Failure to abide by the requirements of this county urban service area plan and the areawide water quality management plans of which it is part may result in a denial of sanitary sewer service to the concerned project.

Existing ESAs on Recorded Land Division Document

Where an existing land division document that was recorded prior to approval of this plan, BCPC staff will recognize the existing ESAs and buffers on that document. If someone wishes to create a new land division out of that parcel, the current ESA definitions and setbacks in this document would now apply. Where a landowner would like to reflect the current ESA definitions and standards on their property, they may pursue an ESA Amendment Plan Correction to update to the current standards.

This plan is intended to be a "living document." ESA features and the basis for their delineation obviously may change over time for a variety of reasons. To accommodate reasonable and justifiable changes to the delineation of an ESA, this plan also sets forth procedures and criteria to be followed in addressing those situations. Such procedures and their criteria are termed ESA amendments and are detailed in the Amendment Application Manual.

The sanitary sewer service area maps set forth in the *Brown County Urban Service Area Water Quality Plan,* and the environmentally sensitive areas shown are a representation of conditions at the time of map preparation. Such physical features may change over time from natural or human causes. Therefore, it is extremely important that appropriate regulatory personnel, prior to any land disturbing activity, verify the presence and location of navigable waters, non navigable waters, floodways, wetlands, steep slopes, and other similar natural resource features. Such verified information shall supersede and replace any previously mapped information set forth in this plan.

Onsite Sewage Disposal Systems

Development utilizing onsite sewage disposal systems, even if located within a sewer service area, is not regulated by the rules of the *Brown County Urban Service Area Water Quality Plan* but may be subject to other state, county, or local regulations. The requirements contained within the *Brown County Urban Service Area Water Quality Plan* will be implemented cooperatively with applicable federal, state, and local rules and regulations, including, but not limited to, the Federal Clean Water Act, Wisconsin Administrative Codes NR 103, 115, 116, 117, 121, 151, 216, and 299, and local zoning ordinances. Therefore, prior to any development or land disturbing activity within the planning area, these plans, ordinances, rules, and corresponding regulatory agencies should be contacted to determine the feasibility of the proposed project.

Policy/Procedure for Delineating and Adding ESAs Through SSA Amendment

ESA Amendments

The *Brown County Urban Service Area Water Quality Plan* does two very important things:

- The plan identifies a sewer service area (SSA) for each community and sanitary district in Brown County which has or might receive sanitary sewer service by the year 2040; and
- The plan identifies environmentally sensitive areas (ESAs) within the sewer service areas.

Any change of these areas is referred to as an amendment. This plan can be amended to change sewer service areas (SSAs) and ESAs. Each SSA or ESA amendment must meet certain specific requirements and

criteria, which have been established by the Wisconsin Department of Natural Resources and the Brown County Planning Commission. Detailed information concerning these requirements and criteria are provided later in this document in Chapter 8.

Amendment Types

If there is a situation when an ESA change needs to be considered, the Brown County Planning Commission has two amendment types to consider those ESA changes:

a) ESA Major Amendment – An ESA amendment to change an ESA area for sewered development requires staff analysis of the possible water quality impacts of the proposed development and the likelihood that the mitigation measures will be successful, approval by the BCPC Board following a public hearing, and the approval of the WDNR. These changes include the following:

i. Removing any mapped wetland area unless the wetland meets the low quality wetland definition (as defined in Definition #4 d.) or is exempted by state administrative rules or state approved rezoning.

ii. Any change that would remove any area below the ordinary high water mark of a stream, pond, or lake.

iii. Any change that reduces the width of vegetated shoreland buffer strips along streams, wetlands, and non navigable waterways below minimum guidelines.

b) ESA Minor Amendment – An ESA minor amendment option is available if the amendment proposes a change of an existing (or previously amended) ESA area, and:

i. Only the ESA buffer is impacted; and

ii. No net loss of the ESA buffer occurs from the proposed change.

For example, this scenario might occur when a proposed development can't avoid crossing into an ESA buffer. If site water quality can still be maintained, a modification to the buffer may be considered. An ESA minor amendment would only be reviewed by BCPC staff.

c) ESA Map Correction - These types of changes do not have the potential for significant adverse impacts on water quality (as determined by BCPC staff). These changes are reviewed by BCPC staff and have a recorded affidavit attached to the property documenting the change. ESA Map Corrections include:

i. Changes resulting from DNR approved changes in floodplain or wetland delineations, or DNR approved rezoning.

ii. Updated information on a waterway, such as one to be found non navigable.

iii. Updating an existing land division record to reflect the most current ESA standards as defined by the *Brown County Urban Service Area Water Quality Plan.*

ESA Amendment Requirements

The Brown County Planning Commission and the Wisconsin Department of Natural Resources are responsible for reviewing and approving all amendments. In addition, the BCPC staff also typically requires that the local unit of government review and concur with the amendment. No sewered development or associated construction can occur until this review is complete and the amendment approved.

Each amendment type has its own special set of requirements, which are detailed further in Chapter 8. The following items identify who can request an amendment, and when it can be requested:

a) **Who Can Request an ESA Amendment -** Any official representative of the state or federal governments, the county, a city, village, town, sanitary district, utility district, or sewerage district can apply for an amendment. Such a representative is commonly referred to as the applicant. If a landowner or developer is requesting an amendment, they must first obtain the support and approval of the local unit of government before the BCPC will accept and review the amendment.

b) **When an Amendment Can Be Requested -** An amendment can be requested at any time. However, the applicant shall get local approval of the change first and then meet with the staff of the Brown County Planning Commission to discuss the change. An amendment will be reviewed by the BCPC only if the local unit of government supports the request. In turn, the DNR will typically not review an amendment until it has first been reviewed by the BCPC. Also, the more information the applicant can provide supporting the request, the better the chances are that the amendment will be reviewed in a timely manner. The applicant should be aware that the review by the Brown County Planning Commission and the Wisconsin Department of Natural Resources can take as long as three months or even longer for especially complicated amendments. No sewered development or associated construction can occur until this review is complete and the amendment approved.

Enforcement

Recommendation

ESA enforcement would be an important part of the Brown County Urban Service Area Water Quality Plan to protect those identified areas to help Brown County work to achieve improved water quality. Enforcement would help protect those existing areas since protecting existing areas is easier than recreating new areas or building new stormwater infrastructure.

