BUILDING CONDITION ASSESSMENT
401 WASHINGTON AVENUE
TOWSON, MD 21204

FINAL REPORT

29 NOVEMBER 2018

ZS # 1823

ZIGER | SNEAD ARCHITECTS

1006 Morton Street
Baltimore, Maryland 21201
410.576.9131
zigersnead.com

TABLE OF CONTENTS

PROJECT PARTICIPANTS

ARCHITECTURAL

ZIGER/SNEAD LLP ARCHITECTS
1006 Morton Street
Baltimore, MD 21201
410-576-9131

Jonathan Lessem, AIA
Katherine LePage, AIA

STRUCTURAL

COLUMBIA ENGINEERING, INC.
6210 Old Dobbin Lane, Suite 150
Columbia, MD 21045
410-992-9970

Randall Haist, PE

MECHANICAL / ELECTRICAL / PLUMBING / FIRE PROTECTION

GLOBAL ENGINEERING SOLUTIONS
6700 Rockledge Drive #301
Bethesda, MD 20817
301-216-2871

Abdullah Ayazi (Electrical)
Young Lee (Electrical)
Perfecto Rodriguez (Plumbing/Fire Protection)
Paul La Crosse (Mechanical)
Jonathan Cann (Mechanical)

INTRODUCTION

10 PROJECT DESCRIPTION

1010 PROJECT SUMMARY

1010.10 Purpose

A. This report is an assessment of 401 Washington Avenue in downtown Towson, Maryland. It is a record of visual observations and evaluations of current building conditions focused on building and life safety codes compliance, accessibility requirements, structural components and existing mechanical, plumbing, electrical, and fire protection systems. The purpose of this report is to assess the current condition of the facility as an indicator of its suitability for future uses.

1010.20 Executive Summary

A. With the assumption that the building complied with the codes in effect at the time of construction, this report evaluates the building now, and identifies deficiencies that would need to be considered for continuing operations of the facility.

This assessment focuses on primary building systems and core elements and does not include an assessment of the interiors of tenant spaces on the various floors. The building is partially occupied.

The building was observed to be structurally sound. There are numerous accessibility and life safety deficiencies. Based on service life estimates as defined in the ASHRAE HVAC Applications Handbook, the building's mechanical and plumbing systems are well past the end of their expected service life. The building's electrical systems are outdated and inefficient. The building envelope is thermally inefficient, having minimal insulation and single-glazed windows, so operational costs are a long-term concern. The roof is in very poor condition.

B. The property information is summarized in the table below. More detailed descriptions may be found in the various sections of the report that follows.

Property Information	
Property Address:	401 Washington Avenue, Towson, MD, 21204
Year Constructed:	1970-71
Building Type:	High-Rise Office Tower
Building Square Footage	102,415 (Building NASF) 130,800 (Total GSF)
Number of Buildings:	One
Number of Stories:	13 stories, plus partial sub-basement and roof penthouse.
Building Construction:	Steel frame with concrete-topped metal decks.
Roof Construction:	Built-up asphalt roofing.
Exterior Finishes:	Precast concrete panels attached to structural frame.
HVAC System:	Water-source heat pump equipment, served by a central electric-powered boiler and rooftop cooling tower.
Fire Protection:	Building has been fully retrofitted with sprinklers and fire

	pump.
Dates of visit:	10/25/18 and 10/30/18
Point of Contact:	Ray Bosley, Towson and Associates, Regional Manager, 443-225-9156
Assessment and Report Prepared By:	Ziger/Snead LLP (Architects) Columbia Engineering (Structural Engineer) Global Engineering Solutions (MEP/FP Engineers)

C. General Building Deficiencies Summary: The following is an overview of significant building systems deficiencies identified in more detail elsewhere in this report, that should be considered for renovation / upgrade:

1. The existing roof is failing. Inadequate slope and drainage have resulted in significant ponding and deterioration. In addition to roof replacement, rooftop mechanical equipment and support frames will require replacement.

2. Existing window and storefront systems are thermally inefficient and maintained in an ad-hoc fashion. Full replacement of existing windows with new, thermally efficient systems and glazing would be ideal. If existing windows must remain, the window systems and related gaskets and sealant joints should be assessed and comprehensively serviced / maintained or replaced.

3. Existing exterior wall panels and related sealant joints should be comprehensively assessed and repaired / maintained as required.

4. The mechanical systems are well beyond their expected service life. While in working order at present, replacement of significant system components will be required in the near future.

5. Lighting systems are dated and inefficient, and should be replaced.

D. Code Deficiencies Summary: The following is an overview of significant code deficiencies identified in more detail elsewhere in this report. As an existing building, the Authority Having Jurisdiction (AHJ) would have the final word on which deficiencies would have to be addressed as part of any future renovation work.

1. Means of egress stairs do not comply with modern requirements for minimum overall width, tread / riser dimensions, and guardrail height / configuration. Many of these deficiencies may be allowed to remain under the IEBC at the discretion of the AHJ.

2. Fireproofing of the structural frame does not fully meet the current requirements for the Construction Type required by Code for a 13-story building. Columns are currently fireproofed, but beams, floors, and roof framing are not. As a fully-sprinklered building with a modest footprint, the AHJ would have to determine if existing conditions would be allowed to remain unchanged.

3. Both egress stairs discharge inside the building, which would not satisfy current code requirements (at least one is required to discharge directly to the exterior). The east stair's exit discharge path is not fully code-compliant, but it appears that an attempt has been made to improve its code situation. The west egress stair's rated enclosure

configuration does not meet current code and would require modifications to the existing main lobby to provide a compliant egress condition.

4. Handicapped restroom facilities are not available at most floors. Renovations would need to include modifications to existing restrooms or the addition of new accessible restrooms to satisfy accessibility requirements.

