Existing Building Investigation & Evaluation Report

Performance Compliance Method

678 Main Street
Anycity, MA 00003

Prepared by:

Massachusetts Registered Design Professional (RDP)

September 1, 2016

Note:

*This report was developed for education purposes and is to be referenced only as a sample of what **may be provided** as part of an existing building investigation and evaluation report. Each building renovation project is unique and should be treated as such. Depending on the project, a greater or lesser level of detail may be required. This sample report may help to establish parameters for a project report, but should not be used as a gauge for code compliance. Photos contained herein were excerpted from internet public images. Information contained in this report is hypothetical and does not reflect actual conditions of internet images used.*

Part A.

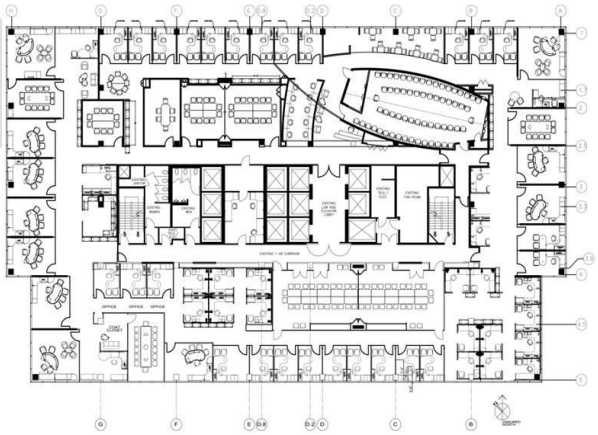
Existing Building General Information:

1. Use Group Classification: Office (B) Building
2. Type of Construction: IIA
3. Area: 40,000 square feet per floor
4. Height above grade plane: 60 feet
5. Stories above grade: 5 stories, slab on grade
6. Sprinkler System: Not sprinklered

The existing building was originally designed and constructed in March, 1993 in accordance with 780 CMR (The Massachusetts Building Code), Fifth Edition as a single use, professional office building. According to the original building permit application, and associated plans and specifications, there have not been any additions or major renovations made to the structure since its original occupancy.

Ariel View of Site

The building sits on a ten acre parcel of land with full perimeter access, shared with 3 other existing retail buildings of similar construction type, with 6 points of fire department access to the site. Ample parking is available on site. A typical office floor plan is depicted below.



Typical Office Floor Plan Layout

Part B.

Renovated Building General Specifications:

The existing building will be renovated to accommodate a new professional tenant who will occupy all five stories. Renovations will include, at minimum:

- Removing and reconfiguring existing cubicle layout, floors 1 through 5;
- New entry, greeting and waiting area on the first floor;
- New carpet, painting and interior trim in both new and existing tenant spaces, mezzanine; and
- New EPDM adhered roof.

The building will be renovated in compliance with ***780 CMR, Ninth Edition, Existing Building Code – Performance Compliance Methods***. The renovated structure shall continue to serve as a professional office building with limited, incidental storage space.

This report is prepared to assess existing conditions for the current use; identify any and all current code deficiencies requiring attention as part of the renovation project; and to generally assess the suitability of the structure for new use conditions. As required by 780 CMR Section 104.2.2.1 and further enhanced by IEBC Chapter 14, most specifically, Section 1401.6 the report shall assess:

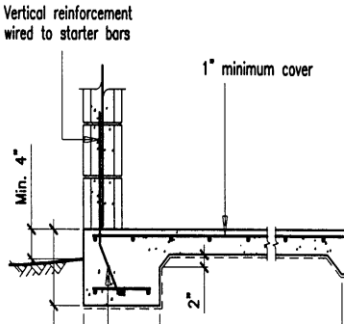
- Building Height (Section 1401.6.1);
- Building Area (Section 1401.6.2);
- Compartment (Section 1401.6.3);
- Tenant and Dwelling Unit Separations (Section 1401.6.4);
- Corridor Walls (Section 1401.6.5);
- Vertical Openings (Section 1401.6.6);
- HVAC (Section 1401.6.7);
- Automatic Fire Detection (Section 1401.6.8);
- Fire Alarm Systems (Section 1401.6.9);
- Smoke Control (Section 1401.6.10);
- Means of Egress Capacity and Number (Section 1401.6.11);
- Dead Ends (Section 1401.6.12);
- Maximum Exit Access Travel Distance to an Exit (Section 1401.6.13);
- Elevator Control (Section 1401.6.14);
- Means of Egress Emergency Lighting (Section 14001.6.15);
- Mixed Occupancies (Section 1401.6.16);
- Automatic Sprinklers (Section 1401.6.17);
- Standpipes (Section 1401.6.18);
- Incidental Uses (Section 1401.6.19);
- Smoke Compartmentation; and
- Patient Ability, Concentration, and Attendant to Patient Ratio (I-2 Occupancies).

