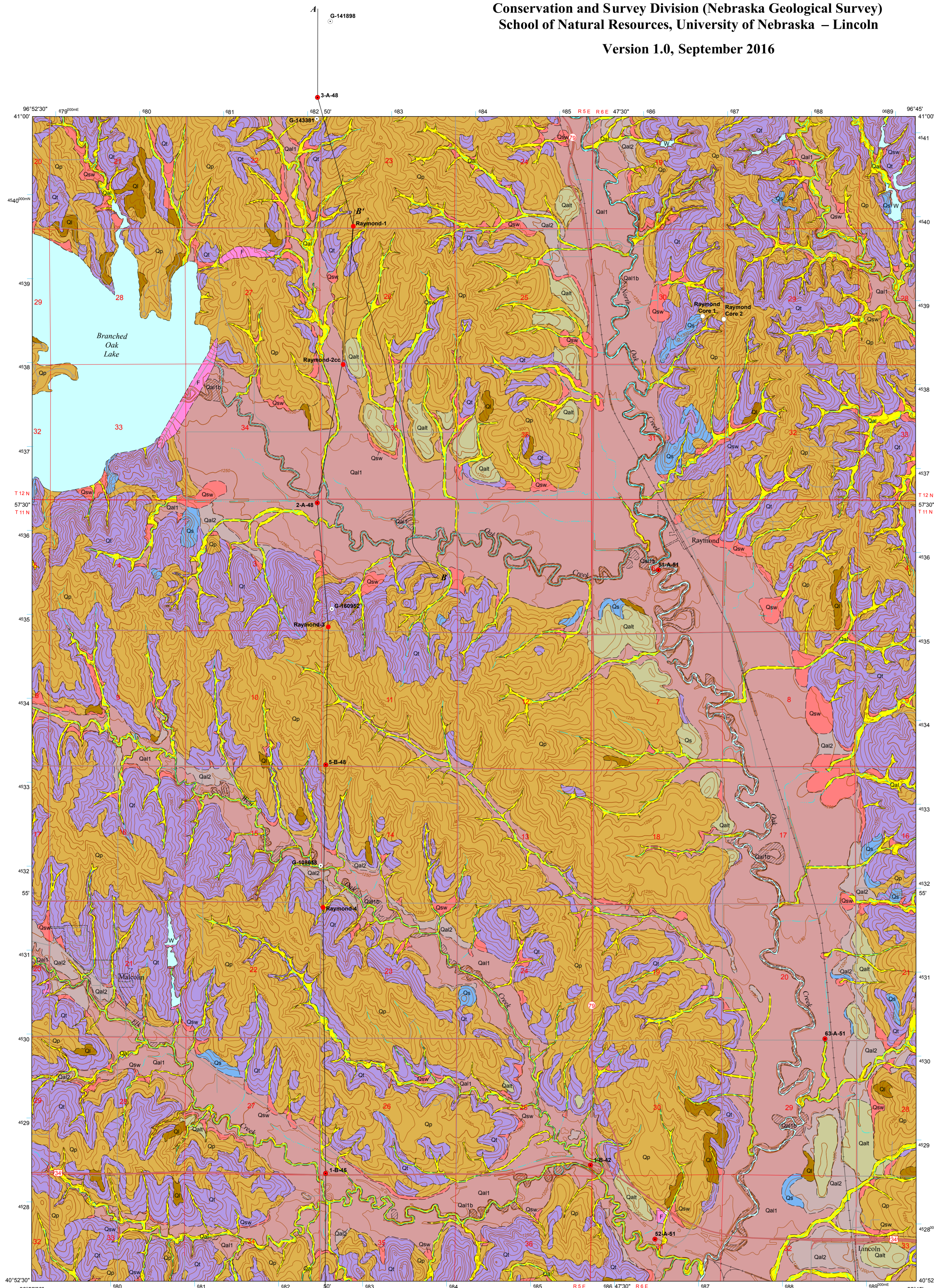


# Surficial Geology of the Raymond 7.5 Minute Quadrangle

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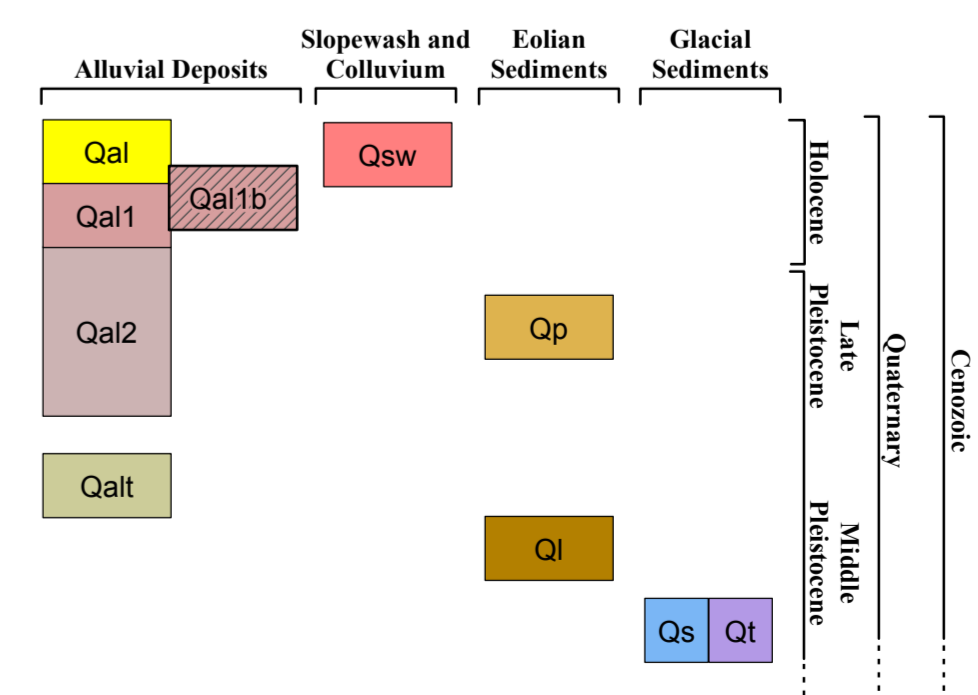
Version 1.0, September 2016