5. As noted in section B1050 “Lateral Load Resisting Systems”, a change in occupancy type from the current office functions to an occupancy with a higher Building Risk Category (such as educational or public assembly) might trigger compliance with the current building code requirements for lateral load resistance. If a detailed structural analysis were to find the building deficient in that regard, a comprehensive structural upgrade would be difficult and costly.

6. The building envelope would not meet current code requirements for energy efficiency. Any new construction associated with renovations would be required to meet those code requirements, although whole-building upgrades would not be triggered unless the proposed renovations were to exceed thresholds as determined by the IEBC.

E. Implications for Future Renovation: The magnitude of necessary future renovations depends significantly on the resolution of the building’s existing code limitations with the AHJ. There are two pathways for implementing building renovations: full renovation (no occupants) and multiple partial renovations (with limited occupancy). Considerations are as follows:

1. Full renovation (one phase, no occupants):
   - Pros:
     - Fastest, most efficient approach if full renovation and upgrade of major building systems and components is desired.
     - Allows comprehensive replacement of HVAC and electrical systems and allows for more options for replacement HVAC systems.
   - Cons:
     - No building occupancy during construction.
     - A full renovation would trigger upgrades of nearly all building systems to meet current code, at significant cost. Some existing components (such as egress stairs) would likely be allowed to remain largely unchanged.

2. Incremental partial renovations (multiple phases, partial occupancy):
   - Pros:
     - Allows modifications to be implemented over time.
     - Allows partial occupancy of the building during the renovation process.
     - Allows a more limited renovation scope, if desired. If renovation scope is limited, this approach could be used to avoid triggering major building upgrades.
   - Cons:
     - Slower and less efficient process for implementing major renovation scope.
     - As noted in more detail in section D6050, an incremental approach to renovations would still require an initial phase involving significant MEP work for replacement of primary MEP systems before subsequent renovations could follow.
     - This approach might limit the options for replacement HVAC systems.

- Upgrades affecting major building components (structural fireproofing, structural supplementation (if needed), window replacement, or modifications to exterior wall panels) would be much more difficult to implement efficiently.

1010.30 Scope of Investigation

A. Collected Data: Scans of the following documents were provided to the AE team by the building manager. These documents were utilized for building analysis and for comparison to field observed conditions.

1. Original Construction Drawings:
   - Title: Equitable Building for Chesapeake Developers, Ltd.
   - Date: December 17, 1969 (revision)
   - Architect: Ferdinand P. Kelly & Associates
   - Structural Engineer: Lamprecht Consultants
   - Mechanical Engineer: Niles & Davidson

2. Fire Alarm Upgrade:
   - Title: Fire Alarm System Audibility Upgrade – Phase 3
   - Date: February 26, 2003
   - Fire Protection Engineer: EBL Fire Engineering

B. Field Survey Methods & Techniques:

Surveys of existing conditions were performed independently by the architectural, structural, mechanical, plumbing, fire protection, and electrical disciplines. The building manager and facilities staff were present during the surveys and provided additional information.

Observations were made on all four sides of the exterior, the main roof, and on each floor level, where accessible. Only areas accessible to the A/E team were included in this survey. No destructive methods were used for visual observations. Visual observations of the exterior facades were performed at ground level and main roof level. Measurements were made as necessary to make a determination of life safety and accessibility code compliance.

1020 PROPERTY DESCRIPTION

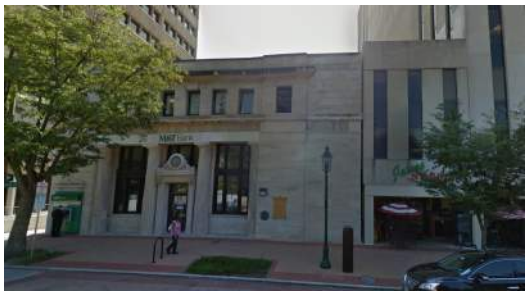
1020.10 Site Description

A. General:

The building site is located at the northeast corner of the intersection of Washington Avenue and West Chesapeake Avenue, directly east of the historic courthouse. The main ground level entrance is on the west side, from Washington Avenue. A secondary building entrance is located at the lower level, accessible from the east side via stairs. Topography is generally level along Washington Avenue, sloping downward as you proceed east along Chesapeake Avenue.

B. Adjacencies:

1. The building footprint extends tight to the north property line. A zero-lot-line condition exists at the northwest edge where a two-story wing of the building abuts an adjacent two-story bank building.



2. The building is separated from the Towson Chamber of Commerce building to the east by a narrow parking lot and access drive.

C. Parking:

On-site parking is minimal, with a total of 8 parking spaces. 4 spaces are located under the building overhang at the east side. Another 4 parallel spaces are allocated along the east edge of the property. A drive aisle along the east side of the building provides access for parking and a dumpster at the northeast corner of the site.

D. Zoning: The scope of this assessment does not address zoning restrictions for this property.

E. Utilities:

1. The existing water service enters the building at the southwest corner, from a meter in the sidewalk at Chesapeake Avenue. The sidewalk is missing at this location.

2. There are two fire department connections. One adjacent to the main entrance at the west side of

the building and another at the southeast corner, at the areaway.

3. Per the 1969 drawings, the electrical service enters the site underground from the northeast, feeding a transformer that is located in an open-air alcove at the northeast corner of the building.

1020.20 Building Description

A. General:

Constructed in 1970, the building is a 12-story office tower (with basement, partial sub-basement, and roof penthouse) with a shorter two-story wing on the north side that abuts the neighboring bank building.

The structure is primarily a steel frame, clad with precast concrete panels and aluminum windows. The ground level structure is concrete-encased where exposed and is typically infilled with aluminum storefront windows. The ground level enclosure at the south side is set back, with the structure above cantilevered over the sidewalk. The ground level enclosure at the east side as been set back a full structural bay (with exposed concrete columns) to provide covered access to the lower level entry via steps.

