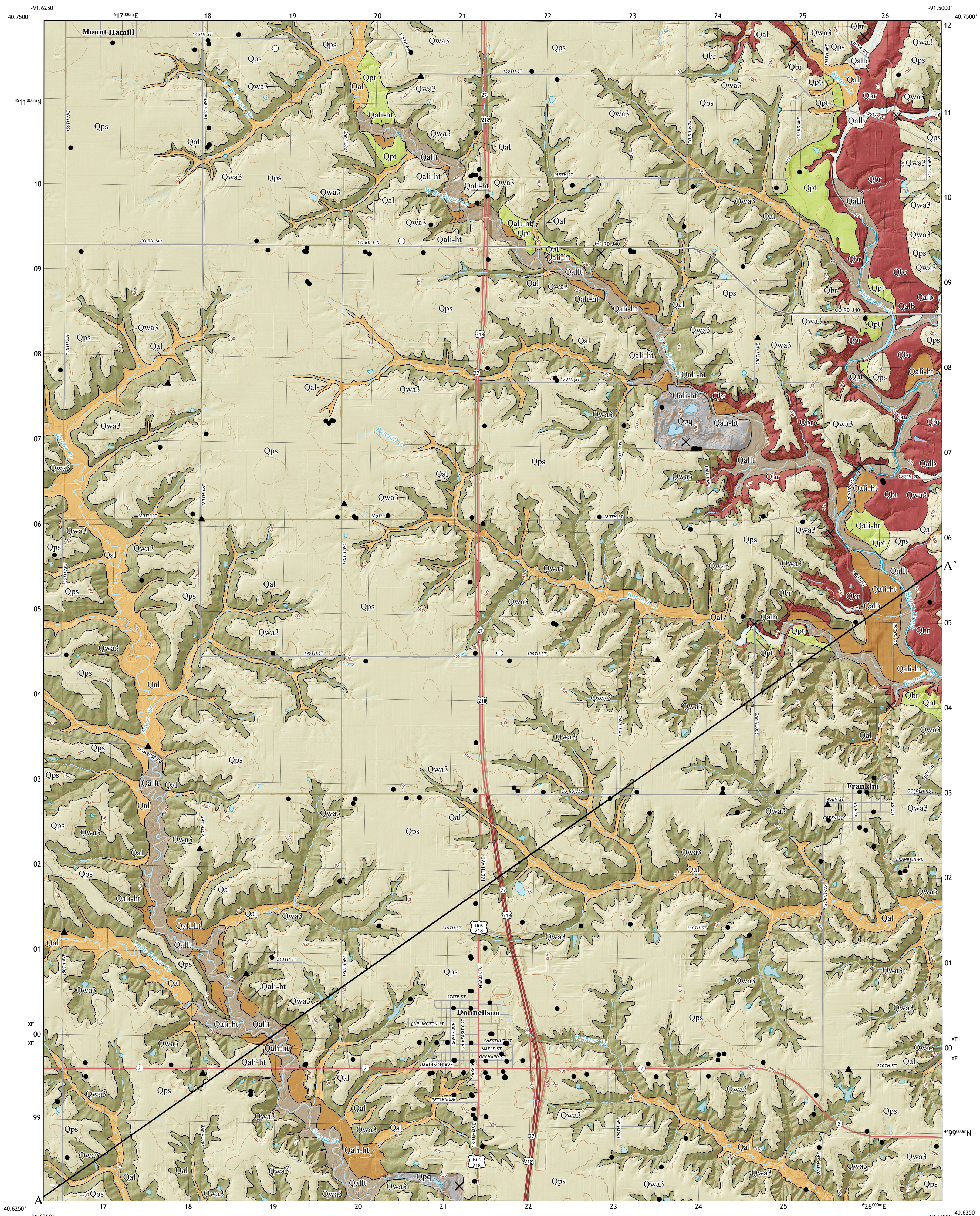


# SURFICIAL GEOLOGIC MAP OF THE DONNELLSON 7.5' QUADRANGLE, LEE COUNTY, IOWA



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Open File Map: OFM-20-2



## INTRODUCTION

The Donnellson Quadrangle is located in Lee County on the Southern Iowa Drift Plain landform region. The map area is dominated by loess mantled till plains in the uplands, and coarse to fine grained alluvial deposits within Sugar Creek and its tributaries. Glacial till is only exposed in drainages and steep sideslopes. The Quaternary stratigraphy of the region consists of 2 to 5 m (7-15 ft) of Peoria Formation loess over a well-developed Yarmouth-Sangamon paleosol formed in Pre-Illinoian till. The Illinoian moraine lies just to the east of the Donnellson Quadrangle. The thickness of Quaternary materials varies widely across the quadrangle, generally ranging from 0 to 18 m (0-60 ft) and reaching a maximum thickness of 55 m (180 ft) in the southern part of the mapping area. Bedrock exposures are found along Sugar Creek and its tributaries. Mississippian and Pennsylvanian units dominate the bedrock surface. An accompanying map of the bedrock geology of the Donnellson Quadrangle has been published concurrently with this map.

