
**Staff Analysis of Proposed Amendment to the
Dane County Water Quality Plan
Revising the Sewer Service Area Boundary and Environmental
Corridors in the Northern Urban Service Area
*“Northern Interstate Corridor Area”***

History of the Northern Urban Service Area

The Northern Urban Service Area (USA) was formed in 2001 through merging the Windsor Urban Service Area and DeForest Urban Service Area. The first amendment to the Northern USA occurred at the time of its creation when 203 developable acres were added. There has been a total of 16 amendments to this urban service area since its creation, 10 were initiated by the Village of DeForest on its own or in cooperation with other adjacent municipalities. In total, amendments to the Northern USA have resulted in a net addition of 1,855 developable acres and 511 acres of Environmental Corridor. The most recent amendment of the service area by the Village of DeForest occurred in 2023, adding approximately 62 developable acres.

Planning in DeForest

The Village of DeForest updated their comprehensive plan in September of 2023. The Comprehensive Plan is substantially consistent with the adopted [2050 Regional Development Framework](#) (Framework). The requested amendment areas are adjacent designated business growth areas. In addition, the “Evans” subarea (northern area) proposes a mixture of housing types that could be designed as a “complete neighborhood.”

Existing Conditions

Land Use

The Village of DeForest is requesting an amendment to the Northern USA northwest of the Village. The three main amendment areas are located near the intersection of I-39/90/94 and CTH-V and have been referred to as the “Evans” (northern area, east of interstate), “Buc-ee’s” (northern area, west of Interstate), and “Research Products” (southwestern area) subareas. The requested amendment areas total approximately 122 acres. Both amendment areas west of I-39/90/94 are adjacent to existing industrial/business development. Most land surrounding the amendment areas is currently agricultural.

Refer to Table 1 for existing and planned land uses.

Surrounding Planned Land Uses:

- **North:** Medium-Density Residential, Low-Density Residential, and Mixed Commercial/Residential
- **West:** Agricultural and Natural Area
- **South:** Agriculture (Research Products) and Natural Area

- **East:** Medium-Density Residential, Low-Density Residential, Mixed Commercial/Residential, and Parks /Recreation(Evans); Industrial/Business (Research Products)

Table 1
Existing and Planned Land Use

Land Use Category	Existing Land Use Acres (see Map 3)	Proposed Land Use Acres (see Map 4)
Agriculture	105.5	
Commercial		34.1
Industrial/Business		32.1
Medium-density Residential		11.1
Mixed Commercial/Residential		19.2
Open Land / Stormwater Management	3.1	11.4
Other Planned Development		1.0
Transportation	12.9	12.6
Water		0
	121.5	121.5

Cultural and Historic Sites

The Wisconsin Historical Society (WHS) has been contacted regarding the presence of any known archaeological sites or cemeteries within the amendment areas. No cultural heritage sites are reported within the proposed “Evans” and “Buc-ee’s” amendment subareas. Given the presence of wetland/water source within the “Research Products” amendment area and relative lack of disturbance, the WHS is recommending a survey for this area.

Natural Resources

The proposed amendment area is in the Cherokee Lake-Yahara River (HUC 12: 070900020504) and One Hundred Mile Grove Cemetery (HUC 12: 070900020502) subwatersheds (see Map 5). There are no delineated wetlands or floodplains within the amendment area.

Wastewater from the amendment area will be treated at the Madison Metropolitan Sewerage District (MMSD) Wastewater Treatment Facility (see Map 5). The treated effluent is discharged to Badfish Creek and Badger Mill Creek, bypassing the Yahara chain of lakes.

Wetlands

WDNR’s Wisconsin Wetland Inventory (WWI) shows one wetland classified as palustrine persistent emergent/wet meadow, that is farmed in dry years, within the Research Products subarea. A wetland

delineation ([link to report](#)) was conducted by Heartland Ecological Group, Inc. in August 2022 within the Research Products subarea. The site investigation and field delineation determined there was one wetland within the study area, but none within the Research Products subarea (see Map 11a). WWI does not show any wetlands within the other subareas. A wetland delineation ([link to report](#)) was conducted for the Buc-cee's subarea by Wetland and Waterway Consulting, LLC in December 2022. The site investigation and field delineation determined there were three wetlands within the study area, but none within the Buc-cee's subarea (see Map 11b). The Village will require a wetland delineation prior to development for the Evans subarea due to the presence of hydric soils.

Yahara River

Most of the amendment subareas are within the Cherokee Lake-Yahara River subwatershed. This subwatershed is approximately 28.5 square miles. The Yahara River (WBIC 798300 / WATERS ID 355202) is 63 miles long and originates in Columbia County, connecting Lakes Mendota, Monona, Kegonsa, and Waubesa. Pollutants of concern in the Yahara River are sediment/total suspended solids and total phosphorus, which have resulted in a degraded habitat and low dissolved oxygen. Total Maximum Daily Loads (TMDL) for total phosphorus and sediment were approved by the US EPA in 2011. Runoff from most of the Research Products and Evans subareas drain to the Yahara River via unnamed tributaries (WBIC's 5033600 and 807700). The Token Creek to the headwaters segment (from mile 47.02 to 63.02) is downstream of the amendment area and supports a Warmwater Sport Fishery (see Map 5). This 16-mile segment was listed as an impaired water per Section 303(d) of the Clean Water Act in 2014 for phosphorus. An assessment for chloride in 2016 found levels to be too high and the segment was listed as impaired. This segment was assessed during the 2022 listing cycle and based on the sample data chloride was proposed for delisting.

There has been a DNR monitoring station ([Station 10033683](#)) at River Road on the unnamed tributary (WBIC 5033600) downstream of the Research Products subarea since 2011. Field measurements from 2023 indicated dissolved oxygen levels of 3.43 to 6.92 mg/L and transparency of 41.5 to 120 cm. Chloride data is not collected at this monitoring station. There has also been a DNR monitoring station ([Station ID 10033681](#)) downstream of the Evans subarea along the Yahara River, at Veteran's Park, since 2011. Field measurements from 2023 indicated dissolved oxygen levels of 6.23 to 9.57 mg/L and transparency of 27 to 120 cm. Chloride data is also not collected at the DNR monitoring station. USGS baseflow monitoring on the Yahara River at Lake Windsor Country Club ([Station ID 05427718](#)) measures discharge, water level, and water quality data. Chloride data from 2022 indicated levels of 47.1 to 95.8 mg/L.

Wheeler Wilcox Creek

The southwest corner of the Research Products subarea is within the One Hundred Mile Grove Cemetery subwatershed. The One Hundred Mile Grove Cemetery subwatershed is approximately 24.2 square miles and drains along Wheeler Wilcox Creek. The Wheeler Wilcox Creek (WBIC 807500 / WATERS ID 3991043) is a 4.7-mile-long tributary to the Yahara River. It falls entirely within Dane County and is managed for fishing and swimming and is not listed as impaired water.

There has been a DNR monitoring location on Wheeler Wilcox Creek at River Road ([Station 133472](#)) since 2010. Field measurements from 2023 indicated dissolved oxygen levels of 2.81 to 10.81 mg/L, total phosphorus levels of 0.09 to 1.26 mg/L, and transparency of 80 to 120 cm.

Springs

Springs represent groundwater discharge visible to the casual observer. The Wisconsin Geological and Natural History Survey (WGNHS) maintains an inventory of springs in Dane County and throughout the state. From 2014 to 2017, the WGNHS surveyed springs statewide that were expected to have flow rates of at least 0.25 cubic feet per second (cfs). There are no known springs in the Cherokee Lake-Yahara River and One Hundred Mile Grove Cemetery subwatersheds.

Groundwater

Groundwater modeling using the 2016 Groundwater Flow Model for Dane County, developed by the WGNHS ([link to website](#)), shows that 2010 modeled baseflow in the Yahara River at South Street (see location on Map 5) decreased compared to predevelopment flow conditions (8.6 to 7.8 cfs; see Table 4). These reductions are primarily due to the cumulative effects of well water withdrawals from multiple municipalities in the groundwatershed. Pre-development conditions represent no well pumping within the model.

In 2012, the WGNHS published a report, *Groundwater Recharge in Dane County, Wisconsin, Estimated by a GIS-Based Water-Balance Model* ([link to report](#)), estimating the existing groundwater recharge rates in Dane County based on the soil water balance method. The study estimates that the existing groundwater recharge rate in the proposed amendment area ranges from approximately 9 to 11 inches per year.

Endangered Resources

The WDNR Bureau of Endangered Resources maintains a database representing the known occurrences of rare plants, animals, and natural communities that have been recorded in the Wisconsin Natural Heritage Inventory ([link to website](#)). A screening review of this database conducted by CARPC staff for species designated as endangered, threatened, or of special concern identified one reptile species of concern and one natural community within a 1 to 2-mile radius of the amendment area. Additional review by the WDNR Bureau of Endangered Resources is not required based on the distance from the amendment area to the element occurrence records.

The amendment area was reviewed for the High Potential Zone (species likely present) for the federally endangered Rusty Patched Bumble Bee ([link to web map](#)). None of the proposed developable area falls within the High Potential Zone.

Soils and Geology

The western two-thirds of the amendment area is located within the Bristol Till Plain Land Type Association of Wisconsin. The Association classifies the surficial geology of this area as undulating till plain with low drumlins and scattered wetlands and bedrock knolls.

Surface elevations within the amendment area range from around 937 feet to 981 feet. There are areas of steep (> 12%) and very steep (>20%) slopes associated with the road embankments in the amendment area (see Map 6). These areas of steep slopes are not riparian and do not require inclusion in Environmental Corridors.

According to the Natural Resource Conservation Service (NRCS) Soil Survey of Dane County, the soils in most of the amendment area are in the Plano-Ringwood-Griswold association. These soils are moderately well drained and well drained, deep silt loams and loams. A small portion of the Evans subarea is in the Batavia-Houghton-Dresden association. These soils are well to poorly drained, deep to moderately deep silt loams and mucks that are underlain by silt, sand, and gravel. Table 2 shows detailed classifications for soils in the amendment area (see Map 7) while Table 3 shows important soil characteristics for the amendment area.

There are two hydric soils within the amendment area, the Colwood and Sable soils (the Co and SaA map units) (see Map 7). Hydric soils are good indicators of existing and former (drained) wetlands.

According to the Soil Survey Geographic data for Dane County developed by the NRCS ([link to web soil survey](#)), the Elburn, Troxel, and Radford soils (the EfB, TrB, and RaA map units) are not hydric, but they do have a seasonal (April to June) zone of water saturation within 5 feet of the ground surface. The Troxel soils are classified as moderately well drained, and therefore do not pose a limitation for buildings with basements. The Elburn and Radford soils are classified as somewhat poorly drained and do pose severe limitations for buildings with basements.

Table 2
Soils Classification

Soil	% of Area	General Characteristics
<i>Research Products Subarea</i>		
Colwood Silt Loam; Co	34	Deep, poorly drained, nearly level soils on low benches in old lake basins. Soils have medium fertility, moderate permeability, and a low hazard of erosion. Poses very severe limitations for development due to depth to saturated zone.
Ringwood Silt Loam; RnB	24.9	Deep, well drained, gently sloping and sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses moderate limitations for development due to low bearing capacity and erodibility.
Radford Silt Loam; RaA	16.5	Deep, somewhat poorly drained, nearly level and gently undulating alluvial soils in low drainageways and stream channels. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses very severe limitations for development due to very low bearing capacity and depth to saturated zone.
Elburn Silt Loam; EfB	14.7	Deep, somewhat poorly drained, nearly level and gently sloping soils in glaciated stream valleys. Soils have high fertility, moderately slow permeability, and a moderate hazard of erosion. Poses severe limitations for development due to depth to saturated zone.