Part C.

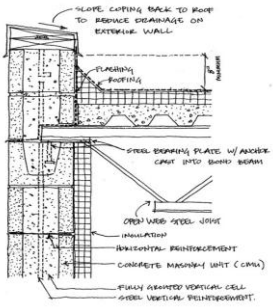
Existing Structural Conditions (*Construction Type, Height & Area Requirements*)**:**

The existing building conforms to Type IIA as established by 780 CMR, Ninth Edition, comprised of:

- Eight (8) inch split-faced, concrete masonry unit (CMU) exterior bearing walls, fully grouted and reinforced with #5 bars @ 4'-0" o.c.;
- Interior 8" x 8" nominal steel tube columns support, wide flange steel beams in 20'-0" bays;
- Open-web, steel bar joists @ 2'-0" o.c. roof structure with corrugated metal decking, light-weight concrete surface, rigid insulation and adhered, EPDM roof membrane (*see typical details below*).
- Interior walls are non-bearing, steel studs with ½" g.w.b. and skim coat of plaster.



Typical Exterior Wall Detail



Typical Roof Detail

Ninth Edition 780 CMR Section 602.2 establishes that *"Types I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials, except as permitted in Section 603 and elsewhere in this code"*. Type IIA construction shall achieve fire resistance ratings for structural elements as detailed in Table 601 (*copy of current table appended below*).

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A	B	A	B	HT	A	B
Primary structural frame[f] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing walls Exterior[e, f] Interior	 3 3[a]	 2 2[a]	 1 1	 0 0	 2 1	 2 0	 2 1/HT	 1 1	 0 0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.
a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.
b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.
c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.
d. Not less than the fire-resistance rating required by other sections of this code.
e. Not less than the fire-resistance rating based on fire separation distance (see Table 602).
f. Not less than the fire-resistance rating as referenced in Section 704.10.

Assessment: The general condition of the structure appears to be in good shape. Construction documents on file at the building department indicate that appropriate live and dead loads were anticipated in the design and construction of the building and there have not been any significant building code changes affecting design loads that would necessitate change.

Height & Area Requirements: The existing building stands five stories high, 60 feet above grade plane level. **Tables 504.3** and **504.4** allow a maximum of 6 stories, 65 feet in height above grade plane for non-sprinklered, business occupancy buildings. **Table 506.2** allows a building area of 37,500 square feet per floor for a non-sprinklered B Use. One-hundred percent (100%) perimeter access established by 780 CMR Section 506.3.2 allows for an area increase to 65,625 square feet per floor. The 40,000 square foot footprint is well within table limits.

TABLE 504.4[a, b]—continued
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
B	NS	UL	11	5	3	5	3	5	3	2
	S	UL	12	6	4	6	4	6	4	3

TABLE 504.3[a]
ALLOWABLE BUILDING HEIGHT IN FEET ABOVE GRADE PLANE

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
A, B, E, F, M, S, U	NS[b]	UL	160	65	55	65	55	65	50	40
	S	UL	180	85	75	85	75	85	70	60

TABLE 506.2[a, b]
ALLOWABLE AREA FACTOR (A_t = NS, S1, S13R, or SM, as applicable) IN SQUARE FEET

OCCUPANCY CLASSIFICATION	SEE FOOTNOTES	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
B	NS	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
	S1	UL	UL	150,000	92,000	114,000	76,000	144,000	72,000	36,000
	SM	UL	UL	112,500	69,000	85,500	57,000	108,000	54,000	27,000

Section 1401.6.1 - Height Formula:

$$\text{Height value, feet} = \frac{(AH) - (EBH)}{125} \times CF \qquad \textbf{(Equation 14-1)}$$

$$\text{Height value, stories} = (AS - EBS) \times CF \qquad \textbf{(Equation 14-2)}$$

where:

AH = Allowable height in feet (mm) from Section 504 of the *International Building Code*.

EBH = *Existing building* height in feet (mm).

AS = Allowable height in stories from Section 504 of the *International Building Code*.

EBS = *Existing building* height in stories.

