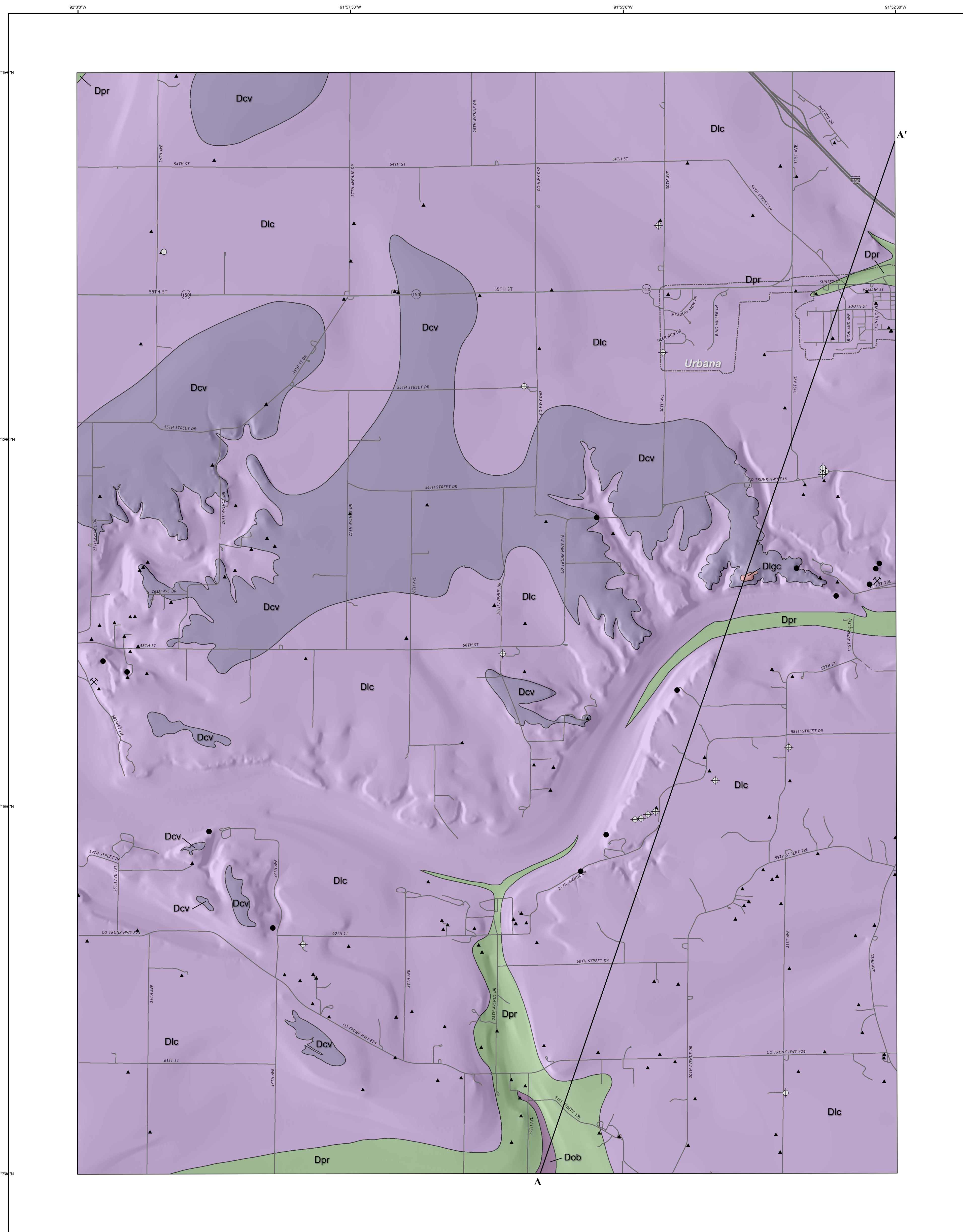


# BEDROCK GEOLOGIC MAP OF THE CENTER POINT NW (IOWA) 7.5' QUADRANGLE



### LEGEND

#### CENOZOIC

##### QUATERNARY SYSTEM

**Qu** - Differentiated Unconsolidated Sediments (Quaternary System). The Quaternary deposits consist of sandy silts developed in loess, glacial till, colluvium of variable thickness, alluvial clay, silt, sand, and gravel. These deposits cover most of the bed surface except the areas of shallow bedrock along the Cedar River and tributaries. The thickness of the Quaternary deposits usually varies between 8 and 24 (25-80 ft), with a maximum over the 200 ft in deep bedrock valleys in northern and south-central of the quadrangle. This unit is shown only on the cross-section, not on the map.

