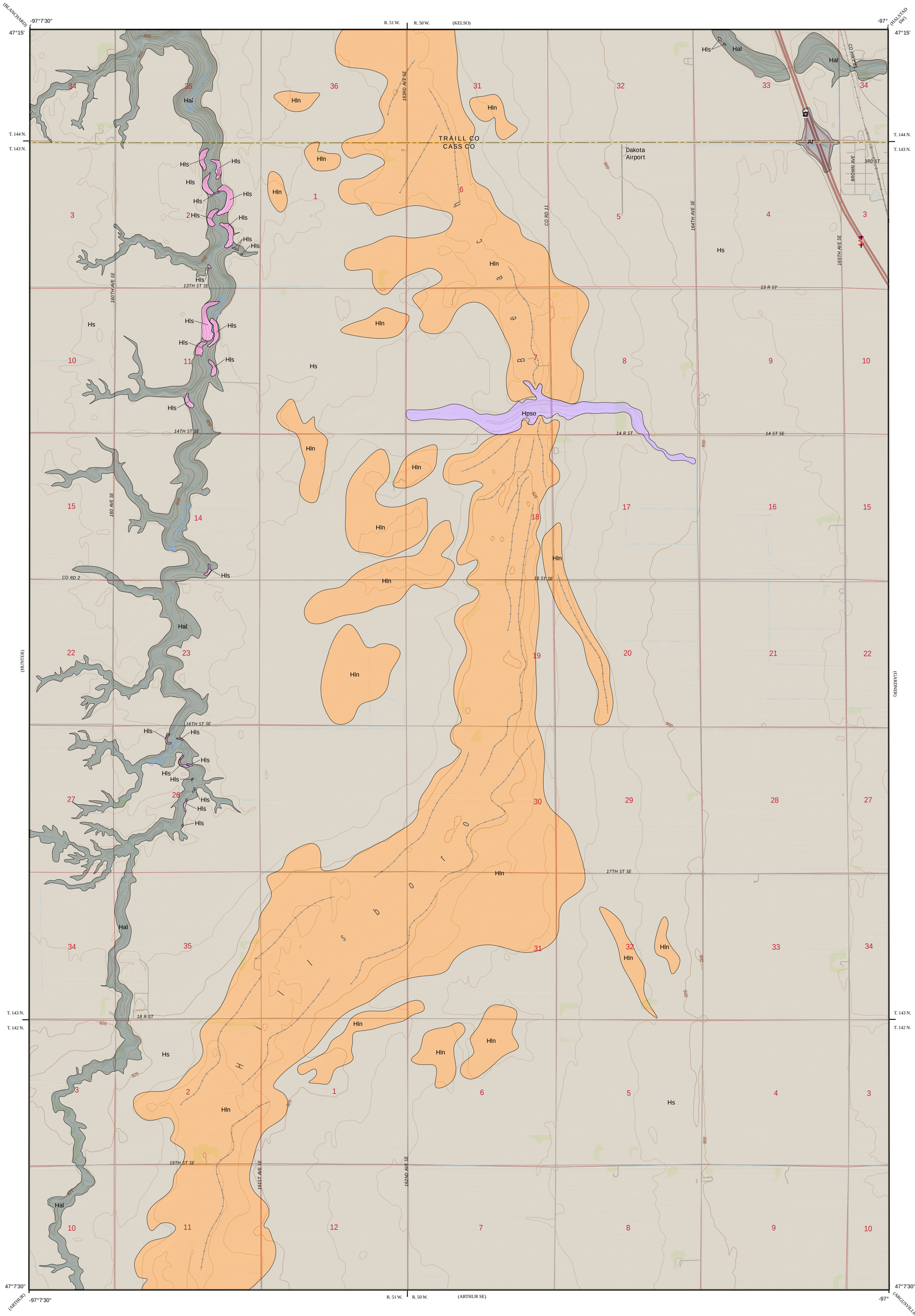
North Dakota Geological Survey
24K: Grnd - sg

Edward C. Murphy, State Geologist
Lynn D. Helms, Director Dept. of Mineral Resources

Surface Geology
Grandin Quadrangle, North Dakota



Fred J. Anderson

2024

EXPLANATION

ANTHROPOCENE

Af FILL DEPOSITS
Cut and fll materials consistng dominantly of silts, clays, and sands from adjacent nearsurface formatons placed by artfcial means. Used in constructon 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 fows, slumps, and areas of soil creep.