CF = 1 if $(AH) - (EBH)$ is positive.

CF = Construction-type factor shown in Table 1401.6.6(2) if $(AH) - (EBH)$ is negative.

14-1 Height Value in feet = $\frac{(65) - (60)}{12.5} \times 1 = 0.4$

14-2 Height Value in stories = (5 - 5) x 1 = 0

Governing Building Height Value = **0**
(Summary Sheet 1401.7)

Section 1401.6.2 - Building Area:

$$A_a = A_t + (NS \times I_f) \qquad \textbf{(Equation 14-3)}$$

where:

A_a = Allowable building area per story (square feet).

A_t = Tabular allowable area factor (NS, S1, S13R, or SM value, as applicable in accordance with Table 506.2 of the *International Building Code*.

NS = Tabular allowable area factor in accordance with Table 506.2 of the *International Building Code* or nonsprinklered building (regardless of whether the building is sprinklered).

I_f = Area factor increase due to frontage as calculated in accordance with Section 506.3 of the *International Building Code*.

14-3 Area Value = (37,500) + (37,500 x .75) = **65,625 square feet**

Frontage Increase Equation = (200 x 30 + 200 x 30 + 200 x 20 + 200 x 30)/800 = 27.5

Frontage Increase Equation = [200 + 200 + 200 + 200]/800 - .25]27.5/30 = (.75)(.91) = .68

Frontage Increase Total = 37,500 x .68 = 25,5000

= 37,500 + 25,500 = 63,000

$$\text{Area value}_i = \frac{\text{Allowable area}_i}{1200 \text{ square feet}}\left[1 - \left(\frac{\text{Actual area}_i}{\text{Allowable area}_i} + \cdots + \frac{\text{Actual area}_n}{\text{Allowable area}_n}\right)\right]$$

(Equation 14-4)

where:

i = Value for an individual separated occupancy on a floor.

n = Number of separated occupancies on a floor.

14-4 Area Value

Commentary indicates that if there is only one occupancy, the formula reduces to the allowable area (63,000) minus the actual area (40,000) divide by the constant 1200. 63,000 – 40,000/1200 = 19.17

1401.6.3 – Compartmentation: The existing building does not contain compartmentation. The entire
40,000 square foot building is considered the compartment. Therefore, the compartment value for the B-Use building from column a below is **0**.

TABLE 1401.6.3
COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES				
	a Compartment size equal to or greater than 15,000 square feet	b Compartment size of 10,000 square feet	c Compartment size of 7,500 square feet	d Compartment size of 5,000 square feet	e Compartment size of 2,500 square feet or less
A-1, A-3	0	6	10	14	18
A-2	0	4	10	14	18
A-4, B, E, S-2	0	5	10	15	20
F, M, R, S-1	0	4	10	16	22

For SI: 1 square foot = 0.0929 m^2.

1401.6.4 - Tenant and Dwelling Unit Separation: The existing building does not contain tenant and\or dwelling unit separation. Therefore, **Section 1401.6.4.(1)** indicates that *"No fire partitions; incomplete fire partitions; no doors; doors not self-closing or automatic-closing"* fall into **Category a**, producing a value of **-4** from Table 1401.6.4 for the B-Use building.

TABLE 1401.6.4
SEPARATION VALUES

OCCUPANCY	CATEGORIES				
	a	b	c	d	e
A-1	0	0	0	0	1
A-2	-5	-3	0	1	3
R	-4	-2	0	2	4
A-3, A-4, B, E, F, M, S-1	-4	-3	0	2	4
I-2	0	1	2	3	4
S-2	-5	-2	0	2	4

1401.6.5 - Corridor Walls: Construction documents on file at the building department indicate that all existing corridors walls maintain a 1-hour fire resistance rating in accordance with UL Design No. G556 (*with sound attenuation provided*). Field observations indicate that all ratings are required rated doors are intact. Therefore, Section 1401.6.5.1(3) indicates that *"1-hour to less than 2-hour firerestance rating, with doors conforming to Section 716 of the IBC or without corridors as permitted by Section 1018 of the IBC"* fall into **Category c**, producing a value of **0** from Table 1401.6.5 for the B-Use building.

