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OPEN-FILE REPORT 80-UR - No. 23: WALWORTH COUNTY

**STATEWIDE LANDFILL STUDY:
WALWORTH COUNTY LANDFILL SITE CHARACTERISTICS**

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INTRODUCTION

Purpose and Scope

The purpose of this report is to summarize the geologic data, hydrologic data, and other site characteristics of the Walworth County landfill. This information was compiled as a part of the Statewide Landfill Study.

In 1984, the state of South Dakota had 38 permitted solid waste landfills, both private and public, that accepted waste other than ordinary household waste. A study was undertaken in an effort to evaluate selected landfills in South Dakota and identify those that may be best suited for the disposal of these special wastes.

This study was conducted by the South Dakota Geological Survey and the Office of Air Quality and Solid Waste of the Department of Water and Natural Resources, now known as the Department of Environment and Natural Resources. The Office of Air Quality and Solid Waste contracted with the South Dakota Geological Survey for certain geological services. The South Dakota Geological Survey contribution to this study was three-fold. First, available geologic and hydrologic data from landfills in South Dakota were reviewed and evaluated. Second, monitoring well systems were designed and installed at four landfills which were selected by the Office of Air Quality and Solid Waste. Finally, the geology was evaluated in more detail at these four landfills.

Selection of Sites

Existing information concerning 38 permitted and 2 proposed landfill sites was reviewed by the Office of Air Quality and Solid Waste in order to prioritize the sites. The Office of Air Quality and Solid Waste used this preliminary screening to reduce the number of potential sites from 40 to 26 (table 1 and fig. 1).

TABLE 1. List of sites considered for further evaluation

1. Belle Fourche City	14. Miedema City
2. Brookings City - Proposed	15. Milbank City
3. Brown County	16. Miller City
4. Brule County	17. Pierre City - Proposed
5. Byre (Private)	18. Pierre City - Old Site
6. Davison County	19. Ralph Dawson (Private)
7. De Smet City	20. Rapid City
8. Gregory County	21. Sioux Falls (Runge) City
9. Haarstad (Private)	22. Vermillion City
10. Huron City	23. Walworth County
11. John Clements (Private)	24. Watertown City
12. Kadoka City	25. Winner City
13. Marshall County	26. Yankton County

Subsequently, the South Dakota Geological Survey evaluated these 26 sites and prepared a draft report describing each site. No field checking was done. Topics such as topography, drainage, climate, soils, geology, hydrology, water quality, adjacent land use, hazardous waste records, and operational practices were addressed. These reports included copies of available maps, lithologic logs, and water quality analyses. Draft copies of these unpublished reports are on file at the Department of Environment and Natural Resources in Pierre and the South Dakota Geological Survey in Vermillion. The individual report on the Walworth County landfill is the basis for this report.

After the initial assessment of the 26 sites, the Office of Air Quality and Solid Waste established criteria for further prioritizing the sites. Four sites were selected for the installation of monitoring wells. The South Dakota Geological Survey conducted detailed investigations at the Brown County, Watertown City, Yankton County, and Rapid City landfills (fig. 1). A draft copy of the unpublished summary report is on file at the Department of Environment and Natural Resources in Pierre and the South Dakota Geological Survey in Vermillion. The following information was available regarding the Walworth County landfill in 1986.

WALWORTH COUNTY LANDFILL

Location

The Walworth County landfill is located 3 miles east and 1 mile south of Mobridge. Its legal location is N½ S½ sec. 36, T. 124 N., R. 79 W. (fig. 2).

Topography, Drainage, and Climate

The information on topography and drainage was taken from the Glenham Quadrangle and the Moreau NE Quadrangle (United States Geological Survey, 1967 and 1968). In actuality, the present landfill surface may be significantly different because of activities at the landfill.

The topography at the Walworth County landfill is comprised of steeply sloping hills which are characteristic of Missouri River bluff terrain (fig. 2). To the south of the site lies the Missouri River floodplain. The elevation ranges from 1,630 to 1,790 feet for a maximum relief of 160 feet at the site.

Most surface drainage in the area is controlled by the Missouri River which is immediately south of the landfill site. Two intermittent streams cut through the eastern half of the landfill. They flow approximately half a mile in a southeasterly direction to the Oahe Reservoir of the Missouri River. Several other small valleys exist within the boundaries of the landfill site.