B. Organization

The building is organized around a central core containing three elevators, two egress stair shafts, restrooms, and mechanical / electrical rooms for each floor. Restrooms at each floor are typically not handicapped-accessible, although some have been modified with updated finishes. Unisex ADA restrooms have been added to the core at two floors.

- Sub-Basement: This partial sub-basement is solely for building services and is accessed via the east stair. It includes mechanical and electrical equipment, including the main switchgear, fire pump, incoming water service, and telecom service. An areaway in the southeast corner includes a ladder to street level and a secondary means of egress. This areaway provide ventilation to the sub-basement and provides a pathway for the fire pump exhaust and other piping. Refer to Part D of this report for more detail on systems.

- Lower Level: This level is below the main grade level and is accessible from the exterior via an entrance at the east side of the building. This entrance is accessed by exterior steps and a ramp that are under cover where the building enclosure steps back at the east side. Note that the ramp does not meet ADA requirements for slope. The elevators and east stair discharge at this level, but there is only one means of egress from the public portions of this floor. Some tenant spaces may have secondary means of egress via doors that are apparent on the east side. Tenant spaces at this level were not available for review.

- Main Level: This floor includes a main entrance and lobby accessed from Washington Avenue. The east stair and the elevators serve this lobby, while the west stair terminates and discharges at this level (not extending to the lower level). The lobby includes a security desk but it does not appear to be currently staffed. The main level currently includes two tenant spaces. Charles Schwab occupies the south tenant

space and Jake's Deli and Catering occupies the north tenant space. Both tenants have separate exterior entrances as well as an entrance into the main lobby. The original restrooms have been modified to provide a single unisex handicapped-accessible restroom.

- Levels 2 & 3: These floors have the largest floor plate, as they extend into the north wing.

- Levels 4 through 12: Typical floor plate. At the 8th and 11th floors, a unisex handicapped restroom has been added to the core. According to the building manager, these restrooms were intended to serve the floors immediately above and below, providing accessible restrooms for the 7th through 12th floors. This strategy had not yet been implemented at the lower levels.

- Roof / Penthouse: A two-level penthouse is located on the roof and is accessed by the east and west stairs. The lower level contains mechanical and electrical equipment, including the central electric boiler. Doors from the lower level provide access to the roof. The upper level contains the elevator hoist gear and machinery, as well as a room that appears to be an abandoned server room.

C. Tabulation of Areas:

Level	NASF	Core SF	Overall GSF	Comments
Sub-Basement	0	1,680	1,925	
Lower Level	6,407	1,520	8,345	
Main Level	5,850	1,780	7,990	ADA Restroom
Level 02	9,985	1,425	11,780	
Level 03	9,985	1,425	11,780	
Level 04	7,820	1,425	9,550	
Level 05	7,820	1,425	9,550	
Level 06	7,820	1,425	9,550	
Level 07	7,820	1,575	9,550	
Level 08	7,660	1,425	9,550	ADA Restroom
Level 09	7,820	1,425	9,550	
Level 10	7,820	1,425	9,550	
Level 11	7,660	1,425	9,550	ADA Restroom
Level 12	7,820	1,575	9,550	
Penthouse - Lower	0	1,350	1,515	
Penthouse - Upper	0	1,035	1,515	
Overall Areas	**102,287**	**23,340**	**130,800**	

D. Sectional Characteristics:

The building section is relatively compact by modern standards, limiting HVAC options for future tenant improvements.

- Floor-to-Floor Height – Lower Level & Main Level: 12'-0"
- Floor-to-Floor Height – Level 2 through Level 12: 10'-4"

At the typical floors, the structural floor assembly is 6-1/4" deep and the deepest structural beams are 14" deep, for a total assembly depth of 1'-8 ¼". With a floor-to-floor height of 10'-4", the underside of structure would be at 8'-7 ¾" AFF. The existing ceilings are typically at 8'-0" AFF, which leaves little clearance at these major beams for piping, ductwork, etc. Secondary beams are typically 10" deep, so an additional 4" of space is available in those areas.

1030 PROJECT CRITERIA

1030.10 Code Analysis

A. Code Situation:

1. The existing building is mostly occupied by commercial tenants, with some vacant tenant spaces at upper floors.

2. The existing building was constructed in 1970, and therefore falls under the requirements of the International Existing Building Code (IEBC). Some building elements that do not comply with current building code may be allowed to remain, subject to compliance with the IEBC.

3. This code analysis does not assess the particular configurations of tenant spaces, but looks at leasable space on each floor generically, and how it relates to the building core for Life Safety and Accessibility requirements.

B. Authority Having Jurisdiction (AHJ):

- Baltimore County

C. Applicable Codes:

1. State of Maryland
   - Maryland Building Rehabilitation Code (2012 International Existing Building Code)
   - Maryland Accessibility Code (2010 ADAAG)

2. Baltimore County
   - 2015 International Building Code (IBC), as amended.
   - 2015 International Mechanical Code (IMC), as amended.
   - 2015 National Standard Plumbing Code, as amended.
   - 2017 National Electrical Code (NEC), as amended.
   - 2015 International Energy Efficiency Code (IEEC), as amended.

- Life Safety Code: 2015 National Fire Protection Association (NFPA) 101, as amended.
- Fire Prevention Code: 2015 NFPA 1, as amended.

D. International Building Code (IBC) 2015

1. Occupancies Present (based on current tenants):

- Business – B (Offices)
- Assembly – A2 (Restaurant)

- Non-Separated Mixed Use (508.3)
  - There is no apparent fire separation between the Deli at the main level and the adjacent common areas and tenant spaces. Therefore, this building is assessed here as a Non-Separated Mixed-Use facility, with the A2 occupancy as the most restrictive use.

