APPENDIX A

WISCONSIN ADMINISTRATIVE CODE, WELLHEAD PROTECTION PLAN

fuel storage facilities; and pesticide or fertilizer handling or storage facilities.

Note: Sites that have been closed with groundwater enforcement standard exceedances can be found on the Department of Natural Resource's GIS Registry of Closed Remediation Sites, at http://www.dnr.state.wi.us/org/aw/rr on the DNR's internet site. Information that appears on the GIS Registry of Closed Remediation Sites can also be accessed by calling the nearest regional DNR office.

(e) Well sites may be inspected by a representative of the department prior to approval of plans.

(5) WELL HEAD PROTECTION PLAN. A well head protection plan shall be provided for all new wells for municipal water systems. The plan shall be developed by the owner of the municipal water system or its agent. No new municipal well may be placed into service until the department has approved the well head protection plan. The plan shall include but is not limited to:

(a) Identification of the recharge area for the proposed well.

(b) Identification of the zone of influence for the proposed well.

(c) Identification of the groundwater flow direction.

(d) An inventory of existing potential contamination sources within a ½ mile radius of the proposed well and an assessment of existing potential contamination sources within the recharge area of the well, including information obtained by checking the department's geographic information system registry of closed remediation sites and the bureau for remediation and redevelopment's tracking system.

Note: A listing of hazardous substance discharge sites, open and closed, can be found on the Bureau for Remediation and Redevelopment's Tracking System, also referred to as "BRRTS," on the DNR's internet site at http://www.dnr.state.wi.us/org/aw/rr. Sites that have been closed with groundwater enforcement standard exceedances can also be found on the Department of Natural Resource's GIS Registry of Closed Remediation Sites, at http://www.dnr.state.wi.us/org/aw/rr. Information that appears on BRRTS and the GIS Registry of Closed Remediation Sites can also be accessed by calling the nearest regional DNR office.

(e) Establishment of a well head protection area for the proposed well. The well head protection area shall encompass, at a minimum, that portion of the recharge area equivalent to a 5 year time of travel to the well. The well head protection area may be determined by a hydrogeologic investigation.

(f) A public education program for well head protection.

(g) A water conservation program.

(h) A contingency plan for providing safe water and protecting the well from contamination based on the inventory and assessment of potential contamination sources.

(i) A management plan, based upon an assessment of alternatives for addressing potential contamination sources, describing the local ordinances, zoning requirements, monitoring program, and other local initiatives proposed within the well head protection area established in subpar. (e). The management plan shall address maintaining the separation distances established by well siting in sub. (4) (d).

(6) CASING AND LINER PIPE FOR DRILLED WELLS. (a) The protective casing shall be new prime steel pipe produced to and meeting A.S.T.M., A–53 Grades A or B, ASTM A–106; ASTM A589–Type I, Grade A or B, Type II, Grade A; or A.P.I., 5L, 5LX, 5A, 5AX specifications. No previously used or reclaimed pipe may be used.

(b) Each length of casing shall be legibly marked in accordance with the ASTM or API marking specification and with s. NR 812.17 (2) (d). The protective casing shall have the minimum weights and thicknesses given in Table 1 except for the allowable variances outlined in par. (c).

(c) If the protective casing is to be installed without driving, it may have a thickness less than indicated in Table 1 but shall be surrounded by at least 4 inches of grout. It shall have a minimum thickness of 0.312 inches except in the case of 6–inch diameter casing which shall be a minimum of 0.280 inches.

(d) Liner pipe installed to seal off a caving zone shall be new, unused and nonreclaimed steel pipe, but may have a lesser thickness than given in Table 1.

(e) All casings and liners shall have additional thickness and weight if standard thickness is determined by the department to be insufficient to assure reasonable life expectancy or withstand forces to which they may be subjected.

(f) Casing and liner pipe shall be equipped with drive shoe when driven and centering guides when set.

(g) Casing and liners shall be assembled watertight by means of joints welded in accordance with the standard welding procedure specifications of s. NR 812.18 or by threaded couplings meeting or equivalent to the specifications listed in par. (a).

(h) For wells in which the protective casing is suspended, the upper terminus of the protective casing shall be securely attached by welding steel bands to the outer casing or by other approved methods, and the grout shall be supported on a steel ring or approved packer attached to the bottom of the casing. The bottom of the casing may be flared out to meet this requirement.

(i) Copies of the forgoing specifications and standards are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the American Society for Testing and Material, 1916 Race St., Philadelphia, Pennsylvania 19103, and the American Petroleum Institute, Production Department, 211 N. Ervay, Suite 1700, Dallas, Texas 75201.

Table 1

STEEL PIPE

SIZE (inches)	DIAMETER (inches)		THICKNESS (inches)	WEIGHT PER FOOT (pounds)	
	External	Internal		Plain Ends (calculated)	With Threads and Couplings (nominal)
6 id.	6.625	6.065	0.280	18.97	19.18
8	8.625	7.981	0.322	28.55	29.35
10	10.750	10.020	0.365	40.48	41.85
12	12.750	12.000	0.375	49.56	51.15
14 od.	14.000	13.250	0.375	54.57	57.00
16	16.000	15.250	0.375	62.58	65.30
18	18.000	17.250	0.375	70.59	73.00
20	20.000	19.250	0.375	78.60	81.00
22	22.000	21.000	0.500	114.81	
24	24.000	23.000	0.500	125.49	
26	26.000	25.000	0.500	136.17	
28	28.000	27.000	0.500	146.85	

The Wisconsin Administrative Code, Chapter NR 811, Section 16(5) states:

(5) Wellhead Protection Plan. A wellhead protection plan shall be provided for all new wells for municipal water systems. The plan shall be developed by the owner of the municipal water system or its agent. No new municipal well may be placed into service until the department has approved the wellhead protection plan. The plan shall include but is not limited to:

(a) Identification of the recharge area for the proposed well.
(b) Identification of the zone of influence for the proposed well.
(c) Identification of the groundwater flow direction.
(d) An inventory of existing potential contamination sources within a ½ mile radius of the proposed well and an assessment of existing potential contamination sources within the recharge area of the well.
(e) Establishment of a wellhead protection area for the proposed well. The wellhead protection area shall encompass, at a minimum, that portion of the recharge area equivalent to a 5 year time of travel to the well. The wellhead protection area may be determined by a hydrogeologic investigation.
(f) A public education program for wellhead protection.
(g) A water conservation program.
(h) A contingency plan for providing safe water and protecting the well from contamination based on the inventory and assessment of potential contamination sources.
(i) A management plan, based upon an assessment of alternatives for addressing potential contamination sources, describing the local ordinances, zoning requirements, monitoring program, and other local initiatives proposed within the wellhead protection area established in subpar.(e). The management plan shall address maintaining the separation distances established by well siting in sub.(4)(d).

APPENDIX B

SURVEY PLAT - UNIT WELL 29

PLAT OF SURVEY

BEING PART OF LOT 1 & 2 OF THE PLAT OF GLACIER HEIGHTS, ALSO BEING A PART OF OUTLOT 15 OF THE PLAT OF PRENTICE PRAIRIE, LYING IN THE SOUTHEAST 1/4 OF THE SOUTHWEST 1/4 AND THE SOUTHWEST 1/4 OF THE SOUTHEAST 1/4 OF SECTION 34, TOWNSHIP 08 NORTH, RANGE 10 EAST, CITY OF MADISON, DANE COUNTY, WISCONSIN.

Legal Description

Beginning at a one inch iron pipe marking the southwest corner of Lot 1 of the plat of Glacier Heights; thence northerly, 83.03 feet along the arc of a curve concave to the northwest, having a radius of 476.00 feet and whose long chord bears N 23°34'59" E, 82.92 feet (recorded as N 23°34'59" E, 82.84 feet) to a two inch iron pipe found; thence S 88°32'53" E, 143.88 feet along a northerly line of said Lot 1 (recorded as S 88°36'22" E, 143.93 feet) to a two inch iron pipe found; thence N 80°10'57" E, 43.04 feet along a northerly line of said Lot 1 (recorded as N 80°14'21" E, 42.97 feet) to a one inch iron pipe found at the northeast corner of said Lot 1; thence S 22°33'03" W, 87.36 feet along the easterly line of said Lot 1 (recorded as S 22°29'40" W, 87.24 feet) to a one inch iron pipe found at the southwest corner of Lot 6 of the plat of Glacier Heights; thence S 22°33'03" W, 64.39 feet along the easterly line of said Lot 1 (recorded as S 22°29'40" W, 64.51 feet) to a one inch iron pipe found at the southeast corner of said Lot 1; thence S 22°30'35" W, 44.20 feet along the easterly line of Lot 2 of the plat of Glacier Heights (recorded as S 22°29'40" W, 44.20 feet) to the easterly corner of said Lot 2, also being the northeast corner of Lot 3 of said plat of Glacier Heights; thence S 65°43'48" W, 123.55 feet along the southerly line of said Lot 2 (recorded as S 65°44'09" W, 123.53 feet) to a one inch iron pipe found; thence northwesterly, 97.61 feet along a westerly line of said Lot 2 and the arc of a curve concave to the west, having a radius of 183.00 feet, whose long chord bears N 28°34'10" W, 96.46 feet (recorded as N 28°36'15" W, 96.50 feet) to a two inch iron pipe found; thence northerly, 40.27 feet along a westerly line of said Lot 2 and the arc of a curve curve concave to the east having a radius of 30.00 feet, whose long chord bears N 05°45'36" W, 37.61 feet (recorded as N 05°32'09" W, 37.23 feet) to a two inch iron pipe found; thence northerly, 35.30 feet along the arc of a curve concave to the northwest having a radius of 476.00 feet, whose long chord bears N 30°58'04" E, 35.29 feet (recorded as N 30°41'51" E, 35.26 feet) to the point of beginning. PLAT OF PRENTICE PRAIRIE

Said parcel contains 34,843 square feet, more or less.

Subject to all other easements and restrictions of record.

I hereby certify that I have surveyed the above described property as shown according to the official records and that this plat of survey is a correct representation of said survey, to the best of my knowledge and belief.

Terrance L. Genske, RLS-1443 — 5/15/02 Dated
Agent for Strond Associates, Inc.

Surveyed for:
City of Madison
Water Utility
523 E. Main Street
Madison, WI 53703

Surveyed by:
Strand Associates, Inc.
910 W. Wingra Drive
Madison, WI 53715
(608)251-4843

Revised 7/05/02

CITY OF MADISON MONUMENT AT CENTER OF SECTION 34-08-10

SITE COORDINATES (ASSUMED)		
POINT NO.	COORDINATES N	E
1002	10079.690	10219.418
441	9999.005	10185.913
20	9939.519	10161.262
102	9847.903	10031.709
281	9932.615	9985.581
280	9969.739	9981.836
101	10000.000	10000.000
279	10075.997	10033.172
276	10072.352	10177.010

Note: Easements shown on Lots 1 and 2 are from the Plat of Glacier Heights. Other easements may be present.
Note: Lots 1 and 2 were dedicated to the public on the Plat of Glacier Heights.
Note: The location of existing utilities, both underground and overhead are approximate only and have not been independently verified by the owner or its representatives. They were marked by representatives of the utilities. There may be more underground utility installations within the project area that are not shown.

CALL DIGGERS HOTLINE TO OBTAIN LOCATION OF PARTICIPANTS' BURIED FACILITIES BEFORE YOU DIG

METRO 414-344-5111
OUTSIDE METRO AREA 800-242-8511, 800-338-3860 (FAX), 800-542-2289 (TDD) (FOR HEARING IMPAIRED)

WISCONSIN STATUTE 182.0175 REQUIRES MINIMUM OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

PROJECT BENCHMARK IS LOCATED IN THE NORTHEAST QUADRANT OF NORTH THOMPSON DR. AND MESTA LANE. TOP NUT OF FIRE HYDRANT - ELV. 94.28 CITY OF MADISON DATUM

ALL BEARINGS REFERENCED TO THE PLAT OF GLACIER HEIGHTS - SOUTH LINE OF LOT 1 BEARS N69°26'30"W.

0 FEET 40 80

LEGEND

- EXISTING BUILDINGS
- POWER POLE
- SOIL BORING
- 1" OUTSIDE DIAMETER IRON PIPE FOUND
- 2" OUTSIDE DIAMETER IRON PIPE FOUND
- 3/4" X 18" REBAR SET
- UTILITY EASEMENT
- ( ) "RECORDED AS"
- LOT LINE
- UTILITY PEDESTAL
- UNDERGROUND ELECTRIC
- FIBER OPTIC CABLE
- BURIED TELEPHONE
- BURIED CABLE TV
- BURIED GAS MAIN
- STORM SEWER
- SANITARY SEWER
- WATERMAIN

CURVE DATA TABLE

CURVE NO.	CHORD LENGTH	CHORD BEARING	RADIUS LENGTH	ARC LENGTH
5-6	82.92' (82.84')	N23°34'59"E (N23°34'59"E)	476.00' (476.00')	83.03' (82.94')
2-3	96.46' (96.50')	N28°34'10"W (N28°36'15"W)	183.00' (183.00)	97.61' (97.66')
3-4	37.31' (37.23')	N05°45'36"W (N05°32'09"W)	30.00' (30.00')	40.27' (40.17')
4-5	35.29' (35.26')	N30°58'04"E (N30°41'51"E	476.00' (476.00')	35.30' (35.30')

RECORD DRAWING
BY:
DATE:
CONTRACTOR:
CONSTRUCTED:
NOTE:

NO.	REVISION	BY	DATE

DATE: MAY 2002
DES BY: TLG
DWN BY: MLQ
PRINTED:
CHK BY: TLG
APP BY: TLG

PLAT OF SURVEY
WELL No. 29
MADISON, WISCONSIN

STRAND ASSOCIATES, INC. ENGINEERS

DRAWING NO.

FILE NAME: s:\eSol\001--050\020\016\Micros\FINALplat-of-survey.dgn ORIGINATOR : PLOT DATE : 07/05/2002 PLOT SCALE : TIME: 09:42:15 AM SHEET OF

APPENDIX C

UNIT WELL 29 AND TEST WELL 29 CONSTRUCTION REPORTS

Well Construction Report

WISCONSIN UNIQUE WELL NUMBER RG 653

State of WI - Private Water Systems-DG/2
Department of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A (R 12/00)

Property Owner: Madison, City of	Telephone Number: (608) 266-4653
Mailing Address: 523 East Main St.	
City: Madison	State: WI Zip Code: 53703
County of Well Location: Dane	Co. Well permit No. W____
Well Completion Date (mm-dd-yyyy): 10 - 30 - 2003	
Well Constructor (Business Name): Municipal Well & Pump	License #: WD013
Address: 1212 Stoxbeck Dr.	
City: Waunon State: WI Zip Code: 53963	
Hicap Permanent Well #: _____	Common Well #: 029
Facility ID Number (Public Wells): 113022470	
Public Well Plan Approval #: W-2000 1127	
Date of Approval (mm/dd/yyyy): 01 / 29 / 2001	
Specific Capacity: 138 gpm/ft	
High Capacity: Well? [X] Yes [ ] No; Property? [X] Yes [ ] No	

1. Well Location

[ ] Town [X] City [ ] Village of Madison — Fire # (If avail.)

Street Address or Road Name and Number: 829 N. Thompson Dr.