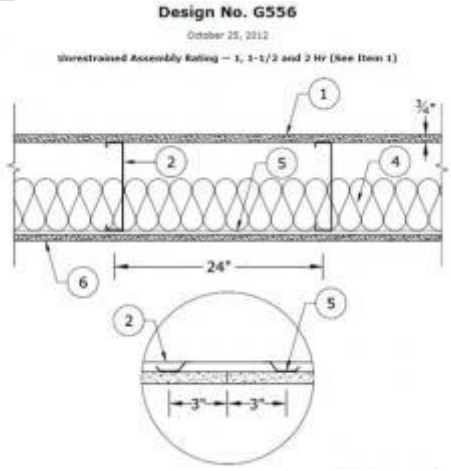


TABLE 1401.6.5
CORRIDOR WALL VALUES

OCCUPANCY	CATEGORIES			
	a	b	c[a]	d[a]
A-1	-10	-4	0	2
A-2	-30	-12	0	2
A-3, F, M, R, S-1	-7	-3	0	2
A-4, B, E, S-2	-5	-2	0	5
I-2	-10	0	1	2

a Corridors not providing at least one-half the exit access travel distance for all occupants on a floor shall use Category b

1401.6.6 – Vertical Openings: Construction documents on file at the building department indicate that all existing vertical, elevator hoistway and stair openings maintain at least a 1-hour fire resistance rating in accordance. Field observations indicate that all ratings are intact. Therefore, Section 1401.6.6 indicates that *"1-to less than 2-hour"* shall receive a value of **1** from Table 1401.6.6(1) and **2.2** from Table 1401.6.6(2) for the B-Use building.

TABLE 1401.6.6(1)
VERTICAL OPENING PROTECTION VALUE

PROTECTION	VALUE
None (unprotected opening)	-2 times number of floors connected
Less than 1 hour	-1 times number of floors connected
1 to less than 2 hours	1
2 hours or more	2

TABLE 1401.6.6(2)
CONSTRUCTION-TYPE FACTOR

FACTOR	TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
	1.2	1.5	2.2	3.5	2.5	3.5	2.3	3.3	7

Section 1401.6.6.1 requires a formula to calculate overall vertical opening value.

$$VO = PV \times CF \qquad \textbf{(Equation 14-5)}$$

where:

VO = Vertical opening value.

PV = Protection value from Table 1401.6.6.(1).

CF = Construction-type factor from Table 1401.6.6.(2).

Equation 14-5 VO = 1 x 2.2 **= 2.2**

1401.6.7 – HVAC systems: Construction documents on file at the building department and field observations indicate that existing plenums were not installed and maintained in accordance with the International Mechanical Code (IMC). Therefore, Section 1401.6.7.1 indicates a value of **-10** is applied for the B-Use building.

1401.6.8 – Automatic Fire Detection: Construction documents on file at the building department and field observations indicate that existing smoke detectors were installed and maintained in all HVAC systems and detectors were installed in accordance with the International Mechanical Code (IMC). Therefore, Section 1401.6.8.1(3) indicates that the system falls into **Category c**, producing a value of **0** from Table 1401.6.8 for the B-Use building.

TABLE 1401.6.8
AUTOMATIC FIRE DETECTION VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-3, F, M, R, S-1	-10	-5	0	2	6	—
A-2	-25	-5	0	5	9	—
A-4, B, E, S-2	-4	-2	0	4	8	—
I-2	NP	NP	NP	4	5	2

1401.6.9 – Fire Alarm System: Construction documents on file at the building department and field observations indicate that existing fire alarm system was installed and maintained in accordance with Section 907 of the International Building Code (IMC). Therefore, Section 1401.6.9.1(3) indicates that the system falls into **Category c**, producing a value of **0** from Table 1401.6.9 for the B-Use building.

TABLE 1401.6.9
FIRE ALARM SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a	b[a]	c	d
A-1, A-2, A-3, A-4, B, E, R	-10	-5	0	5
F, M, S	0	5	10	15
I-2	-4	1	2	5

a. For buildings equipped throughout with an automatic sprinkler system, add 2 points for activation by a sprinkler water-flow device.

1401.6.10 – Smoke Control: Construction documents on file at the building department and field observations indicate that existing **Stair A** is designed and has been maintained as a smoke-proof enclosure in accordance with IBC, Section 1023.11 and **Stair B** is designed and has been maintained as a pressurized stair in accordance with IBC Section 909.20.5. Therefore, Section 1401.6.10(6) indicates that the system falls into **Category f**, producing a value of **4** from Table 1401.6.10 for the B-Use building. However, Note a. reduces this value to **0** since Section 1401.6.8.1 resulted in compliance with **Category c**.