Griswold Loam; GwC	5	Well drained, nearly level and gently sloping, moderately deep soils on benches on outwash plains. Soils have medium fertility, moderate to rapid permeability, and moderate hazard of erosion. Poses no limitations for development.
Plano Silt Loam; PnB	3.2	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development due to shrink/swell potential and low bearing capacity.
Plano Silt Loam; PnA	1.3	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses moderate limitations for development due to low bearing capacity.
<i>Buc-see's/Evans Subarea</i>		
Plano Silt Loam; PnB	39.2	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight limitations for development due to shrink/swell potential and low bearing capacity.
Plano Silt Loam; PnA	21.3	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate to severe hazard of erosion. Poses moderate limitations for development due to low bearing capacity.
Ringwood Silt Loam; RnC2	11.9	Deep, well drained, gently sloping and sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a severe hazard of erosion. Poses moderate limitations for development due to slope, low bearing capacity, and erodibility.
Griswold Loam; GwC	6.4	Well drained, nearly level and gently sloping, moderately deep soils on benches on outwash plains. Soils have medium fertility, moderate to rapid permeability, and moderate hazard of erosion. Poses no limitations for development.
Elburn Silt Loam; EfB	5.9	Deep, somewhat poorly drained, nearly level and gently sloping soils in glaciated stream valleys. Soils have high fertility, moderately slow permeability, and a moderate hazard of erosion. Poses severe limitations for development due to depth to saturated zone.
Plano Silt Loam; PoB	5.7	Deep, well drained and moderately well drained, nearly level to sloping soils on glaciated uplands. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses slight to moderate limitations for development due to low bearing capacity.
Sable Silty Clay Loam; SaA	3.9	Deep, nearly level and gently sloping, poorly drained soils on low benches in stream valleys. Soils have high fertility, moderate permeability, and low hazard of erosion. Poses very severe limitations for development due to low bearing capacity, moderate shear strength and compressibility, flooding, depth to saturated zone, and shrink/swell potential.

Cut and fill land; Cu	3.1	Variable – too variable to be estimated
Troxel Silt Loam; TrB	2.4	Deep, well drained and moderately well drained, gently sloping soils in draws, on fans, and in drainageways. Soils have high fertility, moderate permeability, and a moderate hazard of erosion. Poses severe limitations for development due to low bearing capacity.

Source: Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service

Table 3
Soils Characteristics

Characteristic	Soil Map Symbols (see Map 7)	% of Area
Prime Agricultural Soils	PnB, PnA, RnB, PoB, TrB	55
Hydric Soils (Indicates Potential / Restorable Wetlands)	Co, SaA	14.4
Poorly Drained Soils with Seasonal High Water Table (< 5')	EfB, RaA, SaA, TrB	19.4
Soils Associated with Steep Slopes (> 12%)	None	0
Soils Associated with Shallow Bedrock (< 5')	None	0
Best Potential for Infiltration in Subsoils	PnB, PnA, Co, RnB, RnC2, GwC, PoB, DSC2	78.5

Source: Soil Survey Geographic data for Dane County developed by the USDA Natural Resources Conservation Service

According to WGNHS data, bedrock within the southwestern two-thirds of the Research Products subarea is in the Trempealeau Formation. Bedrock in the Trempealeau Formation is quartz sandstone, dolomitic siltstone, silty dolomite, and sandy dolomite, consists of two formations including the Jordan and underlying St. Lawrence Formations, which were combined as one mapping unit. Thickness is up to 75 feet, where not eroded. The remainder of the amendment area is in the Tunnel City Group. Bedrock in the Tunnel City Group is medium to very fine-grained quartz sandstone, locally very glauconitic, and consists of two formations including the Lone Rock and Mazomanie Formations. Thickness is up to 150 feet. According to WGNHS data, the depth to bedrock in the amendment area ranges from 0-100 feet, with the shallowest depths generally being in the southwestern portion of the Research Products subarea and most of the Evans subarea, and the deepest depths being in the portion of the amendment area along County Highway V.

As is common throughout much of the upper Midwest, karst features such as enlarged bedrock fractures are prevalent in the local dolomite uplands. Karst features including vertical fractures and

conduits provide primary pathways for groundwater movement and can dramatically increase groundwater susceptibility when present. The location of karst features is difficult to predict, and the thickness and type of the overlying soil greatly affects how much water drains into them. Where clay soils are thick, infiltration rates are likely to be very low. However, where bedrock fractures are near the surface infiltration rates can be very high. Karst may be encountered in the Research Products subarea at depths ranging from 0 to 46 feet, with the shallowest depths coinciding with the shallow bedrock in the southwestern corner of that subarea. This can pose a concern for potential groundwater contamination if improperly managed. Karst features are unlikely to be encountered in the remainder of the amendment area.

WDNR Conservation Practice Standard 1001 – Wet Detention Pond (2007) and *WDNR Conservation Practice Standard 1002 – Site Evaluation for Stormwater Infiltration (2017)* require field verification for areas of the development site considered suitable for stormwater management. This includes a site assessment for karst features in this area. If shallow karst features are found, adequate protection measures are required to address any potential for groundwater contamination.

Per Dane County ordinance, infiltration practices receiving runoff from source areas that contain impervious surfaces must be located to allow a separation distance of at least 5 feet between the bottom of the infiltration system and the elevation of seasonal high groundwater, or the top of bedrock, along with certain soil filtering characteristics. There is no minimum separation distance for roofs draining to surface infiltration practices. Soil test pits are required as part of the stormwater management plan to assure that infiltration practices are sited in locations that will not adversely affect groundwater quality.

Proposed Urban Services

Parks and Open Space

The proposed development includes several stormwater management areas, totaling 11.4 acres within the amendment area (see Map 2). No parkland or open space is proposed. All stormwater areas are proposed for placement in Environmental Corridors.

Wastewater

Sanitary sewer service will be provided to the amendment areas by connection to the Village of DeForest sanitary sewer collection system. The Hickory Lane interceptor, a Village-owned 18-inch sanitary interceptor main, whose immediate service area is within the current Northern USA, has already been designed and is being extended west from River Road to Hickory Lane where a 15-inch interceptor is being constructed along the north and south corridor of Hickory Lane, adjacent to the “Research Products” and “Buc-ee’s” subareas. The sizing calculations for sewer (River Road to Hickory Lane and along Hickory Lane) accounted for the projected flows from the amendment areas, as well as additional future growth areas and existing lands within the urban service area. The “Buc-ee’s” amendment subarea is not intended to have sewered development (the portion of the planned Buc-ee’s development which is already within the urban service area will receive sewer service through lateral connection to the Village’s Interceptor). The “Research Products” subarea will receive sewer service via lateral connection to a proposed 15-inch interceptor that will run west from Hickory Lane through the amendment subarea (along future Cake Parkway extension). The “Evans” subarea will receive sewer

service via extension of a proposed interceptor which will run north along Evco Circle and Morrisonville Road, anticipated to be 15-inch. Local sewers will be configured within the “Evans” subarea, connecting to this interceptor, based on final design layout.

All three subareas flow to the previously described 18-inch Hickory Lane Interceptor being constructed west from River Road. Flow in this interceptor connects to an existing interceptor at River Road, between Hilltop Road and West Lexington Parkway, and flows south within the Village-owned sewer within River Road and through greenspace, connecting to the Northeast Interceptor – DeForest Extension interceptor, owned by Madison Metropolitan Sewerage District (MMSD), at the north end of Mayapple Circle (see Map 9A). From there, wastewater flows via the Northeast Interceptor – DeForest Extension to Pump Station 14 within the MMSD system, and eventually to the Nine Springs Treatment Facility. There is an existing pumping station and force main system near and along River Road that is owned by the Town of Vienna Sanitary District 1 and pumps into the MMSD system. There are no plans for this system to pump into Village-owned sewer.

The proposed development within the amendment area consists of approximately 22 acres of residential (8 acres of single-family and 14 acres of multifamily), 33 acres of industrial, and 43 acres of commercial land uses contributing to wastewater flows. The Village estimates that the amendment area will generate an annual average of approximately 64,080 gallons per day (gpd) of wastewater, or 45 gallons per minute (gpm). This assumes 2.67 persons per single-family dwelling unit, 1.8 persons per multifamily dwelling unit, and an average wastewater generation rate of 85 gallons per capita per day (gpcd) for residential land uses (based on water sales records and 35 gpcd infiltration/inflow allowances). For industrial and commercial land uses, the Village assumes 400 gallons per acre (gal/ac) based on flow data from MMSD for the existing USA. The Village estimates that the amendment area will generate a peak daily flow rate of approximately 256,320 gpd (0.256 mgd), or 178 gpm, utilizing a peaking factor of 4 for all land uses.

The proposed 15-inch interceptor extension on future Cake Parkway to serve the “Research Products” subarea have not received final design yet but will be sized based on final projected loadings. The critical section of the proposed 15-inch interceptor along Evco Circle and Morrisonville Road to serve the “Evans” subarea has a design capacity of 1,194 gpm and will receive a cumulative peak daily loading of 328 gpm, including existing flow and projected flows from the subarea. The critical section of the 15-inch sewer extending south along Hickory Lane adjacent to the “Research Products” subarea has a design capacity of 1,194 gpm and will receive a cumulative peak daily loading of 821 gpm, including existing flow and projected flows from the subarea. The critical section of the 15-inch sewer extending north along Hickory Lane has a design capacity of 1,194 gpm and will receive a cumulative peak daily loading of 1,055 gpm, including existing flow and projected flows from the “Buc-ee’s” subarea. The critical section of the east-west 18-inch sewer from Hickory Lane to River Road has a design capacity of 1,827 gpm and will receive a cumulative peak daily loading of 1,773 gpm, including existing flow and projected flows from all three subareas. The existing sewer along River Road, which connects to the MMSD-owned sewer at Mayapple Circle, has a design capacity of 2,042 gpm and will receive a cumulative peak daily loading of 1,917 gpm, including existing and projected flows. The *2018 MMSD Collection System Evaluation* conducted on the receiving MMSD interceptor sewers shows that the MMSD interceptor sewers have sufficient capacity to serve the amendment area. In 2020, Pump Station

14 underwent system upgrades to increase the peak and firm pumping capacity, among other improvements. Altogether, the existing and planned collection system appears to have sufficient capacity to serve the proposed amendment area.

Wastewater Treatment Facility

Madison Metropolitan Sewerage District (MMSD) will provide wastewater treatment for the amendment area. The amendment area will need to be annexed into the MMSD service boundary. The Nine Springs Wastewater Treatment Facility (WWTF) is located on Moorland Road, Madison, and currently discharges treated effluent to Badfish Creek within the Badfish Creek Watershed (Lower Rock River Basin) and Badger Mill Creek within the Upper Sugar River Watershed (Sugar-Pecatonica Basin). The rated monthly design flow capacity of the facility is 56.0 million gallons per day (MGD) and the maximum daily design flow capacity is 68.6 MGD. In the year 2022, the facility received an average monthly influent hydraulic loading of 36.3 MGD (65% of the 56.0 MGD design capacity), including infiltration and inflow, according to the 2022 Compliance Maintenance Annual Report (CMAR) ([link to 2022 CMAR](#)). It is expected to reach 90% of current hydraulic design capacity around 2026 based on current projected growth rate assumptions. This already occurs on occasion, although average flows did not exceed 70% design capacity for any month in 2022. MMSD completed a facility plan in 2017, titled [Liquid Processing Facilities Plan](#), that recommended improvements to the liquid treatment processes at the plant, including the addition of hydraulic capacity. These improvements are being implemented in multiple phases between 2018 and 2030. For the 20-year planning period, treatment for this area is expected to remain at the existing wastewater treatment facility location with expanded capacity of the system as the need is foreseen. The Village has been in contact with MMSD staff regarding annexation of the proposed amendment area into the MMSD service area. CARPC staff have not been informed of concerns about serving this additional area.