The average annual temperature in Walworth County is 44 degrees Fahrenheit. Precipitation averages 17 inches per year. The average annual class A pan evaporation is 49 inches. Climatological data are from Spuhler and others (1971).

Geology

According to Baker (1952), surface sediments at the landfill are primarily the Mobridge member of the Pierre Shale (fig. 3). The far eastern side of the landfill intersects a lake bed deposit. There are six test hole logs located within the boundaries of the landfill (fig. 4, app. A). All test holes were completed between the depths of 9 and 19 feet and only clay was encountered. Within 1 mile of the

site, no additional lithologic logs were found. However, Schroeder (1978) describes sand layers 9 and 5 feet thick at SW SW SW SE sec. 31, T. 124 N., R. 78 W. and SW NE NE SW sec. 2, T. 123 N., R. 79 W., respectively. Both layers were less than 13 feet from the land surface and are part of the older gravels indicated on figure 3.

Only data meeting the South Dakota Geological Survey criteria were used in this study. Lithologic logs were utilized if the legal locations were known to four quarter sections (2.5 acres) and if they were located within the landfill site or within 1 mile of the site boundaries. Also, the source of a log must have been known or the log was not utilized; for example, all logs of test holes drilled by the South Dakota Geological Survey identify the drilling company as "SDGS."

Hydrology

According to records from the Office of Air Quality and Solid Waste, the material at the base of the landfill consists primarily of clay. The permeability of this material (presumably shale) is not known but can be represented in qualitative terms. In general, the permeability of shale is less than that of sand and gravel. No site specific permeability data are available.

No monitoring wells have been installed within 1 mile of the site. Without the presence of adequately constructed monitoring wells (a minimum of three) in the proper locations and at the proper depths, the lateral hydraulic gradient and direction of potential ground water movement cannot be estimated for the landfill area. The nearest ground water supply (aquifer) is unknown. However, the Missouri River floodplain is less than a quarter of a mile downslope from the landfill.

Water Quality

No water quality data were available within the landfill or within 1 mile of the landfill.

Adjacent Land Use and Features

Information about adjacent land use and features was taken from the Glenham Quadrangle and the Moreau NE Quadrangle (United States Geological Survey, 1967 and 1968), the General Highway Map - Walworth County (South Dakota Department of Transportation, 1978), and Schroeder (1978).

- * The nearest surface waters are the Oahe Reservoir (a quarter of a mile southeast) and numerous small stock dams within half a mile of the site.
- * State Highway 1804 crosses through the east half of the site.
- * Railroad tracks are located near the southeast corner of the site.
- * Two gravel pits are located near the landfill. One is located in the NW¼ sec. 31, T. 124 N., R. 78 W. and the other in the S½ sec. 2, T. 123 N., R. 79 W. (Schroeder, 1978).

**Operational and Siting Criteria - Summary from the
Office of Air Quality and Solid Waste Records**

The most common responses found on the Office of Air Quality and Solid Waste site inspection reports prior to 1986 are given in this section. Copies of microfiche data are available from the Department of Environment and Natural Resources in Pierre.

1. Site: Walworth County
2. Population served: 7,000
3. Method of disposal: Cut and fill (trench)
4. Estimated amount of waste received per unit time: 5,616 tons/year
5. Access to site:
 - * Fenced: Yes No Lockable gate: Yes No
 - * Litter fences present: Yes No
 - * All weather access road to site: Yes No
6. List industry present: No information available.
7. Land Use:
 - * Preoperational land use: Grazing
 - * Proposed post-operational land use: Park
 - * Current land use within a quarter of a mile radial area: Grazing, cropland, homesites

SUMMARY

- * Several intermittent streams are located in and near this landfill. They drain to the Oahe Reservoir.
- * The geology at this site generally consists of Pierre Shale. A lake bed deposit is present on the far eastern side of the site.
- * Six test hole logs were available near this site.
- * No monitoring wells were present near this site.
- * No water level data were available near this site.
- * No water quality data were available near this site.