##### PALEOZOIC

#### DEVONIAN

**Dlpc** - Limestone, Dolomite, and Shale (Lithographic City Formation) Middle Devonian. This map unit has been recently eroded and occurs only as a small spot on the bedrock surface along the Cedar River valley in the quadrangle. Although thickness of this unit is regionally around 21 to 27 ft, eroded remnants of this unit are much thinner than the mapping area. This unit consists of limestone, dolomite, limestone, dolomite, and minor shale. Regionally, this unit is characterized by interbedded lithographic and sub-lithographic limestone and dolomite limestone, in part argillaceous. "Bridley" structures, ripple and columnar rock-fills are common. Some intervals are fossiliferous and unconformity-rich.

**Dcv** - Limestone and Dolomite (Coralville Formation) Middle Devonian. This map unit consists of limestone, dolomite limestone, and dolomite, in part argillaceous or shaly. The thickness of this unit varies between 12 to 21 to 40(70 ft) in the mapping area. Blackshales, calciferous dolites, and corals are usually found in the limestone facies. This unit mostly occurs at the bedrock surface of the north part of the quadrangle.

**Dlc** - Dolomite, Limestone, and Shale (Ois and Bertram Formations) Middle Devonian. As the dominating bedrock unit, this formation occupies most of the bedrock surface in the mapping area. This unit mostly consists of limestone, dolomite limestone, and dolomite, slightly argillaceous, and partially laminated and/or cherty. Some minor shale may occur in the upper part of this formation. The thickness of this unit ranges from 17 to 40(70 ft) in the mapping area. This formation is commonly fossiliferous, and blackshales and gasprisms are especially abundant in the limestone facies.

**Dpr** - Dolomite and Dolomite Limestone (Pineau Ridge Formation) Middle Devonian. This map unit occurs at the bedrock surface of the Cedar River valley in the south-central and northern parts of the map. This formation consists of dolomite and dolomite limestone with varying textures (cherty, laminated, banded, sandy, and/or cherty), and occasional exposures. The thickness of this unit usually ranges from 12 to 24 to 40(80 ft). Compressive other Devonian units in the mapping area, this formation is usually unconformity-rich.

**Dob** - Limestone and Dolomite (Ois and Bertram Formations) Middle Devonian. This map unit occurs at the bedrock surface of the bedrock valley in the south-central and northern parts of the map. This formation consists of dolomite and dolomite limestone with varying textures (cherty, laminated, banded, sandy, and/or cherty), and occasional exposures. The thickness of this unit usually ranges from 12 to 24 to 40(80 ft). Compressive other Devonian units in the mapping area, this formation is usually unconformity-rich.

#### SILURIAN SYSTEM

**Slpc** - Limestone and Dolomite Limestone (LaPorte City Formation) upper Silurian and lower Wabash. This is a limestone facies that correlates with the upper Beilfussian lower Scotch Grove Formation of the Silurian. These rocks are unconformably overlain by Devonian units. The formation is dominated by fine, fossiliferous limestone and dolomite limestone, commonly cherty to very shaly. It lithologues the shale argillaceous to shaly chert members at the top of the interval (may be basal Devonian rocks) and green-gray shale. The thickness of the map unit varies from 6 to 10 to 10(10 ft). This unit does not occur at the bedrock surface of the map as it only shows on the cross-section.

#### OTHER FEATURES

- New drill holes for this map project
- Bedrock outcrops
- IGS GSDSM data points - research available at [www.igs.uiowa.edu](http://www.igs.uiowa.edu)
- Incorporated Cities
- Quarries
- Roads
- W22170
- Wells used for geologic cross-section
- Bedrock: Hatched shades of gray show the bedrock surface as it would be illuminated by an artificial light source from the NW direction

### BEDROCK GEOLOGIC MAP OF THE CENTER POINT NW 7.5' QUADRANGLE, BENTON COUNTY, IOWA

IOWA GEOLOGICAL SURVEY  
IOWA FILE MAP OFM-19-15  
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### INTRODUCTION TO THE BEDROCK GEOLOGY OF THE CENTER POINT NW 7.5' QUADRANGLE, BENTON COUNTY, IOWA

The Center Point NW 7.5' Quadrangle is located in Benton County in central Iowa. In terms of landforms, this area belongs to the southern portion of the Iowan Surface landform region, commonly called the Iowan Erosion Surface. This land surface had been modified by various episodes of erosion before and during the Wisconsin glacial events (Piper, 1991). Due to extensive glacial and erosional activities, the landscape of this area is characterized by relatively low topographic relief with common paha ridges and large fieldstones known as erratics, which have a glacial origin.

