



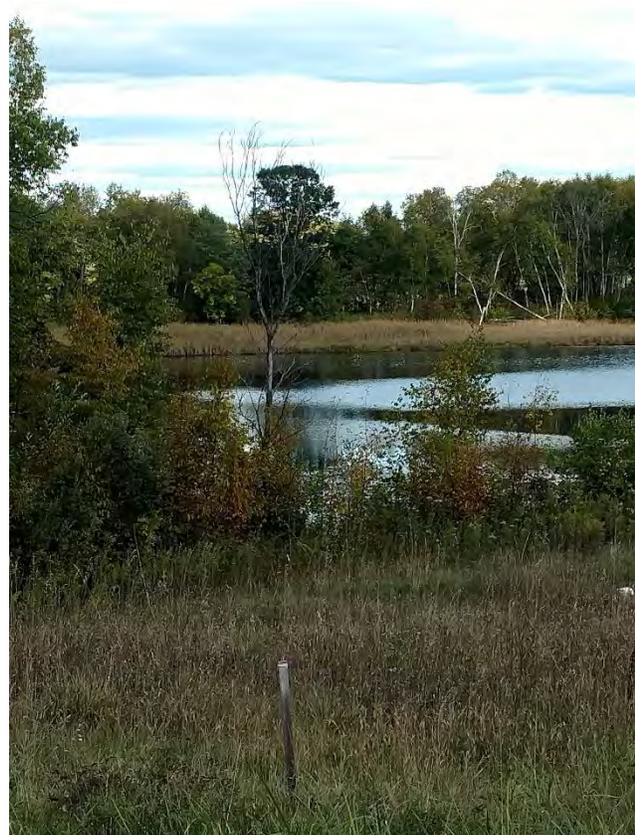
NATURAL ENVIRONMENT

Natural environment areas are of prime importance in Nowthen. Besides serving as aesthetic amenities that enhance the quality of life in the area, they perform important ecological roles. Natural areas often act as buffers or barriers in determining the extent and direction of development. Therefore, it is necessary that special consideration be given to these areas in formulating the 2018 Nowthen Comprehensive Plan. Environmentally sensitive areas include those areas characterized by prime soils for agriculture, soil limitations for structures or septic systems, lakes, rivers, wetlands, and flooding.

WETLANDS/SHORELANDS

The protection of Nowthen's wetland and shoreland areas is becoming an increasingly important issue. Community representatives recognize the valuable role of wetlands with regard to flood water retention, ground water recharge, nutrient assimilation, wildlife habitat and aesthetics. Lakes (shoreland areas) within Nowthen also provide areas of natural beauty and vegetation. To a large extent, the City's lake areas have become a focal point for development interests and may be threatened if left unprotected necessitating that the following precautions be upheld:

- Compliance with the shoreland regulations developed by the Minnesota Department of Natural Resources. These regulations increase lot sizes and setbacks and decrease densities on environmentally sensitive lakes and streams.
- Compliance with Federal, State and local regulations with regards to the protection and alteration of lakes, wetlands, and watercourses. This will require permits and reviews by these governmental agencies before any action which impacts a lake, wetland, or watercourse begins.

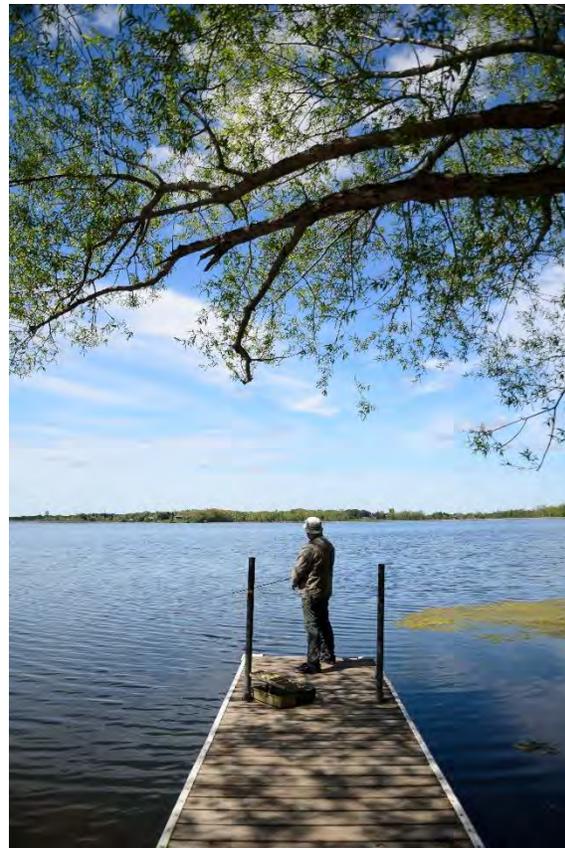




NATURAL ENVIRONMENT

- Recognition and compliance with Minnesota Pollution Control Agency standards regarding feedlots and other agricultural practices. These regulations preserve water quality through control of point-source pollution.
- Adoption and enforcement of the 1991 Minnesota Wetland Conservation Act which requires a "no net loss" of wetlands.

While the above referenced precautions will not preclude development around Nowthen lakes and wetland areas, compliance will ensure a degree of protection of these environmentally sensitive amenities. In addition to the preservation of water quality in Nowthen's waters, wetlands and watercourses, the utilization of these features as recreational and aesthetic amenities is also an important consideration. In the future development of Nowthen's park system, the City should consider these areas as prime park and trail locations.





NATURAL ENVIRONMENT

CITY OF NOWTHEN 2019 COMPREHENSIVE PLAN



STREAMS AND DITCHES

-  Wetlands
-  Ditch
-  Stream (Intermittent)
-  Stream (Perennial)

TPC
The Planning Company




SOURCE: CITY OF NOWTHEN, ANDER COUNTY
 WET DNR
 BMP DATE: 23 JAN, 2019
 \\sawking\p\clients\proj\2019\Nowthen\2019CompPlan





NATURAL ENVIRONMENT

FLOODPLAINS

The 100-year and 500-year flood areas are shown on the Wetland and Flood Map and are fairly limited within Nowthen. The Federal Emergency Management Agency issued new Flood Insurance Rate Maps for Anoka County effective December 16, 2015. The Federal Emergency Management Agency coordinates the federal government's role in preparing for, preventing, mitigating the effects of, responding to, and recovering from all domestic disasters, whether natural or man-made, including acts of terror. In 1968, the National Flood Insurance Act created the Federal Insurance Administration and made flood insurance available for the first time to homeowners. The Flood Disaster Protection Act of 1973 made the purchase of flood insurance mandatory for the protection of property located in Special Flood Hazard Areas.

