

# Wellhead Protection Plan Unit Well 28 City of Madison, Wisconsin

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## EXECUTIVE SUMMARY

This report is a Wellhead Protection Plan (WHPP) for the newly constructed City of Madison Unit Well 28. The purpose of this plan is to establish specific criteria for protection of the Well 28 recharge area. This WHPP was prepared for Unit Well 28 to conform with the requirements of the Wisconsin Administrative Code, Chapter NR 811, Section 16(5), for wellhead protection (WHP) planning.

Unit Well 28 is located at 8210 Old Sauk Road in the western part of the City of Madison. Construction of Unit Well 28 was completed in May 1998. Unit Well 28 is 882 feet deep, is open to the lower bedrock (sandstone) aquifer and has a design capacity of approximately 2,100 gallons per minute (gpm).

Land use in the vicinity of Unit Well 28 is primarily commercial, with some agricultural and residential development. Historically, the land in the vicinity of Unit Well 28 was zoned agricultural and was used for grassland and row crops.

As part of the Dane County regional hydrologic study, a regional groundwater flow model was prepared for Dane County and was used to delineate time-related (5-, 50-, and 100-year time of travel (TOT)) zones of contribution (ZOCs) for municipal wells (Krohelski et. al., 2000) including Unit Well 28. ZOCs extend nearly due west of Unit Well 28 in the simulated upgradient groundwater flow direction.

Figure 3-4 shows the wellhead protection area (WHPA) for Unit Well 28. Two zones of protection are within the WHPA. Zone A is defined by the 5-year TOT ZOC. Zone B is defined by a 1,200-foot fixed radius around Unit Well 28. The WHPA will provide a conservative protection zone to account for changes in pumping rates, pumping duration, and interference drawdown from other existing and future wells.

A contaminant source inventory (CSI) was performed for the Unit Well 28 area during December 2001 and January 2002. Potential and existing contaminant sources within the Unit Well 28 WHPA, or immediately upgradient of the WHPA, include potential spills along roads and main transportation corridors, active and closed underground storage tank (UST) sites, agricultural farming, fertilizer spreading, possible manure and sludge spreading areas on agricultural fields, closed and active private sewage disposal systems, road salt use, and pesticide, herbicide, and nutrient loading on commercial and residential lawns.

Programs and activities to be used by the City of Madison and others for WHPA management at Unit Well 28 are grouped into five principal categories as follows:

1. Existing Programs
  - a. Clean Sweep Collection Program
  - b. On-site waste disposal system maintenance
  - c. Well abandonment
  - d. Land application of sludge and septage
  - e. Spill notification and awareness of remedial investigation and cleanup
2. Land Use Controls
  - a. Existing zoning/WHP overlay zoning and ordinance

3. Intergovernmental Cooperation
  - a. Land use planning and site plan review
4. Monitoring
  - a. CSI maintenance
  - b. Water quality monitoring
5. Public Education and Awareness
  - a. Availability of WHPP
  - b. Public informational meeting
  - c. News releases
  - d. Informational materials distributed to residents in WHPA
  - e. Land use and contamination source awareness
  - f. School programs

Some of these programs and activities are currently being performed, while others are new and will be implemented immediately to help protect Unit Well 28.

The Madison Water Utility has an existing water conservation program and encourages water conservation. The Utility has formulated a contingency plan for providing water in the event that Unit Well 28 or one or more of the City's other water supply wells became contaminated or removed from service.

The City of Madison is developing a WHP ordinance and overlay zoning district. The WHP ordinance will help ensure that other potential contaminant sources are not located in the Unit Well 28 WHPA.

## 1.0 INTRODUCTION AND BACKGROUND

### 1.1 INTRODUCTION

This report is a WHPP for the newly constructed City of Madison Unit Well 28. The purpose of this plan is to establish specific criteria for protection of the local recharge area in the vicinity of Unit Well 28 including, management strategies to maintain a high quality water supply free of contamination.

This WHPP was prepared for Unit Well 28 to conform with the requirements of the Wisconsin Administrative Code, Chapter NR 811, Section 16(5), for WHP planning. A copy of this section of the code is in Appendix A. The project scope included the following:

1. Research available information regarding the geology and hydrogeology of the well sites and aquifer parameters.
2. Research well construction and proposed operation of Unit Well 28.
3. Coordinate with Dane County Regional Planning Commission (DCRPC) for previously delineated 5-year TOT capture zones for Unit Well 28.
4. Perform a CSI to identify and characterize existing and potential contamination sources within the 5-year TOT capture zone and within a ½-mile radius of Unit Well 28.
5. Assist with the determination of a WHPA for Unit Well 28.
6. Assist with the development of WHP management strategies.

### 1.2 LOCATION AND BACKGROUND

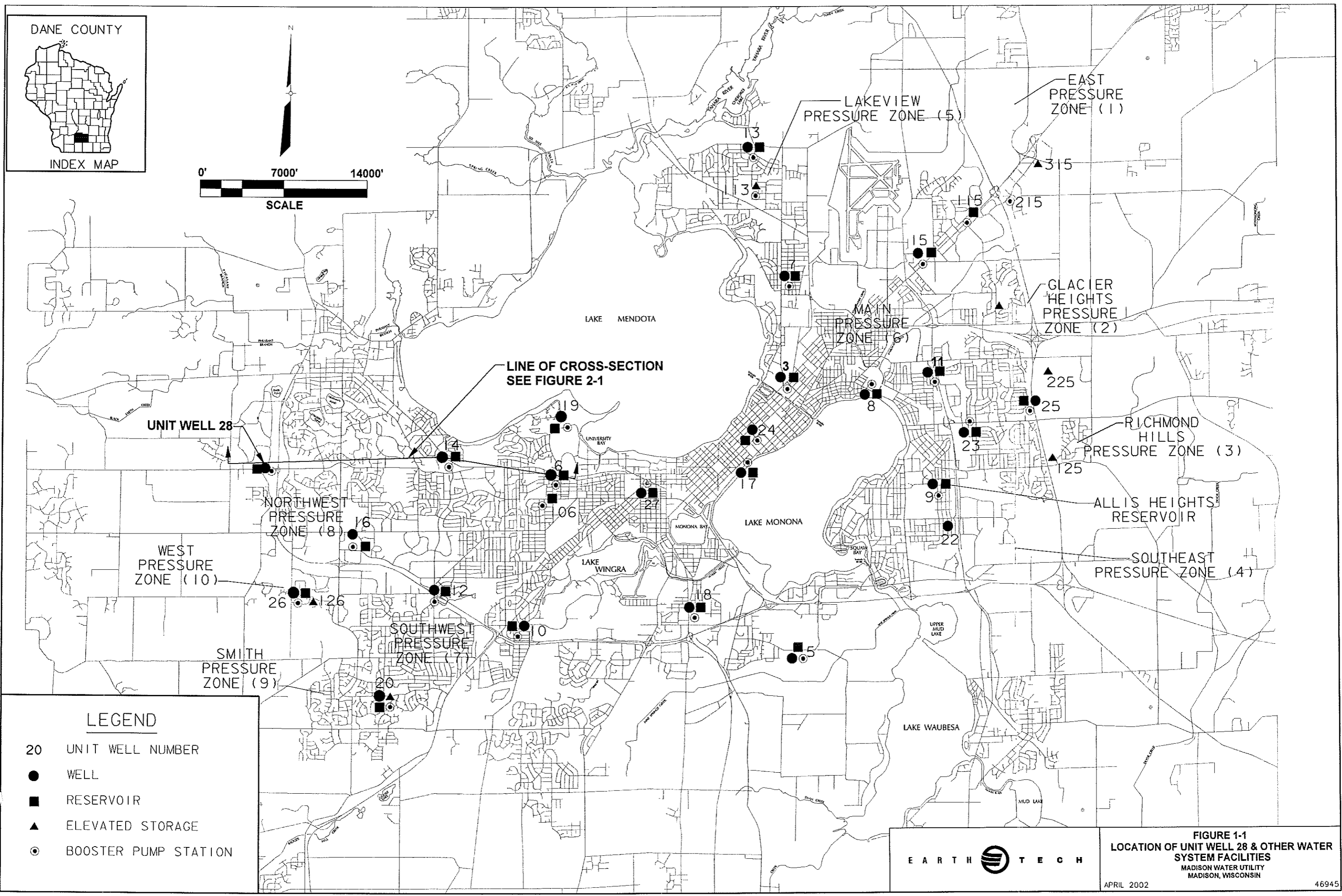
Unit Well 28 is located in Outlot 3 of the Old Sauk Trails Park Plat at 8210 Old Sauk Road in the western part of the City of Madison. The site is in the SE¼ of the SE¼, of Section 15, Township 7 North, Range 8 East, Dane County, Wisconsin. Figure 1-1 shows the location of Unit Well 28 and other water system facilities in the City of Madison. A portion of the survey plat showing the well site is in Appendix B. Construction of Unit Well 28 was completed in May 1998. The well has not been placed into production.

The City water system serves approximately 215,000 people and consists of 23 active wells (not including newly constructed Unit Well 28), 28 booster pumping facilities, 24 ground storage reservoirs, 5 elevated water storage tanks, and approximately 770 miles of water transmission and distribution mains. Because of the varying topography in the Madison area, the water system is divided into 10 separate pressure zones. Unit Well 28 is the City's most westerly well and is located in the City's Northwest Pressure Zone. Unit Well 28 is located approximately 9,500 feet northwest of Unit Well 16 and 15,000 feet west of Unit Well 14.

The City constructed Unit Well 28 to provide additional reliable water supply in this expanding area of the City. Unit Well 28 will serve as a primary water supply for the Northwest Pressure Zone area and is expected to be operational in 2002.



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**LEGEND**

- 20 UNIT WELL NUMBER
- WELL
- RESERVOIR
- ▲ ELEVATED STORAGE
- ⊙ BOOSTER PUMP STATION



**FIGURE 1-1**  
**LOCATION OF UNIT WELL 28 & OTHER WATER**  
**SYSTEM FACILITIES**  
 MADISON WATER UTILITY  
 MADISON, WISCONSIN

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### **1.3 UNIT WELL 28**

Unit Well 28 was constructed to a depth of 882 feet. The well is cased with 30-inch OD steel casing grouted to a depth of 400 feet below ground. A 29-inch diameter open borehole extends from 400 to 500 feet in depth. A 24-inch diameter open borehole extends from 500 to 882 feet in depth. Broken limestone (dolomite) with sand was encountered at a depth of 28 feet. Firm limestone (dolomite) was encountered at a depth of 88 feet, and sandstone was encountered at a depth of 112 feet. Granite was encountered at a depth of 877 feet. Unit Well 28 was test pumped at a rate of 2,100 gallons per minute (gpm) for 24 hours. The specific capacity of Unit Well 28 was approximately 15.7 gallons per minute per foot (gpm/ft) of drawdown. A construction report and formation log prepared by the driller is in Appendix C.

## 2.0 HYDROGEOLOGIC CONDITIONS

### 2.1 LAND USE, TOPOGRAPHY, AND DRAINAGE

Land use in the area is primarily commercial, agricultural, and residential development. Current zoning immediately around Unit Well 28 is Research Park-Specialized Manufacturing District (RPSM), and Planned Unit Development (PUD). Historically, the land in the vicinity of Unit Well 28 was zoned agricultural and was used for grassland and row crops. Other zoning in the area is Planned Community Development (PCD), Residential (R), and a small parcel zoned Agricultural (A).

Northwest-southeast trending, medium-sized glacial moraines dominate the topography of the Unit Well 28 area. Unit Well 28 is located on a gently sloping till-covered plain. Topographic elevations range from approximately 1,080 feet above mean sea level (MSL) on the top of a moraine located approximately 1,650 feet southwest of the well site, to 965 feet MSL in the vicinity of a intermittent north flowing tributary to Pheasant Branch, located approximately ½ mile north of the site. The surface elevation at Unit Well 28 is approximately 1,003 feet MSL.

Drainage in the vicinity of Unit Well 28 is northeast, toward Pheasant Branch. Pheasant Branch discharges to Lake Mendota at a location approximately 3 miles northeast of the well site.

### 2.2 GEOLOGY

The area was glaciated by the Green Bay Lobe during the Wisconsin Stage. The rocks and unlithified deposits in the area range from Precambrian basement rocks to recent soils. The bedrock from oldest to youngest includes Precambrian crystalline rocks and Cambrian and Ordovician age bedrock consisting of sandstone, dolomite, and shale.

Figure 2-1 is a geologic cross-section through Unit Wells 28, 14, and 6. A formation log for strata encountered at Unit Well 28 is in Appendix C. The stratigraphic sequence encountered in the wells is briefly described in the following:

#### 2.2.1 Precambrian Basement Bedrock

Precambrian bedrock was encountered in water supply Wells 6, 14, and 28 at depths of 740, 700, and 877 feet MSL, respectively. The Precambrian bedrock encountered in Wells 6 and 14 is red to dark red brown rhyolite (Wisconsin Geological and Natural History Survey (WGNHS) well logs). The driller described the Precambrian bedrock encountered in Well 28 as granite.

