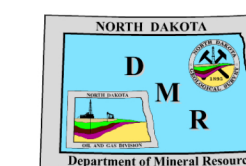




Offshore Glaciolacustrine Deposits of Glacial Lake Agassiz: The Brenna Formation in Pembina County, North Dakota



Fred J. Anderson

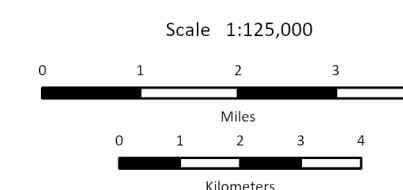
2024

LOCATIONS OF DRILLHOLES

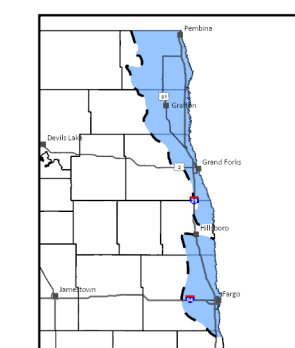
This map displays the locations of drillholes in Pembina County consisting of test holes, water wells, and deep foundation borings, used to map the geologic extent of the Brenna Formation in the shallow subsurface. The Brenna Formation consists of smectitic clay that was deposited as offshore deep-water sediment into glacial Lake Agassiz during latest Wisconsinan time. It was deposited across the eastern two-thirds of the county and covers an area of 898 mi² (2,326 km²). 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 properties.

Drillholes

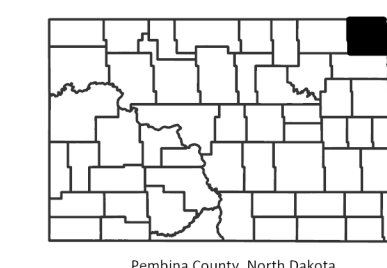
- NDDOT
- Observation Well
- Test Hole



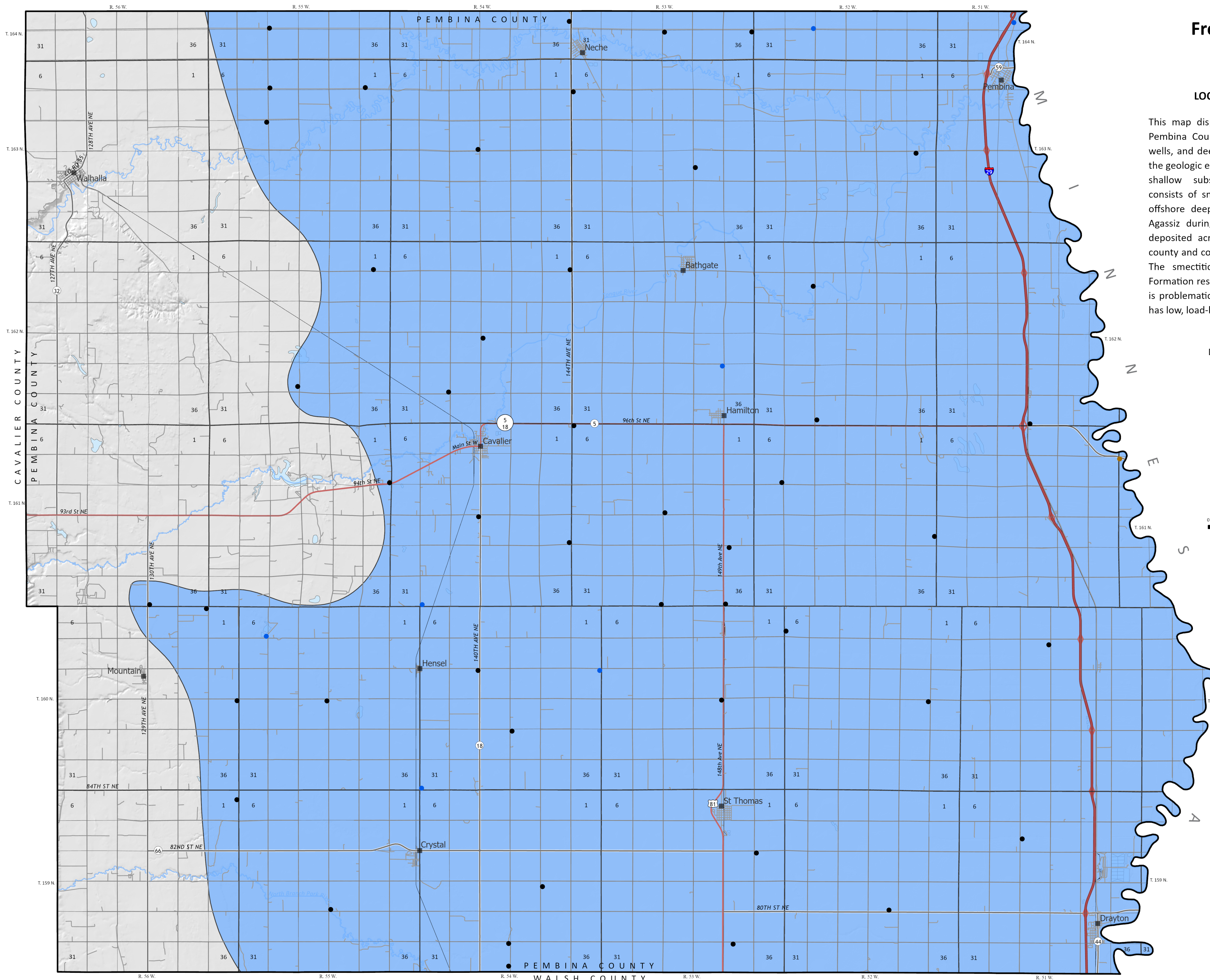
Mercator Projection
Standard Parallel 48°30'0"N
North American 1983 Datum
Central Meridian 97°30'0"E



