

SIGNIFICANT AGGREGATE RESOURCE DEPOSITS*

DODGE COUNTY, MINNESOTA

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AGGREGATE POTENTIAL: For the purpose of this project, aggregate potential is defined as an assessment of the relative probability that an aggregate deposit exists within a given area, with almost all emphasis placed upon geologic evidence, parameters, and interpretation at the reconnaissance level, rather than upon economic feasibility evaluation or other parameters. This assessment does not imply that economic aggregate deposits exist everywhere within a given map unit designated as "Potential Sand and Gravel Resources" or "Potential Crushed Stone Resources." Rather, that within such a map unit, geologic processes were active that could have created aggregate deposits at specific sites. Geologic measurements of aggregate deposits remain consistent, but economic criteria and environmental permitting vary across time and place. Important site-specific factors, such as ownership, zoning, protected waters and wetlands, environmental permitting, distance to markets, royalties, and individual site characteristics, such as access, all contribute to the final "potential" of a specific parcel; however, these factors were not included in this study.

POTENTIAL SAND AND GRAVEL RESOURCES: Geologic units that are inferred to contain moderately to highly desirable sand and gravel deposits. The units in this category exhibit the geologic characteristics that typically contain sand and gravel deposits. Existing gravel pits and MNDOT aggregate sources lying within these units indicate identified or known resources. The geologic units having potential for sand and gravel include alluvial features (flood plains, terraces, and fans) and glacial outwash features (channels and terraces). These units typically contain sorted sand and gravel with little silt or clay.

POTENTIAL CRUSHED STONE RESOURCES: Bedrock formations that consist of moderately and highly desirable limestone that is suitable for crushing. The units are inferred to be thick (greater than 40 feet), with an overburden thickness of less than 30 feet. Quarries located within these units indicate identified or known resources. These bedrock units are most commonly found at or near the surface and along stream cuts in the eastern portion of the county.

LIMITED POTENTIAL FOR AGGREGATE RESOURCES: Units that generally have less desirable, or little or no potential for aggregate resources. These units exhibit geologic characteristics that are typically not consistent with significant aggregate deposits. The geologic units that have less desirable potential typically have thicknesses less than 25 feet and overburden thicknesses sometimes reaching greater than 100 feet. The geologic units include alluvial features (beaches and flood plains), glacial outwash features (outwash channels, fans, and deltas), and ice-contact features (eskers and kames) that are typically small, thin, or have too fine of a material to be of commercial value. The geologic units having limited potential include eolian (wind-blown), lacustrine (lake plains), morainic (till), small alluvial deposits, and bedrock with overburden thicknesses greater than 30 feet. These units typically contain clay, silt, fine sand, unsorted sediments (especially in fill), or very thin layers of sand and gravel. The units may include aggregate deposits that are too small to be mapped.

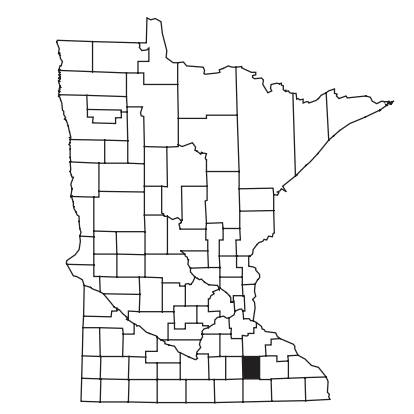
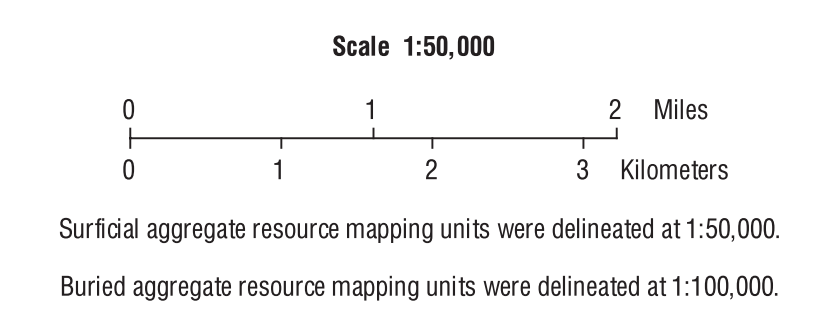
IDENTIFIED AGGREGATE RESOURCES: Areas where aggregate resources (sand, gravel, and/or crushed stone) have been or are currently being mined. Pit and quarry locations have been gathered from several different reference sources, including topographic maps, aerial photographs, county records, county highway department maps, soil surveys, MNDOT files, fieldwork, gravel operators, and other miscellaneous sources. The pits and quarries range in size from less than 1 acre to greater than 50 acres and may be active, inactive, depleted, or reclaimed. The aggregate quality of the pits varies.

- **Gravel Pits:** Locations were gathered from several different reference sources. Any given pit may be active, inactive, depleted, or reclaimed.
- **Gravel Pits - MNDOT files:** Locations gathered from the Minnesota Department of Transportation's Aggregate Source Information System (ASIS) listing of aggregate sources. Test hole logs, sieve, and quality test data are available.
- ★ **Quarries:** Limestone quarries from several different reference sources. Any given quarry may be active, inactive, depleted, or reclaimed.

OTHER FEATURES:

- **WETLANDS:** Wetland area.
- **WATER:** Lakes or rivers.

*Significant aggregate resource deposits are defined as those deposits most likely to be explored and evaluated for future commercial use; they include moderately and highly desirable sand, gravel, and crushed stone deposits.



Base map data sources:
 Lakes, wetlands, and rivers from National Wetland Inventory, U.S. Fish and Wildlife Service, compiled at 1:24,000 from aerial photography (1979-1988) and spot field checked.
 Public Land Survey - PLS Project, 2001, Minnesota Department of Natural Resources, Division of Lands and Minerals.
 Roads were obtained from Dodge County in September of 2002.
 Civil Townships and Municipal Boundaries from MNDOT Basemap 2001 - Data layers Createp and Muni, Minnesota Department of Transportation, BaseMap Development Group, Surveying and Mapping Section.

GIS database design and cartography by Renee Johnson. Database assistance by Erika Rowe.
 Field and drilling assistance by Rico Rihiluoma, Doug Rosman, Al Durock, Mike Ellett, and Pat Geseleman.

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 Projects are determined by a committee composed of Governor-appointed members from the public and private sectors.

Aggregate Resources:
 Aerial photograph interpretation, field work, and delineation of mapping units by Heather E. Anderson, 2001-2002, County Aggregate Mapping Program, Division of Lands and Minerals, Minnesota Department of Natural Resources. Source information included aerial photographs from NAPP (National Aerial Photography Program), 1991-1992, 9" x 9" color infrared photos at 1:40,000; DODs (Digital Orthophoto Quadrangles) at 1:24,000 from USGS (United States Geological Survey); DRGs (Digital Raster Graphics) at 1:24,000 from USGS; 7.5-minute USGS topographic quadrangles at 1:24,000 (dating from 1962-1982); and a digital version of the Soil Survey of Dodge County, 1961, from the USDA-NRCS (United States Department of Agriculture - National Resources Conservation Service), imported into the Soil Survey Information System (SSIS) format by the University of Minnesota, Department of Soil, Water, and Climate.

This project includes a CD-ROM of maps, data, and metadata in a digital format and the following plates:
 Plate I, Report 357, Significant Aggregate Resource Deposits. Plate II, Report 357, Surficial Geology.
 Plate III, Report 357, Aggregate Resources. Plate IV, Report 357, Data Sources and Mapping Methodology.