Creating enforcement policies and procedures will require additional time and collaboration between different Brown County departments, municipalities, and the DNR. Since this issue also overlaps with Brown County's Chapter 21 Subdivision Ordinance, this plan recommends a specific enforcement policy creation effort following the completion of this plan. Until then, BCPC will continue to work with other municipal staff to address issues and questions as they arise, and work towards timely resolutions in those instances.

Chapter 6: Implementation

Brown County Planning Commission is the local administrative authority for the *Brown County Urban Service Area Water Quality Plan* implementation. The cooperation of local municipalities, sanitary districts, utility districts, and sewerage districts is necessary for the plan's success. Brown County is one of four governor designated complex growth areas, and the Brown County Planning Commission is a contract agency for the DNR's areawide water quality management in Brown County. The *Brown County Urban Service Area Water Quality Plan* provides direction for future land use, development, and environmental goals and objectives. In addition to local support, the actions of state authorities, such as the Wisconsin Department of Natural Resources Bureau of Water Quality, will also greatly impact the success of this plan.

Recommendations

The following steps are recommended to implement this plan:

1. The *Brown County Urban Service Area Water Quality Plan* should be formally approved by the Brown County Planning Commission Board of Directors. While not required, the plan will then be forwarded to the governing bodies of the cities, villages, and towns within the planning area impacted by this plan and to the governing bodies of the operators of the wastewater treatment facilities within Brown County for use as a guide for the identification of sanitary sewer service areas and for the provision of public sanitary sewer service.

2. The Brown County Planning Commission, Brown County Land Conservation Department, and the Brown County Zoning Department should review their land division and subdivision, shoreland zoning, and other related ordinances for potential amendments so policies expressed in the ordinances reflect the urban service and environmental protection recommendations in the *Brown County Urban Service Area Water Quality Plan*.

3. The cities, villages, towns, sewerage districts, utility districts, and sanitary districts within the planning area should review their land division and subdivision ordinances, zoning ordinances, comprehensive plans, and utility extension policies to ensure that the policies expressed in the ordinances, plans, and policies reflect the urban service and environmental protection recommendations in the *Brown County Urban Service Area Water Quality Plan*.

Other Considerations

In addition to the above, there are additional programs and policies that impact implementation of the *Brown County Urban Service Area Water Quality Plan*. The programs and policies include the Wisconsin Department of Safety and Professional Services Chapter SPS 383.

Chapter SPS 383

Wisconsin Department of Safety and Professional Services Chapter SPS 383 will establish uniform standards and criteria for the design, installation, and maintenance of private sewage systems, POWTS, so that the systems are safe and will protect health and waters of the state. SPS 383 does not dictate or prioritize specific solutions or the selection of systems. Rather, the chapter delineates the critical factors, parameters, options, prohibitions, and limitations for the design of privately owned wastewater treatment systems.

Financial Assistance

The Clean Water Fund

The Clean Water Fund (CWF) is a State of Wisconsin environmental loan program that was established in June 1990. The purpose of the fund is to provide financial assistance to municipalities for wastewater treatment facilities and urban storm water runoff projects. The Clean Water Fund intended to fill the void in funding sources when the federal government phased out its wastewater project funding in 1994. The Department of Natural Resources (DNR) is the primary administrator of the CWF program, and the Department of Administration is the financial manager for the CWF program.

The CWF provides funds for projects to build new wastewater treatment plants, modify or expand existing treatment plants, construct interceptors, or build a sewer system in an unsewered area. Funds for these various projects are available only for a Wisconsin town, village, city, county, town sanitary district, or lake protection district. Other entities that may benefit are metropolitan sewerage districts and federally recognized Indian tribes but not individual homeowners or businesses. Eligible candidates for the Clean Water Fund can receive funding for wastewater and storm water projects with a total project cost of less than $1,000,000.

Before a municipality begins its project, the community should contact the DNR because the proposed project must be approved by the DNR if a loan is granted. The municipality must have a wastewater user charge system that is fair and equitable. If not already in place, a replacement or depreciation fund must be established to replace equipment that will wear out during the life of the treatment plant. Also, the community must be able to afford the proposed loan payments.

Finally, the Clean Water Fund is an important tool that municipalities can utilize when in need of financial assistance. In addition to benefiting the community that receives the loan, others can utilize available money from future loans made from the repayment of Clean Water Fund loans in the form of a revolving loan fund. The loan program also provides an incentive for users to conserve water resources since a more realistic cost of capital will be reflected in the user charges. Last, since grants provide cost free capital, they tend to keep user charges artificially low.

Chapter 7: Public Involvement

Public involvement is a critical plan component. Successful long term plan implementation depends on public participation. Without public understanding and support of a plan's goals, objectives, policies, and recommendations, successful implementation would not occur.

State of Wisconsin Administrative Code NR 121 requires a public participation process, including a public hearing, for an areawide water quality management plan to receive WDNR Bureau of Water Quality approval. NR 121 also defines the public participation process as the implementation of activities developed to involve individual members of the public, local government officials, and other stakeholders in the areawide water quality management process. This process normally includes both public meetings and public informational hearings.

Opportunities for public involvement in the preparation of the *Brown County Urban Service Area Water Quality Plan* included:

- Providing the Brown County Planning Commission Board of Directors with a project overview and periodic status updates during the planning process in 2021 2022 at public monthly meetings.
- All technical advisory committee meetings were open to the public, posted in the Brown County weekly announcements, and publicly noticed in the Green Bay Press Gazette. Agendas, minutes, and related materials were also posted on the Brown County Planning Commission's Sewer Service Planning website at: https://www.browncountywi.gov/departments/planning and land services/planning/sewer service area planning/.
- Quarterly reporting of the status of the plan to the Wisconsin Department of Natural Resources Bureau of Water Quality in the written staff report.
- All municipalities and all sanitary districts were contacted during the review of acreage allocation. Also, all municipalities were involved in the selection and acceptance of proposed maps establishing new sewer service areas.
- Public hearing and plan review, without action, hosted by the Brown County Planning Commission Board of Directors, open to the public on February 1, 2023.
- Plan review, with approval by resolution, by the Brown County Planning Commission Board of Directors, open to the public on February 1, 2023.

The *Brown County Urban Service Area Water Quality Plan* was approved by the Brown County Board of Directors at its February 1,2023 meeting. A copy of the public hearing minutes, meeting minutes, and resolution approving the *Brown County Urban Service Area Water Quality Plan* is included in Appendix D.

