

ARCHER ENGINEERING COMPANY, P.C.

April 24, 2018

Ms. Susan Murphy
Brookfield Library
182 Whisconier Road
Brookfield, CT 06804

Subject: Existing Construction Drawings
Brookfield Library

Dear Susan;

Archer Engineering reviewed the available existing construction drawings on a preliminary basis in order to comment on the structure of the building and the possibility of expansion. We also walked the property to review the site conditions.

The drawings were prepared for the Joyce Memorial Library by Burton Ashford Bugbee, AIA, Architect and Douglas Watson, P.E., Structural Engineer, both from Brookfield, CT. The drawings are dated June 20, 1974. The footprint of the building is roughly 50'-0" x 130'-0". The lower level at the north end is roughly 50'-0" x 60'-0".

Site: The existing Library faces Whisconier Road (Route 25) to the east. The Site Plan indicates that the septic system extends out from the northeast corner of the building and that the well is under the parking lot to the northwest. There are several areas of exposed bedrock around the Library including to the southeast, northwest and southwest.

Comments:

1. Bedrock could increase excavation costs if reworking and preparing of the stone surface is required. This is especially true if a basement level is desired.
2. Bedrock typically has higher allowable bearing capacity than average soil conditions for this area of Connecticut. Higher bearing capacity could reduce required footing sizes thereby decreasing construction costs.
3. High bearing capacity could also mean that a two or three story building could be supported without the need for deep excavation or special foundation construction.

Foundation: The construction drawings show that the foundation is of poured concrete. Typical wall footing size is 12" x 24". It appears that all walls are 12" thick. Basement walls and walls that retain soil are reinforced. Low foundation walls are unreinforced.

Comments:

1. The foundation should be in very good condition and should be adequate to support additional loads.

2. Direct bearing of the footings on bedrock should be verified. It could be expected that if direct bedrock bearing is not existing, but is necessary for an expansion, then relatively short underpinning or other similar work could resupport the existing foundation on bedrock.
3. Depending on the design of the expansion, current Building Code may require that the unreinforced portions of the concrete foundation be strengthened, reinforced and/or additionally anchored. This can be accomplished in a variety of ways, including adhering carbon fiber mesh on the exterior of the unreinforced walls.

First Floor: There is a lower level under the north end of the main floor. The main level floor at the north is framed with 18" steel bar joists spanning roughly 29'-0" and supporting a 2 1/2' concrete slab on steel deck.

The concrete slabs on grade of the lower level and the southern portion of the main level are 4" thick with 6 x 6 – W2.1 x W2.1 wire mesh over an 8" layer of crushed stone.

Comments:

1. Although a design load table was not found on the drawings, it can be assumed that the floor framing was engineered to support library floor loading since this was the original design intent of the building. The strength of the existing framing should be verified as part of the planning and design process.
2. The specifications for the slabs on grade are of good quality for this use.

Bearing Walls: The structural system for the superstructure of the building consists of wood roof trusses supported by perimeter concrete block bearing walls. The block walls are not reinforced. The tops of the block walls are capped with continuous, reinforced concrete beams. The beams span over the windows and doors and tie the walls together. The drawings show that the concrete beams only contain continuous top and bottom bars and do not have stirrups.

Comments:

1. Unreinforced block bearing walls do not meet current Building Code requirements for a building of this type. Most likely, in a significant renovation of the Library, the concrete block bearing walls would need to be reinforced. This can be done by inserting steel bars inside the cores of the block and grouting solid.
2. The continuous concrete beams would need to be removed if the existing block walls are internally reinforced.

Roof: The roof is framed with wood gable roof trusses that span roughly 50'-0" in the east-west direction. The drawings contain specifications and details for construction of the trusses.

Comments:

1. If a second floor is added, then the roof trusses will be removed.
2. If an adjacent taller structure is added, then the existing roof trusses can be analyzed and reinforced if needed.

Summary for Building Expansion:

1. Foundation bearing could be directly on or is very close to bedrock. These conditions should be considered very conducive to building expansion.
2. The foundation was solidly designed. It is very likely that the vast majority will support a building expansion.
3. The framing of the main floor and the concrete slab on grade are in good condition and can be expected to continue as such in the future.
4. The unreinforced concrete block walls will require strengthening and may require replacement.
5. The roof framing very likely will require strengthening or replacement.

Please call if you have any questions or if additional structural engineering assistance can be provided. Thank you for the opportunity to be of service to you.

Respectfully submitted,



Kevin G. Archer, P.E., SECB
President