Subdivision Name | Lot # | Block #

Gov't Lot # ____ or SE 1/4 of SW 1/4 of Section 34, T 8 N; R 10 [X] E [ ] W

Latitude Deg. ____ Min. ____ Sec. ____

Longitude Deg. ____ Min. ____ Sec. ____

2. Well Type [X] New [ ] Replacement [ ] Reconstruction (see item 12 below)

Lat/Long Method: _____

of previous unique well # _____ constructed in _____

Reason for replaced or reconstructed well? _____

[X] Drilled [ ] Driven Point [ ] Jetted [ ] Other _____

3. Well serves _____ # of homes and or City
(Eg: barn, restaurant, church, school, industry, etc.)

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties? [X] Yes [ ] No (If no, explain on back side)

Well located in floodplain? [ ] Yes [ ] No

Distance in feet from well to nearest: (include proposed)

____ 1. Landfill
____ 2. Building Overhang
____ 3. Septic [ ] Holding Tank [ ]
____ 4. Sewage Absorption Unit
____ 5. Nonconforming Pit
____ 6. Buried Home Heating Oil Tank
____ 7. Buried Petroleum Tank
____ 8. Shoreline [ ] Swimming Pool [ ]
____ 9. Downspout/Yard Hydrant
____ 10. Privy
____ 11. Foundation Drain to Clearwater
____ 12. Foundation Drain to Sewer
____ 13. Building Drain [ ] Cast Iron or Plastic [ ] Other
____ 14. Building Sewer [ ] Gravity [ ] Pressure [ ] Cast Iron or Plastic [ ] Other
140' 15. Collector Sewer: ___ units 2 in. diam.
____ 16. Clearwater Sump
____ 17. Wastewater Sump
____ 18. Paved Animal Barn Pen
____ 19. Animal Yard or Shelter
____ 20. Silo
____ 21. Barn Gutter
____ 22. Manure Pipe [ ] Gravity [ ] Pressure [ ] Cast Iron or Plastic [ ] Other
____ 23. Other Manure Storage _____
____ 24. Ditch
60' 25. Other NR 812 Waste Source Storm Sewer

Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft.)	To (ft.)
42	surface	40
35	40	342
29	342	599
24	590	615

Upper Enlarged Drillhole / Lower Open Bedrock

[ ] 1. Rotary - Mud Circulation
[ ] 2. Rotary - Air
[ ] 3. Rotary - Air and Foam
[ ] 4. Drill-Through Casing Hammer
[X] 5. Reverse Rotary
[ ] 6. Cable-tool Bit ____ in. dia.
[ ] 7. Temp. Outer Casing ____ in. dia. Removed? ____ depth ft.
[ ] Yes [ ] No - If no, explain on back side.

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification & Manufacturer & Method of Assembly	From (ft.)	To (ft.)
36	0.500" wall ASTM A53-B S.E. and beveled, w/c steel casing, 189.57#/ft.	surface	40
30	0.500" wall ASTM A53-B S.E. beveled, w/c. steel casing, 157.33#/Ft.		
Dia. (in.)	Screen type, material & slot size	From	To

7. Grout or Other Sealing Material

Method pressure grout

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
Neat Cement (wet pack if applicable)	surface	342	890

Geology

Geology Codes	8. Geology Type, Caving/Noncaving, Color, Hardness.	From (ft.)	To (ft.)
	Top soil, clay w/sand	surface	25
	Sand stone, yello	25	250
	Shale bl/grn & red	250	295
	Sandy yellow limestone	295	300
	Sandstone	300	792
	Gray siltstone	792	912
	blk/red granite	912	915

9. Static Water Level

____ ft. above ground surface
116 ft. below ground surface

10. Pump Test

Pumping level 275 ft. below surface
Pumping at 2200 GPM/GPH for 24 Hrs.

11. Well Is:

[X] Above Grade
24 in. [ ] Below
Developed? [X] Yes [ ] No
Disinfected? [X] Yes [ ] No
Capped? [X] Yes [ ] No

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
[X] Yes [ ] No If no, explain

13. Signature of Well Constructor or Supervisory Driller: [signature] Date Signed 11/25/03

Signature of Drill Rig Operator (Mandatory unless same as above): [signature] Date Signed 11/26/03

Make additional comments on reverse side about geology, additional screens, water quality, etc.
Comments on reverse side ____ (CHECK √, IF YES) Variance Issued [ ] Yes [ ] No

Well Construction Report

WISCONSIN UNIQUE WELL NUMBER **MZ702**

State of Wi-Private Water Systems-DG/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 12/00)

Property Owner: MADISON, CITY OF
Telephone Number: 608 – 261 – 9243
Mailing Address: 523 E MAIN ST
City: MADISON
State: WI
Zip Code: 53703
County of Well Location: 13 DANE
Co Well Permit No W:
Well Completion Date: May 1, 2000

Well Constructor: MUNICIPAL WELL &
License #: 13
Address: 20950 ENTERPRISE AVE
City: BROOKFIELD
State: WI
Zip Code: 53045
Hicap Permanent Well #:
Common Well #:
Facility ID (Public):
Public Well Plan Approval#:
Date Of Approval:
Specific Capacity: 100 gpm/ft

Depth 435 FT

1. Well Location
C of MADISON (T=Town C=City V=Village)
Fire#:
Street Address or Road Name and Number: MESTA & THOMPSON
Subdivision Name: 829 N THOMPSON
Lot#:
Block #:
Gov't Lot
Section 34 T 8 N R 10 E or SW 1/4 of SE 1/4 of
Latitude Deg. Min. Sec.
Longitude Deg Min. Sec.

2. Well Type 1 (1=New 2=Replacement 3=Reconstruction)
(See item 12 below)
of previous unique well # _____ constructed in _____
Reason for replaced or reconstructed Well?

Lat/Long Method

1 (1=Drilled 2=Driven Point 3=Jetted 4=Other)

3. Well Serves MT (M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole) # of homes and or TEST WELL (eg: barn, restaurant, church, school, industry, etc.)

High Capacity: Well? Y Property? Y

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties? Y

Well located in floodplain? N

Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in . diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
10.0	surface	39
8.0	39	435

Upper Enlarged Drillhole / Lower Open Bedrock
X -- 1. Rotary - Mud Circulation
-- 2. Rotary - Air
-- 3. Rotary - Air and Foam
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
-- 6. Cable-tool Bit _____ in. dia
-- 7. Temp. Outer Casing _____ in. dia. _____ depth ft. Removed ?
Other

6. Casing Liner Screen Material, Weight, Specification Manufacturer & Method of Assembly

Dia. (in.)		From (ft.)	To (ft.)
8.0	SCH .40 TEMPORARY USED CASING	surface	39
Dia.(in.)	Screen type, material & slot size	From	To

7. Grout or Other Sealing Material

Method / Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
TEST WELL (TEMPORARY)	surface		

8. Geology Type, Caving/Noncaving, Color, Hardness, etc

Geology Codes		From (ft.)	To (ft.)
K-I-	BLACK TOP SOIL	Surface	5
--G-	GRAVEL (PEA SIZE)	5	9
G-Z-	GREY CLAY W/GRAVEL	9	28
--N-	SANDSTONE	28	435

9. Static Water Level
103.0 feet B ground surface (A=Above B=Below)

10. Pump Test
Pumping level 106.0 ft. below surface
Pumping at 300.0 GP M 24.0 Hrs

11. Well Is: A Grade
18 in. (A=Above B=Below)
Developed? Y
Disinfected? Y
Capped? Y

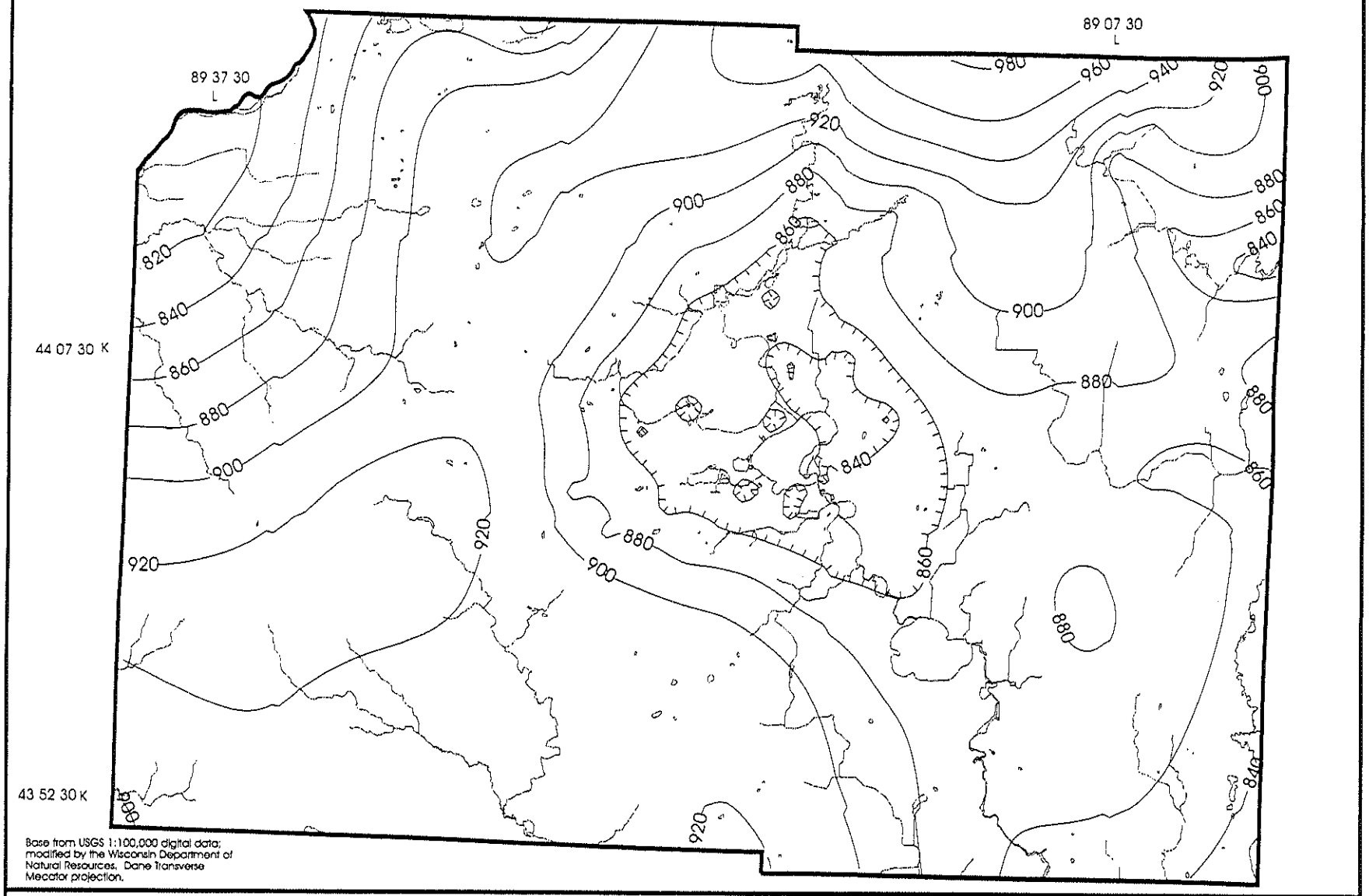
12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property? Y
If no, explain

13. Initials of Well Constructor or Supervisory Driller: TG Date Signed: 6/8/00
Initials of Drill Rig Operator (Mandatory unless same as above): RW Date Signed: 6/8/00

Additional Comments?
Owner Sent Label? Y
Variance Issued?
More Geology?

APPENDIX D

POTENTIOMETRIC SURFACE - LOWER BEDROCK (MOUNT SIMON) AQUIFER AND AREAS OF RECHARGE AND DISCHARGE



Measured Altitude of the Potentiometric Surface of the Mt. Simon Aquifer Dane County, Wisconsin

Explanation

— 900 — Measured potentiometric contour. Contour interval 20 feet. Datum is sea level.

N

0 5

1" = 5 miles

Source: Wisconsin Geological and Natural History Survey, 1999.

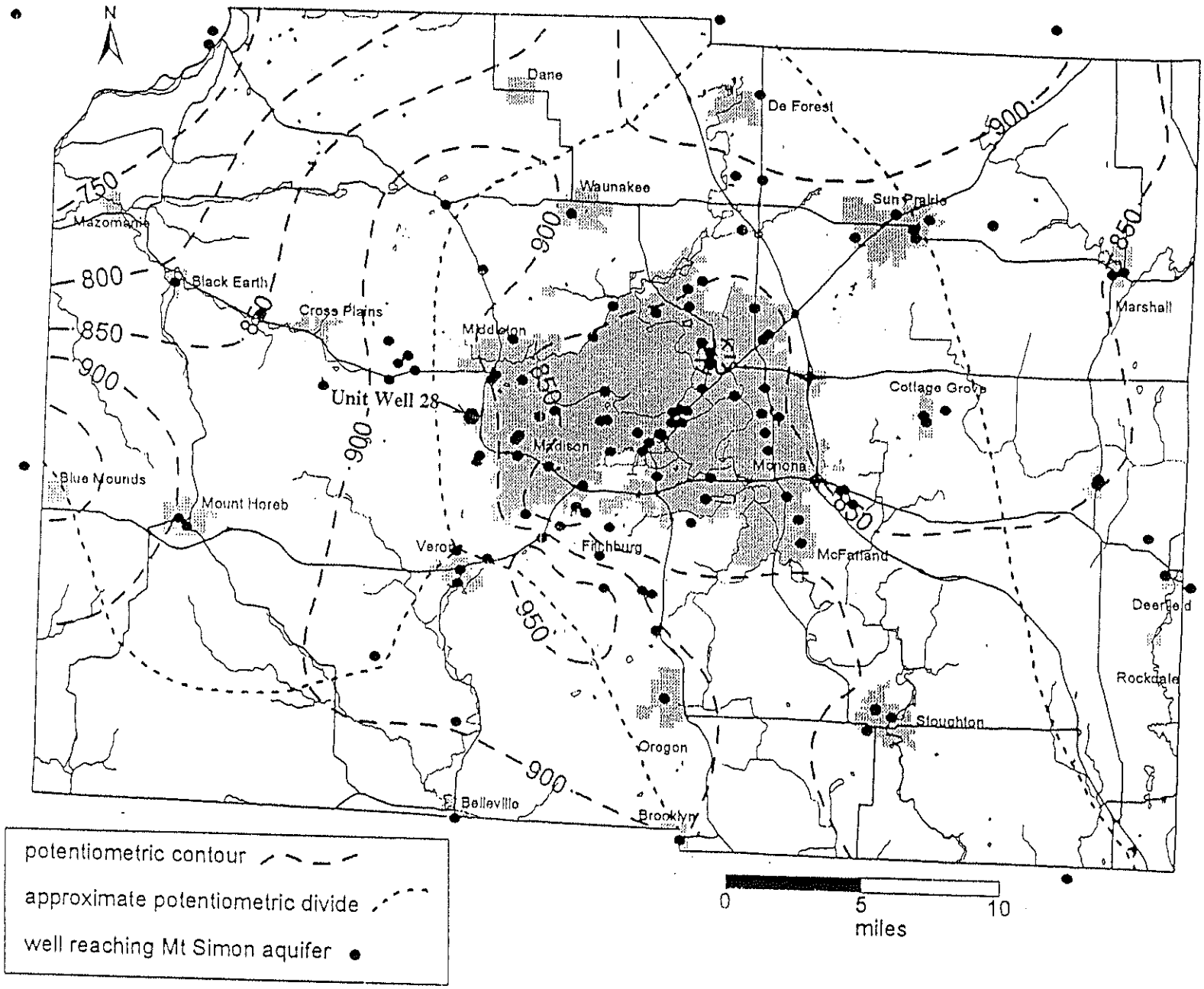
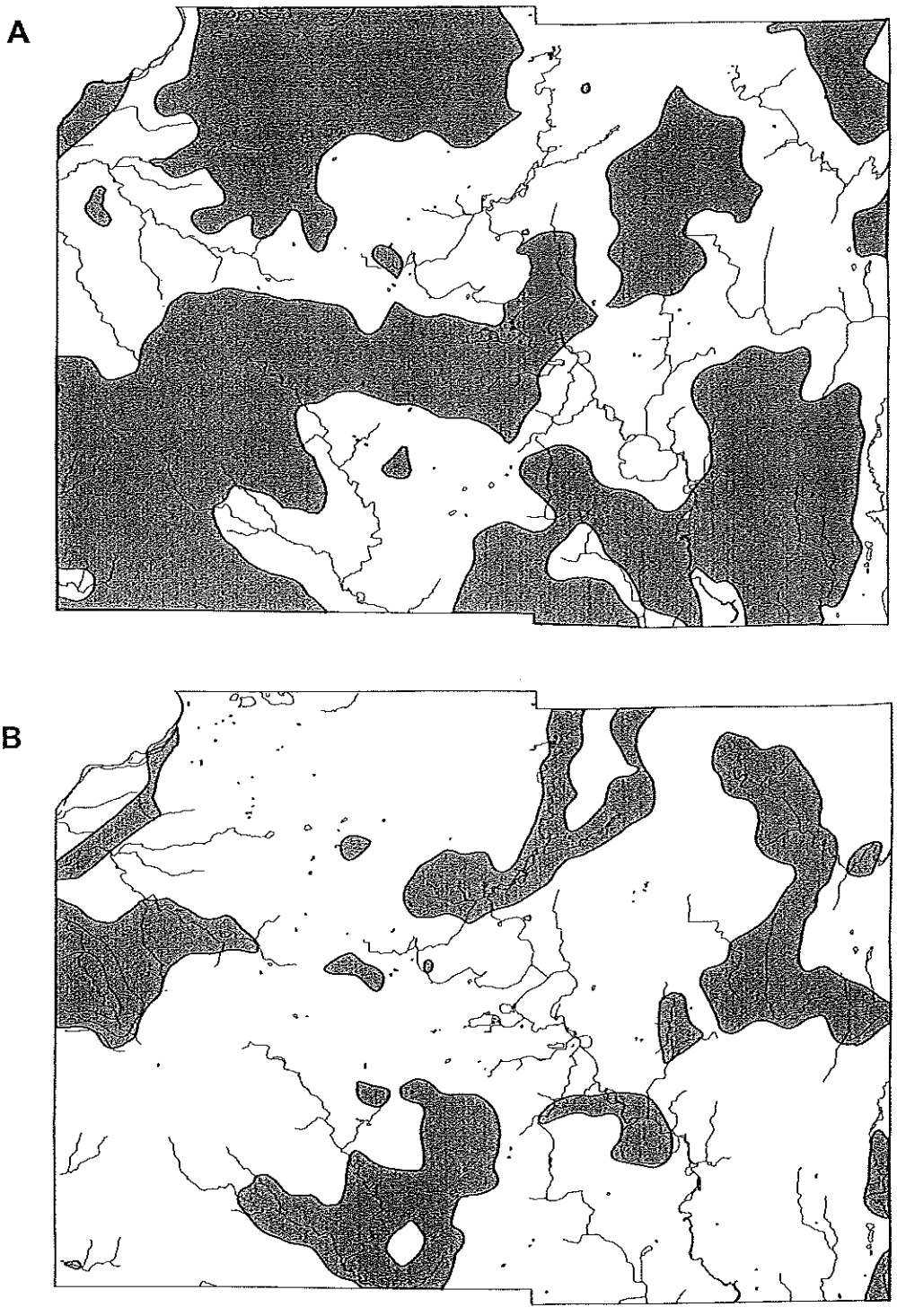


