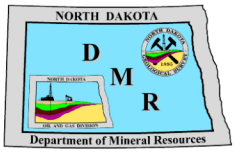




Offshore Glaciolacustrine Deposits of Glacial Lake Agassiz: The Brenna Formation in Grand Forks County, North Dakota



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LOCATIONS OF DRILLHOLES

This map displays the locations of drillholes in Grand Forks County consisting of test holes, water wells, and deep foundation borings, used to map the geologic extent of the Brenna Formation in the shallow subsurface. The Brenna Formation consists of smectitic clay that was deposited as offshore deep-water sediment into glacial Lake Agassiz during latest Wisconsinan time. Lithologically, the Brenna Formation in Grand Forks County contains, on average, 87% clay, 12% silt, with minor (~1%) amounts of sand (Figure 1). It was only deposited in the eastern part of the county and covers an area of 414 mi² (1,072 km²). It is more laterally extensive north of the city of Grand Forks and less extensive to the west and south of the city. The smectitic clay mineralogy of the Brenna Formation results in a soft and expansive clay that is problematic for surface engineered works as it has low, load-bearing characteristics.

- Drillhole Locations
- Test Hole
 - Observation Wells
 - NDDOT Geotechnical Borings
 - Private Well
 - Brenna Extent

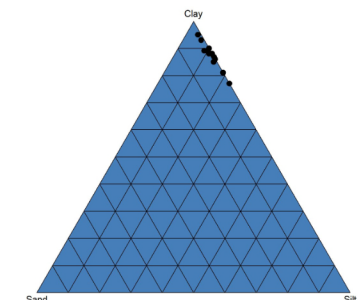
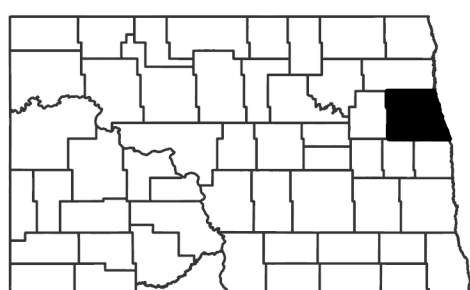
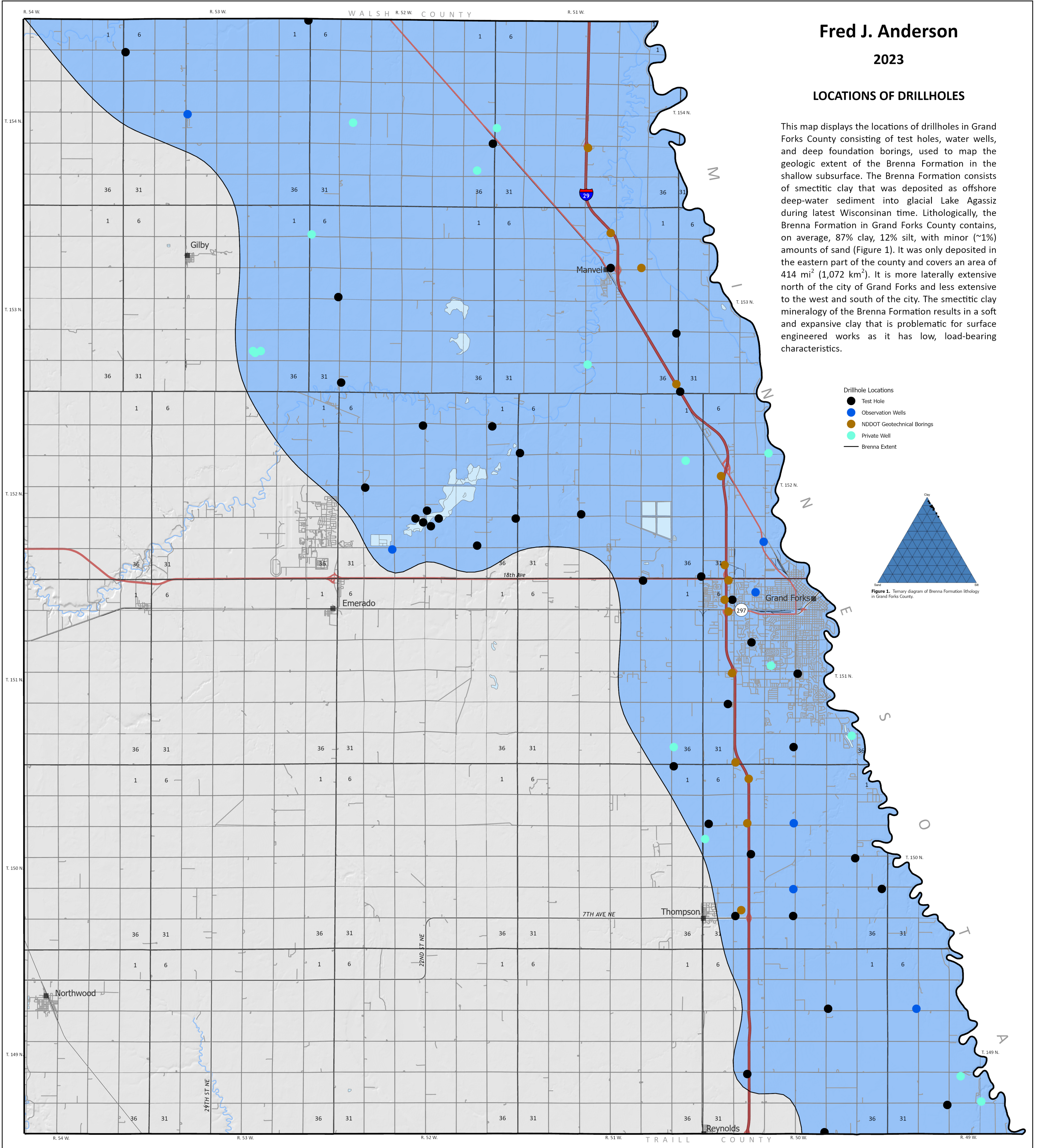
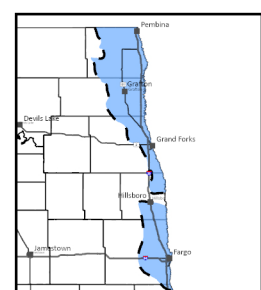


Figure 1. Ternary diagram of Brenna Formation lithology in Grand Forks County.



Grand Forks County, North Dakota



Location and extent of the offshore lake clays of the Brenna Formation in the Red River Valley of North Dakota.