## Description of Mapping Units

- Qal** Recent alluvium (Holocene)  
*Silty clay with local sands and gravels*  
 Alluvium and flood plain deposits of tributaries of Oak Creek, North Oak Creek, West Oak Creek, and Elk Creek. Sediments mapped as **Qal** are the most recent near channel deposits, and are generally less than three meters thick. **Qal** sediments are generally sourced from surrounding glacial till (**Qt**), Peoria Loess (**Qp**) or Loveland Loess (**Ql**), or glacial sands (**Qs**). Except for the lowest most portion of the tributary, channels are not generally deeply incised. Tributaries are intermittent and usually flow only after heavy precipitation.
- Qal1b** Recent alluvium and flood plain deposits in larger stream valleys (Holocene)  
*Sediments vary from clay to coarse sand*  
 Recent alluvium and flood plain deposits of Oak Creek and larger tributaries. Over the last century, straightening efforts on Oak Creek have caused the stream and larger tributaries to become deeply entrenched in a narrow valley 6-8 meters deep, leaving behind cut-off meanders and small abandoned flood plains 2 to 3 meters above the current stream level. **Qal1b** deposits are less than three meters thick in most locations. These deposits may be inundated during seasonal flood events.
- Qal1** Recent alluvial deposits in larger stream valleys (Holocene to late Pleistocene)  
*Sediments vary from clay to coarse sand*  
 Alluvium of Oak Creek and larger tributaries, older than **Qal** and **Qal1b**. Sediments are 8 – 10 meters above stream level. Relict alluvial features are poorly defined and difficult to observe in aerial imagery and elevation data. **Qal1** sediments in the Oak Creek Valley are generally less than 7 meters thick, but the total thickness of **Qal1** and older alluvium in the Oak Creek Valley may exceed 20 meters in many locations. Where alluvial sediments are coarse at depth, the deep alluvial valleys can act as local aquifers capable of supporting high capacity wells. Areas mapped as **Qal1** are extensively farmed with both dryland and irrigated crops. **Qal1** sediments may be inundated in very large floods.
- Qal2** Higher, older alluvium in larger stream valleys (Holocene to late Pleistocene)  
*Sediments vary from clay to coarse sand*  
 Alluvium of Oak Creek and larger tributaries, older and higher in elevation than **Qal1**. Sediments are 2-3 meters thick and are 13-16 meters above the current river level. Alluvial features are not observable on the **Qal2** surfaces. Areas mapped as **Qal2** may be eroded by smaller tributaries, and in some places partially obscured by slope wash or small alluvial fans.
- Qalt** Older, loess covered terraces of Oak Creek (Middle to late Pleistocene)  
*Silt to silty clay*  
 Sediments underlying terraces of Oak Creek. These deposits are older and higher in elevation than **Qal2**. Terrace treads are about 15 meters above modern stream levels. Terraces are covered with about 4.5 meters of Peoria loess, deposited above red, clay-rich sediments with occasional sands and gravels. These red sediments are interpreted as reworked Loveland Loess. Loveland Loess was likely sourced from surrounding areas upslope from areas mapped as **Qalt**. Terraces are likely middle- to late-Pleistocene in age.