2. Type of Construction:

- Existing Building - **Type I-B** (approximate)

  - Per the 1969 construction drawings, the existing non-combustible steel-and-concrete structure exhibits the following characteristics:
    - Exterior Columns (up to Level 2): Steel, concrete-encased
    - Exterior Beams (Level 2): Steel, concrete-encased
    - Interior Columns: Steel, enclosed with 3 layers drywall (equivalent to UL-X528, 2-hour)
    - Interior Beams: No protection.

  - **The construction described above would NOT satisfy the structural protection requirements for Type 1-B construction as described below**.

  - Per IBC 403.2.1.1 – Type of Construction – High Rise Buildings: For buildings less than 420 feet in height, the fire resistance rating of the building elements in Type I-B construction shall be permitted to be reduced to the fire-resistance ratings of Type II-A.

- Fire Resistance Rating Requirements for Building Elements (Table 601) – reduced to **Type II-A**, <u>as noted above</u>:
  - Primary Structural Frame: 1 hours (deficient – columns protected, beams not protected)
  - Exterior Bearing Walls: 1 hours
  - Interior Bearing Walls: 1 hours
  - Interior Non-Bearing Walls: 0 hours
  - Floor Construction: 1 hours (deficient – floors not rated)
  - Roof Construction: 1 hours (deficient – roof not rated)

3. Allowable Building Height (Table 504.3, Table 504.4)

   The allowable height and number of stories, and floor area is based on the building occupancies (Assembly & Business) in a fully sprinklered building of Type I-B construction.

   - Basic Allowable Height (Feet): 180 feet
     - Existing height is 141 feet above main level.

   - Basic Allowable Height (Stories above grade) 12 stories
     - Existing building is 12 occupied stories above grade plane. The rooftop penthouse levels might be considered non-compliant under current code.

4. Allowable Building Area (Table 506.2): The allowable floor area is based on Non-Separated Mixed Use (B & A-2), as dictated by the most restrictive Occupancy (A-2) in a fully sprinklered building of Type 1-B construction.

   - Basic Allowable Building Area – A2 Occupancy (per floor, sprinklered): UNLIMITED

   - The actual floor area for the largest floors (Levels 2 & 3) is 11,780 sf, which is well below the maximum area allowed by less restrictive Construction Types.

5. Passive Fire Resistive Requirements:

   - Occupancy Separations (508.3, Table 508.4):
     - None required (Non-Separated Mixed Use).

   - Stair enclosures (1023.2):
     - 4 stories or more: 2 hours

   - Shaft enclosures (713.4):
     - 4 stories or more: 2 hours (per 403.2.1.2 – Shaft Enclosures - High-Rise Buildings: for buildings less that 420 in height and fully sprinklered, vertical shaft enclosures other than stairs and elevators can be reduced to 1-hour fire resistance rating.

   - Elevator Lobbies (3006.2):
     - Smoke Partitions (with sprinklers) required to separate the elevator entrances from each floor.

     - Per 3006.2, Exception 2: Elevator lobby enclosure not required at the level of exit discharge. Main lobby is not enclosed with a smoke partition.

   - Corridors (Table 1020.1):
     - 0 hour (with sprinklers)

6. Interior Finishes:

- Interior Wall and Ceiling Finishes by Occupancy (Table 803.11) – fully sprinklered:

Occupancy	*Interior Exit Stairways, Ramps, & Passageways*	*Corridors and Exit Access stairways and ramps*	*Rooms and Enclosed Spaces*
B	Class "B"	Class "C"	Class "C"
A-2	Class "B"	Class "B"	Class "C"

7. Active Fire Protection:
   - Automatic Sprinklers: Automatic sprinkler system per NFPA 13.
   - Standpipes: No change to existing system.
   - Fire Alarm System: Required (Section 907.2.)
   - Fire Extinguishers: Required (Section 906). 75' maximum travel distance to extinguisher (Table 906.3).
     - Two fire extinguishers are provided in the core at each typical level.

8. Emergency Power:
   - Emergency Voice/Alarm Communication System (2702.2.1 / 907.5.2.2.5): Required.
   - Exit Signs (2702.2.3 / 1011.6.3): Emergency power required to illuminate all exit signs.
   - Egress illumination (2702.2.4 / 1006.3): Emergency power required for 90 minutes.
   - Accessible Means of Egress Elevators (2702.2.5 / 1009.4): Accessible means of egress elevators would normally be required per 1007.2.1 in new construction. However, accessible means of egress are not required in existing buildings per 1009.1, Exception 1.
   - Emergency power for elevators is not required if they are not an accessible means of egress.

9. Means of Egress:
   - Occupant Load (Table 1004.1.2) –

Occupancy		*Area (sf)*	*Factor (sf/person)*	*Occupant Load*
Sub-Basement				
B2	Accessory Mech'l	1,680	300 gross	6
Lower Level				
B1	B (Business)	6,407	100 gross	65
Main Level				
1	B (Business)	4,120	100 gross	42
1	A-2 (Restaurant)	745	50 gross*	15
1	A-2 (Kitchen)	800	200 gross	4
Levels 2 & 3				
2	B (Business)	9,985	100 gross	100
3	B (Business)	9,985	100 gross	100

Levels 4-12				
4	B (Business)	7,820	100 gross	79
5	B (Business)	7,820	100 gross	79
6	B (Business)	7,820	100 gross	79
7	B (Business)	7,820	100 gross	79
8	B (Business)	7,660	100 gross	77
9	B (Business)	7,820	100 gross	79
10	B (Business)	7,820	100 gross	79
11	B (Business)	7,660	100 gross	77
12	B (Business)	7,820	100 gross	79
Penthouse				
PH1	Accessory Mech'l	1,350	300 gross	5
PH2	Accessory Mech'l	1,035	300 gross	4
TOTAL				**1,048**

***** As a Deli with large display/sales counter and very limited seating, Mercantile occupancy allowances have been applied to this area.