TABLE 1401.6.10
SMOKE CONTROL VALUES

OCCUPANCY	CATEGORIES					
	a	b	c	d	e	f
A-1, A-2, A-3	0	1	2	3	6	6
A-4, E	0	0	0	1	3	5
B, M, R	0	2[a]	3[a]	3[a]	3[a]	4[a]
F, S	0	2[a]	2[a]	3[a]	3[a]	3[a]
I-2	-4	0	0	0	3	0

a. This value shall be 0 if compliance with Category d or e in Section 1401.6.8.1 has not been obtained.

1401.6.11 – Means of Egress Capacity and Number: Construction documents on file at the building department and field observations indicate that egress capacity is equal to at least 125 percent of the required means of egress capacity, complying with minimum required width dimensions specified in the IBC and the number of exits complies with minimums required by IBC Section 1006. Therefore, Section 1401.6.11.1(3) indicates that the system falls into **Category c**, producing a value of **0** from Table 1401.6.11 for the B-Use building.

TABLE 1401.6.11
MEANS OF EGRESS VALUES[a]

OCCUPANCY	CATEGORIES				
	a	b	c	d	e
A-1, A-2, A-3, A-4, E, I-2	-10	0	2	8	10
M	-3	0	1	2	4
B, F, S	-1	0	0	0	0
R	-3	0	0	0	0

a. The values indicated are for buildings six stories or less in height. For buildings over six stories above grade plane, add an additional -10 points.

1401.6.12 – Dead Ends: Construction documents on file at the building department and field observations indicate that there are no existing dead end corridors in the building. Therefore, Section 1401.6.12.1 (3) indicates that the system falls into **Category c**, producing a value of **2** from Table 1401.6.11 for the B-Use building.

TABLE 1401.6.12
DEAD-END VALUES

OCCUPANCY	CATEGORIES[a]			
	a	b	c	d
A-1, A-3, A-4, B, F, M, R, S	-2	0	2	-4
A-2, E	-2	0	2	-4
I-2	-2	0	2	-6

a. For dead-end distances between categories, the dead-end value shall be obtained by linear interpolation.

1401.6.13 – Maximum Exit Access Travel Distance to an Exit: Construction documents on file at the building department and field observations indicate that the maximum travel distance to an exit is 150 feet. The maximum allowable travel distance for a non-sprinkler B-Use building according to IBC Table 1017.2 is 200 feet. Section 1401.6.13 establishes an equation to determine a travel distance value. The equation renders a value of **5** for the B-Use building.

$$\text{Points} = 20 \times \frac{\text{Maximum allowable travel distance} - \text{Maximum actual travel distance}}{\text{Maximum allowable travel distance}}$$

(Equation 14-6)

Equation 14-6 = 20 x (200 feet – 150 feet)/200 = **5**

1401.6.14 – Elevator Controls: Construction documents on file at the building department and field observations indicate that all elevators were designed and maintained with Phase I emergency operation and Phase II emergency in-car operation as required by the International Fire Code (IFC) and 524 CMR. All elevators are in good working order. Therefore, Section 1401.6.14.1(3) indicates that the system falls into

Category c, producing a value of **0** from Table 1401.6.14 for the B-Use building with a travel of less than 25 feet for fire-fighter personnel.

TABLE 1401.6.14
ELEVATOR CONTROL VALUES

ELEVATOR TRAVEL	CATEGORIES			
	a	b	c	d
Less than 25 feet of travel above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-2	0	0	+2
Travel of 25 feet or more above or below the primary level of elevator access for emergency fire-fighting or rescue personnel	-4	NP	0	+4

For SI: 1 foot = 304.8 mm.
NP = Not permitted.

1401.6.15 – Means of Egress Lighting: Construction documents on file at the building department and field observations indicate that means of egress lighting and exit signs are provided with emergency power in accordance with IBC Section 2702 and 527 CMR 12.00. Therefore, Section 1401.6.15.1(2) indicates that the system falls into **Category b**, producing a value of **0** from Table 1401.6.15 for the B-Use building with two or more exits.

TABLE 1401.6.15
MEANS-OF-EGRESS EMERGENCY LIGHTING VALUES

NUMBER OF EXITS REQUIRED BY SECTION 1015 OF THE *INTERNATIONAL BUILDING CODE*	CATEGORIES		
	a	b	c
Two or more exits	NP	0	4
Minimum of one exit	0	1	1

NP = Not permitted.