REFERENCES CITED

- Baker, C.L., 1952, Geology of the Mobridge quadrangle: South Dakota Geological Survey Geologic Quadrangle Map, scale 1:62,500.
- Schroeder, W., 1978, Sand and gravel resources in Walworth County, South Dakota: South Dakota Geological Survey Information Pamphlet 17, 31 p.
- South Dakota Department of Transportation, 1978, General Highway Map Walworth County, South Dakota: South Dakota Department of Transportation in cooperation with the United States Department of Transportation, (revisions as of May 31, 1979).
- Spuhler, W., Lytle, W.F., and Moe, D., 1971, Climate of South Dakota: Brookings, South Dakota, South Dakota State University Agricultural Experiment Station Bulletin 582, 30 p.
- United States Geological Survey, 1967, Glenham quadrangle, South Dakota: 7.5 minute series (topographic), scale 1:24,000.
- _____, 1968, Moreau NE quadrangle, South Dakota: 7.5 minute series (topographic), scale 1:24,000.

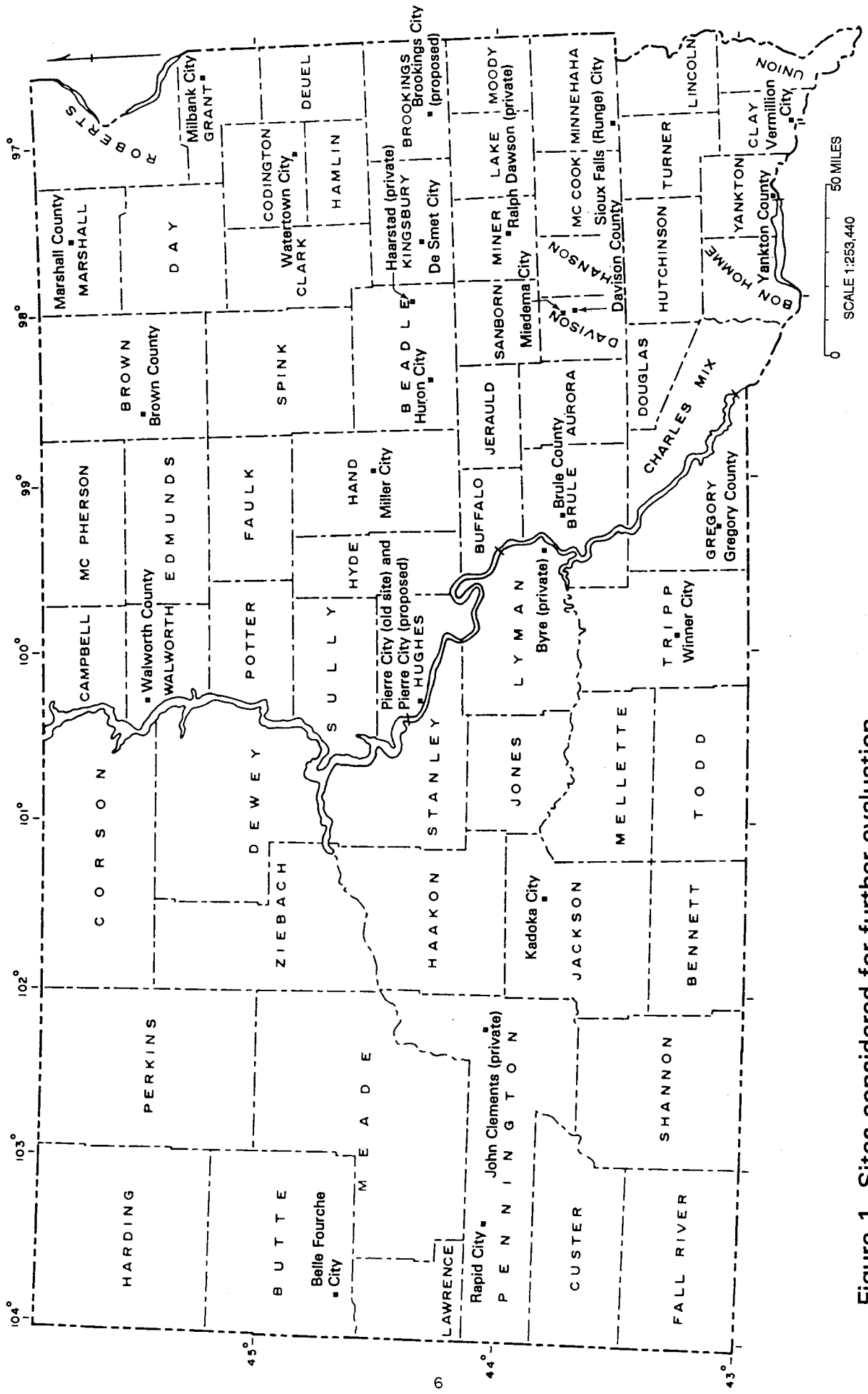
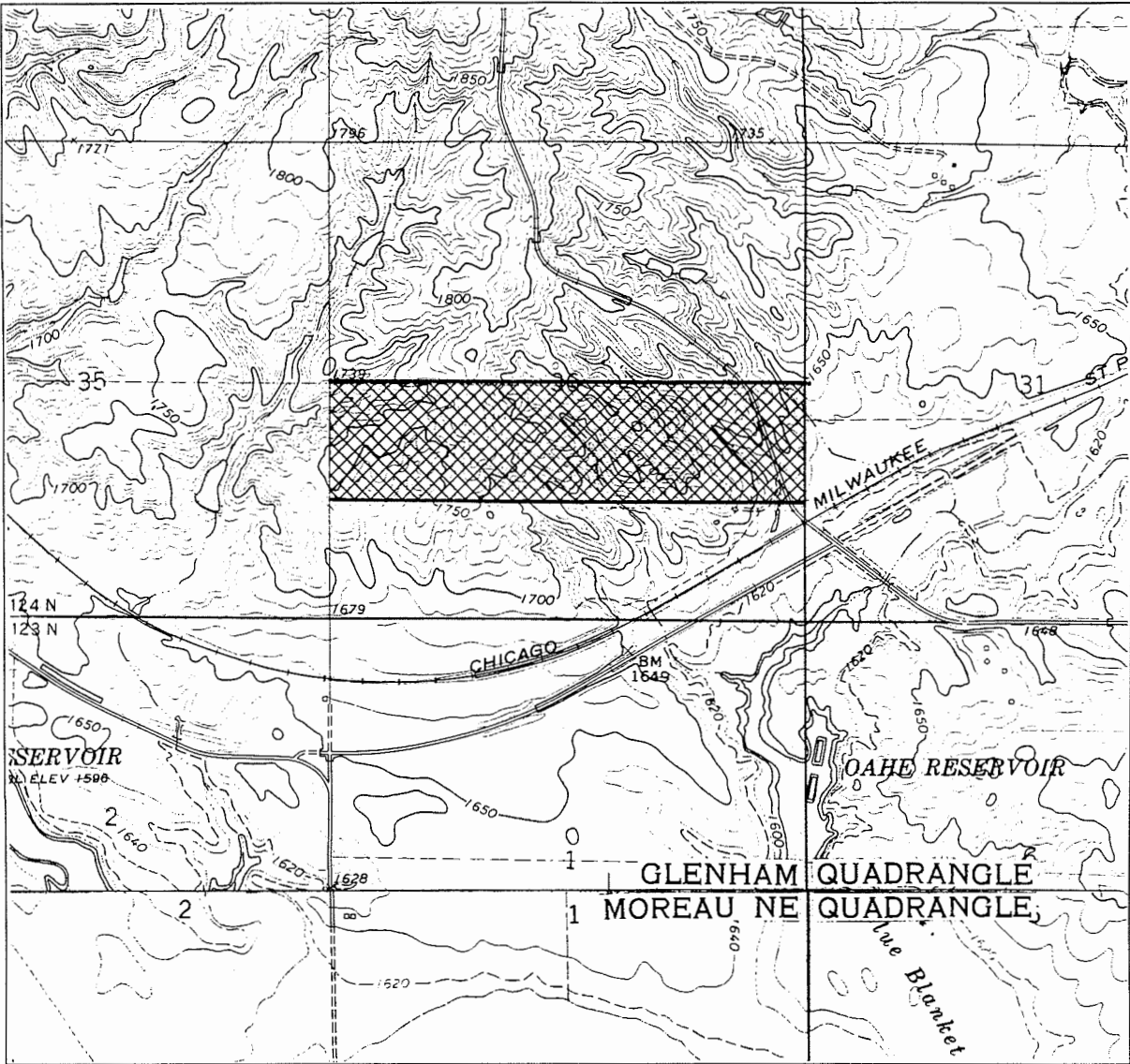


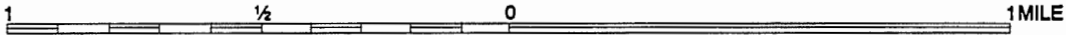
Figure 1. Sites considered for further evaluation.