OAHE FORMATION

Hpso POND AND SLOUGH SEDIMENTS
Dark brown to black obscurely bedded clay, silt, sand, and organic debris generally one to three feet in thickness. Modern pond and slough sediments in oxbow lakes and cutof meanders.

Hal ALLUVIUM
Brown-gray, bedded to massive, sands, silts, gravels, and clays deposited as reworked and recent channel alluvium and overbank deposits along the south branch of the Elm River on the glacial Lake Agassiz plain.

Hln GLACIOLACUSTRINE NEARSHORE SEDIMENT
Silt, sand, and gravel; moderately to well-sorted; planar to cross-bedded; deposited on the shoreline of glacial Lake Agassiz, ranging in thickness from zero to 15 feet (4.6 meters), shallow-water deposits, sand and gravel may occur in beach ridges along with spits, and ofshore sand bars shown as line symbols.

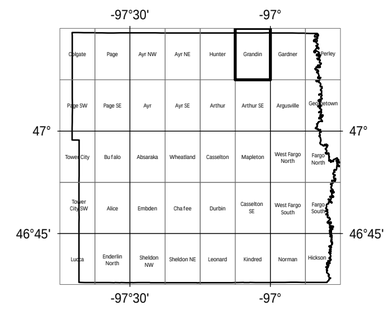
SHERACK FORMATION

Hs GLACIOLACUSTRINE OFFSHORE SEDIMENT
Yellow-gray, laminated to obscurely bedded, silt, clay, and silty-clay, cohesive. Ranges in thickness between 14 and 29-f within the quadrangle. Glaciolacustrine sediments deposited in ofshore environments of glacial Lake Agassiz. Prone to slumping along cutbank meanders within the Elm River and tributary drainages.

Geologic Symbols

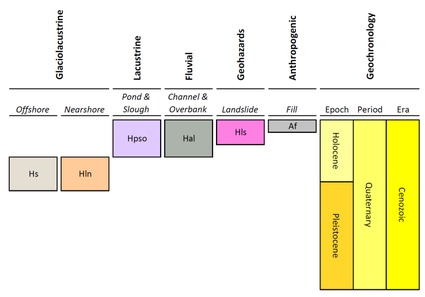
Geologic contact (Known)

BEACH RIDGES
Established from LiDAR maps; line indicates the crest of the ridge or high-water line; interpreted to be a beach ridge along the margin of a lake or high-water level; discernable on LiDAR maps and aerial imagery and may be dif cult to identfy on the ground.



Index to 1:24,000 Quadrangles, Cass County

CORRELATION OF MAP UNITS



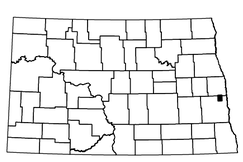
Scale 1:24,000

0 0.3 0.5 0.8 1 Miles
0 1,000 2,000 3,000 4,000 Feet
0 0.3 0.5 0.8 1 Kilometers

Lambert Conformal Conic Projecton
North American 1983 Datum
USGS 7.5 Minute Topo Map

Standard Parallels 47°7'30"N, 47°15'0"N

LiDAR Data Originator:
Internatonal Water Institute, 2010,
Red River Basin Mapping Initatve 2008-2010,
NRCS-Bismarck and ND State Water Commission, 2020,
James River Basin LiDAR QL2.



Grandin Quadrangle, North Dakota

3°0' MN

2019 Magnetc North
Declinaton at Center of Sheet

Cartographic Compilaton: Navin Thapa