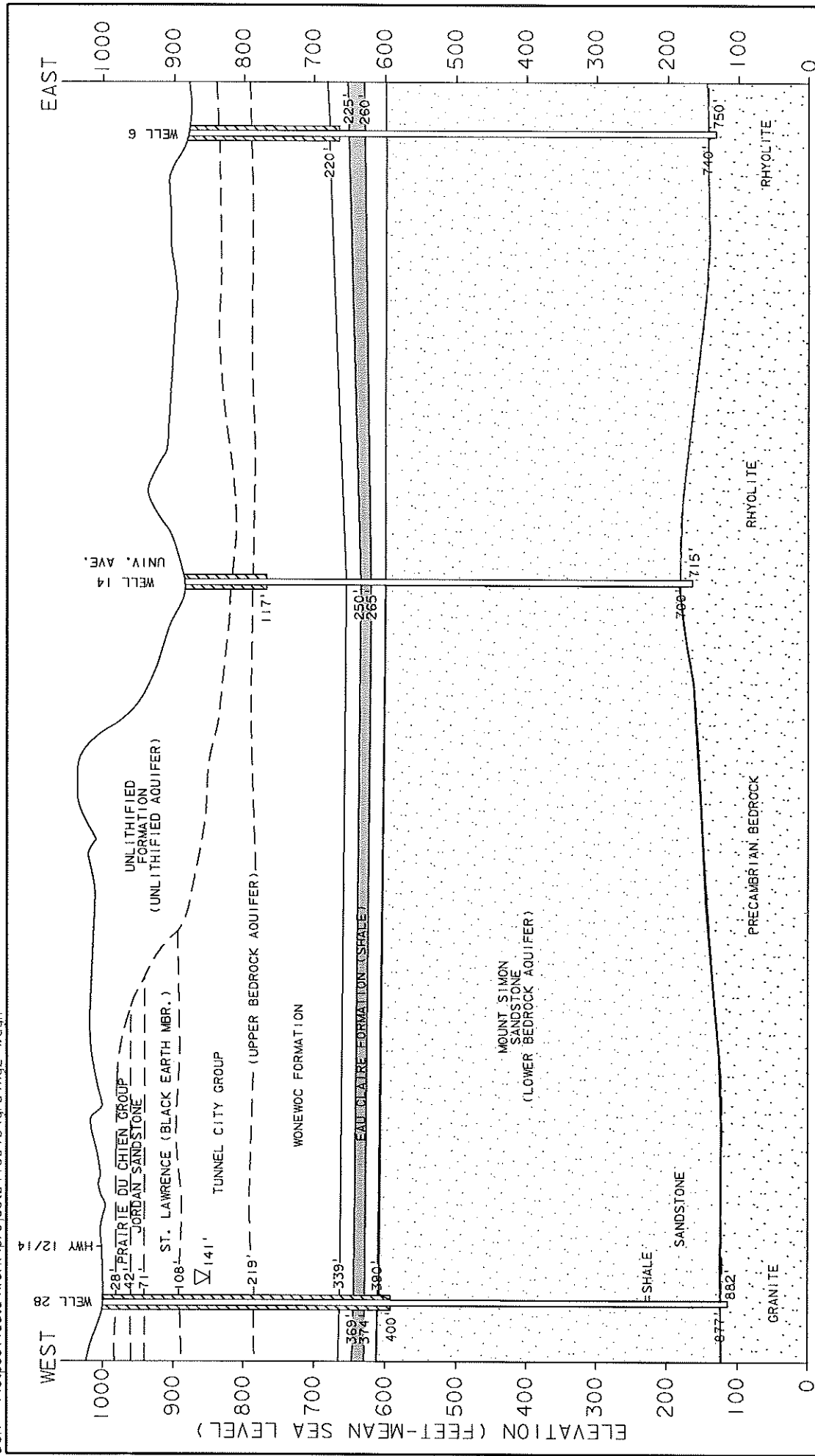
#### 2.2.2 Cambrian and Ordovician Bedrock

Cambrian and Ordovician age rocks encountered in Unit Well 28 include in ascending order the Mount Simon Formation, the Eau Claire Formation, Wonewoc Formation, Tunnel City Group, St. Lawrence Formation (Black Earth Member), Jordan Sandstone, and the Prairie du Chien Group.

Cambrian and Ordovician rocks are relatively flat lying in the Madison area in the east-west direction and dip slightly to the south. The thickness of deep rock units appear to be relatively consistent in the Madison area, although there are textural and compositional changes, laterally. The occurrence and thickness of the upper dolomite (Prairie du Chien) bedrock varies, because it is the upper erosional

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LEGEND

- WELL
- WELL CASING
- POTENTIOMETRIC SURFACE DEPTH (FEET)
- OPEN BOREHOLE

SEE FIGURE 1-1 FOR LINE OF CROSS-SECTION



**FIGURE 2-1**  
**GEOLOGIC CROSS-SECTION THROUGH**  
**MADISON UNIT WELLS 28, 14 & 6**  
 MADISON, WISCONSIN

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surface. Figure 2-1 shows the strata above the Tunnel City Group was encountered in Unit Well 28, but has been eroded away in areas further east. Sandstone is the upper bedrock formation encountered at Unit Wells 6 and 14. A gray shale layer ranging from 10 to 25 feet thick was encountered in Unit Wells 6, 14, and 28, in the middle portion of the Eau Claire Formation. Other thin shale layers, that may not be laterally extensive, are reported at other depths in the wells.

### 2.2.3 Unlithified Deposits

Bedrock is mantled by unlithified glacial till and alluvial deposits. Clayton and Attig (1997) classify the local near surface unlithified deposits in the immediate vicinity of Unit Well 28 as part of the Horicon Member of the Holy Hill Formation. The formation was deposited as non-uniform, collapsed supraglacial till and debris during the last part of the Wisconsin Glaciation (Clayton and Attig, 1997).

At Unit Well 28, the driller described the formation from the top of broken dolomite bedrock (encountered at a depth of 28 feet) to the ground surface as dirty sand and gravel (16-28 feet depth); gravel cobbles and rocks (6 to 16 feet in depth); sandy yellow clay (2 to 6 feet in depth); and top soil (0 to 2 feet in depth).

Soils in the immediate vicinity of Unit Well 28 are classified as the Plano, Saybrook, Ringwood, Elburn, and Pella silt loams. Other nearby soils in moraine areas are the Lapeer, McHenry, and Miami silt loams. These soils have good attenuation potential. The DCRPC assigned a risk classification of low to moderate from surface activities in the Unit Well 28 area on the basis of several factors including soil properties (DCRPC, 1999).

## 2.3 HYDROGEOLOGY

In the study area, groundwater occurs within the lower bedrock aquifer, the upper bedrock aquifer, and the unlithified (sand and gravel) aquifer. Locally, the upper bedrock aquifer and sand and gravel aquifer are used for private domestic supplies. Municipal and industrial wells are constructed into the lower bedrock aquifer. Following is a brief discussion about the aquifers:

### 2.3.1 Lower Bedrock Aquifer

The lower bedrock aquifer occurs in the Mount Simon Formation, and lower part of the Eau Claire Formation. The Precambrian bedrock is the base of the lower bedrock aquifer, and the shale layer in the Eau Claire Formation is the upper confining unit. Water occurs within horizontal and vertical fractures, along bedding planes, and between sand grains in the aquifer. The saturated thickness of the lower bedrock aquifer appears to be approximately 503, 435, and 480 feet thick in Unit Wells 28, 14, and 6, respectively. The hydraulic conductivity of the lower bedrock aquifer is estimated to be approximately 10 feet per day (ft/day) (Krohelski et. al., 2000). The TGUESS program (Bradbury and Rothschild, 1985, 1996) was used to estimate the hydraulic conductivity of the lower bedrock aquifer at Unit Well 28. On the basis of available pumping test and specific capacity data, the hydraulic conductivity of the aquifer is estimated to be 10.2 ft/day. A copy of the hydraulic conductivity estimate (TGUESS) spreadsheet is in Appendix D.

The grouted casing in Unit Well 28 extends through the upper bedrock aquifer and Eau Claire confining layer. Therefore, water levels measured in Unit Well 28 are believed to be representative of the lower bedrock aquifer. In April 1998, the potentiometric surface of the lower bedrock aquifer in Unit Well 28 was 141 feet below ground surface (approximately 862 feet above MSL), which is approximately 233 feet

above the top of the lower bedrock aquifer. Figure 9 and Map 6 in Appendix E show the measured potentiometric surface in the lower bedrock aquifer and show the groundwater flow direction toward Unit Well 28 is from west to east (Bradbury et. al., 1999). Figure 9 and Map 6 shows the potentiometric surface elevation in the vicinity of Unit Well 28 at approximately 900+ and 890 feet MSL, respectively. The storativity of the lower bedrock aquifer is estimated to be approximately 0.0003, and the porosity is estimated to be approximately 30 percent (Bradbury, 2001). The porosity of the Eau Claire Formation is estimated to be 5 percent (Bradbury, 2001).

### **2.3.2 Upper Bedrock Aquifer**

The upper bedrock aquifer occurs in the upper part of the Eau Claire Formation above the shale and within the Wonewoc Formation and Tunnel City Group. Water occurs within fractures, joints, and solution cavities in the dolomite bedrock and within fractures, along bedding planes, and between sand grains in the sandstone.

At Unit Well 28, the combined thickness of the sandstone and dolomite is approximately 340 feet. The saturated thickness of the upper bedrock aquifer in the vicinity of Unit Well 28 appears to be approximately 280 feet. On the basis of available data (Bradbury et. al, 1999; DCRPC, 1999), it appears that the potentiometric surface of the upper bedrock aquifer occurs at a depth of approximately 90 to 100 feet (900 to 910 feet above MSL) at Unit Well 28 and is within the St. Lawrence dolomite Formation. Map 4 in Appendix F shows the measured potentiometric (water table) surface in the upper bedrock aquifer and unlithified (sand and gravel) aquifer. The elevation of the water table surface at Unit Well 28 was not measured.

The hydraulic conductivity of the upper bedrock aquifer is estimated to be approximately 5 ft/day (Krohelski et. al., 2000). The porosity of the formations is estimated to be approximately 5 percent (Bradbury, 2001). The porosity estimate is relatively low given the dolomitic nature of the formations.

### **2.3.3 Sand and Gravel Aquifer**

The sand and gravel aquifer occurs in the near surface sand and gravel deposits. The unlithified materials are thin in the vicinity of Unit Well 28. The driller did not report whether saturated formation was encountered in the unlithified materials. Where present, the hydraulic conductivity of the sand and gravel aquifer varies. For modeling purposes, Krohelski et. al., 2000, assumed a hydraulic conductivity of 7 ft/day and a porosity of 20 percent for the sand and gravel aquifer.

### **2.3.4 Groundwater Flow System**

Average annual precipitation in the City of Madison area is reported to be approximately 30 to 30.5 inches per year (Cline, 1965; Cotter et. al., 1969). Cline (1965) estimated that the amount of recharge to the groundwater reservoir in the Upper Yahara River basin was approximately 6 in/yr. More recently Swanson (1996) estimated that the recharge rate in Dane County ranges from 0.3 to 6.7 inches per year (in/yr) and has an average value of 2.6 in/yr. Precipitation infiltrates through the till layer and recharges the unlithified and shallow bedrock aquifers. In some areas, a small percentage of water moves downward from the upper bedrock aquifer through the Eau Claire confining layer and into the lower bedrock aquifer. Map 7 in Appendix E shows areas of recharge to and discharge from the lower bedrock (Mount Simon) aquifer (Bradbury et. al, 1999; RPC 1999). Figure 9 in Appendix E shows that the recharge area for the lower bedrock aquifer extends west of Unit Well 28 to the potentiometric divide. Bradbury (1994) estimated that the regional hydraulic gradient in the vicinity of Unit Well 28 is

approximately 0.0047 feet per foot (ft/ft). Discharge from the unlithified and shallow bedrock aquifers is to pumping wells and/or to surface waters (lakes, streams and wetlands) in the area. Locally, discharge from the lower bedrock aquifer is primarily to pumping wells.

### 3.0 WELLHEAD PROTECTION AREA DELINEATION

This chapter describes methodologies used to define the Zone of Influence (ZOI) and Zone of Contribution (ZOC) for Unit Well 28.

#### 3.1 ZOI

The ZOI for Unit Well 28 was estimated in accordance with Wisconsin Department of Natural Resources (DNR) requirements based on 30 days of continuous pumping at the rated pump capacity, assuming no aquifer recharge. The ZOI was determined using the Theis equation. The estimated ZOI for Unit Well 28 to a radius where there is 1 foot of drawdown, is approximately 9.4 miles. The estimated ZOI to a radius of zero drawdown is approximately 19.8 miles. These estimated ZOI are believed to be conservatively large, because the Theis equation does not incorporate aquifer recharge or the effects of potential hydraulic boundaries. Also, it is unlikely that the well will ever be pumped continuously for 30 days at maximum capacity. For the calculation, it was assumed that only the lower bedrock aquifer supplies water to Unit Well 28. Distance–drawdown calculations are in Appendix G.

#### 3.2 GROUNDWATER MODEL DEVELOPMENT AND ZOC DELINEATION

As part of the Dane County regional hydrologic study, a regional groundwater flow model was prepared for Dane County and was used to delineate time-related ZOCs for municipal wells (Krohelski et. al., 2000) including Unit Well 28. The Dane County regional hydrologic study was conducted cooperatively by the WGNHS, DCRPC, and the United States Geological Survey (USGS). The USGS modular groundwater modeling code (MODFLOW (McDonald & Harbaugh, 1988)) was used to simulate groundwater flow. After the calibrated groundwater flow model was prepared, PATH3D (Zheng, 1991) was used to determine time-related ZOCs.

The groundwater flow model has three layers. The sand and gravel aquifer is Layer 1. The upper bedrock aquifer is Layer 2. The shaly part of the Eau Claire Formation is a confining layer, and the lower bedrock aquifer is Layer 3.