STORMWATER MANAGEMENT

Nowthen utilizes natural drainage systems to manage stormwater runoff; a series of streams, ditches and ponds carry stormwater away from roads and structures into lakes and other holding areas. These areas collect and store runoff water during periods of heavy rainfall or melting snow and utilize 100-year floodplains to prevent flooding of areas downstream. In recognition of the valuable role the drainageways perform for Nowthen and surrounding communities, the City must take measures to define and protect this natural amenity, including:

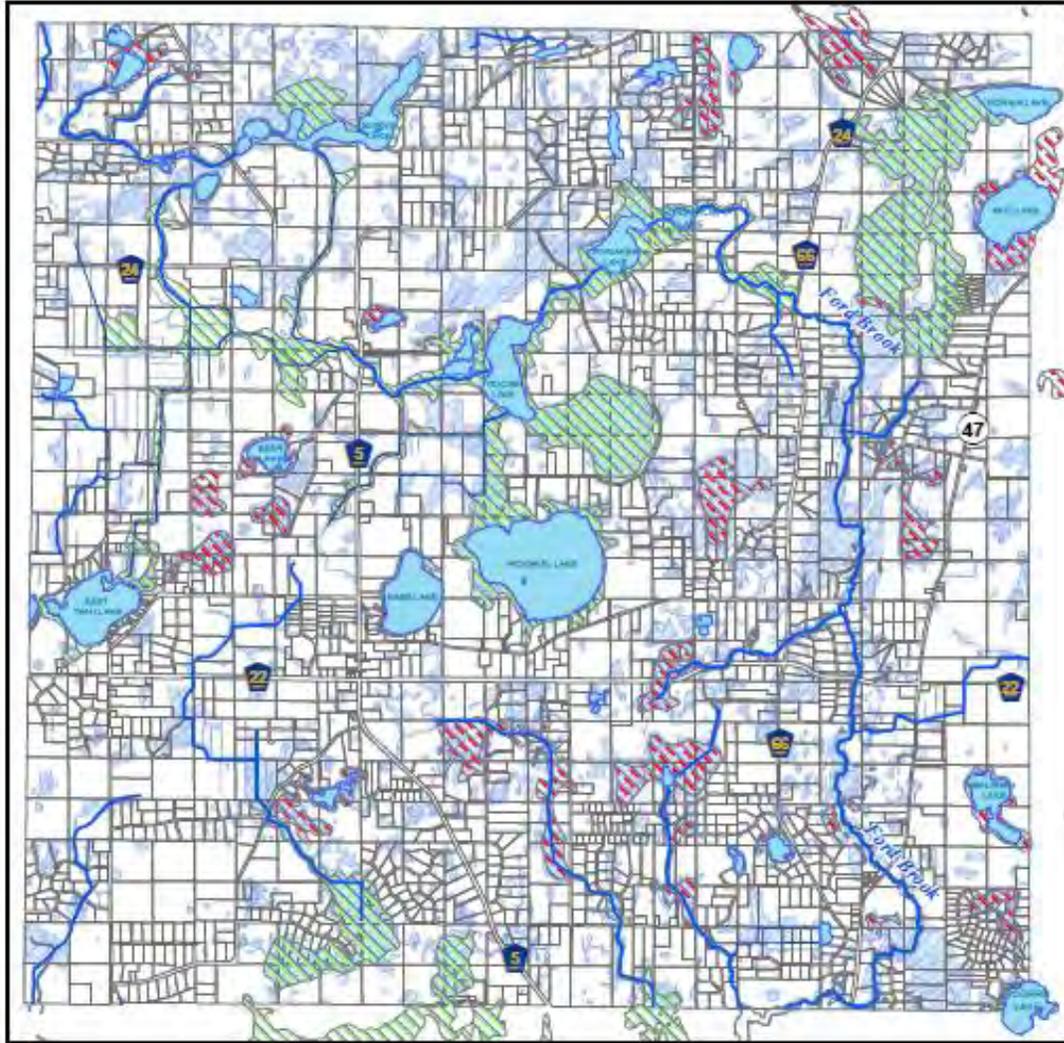
- With each new request for development alteration in the natural drainage system, the developer or agency responsible shall define stormwater volumes, drainageway capacity, and upstream stormwater storage needs. This type of study is necessary to help the City identify and preserve natural storm water holding areas and drainageways so they are not disrupted.
- Prohibit development of lots that may obstruct or interfere with the stormwater flow and/or storage of the natural drainageways.
- Implement subdivision regulations that require the acquisition and establishment of stormwater drainage easements in areas of natural ponding, wetlands and drainage.
- Require stormwater management plans with all development proposals. Review of the plans by the City Engineer is to be provided at the expense of the developer.
- Implementation of floodplain regulations in areas designated as a 100-year floodplain.





NATURAL ENVIRONMENT

**CITY OF NOWTHEN
2019 COMPREHENSIVE PLAN**



WETLAND AND FLOOD MAP

-  1% Annual Flood Chance (100 Year Flood)
-  0.2% Annual Flood Chance (500 Year Flood)
-  Wetlands
-  Ditch
-  Stream



SOURCE: CITY OF NOWTHEN, ANOKA COUNTY,
MN DNR, MRA, TPC, FEMA
MAP DATE: 23 JAN, 2018
K:\cad_eng\PROJECTS\GIS\PC\Nowthen\2019CompPlan





NATURAL ENVIRONMENT

Ongoing growth in Nowthen will continue to increase stormwater flows in the future. Through the aforementioned actions, the City will maintain and utilize the natural wetlands and drainageways for stormwater management. This effort will maintain attractive natural environmental areas and eliminate the necessity for constructed storm sewer systems.

UPPER RUM RIVER WATERSHED MANAGEMENT ORGANIZATION

The Upper Rum River Watershed Management Organization (URRWMO) is a joint powers organization including the Cities of St. Francis, Oak Grove, Nowthen, Bethel, and portions of East Bethel. A small corner of Ham Lake also falls within the URRWMO. The WMO Board is made up of representatives from each of these cities.

This organization seeks to maintain the quality of area lakes, rivers, streams, groundwater, and other water resources across municipal boundaries. Resources of particular importance to the URRWMO include the Rum River, Seelye Brook, Ford Brook, Cedar Creek, and numerous ditches that drain to the Rum River. This stretch of the Rum River is designated as a state Scenic and Recreational Waterway. Lake George and East Twin Lakes, the primary recreation lakes in the watershed, are also of high priority, in addition to many smaller lakes and wetlands.