Figure 9. Potentiometric surface of the Mt Simon aquifer, 1995.

Source: Bradbury et. al., 1999

MAP 7



Areas of Recharge to and Discharge from the Mt. Simon Aquifer* Dane County, Wisconsin

A: areas of recharge

B: areas of discharge

0 miles 9

N

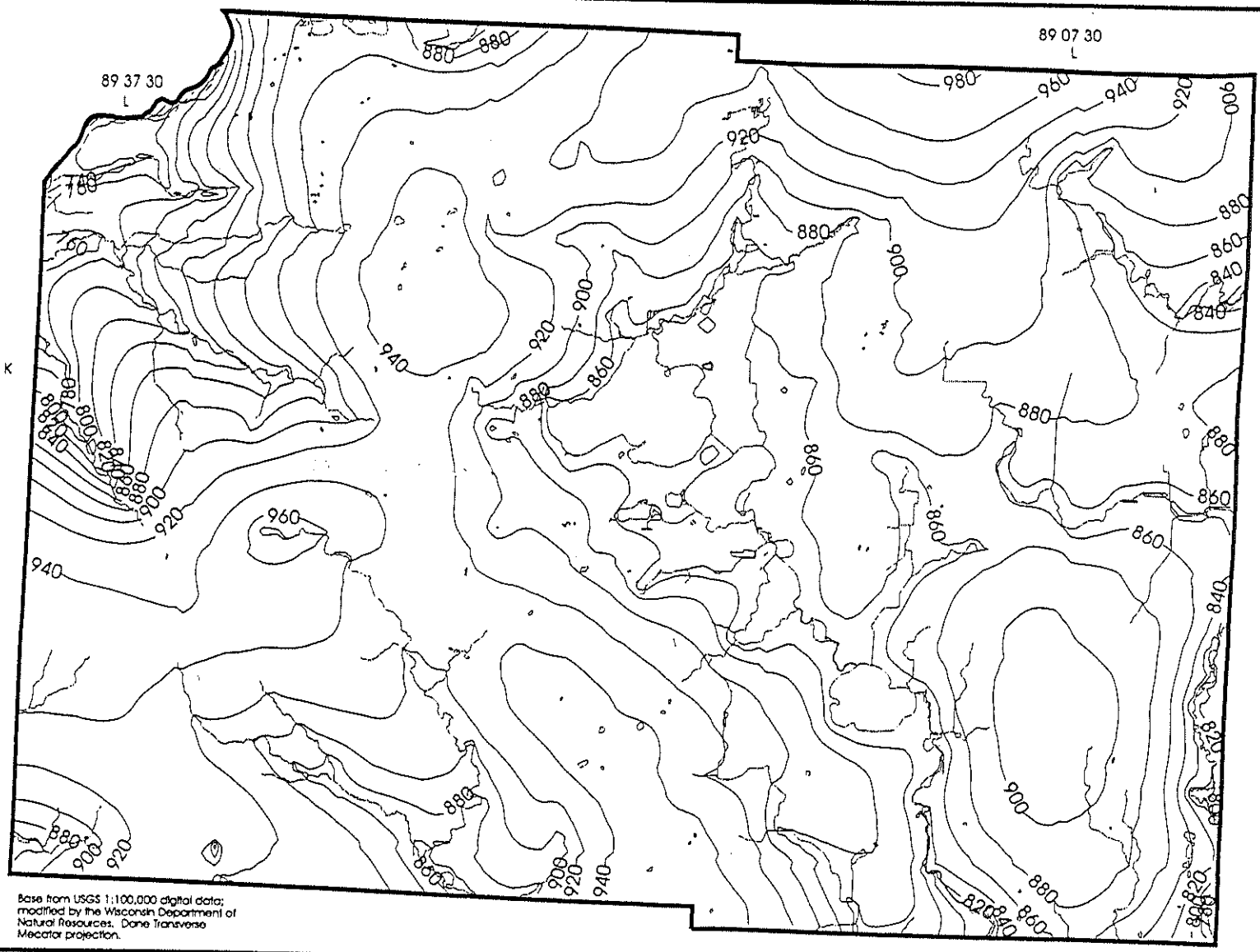
*Based on measured water levels

Source: *Hydrogeology of Dane County*, Bradbury, et. al., 1999.

APPENDIX E

POTENTIOMETRIC SURFACE - WATER TABLE ELEVATION

MAP 4



Measured Altitude of the Water Table Level
Dane County, Wisconsin

— 900 — Measured water-table contour. Contour interval 20 feet. Datum is sea level.

N

0 5

1" = 5 miles

Source: DCRPC, 1999

Source: Wisconsin Geological and Natural History Survey, 1999.

APPENDIX F

DISTANCE-DRAWDOWN CALCULATION
(ZONE OF INFLUENCE)

Appendix F - Well Hydraulic Calculations

I. Specific Capacity Calculations

$$\frac{Q}{s} = \frac{T}{114.6 \times W(u)} \qquad u = \frac{1.87 r^2 S}{Tt}$$

Q = 2200 gpm
T = 17,082 gpd/ft
r = distance from well
S = 0.0004
Q/s = 13.75 gpm/ft
W(u) = Value corresponding to "u" value in Appendix 9.E of Groundwater and Wells

II. Drawdown at Various Distances (after 1 day and 30 days)

$$u = \frac{1.87 r^2 S}{Tt} \qquad s = \frac{114.6 \times Q \times W(u)}{T}$$

Time, t = 30 days

Radius, r (ft)	u	W(u)	Drawdown, s (ft)
500	3.65E-04	7.35	41.67
1000	1.46E-03	6.01	34.10
1500	3.28E-03	5.15	29.21
2000	5.84E-03	4.57	25.92
2500	9.12E-03	4.13	23.41
5280	4.07E-02	2.68	15.22

Time, t = 1 day

Radius, r (ft)	u	W(u)	Drawdown, s (ft)
500	1.09E-02	3.97	22.54
1000	4.38E-02	2.60	14.75
1500	9.85E-02	1.83	10.40
2000	1.75E-01	1.37	7.76
2500	2.74E-01	0.99	5.62
5280	1.22E+00	0.18	1.03

III. Radius of Cone of Depression

Calculation based on a drawdown of 1 ft after 30 days of continuous operation.

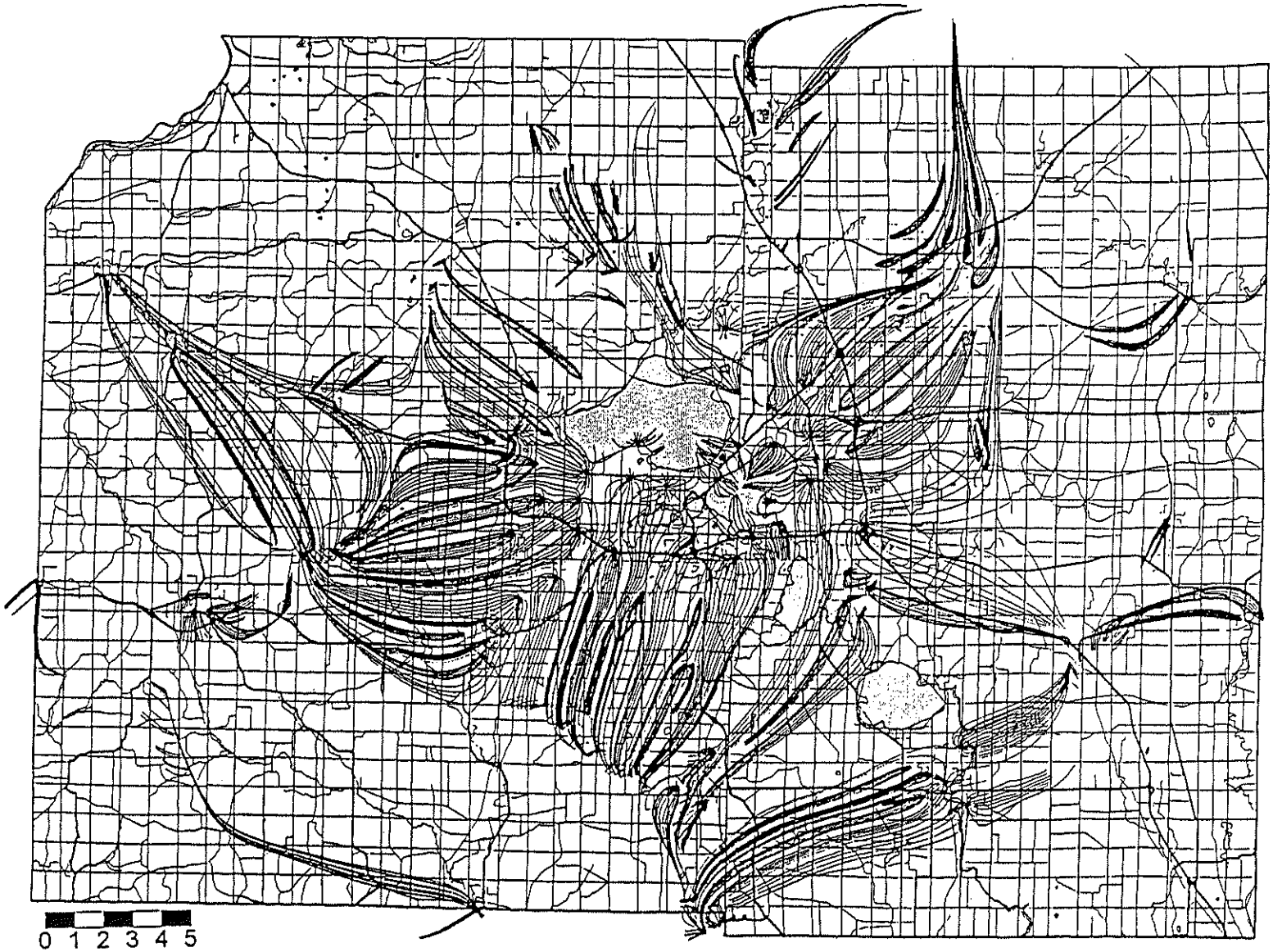
$$u = \frac{1.87r^2S}{Tt} \qquad \Rightarrow \text{upon rearrangement} \Rightarrow \qquad r = \sqrt{\frac{uTt}{1.87S}}$$

$$r = \sqrt{\frac{1.89x17082 \times 30}{1.87 \times 0.0004}} = \underline{\underline{6.82mi}}$$

APPENDIX G

ZOCS FOR MUNICIPAL WELLS IN DANE COUNTY

Fig. 2
Ultimate Zones of Contribution for Municipalities in Dane County, WI.



Source: Bradbury, 1998

APPENDIX H

CONTAMINANT SOURCE INVENTORY

STRAND ASSOCIATES, INC.®
ENGINEERS

☐ Information Only

☒ Project Specific 1-020-019

☐ Policy Memo - File With

MEMORANDUM

TO: Files
FROM: Ann-Perry Witmer
DATE: November 14, 2003
RE: Contamination Source Inventory
Unit Well 29 – Wellhead Protection Planning
City of Madison, Wisconsin

Following are the results of a contamination source inventory (CSI) performed for the area surrounding Unit Well 29. Figure 1 shows the location of Unit Well 29. The CSI included a windshield survey, a review of government records, risk and activity maps (DCRPC, 1999), and interviews with local regulatory personnel. The results of the CSI are summarized in Table 1.

WINDSHIELD SURVEY

A windshield survey of the study area was conducted on March 24, 2003. Potential sources of contamination identified during the windshield survey and during the review of government records are summarized in Table 1 and are shown on Figure 1.

The nearest private sewage disposal system is located outside the WHPA.

The nearest private water supply well is located approximately 1,400 feet east of Unit Well 29.

There are two stormwater detention basins: one is 1,100 feet southeast of the site and the other is 1,300 feet northeast of Unit Well 29.

The nearest sanitary sewer main not constructed of water main materials is located within 200 feet of the well, and existing storm sewer mains are located a little more than 50 feet from Unit Well 29.

On the basis of the site reconnaissance and a review of the Wisconsin registered storage tank list, the nearest USTs are reported to be located at the convenience store and adjacent oil change facility located 1,400 feet south of Unit Well 29. The nearest reported leaking underground storage tank was identified as being located at the City of Madison East Side Public Works facility approximately one-half mile west of Unit Well 29. DNR records indicate the tank's status is closed since 1998.

On the basis of site reconnaissance and a review of the Wisconsin registered storage tank list, no above-ground storage tanks could be located within the WHPA.

No dry-cleaning business is located in the vicinity of the Unit Well 29 WHPA.

There are no golf courses located within the Unit Well 29 WHPA.