MMSD did not have issues meeting its WPDES permit limits for the quality of effluent discharged to Badfish Creek and Badger Mill Creek, according to their 2022 CMAR. Permit limits are specific to each outfall; however, effluent sampling is performed upstream of the flow split to each outfall. Effluent quality summarized here refers to Badfish Creek, where approximately 95% of discharge is released. Below is a summary of the major effluents reported on in the 2022 CMAR for the Badfish Creek outfall:

- The biochemical oxygen demand (BOD) effluent quality for 2022 was well below the monthly average limit, with a monthly average of 3.0 mg/L (16% of the limit) and a maximum concentration of 4 mg/L (21% of the limit) for the month of January through April.
- The total suspended solids (TSS) effluent quality for 2022 was below the monthly average limit, with a monthly average of 5.3 mg/L (27% of the limit) and a maximum concentration of 7 mg/L (35% of the limit) for the month of September and November.
- The ammonia (NH₃) effluent quality for 2022 was below the monthly average limits (limits vary by month), with a monthly average of 0.213 mg/L (3-12% of the limit) and a maximum concentration of 0.452 mg/L (12% of the limit) for the month of March.

- The phosphorus (P) effluent quality for 2022 was below the monthly average limit, with a monthly average of 0.32 mg/L (23-43% of the limit) and a maximum concentration of 0.43 mg/L (43% of the limit) for the month of September.

Badfish Creek is a tributary to the Rock River, and thus the WPDES permit for MMSD includes phosphorus and TSS limits for effluent to Badfish Creek to comply with the Total Maximum Daily Load (TMDL) developed for the Rock River Basin to protect and improve water quality. In addition to the TMDL limits, future water quality-based effluent limits (WQBEL) have been considered in the WPDES permit. The interim limit for phosphorus discharged to Badfish Creek is a 1.0 mg/L monthly average required beginning May 2020 (previous limit was 1.5 mg/L), with a final WQBEL of 0.225 mg/L. Additionally, an interim limit of 0.6 mg/L, expressed as a six-month average (May through October and November through April) is required beginning May 2020, with a final WQBEL of 0.075 mg/L. To meet the WQBEL for phosphorous, MMSD has implemented a Watershed Adaptive Management (WAM) approach, leading a diverse group of partners called Yahara Watershed Improvement Network (Yahara WINs) in implementing phosphorus reducing practices in the Yahara Watershed ([link to Yahara WINs website](#)).

The Nine Springs WWTF does not remove chloride from influent. A 2015 study completed by AECOM determined that while possible, treatment would be cost-prohibitive, energy intensive, and involve other environmental impacts ([link to report](#)). MMSD has been granted a variance from the chronic water quality standard for chloride of 395 mg/L required by NR 105. With this variance, the WPDES permit sets interim (variance) monthly limits above the chronic water quality standard and requires MMSD to implement chloride source reduction measures. One such source reduction initiative which MMSD participates in is the Wisconsin Salt Wise Partnership ([link to Salt Wise website](#)).

Water System

DeForest Municipal Water Utility provides municipal water through a public water distribution system comprised of the original DeForest system (“DeForest North”) and the former Token Creek Sanitary District system (“DeForest South”). In 2021, the Village completed a project to connect the systems, providing a booster station with a pressure control valve to allow water to be pumped from DeForest South to the DeForest North or for water to flow from North to South. Together, the system includes approximately 426,000 linear feet of water main and four active high-capacity groundwater wells within the Village that pump into the distribution system. The active wells are at depths ranging from approximately 412 to 695 feet with an average capacity of 300 to 1,600 gallons per minute (gpm). In total, the gross capacity of the municipal wells is approximately 3,560 gpm, or 5.13 million gallons per day (MGD). The firm capacity (with the largest well assumed to be out of service) is approximately 1,960 gpm, or 2.82 MGD. The Village has three elevated storage tanks, with a combined capacity of 1.10 million gallons. According to the 2022 Annual Report to the Public Service Commission of Wisconsin ([link to 2022 Annual Report](#)), the Village pumped an average of 612 gpm, or 0.88 MGD, in 2022, which is approximately 31% of its firm pumping capacity. In 2022, the maximum amount pumped in any one day was 1,627 gpm, or 2.34 MGD. Applying the Village’s peak hour to maximum day factor of 2.0, the current estimated peak hourly demand is 3,254 gpm, or 4.68 MGD.

Water losses in the Village's distribution system were an average of 33,334 gpd, or 0.03 MGD, in 2022, which accounted for 4% of the net water supplied. Approximately 21% of this was due to unreported and background leakage, with the remaining due to reported leaks and other apparent losses. In 2022, there were 13 main breaks and 0 service breaks which were repaired. Water losses in the Village's distribution system were 2% in 2021 and 2% in 2020. The Wisconsin Administrative Code PSC 185.85(4)(b) requires a utility with more than 1,000 customers to submit a water loss control plan to the Public Service Commission (PSC) if the utility reports its percentage of water losses exceeds 15%.

Water supply within the amendment area will be provided by connecting to existing 12-inch water main which runs adjacent to each of the three subareas (see Map 9B). Within the "Evans" and "Research Products" subareas, water main will be extended throughout the development area with individual service laterals to be provided to each building, as needed. The Buc-ee's development area will connect to the adjacent water main via lateral. Water main within the amendment subareas will be internally looped.

The proposed development within the amendment area consists of approximately 22 acres of residential (8 acres of single-family and 14 acres of multifamily), 33 acres of industrial, and 43 acres of commercial land uses contributing to water demand. The Village anticipates the annual average daily water demand for the amendment area to be approximately 47,042 gallons per day (gpd), or 33 gpm. This assumes an average daily demand of 136 gpd for residential dwelling units and 300 gallons per acre per day (gpd/ac) for the industrial and commercial land uses, based on flow data from MMSD provided by the Village. The estimated peak daily demand is 113,760 gpd, or 79 gpm, based on a peak daily demand factor (peak day to average day) of 2 for all land uses. The estimated peak hourly demand is approximately 9,420 gallons/hour, or 157 gpm, based on a peak hourly demand factor (peak hour to maximum day) of 2 for all land uses. Including the projected demand from the amendment area as well as the additional demand from the recently added "Daentl Road" urban service area amendment (contributing a peak daily demand of 32 gpm), the total peak daily demand on the water system is anticipated to be 1,738 gpm. The peak hourly demand is anticipated to be 3,476 gpm. This is within the gross capacity of the system with all four wells running but does exceed the firm capacity. If one well is down, water from storage will be required to meet the peak hourly demands on the system (note: this is already the case without adding the additional demand from the amendment area). Nonetheless, it is anticipated that the existing water supply system will support the additional demand from the proposed amendment area. The estimated average daily water demand represents an increase of approximately 6% of the current demands on the system.

The Village estimates that static pressures within the amendment area will range between 45 psi (at the highest elevations) to 66 psi (at the lowest elevations), providing acceptable pressure. Furthermore, the Village estimates the system will be able to provide 3,500 gpm for a duration of 3 hours, in accordance with typical Insurance Services Office (ISO) recommendations, by utilizing existing storage volume.

Stormwater Management System

The three subareas, totaling approximately 122 acres, currently consist of mostly active agricultural lands and existing right-of-way.

The “Evans” and “Buc-ee’s” subareas are within the Cherokee Lake-Yahara River subwatershed (HUC 12: 070900020504). These areas are relatively flat but generally drain to the south and east through a series of wetlands, unnamed intermittent and perennial streams, and constructed drainageways, eventually reaching the Yahara River approximately 7,800 feet to the east.

The “Research Products” subarea is also mostly within Cherokee Lake-Yahara River subwatershed, but the southwest corner of this subarea is within the One Hundred Mile Grove Cemetery subwatershed (HUC 12: 070900020502). Most of this subarea is within an internally drained watershed associated with a closed basin (depression) located in the center of the amendment subarea. In larger storm events where the closed basin fills and water flows off-site, it crosses Hickory Lane through an existing culvert, then generally flows east through a straightened intermittent stream along and through several parcels and eventually reaching the Yahara River approximately 6,500 feet to the east. The size of the existing culvert crossing Hickory Lane is unknown. However, based on Dane County LiDAR contour data, during storms events exceeding the capacity of the culvert, stormwater will likely overtop the roadway at this same location and maintain flow within the same drainageway. The southwestern corner of the subarea drains southwest through existing agricultural lands within the Town of Vienna, reaching the Wheeler Wilcox Creek approximately 2,400 feet to the southwest.

According to the Village’s application, new development within the amendment areas will meet or exceed current stormwater regulations for peak rate control and attenuation, water quality (TSS reduction), volume control (infiltration), thermal control for areas within thermally sensitive watersheds, and oil/grease control. Pretreatment of stormwater runoff prior to entering the wetlands will be required in accordance with NR 151 regulations. For the portion of the “Research Products” subarea which is in a closed basin watershed, it will be necessary to model the volume of storage within the closed basin in predevelopment conditions, meet the 90% stay-on requirement without exemption, and meet additional requirements for sites subject to inundation.

Conceptual stormwater management areas have been provided in the Village’s application, though precise configurations and location are subject to change with specific development plans (see Map 9B). Plat-wide or regional stormwater facilities will be placed in outlots dedicated to the public and will be owned and managed by the Village, while any stormwater facilities privately owned and managed will be subject to a stormwater maintenance agreement to be recorded with the Dane County Register of Deeds.

A detailed stormwater management plan review and approval is required prior to beginning any development construction. The plan will be required to meet all stormwater management and performance standards of the Village of DeForest, Dane County, and WDNR current at the time of development. Temporary stormwater management and erosion control using appropriate best management practices during construction will also be required.

Performance Standards

The Village of DeForest stormwater management and performance standards are contained within Chapter 24 of the Village of DeForest Code of Ordinances. Dane County stormwater standards are detailed within Dane County Code of Ordinances, Chapter 14. WDNR stormwater standards are within

Administrative Code Chapters NR 151 and NR 216. Development within the amendment area will be required to follow the more protective requirements contained within the respective standards.

The Village proposes stormwater management performance measures for the amendment area to meet, or exceed, applicable stormwater standards currently required by the State of Wisconsin, Dane County, and Village of DeForest, and include:

1. Require post-construction peak runoff rate control for the 1-, 2-, 10-, 100-, and 200-year, 24-hour design storms (using NRCS MSE4 storm distributions) to match predevelopment peak runoff rates. This is consistent with the standards currently required by Dane County and Village of DeForest ordinances. Additionally, require peak runoff rate control for the 5- and 25-year, 24-hour design storms to match predevelopment peak runoff rates consistent with the standards currently required by Village of DeForest ordinances.
2. Require post-construction sediment control for the average annual rainfall period to reduce total suspended solids leaving the site by at least 80%, as compared to no runoff management controls, with sediment control pretreatment occurring prior to infiltration for runoff from parking lots and new road construction within commercial, industrial, and institutional land uses. This is consistent with the standards currently required by Dane County and Village of DeForest ordinances.
3. Require post-development infiltration (stay-on) volume of at least 90% of the pre-development infiltration (stay-on) volume for the average annual rainfall period. This is consistent with the standards currently required by Dane County and Village of DeForest ordinances.
4. Maintain predevelopment groundwater annual recharge rates of approximately 9 to 11 inches per year, as estimated by the Wisconsin Geological and Natural History Survey in *Groundwater Recharge in Dane County, Wisconsin Estimated by a GIS-Based Water Balance Model* (2012). This is consistent with the standards currently required by Dane County and Village of DeForest ordinances.
5. Require thermal control to reduce the temperature of stormwater runoff from development sites within thermally sensitive watersheds, in accordance with the Village of DeForest and Dane County Stormwater Ordinance.
6. Treat the first one-half inch of runoff to provide oil and grease control using the best available technology for commercial, institutional, and any other land uses where the potential for pollution by oil or grease, or both, exists. This is consistent with the standards currently required by Dane County and Village of DeForest ordinances.

Impacts and Effects of Proposal

Environmental Corridors

The proposed amendment area includes a total of approximately 11.4 acres of Environmental Corridor (see Map 12). This will include proposed stormwater management areas in accordance with the Environmental Corridor Policies and Criteria ([link to document](#)) adopted in the *Dane County Water*

Quality Plan. Some of what is proposed as Environmental Corridor also coincides with mapped Stewardship Areas, as described below.