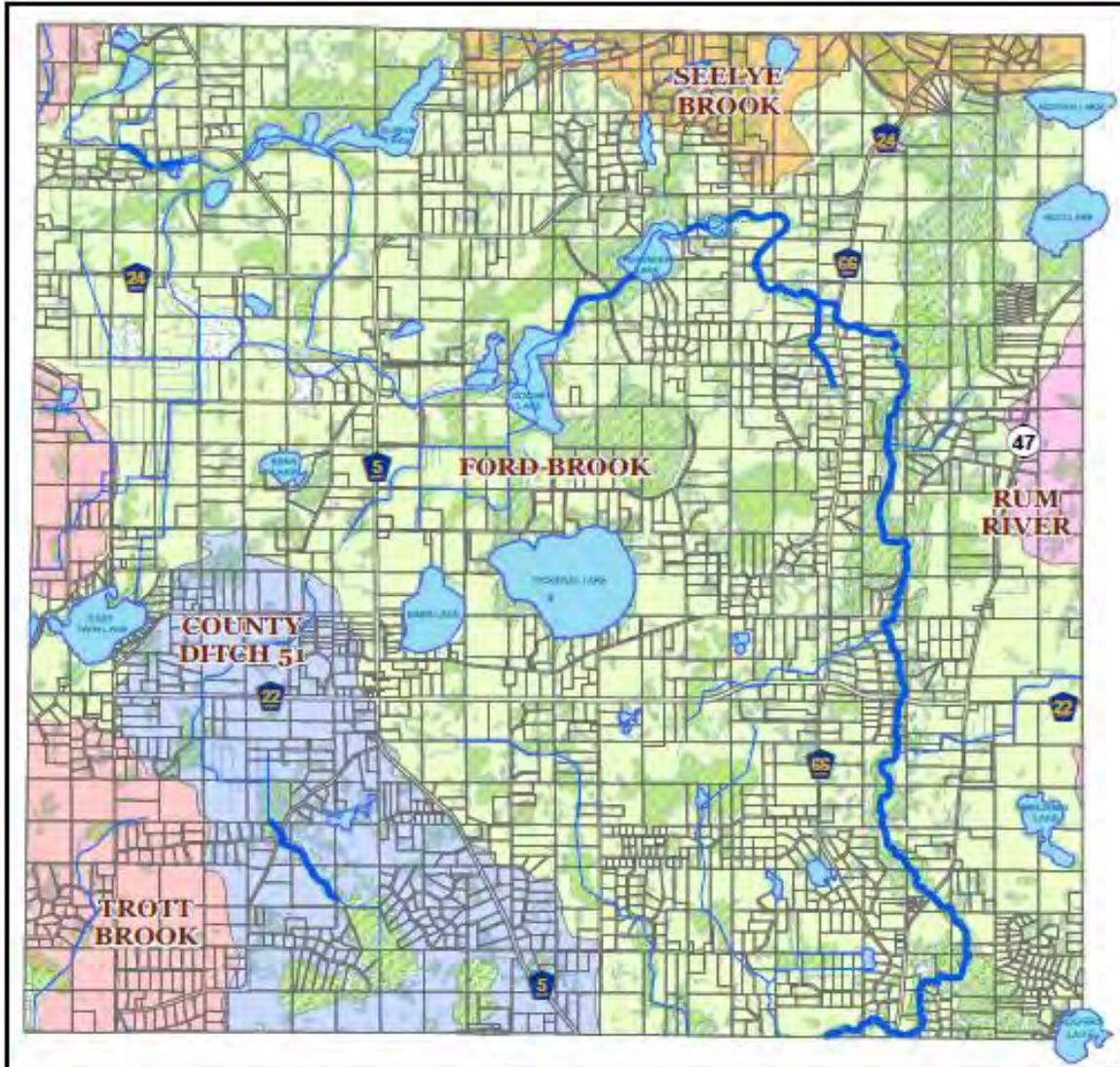
Nowthen is comprised of five minor watershed districts as shown on the following map: Seelye Brook, Rum River, Ford Brook, Trott Brook and County Ditch 51.





NATURAL ENVIRONMENT

**CITY OF NOWTHEN
2019 COMPREHENSIVE PLAN**



WATER RESOURCES - MINOR WATERSHEDS

-  Floodplains
-  Wetlands



SOURCE: CITY OF NOWTHEN, ANOKA COUNTY, MN DNR, HKA, TPC

MAP DATE: 23 JAN, 2018

K:\S&T_ANG\PROJECTS\GIS\TPC\Nowthen\2019 CompPlan





GROUNDWATER LEVEL MONITORING WELLS

Minnesota's environmental and economic future depends on a continued and available supply of groundwater that is managed sustainably. The Minnesota Department of Natural Resources is responsible for managing the quantity of groundwater use through appropriation permits and monitoring water levels. The DNR's *Minnesota Groundwater Level Monitoring Network* (GWLM) is an early warning system designed to detect contamination as it enters the ground water system. The GWLM is a network of wells that collects static groundwater level data to assess groundwater resources, determine long term trends (sustainability), interpret impacts of pumping and climate, plan for water conservation, and evaluate water use conflicts. This allows us to identify the sources of the contamination and possibly design and implement Best Management Practices (BMPs) to prevent contamination. It is not intended to detect or address groundwater contamination.

Groundwater level data obtained from network wells provides an essential portion of the information needed to understand groundwater system change over time and effectively manage the resource. There are currently about 750 wells used for this purpose but as many as 7,000 wells are needed to adequately monitor all parts of the State. A more complete and integrated network of groundwater level monitoring wells will provide stakeholders, local government officials, and groundwater resource managers with the information needed to better understand the status of groundwater quantity throughout the state and formulate management responses to changing water. (Source: Dept. of Natural Resources).

The DNR maintains an observation well nest (multiple wells at different depths) in the Pickerel Lake area of Nowthen. The well nest consists of water table, Wonewoc, and Mt. Simon aquifer observation wells that have been recording static groundwater levels since 2010. The location is not near any large groundwater appropriations that might affect water levels elevation trends. Therefore, patterns of water levels in all the wells are responding to changes in precipitation and increased recharge to the water table aquifer and subsequent pressure loading of the underlying bedrock aquifers. This information will be valuable as Nowthen grows and groundwater use increases.

This information may be obtained from the DNR (Tim Quan, Data Management Administration, 651-539-2127) and from the Geologic Atlas of Anoka County, Part B Hydrogeology pages 56 and 57 (Groundwater Level Monitoring).





NATURAL ENVIRONMENT

The Minnesota Pollution Control Agency maintains an Ambient Groundwater Monitoring Network of wells that determines the general quality of groundwater not associated with a pollution source and not associated with agricultural land use. The Minnesota Department of Agriculture monitors water quality in areas of intense agriculture land use. When groundwater contamination is found, the MPCA or MDA (not the DNR) is the agency that investigates the source of the contamination and may establish actions to remediate the site.