1401.6.16 – Mixed Occupancies: Construction documents on file at the building department and field observations indicate that the building is a single, Business (B) Use (*with ancillary storage*). Section 1401.6.16. indicates that ". . . For buildings without mixed use occupancies, the value shall be **0** . . . ".

1401.6.17 – Automatic Sprinklers: The building is not required to be equipped with automatic sprinkler protection. Section 1401.6.17.1(3) establishes that buildings not required to be equipped with sprinklers shall fall into **Category c**, producing a value of **0** from Table 1401.6.17 for the B-Use building.

TABLE 1401.6.17
SPRINKLER SYSTEM VALUES

OCCUPANCY	CATEGORIES					
	a[a]	b[a]	c	d	e	f
A-1, A-3, F, M, R, S-1	-6	-3	0	2	4	6
A-2	-4	-2	0	1	2	4
A-4, B, E, S-2	-12	-6	0	3	6	12
I-2	NP	NP	NP	8	10	NP

NP = not permitted.
a. These options cannot be taken if Category a in Section 1401.6.18 is used.

1401.6.18 – Standpipes: The building is not required to be equipped with a standpipe. Section 1401.6.18.1(2) establishes that buildings not required to be equipped with sprinklers shall fall into **Category b**, producing a value of **0** from Table 1401.6.18 for the B-Use building.

TABLE 1401.6.18
STANDPIPE SYSTEM VALUES

OCCUPANCY	CATEGORIES			
	a[a]	b	c	d
A-1, A-3, F, M, R, S-1	-6	0	4	6
A-2	-4	0	2	4
A-4, B, E, S-2	-12	0	6	12
I-2	-2	0	1	2

a. This option cannot be taken if Category a or Category b in Section 1401.6.17 is used.

1401.6.19 – Incidental Uses: The building furnace room equipped with (2) 400,000 Btu units is protected with 1-hour firerestance rated walls in accordance with IBC Table 509. Table 1401.6.19 establishes a value of **0** for the B-Use building.

TABLE 1401.6.19
INCIDENTAL USE AREA VALUES

PROTECTION REQUIRED BY TABLE 509 OF THE *INTERNATIONAL BUILDING CODE*	PROTECTION PROVIDED						
	None	1 hour	AS	AS with CRS	1 hour and AS	2 hours	2 hours and AS
2 hours and AS	-4	-3	-2	-2	-1	-2	0
2 hours, or 1 hour and AS	-3	-2	-1	-1	0	0	0
1 hour and AS	-3	-2	-1	-1	0	-1	0
1 hour	-1	0	-1	-1	0	0	0
1 hour, or AS with CRS	-1	0	-1	-1	0	0	0
AS with CRS	-1	-1	-1	-1	0	-1	0
1 hour or AS	-1	0	0	0	0	0	0

AS = Automatic sprinkler system;
CRS = Construction capable of resisting the passage of smoke (see IBC Section 509.4.2 of the *International Building Code*).
Note: For Table 1401.7, see page 75.

1401.6.19 – Smoke Compartmentation: Smoke compartments are not provided in the existing building. Therefore, Section 1401.6.20.1(3) indicates the building falls into **Category c**. Table 1401.6.20 establishes a value of **0** for the B-Use building.

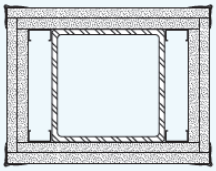
TABLE 1401.6.20
SMOKE COMPARTMENTATION VALUES

OCCUPANCY	CATEGORIES[a]		
	a	b	c
A, B, E, F, M, R and S	0	0	0
I-2	0	NP	NP

For SI: 1 square foot = 0.093 m^2.
NP = Not permitted.
a. For areas between categories, the smoke compartmentation value shall be obtained by linear interpolation.

1401.6.20 – Patient Ability in I-2 Uses: The building does not and will not contain an I-2 Use. Therefore, Section 1401.6.20 establishes a value of **0** for the B-Use building.

Deficiencies: Table 601 requires a one (1) fire resistance rating at tube columns. According to construction documents on file at the building department, column ratings are achieved in accordance with ***Underwriters Laboratory*** Design Number X528. Significant damage has occurred at 2 columns at the first level. All column enclosures will be examined and repaired as necessary to achieve ratings intended by the noted design. .