Protection Areas are required to be included in Environmental Corridors when those areas are added to the urban service area. Protection Areas include natural resource features such as the 1% annual chance floodplain, waterbodies, streams and wetlands, plus their required vegetative buffers, riparian steep slopes, existing public lands, parks, and conservancy areas, and existing stormwater management facilities. Protection areas are mapped based on regionally available information, such as the Wisconsin Wetland Inventory data.

The proposed amendment area includes 23.9 acres mapped as Stewardship Area, including potentially restorable wetlands, hydric soils, and internally drained areas, of which 6.1 acres are proposed to be designated as Environmental Corridor with this amendment (see Map 12). Stewardship Areas are natural resources that are not legally protected from development, but still provide important benefits to the region, and are advised to be considered for inclusion in Environmental Corridors, above the minimum requirements. This concept is described more in the [2050 Regional Development Framework](#) (Framework) and is aimed at achieving the goal of conserving water resources and natural areas. The Stewardship Area recommendations include natural resource features such as the 0.2% annual chance floodplain, potentially restorable wetlands, internally drained areas, hydric soils, current/potential Ice Age Trail Corridor, and Natural Resource Area boundaries identified in the Dane County Parks and Open Space Plan.

Meeting Projected Demand

Based on projections in the Framework, employment in DeForest will grow by at least 20% (1,350 jobs) in the next 30 years. The Framework identifies locations that should be planned for business growth to occur. The requested amendment areas are located adjacent to areas designated for this type of development. The Framework also suggests that this business growth should offer higher wages and stronger career pathways in addition to importing dollars from outside the region that support other industries. Examples include information and communications technology, health care, advanced manufacturing, and biotechnology.

DeForest is projected to need at least 2,700 additional households by the year 2050 (62% increase). The proposed amendments would add roughly 250 housing units, the overwhelming majority of which would not be single-family, detached housing units.

Phasing

None of the individual sub-areas exceeds 100 acres. While a phasing plan is not required, some details are available on timing and phasing. The Buc-ee's site will likely develop soon. The Research Products site is expected to develop in a single phase. The Evans subarea would be developed last, as no development proposals have been submitted for the site.

Surface Water Impacts

Development creates impervious surfaces (e.g., streets, parking areas, and roofs) and typically alters the natural drainage system (e.g., natural swales are replaced by storm sewers). Without structural best management practices (e.g., detention basins and infiltration basins) this would result in increased

stormwater runoff rates and volumes, as well as reduced infiltration. Without structural best management practices for erosion control, development would also cause substantial short-term soil erosion and off-site siltation from construction activities. Scientific research has well documented that without effective mitigation measures, the potential impacts of development on receiving water bodies can include the following:

- Flashier stream flows (i.e., sudden higher peaks)
- Increased frequency and duration of bank-full flows
- Reduced groundwater recharge and stream base flow
- Greater fluctuations in water levels in wetlands
- Increased frequency, level (i.e., elevation), and duration of flooding
- Additional nutrients and urban contaminants entering the receiving water bodies
- Geomorphic changes in receiving streams and wetlands

Natural drainage systems attempt to adapt to the dominant flow conditions. In the absence of mitigation measures, the frequency of bank-full events often increases with urbanization, and the stream attempts to enlarge its cross section to reach a new equilibrium with the increased channel forming flows. Higher flow velocities and volumes increase the erosive force in a channel, which alters streambed and bank stability. This can result in channel incision, bank undercutting, increased bank erosion, and increased sediment transport. The results are often wider, straighter, sediment laden streams, greater water level fluctuations, loss of riparian cover, and degradation of shoreland and aquatic habitat.

Since 2002, there have been stormwater management standards in effect at the state, county, and local level to require stormwater management and erosion control plans and structural best management practices designed to address the impacts of development on water quality, runoff volumes, peak flows, water temperature, and groundwater recharge. In 2011, county and local standards for runoff volume control were increased beyond state standards to further address the potential stormwater impacts of development. Since 2010 many communities adopted even higher standards for volume control through their own ordinances or as part of USA amendment agreements. In 2017, State statute 281.33(6)(a)(1) was changed to limit the ability of local governments to provide more protective standards for runoff volume control through local ordinances. In 2021, Dane County adopted peak rate control requirements for the 200-year storm event in their ordinance as well as requirements for closed basins, which made these requirements universal to all communities in Dane County.

The Village of DeForest proposes to mitigate the urban nonpoint source impacts of the proposed development by requiring the implementation of various stormwater best management practices that will be designed and constructed to meet current Dane County standards for pollutant reduction, runoff volumes, peak flows, water temperature, and groundwater recharge. Such practices will help to address the potential water quality impacts of stormwater runoff from the proposed development on the receiving waters.

Regional partners are actively working to address chlorides through the [Wisconsin Salt Wise Partnership](#). WI Salt Wise's chloride reduction trainings are open to all municipal and private winter maintenance

professionals in the region. Village of DeForest staff have attended winter salt certification classes and training for winter road maintenance and are encouraged to stay current on the latest trainings and development.

The Village of DeForest is also a participant in the Madison Area Municipal Storm Water Partnership (MAMSWaP), which is a coalition of Dane County municipalities and organizations working together to promote practices that reduce and improve stormwater runoff into Dane County lakes, rivers, and streams. The MAMSWaP Information and Education (I&E) Committee works to develop and implement projects and plans through regional outreach and messaging throughout the communities, including maintaining the www.ripple-effects.com website, distributing tools and articles to municipalities, community groups, and neighborhood associations, and providing presentations to focused audiences. Specific goals include promoting proper leaf management, proper lawncare practices, reduction in chlorides pollution from over-use of salt, and rainwater harvesting for beneficial reuse.

Groundwater Impacts

Without effective mitigation practices, converting natural areas to urban development shifts the ground/surface water balance in streams and wetlands from a groundwater-dominated system to one dominated more and more by surface water runoff. This can result in subsequent reductions in stream quality and transitions to biological communities more tolerant to these changing conditions.

Groundwater modeling indicates that the cumulative effects of well withdrawals have resulted in a 0.8 cubic feet per second (cfs) decrease in baseflow of the Yahara River at South Street (see location on Map 5) from predevelopment (no pumping) to 2010 (see Table 4). An additional 0.3 cfs decline compared to 2010 conditions is anticipated for the year 2040, according to modeling.

Table 4
Modeled Baseflow Results Due to Current and Anticipated
Future Municipal Well Water Withdrawals
(All Municipal Wells)

Stream	No Pumping	2010	2040
Yahara River (at South Street)	8.6 cfs	7.8 cfs	7.5 cfs

Generally, groundwater discharge occurs along the entire length of perennial streams and is the source of stream baseflow. The loss of baseflow from the cumulative effects of well water pumping and urbanization is a regional issue, beyond the boundaries of a single USA Amendment or even a single municipality. This issue is discussed along with potential management options in the updated *Dane County Groundwater Protection Planning Framework* ([link to report](#)). Maintaining pre-development groundwater recharge by infiltrating stormwater runoff helps to replenish groundwater, maintain baseflow, and mitigate this impact. The regional groundwater model is a useful tool for evaluating different configurations and scenarios of municipal groundwater well withdrawals on these stream systems.

Comments at the Public Hearing

A public hearing was held on the proposed amendment at the January 11, 2024, meeting of the Capital Area Regional Planning Commission. Representatives from the Village of DeForest spoke in favor of the amendment. There were no registrants opposed to the amendment. Commissioner Zavos inquired about the reason for bringing the Buc-ee's subarea into the urban service area, as no development is intended for sewer service. Commissioner McKeever inquired whether the Village would deed restrict or otherwise limit this area from developing in the future. Mark Roffers, Village Planning Consultant, responded to both comments during the meeting, noting the desire to clean up the boundary and provide continuity by bringing the entirety of the parcel into the urban service area; and that the Village will not deed restrict the parcel, but would review any future development proposals.

Conclusions and Staff Water Quality Recommendations

There is sufficient existing treatment plant system capacity at MMSD's Nine Springs Wastewater Treatment Facility and sufficient existing or planned wastewater collection system capacity to serve the proposed amendment area.

The Village of DeForest proposes to mitigate the potential urban nonpoint source impacts of the proposed development on the receiving waters by requiring the implementation of stormwater best management practices that are designed and constructed to meet current standards for pollutant reduction, runoff volumes, peak flow rates, water temperature, and groundwater recharge.

It is CARPC staff's opinion that the proposed amendment is consistent with water quality standards under Wis. Stat. § 281.15, and the adopted Policies and Criteria for the Review of Sewer Service Area Amendments to the *Dane County Water Quality Plan*, with the existing state and local requirements identified below. Additional actions have also been recommended below to further improve water quality and environmental resource management.

State and Local Requirements

CARPC staff recommend approval of this amendment in recognition of the state and local requirements for the following:

1. State and local review and approval of stormwater management plan(s) is required, including Regional Planning Commission staff review and approval as part of the sewer extension review process.
 - a. Stormwater and erosion control practices are required to be installed prior to other land disturbing activities. Infiltration practices are required to be protected from compaction and sedimentation during land disturbing activities.
 - b. Peak rates of runoff are required to be controlled for the 1-, 2-, 5-, 10-, 25-, 100-, and 200-year 24-hour design storms to pre-development levels, in accordance with the Village of DeForest and Dane County Stormwater Ordinances.
 - c. Sediment control is required to achieve at least 80% sediment control for the amendment area based on the average annual rainfall period, with sediment control pretreatment

occurring prior to infiltration for runoff from parking lots and new road construction within commercial, industrial, and institutional land uses, in accordance with the Village of DeForest and Dane County Stormwater Ordinances.