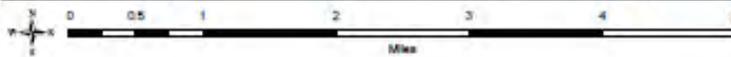
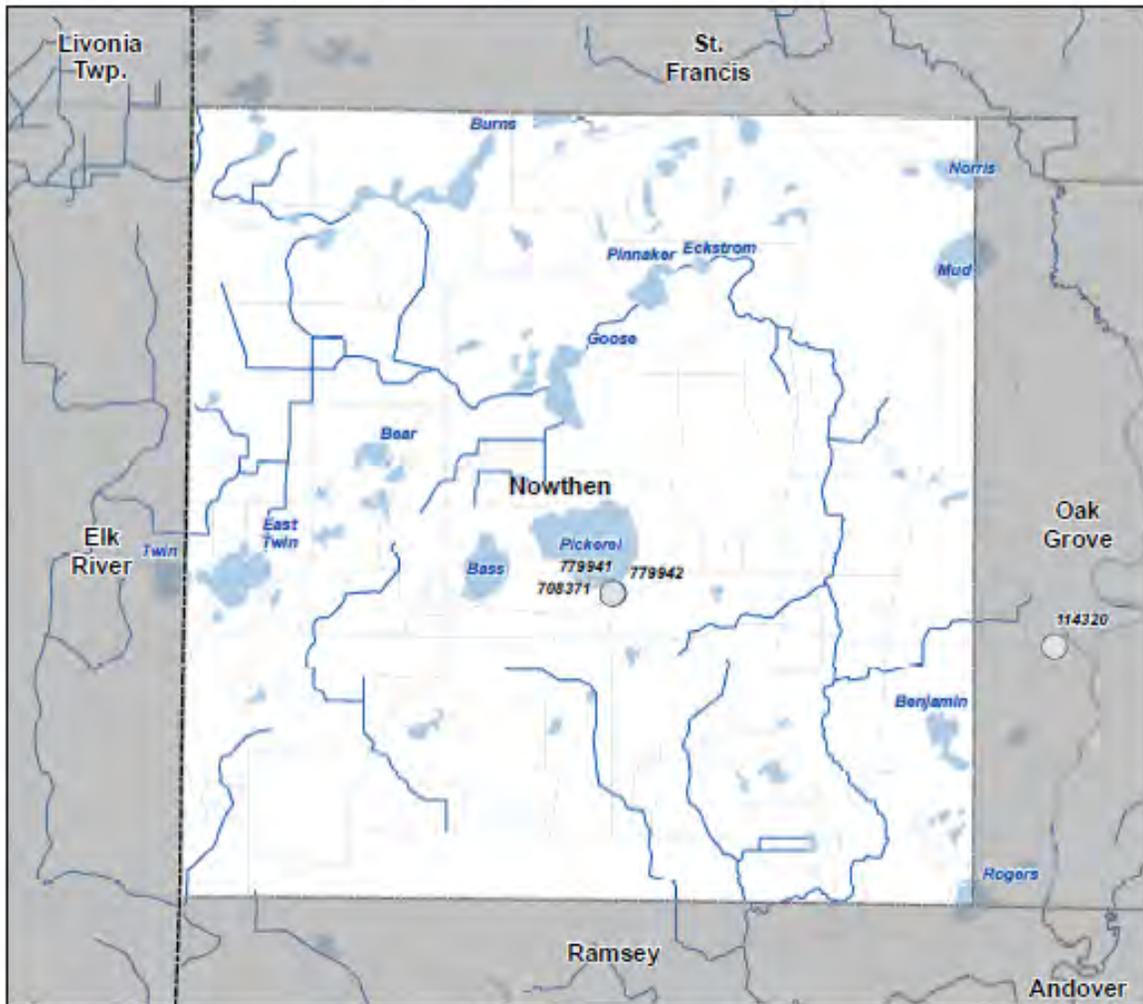
A search of the MPCA's Environmental Data Access system found three (3) groundwater quality monitoring sites (wells) in Nowthen. Information regarding ambient groundwater monitoring may be obtained from Sharon Kroening, 651-757-2507.





NATURAL ENVIRONMENT

Groundwater Level Monitoring Wells City of Nowthen, Anoka County



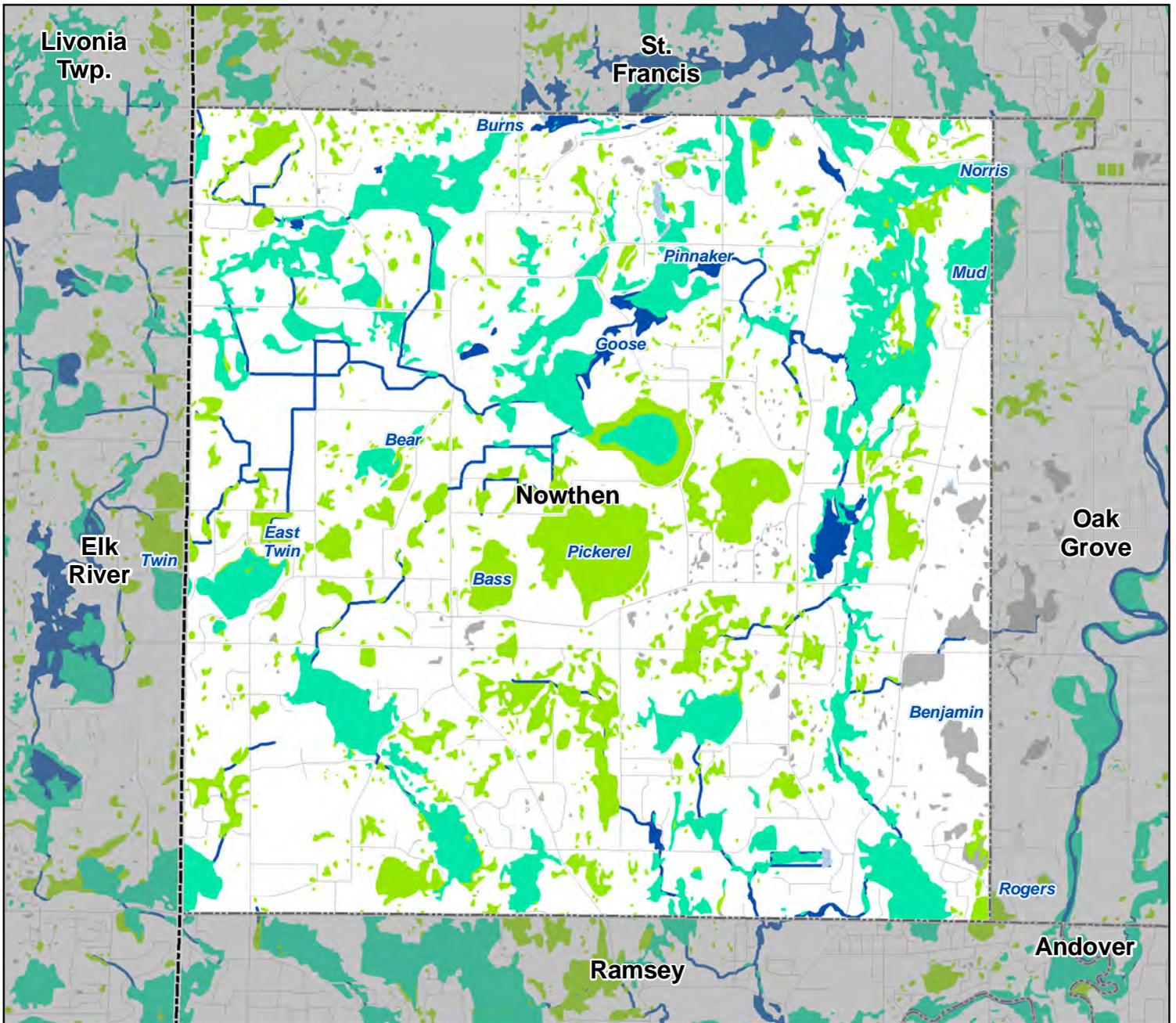
Observation Wells (DNR)