R. 79 W. | R. 78 W.

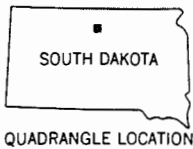


T. 123 N. | T. 124 N.

SCALE 1:24000



CONTOUR INTERVAL 10 FEET, GLENHAM QUADRANGLE
CONTOUR INTERVAL 20 FEET, MOREAU NE QUADRANGLE

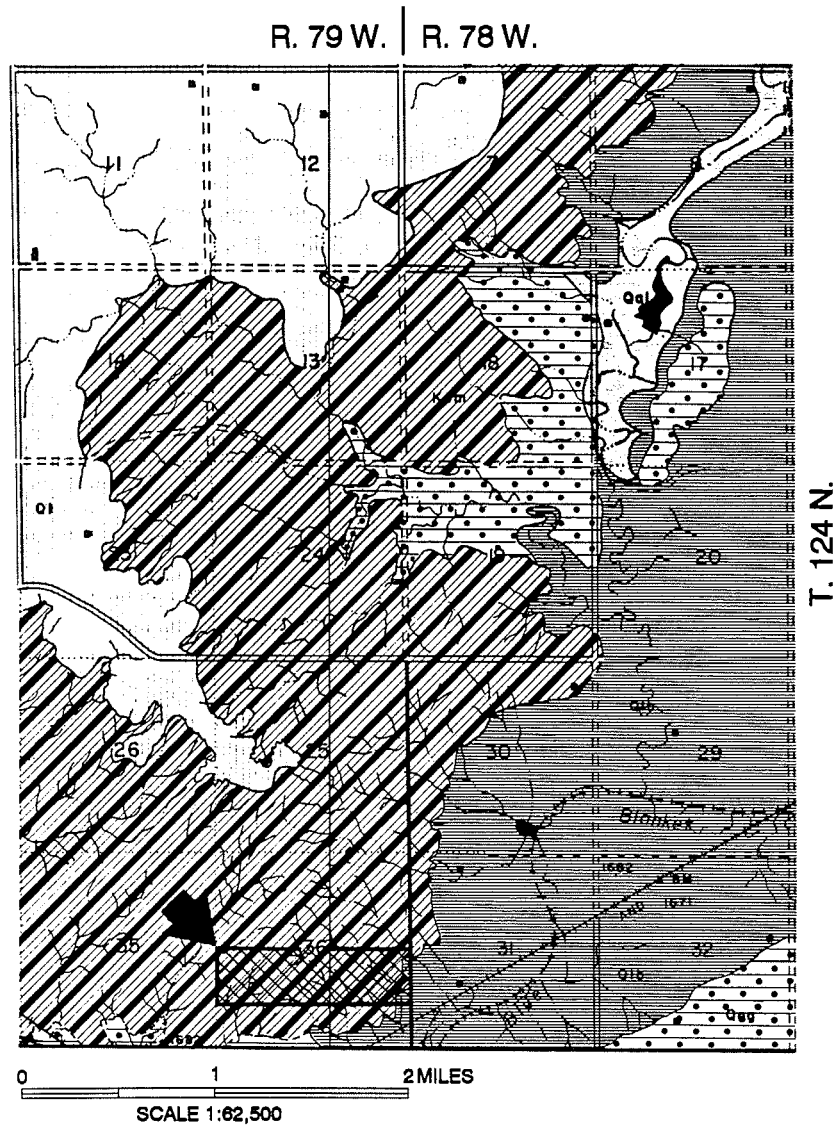


Landfill location: N $\frac{1}{2}$ S $\frac{1}{2}$ sec. 36,
T. 124 N., R. 79 W.
Walworth County



Adapted from United States
Geological Survey (1967 and 1968)

Figure 2. Location of the Walworth County landfill.