The model domain covers an area of 50 by 60 miles and is divided into 144,000 nodes. Each node has regular spacing of 1,312.4 feet (400 meters) on a side. The grid has 200 rows and 240 columns (Krohelski et. al., 2000).

For Layer 1, lakes and streams were set as constant head boundaries. Groundwater divides were set as no-flow boundaries. Other lateral boundaries were set as no-flow. For Layers 2 and 3, all lateral boundaries were set as no-flow. The Eau Claire confining layer was assigned a vertical hydraulic conductivity of 0.0006 ft/day. Other aquifer parameters input into the model were as previously described in Chapter 2 and in Krohelski et. al., 2000.

The model was calibrated using 1992 pumping rates and available water level data spanning several years (Krohelski et. al., 2000). Model calibration involved matching simulated water level and stream flow results to observed water levels and stream flows. Adjustments were made to hydraulic conductivity and recharge rates to achieve the desired match.

Two groundwater flow simulations were performed using the calibrated model and two different pumping rates for existing and known future municipal supply wells in Dane County (Bradbury, 1998). Simulation



No. 1 was performed using the projected pumping rates from municipal wells for the year 2020. The projected pumping rate for Unit Well 28 is 1.298 million gallons per day (MGD). Pumping at a rate of 1.298 MGD is equivalent to pumping continuously at a rate of approximately 901 gallons per minute (gpm). Simulation No. 2 was performed using the “maximum sustained pumping rate” or “one-half design capacity” (Bradbury, 1998). The maximum sustained pumping rate (one-half design capacity) for Unit Well 28 is 1.512 MGD. The design capacity of Unit Well 28 is approximately 2,100 gpm (3 MGD). In April 1998, Unit Well 28 was test pumped at a rate of 2,100 gpm, continuously for 24 hours. Pumping at a rate of 1.512 MGD is equivalent to pumping continuously at a rate of 1,050 gpm.

PATH3D (Zheng, 1991) was used to determine the time-related ZOCs for Unit Well 28. Particles were input in the model around Well 28 and then tracked backward from the well to points where they enter the groundwater flow system.

### 3.3 ZOC

The area that recharges or contributes water to Unit Well 28 is defined as the ZOC. The areal extent of the ZOC (capture zone) depends on the pumping rate, amount of horizontal and vertical recharge, aquifer characteristics, pumping duration, and other stresses such as other pumping wells. It is beneficial to know the well capture zone, because contaminants introduced within the zone could reach Unit Well 28.

Figure 3-1 shows the 5-, 50-, and 100-year TOT ZOCs for Unit Well 28 based on the projected 2020 pumping rates (Simulation No. 1). Figure 3-2 shows the 5-, 50-, and 100-year TOT ZOCs for Unit Well 28 based on the one-half design capacity pumping rate (Simulation No. 2). The capture zones extend nearly due west in the simulated upgradient groundwater flow direction. Table 3-1 summarizes the upgradient and downgradient extent of capture zones for the various pumping simulations. The ZOCs delineated using the Simulation No. 2 pumping rates are more conservative in length and width compared to the ZOCs delineated using the Simulation No. 1 pumping rates.

The ZOCs estimated for Simulation Nos. 1 and 2 are representative of anticipated pumping conditions. For comparison purposes, a simulation was also performed to estimate the ZOC assuming worst-case (maximum) pumping conditions. The RESSQC module of the United States Environmental Protection Agency (USEPA) WHPA code (Blandford and Huyakorn, 1991; Blandford and Yu-Shu Wu, 1993) was used to delineate the capture zone for Unit Well 28, assuming continuous pumping at maximum capacity. For the RESSQC simulation, it was assumed that Unit Well 28 was pumped at a rate of 3 MGD. Aquifer parameters used were a transmissivity of 5,133 ft<sup>2</sup>/day, hydraulic conductivity of 10.2 ft/day, saturated thickness of 503 feet, and a porosity of 30 percent. Figure 3-3 shows the 5-, 10-, 50-, and 100-year TOT ZOCs for Unit Well 28 based on the RESSQC (maximum pumping) simulation. The RESSQC simulation is the most conservative of the simulations performed, because it assumes that Unit Well 28 is pumped continuously at the design capacity (3 MGD). Also, it was assumed that there is no leakage through the Eau Claire confining layer and that all the water pumped from Unit Well 28 is derived from the lower bedrock aquifer.

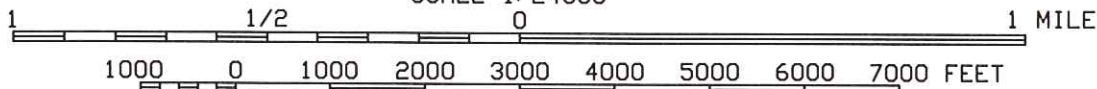
Maps 21 and 22 and Figure 2 in Appendix H show regional and local ZOCs for municipal wells in Dane County. Figure 2 in Appendix H shows ultimate ZOCs for municipal wells in Dane County. The ZOCs for Unit Well 28 are located entirely within Dane County.



SOURCE: USGS 7.5 MINUTE QUADRANGLE, MIDDLETON, WISCONSIN, 1982

T.O.T. = TIME OF TRAVEL  
 Z.O.C.s = ZONES OF CONTRIBUTION

SCALE 1:24000



CONTOUR INTERVAL 10 FEET  
 DATUM IS MEAN SEA LEVEL

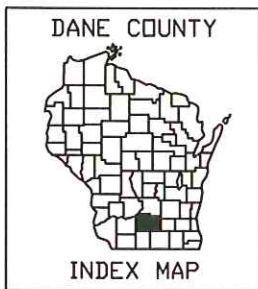


FIGURE 3-1

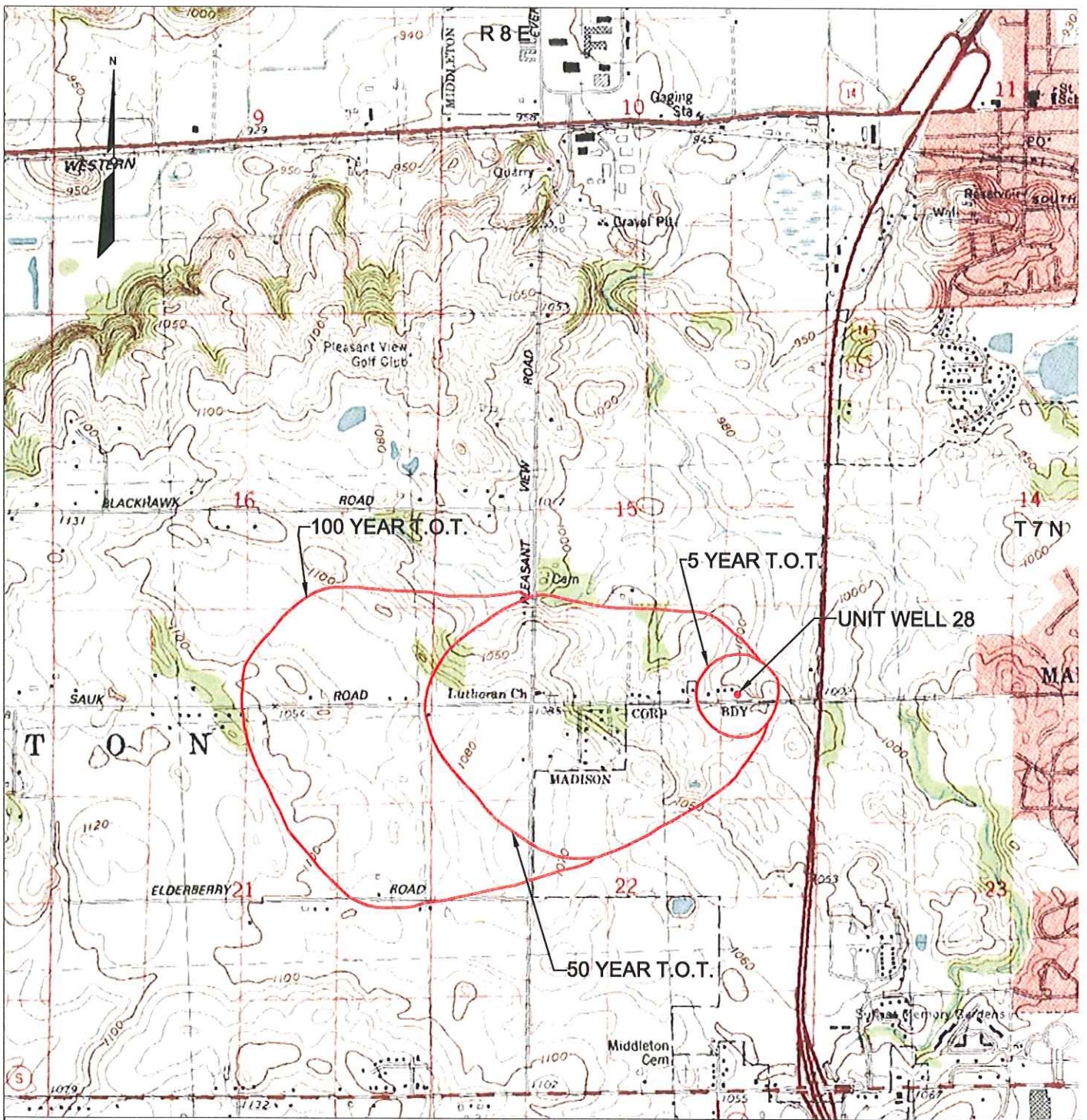
5, 50 & 100 YEAR T.O.T. Z.O.C.s ASSUMING  
 PROJECTED 2020 PUMPING RATE

MADISON, WISCONSIN



APRIL 2002

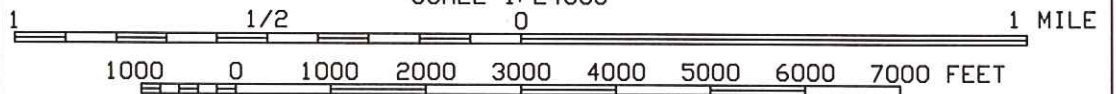
46945



SOURCE: USGS 7.5 MINUTE QUADRANGLE, MIDDLETON, WISCONSIN, 1982

T.O.T. = TIME OF TRAVEL  
 Z.O.C.s = ZONES OF CONTRIBUTION

SCALE 1:24000



CONTOUR INTERVAL 10 FEET  
 DATUM IS MEAN SEA LEVEL

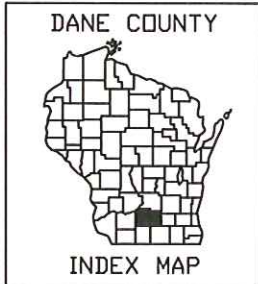


FIGURE 3-2  
 5, 50, & 100 YEAR T.O.T. Z.O.C.s  
 ASSUMING 50 PERCENT CAPACITY PUMPING RATE

MADISON, WISCONSIN

APRIL 2002

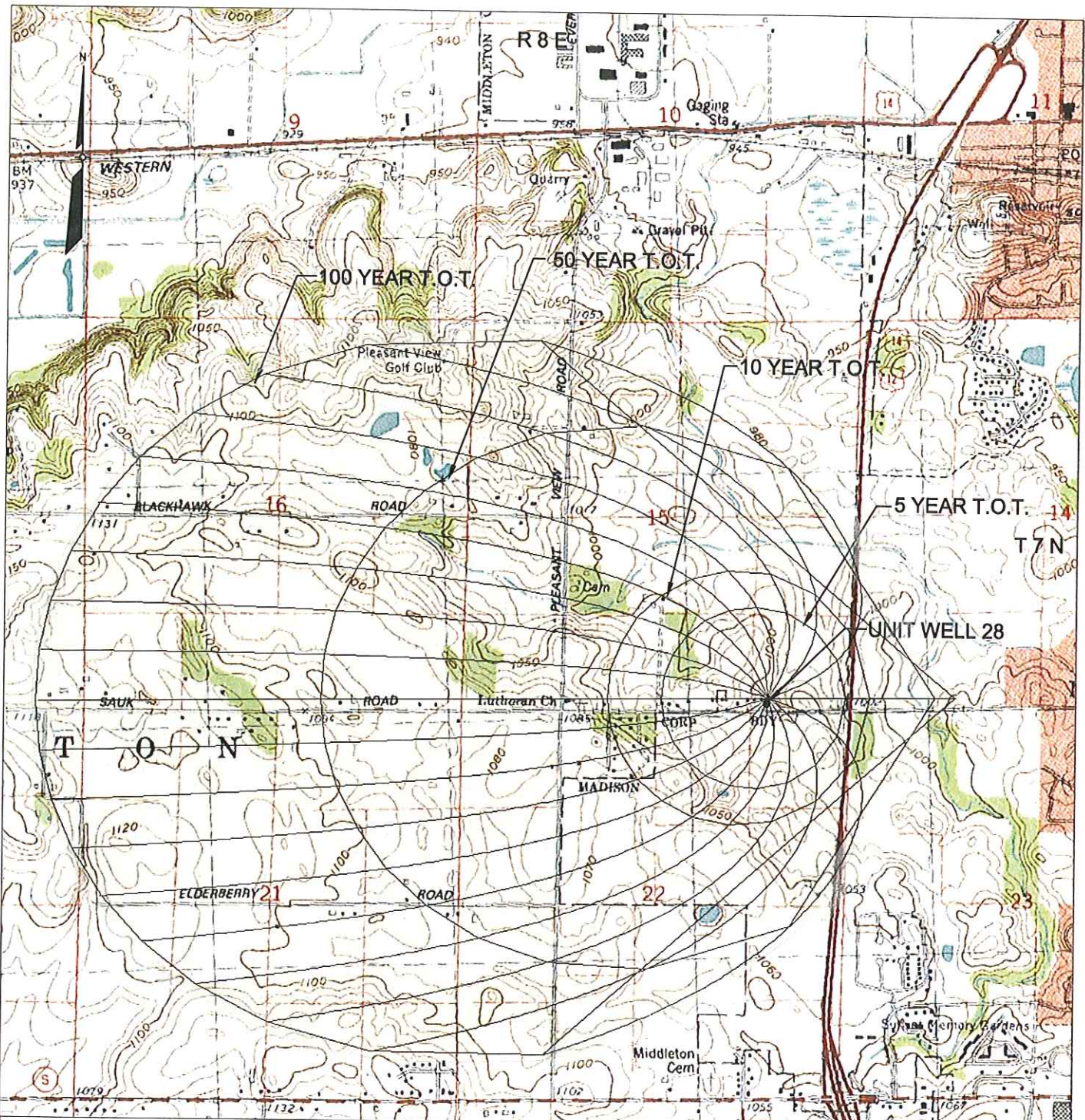
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**TABLE 3-1  
SUMMARY OF EXTENT OF ZOCs (CAPTURE ZONE)  
WELLHEAD PROTECTION UNIT WELL 28  
MADISON, WISCONSIN**