- Showing upward trend in annual minimum values
- Showing downward trend in annual minimum values
- Showing no trend in annual minimum values
- Insufficient data to evaluate a trend
- County Boundaries
- City and Township Boundaries
- NCompass Street Centerlines
- Open Water Features
- Rivers and Streams, perennial & Intermittent

*Minnesota Department of Health aquifer test locations not shown for security reasons.
Please contact the MDH for more information.*



Surface Water and Groundwater Interaction City of Nowthen, Anoka County



Karst Features (DNR)

- ▲ Spring
- Sinkhole
- Calcareous Fens
- ~ Trout Streams (DNR)

Surface water type (regional screening by Met Council)

- Disconnected from the regional groundwater system
- Recharges aquifers
- Receives and discharges groundwater
- Supported by upwelling groundwater

- County Boundaries
- City and Township Boundaries
- NCompass Street Centerlines
- Other Open Water Features



SOILS

Suitability for Development

Nowthen has a number of areas where soil conditions raise suitability concerns for urban development. Both the northwest corner of the City and areas adjacent to Ford Brook hold soil types which limit building and septic system construction. Any development in these areas will require specialized construction measures. To avoid extensive financial and environmental costs associated with development in these areas, the City shall impose provisions that will restrict development in areas with severely limiting soils. These provisions include:

It must be demonstrated that all sites proposed for development have soils with physical properties and percolation rates suitable for on-site sewage disposal and structural capacity to support building.

- On each newly created lot in the City, there must be area set aside for two septic system drainfields. The provision for a second drainfield site allows for the installation of a second septic system in the event the first system fails.
- Building sites within Nowthen must have an average slope of 12 percent or less to be considered buildable. Lots with an average slope of greater than 12 percent must be subject to review of the City Engineer.
- All septic systems must meet state standards and the Nowthen Septic Ordinance.

Erosion

A major concern with regard to agricultural and urban development is that of topsoil loss (via both wind and water erosion). To address this concern, the following actions will be pursued:

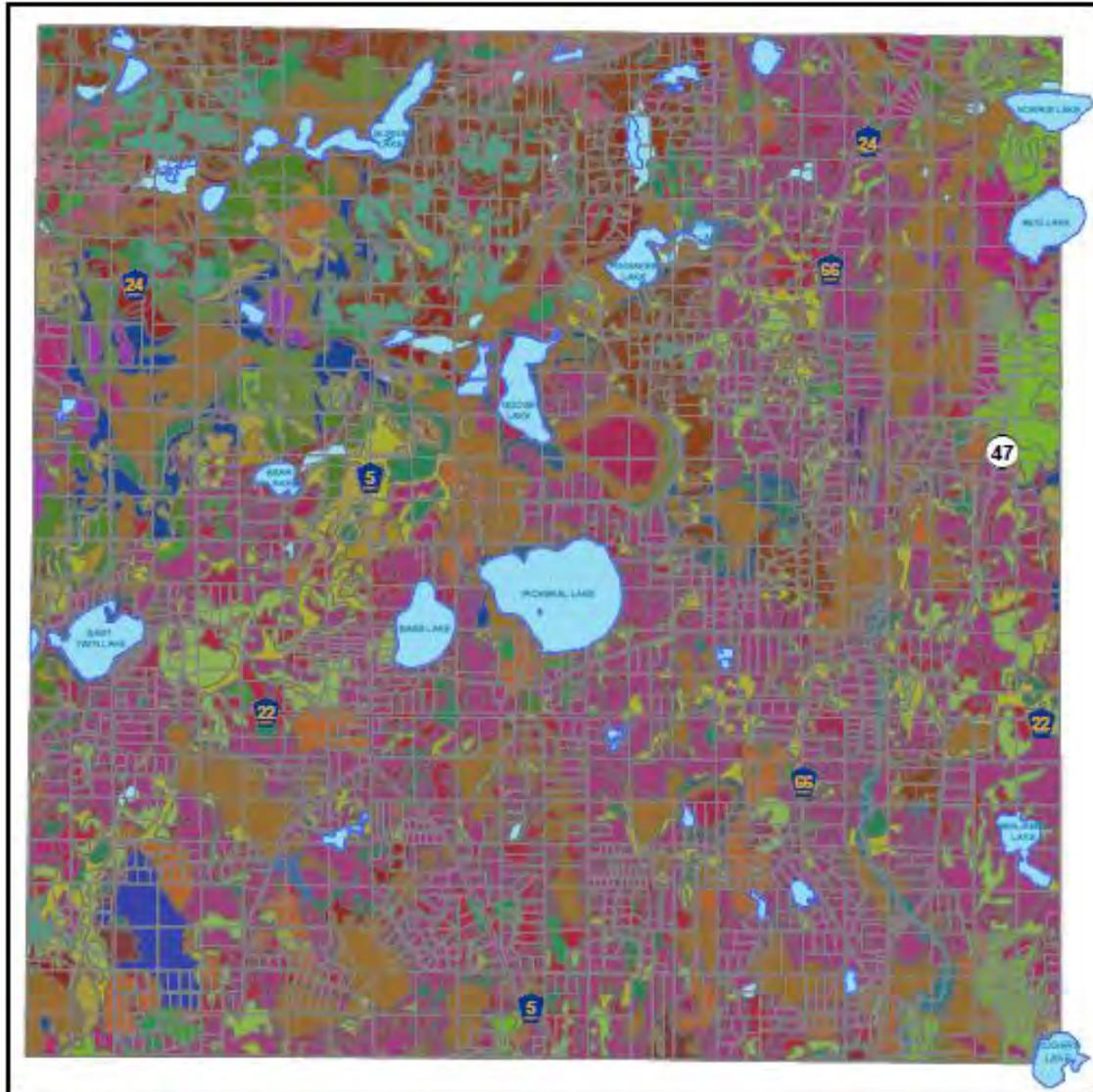
- Encouragement of farming practices that minimize erosion.
- Require, via ordinance provision, proper grading, drainage and erosion control measures for urban development.