	• 2 layers 3/4" SHEETROCK ULTRACODE Core panels – 1-5/8" 25 gauge steel studs – No. 28 MSG 1-1/4" leg corner bead fastened to wallboard with No. 6x1" screws – joints finished	**UL Des X528**	Structural member tested: Tube steel column 8 x 8 x 0.25"	**E-14**

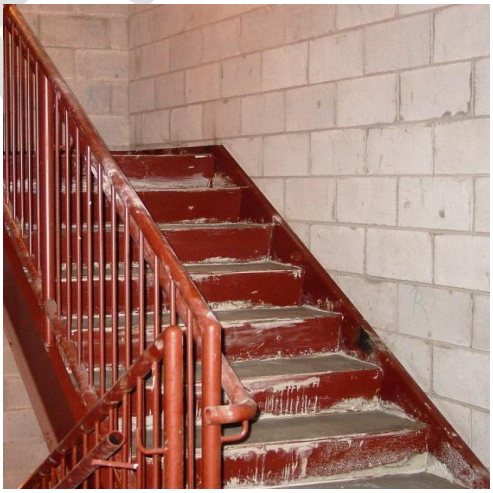
Part D.

Means of Egress Conditions:

Assessment: The maximum design occupant load for the building is 495 occupants. Two (2), fully enclosed, fire-rated stairways, remotely located are provided in accordance with Table 1006.3.1. However, noticeable concrete spawlling was observed at the north stair posing tripping hazards under normal use. Additionally, stair lighting levels do not meet minimums required by 780 CMR, Section 1008.2.1 which establishes that *". . . means of egress illumination level shall be not less than 1 footcandle at the walking service"*. Each deficiency is due to lax maintenance and each will be appropriately remedied during the project renovation.

TABLE 1006.3.1
MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4



Damage at North Stair

Part E.

Fire Protection Systems:

Assessment: The building is protected with a fire sprinkler system installed in accordance with NFPA Standard 13. 780 CMR Section 903 establishes criterion for automatic sprinkler systems. Although the section does not require sprinkler systems in business use buildings, Massachusetts General Law (MGL) Section 26G indicates that "*Every building or structure, including any additions or major alterations thereto, which totals, in the aggregate, more than 7,500 gross square feet in floor area shall be protected throughout with an adequate system of automatic sprinklers in accordance with the provisions of the state building code. No such sprinkler system shall be required unless sufficient water and water pressure exists. For purposes of this section, the gross square footage of a building or structure shall include the sum total of the combined floor areas for all floor levels, basements, sub-basements and additions, in the aggregate, measured from the outside walls, irrespective of the existence of interior fire resistive walls, floors and ceilings. This section shall not apply to buildings used for agricultural purposes as defined in section 1A of chapter 128*".

Tests indicate that the existing sprinkler system is in good working order. However, the system will need to be reconfigured to accommodate new office layouts. Renovation construction documents will establish new design distribution requirements in accordance with NFPA 13 and the system will be fully tested prior to occupancy.

Additionally, the building is equipped with a fully functional manual alarm system as required by 780 CMR, Section 907.2.2(2). This system will also require some redesign to accommodate new office layout which will be reflected in construction documents. The system will be fully tested prior to occupancy.

Part F.

Energy Conservation Conditions and Requirements:

Assessment: Construction documents on file at the building department indicate that the insulation values for the existing roof system were designed and constructed in excess of code requirements when originally constructed and meet enhanced values established by 780 CMR, Ninth Edition, for the area. A new EPDM roof was installed in 2012. Construction documents for this roof replacement project indicate, in part that "*all existing R-values shall be maintained at the roof assembly and all damaged, missing and\or otherwise compromised existing rigid insulation shall be replaced as new . . .*".

Deficiencies: There is no intent to replace or disturb the existing insulation assembly during the renovation. Therefore, there is no need to upgrade existing insulation values for the assembly.

Part G.

Lighting and Ventilation Conditions:

Assessment: With the exception of illumination levels noted in Part D. of this report, existing lighting and ventilations are appropriately sized and in good working order. However, systems will need to be reconfigured to accommodate new layouts. Construction documents for the renovation project will establish new lighting and ventilation conditions.

Part H.

Hazardous Materials:

Assessment: Neither does the existing building nor will the new building contain hazardous materials.

Part I.

Accessibility to, in and around building:

Interior Assessment: New accessible ingress and egress patterns as well as exit and entry doors will be established to accommodate renovated layouts. Existing bathrooms facilities layouts are in full compliance with 780 CMR, Ninth Edition, and 521 CMR, do not require any work and are not part of the renovation project.