Immediately after the Brown County Planning Commission Board of Directors acted to approve the *Brown County Urban Service Area Water Quality Plan* the plan was forwarded to the Wisconsin Department of Natural Resources for final review and consideration.

Chapter 8: Plan Amendment Process

I. Introduction

The Federal Clean Water Act requires that publicly owned sewage treatment plants identify the areas they could serve within a 20 year time period. In Wisconsin, these areas are called sewer service areas. These sewer service areas include all lands which are currently provided by public sanitary sewer service and all lands which are envisioned to receive public sanitary sewer service within the next 20 years.

Federal and state guidelines also allow the boundaries of the sewer service areas to be revised and adjusted when necessary. At a minimum, it is recommended that they be reviewed at least once every five years to determine if circumstances warrant any change.

The Federal Clean Water Act and other federal and state regulations also require that any part of a sewer service area, which, if developed, could result in a significant adverse water quality impact, be identified, and not provided sanitary sewer service. A significant adverse water quality impact would include any harm to surface or ground waters due to point or nonpoint source pollution. In addition, the incremental impacts of individually small actions, when they occur on a widespread basis throughout a watershed or along a water body, can also result in a significant adverse water quality impact. Examples of this include nonpoint source pollution, such as agricultural or construction site erosion, storm water runoff from roads and parking lots, or the incremental grading or filling of wetlands and floodlands.

The Brown County Planning Commission refers to such areas as environmentally sensitive areas (ESAs). They include natural resource features, such as lakes, rivers and streams, floodways, shorelands, wetlands, and steep slopes adjacent to these areas.

The Brown County Planning Commission may allow limited development within the ESAs for such purposes as public and private utilities or recreational uses. For the most part, however, development, grading, and filling within these areas is prohibited.

Amendments

The *Brown County Urban Service Area Water Quality Plan* does two very important things:

- The plan identifies a sewer service area (SSA) for each community and sanitary district in Brown County which has or might receive sanitary sewer service by the year 2040; and
- The plan identifies environmentally sensitive areas (ESAs) within the sewer service areas.

Any change to these areas is referred to as an amendment. A municipality can request sewer service area changes, environmentally sensitive area changes, or both, but all are referred to as amendments. Each sewer service area or environmentally sensitive area amendment must meet certain specific requirements and criteria, which have been established by the Wisconsin Department of Natural Resources and the Brown County Planning Commission. Detailed information concerning these requirements and criteria are provided later in this chapter.

Amendment Requests

Any official representative of the state or federal governments, the county, a city, village, town, sanitary district, utility district, or sewerage district can apply for an amendment. Such a representative is commonly referred to as the applicant.

If a landowner or developer is requesting an amendment, they must first obtain the support and approval of the local unit of government before the BCPC will accept and review the amendment.

Amendment Review

The Brown County Planning Commission and the Wisconsin Department of Natural Resources are responsible for reviewing and approving all amendments. In addition, the BCPC staff also typically requires that the local unit of government review and concur with the amendment.

When Amendments Can Be Requested

An amendment can be requested at any time. However, the applicant shall get local approval of the change first and then meet with the staff of the Brown County Planning Commission to discuss the change. An amendment will be reviewed by the BCPC only if the local unit of government supports the request. In turn, the DNR will typically not review an amendment until it has first been reviewed by the BCPC. Also, the more information the applicant can provide supporting the request, the better the chances are that the amendment will be reviewed in a timely manner.

The applicant should be aware that the review by the Brown County Planning Commission and the Wisconsin Department of Natural Resources can take as long as three months or even longer for especially complicated amendments. No sewered development or associated construction can occur until this review is complete and the amendment approved.

Amendment Types

The BCPC has created an amendment system to both facilitate a quicker turnaround in the review of those sewer service area changes which are small in scope and impact and to provide a closer more comprehensive review for those amendments which are more complicated.

As established by the Brown County Planning Commission, there are five amendment types:

a) Minor Sewer Service Area Amendments (Type 1)
b) Major Sewer Service Area Amendments (Type 2)
c) Minor Environmentally Sensitive Area Amendments (Type 3)
d) Major Environmentally Sensitive Area Amendments (Type 4)
e) Plan Correction (Type 5)

There are also five amendment policies:

- Plan Correction (Policy #1)
- Acreage Swap (Policy #2)
- Existing Development (Policy #3)
- Special Regional Uses (Policy #4)
- Proper Land Use Planning (Policy #5)

Each amendment type and policy has its own special set of requirements, listed in the subsequent section. Each amendment and policy type has its own special set of criteria that must also be addressed.

Amendment Request Procedures

The first step is to determine exactly what you want to do. When you know what property is involved and what it will be used for, check the Brown County Planning Commission's sewer service area maps to see

if any changes need to be requested. The BCPC and the local community both have a larger color map of the sewer service area and the environmentally sensitive areas in their offices. A copy of these maps are also available for viewing and for downloading at the Brown County website (https://www.browncountywi.gov/departments/planning and land services/planning/environmentally sensitive areas esas/).

The second step is to check with the local unit of government to see if it will support your change. The Brown County Planning Commission will not review any change without local government support. Adjacent communities that may be affected by the proposed change should also be notified. The Brown County Planning Commission will require that they also be provided an opportunity to review and comment on any amendment prior to action by the BCPC.

The third step is to contact the Brown County Planning Commission to arrange a meeting to discuss the change. The staff of the BCPC will let you know specifically what information you need to provide and will answer any questions you have about the amendment process.

The fourth step is to fill out the appropriate part of the *Amendment Application Manual* and gather any other information you need to support your request. This can include maps, letters of support, technical studies, or special reports or plans. The more detailed and complete the information provided with the amendment application, the less likely that delays will occur. Review of the amendment by the BCPC typically does not begin until after all information requested in the *Amendment Application Manual* is provided to the BCPC.

The sewer service area guidelines set forth in Chapter 4, particularly those that deal with the expansion of sewer service area by one community into another community, must also be addressed in any amendment. Documentation of management area status, discussions with adjacent communities, and other similar information must be provided along with the amendment application.

In certain rare instances of documented hardship, the BCPC may review incomplete amendment applications or may approve the amendment contingent upon receipt of the missing information. In such instances, the missing information must not involve local support or engineering, or environmental concerns associated with the amendment request. Applicable situations will be decided by BCPC staff on a case by case basis.