- Means of Egress Sizing (1005)
  - Stairways: .3 inch per occupant
    - Existing egress stairs are 42" wide = 140-person occupant capacity, which is sufficient to serve the maximum load from any floor (100 occupants).
    - Per 1011.2, minimum stairway width is 44" – **existing stairs are non-compliant.**
  - Other egress components: .2 inch per occupant

- Remoteness of Interior Exit Stairways – High Rise - 403.5.1:
  - Interior exit stairways shall be separated by a distance not less than 30 feet or not less than one-fourth of the overall diagonal dimension of the floor or area served, whichever is less.
    - The existing doorways into the two egress stairs are separated by 40 feet and are in compliance.

- Stair Dimensional Requirements:

  - Maximum Riser Height: 7"
    - Existing risers are typically 7" +/- 1/8"

  - Minimum Tread Depth: 11"
    - Existing treads are 10-1/4" (plus 1" nosing) – **Non-compliant**

  - Guardrail Height: 42"
    - Existing guardrails are 32" high – **Non-compliant.**

- Existing 3-pipe guardrails do not meet “4-inch sphere” opening requirements per 1015.4. **Non-compliant.**

- Accessible Means of Egress (1009)
  - Accessible Means of Egress not required in alterations to existing buildings (1009.1, Exception 1).
  - Areas of Refuge: Not required per 1009.3 Exception 5 (sprinklers) and 1009.4 Exception 2.
  - Two-way communication System (1009.8): Not required, since accessible means of egress are not required.

- Interior Exit Stairways and Ramps (1023)
  - Interior exit stairways shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway.
  - Per 1028.1, Exception1: Not more than 50 percent of the interior egress stairs are permitted to egress through areas on the level of discharge provided a number of conditions are met:
    1.1 Interior discharge must have a clear and unobstructed path to an exterior exit door.
    1.2 The entire floor area of the egress path has a fire rating matching the exit stair enclosure.
    1.3 The egress path is fully sprinklered.

    - Existing building has two interior means of egress stairs, both of which discharge internally in the building.
      - The east stair discharges into an interior corridor at the Lower Level . Walls enclosing the path to the exterior exit may be rated, but this could not be confirmed. The floor is probably not rated and would be non-compliant.
      - The west stair discharges into the Main Level Lobby, with the rated stair enclosure terminating at Level 2. It does not appear that the Lobby is enclosed in fire-rated construction and the floor is probably not rated and would be non-compliant.

- Common Path of Travel (Table 1006.2):
  - B Occupancy: 100 feet, maximum occupant load of 49

- Exit Access Travel Distance – With Sprinkler System (Table 1017.2):
  - B Occupancy: 300 feet
  - A Occupancy: 250 feet

- Corridors (1018):
  - Minimum Corridor Width (Table 1018.2): 44”
  - Dead ends (1018.4): B Occupancy – 50 feet (with sprinklers)

E. International Existing Building Code (IEBC) 2012

For existing buildings, the IEBC can potentially mitigate some of the code deficiencies identified in this report relative to current codes for new construction, depending upon the magnitude of proposed modifications. The IEBC addresses Repairs, Alterations, Additions, and Change of Occupancy for existing buildings. There are three paths for IEBC compliance: Prescriptive, Work Area, and Performance methods.

- Prescriptive Compliance Method (301.1.1)

  The Prescriptive method allows Alterations such that the existing building or structure would be no less conforming to the current IBC than the existing building was prior to the alteration. This method defines thresholds for structural modifications that would trigger compliance with the International Building Code requirements for new construction.

- Work Area Compliance Method (301.1.2)

  The Work Area method is the most flexible of the three options, building on the premise that specific code provisions are triggered if the scale and level of work warrant. Alterations are classified as Level 1, Level 2, or Level 3 depending upon the magnitude of modifications.

- Performance Method (301.1.3)
  The Performance method is the least-used method. It provides a method to score the existing fire- and life-safety conditions of a building. If the score is below the minimum accepted level, improvements are required to raise the score to an acceptable level.

The following is a summary of the significant applicable requirements of each compliance method, based on Alterations only. Repairs, Additions, or Changes of Use would require a separate assessment.

1. Prescriptive Compliance Method (Chapter 4) - Alterations
   - Alterations (403.1): Shall be such that the existing building or structure is no less conforming to the provisions of the IBC than the existing building or structure was prior to the alteration.
     - Exception: An existing stairway shall not be required to comply with Section 1009 of the IBC where the existing space and construction does not allow a reduction in pitch or slope.
     - Exception: Handrail extensions otherwise required by IBC would not be required where such extensions would be hazardous due to plan configuration.

   - Existing Structural Elements carrying gravity load (403.3): Alterations resulting in more than 5% increase in design gravity load to existing structural elements must be strengthened, supplemented, or replaced to meet the IBC requirements for new structures.
     - Design Live Load (403.3.1): Where the alteration does not result in increased design live load, existing gravity load-carrying structural elements shall be

permitted to be evaluated and designed for live loads approved prior to the alteration.

- Existing structural elements carrying lateral load (403.4): Existing structure with alterations must comply with the requirements of the IBC.
  - Exception: Any existing lateral load-bearing element whose demand-capacity ratio (with the alteration considered) is no more than 10 percent greater than its original capacity shall be permitted to remain unaltered.

2. Work Area Compliance Method (Chapters 5 - 13)

- Repairs: Include the patching or restoration or replacement of damaged materials, elements, equipment or fixtures for the purpose of maintaining such components in good or sound condition with respect to existing loads or performance requirements.

- Alteration – Level 1 (Chapter 7): Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.

  - Conformance (701.2) An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing condition.