A former sanitary landfill is located on the site of Sycamore Park, approximately 1,500 feet northwest of Unit Well 29.

No cemetery is located in the vicinity of the Unit Well 29 WHP area.

Agricultural land is located 1,700 feet east of the site.

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 29.

GOVERNMENT DATABASE REVIEW AND INTERVIEWS WITH REGULATORY PERSONNEL

A review of government records (lists) was performed of the latest available information pertaining to existing and potential contamination sources within a half-mile radius of Unit Well 29. Where necessary, regulatory personnel were interviewed. Databases reviewed and agencies contacted include:

Wisconsin DNR Bureau for Remediation and Redevelopment Web-based database

Department of Commerce Underground Storage Tank/Aboveground Storage Tank Registration

DNR Facility's Approved Sites Report for septage application sites

DNR Bureau for Remediation and Redevelopment Registry of Waste Disposal Sites in Wisconsin

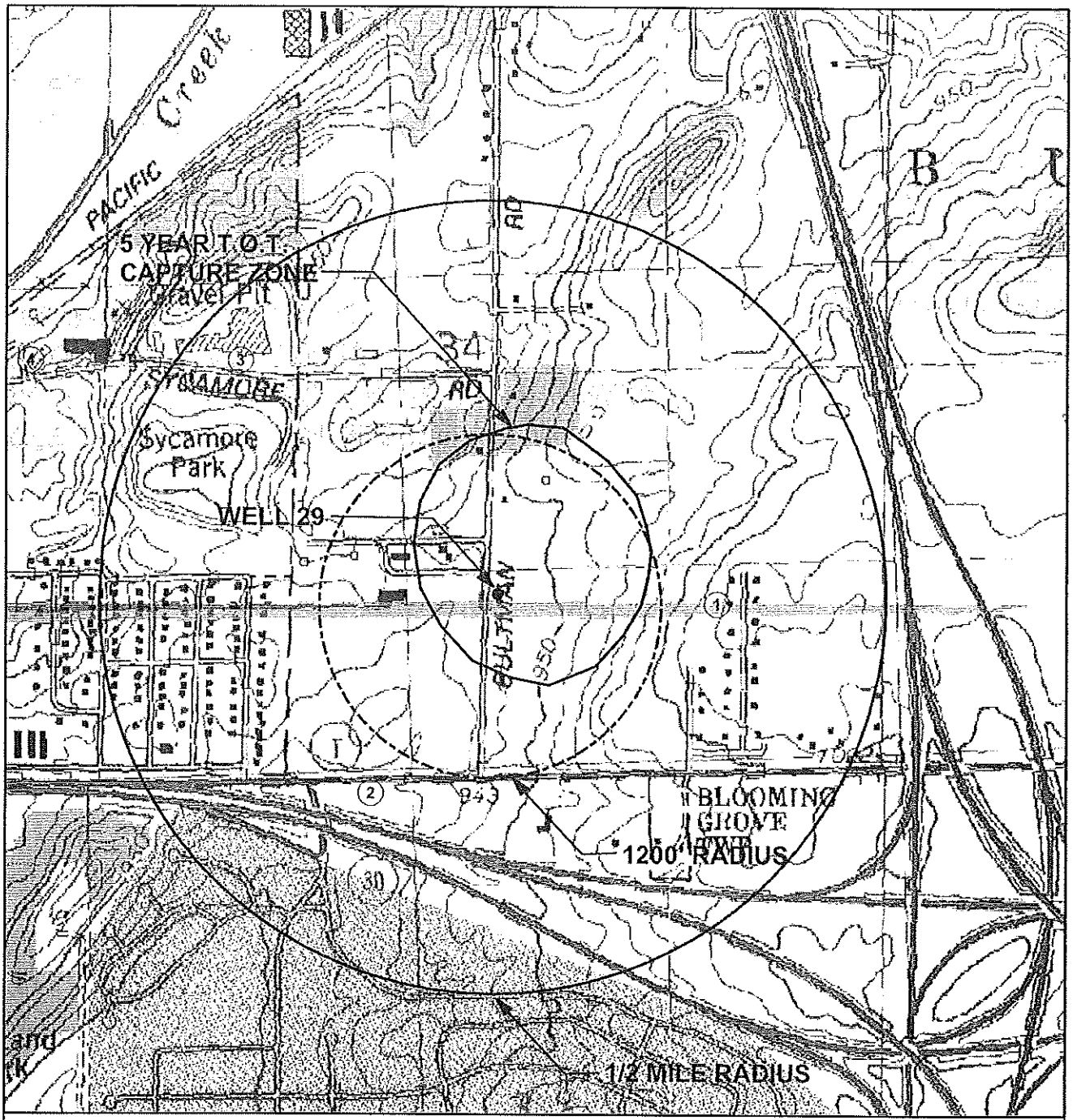
U.S. EPA Envirofacts Data Warehouse Web site

U.S. EPA Enviromapper Web site tool

Dane County Groundwater Protection Plan, Appendix G of the Dane County Water Quality Plan, Dane County Regional Planning Commission, Madison, WI, 1999.

Microfiche records of solid waste disposal sites located within the Unit Well 29 WHP area

Dane County Human Services Department, Division of Public Health



DANE COUNTY

INDEX MAP

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

T.O.T. = TIME OF TRAVEL

(3) POTENTIAL CONTAMINANT SOURCE OR ROUTE

SCALE 1 : 12,000

0 500 1,000 2,000 3,000 4,000 Feet

STRAND ASSOCIATES, INC.® ENGINEERS

FIGURE 1
CONTAMINANT SOURCE INVENTORY
UNIT WELL 29

MADISON, WISCONSIN

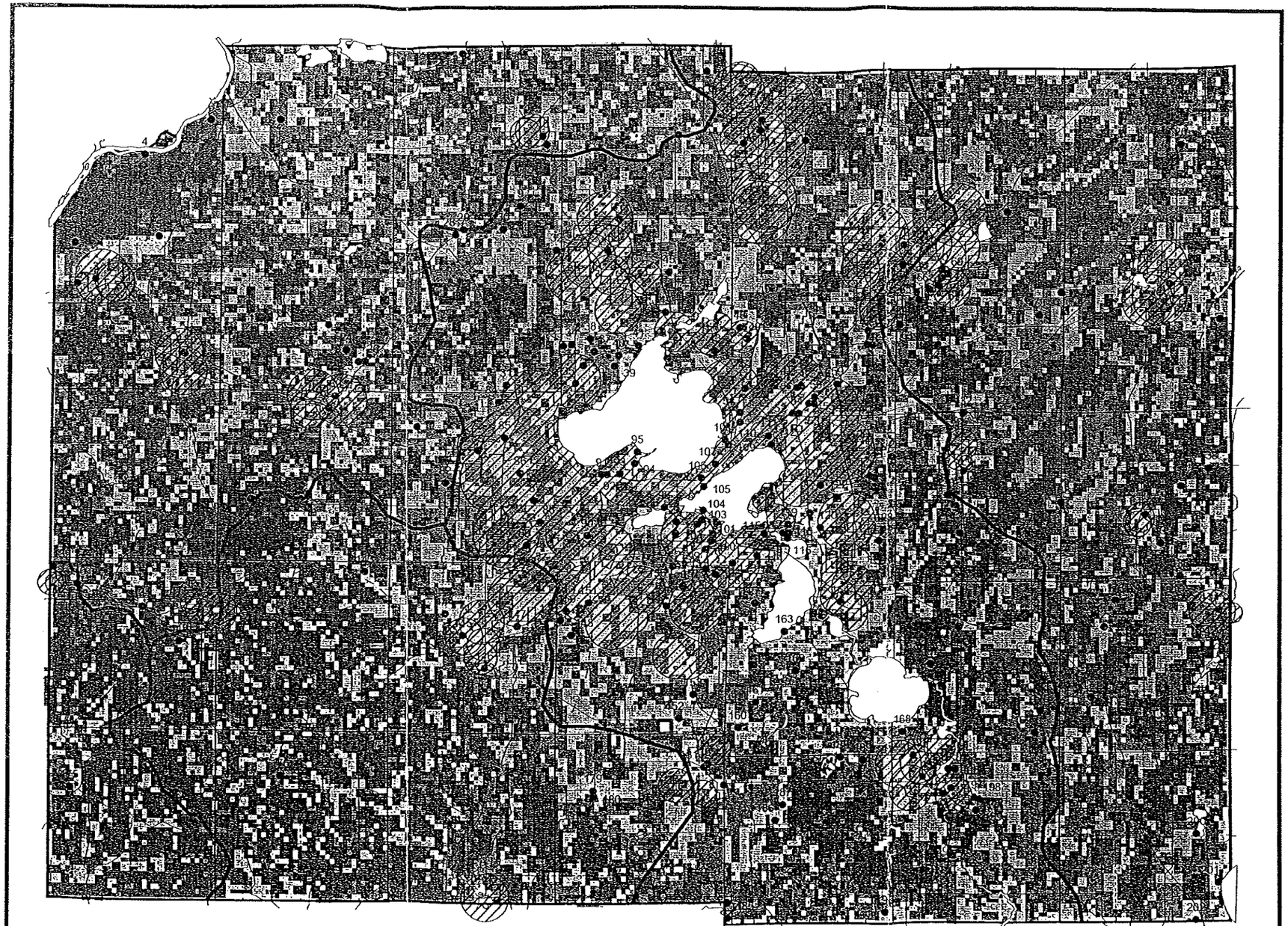
APRIL 2003

Map Site No.	Owner/Location	Existing, Potential, or Former Contaminant Sources
1	Mark Kuhn 4801 Vernon Road Madison, WI	Underground storage tank
2	Francois Oil-Citgo Quik-Mart 4905 Commercial Ave. Madison, WI	
3	City of Madison 4602 Sycamore Ave. Madison, WI	Underground storage tank aboveground storage tank leaking underground storage tank closed municipal landfill
4	Samuels Recycling 4400 Sycamore Ave. Madison, WI	

APPENDIX I

SOLID WASTE STORAGE SITES IN DANE COUNTY

MAP 23



Source: DCRPC, 1999

Appendix C

Solid Waste Disposal Sites in Dane County

DCRPC: 1993a

Map No.	Site Name	Township	Section	Years of Operation	Type of Waste[1]	DNR ID No.[2]	Source of Information[3]
1	T. Mazomanie	Mazomanie	SE SE 6	1949-1971	W,T,G	—	DCRPC Dane Co. Solid Waste Plan
2	V. Mazomanie	Mazomanie	SE NE 18	?	W	Post-Reg.	DNR County Files Bureau
3	Wick Bldg. Systems	Mazomanie	NE NE 17	1967-1973	W, D	480 Temp.	DNR Licensing Log 1970
4	August Shemanek*	Mazomanie	SW 22	?	U	Post-Reg.	DNR County Files Bureau
5	Mazomanie Land Disposal	Mazomanie	NE SE 3	1971-1983	H,D,W,T,G	WID980678197	ERRIS 10/20/83
6	V. Prairie du Sac	Mazomanie	NW SE 13	?	?	—	Public
7	T. Roxbury	Roxbury	NW SW 16	pre-1970-1991	T,G,M	608	DNR Madison Area Files
8	T. Dane	Dane	NE 4	1965-1969	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
9	T. Dane	Dane	NW SE 35	1970-1992	G	335	DNR Madison Area Files
10	V. Dane	Dane	NE NW 24	1958-1974	W,T,G	—	DCRPC Dane Co. Solid Waste Plan
11	V. Dane	Dane	SE NW 24	? - 1990	W,T,G	1142	DNR Madison Area Files
12	T. Vienna	Vienna	NW NW 23	1970-1986	D,W,T,G	928	DNR Madison Area Files
13	V. DeForest	Vienna	SW SW 1	1971-1991	W,T,G	1835	DNR Madison Area Files
14	V. DeForest	Windsor	NW NW 17	?-1971	W,T,G	—	DCRPC Dane Co. Solid Waste Plan
15	T. Windsor*	Windsor	SW SW 8	1971-1972	W,T,G	—	DCRPC Dane Co. Solid Waste Plan
16	V. DeForest	Windsor	18	?	?	Post-Reg.	DNR Central Files
17	T. Windsor	Windsor	SW NE 16	1972-1991	W,T,G	519	DNR Madison Area Files
18	T. Bristol	Bristol	NW SE 5	1968-1991	T,G	579	DNR Madison Area Files
19	Eckel Sanitary Service	Bristol	NE NE 34	1969-1970	T,G	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
20	T. York	York	NW SW 14	pre-1969-1990	W,T,G	537	DNR Madison
21	V. Black Earth - School Playground	Black Earth	N 1/2 SE 26	?	?	Pre-Reg.	Public
22	V. Black Earth - Fireman's Park	Black Earth	N 1/2 SE 26	?	?	Pre-Reg.	Public
23	T. Berry	Berry	SE 22	1971-1992	W,T,G	1927	DNR Madison Area Files
24	V. Cross Plains	Berry	NE SW 26	1968-1990	D,W,T,G	64	DNR Madison Area Files
25	V. Cross Plains	Berry	SE SE 26	1956-1968	W,T	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
26	T. Berry	Berry	SW SW 25	?-1971	D,W,T,G	285 Temp.	DNR Licensing Log 1970
27	George Pulvermacher	Springfield	NW SE 7	?	U	Post-Reg.	DNR County Files Bureau Site questioned by Town Clerk
28	Jerome Dedrich	Springfield	NE SW 4	?-1972	T	2420 Temp.	DNR Madison Area Files
29	Thomas Helt Disposal	Springfield	SW NE 4	1969-1973	U	—	DNR Madison Area Files
30	T. Springfield	Springfield	SW NW 2	1972-1988	T	256	DNR Madison Area Files
31	T. Springfield	Springfield	SW 35	?-1972	T,G	—	DCRPC Dane Co. Solid Waste Plan
32	V. Waunakee	Springfield	NE 12	?-1953	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
33	Metropolitan Refuse District	Westport	SW NW 30	1961-	W,T,G	107	Active Site
34	Metropolitan Refuse District	Westport	NW 30	?	?	107 Temp.	DNR County Files Bureau
35	Herbrand Sand & Gravel-Midwest Steel	Westport	NW SE 31	1972-1978	H,W	Post-Reg.	DNR County Files Bureau
36	UW-Madison Burning Pit	Westport	NE NE 31	1972-1981	H	Post-Reg.	DNR County Files Bureau
37	Westport Sand & Gravel (Demo)	Westport	SW 29	?	D	Post-Reg.	DNR County Files Bureau
38	Ramesh Pit (Demo)	Westport	W 1/2 NW 29	?	D	Post-Reg.	DNR County Files Bureau
39	Unnamed Site	Westport	NE 32	?	?	—	Greater Madison Board of Realtors Not Listed in DNR Inventory
40	T. Westport	Westport	SW SW 28	1960s	T,G	—	DCRPC Dane Co. Solid Waste Plan Existence questioned by DNR
41	T. Westport	Westport	SE 28	1940s	T,G	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
42	Mendota State Hospital	Westport	SE SE 27	?	U	—	DNR County Files Bureau
43	C. Madison-Lakeview	Westport	NE SW 25	1920-1960?	U	Pre-Reg.	Public
44	Harold Zeigler	Westport	SW NE 22	1976	D	Post-Reg.	DNR County Files Bureau
45	T. Westport	Westport	SE SE 10	1966-1987	D,W,T,G	509	DNR Madison Area Files