Qal.....Alluvium

 Landfill

Ql.....Loess

Qlb.....Lake beds

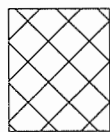
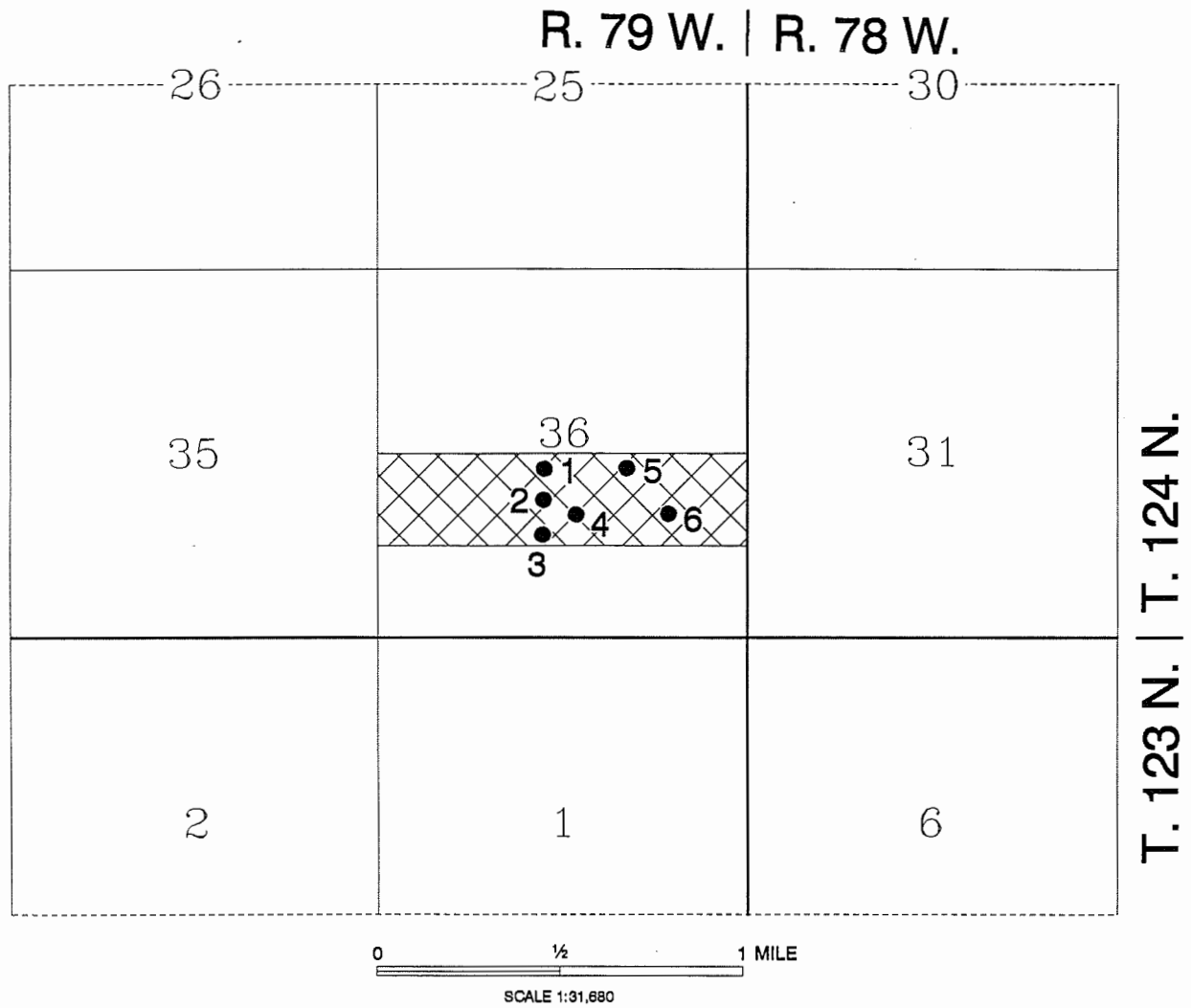
Qog.....Older gravels

Kpm.....Mobridge member

Adapted from Baker (1952)



Figure 3. Geology near the Walworth County landfill.



Landfill

Landfill location: N $\frac{1}{2}$ S $\frac{1}{2}$ sec. 36,
T. 124 N., R. 79 W.
Walworth County

2 ● Test hole. Numbers are the test hole identifier.



Figure 4. Locations of test holes drilled within 1 mile of the Walworth County landfill.

APPENDIX A

Legal locations of Walworth County landfill area logs of test holes

Listed below are the legal locations of those test holes cited in this report. Please contact the South Dakota Geological Survey if a copy of a lithologic log is needed.

NW NE NE SW sec. 36, T. 124 N., R. 79 W.

SW NE NE SW sec. 36, T. 124 N., R. 79 W.

SW SE NE SW sec. 36, T. 124 N., R. 79 W.

NE NW NW SE sec. 36, T. 124 N., R. 79 W.

NW SW NW SE sec. 36, T. 124 N., R. 79 W.

NE SE NW SE sec. 36, T. 124 N., R. 79 W.