  - Building Elements and Materials (702): All new construction elements, components, systems, and spaces shall comply with the IBC.

  - Accessibility (705): A facility that is altered shall comply with the IBC unless it is technically infeasible. Accessible means of egress are not required to be provided in existing facilities.

  - Toilet Rooms (705.1.10) Where it is technically infeasible to alter existing toilet facilities to be accessible, an accessible family or assisted-use toilet room is permitted.

  - Structural (706): Where addition or replacement of roofing or equipment results in additional dead loads exceeding 5% of existing, structural components supporting such reroofing or equipment shall comply with the gravity loads of the IBC.

  - Energy Conservation (707): Level 1 alterations are permitted without requiring the entire building or structure with the energy requirements of IECC. The IECC requirements will apply to new construction only.

- Alteration – Level 2 (Chapter 8): Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment where the work area is **less than 50 percent** of the aggregate area of the building.

- Compliance (801.3): All new construction elements, components, systems, and spaces shall comply with the IBC.

- Means of Egress (805):

  - 805.2, Exception 1: Means of egress conforming to the requirements of the building code under which the building was constructed shall be considered compliant if, in the opinion of the code official, they do not constitute a distinct hazard to life.
    - **Existing stairs' dimensional non-compliance would likely be considered acceptable under this provision**.

  - 805.3.1 Minimum number of exits: Every story utilized for human occupancy on which there is a work area that includes exits or corridors shared by more than one tenant shall be provided with the minimum number of exits based on the occupancy and occupant load per the IBC.

- Structural (807): New structural elements must comply with the IBC.

  - Existing Structural Elements carrying gravity load (807.4): Level 2 Alterations resulting in more than 5% increase in design gravity load to existing structural elements must be strengthened, supplemented, or replaced to meet the IBC requirements for new structures.

  - Existing structural elements carrying lateral load (807.5): Level 2 Alterations resulting in more than 10% increase in lateral force-resisting load to existing structural elements must be strengthened, supplemented, or replaced to meet the IBC requirements for new structures. Calculations must account for the cumulative effects of additions and alterations since the original construction.

- Plumbing (810):
  - 810.1 Minimum fixtures: Where the occupant load of the story is increased by more than 20 percent, plumbing fixtures for the story shall be provided in quantities per the IPC.
  - 705.1.10 Toilet Rooms: Where it is technically infeasible to alter existing toilet rooms to be accessible, an accessible family or assisted-use toilet room is permitted, and shall be located on the same floor as the existing toilet rooms.

- Energy Conservation:
  - 811.1 Minimum requirements: Level 2 alterations are permitted without requiring the entire building or structure to comply with the IECC. The alterations shall conform to the energy requirements of the IECC as they relate to new construction only.

- Alteration – Level 3 (Chapter 9): Level 3 alterations apply where the work area exceeds 50 percent of the aggregate area of the building. Requirements of Chapters 7 and 8 apply in addition to the requirements of Chapter 9.

  - High-rise buildings (902):
    - 902.1.1 Recirculating air or exhaust systems: Systems exceeding 15,000 cfm must be provided with smoke and heat detection.
    - 902.1.2 Elevators: Elevators intended to serve the needs of emergency personnel shall be provided with emergency operation.

  - Structural (807): New structural elements must comply with the IBC.
    - Existing structural elements carrying lateral load (907.4):
      - 907.4.1 Evaluation and analysis: An engineering evaluation and analysis that establishes the structural adequacy of the altered structure shall be prepared by a registered design professional.

      - 907.4.2 Substantial structural alteration: Where more than 30% of the total floor and roof areas of the building have been or are proposed to be involved in structural alteration, the evaluation and analysis shall demonstrate that the altered building complies with the IBC for wind loading and with reduced IBC-level seismic forces.

  - Energy Conservation:
    - 908.1 Minimum requirements: Level 3 alterations are permitted without requiring the entire building or structure to comply with the IECC. The alterations shall conform to the energy requirements of the IECC as they relate to new construction only.

F. Recommendations – Code Situation

1. Construction Type, Building Height & Area:

   - The existing building does not fit cleanly into current IBC construction type classifications. The existing building's height would require a Type 1A or 1B construction type, which requires a fire rating for the structural frame, floor structure, and roof structure. Currently, only the columns are protected appropriately. Fireproofing of the remaining structural elements would require a major whole-building construction effort.

   - The IEBC does not specifically address Construction Types in existing construction, so resolution of structural frame protection requirements would require a determination by the Authority Having Jurisdiction.

2. Means of Egress – Stairs:

- Non-compliance of stair treads, risers, guardrails, and handrails would appear to be allowable under the IEBC, and would not require modification for future use.