The last step is to provide the amendment application and any additional information to the Brown County Planning Commission. This must always include, at a minimum:

- documentation of appropriate support for the specific change;
- a map showing the requested change; and
- a letter explaining the change and its reasons.

Detailed information on the requirements and criteria for the various amendments is set forth in the following sections of this chapter.

BCPC Amendment Review Process

When all required materials are submitted to the Brown County Planning Commission, the BCPC staff will have seven days to review the materials for accuracy and completeness. At this time, the BCPC may contact the Wisconsin Department of Natural Resources and any other concerned units or agencies of

government for additional review and comment on this matter. Should all information be in order, the BCPC will have another 14 working days (for minor amendments) or 38 working days (for major amendments) to complete their review. A public hearing to obtain public comment will also be held.

If the submitted information is incomplete or in error, review will not begin until this problem is corrected. At the end of its review, the BCPC staff will submit a letter to the applicant indicating staff's decision.

Should the BCPC staff approve the amendment as submitted, or in a revised form, and should the applicant agree with the findings and conclusion of the BCPC, the agreed upon change will be reflected in the county sewage plan and in all related sewer service area planning efforts.

If the request was a minor amendment, the agreed upon change is then final, and documented with an affidavit recorded with the Brown County Register of Deeds for the affected property or subdivision.

If the request was a major SSA amendment impacting five or more acres, or a major ESA amendment that results in a net ESA loss of any size, BCPC staff will arrange a public hearing on this matter. That same evening, the BCPC staff will present its findings and the public hearing comments to the Brown County Planning Commission Board of Directors. Should the Board of Directors approve the amendment as submitted or revised and should the applicant agree, the amendment request and all related information would then be provided to the main office of the Wisconsin Department of Natural Resources in Madison. Should the DNR approve the amendment as submitted or revised and should the applicant agree, the change is then final.

Petition Process for BCPC or DNR Findings

Should the applicant disagree with the findings and decision of the Brown County Planning Commission staff regarding a minor amendment, the applicant may petition to be heard by the Brown County Planning Commission Board of Directors.

The procedure for petitioning the Brown County Planning Commission Board of Directors for review of an amendment is as follows:

- the applicant must submit a letter to the BCPC requesting that the Board of Directors review the amendment request; and
- the applicant must resubmit the request as a major amendment. Review of the amendment request will then proceed as outlined under major amendments.

Should the applicant disagree with the findings and recommendation of the Brown County Planning Commission Board of Directors regarding a major amendment, the applicant may so indicate to the Wisconsin Department of Natural Resources when the BCPC submits its materials and information to the DNR.

The Wisconsin Department of Natural Resources will review and consider this matter and will then issue its decision. The decision will be subject to standard appeals and challenge processes applicable to DNR decisions. .

II. Amendment Requirements

Every amendment request must meet the requirements of at least one of the five amendment types and at least one of the five amendment policies.

All amendments must be based upon sound engineering, planning, and environmental principals. If an expansion of a sewer service area by one community into another community is involved, documentation indicating conformance with the guidelines set forth in Chapter 4 regarding this matter is also necessary. Furthermore, all amendments must conform with pertinent federal, state, county, and local rules and regulations, including federal and state water quality certification procedures, county shoreland and subdivision ordinances, and local zoning. All amendments should also generally be consistent with local wastewater treatment plant facility plans, local and county comprehensive plans, cost effectiveness studies, and state prepared population projections.

A. Amendment Types

In recognizing the differences between sewer service area changes and environmentally sensitive area changes, the following four amendment types have been created. The four amendment types have also been created to distinguish amendments that have a smaller scope and impact from those amendments that have a larger impact and warrant a more detailed review.

Type	Amendment	Requirements	Approving Agent
Type 1	Minor Sewer Service Area Amendments	Amendment proposes that less than five acres of the existing (or previously amended) SSA are affected, and multiple amendments are not petitioned.	BCPC Staff
Type 2	Major Sewer Service Area Amendments	Amendment proposes that five or more acres of the existing (or previously amended) SSA are affected.	• BCPC Staff • BCPC Board of Directors • WDNR
Type 3	Minor Environmentally Sensitive Area Amendments	Amendment proposes that only the existing (or previously amended) ESA buffer is impacted or changed, and no net loss of ESA buffer occurs.	BCPC Staff
Type 4	Major Environmentally Sensitive Area Amendments	Amendment proposes to reduce any amount of an existing (or previously amended) ESA and/or ESA buffer, resulting in a net loss of the ESA or the buffer.	• BCPC Staff • BCPC Board of Directors • WDNR
Type 5	Plan Correction	Corrections to a SSA or ESA to update a map. Amendment Policy #1 only.	BCPC Staff

B. Amendment Policies

The different amendment policies describe the reasoning and justification for a proposed sewer service area or environmentally sensitive area change. Both the DNR and the BCPC require that sound engineering, planning, and environmental principals justify all amendments. Such principals are typically based upon consistency with state official population forecasts, local, county, and state plans, ability to provide cost effective sanitary sewer service, etc. The *Brown County Urban Service Area Water Quality Plan* has identified the following five amendment policies:

a) **Plan Correction (Policy #1).** Corrections to a sewer service area or environmentally sensitive area can be made to fix an error in the maps or data of the county sewage plan or to reflect more accurate and up to date information due to an approved regulatory change or field determination. Plan Corrections are performed at a staff level by BCPC staff and is generally the most used policy type for an amendment.

Specific examples of changes that qualify under this policy include:

- Sewer service area boundary clarifications because of an agreement between two or more communities concerning an existing shared boundary.
- Environmentally sensitive area boundary changes made because of a DNR approved flood study. Applicable ESA setback/buffers within the subject location, such as the minimum navigable stream setback, steep slopes, or wetland setback/buffers, would still apply.
- Environmentally sensitive area boundary changes because of an Army Corp of Engineers and DNR approved wetland field verification, or a wetland delineation. However, applicable setback/buffers within the subject location, such as the steep slopes or wetland setback/buffers, would still apply.
- Noting the removal of an exempt wetland from a recorded plat or CSM that falls under Wis. State Statues 281.36 (4n).
- Documenting a revised ESA buffer from an ESA definition change in a *Brown County Urban Service Area Water Quality Plan* update.
- Environmentally sensitive area boundary changes because of a DNR or Brown County Zoning Department navigability determination. Applicable setback/buffers within the subject location, such as the minimum navigable stream setback, minimum navigable stream setback, steep slopes, or wetland setback/buffers, would still apply.
- Environmentally sensitive area boundary changes because of more accurate and detailed topographic mapping (typically to refine steep slope locations and extent).
- Environmentally sensitive area boundary changes because of a detailed storm water management plan and/or Chapter 30 permit approved by all appropriate regulatory agencies. Such changes can include the addition or relocation of non navigable streams and appropriate setback/buffers and changes to slopes. Applicable setback/buffers may also be revised if specifically reviewed and approved by the appropriate regulatory agencies (typically the local community and the DNR under its NR 216 or Chapter 30 permit programs).

b) **Acreage Swap (Policy #2).** Removing land from one location within a sewer service area or environmentally sensitive area and replacing the same amount and type of land back within another location.