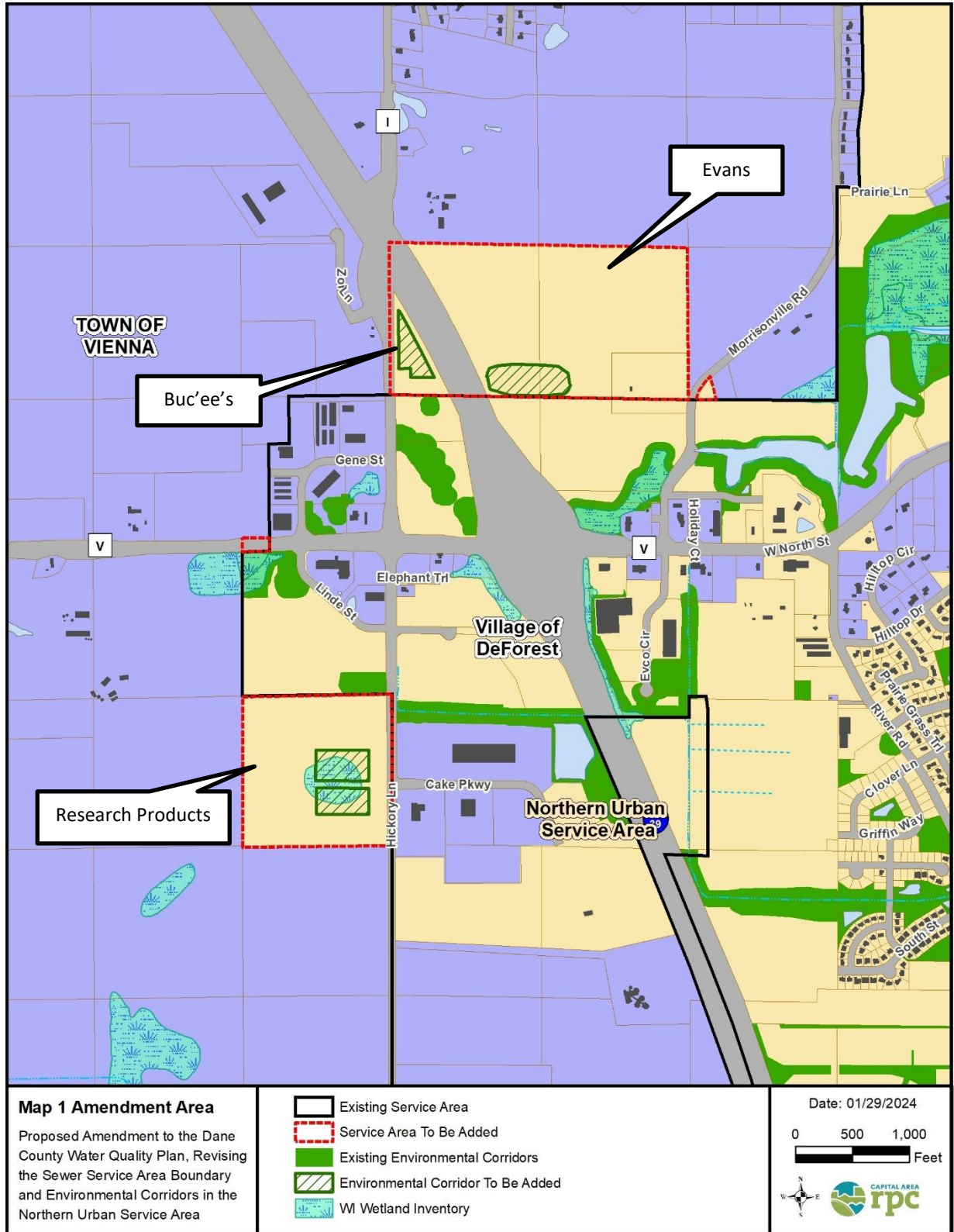
- d. Runoff volume control is required to maintain the post-development stay-on volume to at least 90% of the pre-development stay-on volume for the average annual rainfall period, and without exception for sites within a closed basin watershed, in accordance with the Village of DeForest and Dane County Stormwater Ordinances.
 - e. Maintain predevelopment groundwater recharge rates from the Wisconsin Geological and Natural History Survey's 2012 report, "*Groundwater Recharge in Dane County, Wisconsin, Estimated by a GIS-Based Water-Balance Model*", for the amendment area (a range of 9 to 11 inches/year) or by a site-specific analysis, when required by the Village of DeForest and Dane County Stormwater Ordinances.
 - f. Thermal control is required to reduce the temperature of stormwater runoff from development sites within thermally sensitive watersheds, in accordance with the Village of DeForest and Dane County Stormwater Ordinances.
 - g. Oil and grease control are required to treat the first 0.5 inches of runoff using best management practices at commercial and industrial sites and any other uses where the potential for pollution by oil or grease, or both, exists, in accordance with the Village of DeForest and Dane County Stormwater Ordinances.
2. Easements and perpetual legal maintenance agreements with the Village, to allow the Village to maintain stormwater management facilities if owners fail to do so, are required for any facilities located on private property.
 3. Environmental corridors are required to be delineated to meet the Environmental Corridor Policies and Criteria adopted in the *Dane County Water Quality Plan*.

Recommendations

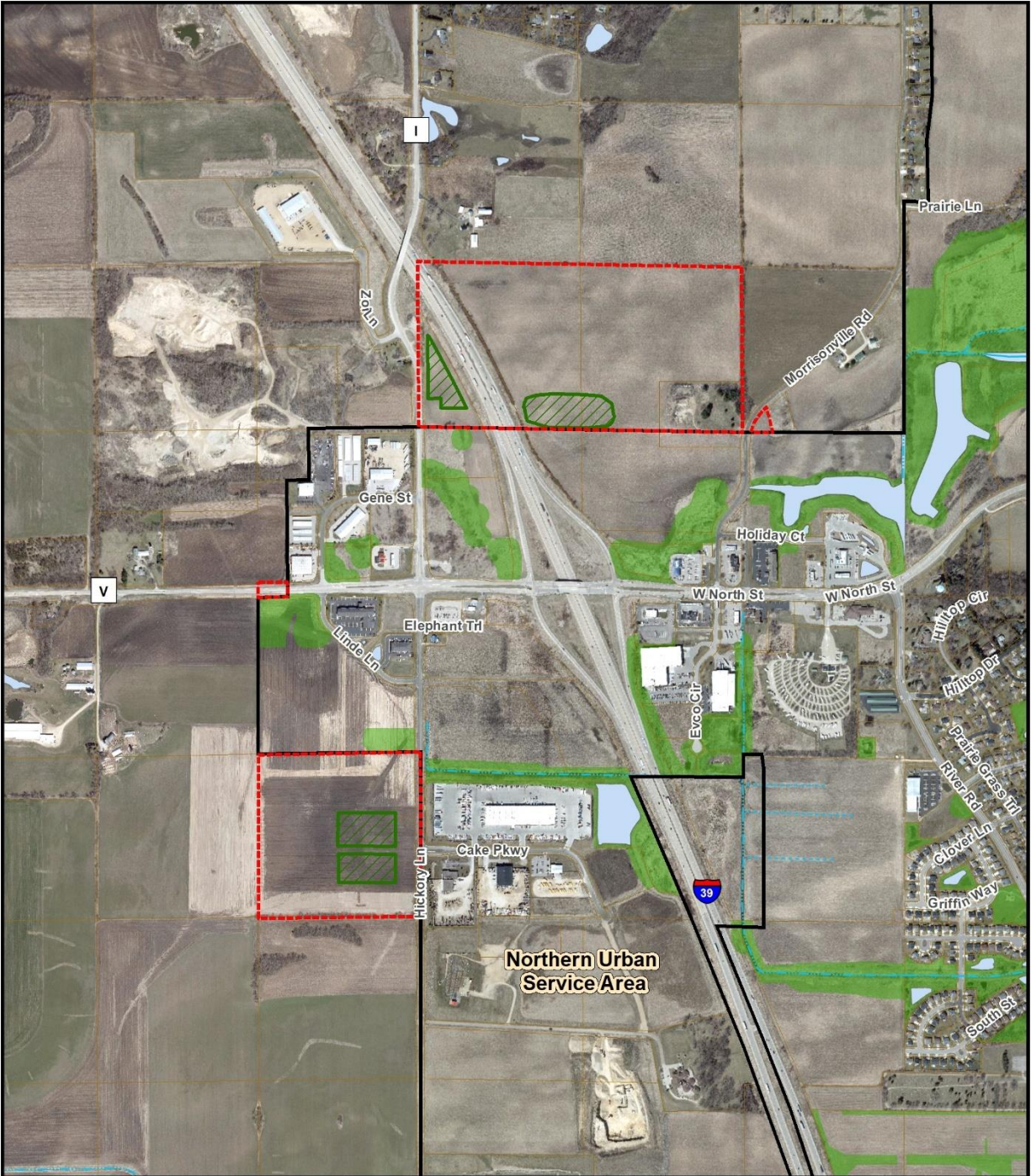
It is recommended that the Village of DeForest pursue the following to further improve water quality and environmental resource management:

1. Continue to participate in regional water quality initiatives including Wisconsin Salt Wise, the Madison Area Municipal Storm Water Partnership (MAMSWaP), and Yahara WINS.
2. Require an archaeological survey to be performed by a qualified archaeologist for the "Research Products" amendment area as recommended by the Wisconsin Historical Society and take necessary protection measures if artifacts are found.

Map 1 - Amendment Area




Map 2 – Aerial

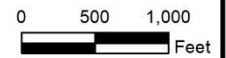


Map 2 Aerial (2022)

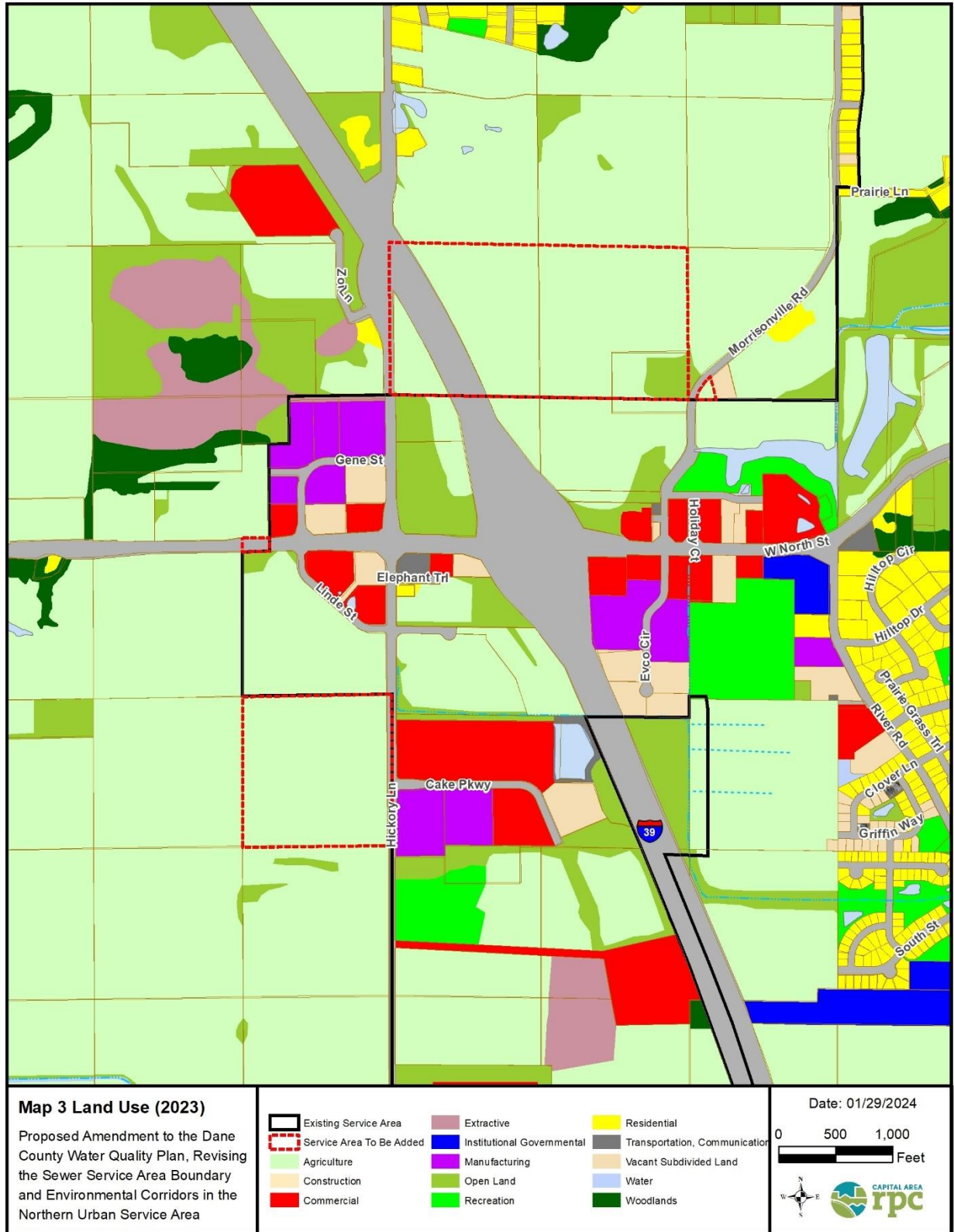
Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Northern Urban Service Area

-  Existing Service Area
-  Service Area To Be Added
-  Existing Environmental Corridors
-  Environmental Corridor To Be Added

