

Surface Geology

Gardner Quadrangle, North Dakota

Fred J. Anderson

2023

EXPLANATION

ANTHROPOCENE

Af FILL DEPOSITS

Cut and fill materials consisting dominantly of silts, clays, and sands from adjacent nearsurface formations placed by artificial means. Used in construction of highway crossover ramps, wastewater ponds and drainage improvement embankments.

QUATERNARY PERIOD

HOLOCENE EPOCH

Hls LANDSLIDE DEPOSITS

A mass of material that has moved downslope. Includes earth flows, slumps, and areas of soil creep.

OAHE FORMATION

Hal ALLUVIUM

Brown-gray, bedded to massive, sands, silts, gravels, and clays deposited as reworked and recent channel alluvium and overbank deposits. Constrained to areas within the Red River and older meander belts and tributary drainages on the Glacial Lake Agassiz Plain.

SHERACK FORMATION

Hs GLACIOLACUSTRINE OFFSHORE SEDIMENT

Yellow-gray, laminated to obscurely bedded, silt, clay, and silty-clay, cohesive. Ranges in thickness between 14 and 29-ft within the quadrangle. Glaciolacustrine sediments deposited in offshore environments of Glacial Lake Agassiz. Prone to slumping along outbank meanders within the Red River and tributary drainages.

Ice-drag marks

Established from aerial photographs and LIDAR. Low linear ridges and shallow grooves made by glacial icebergs or floating lake ice in contact with the lake bottom.

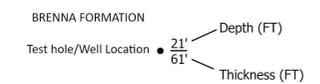
BRENNA FORMATION

Qb GLACIOLACUSTRINE OFFSHORE SEDIMENT

Not Exposed in Map Area, Shallow Subsurface Unit
Brown to very dark-gray, slightly laminated to unbedded, soft, slickensides. Directly underlies the Sherack Formation throughout the quadrangle. Depth and thickness values shown at available test hole/well locations.

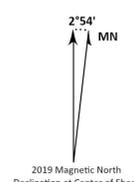
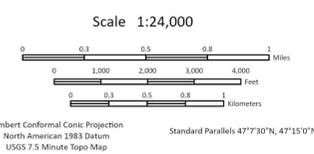
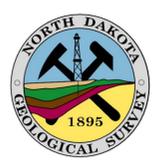
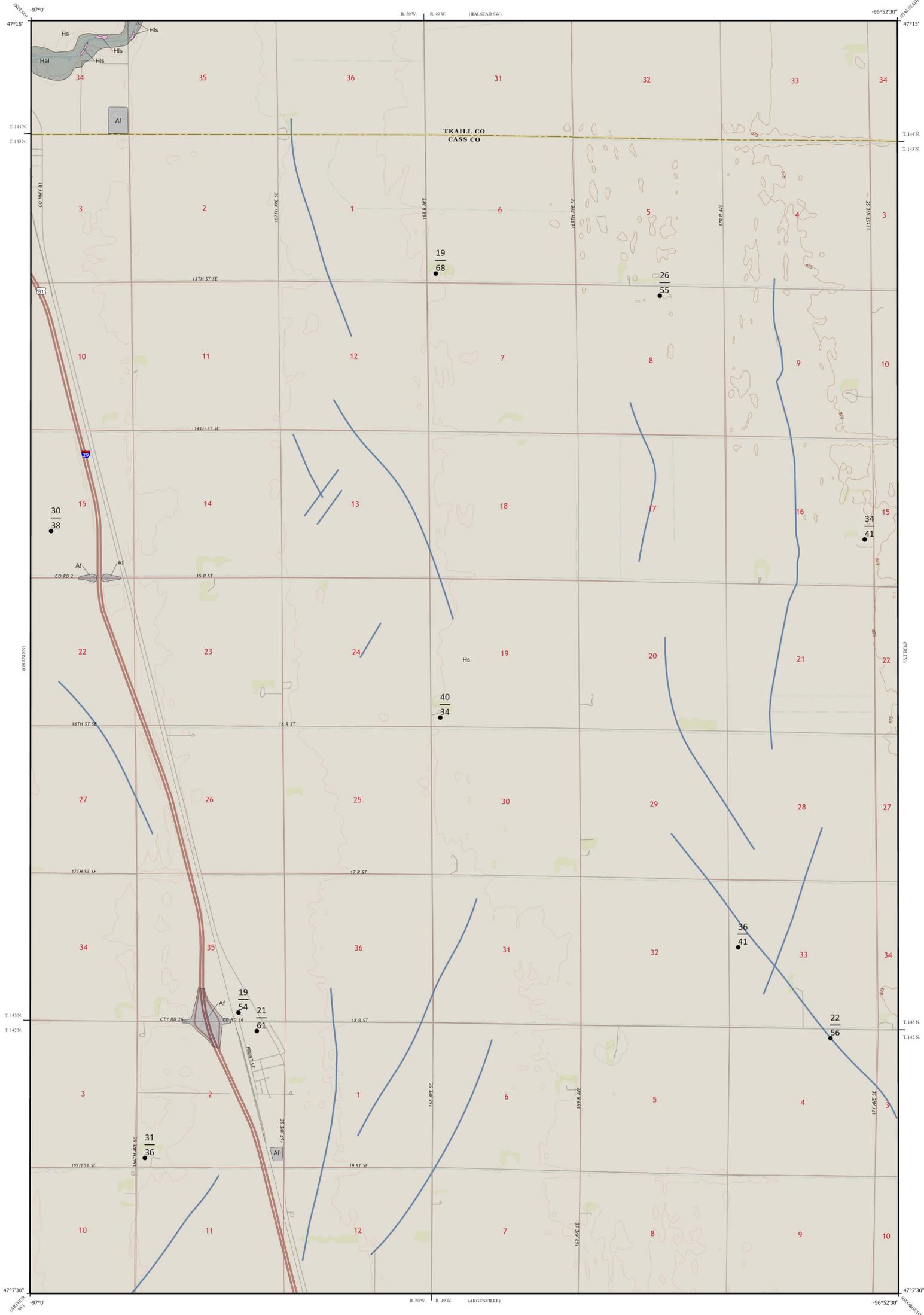
Geologic Symbols

Geologic contact (Known)



CORRELATION OF MAP UNITS

Glaciolacustrine	Fluvial	Geohazards	Anthropogenic	Epoch	Period
Offshore	Channel/O verbank	Landslides	Fill		
Hs	Hal	Hls	Af	Holocene	Quaternary
Qb				Pleistocene	



LOM Data Originator: International Water Institute, 2010; Well Run Basin Mapping Initiative 2008-2010; NDCS Research and 102 State Water Commission, 2010; James River Basin LOMF G2.