The intent of a swap is to keep the acreage and population served the same, therefore this amendment does not need to go through population projections and increased WWTP flow capacity analysis.

The lands to be removed and added must typically not result in the creation of a “hole,” “island,” or narrow extension of SSA. An exact acre for acre swap is preferred. If the acreage swap is not 1 to 1, then the developable acreage added should **not** exceed the developable acreage being removed.

c) **Existing Development (Policy #3).** Sewer service areas and environmentally sensitive areas may be revised to accommodate areas of existing development provided that such changes can be accomplished in a cost effective and environmentally sound manner and other options or alternatives have been similarly considered.

Specific examples of changes that qualify under this policy include:

- Sewer service area boundary changes because of addition of existing development with currently functioning onsite sewage disposal systems. Such changes must undertake a facilities plan and cost effectiveness study which determines that the best long range solution for sewage disposal of the subject area is a connection to the proposed public sewer system. These studies must investigate and compare all reasonable alternatives, including use of conventional and non conventional onsite sewage disposal systems, including community onsite sewage disposal systems, deferment of connection to public sewer until connection is cost effective, and connection to other public sewer systems. When such changes are fully consistent with local and county comprehensive plans for the extension of urban services, such as public sanitary sewer and water service, such developed lands may be added to the appropriate SSA without application of the population projection acreage allocation analysis. All other amendment criteria would apply, however.
- Sewer service area boundary changes because of addition of existing development with failing onsite sewage disposal systems. Such changes must undertake a facilities plan and cost effectiveness study which determines that the best long range solution for sewage disposal of the subject area is connection to the proposed public sewer system. These studies must investigate and compare all reasonable alternatives, including use of conventional and non conventional onsite sewage disposal systems, including community onsite sewage disposal systems, deferment of connection to public sewer until the connection is cost effective, and connection to other public sewer systems. Such developed lands may be added to the appropriate SSA without application of the population projection acreage allocation analysis. All other amendment criteria would apply, however.

d) **Special Regional Uses (Policy #4).** Sewer service areas and environmentally sensitive areas may be revised provided there is a documented need for a unique facility or development of regional or statewide importance and the change can be accomplished in a cost effective and environmentally sound manner. Significant adverse water quality impacts will not be allowed. An example includes development for which a special location is required (such as regional parks, prisons, landfills, and airports).

e) **Proper Land Use Planning (Policy #5).** Sewer service areas and environmentally sensitive areas may be revised to reflect unanticipated growth and development trends when in accord with sound engineering, planning, and environmental principals. Such development must conform with local, county, regional, and state plans, rules, and regulations.

Specific examples of changes that qualify under this policy include:

- Sewer service area changes because of assigning additional sewer service area acreage to the subject SSA, which had previously been held in reserve at the time of the last update of the county sewage plan.
- Sewer service area changes because of loss (development) of previously vacant developable land within the SSA. The *Brown County Urban Service Area Water Quality Plan* allows SSA acreage to be replenished when the amount of such acreage within the SSA falls below the amount stated in the approved population projection acreage allocation for that SSA.
- Sewer service area changes because of unanticipated rates of growth within the community.
- Sewer service area changes because of intergovernmental services or boundary agreements between neighboring communities.

III. Amendment Criteria

All submitted amendments must be consistent with at least one of the amendment types, one of the amendment policies, and the following criteria.

> **Note:** Although hardship cases may exist and may warrant conditional BCPC review and/or approval and special circumstances may sometimes warrant a unique approach in an amendment's review and consideration, the intent of this plan is to fully, consistently, and fairly apply the goals, objectives, policies, requirements, and criteria set forth in the *Brown County Urban Service Area Water Quality Plan.*
>
> However, in no instance shall an amendment be approved by the Brown County Planning Commission that is not in conformance with at least a majority of the following criteria, nor shall an amendment be approved which does not promote the cost effective and environmentally sound provision of public sanitary sewer service.

Details of the amendment criteria are summarized in the checklists at the end of this section.

A. Letter from Municipality and Owners

All amendments, except Plan Corrections, should include letter(s) from the affected municipalities. Letters may be provided by the chief elected official of the community or organization, by its governing body, or by any representative authorized to speak on behalf of the community or agency on such matters. The letter should specifically reference the amendment and state if the municipality is in support of, objecting to, or not concerned with the amendment. If objecting, reasons should be stated.

A letter from a municipality allows an opportunity for the municipality to express support of or concerns regarding the amendment. A municipality letter in support or opposition of an amendment does not guarantee approval or denial of an amendment proposal. Concerns will be taken into consideration when final decisions of approval or rejection are made by the BCPC and/or the WDNR.

Letters of support from affected property owners are required for all ESA amendments. For SSA amendments when acreage is being removed from an SSA (in a swap with another community, for example) a letter from the affected property owners shall be provided to ensure that those property owners are aware of the proposal and have had a chance to comment on it.

When an amendment is sponsored by the WDNR or the BCPC, reasonable efforts will be made to obtain local support. While a consensus among affected units of government will be sought, in some cases unanimous support of an amendment may not be achieved. The WDNR and the BCPC Board of Directors may consider the concerned parties' positions, weigh it against the regional aspects of the amendment, and make a final determination concerning the issues involved.

Amendments that fail to receive applicable state, county, or local support will not meet this criterion.

B. Letter of Intent/Explanation

All amendment submittals must include a letter from the applicant that fully explains the purpose and intent of the amendment. The letter must also identify the subject area and which amendment type and policy are applicable.

Inclusion of any other information that would support the amendment request is also strongly encouraged.

