



**Preliminary Geotechnical  
Review**

## 1.0 PRELIMINARY GEOTECHNICAL REVIEW

### 1.1 Resources and Summary

Historic test boring information<sup>1</sup> was assembled from outlying sources or projects nearly surrounding the hospital site and campus. No test boring information was discovered within any of the proposed building sites, thus for the purposes of this report, CME has interpolated the subsurface data across several city blocks. Many of the existing boring logs are of variable quality and relevance in respect to this project, contain incomplete or fragmented data, and use terms and nomenclature subject to misinterpretation.

The hospital campus site is situated in a fully urbanized area which lies in the geologic transition zone characterized by relatively deep, soft, plastic lowland soils in the north and by relatively shallow, firm, elastic hillside soils in the south. Mostly single-story with a few multi-story concrete masonry and steel framed buildings dominate the site. Single-story structures are chiefly founded on conventional footing foundations in overburden or Till and multi-story structures on deep foundations. Most buildings are slab-on-grade with few basements.

From a geotechnical perspective, the lowland stratigraphy poses greater difficulties, more severe limitations and higher building costs than the hillside stratigraphy.

### 1.2 Subsurface Conditions and Characterizations

The generalized subsurface profile is preliminarily interpreted as given below based on the historic data.

| Approximate Depth Range (feet) | Approximate Thickness (feet) | Deposit Description/Characterization  |
|--------------------------------|------------------------------|---|
| 0 to 10                        | 0 to 10                      | <b>Urban Fill</b> , existing structures, miscellaneous materials, unsuitable soils, random materials and buried or remnant pre-existing topsoil horizon.  |
| 2 to 40                        | 7 to 39                      | <b>Natural Overburden</b> soils consisting chiefly of silts and sands with minor proportions of gravel and clay are generally soft to medium compact. In the northern portion of the site, plastic clays, deposited as sediment from a pre-historic lake, intervenes. These clays are subject to compression and long-term consolidation (volume loss). Overburden soils generally exhibit low bearing capacity which may be limited by settlement tolerance. |
| 12 to 44                       | 0 to 6                       | <b>Glacial Till</b> is discontinuous across the project area and where present consists of a mixture of soils overridden by Glacier. Till is generally firm or compact and exhibits moderate bearing capacity. Till contains shale rock in areas.   |

<sup>1</sup> Historic Test Boring Logs were obtained from NYSDOT MUD Ph. 7 and Overhead Sign Projects, (2009-2012), the City Courthouse (1995), Utica Auditorium (2014), City Hall (1964), Utica National Insurance (2001) and Police Vehicle Maintenance Facility (2004) projects.

| Approximate Depth Range (feet) | Approximate Thickness (feet) | Deposit Description/Characterization  |
|--------------------------------|------------------------------|---|
| 12 to 44                       | unknown                      | <b>Utica Shale Bedrock</b> is poor quality and exhibits moderate bearing capacity. The upper several feet of bedrock may exist as highly weathered rock exhibiting little structure and very poor quality and/or decomposed rock consisting of Residual Soil (i.e. silt and clay) and/or interlayered rock-like and soil-like materials. Utica Shale may exhibit expansive characteristics. |

The historic groundwater observations indicate a hydraulic gradient oriented approximately northerly at 10 feet to 20 feet below existing grade. The groundwater table may be a confined aquifer in areas, and if the upper confining layer is removed or penetrated, artesian conditions may be exposed. At the City Courthouse, once the confining layer was removed to accommodate a Basement Level, groundwater flowed vertically upward inside parts of the sheeted excavation creating a quick-sand condition. At the City Hall Project, construction delays and difficult dewatering conditions were reported by the inspecting engineer during drilled pier foundation construction.

Boring logs at the New Court Facility report odors consistent with hazardous materials and/or petroleum products. Hazmat and petroleum product contamination of the soils may impart premium costs to disposal of removed materials and may prevent re-use of the soils as unclassified fill.

Bedrock is of the Utica Shale Formation, which is known to exhibit expansive characteristic, in areas, due to pyritic sulfur content. At the Stanley Theater (Southeast corner of Genesee and Hopper Street), a building addition slab on grade was reported to have heaved as much as one-half foot due to expansion of bedrock and shale-rich fill used under the slab. Bedrock is within 12 feet of grade at the Stanley.

The upper 2 feet to 4 feet of the Shale Bedrock is typically weathered and/or decomposed to soil-like materials where many borings were able to penetrate it using earth drilling tools, before practical refusal to penetration was achieved. Decomposed and highly weathered bedrock is unsuitable bearing material due to variability of composition.

Practical refusal in Shale Bedrock was achieved at about elevation 445 near the south line of City Hall, about elevation 395 near the corner of Oriskany at Washington, about elevation 365 near the corner of Oriskany at N-S Arterial, and about elevation 405 near Kennedy Plaza at State Street. Bedrock below practical refusal generally was not sampled or tested for strength or quality in the historic borings.

### 1.3 Preliminary Geotechnical Engineering Evaluation

The current Downtown Hospital Location Plan shows the four proposed structures (i.e. CUP, Hospital, MOB/ACC, and Parking Garage) located between Columbia and Oriskany Streets. Except for the CUP, the other three structures are planned to be multi-story buildings with relatively high gravity roads at foundation level. The CUP may house heavy equipment that may require special considerations for foundation support.

Historic borings along Oriskany Street indicate intervening strata of generally plastic, soft, compressible, lakebed sediments and natural organic deposits.

It is CME's preliminary opinion that the foundations for the four proposed structures will consist of deep foundations bearing in competent bedrock, such as driven end-bearing Piles or Drilled Piers (DPs). DPs may rely on skin friction in bedrock or a combination of end-bearing plus skin friction to support the planned improvements.

The lowest level floor slabs may be either conventional reinforced concrete slab on grade or grade beam (structurally) supported reinforced concrete slab, depending on many factors including, but not limited to, subsurface conditions, elevation, depth of cut and/or fill, slab loading, flatness/levelness tolerances, floor finishes, and planned use. Lightly loaded floor slabs set below existing grade and below Urban Fill are more likely to be conventional slab on grade.

The lowest level slab elevation will likely be limited by the ground water table, as excavation and construction below the water table will be very expensive.

Bedrock expansive characteristic may be an important consideration in the vicinity of the MOB/ACC site. The boring records for the site just east of Broadway, indicate decomposed shale and Utica Shale Bedrock within 12 feet of pre-existing grade. Special laboratory testing and engagement of an expert in shale expansion and design in expansive material may be warranted.

A site-specific Foundation Engineering Investigation is recommended for each major structure and its site plan under the design development phase. The limited planning-level opinions and criteria presented herein are not intended to be satisfactory for design purposes.