New data collected for this mapping project included three drill cores, 14 passive seismic data points, and investigation of six outcrops as well as two active and three abandoned quarries. Additional subsurface information was derived from the analysis of more than 280 water well records, more than 40 of which have cutting samples that were described as part of this mapping project. Additional information about the surficial mapping units and stratigraphy may be found in the Summary Map Report of the Donnellson Quadrangle.

## LEGEND

### CENOZOIC QUATERNARY SYSTEM HUDSON EPISODE

- 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 Pre-Illinoian formation glacial till, Peoria Formation loess or eolian sand, or Noah Creek Formation sand and gravel. Associated with low-relief modern floodplain, closed depressions, modern drainageways or toe slope positions on the landscape. Seasonal high water table and potential for frequent flooding. The depth to bedrock may be less than 8 m (26 ft) along portions of Sugar Creek and its tributaries.
- Qalb** - Alluvium Shallow to Bedrock (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 hillslopes and in closed depressions. May overlie the Noah Creek Formation, Mississippian or Pennsylvanian bedrock. Bedrock surface is within 5 m (16 ft) of the land surface. Associated with low-relief modern floodplain, closed depressions, modern drainageways or toe slope positions on the landscape. Seasonal high water table and potential for frequent flooding.
- Qallt** - Low Terrace (DeForest Formation-Camp Creek and Roberts Creek members) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous, stratified silty clay loam, loam, or clay loam, associated with the modern channel belt of Sugar Creek, Little Sugar Creek, and their tributaries. Overlies Noah Creek Formation sand and gravel. Occupies the lowest position on the floodplain i.e. modern channel belts. Seasonal high water table and frequent flooding potential.
- Qali-ht** - Intermediate-High Terrace (DeForest Formation-Gunder Member) Variable thickness of less than 1 to 5 m (3-16 ft) of very dark gray to brown, noncalcareous, silty clay loam to loam alluvium or colluvium. Overlies Noah Creek Formation sand and gravel along Sugar Creek, Little Sugar Creek, and their tributaries. Occupies terrace and valley margin positions 1 to 2 m (3-7 ft) above the modern floodplain. Two terrace levels are present in some areas. Seasonal high water table and low to moderate flooding potential.

### WISCONSIN EPISODE

- Qnw** - Sand and Gravel (Noah Creek Formation) Generally 3 to 9 m (10-30 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. This unit is buried by Peoria Formation silt or younger Hudson-age alluvial deposits associated with Sugar Creek and Little Sugar Creek and encompasses deposits that accumulated in river valleys during the Wisconsin Episode. This unit is shown only on the cross-section.
- Qpt** - Loess Mantled Terrace (Peoria Formation-silt and/or sand facies) 2 to 7 m (7-23 ft) of yellowish brown to gray, massive, jointed, calcareous or noncalcareous, silt loam and intercalated fine to medium, well sorted, sand. May grade downward to poorly to moderately well sorted, moderately to well stratified, coarse to fine feldspathic quartz sand, loam, or silt loam alluvium (Late Phase High Terrace) or may overlie a Farmdale Geosol developed in Pisgah Silt which in turn overlie a well-exposed Sangamon Geosol developed in poorly to moderately well sorted, moderately to well stratified, coarse to fine sand, loam, or silt loam alluvium (Early Phase High Terrace). This unit may also be banded on bedrock.
- Qps** - Loess (Peoria Formation-silt facies) Generally 2 to 5 m (7-15 ft) of yellowish to grayish brown, massive, jointed calcareous or noncalcareous silt loam to silty clay loam. May overlie a grayish brown to olive gray silty clay loam to silty clay (Pisgah Formation-eroded Farmdale Geosol) which is less than 1.5 m (5 ft) thick. The Pisgah Formation is in the same stratigraphic position as the Roxanna Silt which is mapped in Illinois. The Farmdale Geosol may be welded to an older Sangamon Geosol developed in loamy glacial till of the Wolf Creek or Albion formations. This mapping unit encompasses upland divides, ridgetops and convex sideslopes. Well to somewhat poorly drained landscape.