NATURAL ENVIRONMENT

CITY OF NOWTHEN 2019 COMPREHENSIVE PLAN



SOILS

Alluvial land	Anoka	Blomford	Braham	Brecken
Cathro	Chetek	Dalbo	Emmert	Glencoe
Growton	Hayden	Hayder	Isan	Isanti
Kingsley	Kredex	Lake Beulah	Lino	Loamy wet land
Merkley	Marsh	Meehan	Mora	Nessel
Nowan	Nyromo	Ribe	Seelyville	Soderville
Zimmerman				



SOURCES: CITY OF NOWTHEN, ANOKA COUNTY, MN DNR, MRA, AND NAC; SOIL SURVEY OF ANOKA COUNTY, MN 1917
MAP DATE: 23 JAN, 2019
K:\oad_eng\PROJECTS\2019\2019Nowthen2019CompPlan





NATURAL ENVIRONMENT

Filling/Excavation

The filling/excavation of land to accommodate development has created past concerns within Nowthen. Specifically, low areas have been excavated to create wetlands and ponds while the excavated soil is used for on-site fill or transported to other developments. The environmental impact of this type of activity must be considered, as well as the potential impacts of hauling excavated material upon City streets. The City will continue to regulate gravel mining through the Extraction and Mining Ordinance included within the City Code. The City utilizes this ordinance to evaluate gravel mining plans and operations in issuing an annual license. These regulations allow the City to proactively mitigate potential land use compatibility issues and negative impacts during the operation. A plan for reclamation of the gravel mine and future land use is also required for approval of a license to ensure that the ultimate plan for the parcel is consistent with the Comprehensive Plan.

VEGETATION

Nowthen does have some concentrations of vegetation, but only to a limited degree in relation to agriculture production and development. The majority of tree massings within Nowthen are along Ford Brook and adjacent to wetlands. These valued aesthetic and ecologically important assets should be protected. The Subdivision Ordinance stipulates that subdivisions must be designed and constructed so that existing healthy trees are preserved to the extent possible although adoption of more detailed tree preservation guidelines. These guidelines would require developers and builders to incorporate a tree preservation plan with the required grading plan submission. Tree preservation may also be considered as part of a rural cluster development requirement intended to preserve massings of mature trees as a development amenity.

NOISE

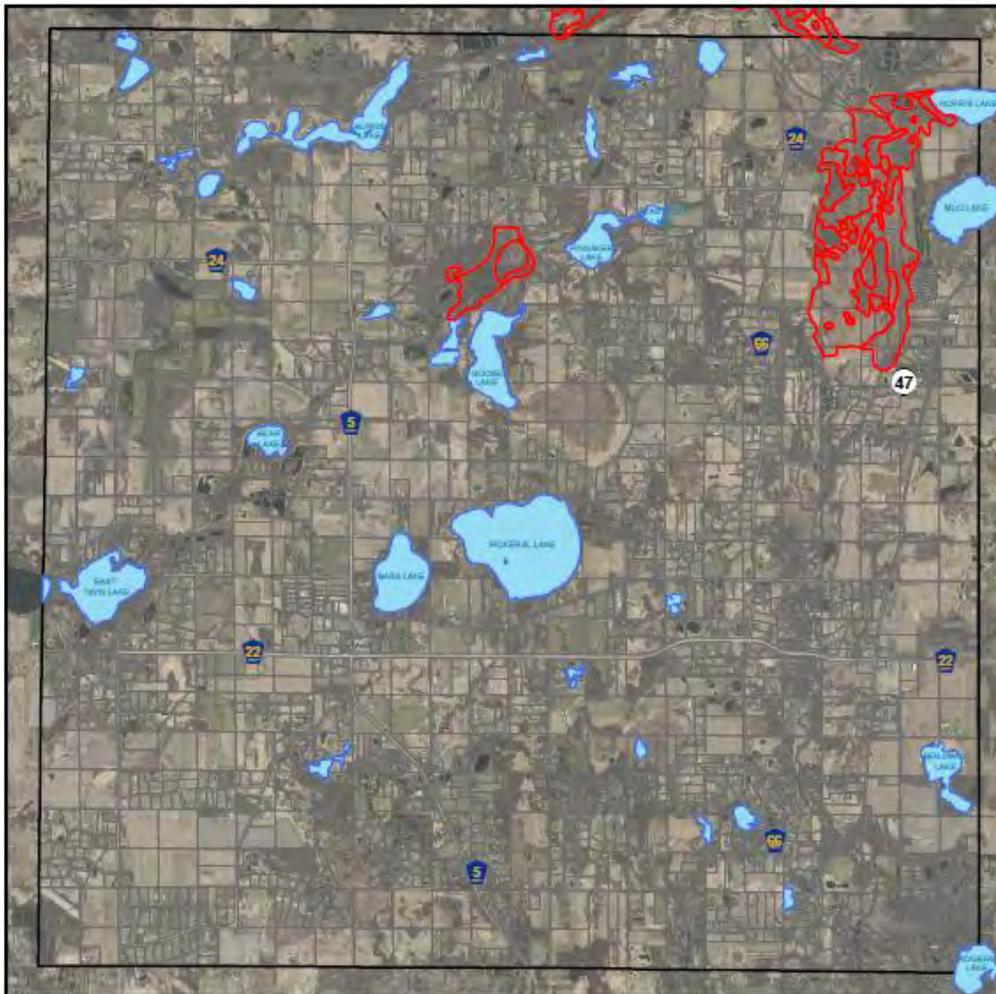
Development is accompanied by increasing noise levels from corresponding increases in traffic and general activity that can impact the community. These potential impacts must be anticipated during the development process to avoid future issues by providing proper transition between noise generators and uses sensitive to noise impacts. Nowthen will consider requiring the use of landscaping and site design to aesthetically and physically separate different types of land uses and to provide protection from noise along major roadways.