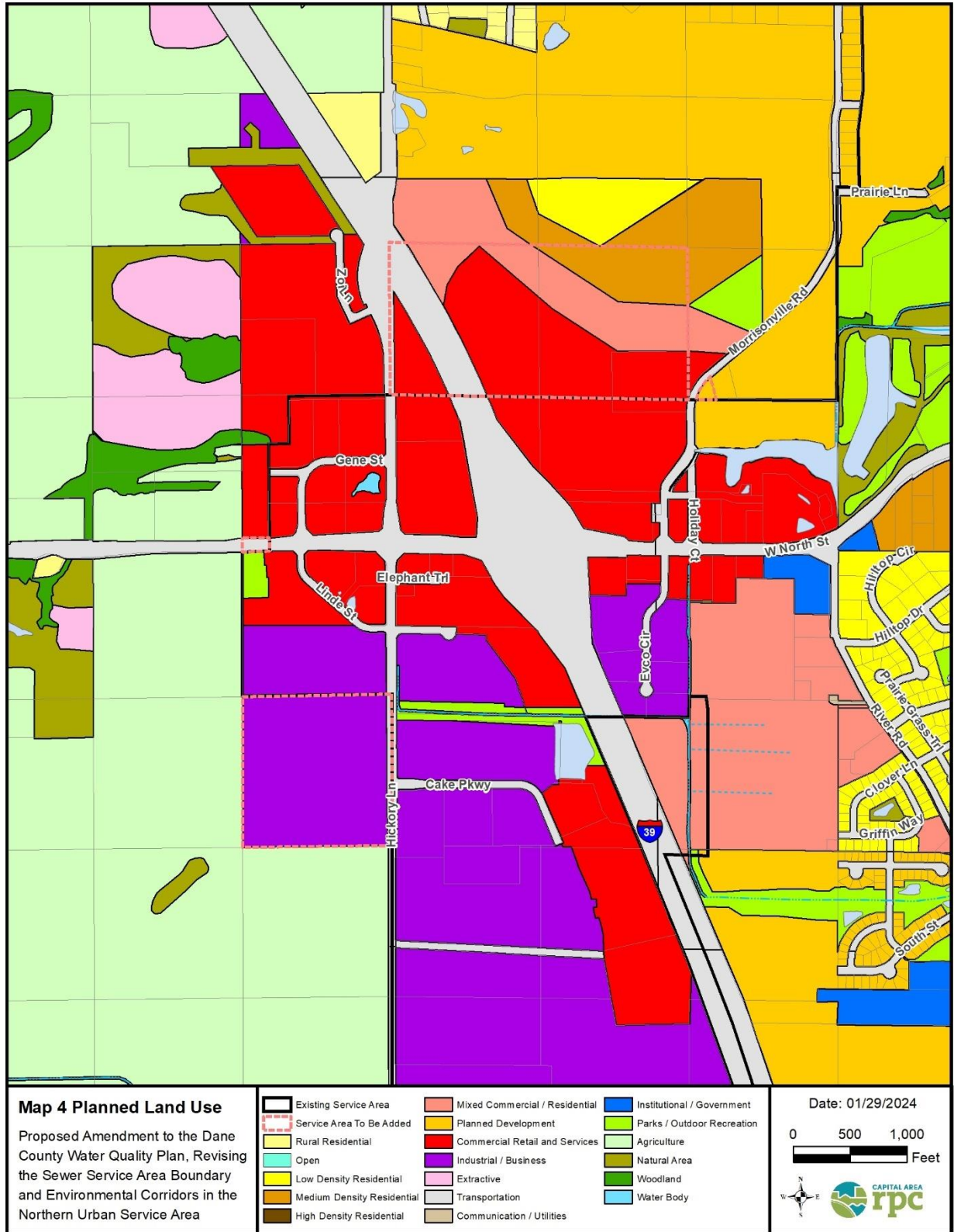
Date: 01/29/2024



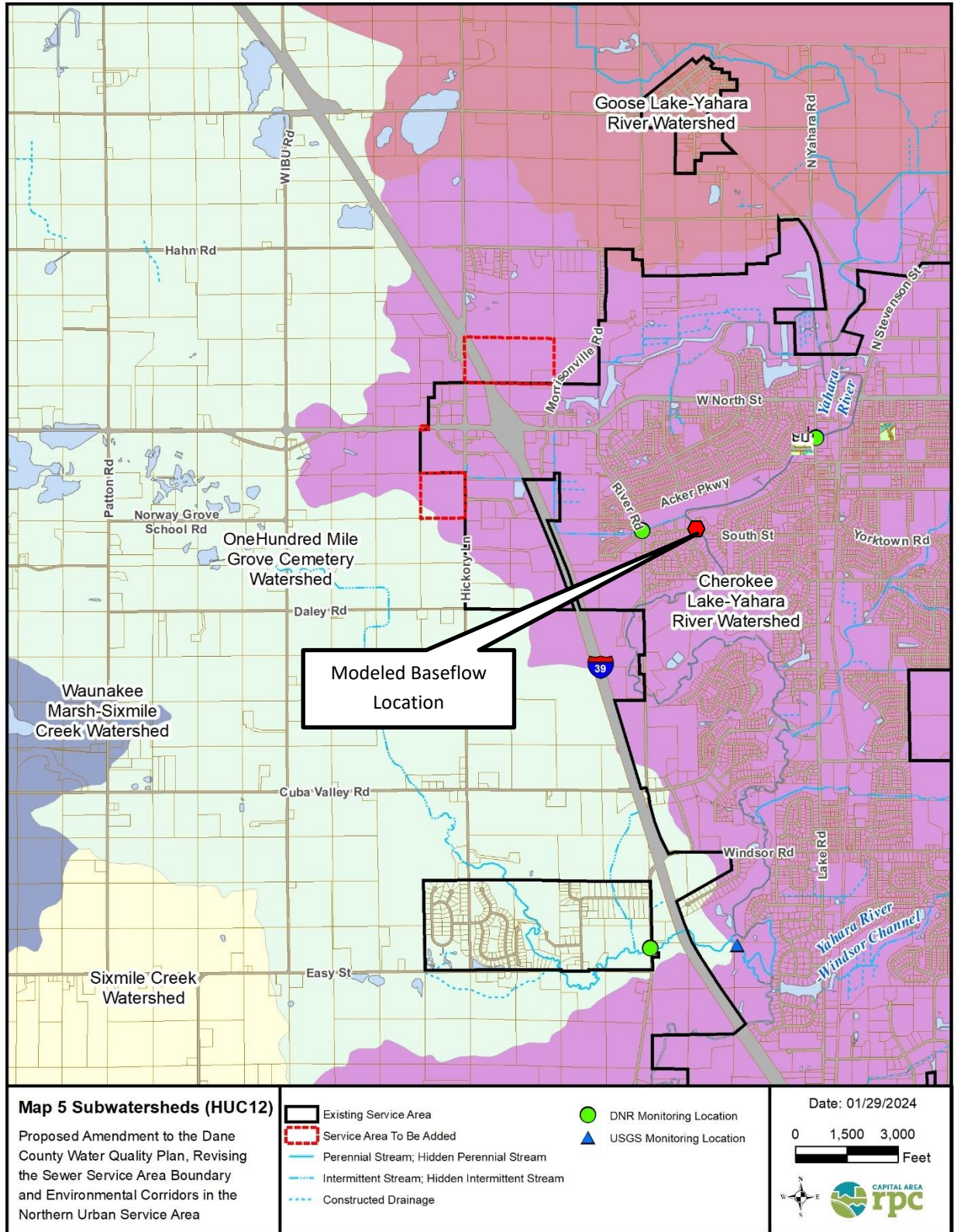
Map 3 – Existing Land Use



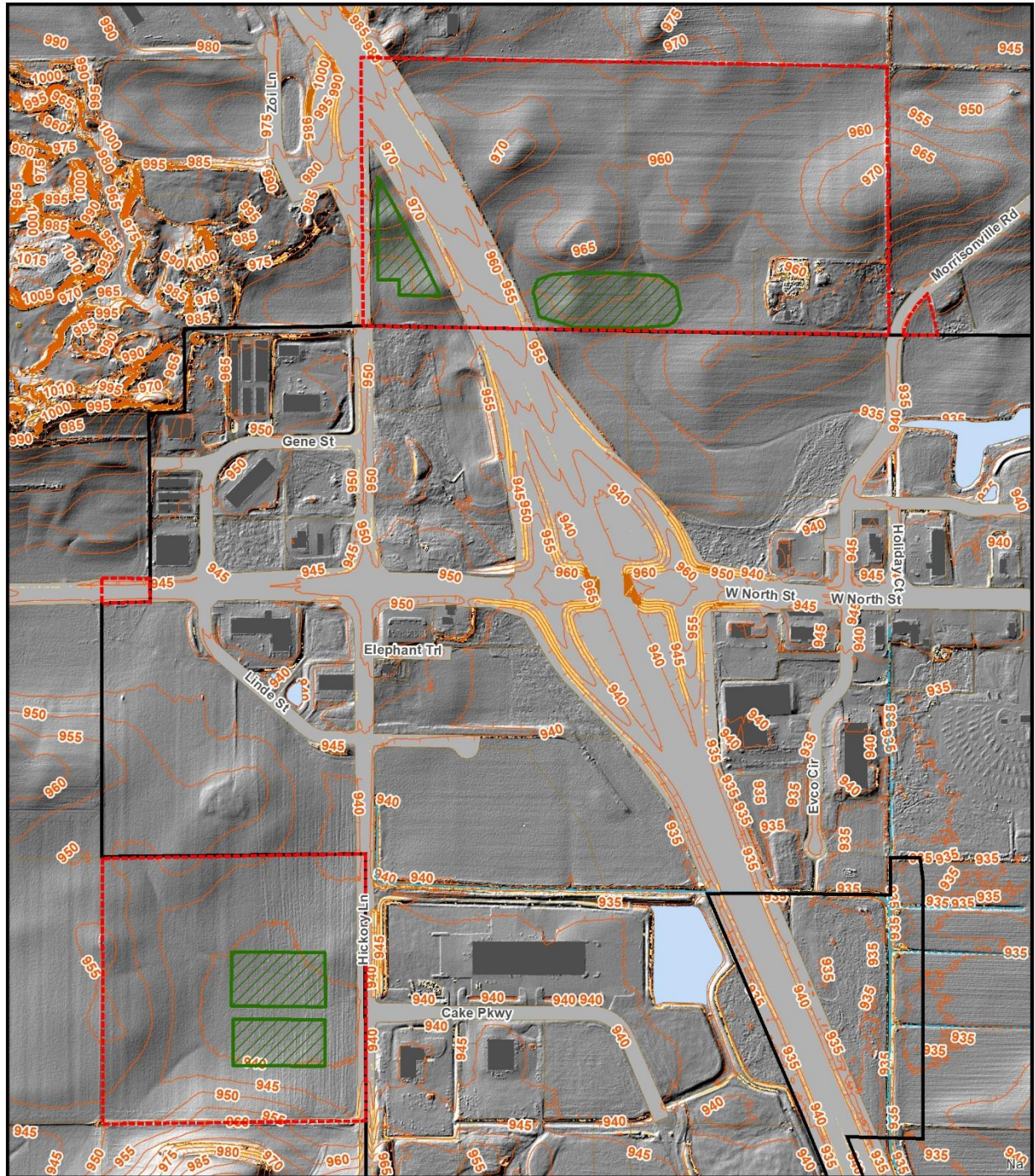
Map 4 – Planned Land Use



Map 5 – Subwatersheds

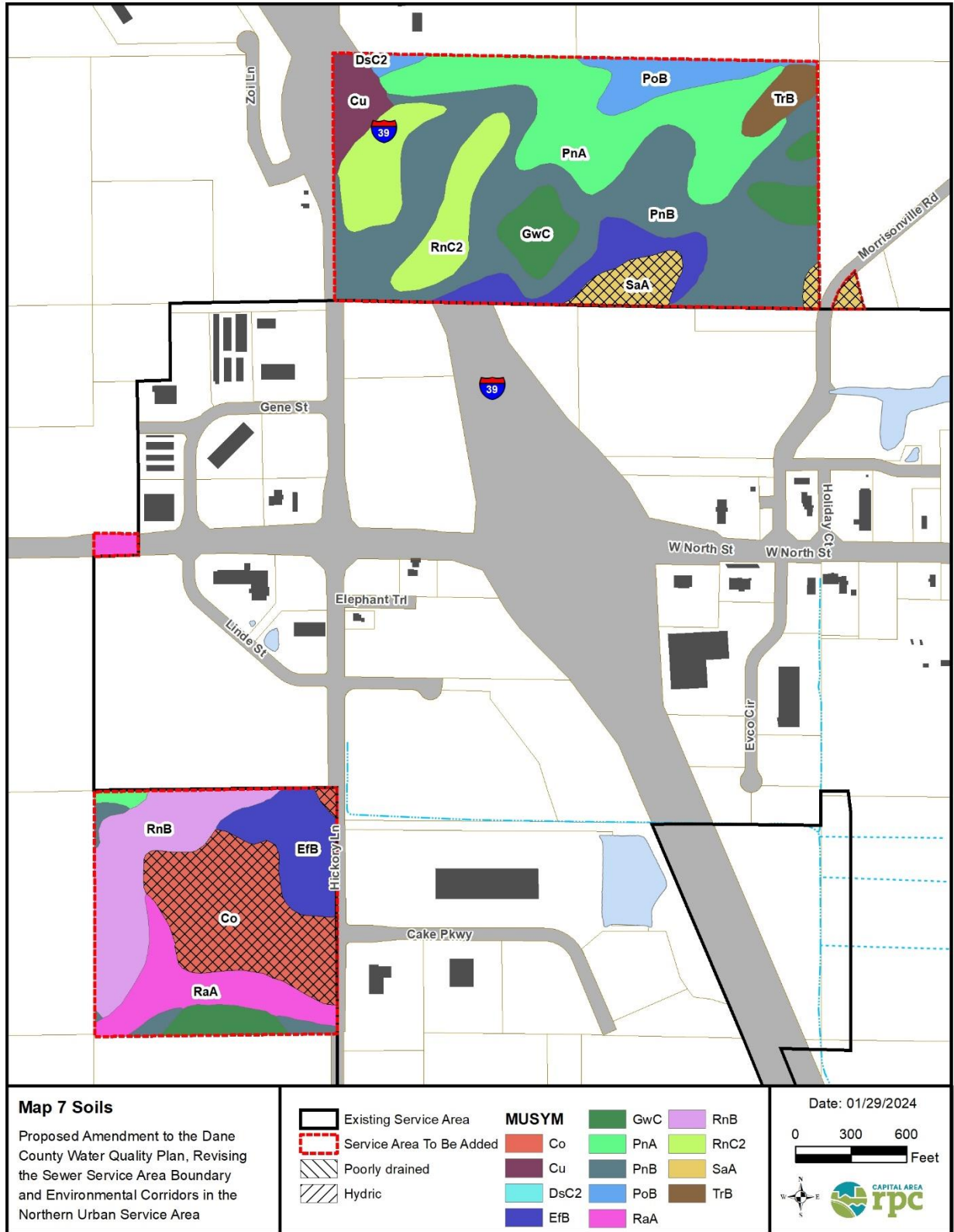


Map 6 – Elevations

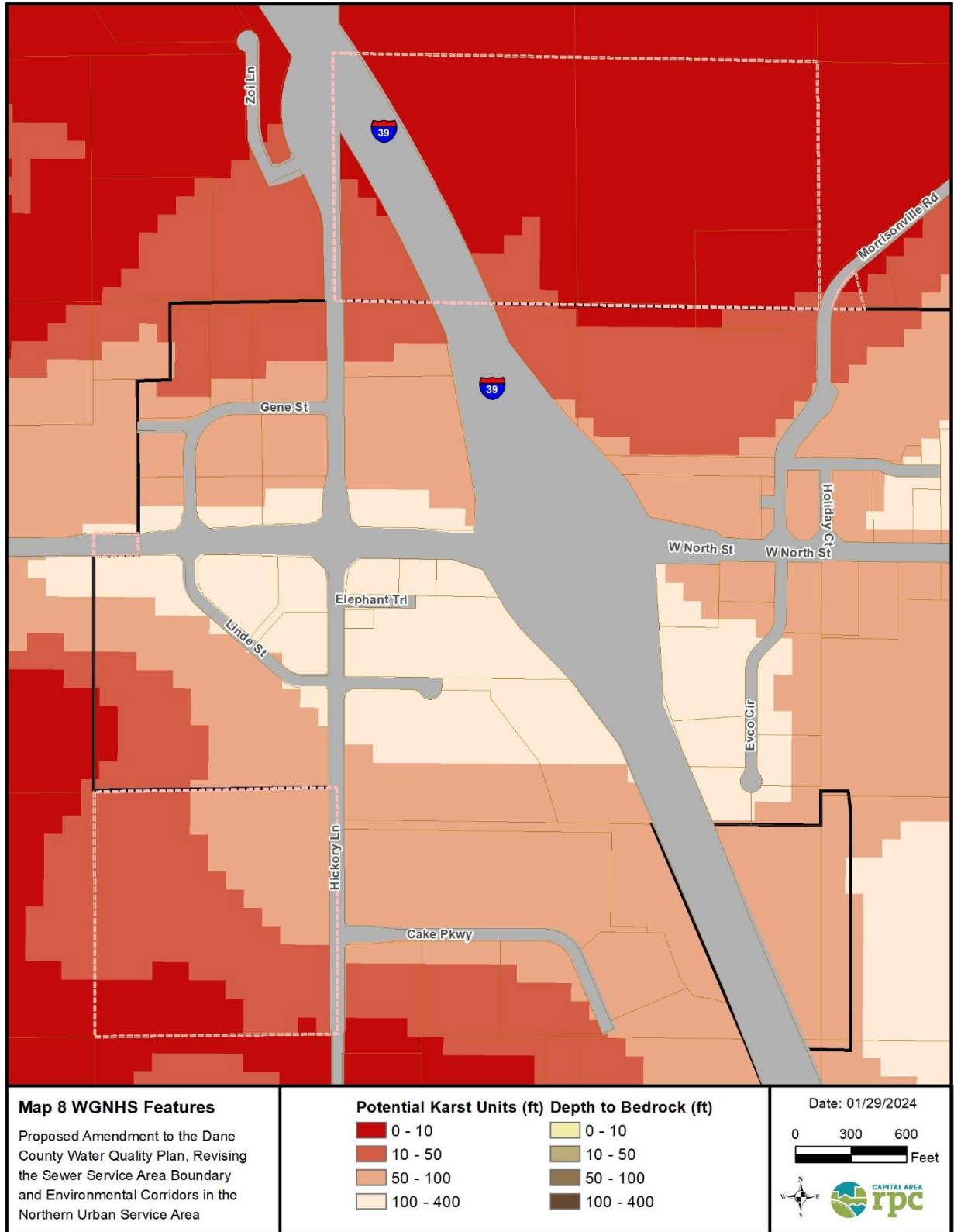


<p>Map 6 Elevation</p> <p>Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Northern Urban Service Area</p>	<table border="0"> <tr> <td data-bbox="568 1627 779 1659"> Existing Service Area </td> <td data-bbox="941 1627 1104 1659"> Percent Slope </td> </tr> <tr> <td data-bbox="568 1669 844 1701"> Service Area To Be Added </td> <td data-bbox="941 1669 1055 1701"> 12 - 20 </td> </tr> <tr> <td data-bbox="568 1711 941 1743"> Environmental Corridor To Be Added </td> <td data-bbox="941 1711 1120 1743"> 20 and greater </td> </tr> </table>	Existing Service Area	Percent Slope	Service Area To Be Added	12 - 20	Environmental Corridor To Be Added	20 and greater	<p>Date: 01/29/2024</p> <p>0 300 600 Feet</p> <p> </p>
Existing Service Area	Percent Slope							
Service Area To Be Added	12 - 20							
Environmental Corridor To Be Added	20 and greater							