C. Map(s) of Subject Area/Amendment Request

All amendments must include a map or maps of the subject area. The map(s) must specifically identify the proposed changes at a scale and detail acceptable to BCPC staff. The map(s) shall not only identify the subject area but shall also identify all other information applicable to the amendment request. The applicant must contact BCPC staff prior to submittal of an amendment request to determine specific mapping requirements.

While map(s) for minor SSA and Policy #1 amendments need not be to scale and can be similar in nature to a sketch plan, map(s) for all other amendments shall be to scale and shall be sufficiently detailed to show all relevant information accurately and legibly.

For SSA amendments, mapping requirements should generally include:

- The extent of the subject area.
- The location of relevant municipal boundaries, property boundaries, sanitary district/sewerage district boundaries, sanitary sewers and other major utilities, easements, rights of way, land uses, and zoning districts within and immediately adjacent to the subject area.
- The generalized location, extent, and identification of proposed development and land disturbing activities.
- The generalized location and extent of erosion control and storm water management activities.
- The generalized location and extent of pertinent major natural resource features, such as lakes, rivers, streams, floodlands, wetlands, and steep slopes. Of particular importance is the identification of the ESAs.
- The location and extent of the existing and proposed SSA boundaries.

For ESA amendments, mapping requirements should generally include:

- The extent of the subject area.
- The location of pertinent municipal boundaries, property boundaries, easements, rights of way, land uses, and zoning districts.

- Identification of such features as drainage easements, conservancy districts, and publicly or privately owned recreational lands.
- The location, extent, and identification of proposed development and land disturbing activities.
- The location, extent, and identification of proposed erosion control and storm water management facilities.
- The location and extent of all pertinent natural resource features, such as lakes, rivers, streams, drainageways, floodlands, shorelands, wetlands, steep slopes, critical soils, and significant vegetative, topographical, geological, archeological, and historic features within and immediately adjacent to the subject area. All relevant features shall be field verified and approved by the appropriate regulatory agencies, and this verification shall be provided to BCPC staff.
- The location and extent of the existing and proposed ESA boundaries.

The greatest level of site detail will typically be necessary for ESA amendments, as accurate locations of all pertinent physical and natural resource features are often critical to such an amendment's approval. Slightly less detailed mapping will typically be necessary for major SSA amendments, as only accurate locations of the proposed SSA boundary changes are critical. Less detailed mapping will typically be acceptable for minor SSA amendments.

BCPC staff may require additional mapping requirements on a case by case basis. Additional mapping will typically be required when DNR and/or BCPC staff believes a possible adverse water quality impact may occur, when unique or critical natural resources are involved, or when mitigation or enhancement efforts are proposed. Examples of such mapping include detailed flood studies, geotechnical and slope analysis studies, grading and drainage plans, detailed erosion control and storm water management plans, soil surveys, vegetation surveys, and landscaping plans.

D. Amendment Fees

An amendment review fee will be charged for the BCPC staff review and documentation of the amendment request.

Amendments which are sponsored by the DNR or BCPC shall not be subject to an amendment fee.

The fee for all other major and minor amendments shall be the county fees as established by the County Board at the time the proposed amendment is submitted for review. This fee must be submitted to the Brown County Planning Commission in full at the time of the amendment's submittal.

E. Cost-Effectiveness Analysis

Sewer service amendments will be required to provide a cost effectiveness analysis. However, minor sewer service amendments under Policy #1 will not need to provide this.

For all other amendments, the analysis should include a brief review of the relationship of the subject area to adjacent SSAs, ESAs, sanitary and sewerage districts, and sewerage systems, other options, or alternatives available for resolution of the subject issue, and the reasons for selection of the preferred alternative.

For major SSA amendments under Policy #3, the analysis should specifically include a discussion of why continued use of onsite sewage disposal systems was not chosen, why the extension of public sewers could not be deferred until a regularly scheduled update of the county sewage plan could be prepared, and what other options or arrangements for the provision of public sewer service could have been made.

Costs associated with providing onsite and public sewer should be identified and compared. The comparison should be made for both sewered development densities, as well as unsewered development densities, and for both a 20 year and a 50 year timeframe. A facilities plan should also be prepared which indicates the extent of failing onsite systems, the probability of other adjacent systems failing, and a detailed comparison of other alternatives for both onsite and public sewer service.

For major ESA amendments, the analysis should include a discussion of why an alternative design, development, or land use which would not have required an ESA amendment could not have been pursued and why a lesser level of intrusion into the ESA could not have been accomplished.

F. Sewage Conveyance and Treatment Analysis

Most amendments shall be required to provide a sewage conveyance and treatment analysis. Such an analysis is not necessary for amendments that meet the requirements of Policy #1. For all other amendments, the analysis should include a letter from the appropriate local engineer confirming the ability of the community's sewers to adequately convey the subject area's sewage.

For all major SSA amendments, the analysis should also include a letter from the operator of the downstream sewerage system (if different than the local community) and from the appropriate sewage treatment plant operator confirming their ability to adequately convey and treat the subject area's sewage. As outlined in Chapter 4, the analysis should also include a detailed description of the flows and loads to be generated by the subject development, as well as a description of the impact and relationship of those flows and loads to the design capacity and permit levels of the treatment facility.

G. Public Water Supply and System Analysis

Most amendments will be required to provide a public water supply and system analysis. Such an analysis will not be necessary for ESA amendments or amendments under Policy #1.

For all other amendments, the analysis should include a brief review of the relationship of the subject area to adjacent public water supplies and systems and the options or alternatives for obtaining public water. If public water will be provided, a letter from the appropriate service provider confirming this fact must be obtained. If public water is not to be provided, an explanation is required.

For major SSA amendments under Policy #5, the analysis should specifically address the proposed development's impact upon the adjacent public water supplies and public water systems. This analysis must consider:

- The identification and description of the proposed source of drinking water;
- The possibility and sources of potential drinking water contamination, excessive withdraw, lowering of water table levels, etc.; and
- Current and projected future capacities within adjacent drinking water systems.

H. Compliance with Local and County Plans and Planning Efforts Analysis

All amendments shall provide an analysis of conformance with local and county plans. The analysis should indicate whether the subject area is located within an urban service area and/or has been designated to receive public sanitary sewer and other urban services, as identified by local and county plans. In addition, the analysis should also indicate whether an area development plan has been prepared for the subject area, what the current and planned land use and zoning are for the subject area, and whether they are consistent with the proposed amendment request.