The land surface of this mapping area is mostly covered by Quaternary sediments, including loess, glacial sediments, colluvium and alluvial deposits. The thickness of the Quaternary deposits usually varies between 8 and 24 m (25-80 ft), with a maximum of more than 60 m (200 ft) in deep bedrock valleys in the northeastern and south-central of the quadrangle. These unconformable Quaternary sediments are undifferentiated in this map. For the detailed Quaternary stratigraphy and distribution, see the surficial geologic map of this quadrangle (Kerr et al., 2019).

Bedrock exposures commonly occur in the valleys along the Cedar River and its tributaries in the mapping area. During the field investigation, previous geologic field work records and shallow bedrock locations from the digital soil surveys in Benton County (Brown & Highland, 1980) provided essential information to delineate potential bedrock outcrops. In the map area, 12 bedrock outcrops including several rock quarries were accessed and studied, which provided important regional stratigraphic information for the bedrock geologic map. Subsurface geologic information was mainly derived from the analysis of water well data stored in the IGS GeoSam database. Within the quadrangle, 187 private and public wells were studied, including 17 holes drilled holes especially for this mapping project. Among these studied wells, 19 had descriptive striplogs with cutting samples which are reported at the Oakdale Rock Library of the IGS, and three of which were newly logged for this bedrock geologic mapping task. Bedrock stratigraphic information from the surrounding area, including bedrock outcrops, quarries, and well records, was also studied and utilized for this mapping project.

The bedrock surface of the Center Point NW 7.5' Quadrangle is dominated by Devonian strata. Some Silurian deposits also occur on the bedrock surface in a deep bedrock valley across the map area. Paleogeographically, the mapping area is within the Devonian Iowa Basin, a region of thickened shelf carbonate, shale and minor lithologies deposited from the late Eifelian to early Frasnian age (Witzke et al., 1988; Witzke and Bunker, 2006). The Middle and lower Upper Devonian carbonate rocks form the important upper bedrock aquifer in the mapping area (Libra et al., 1984, 1994). Due to its complex sedimentary lithologies and depositional environments, the geology, paleoenvironments, paleontology and stratigraphy of the Devonian Iowa Basin have been intensively studied. Recent important studies of the Devonian Iowa Basin are represented by Witzke and Bunker (1984), Anderson (1984), Bunker et al. (1986), Witzke et al. (1988), Day and Bunker (1992), Bunker (1995), Anderson and Bunker (1998), Groves et al. (2008), McKay and Liu (2012), and Day et al. (2006, 2008, 2013). Studies on the regional Silurian stratigraphy and geology include the publications of Witzke (1984, 1986, 1992). Several geologic maps at 1:24,000 and 1:100,000 scales have been recently completed in nearby counties. The bedrock geologic map of east-central Iowa (1:250,000; Witzke et al., 2003) and the bedrock geologic map of Iowa (1:500,000; Witzke et al., 2010) have also been completed by the IGS. Results from these geologic studies and bedrock geologic mapping projects provide significant regional geologic information and new data for the present bedrock map.

The bedrock stratigraphic nomenclature and correlation of the Devonian strata for this map follow the stratigraphic framework proposed by Witzke et al. (1988). Six bedrock formations, in descending order, the Lithographic City, Coralville, Little Cedar, Pinicon Ridge, Ois and Bertram formations comprise the bedrock surface of the map area. However, the Ois and Bertram formations are not differentiated in the map because of their lithological similarity and distribution restriction. The Devonian units are underlain by the Silurian LaPorte City Formation. The general lithologic features and thickness of each map unit are shown in the Stratigraphic Column and described in the Legend section of this map.