Source: DCRPC, 1999

Solid Waste Disposal Sites in Dane County

DCRPC: 1993a

Map No.	Site Name	Township	Section	Years of Operation	Type of Waste[1]	DNR ID No.[2]	Source of Information[3]
46	V. Waunakee	Westport	NE 8	1950s	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
47	Scientific Protein Lab	Westport	NW NW 4	1976-1977	U	—	DNR Madison Area Files
48	V. Maple Bluff	Burke	SE SW 18	1954-	W	166	Active Site
49	Findorff Demolition	Burke	NE 19	?	D,W	Post-Reg.	DNR Southern District Files
50	C. Madison-Truax Field	Burke	NW NE 31	1948-1972	W,T,G,H	—	DNR Madison Area Files
51	C. Madison-Oscar Mayer RDF Receiving Facility	Burke	SE SW 31	1977-	T	2872?	DNR
52	Madison Crushing and Excavation	Burke	SE SW 33	pre-1972	D	672 Temp.	DNR Madison Area Files
53	Gilomen Truck & Equipment	Burke	SW SE 33	?	D,T	Post-Reg.	DNR County Files Bureau
54	H. Samuels Midwest Steel	Burke	SE NE 33	?	Auto shredder	Post-Reg.	DNR Southern District Files
55	C. Madison-Sycamore	Burke	NW SW 34	1972-1977	D,W,T,G	1935 Temp.	DNR Madison Area Files
56	C. Madison-Sycamore Brush Site	Burke	SW NW 34	1963-1975	W	304 Temp.	DNR Madison Area Files
57	Russ Darrow Foundry	Burke	SW SE 28	1976-1977	F	2682 Temp.	DNR Southern District Files
58	RTRV Partnership	Burke	SE 28	1977-1992	F	2529	DNR Madison Area Files
59	Leona Gerke	Burke	SE SE 27	?	D	2632 Temp.	DNR Madison Area Files
60	T. Burke	Burke	NE SE 23	1975-1991	D,W,T,G	1127	DNR Madison Area Files
61	Otto Zerwick	Burke	NW SW 24	?	?	Post-Reg.	DNR County Files Bureau
62	Madison Prairie Demolition*	Burke	NE NE 23	1981-	D,F,Ash	2918	Active Site
63	J.P. West	Sun Prairie	SW 18	Early 1950s	Organic wastes	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
64	Herbert Hellenbrand	Sun Prairie	SE SE 7	?	D	2449 Temp.	DNR Madison Area Files
65	Marvin Starks Demolition	Sun Prairie	SE SE 7	?-1975	D	2448 Temp.	DNR Madison Area Files
66	C. Sun Prairie	Sun Prairie	SW SW 8	?-1992	D,W	231	DNR Madison Area Files
67	C. Sun Prairie - Miller Drive	Sun Prairie	SE 8	1970-1974	W	—	DCRPC Dane Co. Solid Waste Plan
68	C. Sun Prairie	Sun Prairie	SW NE 8	1971-1974	W	814 Temp.	DNR Madison Area Files
69	C. Sun Prairie-Angel Park Speedway	Sun Prairie	NE NE 8	?	U	Post-Reg.	Unlicensed Site Log
70	C. Sun Prairie-Transfer Receiving Facility	Sun Prairie	SW SE 5	1980-	W,T,G	2823?	DNR
71	Wisconsin Cheeseman Incinerator	Sun Prairie	SW 6	1972-	T	1856?	DNR
72	Don Simon Realtors	Sun Prairie	NW NW 6	?	U	Post-Reg.	DNR County Files Bureau
73	T. Sun Prairie	Sun Prairie	NW SW 13	1970-1990	W,T,G	620	DNR Madison Area Files
74	T. Sun Prairie	Sun Prairie	SE SE 12	?-1970	U	620 Temp.	DCRPC Dane Co. Solid Waste Plan
75	Phillip Freidel	Medina	NE SE 10	?	?	Post-Reg.	DNR County Files Bureau
76	V. Marshall	Medina	SW SE 13	1970-1988	W,T,G	961	DNR Madison Area Files
77	T. Medina	Medina	SE SW 24	1970-1990	W,T	854	DNR Madison Area Files
78	T. Cross Plains	Cross Plains	SE SW 20	?	D,W,T	325 Temp.	DNR Madison Area Files
79	V. Cross Plains - Transport Gas Station	Cross Plains	NE SE 3	1956-1963	T,G	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
80	Valley Street Brewery	Cross Plains	NW 2	?	?	Pre-Reg.	Jerry Brunner
81	Refuse Hideaway	Middleton	SW NW 8	1973-1988	D,W,T,G,H	1953	DNR Southern District Files
82	Heather Crest Farms	Middleton	NW NW 21	?-1973	T	Post-Reg.	DNR County Files Bureau
83	Pleasant View Golf Course	Middleton	NW NW 15	?	T	—	DNR Southern District Files
84	Ray Weitzel	Middleton	SE NE 3	?	?	Post-Reg.	DNR County Files Bureau
85	Prefinished Millwork Corp.	Middleton	NW SW 11	?	?	WID063524342	ERRIS 10/20/83
86	Dennis Howard Dump	Middleton	SW SE 14	?-1977	W,T	Post-Reg.	DNR County Files Bureau
87	C. Madison-Mineral Point	Middleton	SW 24	1965-1971	H,T,G	303 Temp.	DNR Madison Area Files
88	Herman Schnoor	Middleton	NE SW 25	?-1973	D	—	DNR Southern District Files
89	C. Madison-Greentree Hills	Middleton	SW NW 36	1973-1982	W,T,G	1714 Temp.	DNR Madison Area Files
90	C. Madison Odana Hills Golf Course	Madison	NE NE 31	?	?	—	Public
91	C. Madison-Old Brickyard	Madison	SW SE 17	1938-1941	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
92	V. Shorewood-Steve's Liquor & Kohls	Madison	SE 17	?	?	Pre-Reg.	Public
93	V. Shorewood Hills - Doctors Park	Madison	SE SW 16	?	W	Pre-Reg.	DNR Southern District Files
94	UW-University Bay	Madison	SW NE 16	1968(?)-1971	D, Ash	—	DCRPC Dane Co. Solid Waste Plan
95	UW-Picnic Point	Madison	NE NE 16	?	D,W	Pre-Reg.	DNR Southern District Files

Solid Waste Disposal Sites in Dane County

DCRPC: 1993a

Map No.	Site Name	Township	Section	Years of Operation	Type of Waste[1]	DNR ID No.[2]	Source of Information[3]
96	C. Madison-St. Mary's Parking Lot	Madison	NE NE 27	?	U	Pre-Reg.	Public
97	C. Madison-Fiore Plat	Madison	NW SW 26	1932-1935	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
98	C. Madison-Bowman Field	Madison	SW SW 26	?	U	Pre-Reg.	City of Madison
99	Icke Construction	Madison	NW SW 36	?-1983	D, Ash	2041 Temp.	DNR Madison Area Files
100	Coyle Inc.	Madison	NE NW 36	?	U	Post-Reg.	DNR County Files Bureau
101	Lennes Schlobohm	Madison	NE NW 36	?	D	Post-Reg.	DNR County Files Bureau
102	C. Madison-Olin	Madison	NW SW 25	1945-1976	U	305 Temp.	City of Madison
103	C. Madison-Olin Milling	Madison	NW SW 25	?	T,G	2026?	DNR Southern District Files
104	C. Madison-Lakeside	Madison	NW NW 25	1937-1939	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
105	C. Madison-Law Park	Madison	NW 24	1941-1946	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
106	C. Madison - Madison Square	Madison	SW SW 13	1953-1969	?	Pre-Reg.	Newspaper Article
107	Madison Gas & Electric RDF Storage Facility	Madison	S 1/2 13	?	T,RDF	2769?	DNR Southern District Files
108	Madison Gas & Electric	Madison	SE 12	1941(?)-1944	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
109	C. Madison-Burr Jones	Blooming Grove	NW 7	1927-1930	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
110	C. Madison-Demetral Field	Blooming Grove	NE NW 6	1952-1967	T,G	1967 Temp.	City of Madison
111	Garver Supply	Blooming Grove	NW SE 5	?	D	—	DNR Southern District Files
112	C. Madison-Olbrich Park	Blooming Grove	SE 5	1946-1951	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
113	Nutri-Feed Corp.	Blooming Grove	W 1/2 31	?	?	2631 Temp.	DNR
114	Madison Metropolitan Sewerage District	Blooming Grove	SW SW 29	—	Sludge	—	Active Site
115	Gisholt Foundry	Blooming Grove	NE NW 29	1971-1972	F	—	DNR Madison Area Files
116	L.S. Lunder Construction Co.	Blooming Grove	N 1/2 NW 28	?	?	407 Temp.	DNR Licensing Log 1970
117	C. Monona	Blooming Grove	NW NW 28	1963-1972	W,G	50 Temp.	DNR License Log 1970
118	Harp & Kettle Cheesehouse	Blooming Grove	NW 28	?	D	Post-Reg.	DNR County Files Bureau
119	Goben Cars	Blooming Grove	SW SW(?)21	?	D,W	Post-Reg.	DNR County Files Bureau
120	Hy-Ho Silver Inc.	Blooming Grove	W 1/2 NW 22	?	?	WID980610596	ERRIS 10/20/83
121	L.A.O. Machine Shop	Blooming Grove	SE SW 22	?	?	Post-Reg.	DNR Southern District Files
122	Terra Engineering & Construction Corp.	Blooming Grove	SE SE 15	1972-	D,W	1912	Active Site
123	Midwest Steel	Blooming Grove	NE SW 15	1976-1980	Auto Shredder	2528 Temp.	DNR Southern District Files
124	T. Blooming Grove	Blooming Grove	NW NW 13	1954-1960	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
125	D & M Construction	Blooming Grove	NW 13	?	D,G	Post-Reg.	DNR County Files Bureau
126	T. Blooming Grove	Blooming Grove	SW NE 12	1961-1991	W,T,G	569	DNR Madison Area Files
127	C. Madison - Yahara Hills Golf Course	Blooming Grove	NE SW 25	?	?	—	Public
128	Dane County-Rodefeld	Blooming Grove	NE 25	1985-	D,W,T,G	3018	Active Site
129	T. Cottage Grove	Cottage Grove	NW NE 28	1969-1988	D,W,T,G	585	DNR Madison Area Files
130	Fred Schroeder	Cottage Grove	SW SW 16	?-1974	T,F	Post-Reg.	DNR County Files Bureau
131	Hydrite Chemical Company	Cottage Grove	NW NE 16	?	?	WID000808824	ERRIS 84
132	Irving Smith Fill Site	Cottage Grove	NW NE 4	?	D,W	Pre-Reg.	DNR Southern District Files
133	Taliaferre Tire Storage Site	Cottage Grove	NE 24	?-1973	Tires	—	DNR Madison Area Files
134	V. Deerfield	Deerfield	SW SW 22	?-1981	D,W	8 Temp.	DNR Southern District Files
135	T. Deerfield	Deerfield	SW SE 27	1970-1991	W,T,G	1095	DNR Madison Area Files
136	Thompson State Camp	Deerfield	SE SW 35	1969-1970	T,G	492 Temp.	DNR Licensing Log-1970
137	Zickert Farm	Deerfield	NE SW 14	?	?	Post-Reg.	DNR County Files Bureau
138	Unnamed Site	Deerfield	NW 13	?	?	Post-Reg.	Greater Madison Board of Realtors
139	Blue Mounds State Park - Near entrance	Blue Mounds	SW NW 6	?	?	Pre-Reg.	Not Listed in DNR Inventory
140	Brigham Farm	Blue Mounds	SW SW 5	?-1976	D,W	Post-Reg.	Public

Solid Waste Disposal Sites in Dane County

DCRPC: 1993a

Map No.	Site Name	Township	Section	Years of Operation	Type of Waste[1]	DNR ID No.[2]	Source of Information[3]
141	V. Mt. Horeb	Blue Mounds	NE SW 10	Pre-1943	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
142	V. Mt. Horeb	Blue Mounds	SE SE 14	1943-1975	D,W,T,G	1329 Temp.	DNR Madison Area Files
143	Edgar Markwardt	Springdale	SW NW 1	1960s	H	Pre-Reg.	DNR Southern District Files
144	T. Verona	Verona	SW SW 9	pre-1968-1990	W,T,G	712	DNR Madison Area Files
145	C. Verona	Verona	NE SE 16	1968-1971	W,T	—	DCRPC Dane Co. Solid Waste Plan
146	C. Verona	Verona	NE SW 22	1940-1950	T,G	Pre-Reg.	DNR Madison Area Files
147	Dane County-Verona Landfill	Verona	NE 14	1977-1986	D,W,T,G	2680	DNR Madison Area Files
148	C. Fitchburg	Fitchburg	NE SW 18	?	U	Pre-Reg.	Public
149	Keith Hammersley, Jr.	Fitchburg	SE SW 7	1970-1980	D,W,T	1128 Temp.	DNR Southern District Files
150	Wis. Brick & Block	Fitchburg	NE SW 7	?	D,W,T,G,Tires	Post-Reg.	DNR County Files Bureau
151	Hammersley Stone Co. - Yanggen	Fitchburg	NE NE 7		D	Demo	Co. Solid Waste Tracking System
152	Oregon State Farm	Fitchburg	SE NW 35	?-1972	G	246 Temp.	DNR Madison Area Files
153	Wis. School for Girls	Fitchburg	NE SE 26	1969-1971	T,G	518 Temp.	DNR Licensing Log-1970
154	Nevin Hatchery	Fitchburg	SE NE 10	1974	D	831 Temp.	DNR Licensing Log-1970
155	Hammersley Const. Co.	Fitchburg	SE SW 2	1977	D	One-Time	DNR County Files Bureau
156	Stewart Watson	Fitchburg	NW NW 2	?	D	Post-Reg.	DNR County Files Bureau
157	Schuepbach	Fitchburg	NW 1	?-1973	D,W	—	Dane Co. - Existence of site is questioned
158	Madison Crushing Co.	Fitchburg	NW SE 1	1971-1973	D,F	Post-Reg.	DCRPC Dane Co. Solid Waste Plan
159	Holtzman Solid Waste	Dunn	SE SE 6	pre-1971-1992	Lab animals	247	DNR Southern District Files
160	Waste Management of Wis.-City Disposal*	Dunn	SE SW 30	1966-1977	H,D,W,T,G	37 Temp.	DNR Madison Area Files
161	Arlo Ladell (T & H)	Dunn	NW NW 29	?	?	WID980610125	ERRIS 10/20/83
162	T. Dunn	Dunn	NW NE 21	1970-1991	T,G	1871	DNR Madison Area Files
163	Crescent Drive Site	Dunn	SW 9	?	?	—	Greater Madison Board of Realtors Not Listed in DNR Inventory
164	V. McFarland	Dunn	NW SW 2	1972-1975	W	929 Temp.?	Newspaper Article
165	Lloyd Downing	Pleasant Springs	NW NW 6	?-1973	T	—	DNR Southern Distrtict Files
166	Old Time Auto Parts - 190 Rubble	Pleasant Springs	NE SW 9	?	?	—	Greater Madison Board of Realtors Not Listed in DNR Inventory
167	Clifford Sagen	Pleasant Springs	SE SW 17	?	D	Post-Reg.	DNR Dane Co. Files Bur.
168	T. Pleasant Springs - 2 acres	Pleasant Springs	E 1/2 NW 31	1940-1966	?	—	Greater Madison Board of Realtors Not Listed in DNR Inventory
169	T. Pleasant Springs	Pleasant Springs	SW NW 36	1972-1989	D,W,T,G	1955	DNR Madison Area Files
170	T. Pleasant Springs*	Pleasant Springs	NE SW 25	1967-1972	W,T,G	7 Temp.	DNR Licensing Log - 1970
171	T. Christiana	Christiana	NW NW 29	?-1970	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
172	T. Christiana	Christiana	NE SW 8	?-1986	W,T	803	DNR Madison Area Files
173	Bob Birkrem	Christiana	NE SE 5	?	D,G	Post-Reg.	DNR Dane Co. Files Bur.
174	Melster Candy Kitchens	Christiana	NW NE 12	?	U	Post-Reg.	Unlicensed Site Log
175	T. Perry	Perry	NE NE 18	1970-1991	D,W,T	778	DNR Southern District Files
176	T. Primrose	Primrose	NE SW 9	1970-1974	T,G	1218 Temp.	DNR Licensing Log-1970
177	V. Belleville	Montrose	SE SE 34	1972-1988	D,W	79 Temp.	DNR Southern District Files
178	T. Montrose	Montrose	SE SW 1	?-1973	D,W,G	757 Temp.	DNR Licensing Log-1970
179	T. Oregon	Oregon	NE NW 17	?-1974	W	576 Temp.	DNR Licensing Log-1970
180	Dane County Hwy. Dept.-Aces' Pit*	Oregon	SE NW 17	?-1974	D,W,T	985 Temp.	DNR Madison Area Files
181	V. Oregon - Senior Citizen Center	Oregon	NW 12	?	?	Pre-Reg.	Public
182	V. Oregon - Kiser Park	Oregon	NE NW 12	?	?	Pre-Reg.	Public
183	Oregon Kar Body	Rutland	NW NW 7	?-1973	D	—	DNR Southern Distrtict Files
184	Disposal Site North of STH 92	Rutland	SW NW 31	?	?	Pre-Reg.	Greater Madison Board of Realtors Not Listed in DNR Inventory
185	V. Brooklyn	Rutland	SW SW 31	1969-1988	D,W	581	DNR Madison Area Files