Item	Simulation No. 1 (projected 2020 pumping rates)	Simulation No. 2 (one-half design capacity pumping rates)	RESSQC Simulation (continuous pumping at maximum capacity)
Simulated Pumping Rate (MGD)	1.298	1.512	3.0
<b>Upgradient Extent of ZOC (feet)</b>			
5-year TOT	500	550	1,450
10-year TOT	--	--	2,175
50-year TOT	3,700	4,250	6,100
100-year TOT	5,950	6,800	10,000
<b>Downgradient Extent of ZOC (feet)</b>			
5-year TOT	475	550	1,050

Notes:

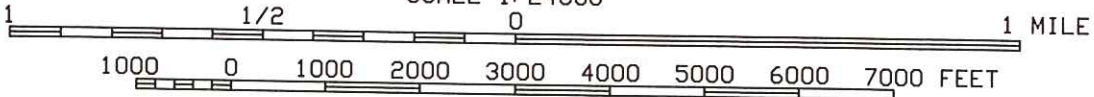
MGD = Million Gallons per Day  
 ZOC = Zone of Contribution  
 TOT = Time of Travel



SOURCE: USGS 7.5 MINUTE QUADRANGLE, MIDDLETON, WISCONSIN, 1982

T.O.T. = TIME OF TRAVEL  
 Z.O.C.s = ZONES OF CONTRIBUTION

SCALE 1: 24000



CONTOUR INTERVAL 10 FEET  
 DATUM IS MEAN SEA LEVEL

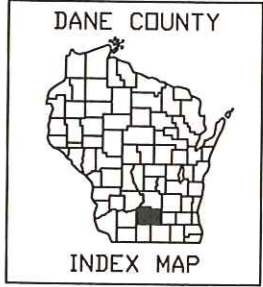


FIGURE 3-3  
 5, 10, 50 & 100 YEAR T.O.T. Z.O.C.s ASSUMING PUMPING AT 100 PERCENT CAPACITY (3MGD)

APRIL 2002

MADISON, WISCONSIN

46945

### 3.4 WELLHEAD PROTECTION AREA

The Wisconsin Administrative Code (Chapter NR811.16(5)(e)) requires that a WHPA for new municipal water supply wells “encompass, at a minimum, that portion of the recharge area equivalent to a 5 year time of travel to the well.” The 5-year TOT ZOC for Unit Well 28 extends approximately 550 feet upgradient and downgradient from the well, and may not be adequate for long-term protection of the well recharge area. The 100-year TOT ZOC extends approximately 6,800 feet upgradient from the Unit Well 28. However, protecting the entire 100-year TOT ZOC from Unit Well 28 to the upgradient boundary at the same level of protection, as the area within the 5-year TOT ZOC is likely too severe. Therefore, varying zones of protection are defined.

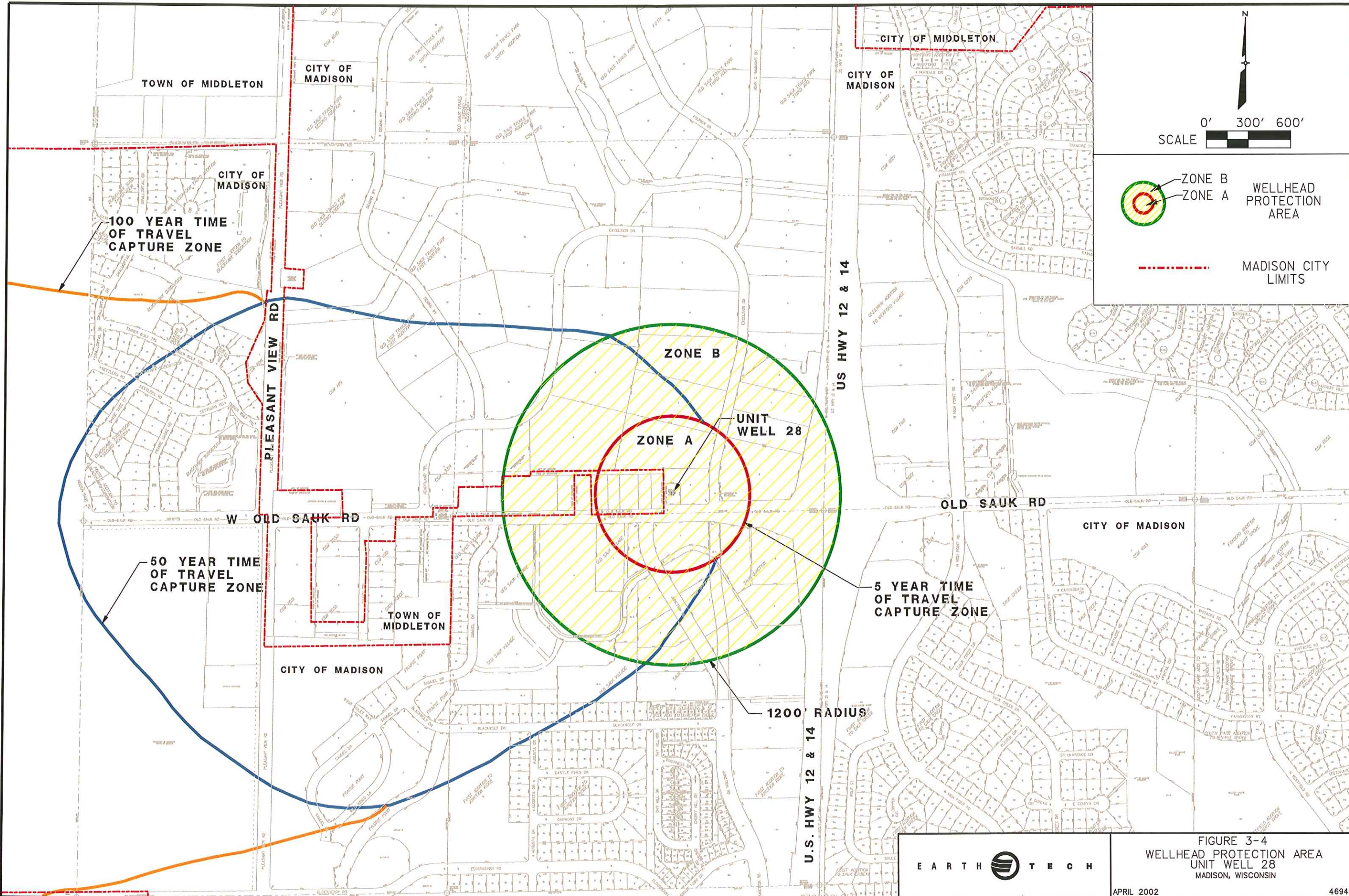
Figure 3-4 shows the WHPA for Unit Well 28. Two zones of protection are within the WHPA. Zone A is the area around Unit Well 28 that is defined by the 5-year TOT ZOC delineated for Simulation No. 2 (one-half design capacity pumping rate). Zone B is the area around Unit Well 28, beyond Zone A, that is defined by a 1,200-foot fixed radius around Unit Well 28.

A 1,200-foot radius (Zone B) is the minimum separation distance established between a municipal water supply well and some contamination sources summarized in Wisconsin Administrative Code, Chapter NR811.16(4). The boundary of Zone B is larger than the 5-year TOT ZOC delineated for Unit Well 28 for Simulation No. 2, and is approximately equivalent to the 5-year TOT ZOC determined from the RESSQC (maximum pumping) simulation. The WHPA will provide a conservative protection zone to account for changes in pumping rates, pumping duration, and interference drawdown from other existing and future wells. The WHPA is located within the City of Madison and Town of Middleton.

\$\$\$REF03\$\$  
\$\$\$RF03\$\$  
\$\$\$REF04\$\$  
\$\$\$RF04\$\$

\$\$\$REF01\$\$  
\$\$\$RF01\$\$  
\$\$\$REF02\$\$  
\$\$\$RF02\$\$

\$\$\$USER\$\$  
\$\$\$PEN\$\$  
\$\$\$LEVEL\$\$  
\$\$\$PRF\$\$  
\$\$\$DATE\$\$  
\$\$\$DGN\$\$



SCALE 0' 300' 600'

ZONE B  
ZONE A

WELLHEAD PROTECTION AREA

MADISON CITY LIMITS



FIGURE 3-4  
WELLHEAD PROTECTION AREA  
UNIT WELL 28  
MADISON, WISCONSIN

APRIL 2002 46945

## 4.0 POTENTIAL CONTAMINANT SOURCES

### 4.1 CONTAMINANT SOURCE INVENTORY

A CSI was performed for the Unit Well 28 area during December 2001 and January 2002. The CSI consisted of a search of government records, interviews, review of aerial photographs, and a reconnaissance survey of the area within a ½-mile radius of Unit Well 28. A copy of the CSI is in Appendix I.

General land use observations and reconnaissance were made on December 13, 2001. A CSI was performed for the area surrounding Unit Well 28 during 1994 as part of the well site survey report. A portion of the well site survey report relative to potential contaminant sources is in Appendix J. Follow-up correspondence is also in Appendix J.

Figures 4-1 and 4-2 show the location of potential and existing contaminant sources in the WHPA and within a ½-mile radius of Unit Well 28. Figure 4-1 shows the topography of the area, and Figure 4-2 shows the land subdivisions. Table 4-1 summarizes potential contaminant sources that were identified and/or reported to be within the WHPA and review area.

Some of the potential contaminant sources observed in 1994 were also identified during the December 2001 reconnaissance survey. Several sewer commercial and residential properties have been developed since 1994.

Potential and existing contaminant sources within the WHPA for Unit Well 28 include potential spills along roads and main transportation corridors, active and closed underground storage tank (UST) sites, agricultural farming, fertilizer spreading, possible manure and sludge spreading areas on agricultural fields, closed and active private sewage disposal systems, road salt use, and pesticide, herbicide, and nutrient loading on commercial and residential lawns.

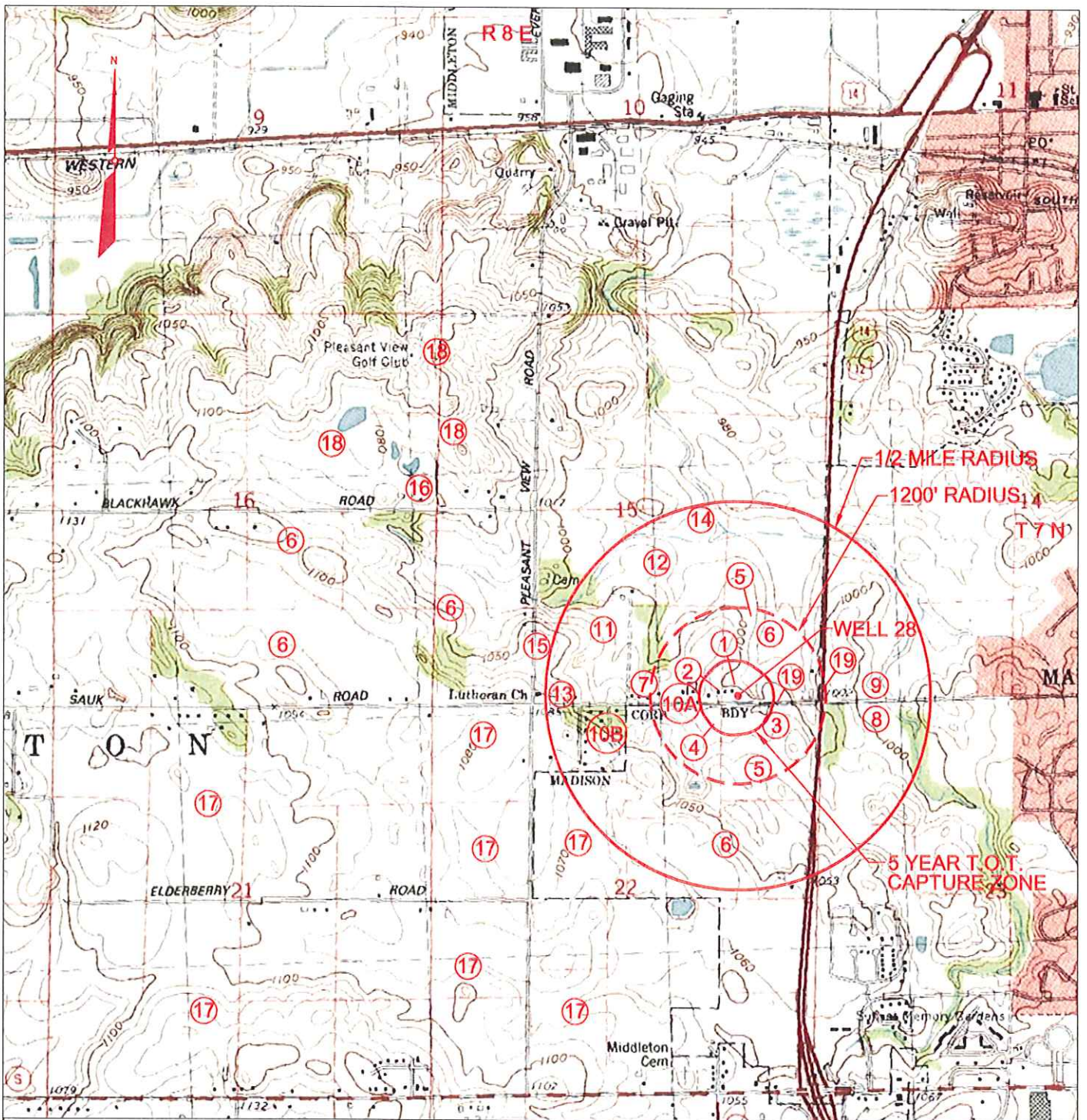
On the basis of available information, following are descriptions of known existing or potential contaminant sources in the WHPA and/or within a ½-mile radius of Unit Well 28:

The nearest private sewage disposal system is located approximately 600 feet west of Unit Well 28. The Madison Water Utility reported that the private sewage disposal systems that were located within 400 feet of Unit Well 28, were abandoned in January 2002. Other active private sewage disposal systems are located along West Old Sauk Road, approximately 600 feet west of Unit Well 28 and along Sauk Court, approximately 1,850 feet west and southwest of Unit Well 28.

The residences located immediately west of Unit Well 28 have private water supply wells. The nearest private well is located at 6924/26 West Old Sauk Road, approximately 100 feet west of Unit Well 28. The well is likely terminated in the Upper Bedrock aquifer, above the interval open to Unit Well 28. The DNR and Dane County Environmental Health Department were contacted regarding private wells. These departments are not aware of any water quality issues with any private wells in the vicinity of Unit Well 28.

The nearest storm sewer is located in West Old Sauk Road, approximately 100 feet south of Unit Well 28, and is constructed of water main materials.



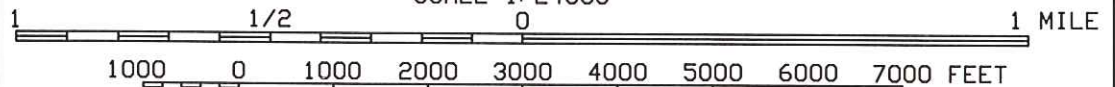


SOURCE: USGS 7.5 MINUTE QUADRANGLE,  
MIDDLETON, WISCONSIN, 1982

T.O.T. = TIME OF TRAVEL

③ POTENTIAL CONTAMINANT SOURCE OR ROUTE

SCALE 1:24000



CONTOUR INTERVAL 10 FEET  
DATUM IS MEAN SEA LEVEL

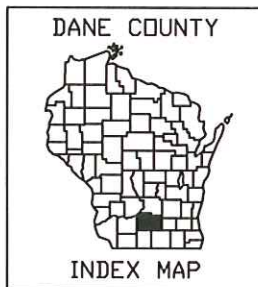


FIGURE 4-1  
CONTAMINANT SOURCE INVENTORY  
UNIT WELL 28

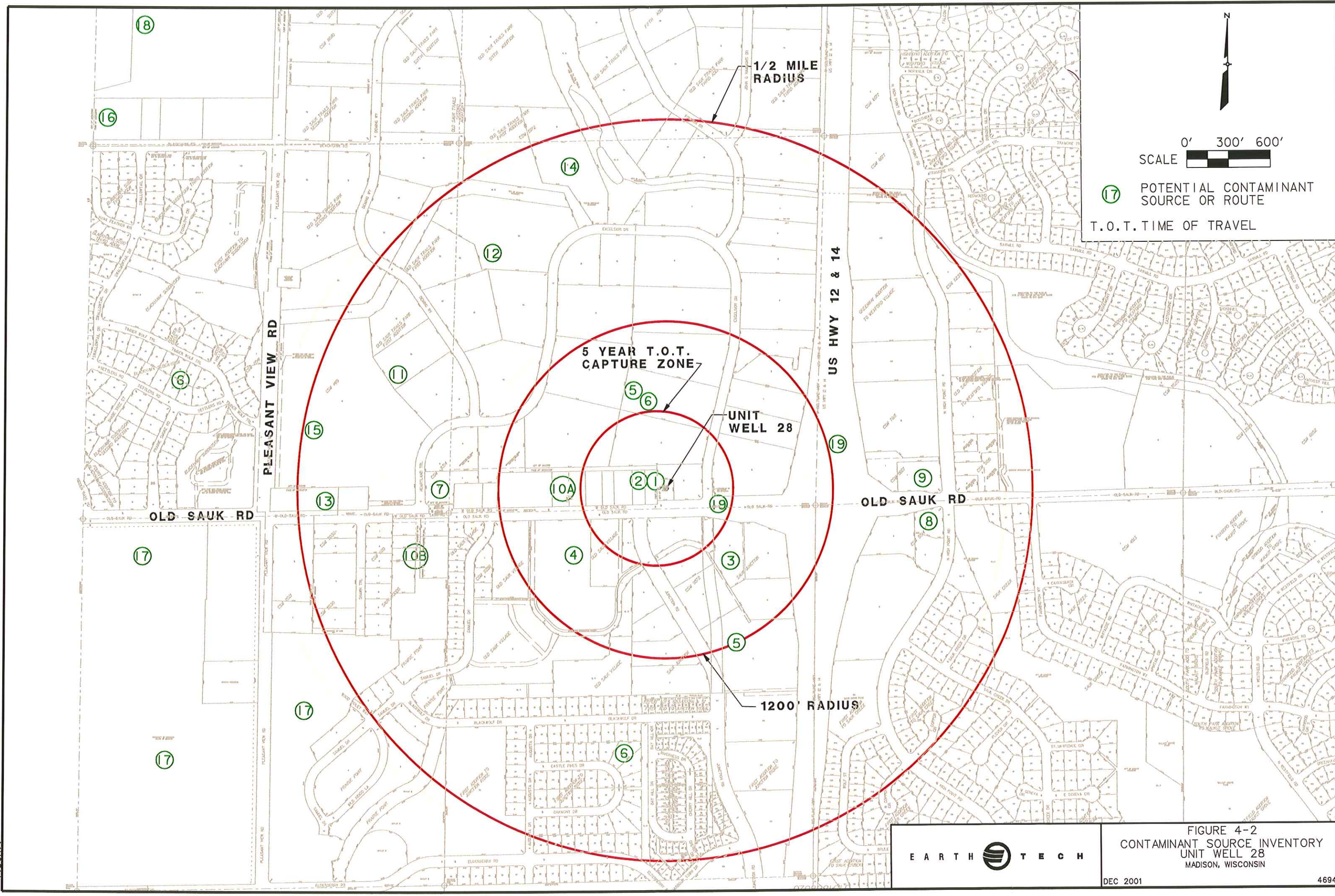
MADISON, WISCONSIN



\$\$\$REF03\$\$  
\$\$\$REF03\$\$  
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\$\$\$REF04\$\$

\$\$\$REF01\$\$  
\$\$\$REF01\$\$  
\$\$\$REF02\$\$  
\$\$\$REF02\$\$

\$\$\$USERS\$\$  
\$\$\$PEN\$\$  
\$\$\$LEVELS\$\$  
\$\$\$PRF\$\$  
\$\$\$DATE\$\$  
\$\$\$DGN\$\$



17 POTENTIAL CONTAMINANT SOURCE OR ROUTE  
T.O.T. TIME OF TRAVEL

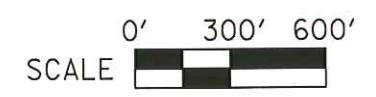


FIGURE 4-2  
CONTAMINANT SOURCE INVENTORY  
UNIT WELL 28  
MADISON, WISCONSIN

**TABLE 4-1  
CONTAMINANT SOURCE INVENTORY SUMMARY  
WELLHEAD PROTECTION UNIT WELL 28  
MADISON, WISCONSIN  
DECEMBER 2001**

Map Site No.	Owner/Location	Database or Reference Source	Existing, Potential, or Former Contaminant Sources	Reported Status	Approximate Distance to Unit Well 28	Location within Capture Zone	Estimated Threat to Supply Wells
1	Residence 6924/26 West Old Sauk Road Madison, WI	Visual Inspection	Private Well - Pitless adaptor stick-up	Active	Approx. 75-100 ft west-northwest	5 year TOT	Low
2	Residence 6934 West Old Sauk Road Madison, WI	Visual Inspection	Private sewage disposal system vent. Reported that the sewage disposal systems located at the properties immediately west of Unit Well 28 were abandoned in January 2002.	Abandoned	Within 400 ft west	5 year TOT	Moderate
3	Mobil Mart 633 Junction Road	Visual Inspection	USTs, gasoline and diesel 6 pump islands	Active	600 ft southeast	5 year TOT	Moderate
4	Attic Angel Association 8301 Old Sauk Road Madison, WI 53562	EcoSearch - Wisconsin Registered Storage Tank Database, Agency ID No. 181484	Aboveground 405-gal, diesel storage tank Tank ID No. 662592 - for backup generator supply	Active	600 ft southwest	5 year TOT	Moderate
5	Numerous properties throughout area	Visual Inspection	Parking Surfaces - Runoff to drainage ways and detention areas	Active	Variable	5 year TOT and beyond	Low-Moderate
6	Numerous properties throughout area	Visual Inspection	Grass Areas - Potential nutrient loading	Active	Variable	5 year TOT and beyond	Low-Moderate
7	Thomas Mohoney 6988 West Old Sauk Road Middleton, WI 53562	EcoSearch - Wisconsin Registered Storage Tank Database, Agency ID No. 136810	Former 100-gal, fuel oil underground storage tank Tank ID No. 277675	Closed/Removed	1,400 ft west	Upgradient beyond 5 year TOT	Low
8	TLC Dry Cleaning 668 North High Point Road Madison, WI	Visual Inspection	Dry cleaning fluids	Active	1,850 ft east	Downgradient beyond capture zone	Low
9	Duane Hawkinson 7810 Old Sauk Road Middleton, WI	EcoSearch - Wisconsin Registered Storage Tank Database, Agency ID No. 72358 Visual Inspection	100-gal, fuel oil underground storage tank Tank ID No. 277480 No UST observed - location is Klein Insurance Bldg.	Reported active in database, but could not locate	1,850 ft east	Downgradient beyond capture zone	Low
10A	Residences West Old Sauk Road	Visual Inspection Madison Water Utility Interview	Private water supply wells Private sewage disposal systems	Active	>600 ft west	Directly upgradient, beyond 5 year TOT	Moderate
10B	Sauk Court Middleton, WI	Visual Inspection	Private water supply wells Private sewage disposal systems	Active	1,850 ft west-southwest	Upgradient beyond 5 year TOT	Low-Moderate
11	Covance Labs Inc. West 802 Deming Way Madison, WI 53717	EcoSearch - RCRA Generator RCRA Notifier Site, EPA No. WIR 12443	Analytical Laboratory - Agri chemistry and food packaging analysis, chemical storage and use, spent chemicals disposed of quarterly by Onyx or other contractor	Active	2,000 ft northwest	Upgradient beyond 5 year capture zone	Low
12	John Deere Credit 8402 Excelsior Drive Madison, WI 53717	EcoSearch RCRA Small Quantity Generator EPA No. WID 988629895	Small quantities of chiller oil generated on site Disposed of at Safety Klean Corp.	Active	2,100 ft northwest	Upgradient beyond 5 year TOT	Low
13	Lutheran Church Cemetery NE corner of intersection of W Old Sauk Rd and Pleasant View Rd Madison, WI	Visual Inspection	Cemetery	Active	2,400 - 2,800 ft west	Upgradient beyond 5 year TOT	Low
14	Artesyn Technologies 8310 Excelsior Drive Madison, WI 53717	EcoSearch RCRA Small Quantity Generator EPA No. WID 988601167	Manufacturer of computer circuit boards User and generator of solder and isopropyl alcohol - disposed of with licensed contractor	Active	2,400 ft north-northwest	Upgradient beyond 5 year TOT	Low

