Surficial Geologic Map of the Van Horne 7.5' Quadrangle, Benton County, Iowa

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IOWA GEOLOGICAL SURVEY

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Introduction

The Van Horne Quadrangle is located in central Iowa on the Iowan Erosion Surface landform region. The map area is dominated by dissected till plains with unnamed reworked periglacial sediments and elongated loess-covered uplands called paha. Stratigraphically, this area contains Pre-Illinoian age glacial deposits above Paleozoic carbonates. The thickness of Quaternary deposits in the Van Horne Quadrangle is generally between 30 to 45 m (100-150 ft).

New data collected for this mapping project included ten drill cores and an investigation of two nearby quarries. New subsurface information was derived from the analysis of more than 80 water well records. Additional information about the surficial mapping units and stratigraphy may be found in the Summary Map Report of the Van Horne Quadrangle.

Legend

CENOZOIC

QUATERNARY SYSTEM

HUDSON EPISODE

Qal — **Qal - Alluvium** (DeForest Formation - Undifferentiated) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous to calcareous, stratified silty clay loam, clay loam, loam to sandy loam alluvium and colluvium in stream valleys, on hill slopes and in closed depressions. May overlie Wolf Creek or Alburnett formation glacial till, Peoria Formation loess or eolian sand, or Wisconsinan sand and gravel. Associated with low-relief modern floodplain, closed depressions, modern drainageways or toeslope positions on the landscape. Seasonal high water table and potential for frequent flooding.

WISCONSIN EPISODE

Qnw2 — **Qnw2 - Sand and Gravel** (Noah Creek Formation) Generally 2 to 10 m (6-33 ft) of yellowish brown to gray, poorly to well-sorted, massive to well stratified, coarse to fine feldspathic quartz sand, pebbly sand and gravel with few intervening layers of silty clay. A thin mantle of loess, reworked loess or fine-grained alluvium may be present. This unit includes silty colluvial deposits derived from the adjacent map units. This unit encompasses "pre-Gunder Member" deposits that accumulated in low-relief stream valleys during the Wisconsin and Hudson episodes. Seasonal high water table and some potential for flooding.

Qps1 — **Qps1 - Loess and Intercalated Eolian Sand** (Peoria Formation - silt and/or sand facies) Generally 2 to 5 m (7-16 ft) of yellowish brown to gray, massive, fractured, noncalcareous grading downward to calcareous, silt loam and intercalated fine to medium, well-sorted sand. Sand is most abundant in the lower part of the eolian package. Overlies massive, fractured, loamy glacial till of the Wolf Creek or Alburnett formations with or without the intervening clayey Farmdale/Sangamon Geosol.

Qps1b — **Qps1b - Thick Loess and Intercalated Eolian Sand** (Peoria Formation –silt and/or sand facies) Generally 5 to 15 meters (16 to 49 ft) of yellowish brown to gray, massive, noncalcareous grading downward to calcareous silt loam and intercalated fine to medium, well sorted, sand. Minimum thickness of 5 m (16 ft) on uplands. Maximum thickness of 2 to 7 m (6 – 23 ft) of loess occurs on adjacent slopes. Overlies massive, fractured, loamy glacial till of the Wolf Creek or Alburnett formations with or without intervening clayey Farmdale /Sangamon Geosol.

Qwa2 — **Qwa2 - Loamy and Sandy Sediment Shallow to Glacial Till** (Unnamed erosion surface sediment) Generally 2 to 8 m (6-26 ft) of yellowish brown to gray, massive to weakly stratified, well to poorly sorted loamy, sandy and silty Iowan Erosion Surface sediment. Map unit includes some areas mantled with less than 2 m (7 ft) of Peoria Formation materials (loess and eolian sand). Overlies massive, fractured, firm, glacial till of the Wolf Creek and Alburnett formations. Seasonal high water table may occur in this map unit.

PRE-ILLINOIS EPISODE

Qwa3 — **Qwa3 - Glacial Till** (Wolf Creek or Alburnett formations) - Generally 3 to 15 m (10-50 ft) but can be more than 90 m thick (295 ft) within the bedrock valley in the eastern part of the mapping area. This mapping unit consists of very dense, massive, fractured, clay loam glacial till of the Wolf Creek or Alburnett formations. This mapping unit can be overlain by unnamed erosion surface sediments, loess, eolian sand, outwash, or alluvium. This unit is shown only on the cross-section.

Correlation Chart

General Lithology	Mapping Unit		Episode	Series	System
Alluvium	Qal		Hudson	Holocene	Quaternary
Loess	Qps1	Qps1b	Wisconsin	Pleistocene	
Colluvium	Qnw2				
Erosion Surface Sediments	Qwa2				
Glacial till	Qwa3		Pre-Illinois		

Map Symbols

- GeoSam point
- new drill core
- unit contact
- cross-section
- water body
- river/stream

Road Classification

- U.S. Route
- State Route
- Local road

Base map from USGS Van Horne 7.5' Quadrangle map, published by the US Geological Survey in 2018. Land elevation contours (10' interval). Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 15N, datum NAD83.

The map and cross-section are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site-specific studies. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

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MN
GN
0°22'
6 MILS
0°33'
10 MILS
UTM GRID AND 2020 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

1:24,000

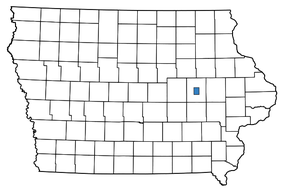
0 0.5 1 2 Miles

0 0.5 1 2 Kilometers

CONTOUR INTERVAL 10 FEET

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Garrison, IA
2 Vinton, IA
3 Center Point NW, IA
4 Keystone North, IA
5 Center Point SW, IA
6 Keystone South, IA
7 Blairstown, IA
8 Newhall, IA



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Geologic Cross-Section A-A'