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

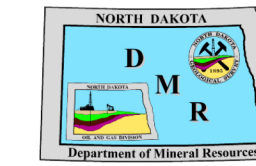


Pembina County, North Dakota





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

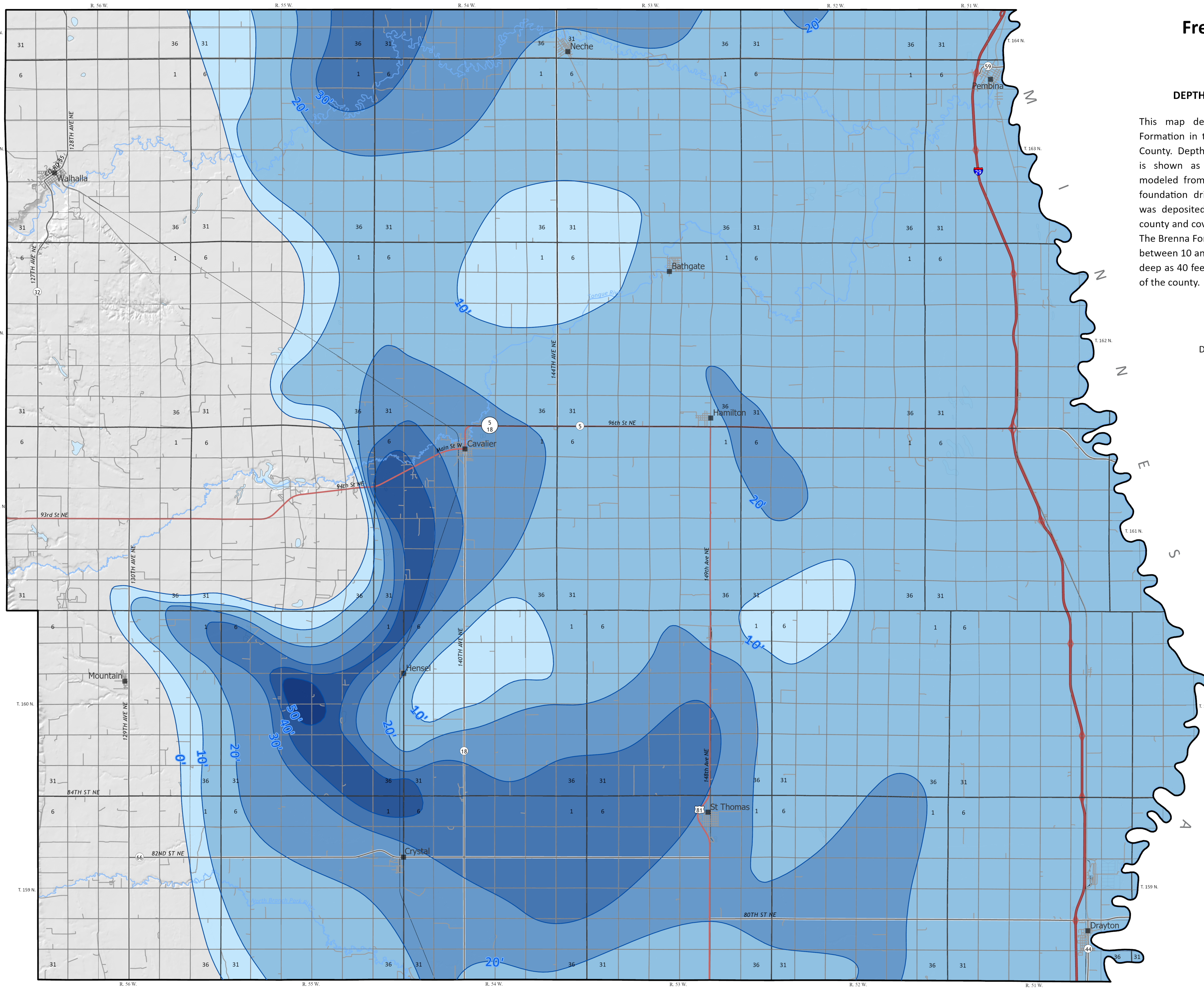


Fred J. Anderson

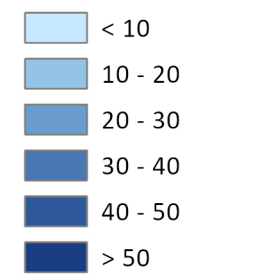
2024

DEPTH TO BRENNA FORMATION

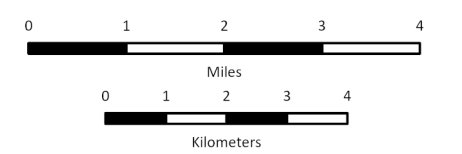
This map depicts the depth of the Brenna Formation in the shallow subsurface in Pembina County. Depth to the top of the Brenna Formation is shown as colored depth contour intervals modeled from test, hole, water well, and deep foundation drilling