For all ESA amendments, the analysis should also indicate whether the subject area has been identified for natural resource preservation or otherwise intended to be protected.

I. Population Projection Acreage Allocation Formula Analysis

Sewer service amendments shall be required to provide a population projection acreage allocation formula analysis. Such an analysis is not necessary for amendments that meet the requirements of Policies #1 (except SSA exchanges), #2, or #4.

For all other amendments, the analysis should indicate the current amount of vacant developable land located within the subject sewer service area and compare that to the amount provided to the SSA under the county sewage plan to determine if additional vacant developable land is warranted.

For all amendments that meet the requirements of Policy #3, those developed lands which have confirmed the presence of failing onsite sewage disposal systems need not meet this criteria.

J. ESA Impacts Analysis

Most amendments shall be required to provide an ESA impacts analysis. Such an analysis is not necessary for amendments that meet the requirements of Policy #1 when the subject area has subsequently been determined not to be an ESA per approved flood studies, wetland field determinations, etc.

For all other amendments, the analysis should include a general description and identification of the ESAs within and immediately adjacent to the subject area, the anticipated impacts upon and land disturbing activities within the subject ESAs, and any proposed erosion control and storm water management activities.

For all ESA amendments, the analysis should also indicate the local and county shoreland zoning, any conservancy zoning, and erosion control and subdivision ordinance requirements which pertain to the subject area and the proposed development's conformance with those requirements. The location and delineation of all pertinent natural resource features, such as lakes, rivers, streams, drainageways, floodlands, wetlands, and steep slopes, should be verified by the appropriate regulatory agencies and that information provided with the analysis.

If applicable and warranted, the DNR, BCPC, or local community may require the preparation of additional detailed studies, such as flood studies, drainage plans, grading plans, geotechnical studies, slope analysis studies, soil surveys, vegetation surveys, and landscaping plans. Such additional information will typically be required when DNR and/or BCPC staff believe a possible adverse water quality impact may occur, when unique or critical natural resources are involved, or when mitigation or enhancement activities are proposed.

While the *Brown County Urban Service Area Water Quality Plan* provides an option to amend and revise environmentally sensitive areas, the Brown County Planning Commission strongly recommends that such actions not be undertaken lightly or resorted to frequently. NR 121 states that ESAs are not developed due to environmental concerns. Research and practical application have long shown that natural resource features and systems are very difficult to recreate. While significant success has been experienced with enhancing previously damaged features or resources or mitigating some of the ongoing impacts upon these resources from adjacent development, this success often requires a substantial commitment of financial resources and technical expertise.

In general, the following guidelines should be considered during any proposed ESA amendment:

- First, try to avoid any impact on or need for an amendment of an ESA. Document these efforts.
- Second, if an impact or amendment is unavoidable, try to minimize it. Document these efforts.
- Third, if an impact and amendment cannot be avoided or minimized, undertake appropriate mitigation and/or enhancement efforts. Guidance for mitigation and/or enhancement efforts can often be obtained from local DNR staff. BCPC staff will place great consideration upon such input and the following guidelines.
    - Loss or degradation of particularly high quality natural resources will typically not be supported by BCPC staff, even with mitigation or enhancement efforts. Such resources would typically include DNR identified Outstanding Resource Waters, Exceptional Resource Waters, and state identified Natural Area Sites.
    - The emphasis for mitigation/enhancement efforts should be placed first upon maintaining or improving local water quality, second upon water quantity, third upon aquatic resources, fourth upon public recreation, and last upon terrestrial resources.
    - All efforts shall include appropriate erosion control and storm water management practices both during and after construction. These practices shall be in accordance with the Wisconsin Construction Site Best Management Practice Handbook, the Wisconsin Storm Water Manual, and the USDA NRCS Field Office Technical Guide. Applicable nonpoint source performance standards and guidelines must also be noted. Those more natural practices such as infiltration areas, vegetated buffers, or vegetated swales, are preferred over gray infrastructure, such as catch basins and storm sewers, when possible.
    - Within the ESA features to remain or to be created, native habitat should be maintained or established, and the planting of native vegetation is optimal.
    - When creating or recreating a setback/buffer, a three tiered system should be undertaken. The target of the first tier, closest to the water body, should be eventual establishment of a mature riparian forest that can provide shade, leaf litter, woody debris, and erosion protection to the nearby water body. This tier should extend at least the size of two mature trees in width (about 25 feet) and should remain undisturbed. The target of the middle tier should also be the establishment of a mature riparian forest. This tier should vary in width depending upon stream order but would ideally extend the width of the 100 year floodplain or 50 feet, whichever is greater. Disturbance of this area for such activities as storm water management and recreation should be allowed. The third tier, furthest from the water body, should be comprised of grasses; although, some trees, shrubs, and bushes could be allowed. This tier should extend about 25 feet in width and could be comprised of the backyards of adjacent development. However, target vegetation and buffer width of each of these three tiers should also consider and often reflect the vegetation native to the specific area and the historic development patterns within lands immediately adjacent to the subject area.

K. Erosion Control and Storm Water Management Analysis

Most amendments shall be required to provide an erosion control and storm water management analysis. Such an analysis is not necessary for amendments that meet the requirements of Policy #1 (except SSA exchanges).

For all other amendments, the analysis should generally describe what erosion control and storm water management practices will be implemented. Such practices should describe and comply with any local, county, and state requirements.

All amendments which contain an ESA, but which do not propose to impact that ESA, should also indicate what and where specific erosion control measures will be implemented to ensure such ESA protection.

All ESA amendments should include an erosion control and storm water management plan. For minor ESA amendments, the erosion control plan should include both text and a map indicating the timing, placement, and the party responsible for implementation of the erosion control and storm water management practices. Implementation of practices in accord with the Wisconsin Construction Site Best Management Practice Handbook, the Wisconsin Storm Water Manual, and the USDA NRCS Field Office Technical Guide will be assumed to provide adequate protection of the subject ESA.

For all major ESA amendments, the erosion control and storm water management plan should be more comprehensive and detailed. The plan should address erosion control and storm water management both during and after construction. The plan should also include a general site plan of the development, which depicts site boundaries, lot and road locations, existing structures, vegetative cover, soil types, watershed boundaries, direction of surface water flow, location of bridges, culverts, waterways, storm sewers, detention basins, etc., topography at 2 foot contour intervals, and drainage easements. The plan should also include the location of the proposed erosion control and storm water management practices, and include pre construction and post construction peak flow calculations and rates, assumed runoff curve numbers, time of concentration, etc. Additionally, it should identify the timing and the parties responsible for implementation and maintenance of the practices.

