SURFICIAL GEOLOGY OF CALUMET CITY QUADRANGLE
COOK COUNTY, ILLINOIS AND LAKE COUNTY, INDIANA

Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

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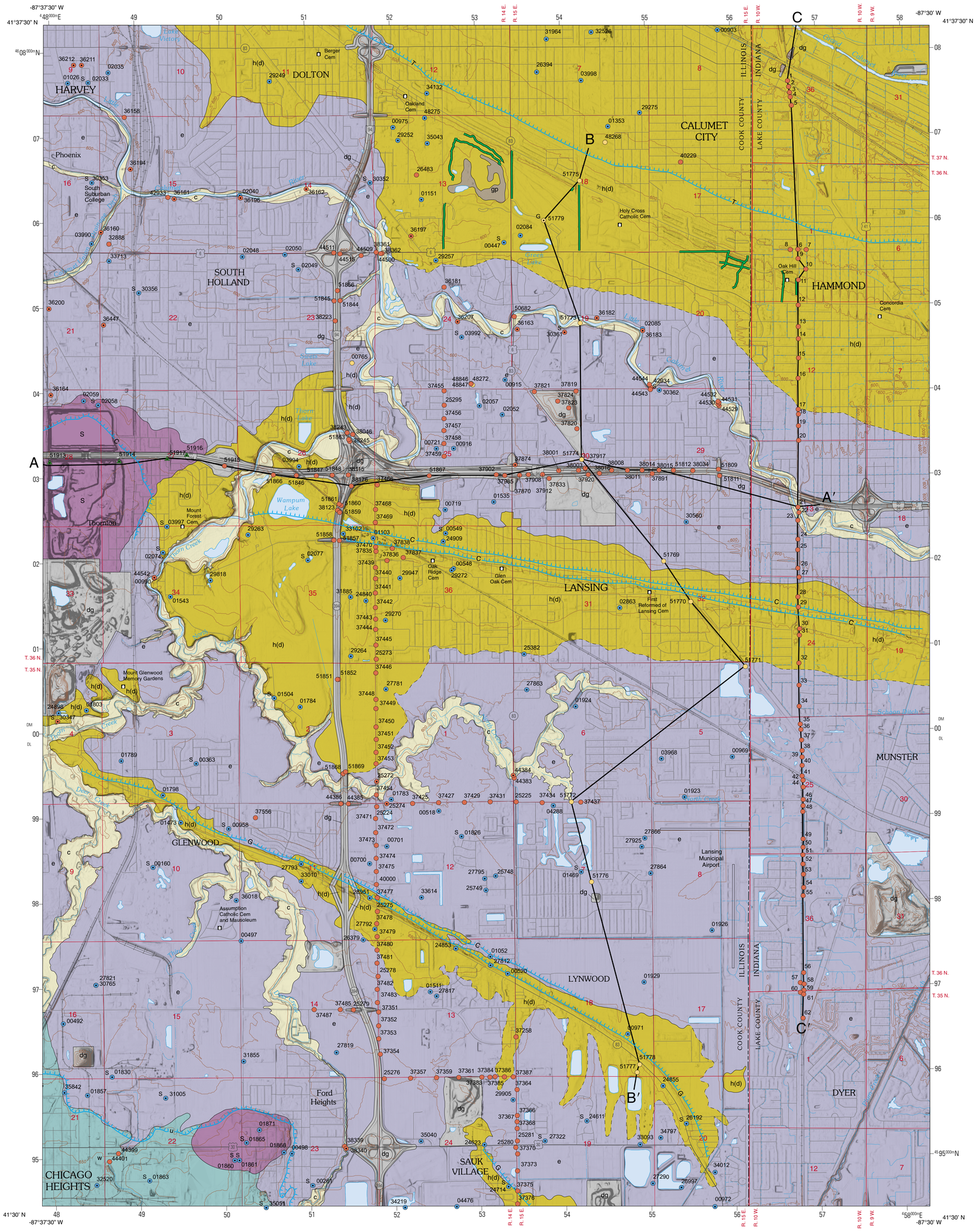
2021

