

# Cement Rock Mineral Resources

## Shawnee - McCanna Area

### Grand Forks County, North Dakota

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#### CEMENT ROCK MINERAL RESOURCES BEDROCK GEOLOGY

Cement rock mineral resources and relationship of the subcrop of bedrock geologic units in the vicinity of the Shawnee - McCanna areas, Grand Forks County, North Dakota are depicted on this map at a scale of 1:24,000. The prospect boundary area as outlined by Carlson (1964) is delineated in blue and covers an area of approximately 17,280 acres (27 square miles). The geologic contacts of middle Cretaceous strata that subcrop in the map area are depicted on this map as interpreted by Kelley and Paulson (1970). The locations of drillholes are shown in their approximated locations as obtained from Carlson (1964). A modified isopach of the Carlson interpreted "high lime zone" is also shown which delineates areas of uniform material thickness across the study area. These isopach contours have been extended outside of the traditional prospect area as defined by Carlson (1964) and are shown as dashed lines in those areas in order to visualize the continued possible extents of high CaCO<sub>3</sub> bearing materials at depth.

The subsurface geology consists of Cretaceous age marine sedimentary units overlain by a veneer of glacial sediments. Cretaceous sedimentary strata of the Greenhorn Formation (**Kg**) consisting of marlstones, limestones, and shales is interpreted to subcrop beneath 3,484 acres (5.4 square miles) of the study area. The Greenhorn Formation is overlain conformably by Cretaceous shale of the Carlisle Formation (**Kc**) and is interpreted to subcrop beneath 17,643 acres (27.6 square miles) of the study area. The Niobrara Formation (**Kn**) conformably overlies the Carlisle Formation (**Kc**) and is interpreted to subcrop beneath 11,955 acres (18.7 square miles) of the study area. The Niobrara Formation (**Kn**) is conformably overlain by the Cretaceous shale of the Pierre Formation (**Kp**) and is interpreted to subcrop beneath 9,468 acres (14.8 square miles) of the study area. Regional dip of Cretaceous units is 5° to the west/southwest. The Cretaceous sediments are overlain throughout the map area by a variable thickness of glacial sediments of subglacial and glaciolacustrine origin.

#### EXPLANATION

##### CRETACEOUS SYSTEM

- Kp** **PIERRE FORMATION**  
Shale - Gray to dark-gray, fissile to blocky, marine offshore sediment.
- Kn** **NIORBARA FORMATION**  
Marlstone, Shale - Light-gray to light-brownish-gray marlstones and shales.
- Kc** **CARLILE FORMATION**  
Shale - Dark gray, flaky to spongy shale with thinly interbedded light-gray to light-bluish gray bentonitic clays.
- Kg** **GREENHORN FORMATION**  
Marlstone, Limestone, Shale - Gray to dark gray marlstone, calcareous shale and thin beds of limestone.

##### Geologic Symbols

- Known contact between two geologic units as depicted in the subsurface of the map area.
- A A' Line of geologic cross-section.
- 10 -- Modified Carlson (1960) "high lime zone" isopach delineates areas of equal material thickness in feet. Contour interval is equal to one foot.
- 5° Gently inclined bedding (between 0° and 30°) of units in the subsurface, interpreted from previous work.
- S-1 Drill hole location.  
S-1: drillhole ID number.  
10: "high lime zone" thickness (in feet).