TABLE 4-1 (cont.)							
Map Site No.	Owner/Location	Database or Reference Source	Existing, Potential, or Former Contaminant Sources	Reported Status	Approximate Distance to Unit Well 28	Location within Capture Zone	Estimated Threat to Supply Wells
15	General Electric-Lunar Corp. 726 Heartland Trail Madison, WI 53717	EcoSearch RCRA Small Quantity Generator EPA No. WID 45443	User and generates waste - degreaser, isopropyl alcohol, lead litharge, and absorbent pigmatting, small quantities of 1-2 drums per year Contractor disposal - Onyx and Renewable Resources	Active	2,500 ft west-north	Upgradient beyond 5 year TOT	Low
16	Business 9118(?) Blackhawk Road Middleton, WI	Visual Inspection	Aboveground storage tank, in secondary containment vessel, est. 500 gal, fenced	Active	5,100 ft northwest	Beyond 50 year TOT (sidegradient)	Low
17	Numerous Parcels	Visual Inspection	Agricultural Fields - Row crops Nutrient loading	Active	2,000 ft +, west, southwest, northwest	Within 50 year TOT	Low
18	Pleasant View Golf Club 1322 Pleasant View Road Middleton, WI 53562	Visual Inspection	Grass Areas - Nutrient, pesticide, herbicide loading	Active	5,500 ft northwest	Beyond 50 year TOT (sidegradient)	Low
19	Highways 12/14 and Old Sauk Rd. Madison, WI	Visual Inspection	Salt application Potential spills	Active	100 ft +	5 year TOT and beyond	Low-Moderate

**TABLE 4-2  
MINIMUM SEPARATION REQUIREMENTS  
BETWEEN PUBLIC WELLS AND  
POTENTIAL CONTAMINANT SOURCES  
WELLHEAD PROTECTION PLAN, UNIT WELL 28  
MADISON, WISCONSIN**

Potential Contamination Source	Minimum Separation Distance
Storm Sewer	50 feet
Sanitary Sewer	200 feet <sup>1</sup>
Sanitary Lift Station	200 feet
Single Family Residential Fuel Oil Tank	200 feet
Septic Tank Receiving Less than 8,000 gpd	400 feet
Cemetery	400 feet
Storm Water Drainage Pond	400 feet
Gasoline or Fuel Oil Tank Approved by Comm 10.10	600 feet
Land Application of Municipal, Commercial, or Industrial Waste	1,000 feet
Commercial or Municipal Wastewater Lagoons or Storage Structures	1,000 feet
Manure Stacks or Storage Structures	1,000 feet
Septic Tanks or Soil Absorptive Units Receiving Greater than 8,000 gpd	1,000 feet
Solid Waste Storage, Transportation, Transfer, Incineration, Air Curtain Destructor, Processing, Wood Burning, or One-Time Disposal or Small Demolition Facility	1,200 feet
Sanitary Landfill	1,200 feet
Coal Storage Area	1,200 feet
Salt or Deicing Material Storage	1,200 feet
Gasoline or Fuel Oil Storage Tanks not Approved by Comm 10.10	1,200 feet
Bulk Fuel Storage Facilities	1,200 feet
Pesticide or Fertilizer Handling or Storage Facilities	1,200 feet

Reference: Wisconsin Administrative Code, NR 811, October, 2001

Footnote:

<sup>1</sup> Lesser separation for sanitary sewer may be allowed if the sewer is constructed of water main materials and pressure tested. Less than 50 feet separation is not allowed

The nearest sanitary sewer main is located in West Old Sauk Road approximately 100 feet south of Unit Well 28. The lateral extending from the sewer main to Unit Well 28 is constructed of water main materials.

On the basis of the site reconnaissance and a review of the Wisconsin registered storage tank list, the nearest USTs are believed to be located at the Mobil Mart gas station located approximately 600 feet southeast of Unit Well 28 and at the Attic Angel Association approximately 600 feet southwest of Unit Well 28. There are no reported leaking underground storage tanks (LUSTs) in the vicinity of Unit Well 28.

On the basis of the site reconnaissance and a review of the Wisconsin registered storage tank list, the nearest aboveground storage tank (AST) is believed to be located approximately 5,100 feet northwest of Unit Well 28, on Black Hawk Road.

A dry cleaning business is located approximately 1,850 feet east of Unit Well 28.

The nearest golf course is Pleasant View Golf Club and is located approximately 5,500 feet northwest of Unit Well 28.

There are no apparent solid waste storage sites in the immediate vicinity of Unit Well 28. It is reported (DCRPC, 1999) that solid waste (trash) disposal sites were located at Pleasant View Golf Course (approximately 1 mile northwest of Unit well 28) and at Heather Crest Farms (approximately 2 miles west of Unit Well 28). The sites are closed. The Heather Crest Farms site appears to be located on the other side of the regional groundwater divide. The Dennis Howard Dump is located approximately 4,000 feet east of Unit Well 28. A copy of the solid waste storage sites map and summary (DCRPC, 1999) is in Appendix K.

The nearest cemetery (Lutheran Church Cemetery) is located approximately 2,400 to 2,800 feet west of Unit Well 28.

The nearest pond is located approximately 1,300 feet south-southwest of Unit Well 28. Other ponds are located approximately ½ mile north and northwest of Unit Well 28.

The DCRPC (1999) Map 29 shows there are State approved septage application sites approximately 1 to 1.5 miles west of Unit Well 28. A copy of Map 29 is in Appendix L. Greg Kester, DNR, and Mike Northouse, Madison Metropolitan Sewerage District (MMSD), confirmed that there are several permitted sludge and septage disposal sites in the vicinity of Unit Well 28. Many of the permitted sites are not being used for septage and sludge disposal because the properties are being developed for other uses, and because there are ordinances prohibiting truck traffic in the area. MMSD stated that in 2000/2001 they applied a small quantity of biosolids on a research plot at the University Farms site located in the vicinity of Elderbury Road for research purposes. In 1990, the MMSD applied biosolids to a field located in the NW 1/4 of Section 21, T7N, R8E, Town of Middleton. MMSD said the majority of their active biosolids application areas are south and east of the City of Madison. The DNR reported that Ring Septic Service and Speedway Sewer Service have permitted land application sites in Sections 16, 20, and 21, T7N, R8E, Town of Middleton.

No bulk salt storage sheds, or bulk pesticide, fertilizer storage, and/or mix-load sites were identified within a 1-mile radius of Unit Well 28, or within the upgradient recharge area beyond a 1-mile radius.

The separation distances between Unit Well 28 and potential contaminant sources identified in Wisconsin Administrative Code NR 811.16 are summarized in Table 4-2. It appears that required separation distances from Unit Well 28 and potential contaminant sources, identified in the code, are currently being met.

#### **4.2 LAND USES AND WELLHEAD PROTECTION PLANNING**

Existing land uses in the vicinity of Unit Well 28 are generally compatible with WHP planning. However, existing land uses such as retail commercial fuel sales, non-approved USTs and/or ASTs (if any), and dry cleaners are not compatible uses. Generally speaking, it is not desirable to have commercial, manufacturing, or industrial districts located in WHPAs.

Land uses summarized in Table 4-2 should be prohibited in the vicinity of Unit Well 28, within the respective minimum separation distances shown. Additionally, we recommend that land uses summarized in Table M-1 in Appendix M be prohibited from WHPA Zones A and B. Where any of the uses listed in Table M-1 currently exist within Zones A and B, owners should be allowed to upgrade the facilities to facilitate or enhance groundwater protection.

Tables 4-4 and 4-5 in Appendix M summarize several potential sources of groundwater contamination and land uses and their relative risk to groundwater, respectively.

## 5.0 MANAGEMENT STRATEGIES

### 5.1 ALTERNATIVE MANAGEMENT STRATEGIES

Table 5-1 summarizes key elements of a management plan developed for the City of Madison. Activities were identified for resource management within the delineated WHPA.

The various activities can be grouped into five principal categories as follows:

1. Existing programs
2. Land use controls
3. Intergovernmental cooperation
4. Monitoring
5. Public education and awareness

Because all landowners within the WHPA rely on groundwater resources for water supply, and a few maintain private water supply wells, emphasis should be placed on management activities that will provide a mutual benefit to the City of Madison residents and other property owners located within the WHPA.

#### 5.1.1 Category 1 - Existing Programs

##### 5.1.1.1 Hazardous Waste Collection/Disposal Program (Clean Sweep)

The Dane County Department of Public Works and the City of Madison Department of Public Health co-sponsor the Clean Sweep Collection Program. The Clean Sweep program involves collection and disposal of residential, agricultural, and small business hazardous chemicals and wastes. Disposal of household residential hazardous wastes is free. Small quantities of hazardous materials and wastes from small businesses are accepted by appointment, and there is a per-pound charge for materials. There is no charge for disposal of hazardous materials disposed of by producers of agricultural crops and commodities. Collections are held between 7:30 a.m. and 2:00 p.m. on Tuesdays, Wednesdays, Fridays, and Saturdays, May 1 through October 27. The Clean Sweep site is located at the Dane County Highway Garage, 2302 Fish Hatchery Road, Madison, Wisconsin. The phone number at the Clean Sweep site is (608) 267-3105.

Information about the Clean Sweep Collection Program can be obtained by calling (608) 294-5366 or (608) 294-5358. Clean Sweep Collection Program web sites are at:

[www.co.dane.wi.us/pubworks/recyc/csaccept.htm](http://www.co.dane.wi.us/pubworks/recyc/csaccept.htm)

and

[www.ci.madison.wi.us/health/EnvHlth/clnswp.html](http://www.ci.madison.wi.us/health/EnvHlth/clnswp.html)

The Clean Sweep Collection Program is advertised using public service announcements and materials distributed by municipalities. Funding for the program is provided by a percentage of tipping fees collected at local landfills and support from the Wisconsin Department of Agriculture, Trade and



**TABLE 5-1  
SUMMARY OF MANAGEMENT STRATEGIES  
WELLHEAD PROTECTION AREA PLAN - UNIT WELL 28  
MADISON, WISCONSIN**

Program Category	Activity	Description	Responsible Unit(s) of Government	Implementation Schedule	
				Date	Action Item
1. Existing Programs	a. Hazardous Waste Collection (CLEAN SWEEP)	<ul style="list-style-type: none"> <li>• Hazardous waste collection and disposal. Residential, agricultural, and small business hazardous waste. Commercial with small fee. May through October collections in Madison.</li> <li>• Target local property owners and residents to participate.</li> </ul>	<ul style="list-style-type: none"> <li>• Dane County Department of Public Works</li> <li>• City of Madison Department of Public Health</li> </ul>	1. May 2002.	1. <b>Madison Water Utility</b> send information about the Clean Sweep Collection Program to property owners in the WHPA, to encourage participation in the program.
	b. On Site Waste Disposal System (Septic) Maintenance	<ul style="list-style-type: none"> <li>• Maintenance/servicing contract currently required for system owners on record.</li> <li>• Orders issued to confirmed failing system owners.</li> <li>• Include all property/septic system owners in WHPA in notification database.</li> <li>• Conduct Public Education.</li> </ul>	<ul style="list-style-type: none"> <li>• Dane County Environmental Health Department</li> </ul>	1. May 2002, then annually	1. <b>Madison Water Utility</b> request that the Dane County Environmental Health Department provide them the names and addresses of owners of private sewage disposal systems located in the Unit Well 28 WHPA.
				2. May 2002	2. <b>Madison Water Utility</b> send a mailing to owners of private sewage disposal systems located within the WHPAs, about sewage system maintenance, and the types of waste that should not be disposed of in a septic system.
				3. Every 3 years	3. <b>Dane County Environmental Health Department</b> ensure that system maintenance and pumping are performed.

TABLE 5-1 (cont.)

Program Category	Activity	Description	Responsible Unit(s) of Government	Implementation Schedule	
				Date	Action Item
1. Existing Programs (cont.)	c. Private Well Abandonment	<ul style="list-style-type: none"> <li>Enforce well abandonment ordinance(s) (Dane County Chapter 45, and City of Madison General Ordinance Sec. 13.21) and review new well construction.</li> <li>Require proper abandonment of unused and unsafe wells.</li> <li>Update well inventory in WHPA once every 5 years.</li> <li>Familiarize with WI Admin. Codes, Chapters NR 141, 811, and 812.</li> </ul>	<ul style="list-style-type: none"> <li>Wisconsin DNR</li> <li>Dane County Environmental Health Department</li> <li>City of Madison</li> </ul>	<ol style="list-style-type: none"> <li>May 2002, then annually</li> <li>June - August 2002, then every five years (2007)</li> <li>September - December 2002</li> <li>2002, then every five years</li> <li>Ongoing</li> <li>May 2002</li> <li>As needed</li> </ol>	<ol style="list-style-type: none"> <li>Madison Water Utility request that the Dane County Environmental Health Department provide them the names and addresses of owners of private wells located in the Unit Well 28 WHPA.</li> <li>Madison Water Utility determine the location of other private water supply wells that may be located within the WHPA and which are not recorded in the County database.</li> <li>Madison Water Utility send private well owners within the WHPA, DNR pamphlets about well upkeep and proper abandonment procedures in the event the owners abandon their existing wells.</li> <li>Madison Water Utility update the private well inventory for wells located in the WHPA.</li> <li>City of Madison and Dane County enforce existing well abandonment ordinances, to ensure that all private wells are permitted, or properly abandoned if unused.</li> <li>Madison Water Utility request that Dane County consider proximity and depth of proposed private wells relative to Unit Well 28 prior to issuing permits for construction of new private water supply wells.</li> <li>Madison Water Utility direct residents to the DNR private well code (Chapter NR 812) or to the Wisconsin DNR private well section (608-266-0821) when questions arise about private water supply wells.</li> </ol>

TABLE 5-1 (cont.)