STATEMAP Calumet City-SG



QUATERNARY DEPOSITS

Description	Unit	Interpretation
HUDSON EPISODE (~14,700 years before present [B.P.] to today)[1]		
Diamicton, sand, gravel, silt or blocky fragments of dolomite (gravel to boulders) as much as 35 feet thick; includes landfill refuse.	Disturbed ground: dg	**Disturbed land;** includes landfills, major highway embankments, other construction and debris-strewn quarried areas.
Peat, muck, organic silt and clay; interbedded with sand, silt, and clay in some places; up to about 5 feet thick.	Grayslake Peat: gp	**Organic debris deposited in depressions;** intertongues with the Equality and Cahokia Formations.
Sand, silt, and clay; stratified; locally containing beds of sand;- fossiliferous in places; generally less than 15 feet thick	Cahokia Formation: c	**Alluvium in floodplains and channels of modern rivers and streams;** base marked by Pleuroceras-rich sandy lag atop silty lacustrine sediment.
late WISCONSIN EPISODE and HUDSON EPISODES (~17,600 years B.P. to today)[1]		
Sand, fine to medium, well-sorted, stratified, gravelly in places, silty in others, less than 30 feet thick.	Henry Formation (Dolton facies): h(d)	**Littoral and beach sands** (deposited by Lake Chicago) capped by long linear dune complexes that parallel that ancient shoreline. Three ancient shorelines are present: the Glenwood, Calumet, and Toleston beach ridges (Bretz, 1939).
Clay and silt; uniform and laminated; in places with laminae of silty fine sand, beds of sand and gravel, and silty diamicton; as much as 60 feet thick	Equality Formation: e	**Lake sediment** of late Pleistocene Lake Chicago and Holocene Lake Michigan. Evidence of sediment disturbance suggests ploughing and some dewatering (compaction) by floating ice margins including bergs.
WISCONSIN EPISODE: Michigan Subepisode (~29,000–17,600 years B.P.)[1]		
Diamicton, silty clay loam; vaguely stratified in most places, gray (fresh) to brown, yellowish brown, and light gray (weathered); with lenses of sand and gravel; as much as 50 feet thick.	Wadsworth Formation: w	**Typically soft till (sensu ice-deposited) with rafts of ice-marginal silty and fine-sandy lake sediment;** likely includes subaqueous debris flow deposits; basal 10 ft or so is hard in many places suggesting intial deposition by thicker ice.
Diamicton, silt loam; hard; gray, with layers of and laminae of silt and very fine sand; as much as 55 ft thick.	Lemont Formation, Haeger Member (cross sections only): l-h	**Till and ice-marginal sediment**
Gravelly sand; hard; stratified in places; as much as 60 ft thick.	Beverly Tongue, Henry formation (cross sections only): h-b	**Proglacial deltaic and fluvial deposits**

PRE-QUATERNARY DEPOSITS

Description	Unit	Interpretation
SILURIAN SYSTEM (440-410 million years B.P.)		
Dolomite, fine-grained, hard, gray to cream	Silurian Bedrock[2]: S	**Reef and carbonate bank deposits**

[1]The time periods for the Wisconsin Episode and the Hudson Episode are reported as calibrated radiocarbon years and can be directly compared to calendar years before 1950 (Stuiver et al. 2015).

[2]Thornton Quarry (cross section A-A′) removed more than 300 feet of Silurian dolomite; as of 2021, the quarry was inactive, and used for storage of storm runoff.

Note: The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Most well and boring records are available online from the ISGS Web site.

Cross section C-C′ includes data interpreted from 61 engineering boring logs made available to us through Wang Engineering. The original data may be obtained by contacting the ISGS.

Bretz, J.H., 1939, Surficial Geology of the Calumet City Quadrangle, map no. 20 *in* Bretz, J.H., 1943, Chicago area geologic maps: Illinois State Geological Survey, Bulletin 65 maps, 24 sheets, 1:24,000.

Base map compiled by Illinois State Geological Survey from digital data (2018 US Topo) provided by the United States Geological Survey. Shaded relief derived from LiDAR elevation data provided by Cook County, IL (2018), the Indiana Geographic Information Council (IGIC) and USGS 3DEP Program (2018).

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

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SCALE 1:24,000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1988

Geology based on field work by B.B. Curry, A.C. Phillips, E.N.G. Huggett and W.R. Lenihan 2019-2021.

Digital cartography by Deette M. Lund, Emily G. Bunse, Illinois State Geological Survey.

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This map has not undergone the formal Illinois Geologic Quadrangle map review process. Whether or when this map will be formally reviewed and published depends on the resources and priorities of the ISGS.

The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to the accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. Maps or cross sections in this document are not meant to be enlarged.

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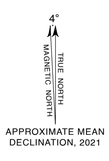
1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Blue Island
2 Lake Calumet
3 Whiting (IN)
4 Harvey
5 Highland (IN)
6 Steger
7 Dyer
8 Saint John (IN)



APPROXIMATE MEAN DECLINATION, 2021

ROAD CLASSIFICATION
Interstate Route
U.S. Route
State Route
Local road

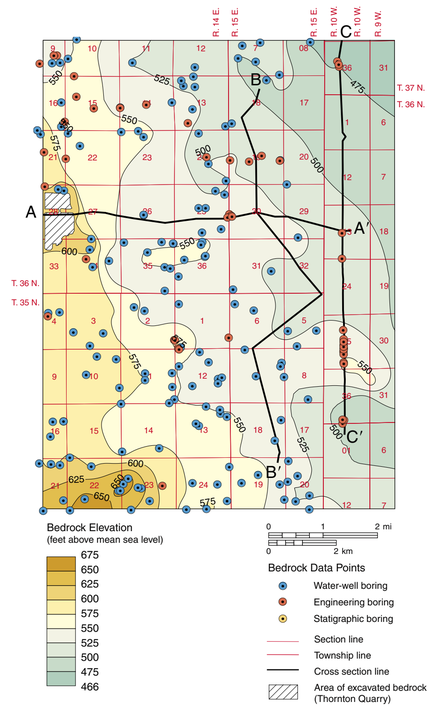


Figure 1 The generalized topography of the bedrock surface of the Calumet City Quadrangle. Data points on map were used to determine bedrock surface. Map scale is 1:100,000. The area of Thornton Quarry, where bedrock is exposed at the surface, has been excavated to a maxiumum depth of 253 feet above mean sea level.