The construction phase storm water management facilities should by design reduce the average annual sediment load carried in runoff by 80%, as compared to no practices in place.

The post construction phase storm water management facilities should by design control 80% of the total suspended solids that would normally run off the site.

The storm water management facilities should also conform with the erosion control and storm water management guidelines set forth under the ESA Impacts Analysis criteria, as well as the following guidelines:

- Maintain or reduce pre development peak runoff volumes and velocities for the 2 year, 24 hour storm event in Brown County.
- Maintain or reduce pre development peak runoff volumes and velocities for the 25 year, 24 hour storm event in Brown County.
- Safely pass the 100 year, 24 hour storm event in Brown County.
- Provide 80% reduction of sediment loadings resulting from the 1 year, 24 hour storm event in Brown County assuming no sediment resuspension.

L. Intergovernmental Cooperation and Coordination Analysis

Most amendments shall be required to provide an intergovernmental cooperation and coordination analysis. Such an analysis is not necessary for amendments that meet the requirements of Policy #1.

For all other amendments, the analysis should include documentation that indicates that adjacent local units of government which might be impacted by the proposed amendment have been informed of the proposal and have been provided an opportunity to comment on this matter. Any efforts to resolve any concerns should also be noted.

The intent of this approach is to encourage adjacent communities to work together on such issues as land use planning and the provision of urban services. Although such local support should always be sought on these matters, such support might not always be obtainable. In those cases, the DNR and the BCPC will have to weigh the positions of the concerned parties and make a final determination based on the issues involved.

Type 1: Minor Sewer Service Area Amendment Checklist

Criteria	Policy #1	Policy #2	Policy #3	Policy #4	Policy #5
A. Letter from Municipality and Letter from Owners	✓	✓	✓	✓	✓
B. Letter of Intent/Explanation	✓	✓	✓	✓	✓
C. Map(s)	✓	✓	✓	✓	✓
D. Amendment Fee	✓	✓	✓	✓	✓
E. Cost effectiveness Analysis	n/a	✓	✓	✓	✓
F. Sewage Conveyance and Treatment Analysis	n/a	✓	✓	✓	✓
G. Public Water Supply and System Analysis	n/a	✓	✓	✓	✓
H. Compliance with County and Local Comprehensive Plans	✓	✓	✓	✓	✓
I. Population Projection Acreage Allocation Analysis	n/a	✓	✓	n/a	✓
J. ESA Impact Analysis	✓	✓	✓	✓	✓
K. Erosion Control and Storm Water Management Analysis	n/a	✓	✓	✓	✓
L. Intergovernmental Cooperation and Coordination Analysis	n/a	✓	✓	✓	✓

✓ = required
n/a = not applicable
■ = Policy is not an option

Type 2: Major Sewer Service Area Amendment Checklist

Criteria	Policy #1	Policy #2	Policy #3	Policy #4	Policy #5
A. Letter from Municipality and Letter from Owners		✓	✓	✓	✓
B. Letter of Intent/Explanation		✓	✓	✓	✓
C. Map(s)		✓	✓	✓	✓
D. Amendment Fee		✓	✓	✓	✓
E. Cost effectiveness Analysis		✓	✓	✓	✓
F. Sewage Conveyance and Treatment Analysis		✓	✓	✓	✓
G. Public Water Supply and System Analysis		✓	✓	✓	✓
H. Compliance with County and Local Comprehensive Plans		✓	✓	✓	✓
I. Population Projection Acreage Allocation Analysis		n/a	✓	n/a	✓
J. ESA Impact Analysis		✓	✓	✓	✓
K. Erosion Control and Storm Water Management Analysis		✓	✓	✓	✓
L. Intergovernmental Cooperation and Coordination Analysis		✓	✓	✓	✓

✓= required
n/a = not applicable
■ = Policy is not an option

Types 3 and 4: Minor and Major ESA Amendment Checklist

(Only relevant criteria listed for ESAs, but criteria lettering system remains the same as the previous charts for easy reference)

Criteria	Policy #1	Policy #2	Policy #3	Policy #4	Policy #5
A. Letter from Municipality and Letter from Owners		✓	✓	✓	✓
B. Letter of Intent/Explanation		✓	✓	✓	✓
C. Map(s)		✓	✓	✓	✓
D. Amendment Fee		✓	✓	✓	✓
H. Compliance with County and Local Comprehensive Plans		✓	✓	✓	✓
J. ESA Impact Analysis		✓	✓	✓	✓
K. Erosion Control and Storm Water Management Analysis		✓	✓	✓	✓
L. Intergovernmental Cooperation and Coordination Analysis		✓	✓	✓	✓

✓= required
n/a = not applicable
■ = Policy is not an option

Type 5: Plan Correction Checklist

Criteria	Policy #1	Policy #2	Policy #3	Policy #4	Policy #5
A. Letter from Owners/Agent	✓				
B. Letter of Intent/Explanation	✓				
C. Map(s)	✓				
D. Amendment Fee	✓				
M. Draft Affidavit (will require coordination with BCPC staff)	✓				

✓= required
n/a = not applicable
■ = Policy is not an option

IV. Summary

The Brown County Planning Commission intends to promote the sewer service area planning process for Brown County in a consistent and equitable way, using the best engineering, planning, and environmental

practices and principles available. The BCPC has committed itself to preparing a document which promotes the efficient provision of urban services while at the same time protecting and preserving the natural resource features of Brown County.

While there are numerous federal, state, and local rules and regulations which must guide this type of planning process, the BCPC wants this plan to be clear and helpful to the communities in the urban service area. Protecting and preserving the natural environment present complex and sensitive issues, and the BCPC hopes that this plan, the latest in a series of plans which sets forth the sewer service areas and environmentally sensitive areas of Brown County, is helpful in working through those issues.

The Brown County Planning Commission stands ready to work with all parties interested in implementing this plan and its recommendations. Such assistance will always strive to achieve the community's goals and desires while encouraging the efficient provision of urban services in a cooperative fashion while encouraging the protection and preservation of our county's valuable natural resources.

Please join us in this effort and participate in making Brown County a better place to live and work.