Solid Waste Disposal Sites in Dane County

DCRPC: 1993a

Map No.	Site Name	Township	Section	Years of Operation	Type of Waste[1]	DNR ID No.[2]	Source of Information[3]
186	T. Rutland	Rutland	SE NE 17	1974-1992	W,T,G	2115	DNR Madison Area Files
187	Oregon Race Track	Rutland	SW SW 9	?-1973	T	Post-Reg.	DNR Dane County Files Bureau
188	T. Rutland	Rutland	NW NW 2	1970-1974	W,T,G	1584 Temp	DNR Licensed Site
189	Every Farm	Rutland	SE NE 2	1963-1966	H	WID980610794	ERRIS 10/20/83
190	T. Rutland	Rutland	NW SE 36	1950s	U	Pre-Reg.	DCRPC Dane Co. Solid Waste Plan
191	Petty Realty - Keenan Lane	Dunkirk	NE NE 6	?	?	Post-Reg.	DNR County Files Bureau
192	C. Stoughton - St. Ann's School	Dunkirk	SW SW 5	?	U	Pre-Reg.	Public
193	C. Stoughton	Dunkirk	SE NE 8	?	U	Pre-Reg.	DNR Madison Area Files
194	C. Stoughton - Nelson St.	Dunkirk	NW NW 9	?	?	Pre-Reg.	Mrs. Hanson
195	C. Stoughton	Dunkirk	NW SW 4	?	?	133 Temp.	DNR
196	C. Stoughton (Amundson Park)	Dunkirk	NE SW 4	1953-1978	H	WID?	DNR Madison Area Files
197	Thomas Matson (Demo Site)	Dunkirk	NW SW 10	?	U,D	Post-Reg.	DNR County Files Bureau
198	Orrin Hagen Farm	Dunkirk	NE SW 10	Late 1950s-early 1960s	H	WID980610059	ERRIS 10/20/83
199	T. Dunkirk*	Dunkirk	NE NE 16	?-1986	W,T,G	860	DNR Madison Area Files
200	T. Albion	Albion	NE NE 23	1967-1972	G	Pre-Reg.	DNR Southern District Files
201	Gus Oberg's Bar	Albion	NW SE 25	?	D,W,T	2731 Temp	DNR
202	T. Albion	Albion	SE SE 35	1973-1986	D,W,T	987?	DNR

*There may be other nearby or associated disposal sites.

Note: All landfills are closed or inactive, except for Map #33, 48, 62, 122 and 128.

[1]Type of Waste

- U = Undifferentiated
- W = Wood and brush
- T = Trash
- G = Garbage (discarded materials from food processing and consumption)
- D = Construction and demolition waste
- F = Foundry waste
- H = Hazardous waste

[2]DNR ID No.

WID: Prefix identifies sites that have formally received hazardous waste generator numbers from the U.S. Environmental Protection Agency (EPA).

Temp: Indicates that a temporary permit or license has been issued.

Post-Reg or Pre-Reg: Indicates whether disposal occurred previous to or following the 1969 requirements that landfills be licensed by the state.

Demo: Demolition sites requiring permits are noted by "one-time" or "Demo."

[3]Source of Information

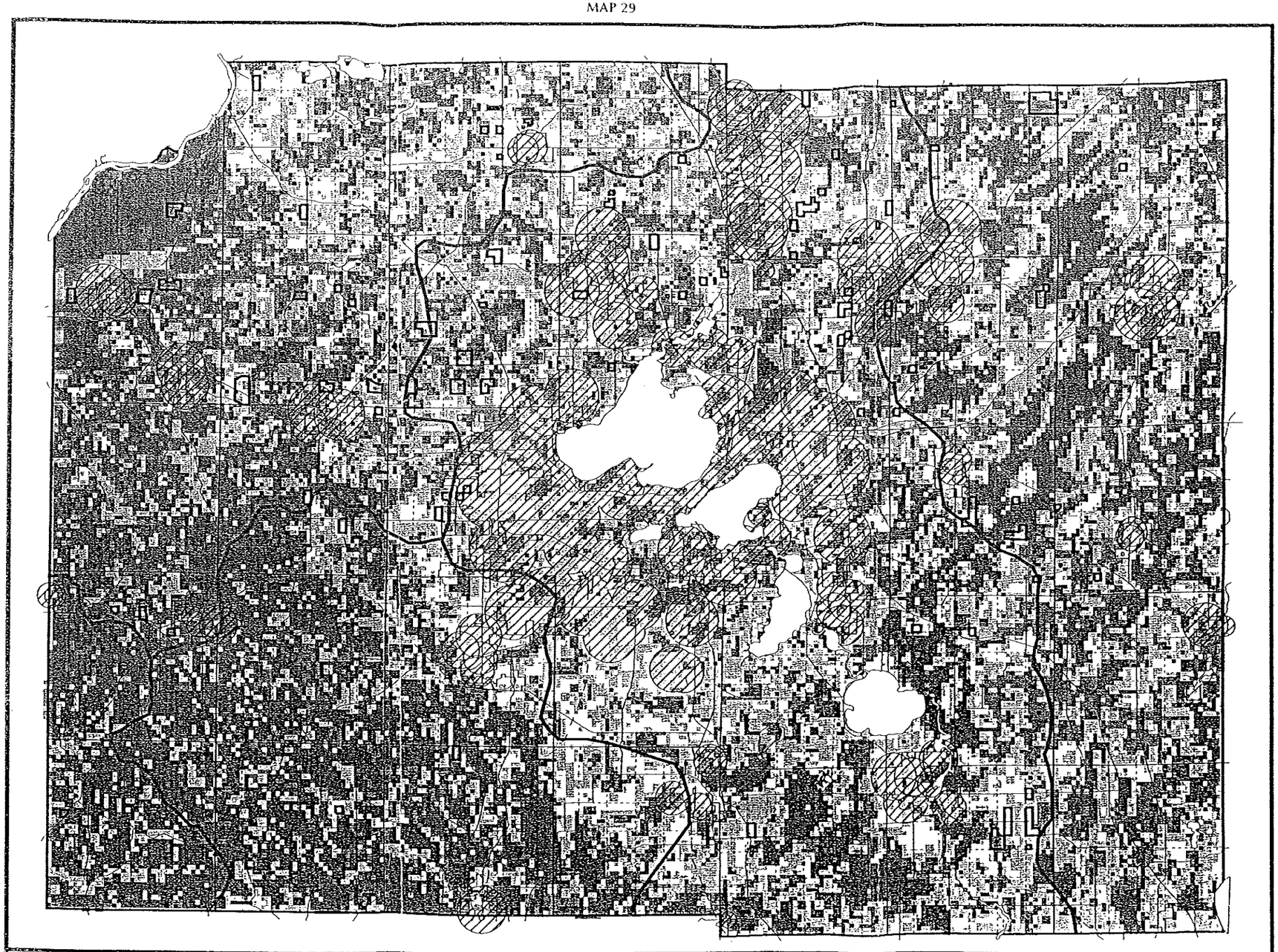
This can include: DNR Area, District and Central Office files as of 6/93; Dane County Regional Planning Commission reports; Greater Madison Board of Realtors Listing 3/93; newspaper articles; the name of a private citizen knowledgeable about the site; or a reference to various other federal or DNR listings. For example, ERRIS = EPA Emergency and Remedial Response Information List.

NOTE: This table and associated map indicate only the general location of waste disposal sites identified by the DNR and other governmental units and private entities. In many cases, the exact boundaries and precise contents of the sites are not known.

APPENDIX J

STATE APPROVED SEPTAGE APPLICATION SITES IN DANE COUNTY

MAP 29



State Approved Septage Application Sites and Groundwater Contamination Risk from Surface Activities

Risk

- Low
- Moderate
- High
- Extreme

- Well Protection Zone
- Major Groundwater Divide
- Septage Disposal Sites

(Source: Dane County Regional Planning Commission, 11/97).

Dane County, Wisconsin
July, 1999

0 N 4
Miles

Prepared by: The Dane County Regional Planning Commission

Source: DCRPC, 1999

APPENDIX K

PROHIBITED LAND USES IN WHPAs, POTENTIAL SOURCES OF GROUNDWATER CONTAMINATION AND LAND USES, AND THEIR RELATIVE RISK TO GROUNDWATER

TABLE K-1
RECOMMENDED PROHIBITED LAND USES
UNIT WELL 29 WELLHEAD PROTECTION ZONES
MADISON, WISCONSIN

ZONE A – PROHIBITED USES

Commercial animal confinement facilities
Animal waste facilities
Asphalt products manufacturing
Auto body repair businesses
Auto sales and service
Auto salvage yards (junk yards)
Bus or truck terminals
Commercial bulk fertilizer and/or pesticide facilities (storage, mixing and/or loading)
Cemeteries
Dry-cleaning businesses/facilities
Electroplating businesses/facilities
Exterminating businesses/facilities
Fuel storage tanks (heating oil)
Furniture manufacturing and refinishing
Garage and vehicular towing
Hazardous and/or toxic materials storage
Hazardous and/or toxic waste facilities
Industrial businesses that use hazardous chemicals as defined by the EPA
Public and municipal maintenance garages
Radioactive waste facilities
Recycling facilities
Research laboratories
Retail liquid motor fuel dispensing facilities
Salt storage
Septage and/or sewage sludge spreading
Spray wastewater facilities
Stormwater impoundments/retention areas
Underground and aboveground petroleum and chemical product storage tanks
Unsewered residential, commercial, or industrial development
Vehicle Repair shops
Wastewater treatment or disposal facilities

ZONE B – PROHIBITED USES

Commercial animal confinement facilities
Animal waste facilities
Asphalt products manufacturing
Auto body repair businesses
Auto salvage yards (junk yards)
Bus or truck terminals
Commercial bulk fertilizer and/or pesticide facilities (Storage, mixing and/or loading)
Dry-cleaning businesses/facilities
Electoplating businesses/facilities
Exterminating businesses/facilities

ZONE B – PROHIBITED USES (cont.)

Garage and vehicular towing
Hazardous and/or toxic materials storage
Hazardous and/or toxic waste facilities
Industrial businesses that use hazardous chemicals as defined by the EPA
Landfills or waste disposal facilities
Manufacturing businesses that use hazardous chemicals as defined by the EPA
Paint and coating manufacturing
Printing and duplicating businesses that use hazardous chemicals as defined by the EPA
Public and municipal maintenance garages
Radioactive waste facilities
Recycling facilities
Retail liquid motor fuel dispensing facilities
Salt storage
Septage and/or sewage sludge spreading
Spray wastewater facilities
Underground and aboveground petroleum and chemical product storage tanks (less than 600 feet from well)
Unsewered residential, commercial, or industrial development (if sewage system receives 8,000 gallons per day or more)
Vehicle Repair shops
Wastewater treatment or disposal facilities

Source: USEPA 1993, Wellhead Protection: A Guide for Small Communities, EPA/625/R-93/002

Table 4-4. Potential Sources of Ground Water Contamination

Source	Health, Environmental, or Aesthetic Contaminant[1,2,3]
NATURALLY OCCURRING SOURCES	
Rocks and soils	*Aesthetic Contaminants:* Iron and iron bacteria; manganese; calcium and magnesium (hardness) *Health and Environmental Contaminants:* Arsenic; asbestos; metals; chlorides; fluorides; sulfates; sulfate-reducing bacteria and other microorganisms
Contaminated water	Excessive sodium; bacteria; viruses; low pH (acid) water
Decaying organic matter	Bacteria
Geological radioactive gas	Radionuclides (radon, etc.)
Natural hydrogeological events and formations	Salt-water/brackish water intrusion (or intrusion of other poor quality water); contamination by a variety of substances through sink-hole infiltration in limestone terrains
AGRICULTURAL SOURCES	
Animal feedlots and burial areas	Livestock sewage wastes; nitrates; phosphates; chloride; chemical sprays and dips for controlling insect, bacterial, viral, and fungal pests on livestock; coliform[4] and noncoliform bacteria; viruses
Manure spreading areas and storage pits	Livestock sewage wastes; nitrates
Livestock waste disposal areas	Livestock sewage wastes; nitrates
Crop areas and irrigation sites	Pesticides;[5] fertilizers;[6] gasoline and motor oils from chemical applicators
Chemical storage areas and containers	Pesticide[5] and fertilizer[6] residues
Farm machinery areas	Automotive wastes;[7] welding wastes
Agricultural drainage wells and canals	Pesticides;[5] fertilizers;[6] bacteria; salt water (in areas where the fresh-saltwater interface lies at shallow depths and where the water table is lowered by channelization, pumping, or other causes)
RESIDENTIAL SOURCES	
Common household maintenance and hobbies	*Common Household Products:*[8] Household cleaners; oven cleaners; drain cleaners; toilet cleaners; disinfectants; metal polishes; jewelry cleaners; shoe polishes; synthetic detergents; bleach; laundry soil and stain removers; spot removers and dry cleaning fluid; solvents; lye or caustic soda; household pesticides;[9] photochemicals; printing ink; other common products *Wall and Furniture Treatments:* Paints; varnishes; stains; dyes; wood preservatives (creosote); paint and lacquer thinners; paint and varnish removers and deglossers; paint brush cleaners; floor and furniture strippers *Mechanical Repair and Other Maintenance Products:* Automotive wastes;[7] waste oils; diesel fuel; kerosene; #2 heating oil; grease; degreasers for driveways and garages; metal degreasers; asphalt and roofing tar; tar removers; lubricants; rustproofers; car wash detergents; car waxes and polishes; rock salt; refrigerants
Lawns and gardens	Fertilizers;[5] herbicides and other pesticides used for lawn and garden maintenance[10]
Swimming pools	Swimming pool maintenance chemicals[11]
Septic systems, cesspools, and sewer lines	Septage; coliform and noncoliform bacteria;[4] viruses; nitrates; heavy metals; synthetic detergents; cooking and motor oils; bleach; pesticides;[9,10] paints; paint thinner; photographic chemicals; swimming pool chemicals;[11] septic tank/cesspool cleaner chemicals;[12] elevated levels of chloride, sulfate, calcium, magnesium, potassium, and phosphate
Underground storage tanks	Home heating oil
Apartments and condominiums	Swimming pool maintenance chemicals;[11] pesticides for lawn and garden maintenance and cockroach, termite, ant, rodent, and other pest control;[9,10] wastes from onsite sewage treatment plants; household hazardous wastes[8]