NATURAL ENVIRONMENT

CITY OF NOWTHEN 2019 COMPREHENSIVE PLAN



WOODED AREAS

 Exceptional plant communities and rare species as identified in the Anoka County Biological Survey

TPC



SOURCES: CITY OF NOWTHEN, ANOKA COUNTY, ANOKA BIOLOGICAL SURVEY
MAP DATE: 22 JUN, 2019

K:\aok_eng\PROJ\SC\5068\TPC\nowthen\017CompPlan





LIGHT POLLUTION

On-going development within Nowthen is accompanied by additional light sources intended to illuminate streets, intersections, yards, parks, parking lots, business signs, etc. The growing number of light sources within the City results in increased levels of light being directed or reflected skyward that can obscure the dark skyline characteristic of rural areas. To minimize the effects of light pollution, the City has adopted lighting standards as part of the Zoning Ordinance. These standards address basic lighting issues such as glare cast to a public right-of-way or adjacent residential properties. To ensure appropriate levels of night time illumination that are controlled in intensity and direction to preserve the dark sky, the City may consider implementing additional requirements for new developments and redevelopment of existing uses within the community as part of future Zoning Ordinance updates.

WIND ENERGY

Use of wind for generating electricity is gaining attention as a way to better conserve energy resources. State law mandates a minimum amount of future energy must be generated from renewable resources, such as wind, leading businesses to explore opportunities for large scale facilities. Agricultural uses and residential uses like those in Nowthen can also utilize wind as an energy source for individual properties. The rural character of Nowthen creates opportunities to access wind energy, but offers challenges as well to land use compatibility, solar and wind access protection and aesthetics. The City will consider adoption of performance standards as part of the Zoning Ordinance for wind energy systems ensuring that those systems allowed to be constructed within the City are consistent with community objectives.

SOLAR ACCESS

Adequate access to sunlight for all properties in Nowthen is a priority not only for potential solar energy systems, but for aesthetic reasons as well. The Metropolitan Land Planning Act requires that the Comprehensive Plan contain "an element for the protection and development of access to direct sunlight for solar energy systems". Met Council has calculated each community's solar resource, explained below, and provided the Solar Suitability Analysis Map.





NATURAL ENVIRONMENT

The gross solar potential and gross solar rooftop potential are expressed in megawatt hours per year (Mwh/yr), and these estimates are based on the solar map for Nowthen. These values represent gross totals; in other words, they are not intended to demonstrate the amount of solar likely to develop within your community. Instead, the calculations estimate the total potential resource before removing areas unsuitable for solar development or factors related to solar energy efficiency.

The gross solar generation potential and the gross solar rooftop generation potential for your community are estimates of how much electricity could be generated using existing technology and assumptions on the efficiency of conversion. The conversion efficiency of 10% is based on benchmarking analyses for converting the Solar Suitability Map data to actual production, and solar industry standards used for site level solar assessment.

Solar access protection is provided for in Nowthen by the uniform implementation of lot and building performance standards adopted as part of the Zoning Ordinance. Requirements such as maximum building height and yard setback standards are implemented for the purpose of creating separation between structures and allowing equal sunlight access such that a property is not in the shadow of an adjacent building.

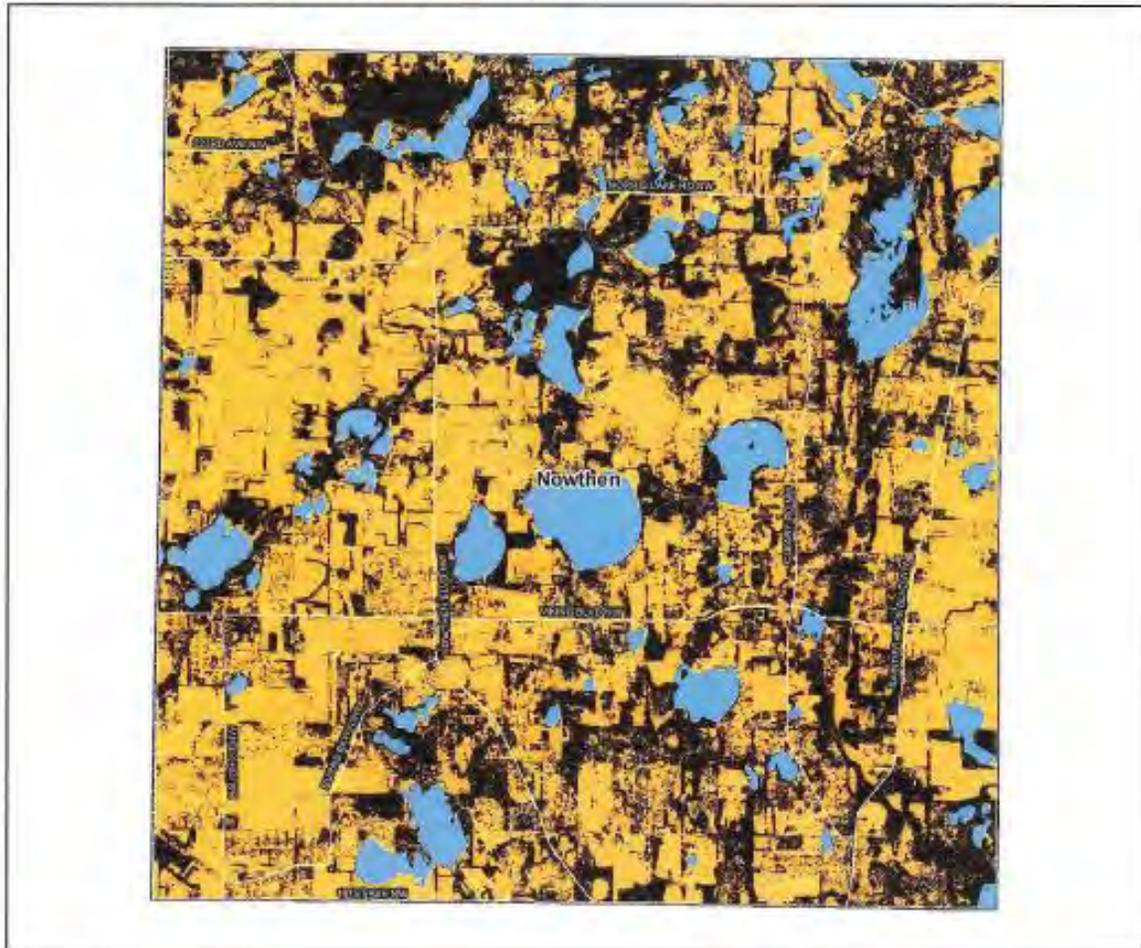
Community ¹	Gross Potential (Mwh/yr)	Rooftop Potential (Mwh/yr)	Gross Generation Potential (Mwh/yr) ²	Rooftop Generation Potential (Mwh/yr) ²
Nowthen	61,057,736	424,370	6,105,773	42,437
<p>¹ There are a few communities where generation potential calculations could not be produced. There are areas within some maps where data was unusable. These areas were masked and excluded from gross rooftop potential and generating potential calculations.</p> <p>² In general, a conservative assumption for panel generation is to use 10% efficiency for conversion of total insolation into electric generation. These solar resource calculations provide an approximation of each community's solar resource. This baseline information can provide the opportunity for a more extensive, community-specific analysis of solar development potential for both solar gardens and rooftop or accessory use installations. For most communities, the rooftop generation potential is equivalent to between 30% and 60% of the community's total electric energy consumption.</p>				