Exterior Assessment: There are over 500 available parking spaces on site for use by patrons of the four existing structures. The lot was recently repaired and re-striped. All spaces are clearly delineated and 8 accessible spaces are dedicated to each of the 4 existing structures for a total of 32 available spaces. **521 CMR Section 23.2** establishes that parking facilities accommodating 501 – 1000 shall provide at least 2 percent of total as accessible spaces. Additionally, **Section 23.2.2** requires *"One in every eight accessible spaces, but not less than one, shall be van accessible"*. Two (2) of the 8 spaces provided for each building are van accessible. All curb-cuts, walkways and exterior accessible routes are in compliance with applicable provisions of 521 CMR.

Deficiencies: None

Part J.

Electrical, mechanical and plumbing conditions:

With exceptions noted herein, all electrical, mechanical and plumbing systems are suitably sized and in good working order.

This report is respectfully submitted in accordance with **Ninth Edition, 780 CMR, Section 104.2.2.1** ***Existing Building Code, Level 3 Work Alteration Methods***.

Registered Design Professional

Signed by:

August 31, 2016

Date:

TABLE 1401.7
SUMMARY SHEET-BUILDING CODE

Existing occupancy: Business Use
Proposed occupancy: Business Use
Year building was constructed: 1993
Number of stories: 5 Height in feet: 60
Type of construction: IIA
Area per floor: 40,000
Percentage of open perimeter increase: 68 %
Completely suppressed: Yes ____ No ✓
Corridor wall rating: 1 hour
Type: UL G556
Compartmentation: Yes ____ No ✓
Required door closers: Yes ✓ No ____
Fire-resistance rating of vertical opening enclosures: 1 hour
Type of HVAC system: Carrier Infinity Series serving number of floors: 5
Automatic fire detection: Yes ✓ No ____
Fire alarm system: Yes ✓ No ____
Smoke control: Yes ✓ No ____
Adequate exit routes: Yes ✓ No ____
Maximum exit access travel distance: 150
Means of egress emergency lighting: Yes ✓ No ____
Standpipes: Yes ____ No ✓
Incidental use: Yes ✓ No ____
Smoke compartmentation less than 22.500 sq. feet (2092 m^2): Yes ____ No ✓
Attendant-to-patient ratio: N/A

Needs Work To Make the Renovated Building Comply

SAFETY PARAMETERS	FIRE SAFETY (FS)	MEANS OF EGRESS (ME)	GENERAL SAFETY (GS)
1401.6.1 Building Height	0	0	0
1401.6.2 Building Area	19.17	19.17	19.17
1401.6.3 Compartmentation	0	0	0
1401.6.4 Tenant and Dwelling Unit Separations	-4	-4	-4
1401.6.5 Corridor Walls	0	0	0
1401.6.6 Vertical Openings	2.2	2.2	2.2
1401.6.7 HVAC Systems	-10	-10	-10
1401.6.8 Automatic Fire Detection	0	0	0
1401.6.9 Fire Alarm System	0	0	0
1401.6.10 Smoke control	****	0	0
1401.6.11 Means of Egress	****	0	0
1401.6.12 Dead ends	****	2	2
1401.6.13 Maximum Exit Access Travel Distance	****	5	5
1401.6.14 Elevator Control	0	0	0
1401.6.15 Means of Egress Emergency Lighting	****	0	0
1401.6.16 Mixed Occupancies	0	****	0
1401.6.17 Automatic Sprinklers	0	÷2 =	0
1401.6.18 Standpipes	0	0	0
1401.6.19 Incidental Use	0	0	0
1401.6.20 Smoke compartmentation	0	0	0
1401.6.21.1 Patient ability for self-preservation	****	—	—
1401.6.21.2 Patient concentration	****	—	—
1401.6.21.3 Attendant-to-patient Ratio	****		
Building score—total value	7.37	16.37	23.17

**** No applicable value to be inserted.

TABLE 1401.9
EVALUATION FORMULAS[a]

FORMULA	T1401.7	T1401.8		SCORE	PASS	FAIL
FS - MFS ≥ 0	7.37 (FS) -	30 (MFS)	=	-22.63		✓
ME - MME ≥ 0	16.37 (ME) -	40 (MME)	=	-23.63		✓
GS - MGS ≥ 0	23.17 (GS) -	40 (MGS)	=	-16.83		✓

a. FS = Fire Safety.
ME = Means of Egress.
GS = General Safety.
MFS = Mandatory Fire Safety.
MME = Mandatory Means of Egress.
MGS = Mandatory Means of Safety.

Needs Work to Make the Renovated Building Comply