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant[1,2,3]
MUNICIPAL SOURCES	
Schools and government offices and grounds	Solvents; pesticides;[9,10] acids; alkalis; waste oils; machinery/vehicle servicing wastes; gasoline and heating oil from storage tanks; general building wastes[13]
Park lands	Fertilizers;[6] herbicides;[10] insecticides[9]
Public and residential areas infested with mosquitoes, gypsy moths, ticks, ants, or other pests	Pesticides[5,9]
Highways, road maintenance depots, and deicing operations	Herbicides in highway rights-of-way;[5,10] road salt (sodium and calcium chloride); road salt anticaking additives (ferric ferrocyanide, sodium ferrocyanide); road salt anticorrosives (phosphate and chromate); automotive wastes[7]
Municipal sewage treatment plants and sewer lines	Municipal wastewater; sludge;14 treatment chemicals[15]
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	Sewage wastewater; nitrates; other liquid wastes; microbiological contaminants
Land areas applied with wastewater or wastewater byproducts	Organic matter; nitrate; inorganic salts; heavy metals; coliform and noncoliform bacteria;[4] viruses; nitrates; sludge;[14] nonhazardous wastes[16]
Storm water drains and basins	Urban runoff; gasoline; oil; other petroleum products; road salt; microbiological contaminants
Combined sewer overflows (municipal sewers and storm water drains)	Municipal wastewater; sludge;[14] treatment chemicals;[15] urban runoff; gasoline; oil; other petroleum products; road salt; microbial contaminants
Recycling/reduction facilities	Residential and commercial solid waste residues
Municipal waste landfills	Leachate; organic and inorganic chemical contaminants; wastes from households[8] and businesses;[13] nitrates; oils; metals
Open dumping and burning sites, closed dumps	Organic and inorganic chemicals; metals; oils; wastes from households[8] and businesses[13]
Municipal incinerators	Heavy metals; hydrocarbons; formaldehyde; methane; ethane; ethylene; acetylene; sulfur and nitrogen compounds
Water supply wells, monitoring wells, older wells, domestic and livestock wells, unsealed and abandoned wells, and test hole wells	Surface runoff; effluents from barnyards, feedlots, septic tanks, or cesspools; gasoline; used motor oil; road salt
Sumps and dry wells	Storm water runoff; spilled liquids; used oil; antifreeze; gasoline; other petroleum products; road salt; pesticides;[5] and a wide variety of other substances
Drainage wells	Pesticides;[9,10] bacteria
Well pumping that causes interaquifer leakage, induced filtration, landward migration of sea water in coastal areas; etc.	Saltwater; excessively mineralized water
Artificial ground water recharge	Storm water runoff; excess irrigation water; stream flow; cooling water; treated sewage effluent; other substances that may contain contaminants, such as nitrates, metals, detergents, synthetic organic compounds, bacteria, and viruses
COMMERCIAL SOURCES	
Airports, abandoned airfields	Jet fuels; deicers; diesel fuel; chlorinated solvents; automotive wastes;[7] heating oil; building wastes[13]
Auto repair shops	Waste oils; solvents; acids; paints; automotive wastes;[7] miscellaneous cutting oils
Barber and beauty shops	Perm solutions; dyes; miscellaneous chemicals contained in hair rinses
Boat yards and marinas	Diesel fuels; oil; septage from boat waste disposal areas; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes[7]

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant[1,2,3]
Bowling alleys	Epoxy; urethane-based floor finish
Car dealerships (especially those with service departments)	Automotive wastes;[7] waste oils; solvents; miscellaneous wastes
Car washes	Soaps; detergents; waxes; miscellaneous chemicals
Camp grounds	Septage; gasoline; diesel fuel from boats; pesticides for controlling mosquitoes, ants, ticks, gypsy moths, and other pests;[5,9] household hazardous wastes from recreational vehicles (RVs)[8]
Carpet stores	Glues and other adhesives; fuel from storage tanks if forklifts are used
Cemeteries	Leachate; lawn and garden maintenance chemicals[10]
Construction trade areas and materials (plumbing, heating and air conditioning, painting, paper hanging, decorating, drywall and plastering, acoustical insulation, carpentry, flooring, roofing and sheet metal, wrecking and demolition, etc.)	Solvents; asbestos; paints; glues and other adhesives; waste insulation; lacquers; tars; sealants; epoxy waste; miscellaneous chemical wastes
Country clubs	Fertilizers;[6] herbicides;[5,10] pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests;[9] swimming pool chemicals;[11] automotive wastes
Dry cleaners	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
Funeral services and crematories	Formaldehyde; wetting agents; fumigants; solvents
Furniture repair and finishing shops	Paints; solvents; degreasing and solvent recovery sludges
Gasoline services stations	Oils; solvents; miscellaneous wastes
Golf courses	Fertilizers;[6] herbicides;[5,10] pesticides for controlling mosquitoes, ticks, ants, gypsy moths, and other pests[9]
Hardware/lumber/parts stores	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote
Heating oil companies, underground storage tanks	Heating oil; wastes from truck maintenance areas[7]
Horticultural practices, garden nurseries, florists	Herbicides, insecticides, fungicides, and other pesticides[10]
Jewelry/metal plating shops	Sodium and hydrogen cyanide; metallic salts; hydrochloric acid; sulfuric acid; chromic acid
Laundromats	Detergents; bleaches; fabric dyes
Medical institutions	X-ray developers and fixers;[17] infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; dental acids; miscellaneous chemicals
Office buildings and office complexes	Building wastes;[13] lawn and garden maintenance chemicals;[10] gasoline; motor oil
Paint stores	Paints; paint thinners; lacquers; varnishes; other wood treatments
Pharmacies	Spilled and returned products
Photography shops, photo processing laboratories	Biosludges; silver sludges; cyanides; miscellaneous sludges
Print shops	Solvents; inks; dyes; oils; photographic chemicals
Railroad tracks and yards	Diesel fuel; herbicides for rights-of-way; creosote for preserving wood ties
Research laboratories	X-ray developers and fixers;[17] infectious wastes; radiological wastes; biological wastes; disinfectants; asbestos; beryllium; solvents; infectious materials; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade, bleach); miscellaneous chemicals

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant[1,2,3]
COMMERCIAL SOURCES (continued)	
Scrap and junk yards	Any wastes from businesses[13] and households;[8] oils
Sports and hobby shops	Gunpowder and ammunition; rocket engine fuel; model airplane glue
Above-ground and underground storage tanks	Heating oil; diesel fuel; gasoline; other petroleum products; other commercially used chemicals
Transportation services for passenger transit (local and interurban)	Waste oil; solvents; gasoline and diesel fuel from vehicles and storage tanks; fuel oil; other automotive wastes[7]
Veterinary services	Solvents; infectious materials; vaccines; drugs; disinfectants (quaternary ammonia, hexachlorophene, peroxides, chlornexade, bleach); x-ray developers and fixers[17]
INDUSTRIAL SOURCES	
Material stockpiles (coal, metallic ores, phosphates, gypsum)	Acid drainage; other hazardous and nonhazardous wastes[16]
Waste tailing ponds (commonly for the disposal of mining wastes)	Acids; metals; dissolved solids; radioactive ores; other hazardous and nonhazardous wastes[15]
Transport and transfer stations (trucking terminals and rail yards)	Fuel tanks; repair shop wastes;[7] other hazardous and nonhazardous wastes[15]
Above-ground and underground storage tanks and containers	Heating oil; diesel and gasoline fuel; other petroleum products; hazardous and nonhazardous materials and wastes[16]
Storage, treatment, and disposal ponds, lagoons, and other surface impoundments	Hazardous and nonhazardous liquid wastes;[16] septage; sludge[14]
Chemical landfills	Leachate; hazardous and nonhazardous wastes;[16] nitrates
Radioactive waste disposal sites	Radioactive wastes from medical facilities, power plants, and defense operations; radionuclides (uranium, plutonium)
Unattended wet and dry excavation sites (unregulated dumps)	A wide range of substances; solid and liquid wastes; oil-field brines; spent acids from steel mill operations; snow removal piles containing large amounts of salt
Operating and abandoned production and exploratory wells (for gas, oil, coal, geothermal, and heat recovery); test hole wells; monitoring and excavation wells	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals[16]
Dry wells	Saline water from wells pumped to keep them dry
Injection wells	Highly toxic wastes; hazardous and nonhazardous industrial wastes;[16] oil-field brines
Well drilling operations	Brines associated with oil and gas operations
INDUSTRIAL PROCESSES (PRESENTLY OPERATED OR TORN-DOWN FACILITIES)[18]	
Asphalt plants	Petroleum derivatives
Communications equipment manufacturers	Nitric, hydrochloric, and sulfuric acid wastes; heavy metal sludges; copper-contaminated etchant (e.g., ammonium persulfate); cutting oil and degreasing solvent (trichloroethane, Freon, or trichloroethylene); waste oils; corrosive soldering flux; paint sludge; waste plating solution
Electric and electronic equipment manufacturers and storage facilities	Cyanides; metal sludges; caustics (chromic acid); solvents; oils; alkalis; acids; paints and paint sludges; calcium fluoride sludges; methylene chloride; perchloroethylene; trichloroethane; acetone; methanol; toluene; PCBs
Electroplaters	Boric, hydrochloric, hydrofluoric, and sulfuric acids; sodium and potassium hydroxide; chromic acid; sodium and hydrogen cyanide; metallic salts
Foundries and metal fabricators	Paint wastes; acids; heavy metals; metal sludges; plating wastes; oils; solvents; explosive wastes

Table 4-4. Potential Sources of Ground Water Contamination (continued)

Source	Health, Environmental, or Aesthetic Contaminant[1,2,3]
Furniture and fixtures manufacturers	Paints; solvents; degreasing sludges; solvent recovery sludges
Machine and metalworking shops	Solvents; metals; miscellaneous organics; sludges; oily metal shavings; lubricant and cutting oils; degreasers (tetrachlorethylene); metal marking fluids; mold-release agents
Mining operations (surface and underground), underground storage mines	Mine spoils or tailings that often contain metals; acids; highly corrosive mineralized waters; metal sulfides
Unsealed abandoned mines used as waste pits	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals[16]
Paper mills	Metals; acids; minerals; sulfides; other hazardous and nonhazardous chemicals;[16] organic sludges; sodium hydroxide; chlorine; hypochlorite; chlorine dioxide; hydrogen peroxide
Petroleum production and storage companies, secondary recovery of petroleum	Hydrocarbons; oil-field brines (highly mineralized salt solutions)
Industrial pipelines	Corrosive fluids; hydrocarbons; other hazardous and nonhazardous materials and wastes[16]
Photo processing laboratories	Cyanides; biosludges; silver sludges; miscellaneous sludges
Plastics materials and synthetics producers	Solvents; oils; miscellaneous organics and inorganics (phenols, resins); paint wastes; cyanides; acids; alkalis; wastewater treatment sludges; cellulose esters; surfactant; glycols; phenols; formaldehyde; peroxides; etc.
Primary metal industries (blast furnaces, steel works, and rolling mills)	Heavy metal wastewater treatment sludge; pickling liquor; waste oil; ammonia scrubber liquor; acid tar sludge; alkaline cleaners; degreasing solvents; slag; metal dust
Publishers, printers, and allied industries	Solvents; inks; dyes; oils; miscellaneous organics; photographic chemicals
Public utilities (phone, electric power, gas)	PCBs from transformers and capacitors; oils; solvents; sludges; acid solution; metal plating solutions (chromium, nickel, cadmium); herbicides from utility rights-of-way
Sawmills and planers	Treated wood residue (copper quinolate, mercury, sodium bazide); tanner gas; paint sludges; solvents; creosote; coating and gluing wastes
Stone, clay, and glass manufacturers	Solvents; oils and grease; alkalis; acetic wastes; asbestos; heavy metal sludges; phenolic solids or sludges; metal-finishing sludge
Welders	Oxygen, acetylene
Wood preserving facilities	Wood preservatives; creosote

[1]In general, ground water contamination stems from the *misuse and improper disposal* of liquid and solid wastes; the *illegal dumping or abandonment* of household, commercial, or industrial chemicals; the *accidental spilling* of chemicals from trucks, railways, aircraft, handling facilities, and storage tanks; or the *improper siting, design, construction, operation, or maintenance* of agricultural, residential, municipal, commercial, and industrial drinking water wells and liquid and solid waste disposal facilities. Contaminants also can stem from *atmospheric pollutants*, such as airborne sulfur and nitrogen compounds, which are created by smoke, flue dust, aerosols, and automobile emissions, fall as acid rain, and percolate through the soil. When the sources listed in this table are used and managed properly, ground water contamination is not likely to occur.

[2]Contaminants can reach ground water from activities occurring on the land surface, such as industrial waste storage; from sources below the land surface but above the water table, such as septic systems; from structures beneath the water table, such as wells; or from contaminated recharge water.

[3]This table lists the most common wastes, but not all potential wastes. For example, it is not possible to list all potential contaminants contained in storm water runoff or research laboratory wastes.

[4]Coliform bacteria can indicate the presence of pathogenic (disease-causing) microorganisms that may be transmitted in human feces. Diseases such as typhoid fever, hepatitis, diarrhea, and dysentery can result from sewage contamination of water supplies.

[5]Pesticides include herbicides, insecticides, rodenticides, fungicides, and avicides. EPA has registered approximately 50,000 different pesticide products for use in the United States. Many are highly toxic and quite mobile in the subsurface. An EPA survey found that the most common pesticides found in drinking water wells were DCPA (dacthal) and atrazine, which EPA classifies as *moderately toxic* (class 3) and *slightly toxic* (class 4) materials, respectively.

[6]The EPA National Pesticides Survey found that the use of fertilizers correlates to nitrate contamination of ground water supplies.

[7]Automotive wastes can include gasoline; antifreeze; automatic transmission fluid; battery acid; engine and radiator flushes; engine and metal degreasers; hydraulic (brake) fluid; and motor oils.

[8]Toxic or hazardous components of common household products are noted in Table 3-2.

[9]Common household pesticides for controlling pests such as ants, termites, bees, wasps, flies, cockroaches, silverfish, mites, ticks, fleas, worms, rats, and mice can contain active ingredients including napthalene, phosphorus, xylene, chloroform, heavy metals, chlorinated hydrocarbons, arsenic, strychnine, kerosene, nitrosamines, and dioxin.

[10]Common pesticides used for lawn and garden maintenance (i.e., weed killers, and mite, grub, and aphid controls) include such chemicals as 2,4-D; chlorpyrifos; diazinon; benomyl; captan; dicofol; and methoxychlor.

[11]Swimming pool chemicals can contain free and combined chlorine; bromine; iodine; mercury-based, copper-based, and quaternary algicides; cyanuric acid; calcium or sodium hypochlorite; muriatic acid; sodium carbonate.

[12]Septic tank/cesspool cleaners include synthetic organic chemicals such as 1,1,1 trichloroethane, tetrachloroethylene, carbon tetrachloride, and methylene chloride.

[13]Common wastes from public and commercial buildings include automotive wastes; rock salt; and residues from cleaning products that may contain chemicals such as xylenols, glycol esters, isopropanol, 1,1,1-trichloroethane, sulfonates, chlorinated phenolys, and cresols.

[14]Municipal wastewater treatment sludge can contain organic matter; nitrates; inorganic salts; heavy metals; coliform and noncoliform bacteria; and viruses.

[15]Municipal wastewater treatment chemicals include calcium oxide; alum; activated alum, carbon, and silica; polymers; ion exchange resins; sodium hydroxide; chlorine; ozone; and corrosion inhibitors.

[16]The Resource Conservation and Recovery Act (RCRA) defines a hazardous waste as a solid waste that may cause an increase in mortality or serious illness or pose a substantial threat to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. A waste is hazardous if it exhibits characteristics of ignitability, corrosivity, reactivity, and/or toxicity. Not covered by RCRA regulations are domestic sewage; irrigation waters or industrial discharges allowed by the Clean Water Act; certain nuclear and mining wastes; household wastes; agricultural wastes (excluding some pesticides); and small quantity hazardous wastes (i.e., less than 220 pounds per month) generated by businesses.