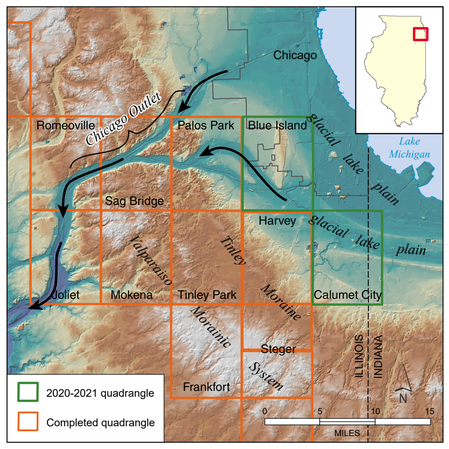


Figure 2 Location map for the Calumet City Quadrangle in northeastern Illinois. The area includes portions of the Valparaiso Morainic System, and the Tinley Moraine, and Chicago Plain (glacial lake plain).

Table 1 Mean and standard deviation of unit properties, including depth (feet), SPT (Standard Penetration Test), % refusal (SPT > 100 blows/ft), moisture content, unconfined compressive strength (Qu, t/ft2), and particle size distribution data by laser diffraction methods at Prairie Research Institute. Dx10, Dx50 and Dx90 refers to the percent particles remaining at 10, 50, and 90 percent, respectively, on the cumulative data curve. The ratio of Dx50/Dx10 provides information about relative sorting, with smaller values indicating better sorting.

Unit	Statistic	Depth (feet)	SPT	Refusal (%)	Moisture Content (%)	Qu (t/ft²)	% Gravel Total Sample	Less than 2mm fraction Sand (%)	Silt (%)	Clay (%) (<4µm)	Dx 10	Dx 50	Dx90	Dx50/ Dx10	USDA Classification
dg disturbed ground	Mean	8.6	13.9		20.7	2.1									
	St. Dev.	7.6	16.8	3	9.6	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
	no	209	67		189	96									
c Cahokia Formation	Mean	9.0	ND		30.4	ND	1.1	12.4	68.5	19.2	2.2	13.7	79.1	6.3	
	St. Dev.	5.0		ND	5.3		1.9	4.4	6.9	2.6	0.3	0.3	26.7	0.8	ZL(3)
	no	3	3		3		3	3	3	3	3	3	3	3	
h(d) Henry Formation Dolton Member	Mean	10.2	19.8		22.5	2.6	2.0	6.6	26.1	8.2	1.9	5.7	36.3	11.9	
	St. Dev.	7	13.1	0	7	1.7	0.9	5.1	36.7	9.5	1.4	7.1	38.9	11.0	S(5), LS(2)
	no	213	199		170	21	7	7	7	7	7	7	7	7	
e Equality Formation	Mean	22.6	10.6		22.1	2.2	0.7	5.5	63.3	31.2	1.4	8.9	41.1	6.4	
	St. Dev.	14.5	6.4	0	4.1	1.1	1.7	3.1	10.4	8.4	1.1	4.8	14.2	0.8	ZCL(15), ZL(4), ZC(2), Z(1)
	no	326	253		285	307	22	22	22	22	22	22	22	22	
w Wadsworth Formation	Mean	30.1	16.6		19.9	3.0	3.8	9.2	53.6	37.2	1.1	6.6	59.2	6.1	
	St. Dev.	16.5	9.5	0	3.2	1.6	5.1	2.6	6.2	5.7	0.4	2.3	32.7	0.4	ZCL(24), ZL(4), ZC(2), Z(1)
	no	470	430		286	435	37	37	37	37	37	37	37	37	
l(h) Lemont Formation Haeger Member	Mean	57.8	47.1		15.8	5.4	14.9	8.8	63.3	27.9	1.4	9.5	56.1	6.8	
	St. Dev.	26.8	25.3	12	3.7	2.4	8.5	12.1	61.1	26.9	1.5	9.8	120.4	6.4	ZCL(9), ZL(3)
	no	328	315		240	241	12	12	12	12	12	12	12	12	
h(b) Henry Formation Beverly Tongue	Mean	93.6	81.6		16.2	6.9	2.5	74.1	18.6	7.3	6.5	195.5	391.8	33.9	
	St. Dev.	20.0	21.2	50	3.1	2.9	3.4	2.6	2.0	1.3	1.9	63.0	112.7	18.9	LS(4)
	no	42	42		36	22	4	4	4	4	4	4	4	4	

ZCL = silty clay loam, **ZC** = silty clay, **Z** = silt, **LS** = loamy sand, **S** = sand, **ZL** = silt loam, **Z** = silt