### PRE-ILLINOIS EPISODE

- Qwa3** - Till (Wolf Creek or Albion formations) Generally 10 to 18 m (33-60 ft) of very dense, massive, fractured, loamy glacial till of the Wolf Creek or Albion formations with or without a thin loess mantle (Peoria Formation- less than 2 m) and intervening clayey Farmdale/Sangamon Geosol. This mapping unit encompasses narrowly dissected interflutes and side slopes, and side valley slopes. Drainage is variable from well drained to poorly drained.

### OTHER MAPPING UNITS

- Qbr** - Loamy Sediments Shallow to Dolomite, Limestone, Shale and Sandstone (DeForest, Noah Creek, Peoria, Wolf Creek, and Albion formations) - 1 to 2 m (3-7 ft) of yellowish brown to gray, massive to weakly stratified, well to poorly sorted loamy, sandy and silty sediments that overlie the Pennsylvanian or Mississippian bedrock surface. All areas of bedrock outcrop or shallow to bedrock soils are shown in red on the map, regardless of the bedrock mapping unit. Bedrock units are shown on the cross-section and may be identified on the bedrock map of the Donnellson Quadrangle, see OFM-20-1.
- Qpq** - Pits and Quarries - Sand and gravel pits and rock quarries. Extent mapped as shown on the county soil survey and as identified on aerial imagery.

## CORRELATION CHART

General Lithology	Shallow Bedrock	Valley	Upland	Episode	Series	Stage
Alluvium	Qalb	Qallt Qali-ht	Qal	Hudson	Holocene	Quaternary
Loess		Qpt	Qps	Wisconsin	Pleistocene	
Outwash	Qbr	Qnw*				
Glacial Till			Qwa3	Pre-Illinois		
Bedrock		Pcl*				Pennsylvanian
		Mpsl*				Mississippian
		Mws*				
		Mkeo*				
		Mb*				Devonian
		Mk*				
	Der*					
		Dss*				
		Dgc*				

\*Units only shown on the Cross-Section

### MAP SYMBOLS

- × bedrock outcrop
  - GeoSam point
  - new drill core
  - ▲ geophysics
  - △ collection point
  - unit contact
  - cross-section
  - water body
  - river/stream
- ROAD CLASSIFICATION**
- U.S. Route
  - State Route
  - Local road

## ACKNOWLEDGMENTS

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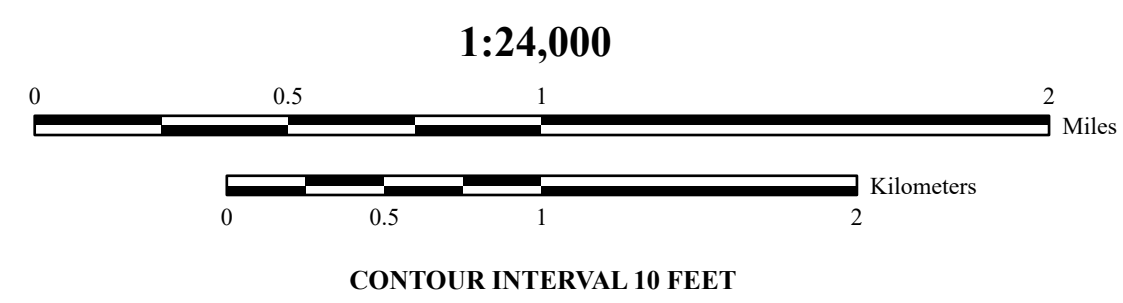
Base map from USGS Donnellson 7.5' Quadrangle map, published by the US Geological Survey in 2018. Land elevation contours (10' interval). Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 18N, datum NAD83.

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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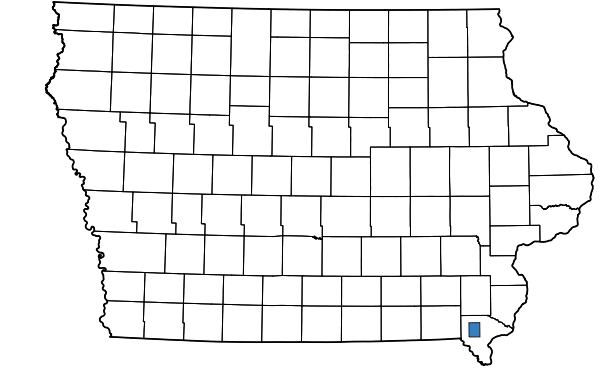
UTM GRID AND 2020 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

0°51' 15 MILS  
0°56' 17 MILS



**ADJOINING QUADRANGLES**

1 Hillsboro, IA	2 Salem, IA	3 Lowell, IA
4 Farmington, IA	5 West Point, IA	6 Croton, IA-MO
7 Argyle, IA-MO	8 Nauvoo, IA-IL	



## GEOLOGIC CROSS-SECTION A-A'