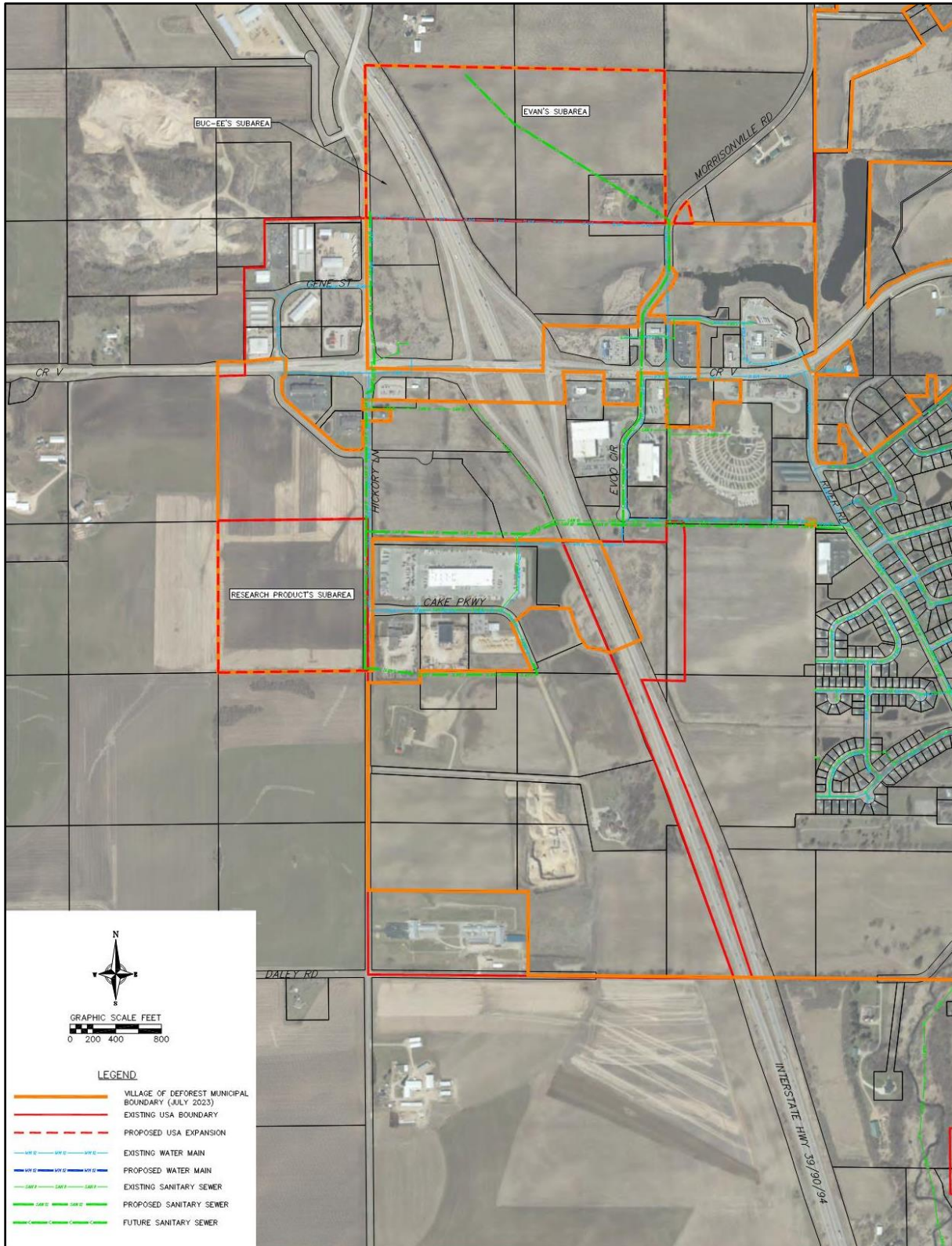
Map 7 - Soil Type



Map 8 – WGNHS Bedrock Depth and Potential Karst Features



Map 9A – Proposed Sanitary Sewer and Water Main



N

GRAPHIC SCALE FEET

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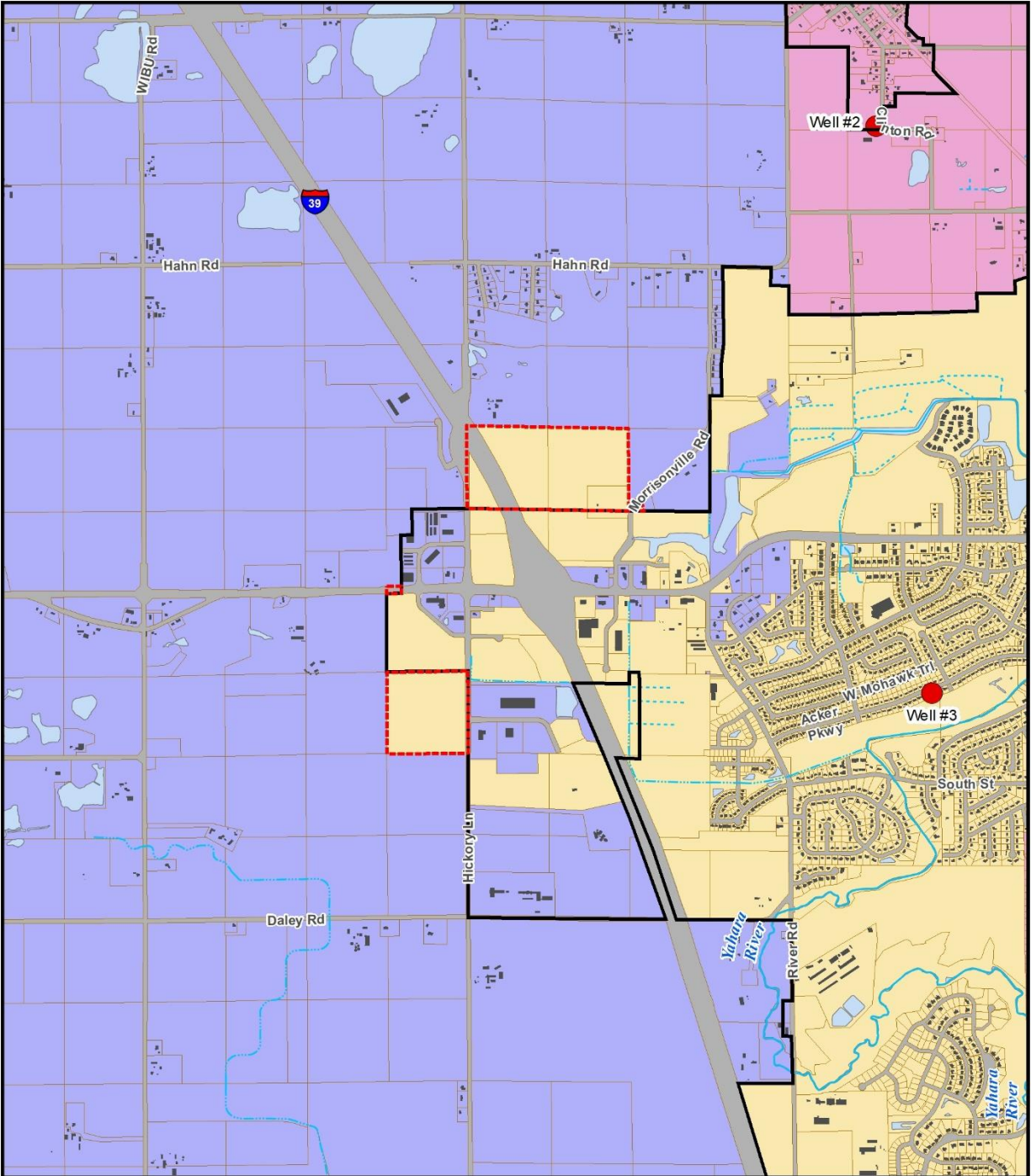
LEGEND

- VILLAGE OF DEFOREST MUNICIPAL BOUNDARY (JULY 2023)
- EXISTING USA BOUNDARY
- PROPOSED USA EXPANSION
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- FUTURE SANITARY SEWER

MAP 7: OVERALL UTILITY SYSTEM CONFIGURATION
 VILLAGE OF DEFOREST, WISCONSIN
 OCTOBER 31, 2023



Map 10 – Municipal Wells



Map 10 Municipal Wells

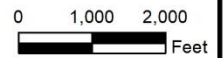
Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Northern Urban Service Area

- Existing Service Area
- Service Area To Be Added
- Wells

Municipal Boundaries

- Town of Vienna
- Village of DeForest
- Village of Windsor

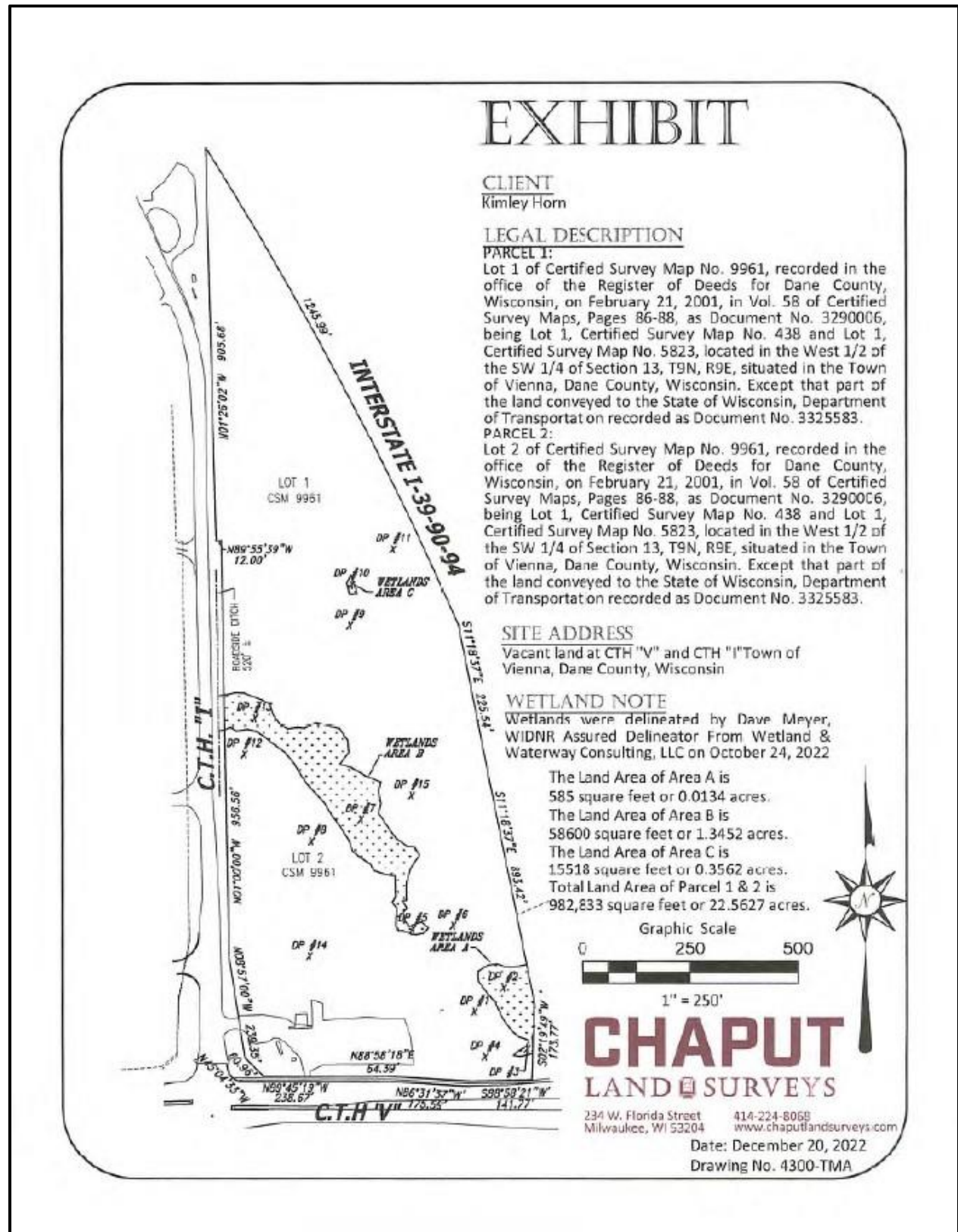
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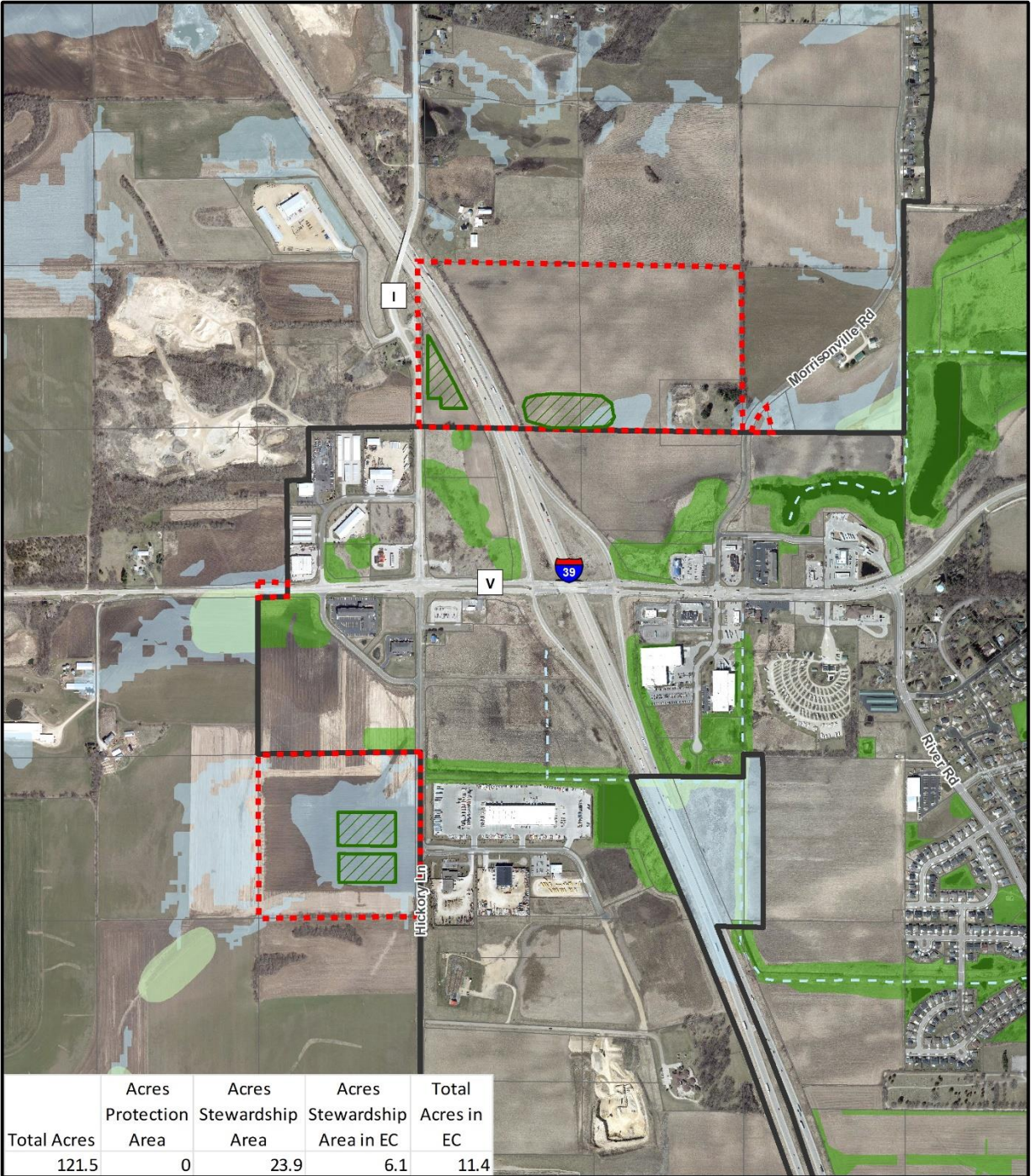
Map 11a – Wetland Delineation (2022 - Research Products Subarea)



Map 11b – Wetland Delineation (2022 – Buc-ee’s Subarea)



Map 12 – Proposed Environmental Corridor



Map 12 Proposed Environmental Corridor
 Proposed Amendment to the Dane County Water Quality Plan, Revising the Sewer Service Area Boundary and Environmental Corridors in the Northern Urban Service Area

- Existing Service Area
- Service Area To Be Added
- Existing Environmental Corridor
- Environmental Corridor To Be Added
- Protection Area
- Stewardship Area

Date: 1/16/2024

0 500 1,000 Feet