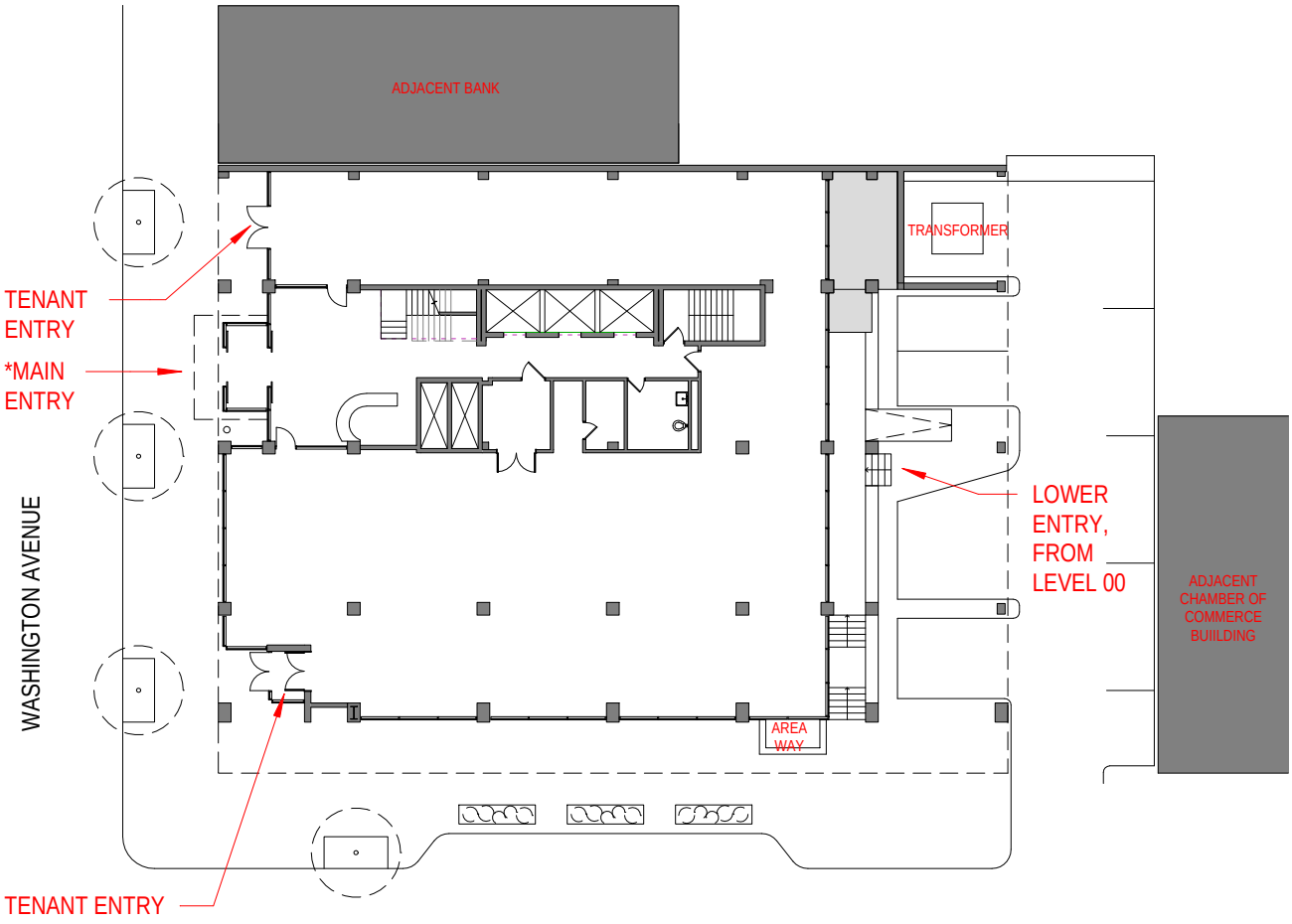
3. Means of Egress – Level of Exit Discharge:

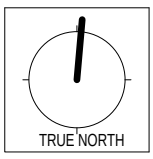
   - Since both egress stairs discharge inside the building, the egress arrangement is not code compliant. The east stair's discharge at the Lower Level appears to attempt to create a horizontal exit condition to the exterior, but it is probably not completely compliant and would require confirmation with the Authority Having Jurisdiction.

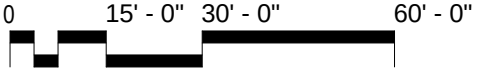
   - The west stair's discharge arrangement into the Main Lobby area is very unusual and will require further study. Additional protection of the egress path to the exterior may be required and must be confirmed with the Authority Having Jurisdiction.

4. Means of Egress – Occupancy and Occupant Loads:

   - This building has been assessed relative to its current occupancy types and has been determined to be fully compliant for means of egress capacity. If future uses would require changes of occupancy that increase the occupant loads, the suitability of the means of egress capacity would have to be re-assessed.



