STRUCTURAL

PURPOSE

The purpose of this report is to describe in broad terms the structure of the existing building, to comment on the condition of the existing building, and on the feasibility of renovation and expansion of the facility.

SCOPE

1. Description of existing structure
2. Comments on the existing condition
3. Comments on the feasibility of renovation and expansion

BASIS OF THE REPORT

This report is based on visual observations during our site visit on July 23, 2002, the review of the available drawings of the existing buildings: Ref. "A" through "F" dated February 27, 1959, "G" dated February 18, 1965, and "H" dated September 29, 1971 prepared by TAC. Interior renovations dated November 1989 prepared by Strekalovsky & Hoit, Inc.

During our site visit, we did not remove any finishes or take measurements so our understanding of the structure is limited to the structural information contained in the drawings.

BUILDING DESCRIPTION

A. Block A - 1959

Foundations are traditional spread concrete footings with a permissible G.B.P. of two and one-half (2 ½ t.s.f.) tones per square foot. The first floor is a four-inch (4") cast-in-place concrete slab-on-grade and 10-inch plus 3-inch concrete joist construction at a localized area over the boiler room.

The second floor framing consists of 10-inch plus 3-inch concrete joists supported on cast-in-place concrete beams and concrete encased steel wide flanged columns.

The roof framing has steel beams supporting bulb tees with Tectum panels at the academic areas and long span steel joists supporting one and one-half inch (1 ½") metal deck over the lecture hall areas. There is no evidence of any specific lateral load resisting elements.

B. Block B – 1959

Is a single-story structure with traditional spread footings, four-inch (4") cast-in-place concrete slab-on-grade with formed concrete utility trenches.

The roof structure consists of various concrete roof systems including solid cast-in-place one–way slab, 12-inches in diameter "Sonavoids", a non-prestressed hollow core type cast-in-place concrete slab and eight and one-half inch (8 ½") deep solid lift slab. There is no evidence any specific lateral load resisting elements.

C. Block C, D, & E - 1959

These are similar to Block B with spread footings and eight and one-half inch (8 ½") lift slab at the roof. There is a localized area of cast-in-place "Sonavoids" in Block D. There is no evidence any specific lateral load resisting elements.

D. Block F – 1959

The gymnasium structure has traditional concrete spread footings supporting an exterior cast-in-place concrete wall built up to the eaves of the domed roof.

There is an upper floor at the locker rooms consisting of 12-inch and 3-inch concrete joists supported on encased steel beams and steel tube columns.

The domed roof has a wood framed system with glu-lam beams, forming a geodesic dome and supporting wood plank. The glu-lam beams have bolted steel connectors and continuous steel channel or plate at the perimeter connected to the concrete wall. There is no evidence any specific lateral load resisting elements.

Small additions at each side of the main entry were added in 1989 and consisted of reinforced load bearing CMU supporting steel beams and one and one-half inch (1 ½") roof deck.

E. Block G – 1965

Is a single-story structure with spread footings supporting cast-in-place concrete columns. There is a four-inch (4") concrete slab-on-grade with formed concrete perimeter utility trenches.

The roof consists of a concrete joists or pan system (one-way span) 12-inches deep with variable topping of four to seven-inches (4"-7") supported on cast-in-place concrete beams.

There is a connector with Building B, which has steel columns supporting eight-inch (8") deep steel beams and two and one-half inch (2 ½") wood deck. There is no evidence any specific lateral load resisting elements.

F. Block H – 1971

Is a two-story steel framed building supported on traditional concrete spread foundations. Steel columns are tubular and wide flange.

The second floor framing consists of steel joists at 2'-0" on center supporting a four-inch (4") slab on metal formed deck at the main reading area and joists at 5'-0" on center supporting a four-inch (4") slab on composite steel deck at the remainder.

The roof framing has long-span steel joists supported on steel beams with one and one-half inch (1 ½") deep metal deck.

The main stairs are cast-in-place concrete. There is a structural lateral system for exterior curtain walls. There is no apparent lateral load resisting system.

EXISTING CONDITIONS

Based on our observations, we conclude that the existing structures are in sound condition.

There is no evidence of any foundation settlement or cracking at Blocks A, B, C, D, E, F, & G other than evidence of repair around the exterior veneer at the underpass between C and D. This was caused by thermal movement and is not structurally significant.

The superstructure at Block F in the field house is in sound condition although there is evidence of localized distress at the connection of the domed roof where the supporting concrete walls exhibit cracking.

It would appear that these have been in evidence for a long time and pose no structural concerns. The overhangs at the field house, windows, and fascia are in poor condition with gaps at the columns.

Exposed overhangs at the concrete roofs, which can sometimes be a source of thermal problems, appear okay with no signs of distress. Generally, the structures are in sound condition.

FEASIBILITY OF RENOVATION AND EXPANSION OF THE STRUCTURE

None of the buildings have been designed for any vertical future expansion and additions need to be kept structurally separate from the existing with expansion joints.

The single-story buildings, particularly B, C, D, and E rely on existing interior masonry walls to provide any semblance of lateral restraint to the building and as a minimum compliance under Chapter 34 of the Massachusetts State Building Code would require positive connection of all masonry walls to the existing roof structure.

The roof structures, for these solid eight and one-half inch (8 ½") thick concrete slab, is susceptible to lateral seismic loading and extreme care needs to be taken to avoid reducing the existing lateral system of masonry walls and additional masonry walls would help somewhat to enhance such a system.

Modification of these roof slabs for M.E.P. requirements is very difficult, as openings cannot be easily formed in the lift slab/flat slab type of construction. This form of construction was very often a contractor design and can be difficult to ascertain capacities without shop drawings.

The low floor to the underside of the roof may also be restrictive to M.E.P. requirements in certain instances.

RECOMMENDATIONS

Primarily the buildings, while in sound condition, are limited as far as structural adaptability goes and as stated, extreme care needs to be taken with respect to lateral systems and existing masonry walls.

Compliance with Chapter 34 (Additions and Renovations to Existing Buildings) of the Massachusetts Building Code is needed. Planning and layout need to be carefully considered with respect to existing lateral systems.