Program Category	Activity	Description	Responsible Unit(s) of Government	Implementation Schedule	
				Date	Action Item
1. Existing Programs (cont.)	d. Land Application of Sludge and Septage	<ul style="list-style-type: none"> <li>Enforce existing rules.</li> </ul>	<ul style="list-style-type: none"> <li>Wisconsin DNR</li> <li>Dane County</li> <li>Madison Metropolitan Sewerage District (MMSD)</li> </ul>	1. May 2002	1. <b>Madison Water Utility</b> provide a copy of the WHPA and recharge area maps to the MMSD and request that sludge not be spread in the Unit Well 28 recharge area equivalent to the 50-year TOT capture zone.
				2. May 2002	2. <b>Madison Water Utility</b> provide a copy of the WHPA and recharge area maps to the DNR Watershed Management office (608-267-7694 (central office) 608-275-3325 (Fitchburg office)) and request that new permits for sludge and septage spreading not be issued for properties located in the Unit Well 28 recharge area equivalent to the 50-year TOT capture zone.
				3. Ongoing	3. <b>Madison Water Utility</b> encourage development of additional authorized septage discharge points in the City of Madison wastewater treatment system.
				4. Ongoing	4. <b>DNR</b> enforce rules, particularly in WHPAs.
				5. 2002-2003	5. <b>Dane County</b> develop regulatory program including ordinance.
	e. Spill Notification and Awareness of Remedial Investigation and Cleanup	<ul style="list-style-type: none"> <li>Monitor and keep informed of potential contamination sources in the WHPA and recharge areas.</li> <li>Work with DNR to achieve investigation and cleanup of known contamination sources.</li> </ul>	<ul style="list-style-type: none"> <li>Wisconsin DNR</li> <li>Dane County Emergency Management</li> <li>Wisconsin DATCP and COMM</li> <li>City of Madison Fire Department</li> </ul>	1. May 2002	1. <b>Madison Water Utility</b> request that DNR and the Dane County Emergency Management Office inform the City about future events (spills, leaks, investigations, etc.) that occur in the Unit Well 28 WHPA or in upgradient recharge areas.
				2. May 2002, then ongoing	2. <b>Madison Water Utility</b> monitor the status of existing and potential contamination sources in the WHPA and upgradient recharge areas, investigations regarding nature and extent of releases, and the status of cleanup activities, then determine if Utility action is needed.
2. Land Use Controls	a. Existing Zoning/Wellhead Protection Overlay Zoning and Ordinance	<ul style="list-style-type: none"> <li>Enforce existing zoning.</li> <li>Discourage conditional uses or zoning changes that increase risk to groundwater.</li> </ul>	<ul style="list-style-type: none"> <li>City of Madison</li> <li>Dane County Planning and Development</li> <li>Town of Middleton</li> </ul>	1. 2002 - Ongoing	1. <b>City of Madison</b> develop and adopt a WHP ordinance during 2002.
				2. 2002	2. <b>City of Madison</b> provide Dane County and Middleton Township with a copy of the WHP ordinance.
				3. 2002	3. <b>City of Madison</b> add language to local zoning and subdivision ordinances to require that groundwater impacts and protection are considered during the review and decision process.
				4. 2002-2003	4. <b>Dane County</b> consider developing WHP Overlay District ordinance.

TABLE 5-1 (cont.)

Program Category	Activity	Description	Responsible Unit(s) of Government	Implementation Schedule	
				Date	Action Item
3. Intergovernmental Cooperation	a. Land Use Planning and Site Plan Review	<ul style="list-style-type: none"> <li>• Cooperate in land use planning to protect groundwater resources and WHPAs.</li> <li>• Keep apprised of development in WHPA.</li> <li>• Ensure development complies with separation distances between the well and potential contamination sources as required by WI Admin. Code, Chapter NR 811.16.</li> </ul>	<ul style="list-style-type: none"> <li>• City of Madison Planning and Development Department</li> <li>• Dane County Planning and Development Department</li> <li>• Town of Middleton</li> </ul>	1. May 2002	<ol style="list-style-type: none"> <li>1. <b>City of Madison</b> provide Dane County and the Town of Middleton with a copy of:               <ol style="list-style-type: none"> <li>a. The WHPP and maps showing the Unit Well 28 WHPA and recharge areas.</li> <li>b. A summary of separation distances required between municipal water supply wells and potential contamination sources (Wisconsin Administrative Code, Chapter NR 811.16(4)(d)).</li> <li>c. A list of potential contamination sources that can threaten groundwater.</li> <li>d. A list of high risk land uses that should be prohibited from WHPAs.</li> </ol> </li> </ol>
				2. May 2002 – Ongoing	<ol style="list-style-type: none"> <li>2. <b>City of Madison Planning and Development Department</b> ensure that development complies with separation distances required between municipal water supply wells and potential contamination sources.</li> </ol>
				3. May 2002 – Ongoing	<ol style="list-style-type: none"> <li>3. <b>City of Madison</b> encourage the Town of Middleton and Dane County Boards to review proposed development in the WHPA in their jurisdiction, before construction approval, to ensure compliance with separation distances between Unit Well 28 and potential contamination sources.</li> </ol>
				4. 2002	<ol style="list-style-type: none"> <li>4. <b>City of Madison Planning and Development Department</b> develop an Environmental Permits Checklist for site plan review. The checklist will help ensure compliance with local, County, and State permits and will raise awareness about groundwater protection.</li> </ol>
				5. 2002 – Ongoing	<ol style="list-style-type: none"> <li>5. <b>City of Madison Planning and Development Department</b> provide a copy of the WHPA map and Site Plan Review Environmental Permits Checklist to developers and property owners and require that the developer indicate on the environmental permits checklist and hazardous substances reporting form whether the proposed development is in a WHPA.</li> </ol>



TABLE 5-1 (cont.)

Program Category	Activity	Description	Responsible Unit(s) of Government	Implementation Schedule	
				Date	Action Item
5. Public Education and Awareness (cont.)	e. Land Use and Contaminant Source Awareness	<ul style="list-style-type: none"> <li>Notify and offer guidance to owners of potential high risk land uses in WHPA.</li> </ul>	<ul style="list-style-type: none"> <li>City of Madison</li> <li>Town of Middleton</li> </ul>	1. May 2002	<p>1. <b>Madison Water Utility</b> provide information to owners of property with existing or potential contamination sources located within the WHPA to emphasize the importance of awareness of the WHPA, the owner's location with respect to the WHPA, and potential contamination source(s) of concern. Specific information to be provided includes:</p> <ul style="list-style-type: none"> <li>a. Septic system do's and don'ts.</li> <li>b. Leaking underground and above ground storage tanks.</li> <li>c. Materials describing the proper use and application of lawn fertilizers and pesticides.</li> </ul>
	f. School Programs	<ul style="list-style-type: none"> <li>Participate in school programs.</li> </ul>	<ul style="list-style-type: none"> <li>City of Madison</li> <li>University Extension Office</li> <li>Madison Public Schools</li> </ul>	<p>1. May 2002</p> <p>2. 2002</p>	<p>1. <b>Madison Water Utility</b> inform schools about the availability of tours at water supply facilities.</p> <p>2. <b>Madison Water Utility</b> prepare a water/groundwater fact sheet for school education.</p>

Consumer Protection (DATCP). Additional information about the Clean Sweep Collection Program is in Appendix N.

The Clean Sweep Collection Program will be coupled with the City of Madison's WHP planning efforts. The following task will be completed in conjunction with this management activity:

1. Madison Water Utility will send information about the Clean Sweep Collection Program to property owners in the WHPA, to encourage participation in the program.

#### **5.1.1.2 On-Site Waste Disposal System Maintenance**

The Dane County Environmental Health Department has an existing program for maintenance/servicing of private on-site waste disposal (septic) systems. Data for private waste disposal systems are recorded in a central database. All owners of septic systems are required every three years to have their septic tanks pumped and inspected and any required maintenance performed. The County charges the owners of septic systems a \$24 filing fee at the time the maintenance/servicing is performed.

The Dane County Environmental Health Department investigates complaints about non-complying sewage disposal systems and issues replacement orders to owners of failing systems.

Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will request that the Dane County Environmental Health Department provide them the names and addresses of owners of private sewage systems located in the Unit Well 28 WHPA.
2. Madison Water Utility will send a mailing to owners of private sewage disposal systems located within the WHPAs, about sewage system maintenance, and the types of waste that should not be disposed of in a septic system.

#### **5.1.1.3 Well Abandonment**

The proposed strategies under this category for WHP include public education and private well inventory maintenance. Education will improve awareness on the part of private well owners of the importance of proper well abandonment. Residential properties located immediately west of Unit Well 28 have private water supply wells. The nearest private well is approximately 100 feet west of Unit Well 28. The well is terminated with a pitless adaptor and appears to be of relatively recent construction. Other private wells are located west of Unit Well 28 along West Old Sauk Road.

The City of Madison (General Ordinance Section 13.21) and Dane County (Chapter 45) have well abandonment ordinances for non-complying, unsafe, and unused wells. A copy of the City of Madison Well Abandonment Ordinance and the Dane County ordinance "Relating to Private Water Systems" are in Appendix O. Other information about wells and well abandonment is in Appendix P.

Dane County and the Wisconsin DNR have regulatory authority for proper construction and abandonment of unused wells (Wisconsin Administrative Code, Chapters NR 811 and 812).

Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will request that the Dane County Environmental Health Department provide them the names and addresses of owners of private wells located in the Unit Well 28 WHPA.
2. Madison Water Utility will determine the location of other private water supply wells that may be located within the WHPA and which are not recorded in the County database.
3. Madison Water Utility will send private well owners within the WHPA, DNR pamphlets about well upkeep and proper abandonment procedures in the event the owners abandon their existing wells.
4. Every five years, Madison Water Utility will update the private well inventory for wells located in the WHPA.
5. The City of Madison and Dane County will enforce the existing City and Dane County well abandonment ordinances, to ensure that all private wells are permitted, or properly abandoned if unused.
6. Madison Water Utility will request that Dane County consider proximity and depth of proposed private wells relative to Unit Well 28 prior to issuing permits for construction of new private water supply wells.
7. Madison Water Utility will direct residents to the DNR private well code (Chapter NR 812) or to the Wisconsin DNR private well section (608-266-0821) when questions arise about private water supply wells.

#### **5.1.1.4 Land Application of Sludge and Septage**

The Wisconsin DNR issues permits for septage and sludge disposal sites in Wisconsin. Private sewage haulers and the MMSD have permitted septage and sludge disposal sites in areas upgradient from Unit Well 28. The MMSD is not currently disposing of sludge on sites in the Unit Well 28 area. Private haulers are disposing of septage on fields in upgradient recharge areas. On the basis of available data, it appears that septage and sludge are not currently being applied to parcels located within 1 mile of Unit Well 28.

Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will provide a copy of the WHPA and recharge area maps to the MMSD and request that sludge not be spread in the Unit Well 28 recharge area equivalent to the 50-year TOT capture zone.
2. Madison Water Utility will provide a copy of the WHPA and recharge area maps to the DNR Watershed Management office (608-267-7694 (central office) 608-275-3325 (Fitchburg office)) and request that new permits for sludge and septage spreading not be issued for properties located in the Unit Well 28 recharge area equivalent to the 50-year TOT capture zone.
3. Madison Water Utility will encourage development of additional authorized septage discharge points in the City of Madison wastewater treatment system.



### **5.1.1.5 Spill Notification and Awareness of Remedial Investigation and Cleanup**

There are no known active or closed remediation sites in the Unit Well 28 WHPA. Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will request that DNR and the Dane County Emergency Management Office inform the City about future events (spills, leaks, investigations, etc.) that occur in the Unit Well 28 WHPA or in upgradient recharge areas.
2. Madison Water Utility will monitor the status of existing and potential contamination sources in the WHPA and upgradient recharge areas, investigations regarding nature and extent of releases, and the status of cleanup activities.

### **5.1.2 Category 2 - Land Use Controls**

#### **5.1.2.1 Existing Zoning/Wellhead Protection Overlay Zoning and Ordinance**

The City of Madison, Dane County, and Town of Middleton have land subdivision and zoning ordinances to control and direct development. Land subdivision and zoning ordinances are used to safeguard flood plains, wetlands, shore lands, highway access, air quality, surface water, and other concerns. Existing zoning regulations will be enforced to help protect municipal well recharge areas and groundwater.

The City of Madison is developing a WHP ordinance. The ordinance references the Unit Well 28 WHPA map. The ordinance prohibits incompatible development with the establishment of an overlay district for the 5-year TOT ZOC (Zone A) and the 1,200-foot radius ZOC (Zone B). The WHP ordinance helps ensure that future potential contamination sources are not located in the Unit Well 28 WHPA. A copy of the draft WHP ordinance is in Appendix Q.

Tasks that will be completed in conjunction with this management activity include:

1. The City of Madison will develop and adopt a WHP ordinance during 2002.
2. The City of Madison will provide Dane County and Middleton Township with a copy of the WHP ordinance.

### **5.1.3 Category 3 - Intergovernmental Cooperation**

#### **5.1.3.1 Land Use Planning and Site Plan Review**

Land use planning is performed to control and direct development. Land use planning and site plan review should also be used to help protect WHPAs. Tasks that will be completed in conjunction with this management activity include:

1. The City of Madison will provide Dane County and the Town of Middleton with a copy of:
  - a. The WHPP and maps showing the Unit Well 28 WHPA and recharge areas.
  - b. A summary of separation distances required between municipal water supply wells and potential contamination sources (Wisconsin Administrative Code, Chapter NR 811.16(4)(d)).