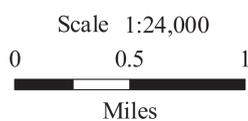
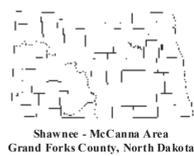
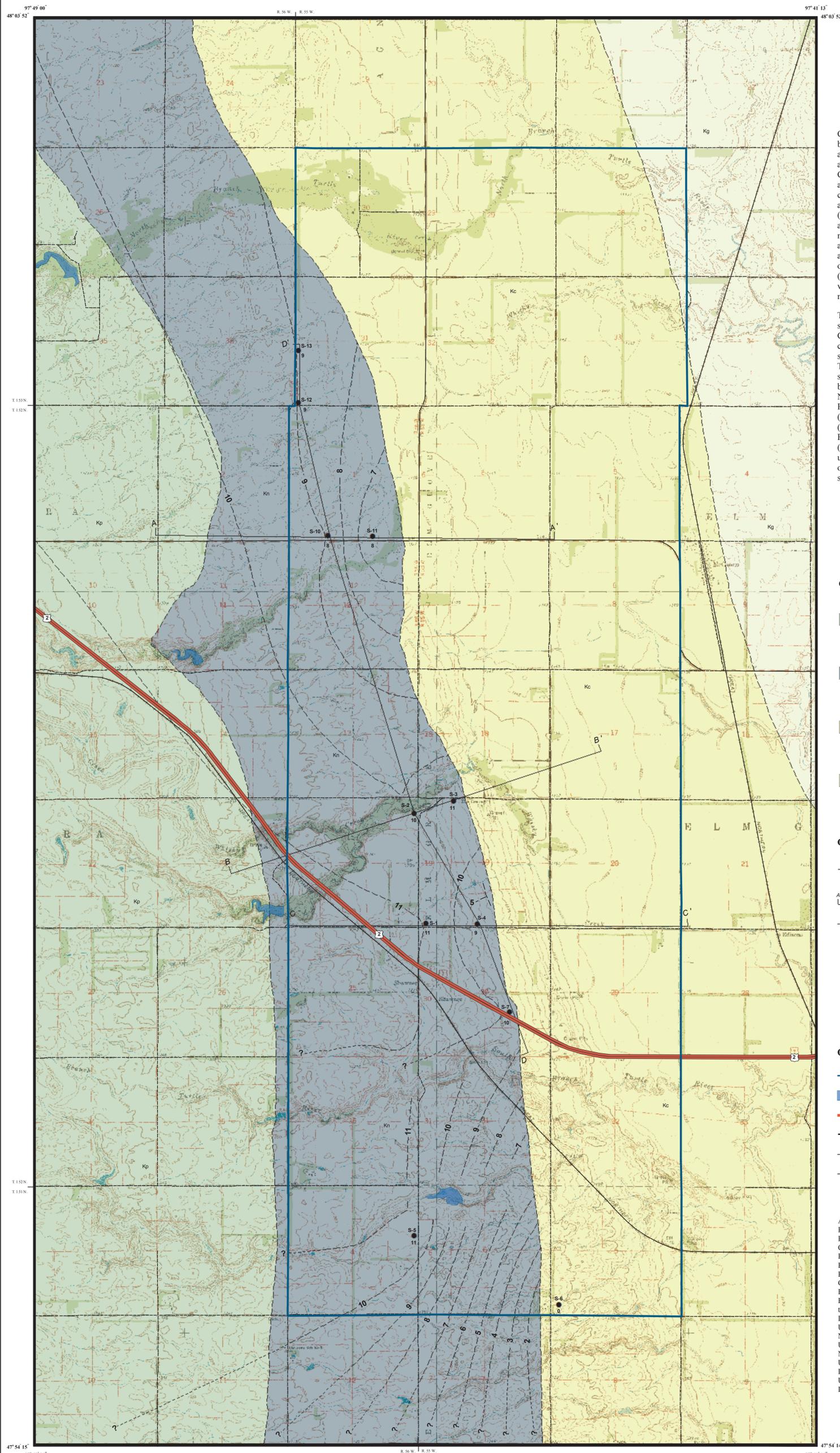
##### Other Features

- Extent of prospect area as defined by Carlson, 1964.
- Water
- US Highway
- Paved Road
- Unpaved Road
- Railroad

##### REFERENCES

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- Reiskind, J.R., 1986, Paleontology and Stratigraphy of the Niobrara Formation (Upper Cretaceous) of Eastern North Dakota with Emphasis on the Calcareous Nanoplankton, University of North Dakota, PhD Dissertation.
- USGS, 1963, Topographic Map of the Fordville SE Quadrangle, 1:24,000, North Dakota, Grand Forks County.
- USGS, 1963, Topographic Map of the Larimore West Quadrangle, 1:24,000, North Dakota, Grand Forks County.
- USGS, 1963, Topographic Map of the Niagara Quadrangle, 1:24,000, North Dakota, Grand Forks County.
- USGS, 1963, Topographic Map of the Orr Quadrangle, 1:24,000, North Dakota, Grand Forks County.

The North Dakota Geological Survey compiled this map according to conventional cartographic standards, using what is thought to be the most reliable information available. The North Dakota Geological Survey does not guarantee freedom from errors or inaccuracies and disclaims any legal responsibility or liability for interpretations made from the map, or decisions based thereon.



Lambert Conformal Conic Projection  
1927 North American Datum  
Standard Parallels 47° 52' 30" and 48° 07' 30"