- Qsw** Slope wash (Holocene to late Pleistocene)  
*Clay to silt, with local sand to boulders*  
 Sediments at the base of slopes, sourced from adjacent till, loess, or outwash. In some places, slope wash sediments form small alluvial fans at the base of small drainages. Slope wash sediments are generally less than 3 meters thick.
- Qp** Peoria Loess (Late Pleistocene)  
*Silt to silty clay*  
 Late Pleistocene, wind-blown, tan silt and clay deposits. The thickness of Peoria Loess in the mapping area ranges from 1 to about 7 meters. Locally, some areas mapped as Peoria Loess may be less than one meter thick near unit boundaries. This loess was likely deposited between about 25,000 and 14,000 years ago (Bettis et al., 2003). Most areas mapped as Peoria Loess have thick, well-formed, fertile soils. Land use is generally pasture or row crop, depending on slope.
- Ql** Loveland Loess (Mid-Pleistocene)  
*Silty clay to clayey silt*  
 Loveland Loess is older than the overlying Peoria Loess. Loveland Loess can be distinguished from Peoria Loess by its characteristic red or pink color and finer clay-rich texture. Some areas mapped as Loveland Loess along river valleys and areas mapped as **Qalt** contain reworked Loveland Loess mixed with older alluvial sands and gravels.
- Qt** Glacial till (Mid-Pleistocene)  
*Gravel-clay*  
 Tills in Nebraska were deposited by glaciers between about 2,600,000 and 640,000 years ago (pre-Illinoian) (Roy et al., 2004; Balco et al., 2005). In the Raymond area, glacial till is generally reddish-brown to blue, gravelly clay. Locally, glacial till can consist of tan, medium-fine, sandy clay. Sediments mapped as glacial till generally have well developed clay-rich soils, with moderate soil fertility. Land is generally pasture or row crop, depending on slope.
- Qs** Glacial sands (Mid-Pleistocene)  
*Silty fine to coarse sands*  
 Sandy sediments associated with glacial deposits, likely in the form of glacial outwash. Sands are highly compacted, and in some locations weakly carbonate cemented. Glacial sands in the Raymond area have weakly developed, moderately oxidized soils, with poor soil fertility.
- F** Fill  
 Highly disturbed or built-up areas. Areas mapped as fill on the Raymond Quad are earthen dams or spillways.
- W** Water

- New test hole drilled during the 2015 mapping season
- Historic test hole drilled by the CSD drilling program (the last two digits indicate year drilled)
- Registered water well contractor logs used for cross section and mapping
- Sediment core

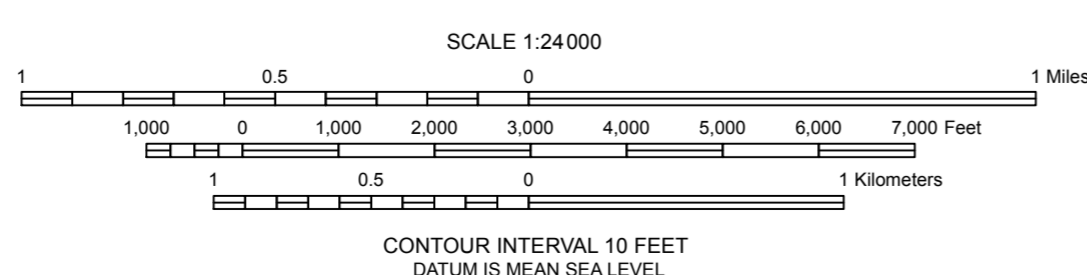


Projection: Universal Transverse Mercator, zone 14 North, NAD83.  
 1,000-meter Universal Transverse Mercator grid ticks shown in blue.

Contours from the Nebraska Department of Natural Resources,  
 Compiled from USGS 7.5 minute topographic quadrangles.

Additional base data derived from the 2010 TIGER line files.

G-079468  
 APPROXIMATE MEAN DECLINATION, 2016



MUNNICK	ALPHEUS	DEERESCO
GARLAND	RAYMOND	DAVEY
PLEASANT	EMERALD	LINCOLN

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