data. The Brenna Formation was deposited across the three-quarters of the county and covers an area of 898 mi² (2,326 km²). The Brenna Formation is generally found at depths between 10 and 20 feet (3 to 6.1 m) but may be as deep as 40 feet (12.2 m) in the southwestern part of the county.



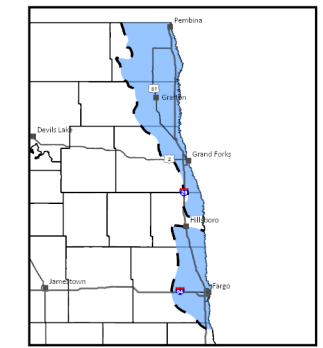
Depth Contour (feet bls)



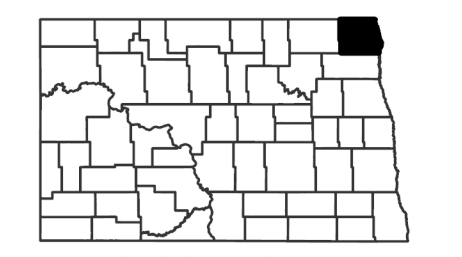
Scale 1:125,000



Mercator Projection North American 1983 Datum
Standard Parallel 48°30'0"N Central Meridian 97°30'0"E



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



Pembina County, North Dakota