- c. A list of potential contamination sources that can threaten groundwater.
- d. A list of high risk land uses that should be prohibited from WHPAs.
2. The City of Madison Planning and Development Department will ensure that development complies with separation distances required between municipal water supply wells and potential contamination sources.
3. The City of Madison will encourage the Town of Middleton and Dane County Boards to review proposed development in the WHPA in their jurisdiction, before construction approval, to ensure compliance with separation distances between Unit Well 28 and potential contamination sources.
4. The City of Madison Planning and Development Department will develop an Environmental Permits Checklist for site plan review. The checklist will help ensure compliance with local, County, and State permits and will raise awareness about groundwater protection.
5. The City of Madison Planning and Development Department will provide a copy of the WHPA map and Site Plan Review Environmental Permits Checklist to developers and property owners and require that the developer indicate on the environmental permits checklist and hazardous substances reporting form whether the proposed development is in a WHPA.

#### **5.1.4 Category 4 - Monitoring**

##### **5.1.4.1 CSI Maintenance**

As part of this study, a CSI was conducted within the delineated WHPA. It will be important to maintain current knowledge of land use, potential contamination sources, and development within the WHPA. The following task will be completed in conjunction with this management activity:

1. Madison Water Utility will update the CSI by conducting a windshield survey of properties located in the WHPA and by performing State and Federal database checks on an interval of once every five years.

##### **5.1.4.2 Water Quality Monitoring**

Currently, each of the City of Madison's supply wells are tested annually, some are tested more often depending on the analytes, and the detected level. Volatile organic compounds (VOCs) are tested annually and quarterly for several wells. Synthetic organic compounds (SOCs) are tested every three years. Inorganic testing is done every three years. Microbiological testing, total coliform bacteria are tested for weekly. Results are summarized and reviewed for conformance with regulatory drinking water standards, for comparison with current water quality results, and to identify any potential trends in contaminant concentrations.

The following task will be completed in conjunction with this management activity:

1. Madison Water Utility will perform water quality monitoring as required by DNR and as otherwise needed.

### **5.1.5 Category 5 - Public Education and Awareness**

The City of Madison will implement an education program to inform area residents of the need to protect the public water supply. Education is the best way to help people understand that what they apply on or dispose in their land today may be what they or their neighbors drink tomorrow. The public education program will consist of the following:

1. Make available copies of the WHPP
2. Public Informational Meeting
3. News releases
4. Make available and distribute information materials
5. Land Use and Contaminant Source Awareness
6. School programs

#### **5.1.5.1 Availability of WHPP**

Tasks that will be completed in conjunction with this management activity include:

1. The City of Madison will provide copies of the WHPP for review by the public at the Water Utility Office, Madison Public Library, and City Hall.
2. The City of Madison will provide copies of the WHPP to the Town of Middleton and Dane County.
3. Madison Water Utility will communicate the availability of the plan through a newspaper article.

#### **5.1.5.2 Public Informational Meeting**

The purpose of a public informational meeting will be to inform residents of the WHPP, and provide an opportunity for public education and awareness.

Tasks that will be completed in conjunction with this management activity include:

1. The City of Madison will conduct a public informational meeting as part of a City committee meeting or the Common Council meeting during the review phase of the WHPP.
2. The City of Madison will provide WHPA maps available for public review and an information sheet or brochure available for public use.

#### **5.1.5.3 News Releases**

The purposes of news releases are to elevate public awareness, educate the public on the need for WHP, and provide examples of prudent WHP measures. Initially, a news release will inform the public that a WHPP has been developed for Unit Well 28, and will indicate the locations where the WHPP will be available for review.

The following task will be completed in conjunction with this management activity:

1. Madison Water Utility will provide a news release to the local newspaper, at the beginning of the WHP project for Unit Well 28, then annually.

#### 5.1.5.4 Informational Materials Distributed to Residents in WHPA

Informational materials will be prepared and distributed to residents living within the WHPA to educate and inform property owners about various topics such as WHP planning activities, and best waste management procedures.

Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will prepare informational materials and/or obtain from the Wisconsin DNR Bureau of Drinking Water and Groundwater, Dane County or UW Extension fliers, brochures, and pamphlets, including:
  - a. Information about hazardous waste collection/disposal program (Clean Sweep) activities
  - b. Materials describing the proper use and application of lawn fertilizers and pesticides
  - c. WHP planning
  - d. Annual Consumer Confidence Report (CCR) containing information about WHP planning.
2. Madison Water Utility will add information to its website homepage (<http://www.ci.madison.wi.us/water/>) about WHP planning.

#### 5.1.5.5 Land Use and Contaminant Source Awareness

During the CSI, properties were identified with land uses and existing or potential contaminant sources that pose, or may pose, a risk to groundwater. To increase awareness and minimize risk to groundwater and Unit Well 28, it is important to inform property owners about existing and potential contaminant sources on their properties. An initial mailing will be made at the beginning of the WHP program. In this mailing, property owners will be advised to contact the City if they have questions, or require additional information.

The following tasks will be completed in conjunction with this management activity:

1. Madison Water Utility will provide information to owners of property with existing or potential contaminant sources located within the WHPA to emphasize the importance of awareness of the WHPA, the owner's location with respect to the WHPA, and potential contaminant source(s) of concern. Specific information to be provided includes:
  - a. Septic system dos and don'ts
  - b. Leaking underground and aboveground storage tanks
  - c. Materials describing the proper use and application of lawn fertilizers and pesticides

#### 5.1.5.6 School Programs

The City of Madison will participate in school education programs. Tasks that will be completed in conjunction with this management activity include:

1. Madison Water Utility will inform schools about the availability of tours at water supply facilities. During tours, students will be exposed to important concepts related to groundwater and WHP.
2. Madison Water Utility will prepare a water/groundwater fact sheet for school education programs.

## 5.2 WATER CONSERVATION PROGRAM

The Madison Water Utility has an existing water conservation program that includes addressing the needs for both water accountability in the distribution system and water conservation by the public.

During 2000, the Utility maintained a water accountability in the distribution system of 92 percent. The Utility maintains this high level of water accountability by regularly servicing water meters, reviewing water accountability records, and conducting water leak detection surveys when needed.

The Utility currently has brochures available free to the public describing useful water conservation measures. The brochures are also distributed to the public and discussed in speaking engagements with local organizations and schools by Water Utility staff.

The Madison Water Utility also has information about water conservation at its website (<http://www.ci.madison.wi.us/water/>). Water conservation information is in Appendix R.

The Utility has the authority to impose water use restrictions when necessary.

## 5.3 CONTINGENCY PLAN

The Utility has formulated a contingency plan for providing water in the event that Unit Well 28 or one or more of the City's other water supply wells became contaminated or removed from service. The plan primarily relies on the capacity of the system without the capacity of any given well or wells to meet the supply needs of the City of Madison.

The City's water system was designed to supply the maximum water demand for an indefinite period with the largest well out of service. As a result, if Unit Well 28, or any other supply well of the water system, is out of service for a short period of time, the reliable water supply capacity is sufficient to meet demands. In addition to providing additional reliable supply to the water system and fire protection for the western part of the City, Well 28 was installed for the purpose of improving the hydraulic flow conditions in the City's Northwest Pressure Zone. Unit Wells 16, 26, and 28 supply the Northwest Pressure Zone. By utilizing the existing water system currently in place, the City is prepared to meet short-term water supply needs if Unit Well 28 were contaminated or removed from service.

Additionally, the City's wells and wellfields are widely spaced and generally have different recharge areas, thereby making them less vulnerable to potential localized contamination. Unit Well 28 has a transfer switch and plug so that a portable generator could be connected to power the well pump. Well 16 has a standby diesel generator, and several other supply well pumping stations are equipped with standby generators.

The contingency plan also relies on communication with first responders and a plan of action in the event of a water system emergency. Dane County Emergency Management Office will be requested to notify the Water Utility if there is an occurrence in the vicinity of the Unit Well 28 WHPA.

A list of emergency contact numbers was compiled to provide Utility staff immediate access to the appropriate agencies in the event of an emergency. This list is provided in Table 5-2.

**TABLE 5-2  
EMERGENCY CONTACT NUMBERS  
WELLHEAD PROTECTION PLAN, UNIT WELL 28  
MADISON, WISCONSIN**

	Name	Phone No.
Water Utility Emergency Service	On-call	Office: 608-266-4661
General Manager	David Denig-Chakroff	Office: 608-266-4651
Principal Engineer	Alan Larson	Office: 608-266-4653
Civil Engineer	Dennis Cawley	Office: 608-261-9243
Police Department	Emergency Dispatch Non-Emergency Dispatch	911 608-255-2345
Fire Department	Emergency Dispatch Administration	911 608-266-4420
Dane County Emergency Response	On-Call	911
Dane County Emergency Management Office	Hazardous Materials Planning Office (General)	608-266-4330
Local – DNR Water Supply Contact Person	Tom Stunkard Fitchburg	608-275-3300
Central Office – DNR Water Supply	Norman Hahn Madison	608-267-7661
Well Driller	Municipal Well & Pump Tracy Greenfield	Office: 920-324-3400 Cellular: 262-424-2328
Well Driller	Layne Northwest Jeff Gibson	Office: 262-246-4646 After Hours: 262-246-4646 (menu)
Pump Installer	Municipal Well & Pump Tracy Greenfield	Office: 920-324-3400 Cellular: 262-424-2328
Pump Installer	Layne Northwest Jeff Gibson	Office: 262-246-4646 After Hours: 262-246-4646 (menu)
Town Clerk/Administrator	James Mueller	608-833-5887
Middleton Town Chairman	Edwin Tallard	608-831-6262
State Patrol	Emergency Administration	911 608-266-3212
Hazardous Material Response Team (DNR) Wisconsin Division of Emergency Mgt.	Leroy Conner	1-800-943-0003 (Menu)
Electric Utility	Madison Gas & Electric Emergency Service	608-252-1111

#### 5.4 MANAGEMENT PLAN

A management plan was formulated to help protect the Unit Well 28 WHPA from existing and potential future sources of contamination. Table 5-1 summarizes major elements of the management plan. Table 5-3 is an implementation schedule for management plan action items.

Public education is an important element in the management plan, particularly because the Unit Well 28 WHPA includes property in the City of Madison and Town of Middleton. Educational activities will provide a mutual benefit to the City of Madison and other property owners located within the WHPA.

The hazardous waste collection/disposal program (Clean Sweep) will also be an important part of the management plan. The program provides a means for residents and businesses in the WHPA and throughout the area to properly dispose of hazardous chemicals. Residents and producers of agricultural crops and commodities can dispose of hazardous materials and wastes free of charge. Small quantities of commercial wastes from small businesses can be disposed of for a nominal fee. The City will promote the Clean Sweep programs using the public education activities summarized in this plan.

Local governmental agencies (City, Township, and County) recognize the need for planning to protect WHPAs. Intergovernmental cooperation is an important part of the plan as agencies work together to consider the needs for WHP during planning and permitting processes. The City will provide Dane County and the Town of Middleton with a copy of the WHPP and maps showing the Unit Well 28 WHPA, the separation distances required between municipal water supply wells and potential contamination sources (Wisconsin Administrative Code, Chapter NR 811.16(4)(d)), and a list of potential contamination sources that can threaten groundwater. The City will encourage County and Town Boards to help protect the WHPA and upgradient recharge areas when evaluating proposed development.

The City of Madison is developing a WHP ordinance and overlay zoning district. The WHP ordinance will help ensure that future potential contamination sources are not located in the Unit Well 28 WHPA.

**TABLE 5-3  
IMPLEMENTATION SCHEDULE  
WHP PROTECTION MANAGEMENT PLAN - UNIT WELL 28  
MADISON, WISCONSIN**

Task Name	01		2002				2003				2004				2005				2006				2007				2008				
	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
<b>MADISON WATER UTILITY</b>																															
1. Send information about Clean Sweep Collection Program to property owners in WHPA.				◆ 5/1																											
2. Request Dane County Environmental Health Department provide names and addresses of owners of private sewage system located in WHPA.			◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1		
3. Send mailing to owners of private sewage disposal systems.																															
			5/1	◆																											
4. Request Dane County Environmental Health Dept. provide names and addresses of owners of private wells located in WHPA.			◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1		
5. Determine the location of other private water supply wells in WHPA.			5/1	◆																											
6. Send private well owners in WHPA, DNR pamphlets about upkeep and proper abandonment.																															
7. Update the private well inventory for wells in the WHPA.																															
8. Request Dane County evaluate proposed private wells in WHPA.				◆ 9/1																											
9. Direct residents to DNR private well code regarding questions.			◆ 5/1																												
			5/1	◆																											
10. Provide WHPA map to MMSD and request that sludge not be spread in 50-year TOT capture zone.			◆ 5/1																												
11. Provide WHPA map to DNR Watershed Management office and request that new permits for sludge and septage spreading not be issued for properties located in 50-year TOT capture zone.			◆ 5/1																												
12. Encourage development of additional septage discharge points in wastewater treatment system.																															
			5/1	◆																											
13. Request DNR and Dane County Emergency Management office inform about spills in WHPA.																															
			5/1	◆																											
14. Monitor status of existing and potential contaminant sources in the WHPA.																															
			5/1	◆																											
15. Update the CSI - perform reconnaissance and database review.			◆ 12/1																												
16. Perform water quality monitoring as required or needed.			12/1	◆																											
17. Communicate availability of the plan through a newspaper article.			◆ 5/1																												
18. Provide newsrelease about WHP project.			◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1		
19. Prepare informational materials - fliers, brochures, and pamphlets.																															
			5/1	◆																											
20. Include WHP information in Consumer Confidence Report.			◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1			◆ 5/1				◆ 5/1				◆ 5/1		
21. Add information to website about WHP planning.																															
			5/1	◆																											