[17]X-ray developers and fixers may contain reclaimable silver, glutaldehyde, hydroquinone, phenedone, potassium bromide, sodium sulfite, sodium carbonate, thiosulfates, and potassium alum.

[18]This table lists potential ground water contaminants from many common industries, but it does not address all industries.

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Table 4-5. Land Uses and Their Relative Risk to Ground Water

LEAST RISK	A.	1. Land surrounding a well or reservoir, owned by a water company.
		2. Permanent open space dedicated to passive recreation.
		3. Federal, state, municipal, and private parks.
		4. Woodlands managed for forest products.
		5. Permanent open space dedicated to active recreation.
	B.	1. Field crops: pasture, hay, grains, vegetables.
		2. Low density residential: lots larger than 2 acres.
		3. Churches, municipal offices.
	C.	1. Agricultural production: dairy, livestock, poultry, nurseries, orchards, berries.
		2. Golf course, quarries.
		3. Medium density residential: lots from 1/2 to 1 acre.
	D.	1. Institutional uses: schools, hospitals, nursing homes, prisons, garages, salt storage, sewage treatment facilities.
		2. High density housing: lots smaller than 1/2 acre.
		3. Commercial uses: limited hazardous material storage and only sewage disposal.
	E.	1. Retail commercial: gasoline, farm equipment, automotive, sales and services; dry cleaners; photc processor; medical arts; furniture strippers; machine shops; radiator repair; printers; fuel oil distributors.
		2. Industrial: all forms of manufacturing and processing, research facilities.
		3. Underground storage of chemicals, petroleum.
GREATEST RISK		4. Waste disposal: pits, ponds, lagoons, injection wells used for waste disposal; bulky waste and domestic garbage landfills; hazardous waste treatment, storage and disposal sites.

Source: Adapted from U.S. EPA, 1989a.

Source: USEPA 1993, Wellhead Protection: A Guide for Small Communities, EPA/625/R-93/002

APPENDIX L

WELLHEAD PROTECTION ORDINANCE

AGENDA #_____
Copy Mailed to Alderpersons_____

CITY OF MADISON, WISCONSIN

AN ORDINANCE _____

amending Section 28.06(1)(h) and creating Sections 28.107(7) and (8) of the Madison General Ordinances to establish two new Wellhead Protection Districts.

Drafted by: Katherine C. Noonan
Assistant City Attorney

Date: June 5, 2003

Fiscal Note:

SPONSORS: Request of Plan Commission (Ald. Van Rooy, MacCubbin and Konkel)

PRESENTED _____
REFERRED Plan Commission;
Water Utility
REREFERRED _____

REPORTED BACK _____

ADOPTED _____ POF _____
RULES SUSP. _____ TABLED _____
PUBLIC HEARING _____

* * * *

MAYOR SIGNED _____
PUBLISHED _____

* * * *

APPROVAL OF FISCAL NOTE IS NEEDED
BY THE COMPTROLLER'S OFFICE
Approved By

_____
Comptroller's Office

* * * *

ORDINANCE NUMBER _____
ID NUMBER _____

The Common Council of the City of Madison do hereby ordain as follows:

1. Subdivision (h) entitled "Wellhead Protection Districts" of Subsection (1) entitled "Establishment Of Zoning Districts" of Section 28.06 entitled "Zoning Districts And Zoning District Maps" of the Madison General Ordinances is amended to read as follows:

"(h) Wellhead Protection Districts.
1. WP-28 Wellhead Protection District No. 28. See 28.107(6).
2. WP-26 Wellhead Protection District No. 26. See 28.107(7).
3. WP-15 Wellhead Protection District No. 15. See 28.107(8).

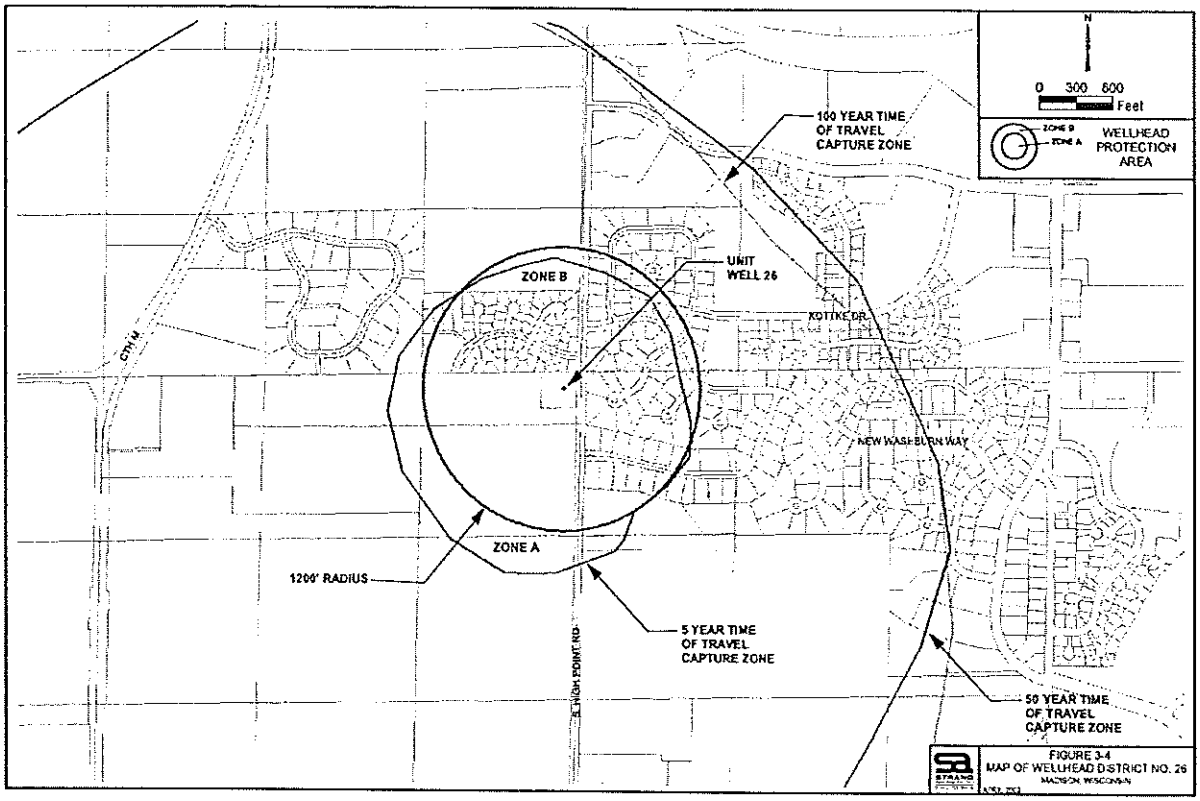
2. Subsection (7) entitled "Wellhead Protection District No. 26" of Section 28.107 entitled "Wellhead Protection Districts" of the Madison General Ordinances is created to read as follows:

"(7) Wellhead Protection District No. 26. The location of Well No. 26 and the surrounding Zone A and Zone B are shown in Sect. 28.107(7)(a).

Approved as to form:

_____
James L. Martin, City Attorney

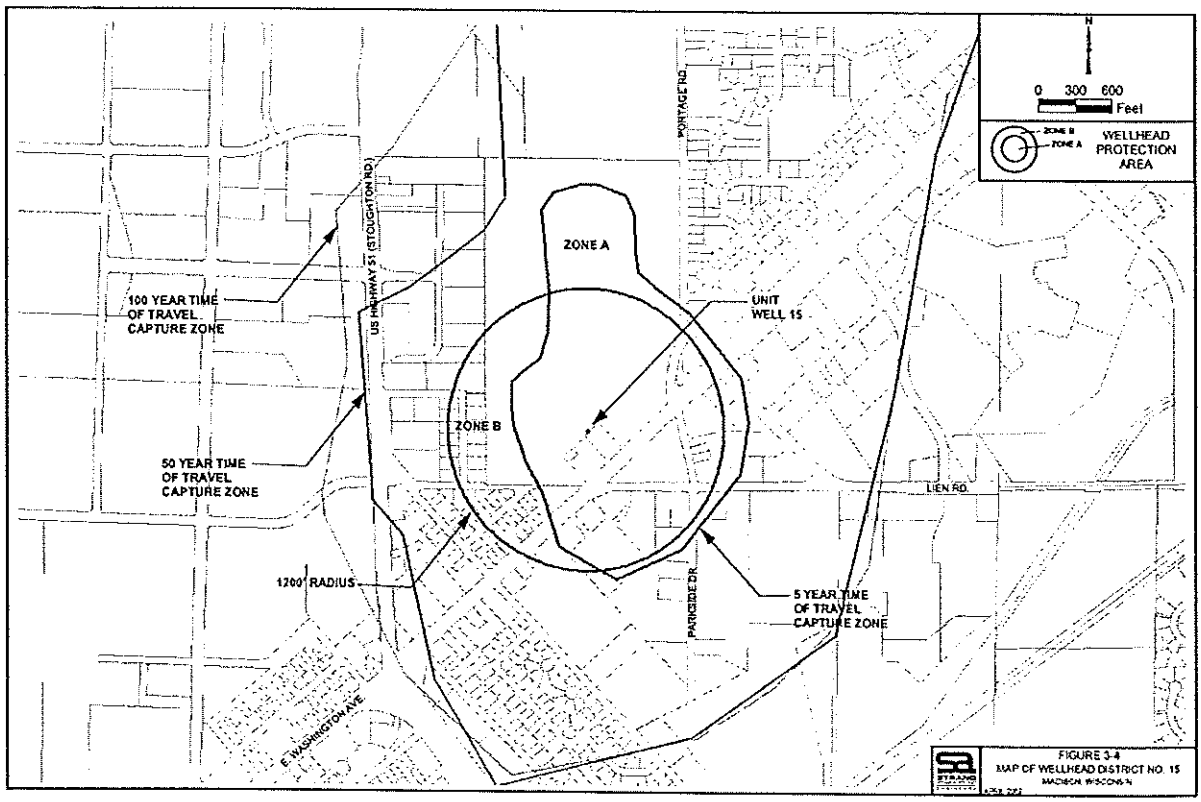
(a) Map of Wellhead District No. 26.



3. Subsection (8) entitled "Wellhead Protection District No. 15" of Section 28.107 entitled "Wellhead Protection Districts" of the Madison General Ordinances is created to read as follows:

"(8) Wellhead Protection District No. 15. The location of Well No. 15 and the surrounding Zone A and Zone B are shown in Sect. 28.107(8)(a).

(a) Map of Wellhead District No. 15.



AGENDA #_____
Copy Mailed to Alderpersons_____

CITY OF MADISON, WISCONSIN

AN ORDINANCE _____

creating Section 28.06(1)(h) of the Madison General Ordinances to add Wellhead Protection Districts to the list of zoning districts, **creating Section 28.107** of the Madison General Ordinances to establish Wellhead Protection Districts, **creating new Section 13.22** of the Madison General Ordinances to administer approval of uses in Wellhead Protection Districts, and **renumbering current Section 13.22** to Section 13.23.

Drafted by: Katherine C. Noonan
Assistant City Attorney

Date: March 22, 2002

Fiscal Note:

SPONSORS:

PRESENTED _____
REFERRED Plan Commission;
Water Utility _____
REREFERRED _____

REPORTED BACK _____

ADOPTED _____ POF _____
RULES SUSP. _____ TABLED _____
PUBLIC HEARING _____

* * * *

MAYOR SIGNED _____
PUBLISHED _____

* * * *

APPROVAL OF FISCAL NOTE IS NEEDED
BY THE COMPTROLLER'S OFFICE
Approved By

_____
Comptroller's Office

* * * *

ORDINANCE NUMBER _____
ID NUMBER _____

ANALYSIS: Pursuant to Wisconsin Administrative Code Ch. NR811, a Wellhead Protection Plan is required for all new wells for municipal water systems. The plan must include a management plan that addresses potential contamination sources and how they will be managed by local ordinances and other local initiatives.

1. Subdivision (h) entitled "Wellhead Protection Districts" of Subsection (1) entitled "Establishment of Zoning Districts" of Section 28.06 entitled "Zoning Districts and Zoning Map Amendments" of the Madison General Ordinances is created to read as follows:

"(h) Wellhead Protection Districts.
1. WP-28 Wellhead Protection District No. 28. See 28.107(6)."

2. Section 28.107 entitled "Wellhead Protection Districts" of the Madison General Ordinances is created to read as follows:

Approved as to form:

_____
Larry W. O'Brien, Interim City Attorney

"28.107 **WELLHEAD PROTECTION DISTRICTS.**

(1) Statement of Purpose. The Common Council of the City of Madison finds that certain uses can seriously threaten or degrade groundwater quality. To promote the public health, safety, and general welfare of the City of Madison, the Wellhead Protection Districts are created to protect municipal water supplies.

(2) Applicability. The requirements of the Wellhead Protection Districts shall apply to all zoning lots located in such districts in addition to all requirements in the Madison General Ordinances that apply to the principal zoning district classification of said zoning lots.

(3) Protection Zones. Each wellhead shall have two (2) zones of protection around it.

(a) Zone A shall be the area around the well in which it has been determined that groundwater and potential contaminants will take five (5) years or less to reach the pumping well.

(b) Zone B shall be the smaller of the area around the well in which it has been determined that groundwater and potential contaminants will take one hundred (100) years or less to reach the pumping well, or the area within a twelve hundred (1,200) foot radius around the well.

(4) Uses. All uses in Zones A and B of any Wellhead Protection District shall be approved by the Water Utility General Manger or his/her designee. A use may be approved with conditions.

(a) Permitted Uses In Zones A and B. Any use allowed as permitted in the principal zoning district, except those uses not approved pursuant to Sec. 13.22.

(b) Conditional Uses In Zones A and B. Any use allowed as a conditional use in the principal zoning district except those uses not approved pursuant to Sec. 13.22. All conditional uses are subject to the provisions of Sec. 28.12(11).

(5) Existing Uses. Any lawful use existing at the time of the creation of a Wellhead Protection District may be continued, however, no expansion or enlargement of such use is allowed without approval pursuant to Sec. 13.22 by the Water Utility General Manager or his/her designee.

(6) Wellhead Protection District No. 28. The location of Well No. 28 and the surrounding Zone A and Zone B are shown in Section 28.107(6)(a).

(a) Map of Wellhead District No. 28.

INSERT MAP

3. New Section 13.22 entitled "Wellhead Protection" of the Madison General Ordinances is created to read as follows:

"13.22 **WELLHEAD PROTECTION.**

(1) To prevent contamination of wells supplying municipal water systems, the Water Utility General Manager or his/her designee shall review all proposed uses on zoning lots in Zones A and B in Wellhead Protection Districts.

(2) Review will be based on the presence, use, or storage on the lot of hazardous chemicals, as defined by the Environmental Protection Agency. Consideration will be given to factors including but not limited to the following: whether the zoning lot is in Zone A or Zone B, effective storage or containment of particular hazardous chemicals, and the magnitude and/or frequency of use of the hazardous chemicals. Approval of the use may be contingent on specific conditions being met. A current list of hazardous chemicals, as defined by the Environmental Protection Agency, shall be maintained."

4. Current Section 13.22 entitled "Penalty" of the Madison General Ordinances is renumbered to Section 13.23.

N

0' 300' 600'
SCALE

ZONE B
ZONE A
WELLHEAD PROTECTION AREA

ZONE B

ZONE A

UNIT WELL 28

5 YEAR TIME OF TRAVEL CAPTURE ZONE

1200' RADIUS

PLEASANT VIEW RD

W OLD SAUK RD

OLD SAUK RD

US HWY 12 & 14

U.S. HWY 12 & 14

MAP OF WELLHEAD DISTRICT NO. 28
MADISON, WISCONSIN

APRIL 2002