NATURAL ENVIRONMENT

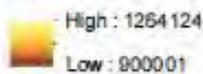
**Gross Solar Potential
City of Nowthen, Anoka County**



10/2017



**Gross Solar Potential
(Watt-hours per Year)**



- Solar Potential under 900,000 watt hours per year
- County Boundaries
- City and Township Boundaries
- Wetlands and Open Water Features

Source: University of Minnesota U-Spatial Statewide Solar Raster.





NATURAL ENVIRONMENT

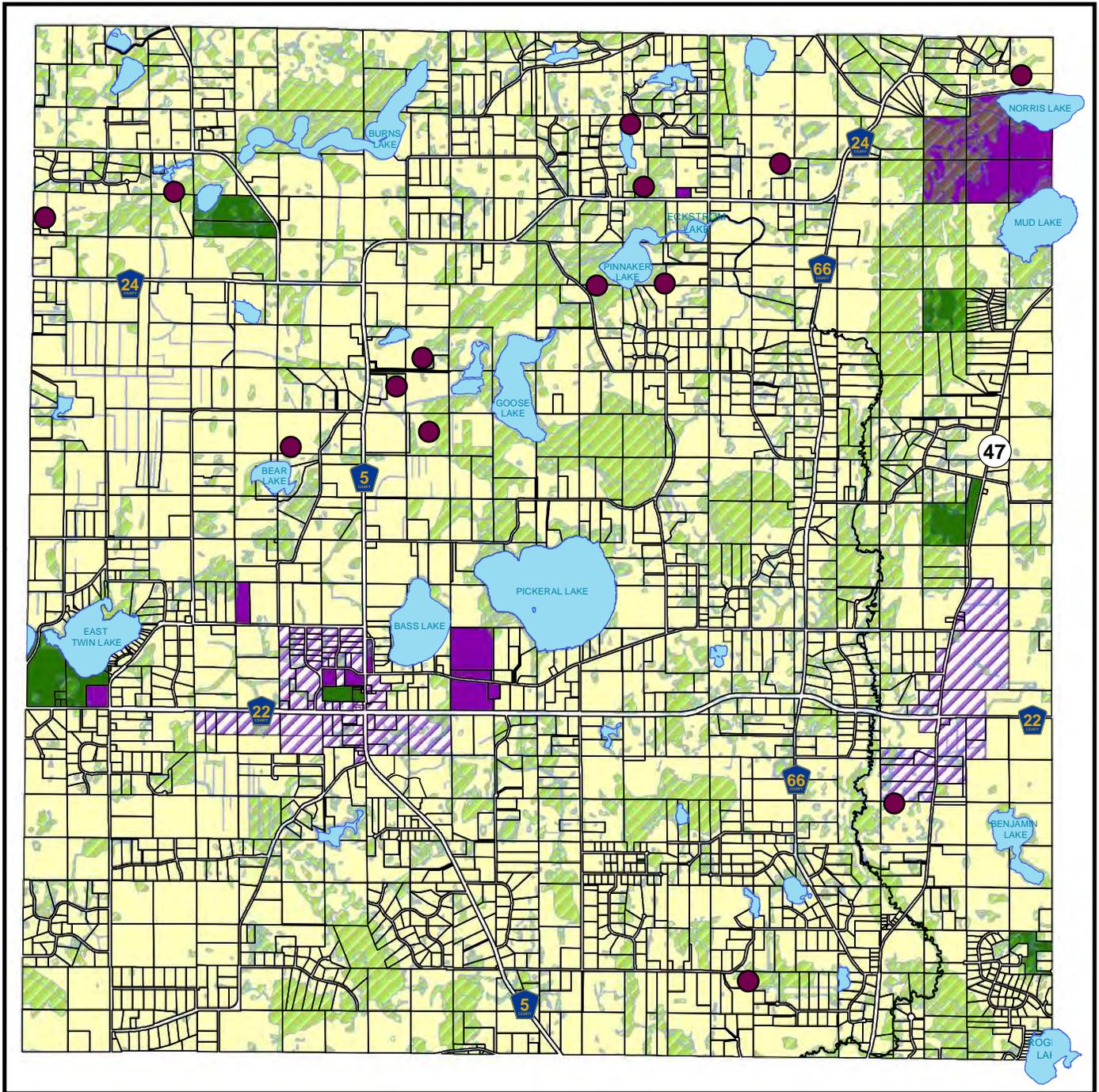
AGGREGATE RESOURCES

Nowthen's aggregate resources have been shown on the 2040 Land Use Map. The Aggregate Resource Mapping Program (ARMP) began in 1984 when the Minnesota Legislature passed a law (Minnesota Statutes, section 84.94) to provide aggregate resource information to local units of government and others for making comprehensive land-use and zoning plans. The mapping, which is performed by the DNR, helps to introduce aggregate resource protection and promote orderly and environmentally sound development of the resource.



CITY OF NOWTHEN

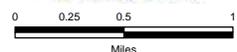
2019 COMPREHENSIVE PLAN



AGGREGATE RESOURCES (WITH 2040 LAND USE)

-  Rural Residential (Permanent) 8/40 (19997.5 acres / 94.24%)
-  Commercial / Light Manufacturing (590.74 acres / 2.78%)
-  Public and Quasi Public (364.71 acres / 1.72%)
-  Parks and Open Space (265.77 acres / 1.25%)
-  Aggregate Resources
-  Wetlands

TPC
The Planning Company



SOURCES: CITY OF NOWTHEN, ANOKA COUNTY, MN DNR, HAA, TPC

MAP DATE: 23 JAN, 2019

K:\cad_eng\PROJECTS\GIS\TPC\Nowthen\2017CompPlan