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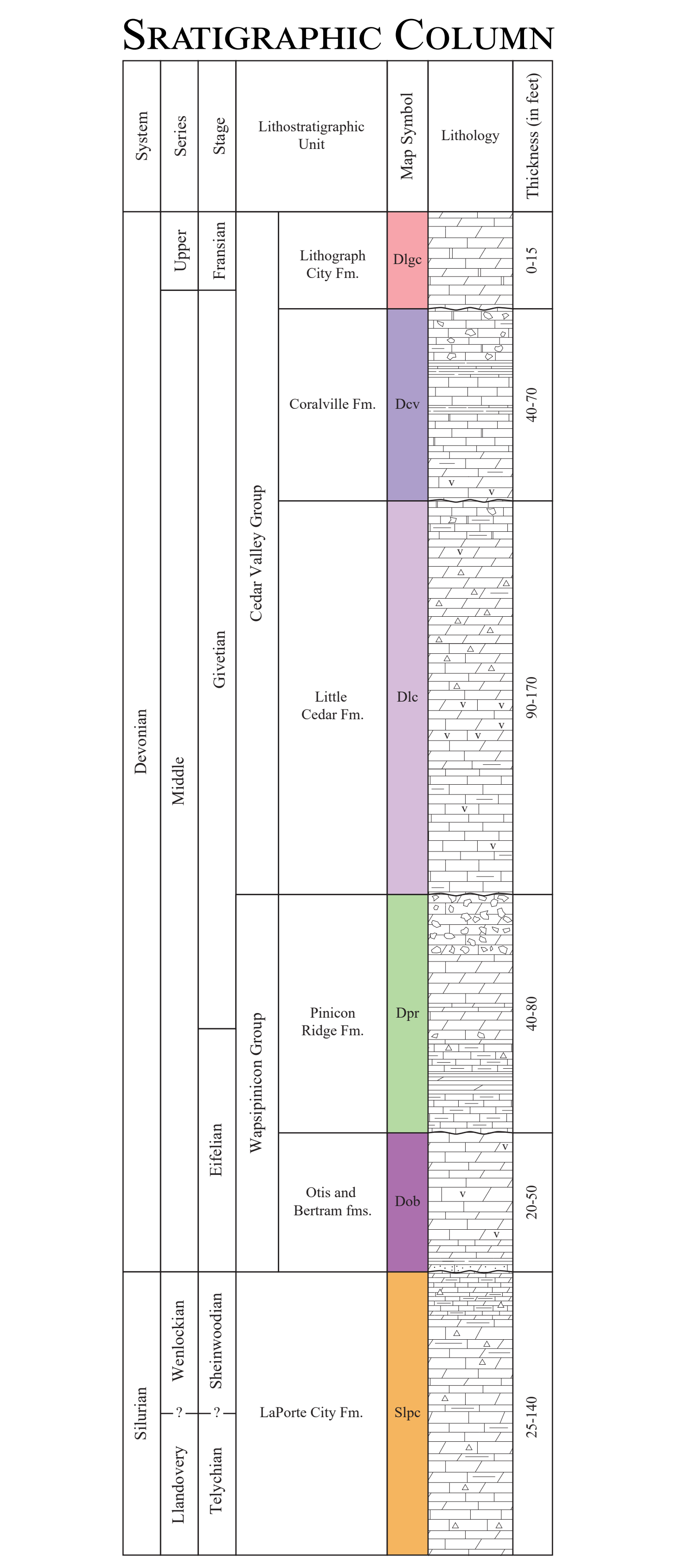
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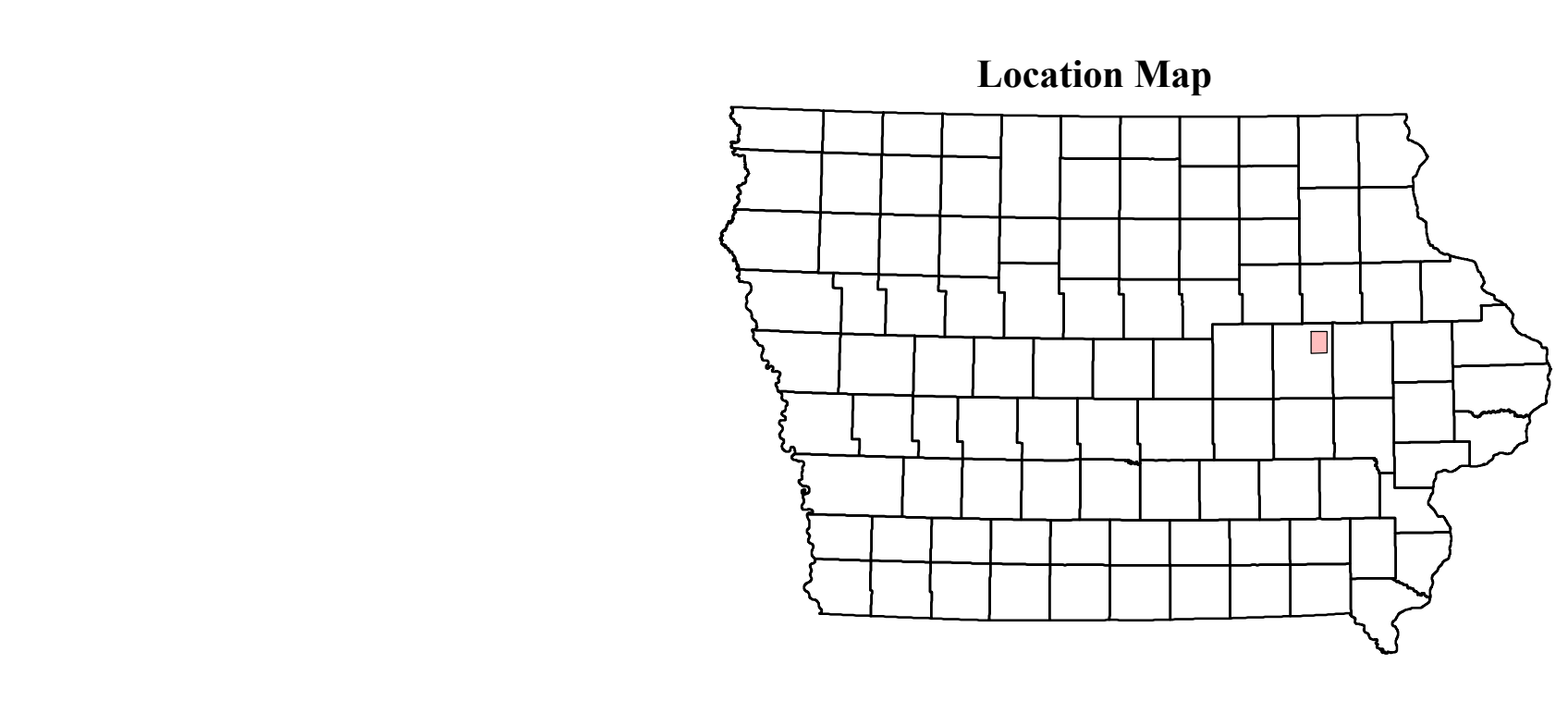
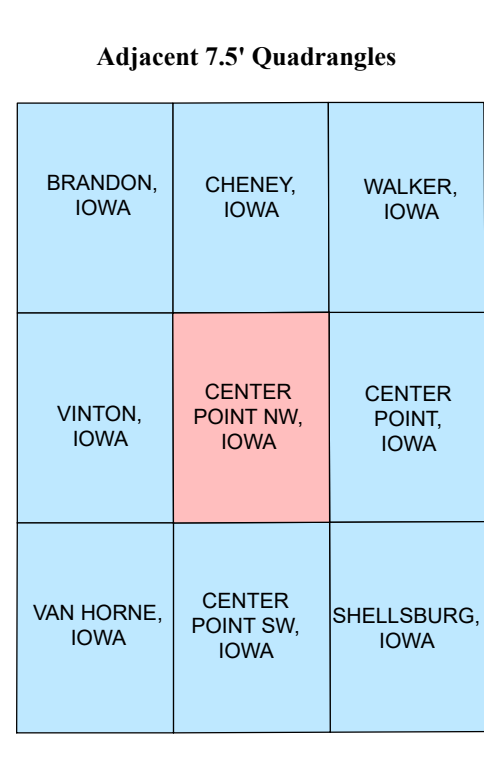


#### Lithology Key

- delomitic limestone/caliche dolomite
- dolomitic
- limestone
- shale
- lithographic limestone
- breccia

#### Symbol Key

- argillaceous
- dolomitic
- chert
- sandy
- unconformity
- vugs



### GEOLOGICAL CROSS-SECTION A-A'