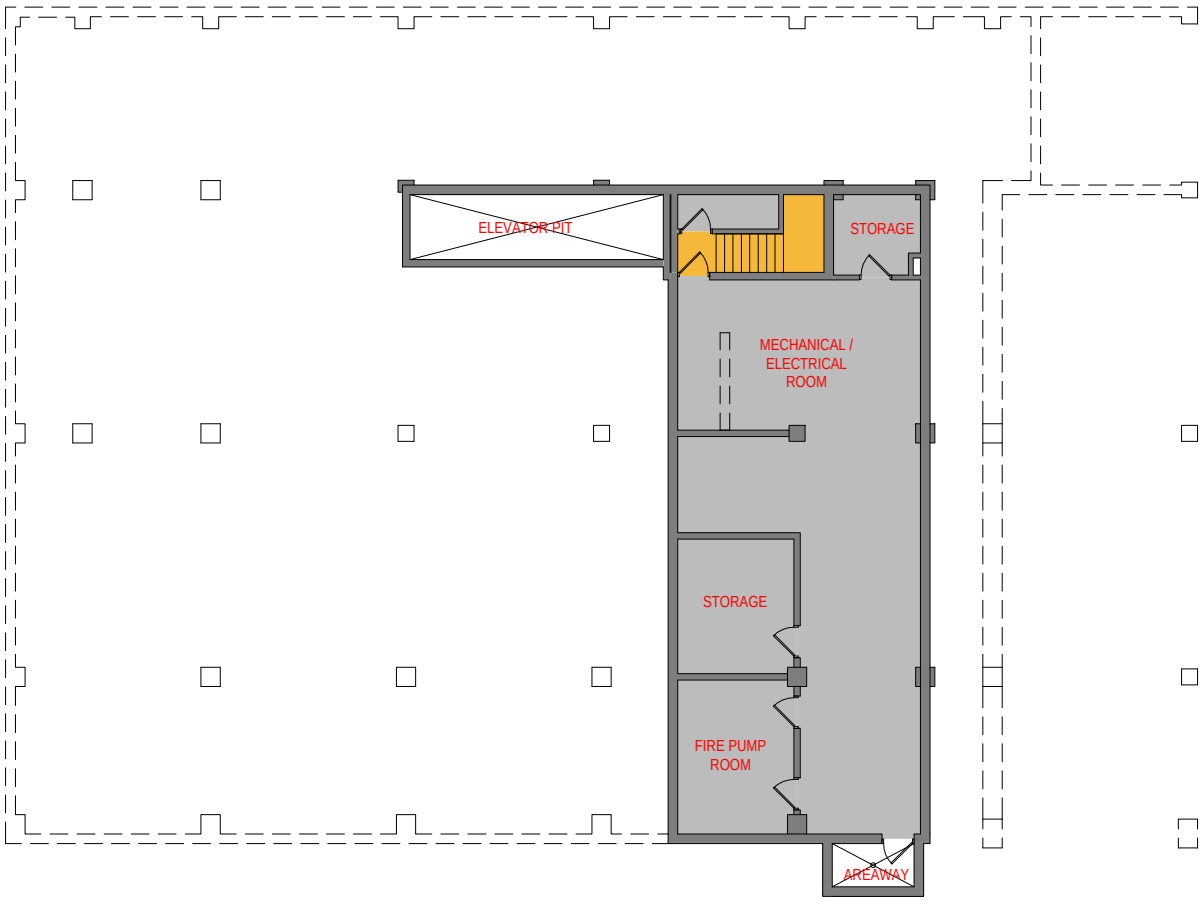




OVERALL AREA:
LEASEABLE - 102,290 NET SF
BUILDING CORE - 23,340 NET SF

OVERALL = 130,800 GROSS SF

SITE PLAN
16 NOVEMBER 2018



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

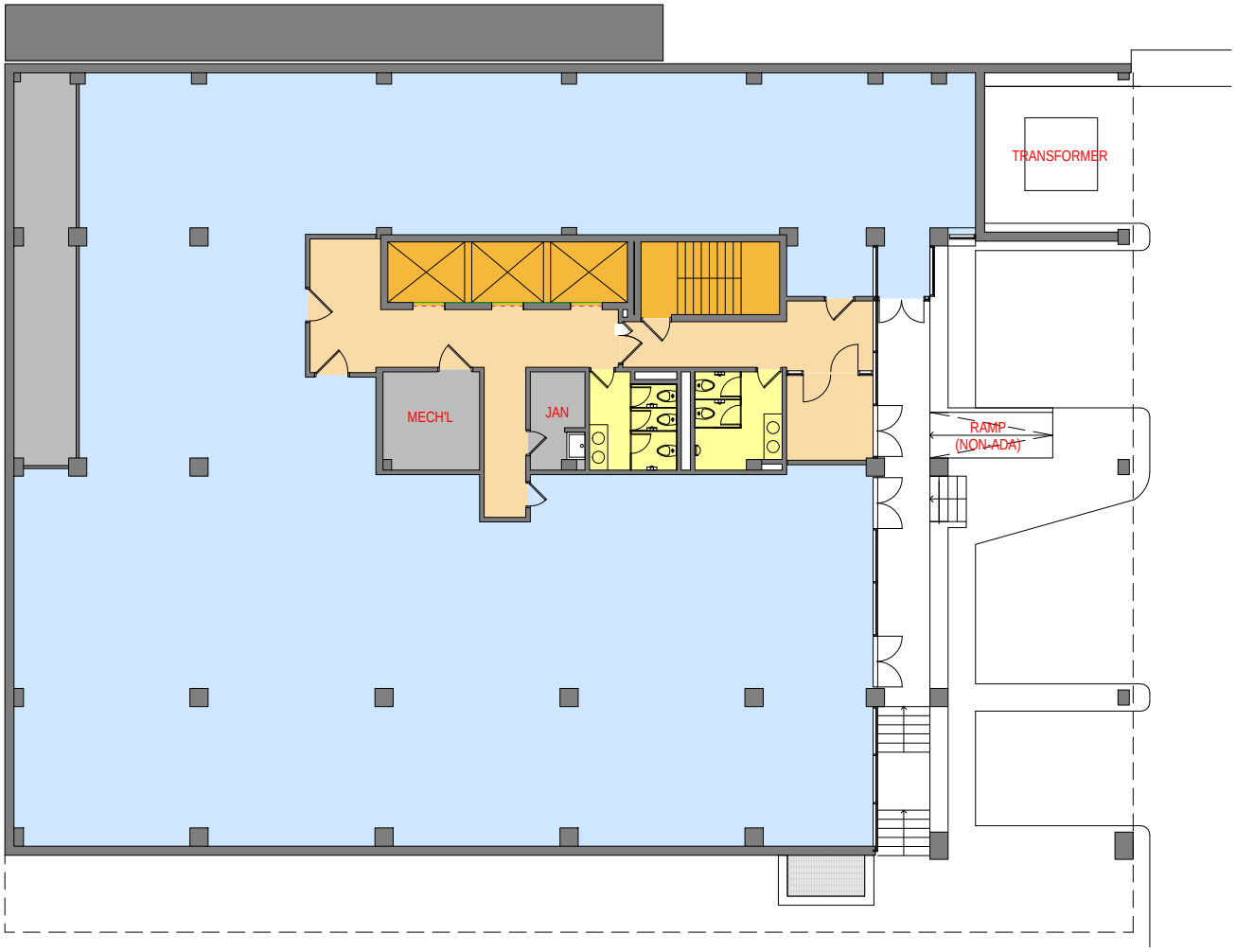
BUILDING CORE, CIRCULATION, VERTICAL

BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 0 NET SF
BUILDING CORE - 1,680 NET SF

FLOOR PLAN - SUB-BASEMENT
16 NOVEMBER 2018



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

BUILDING CORE, CIRCULATION, VERTICAL

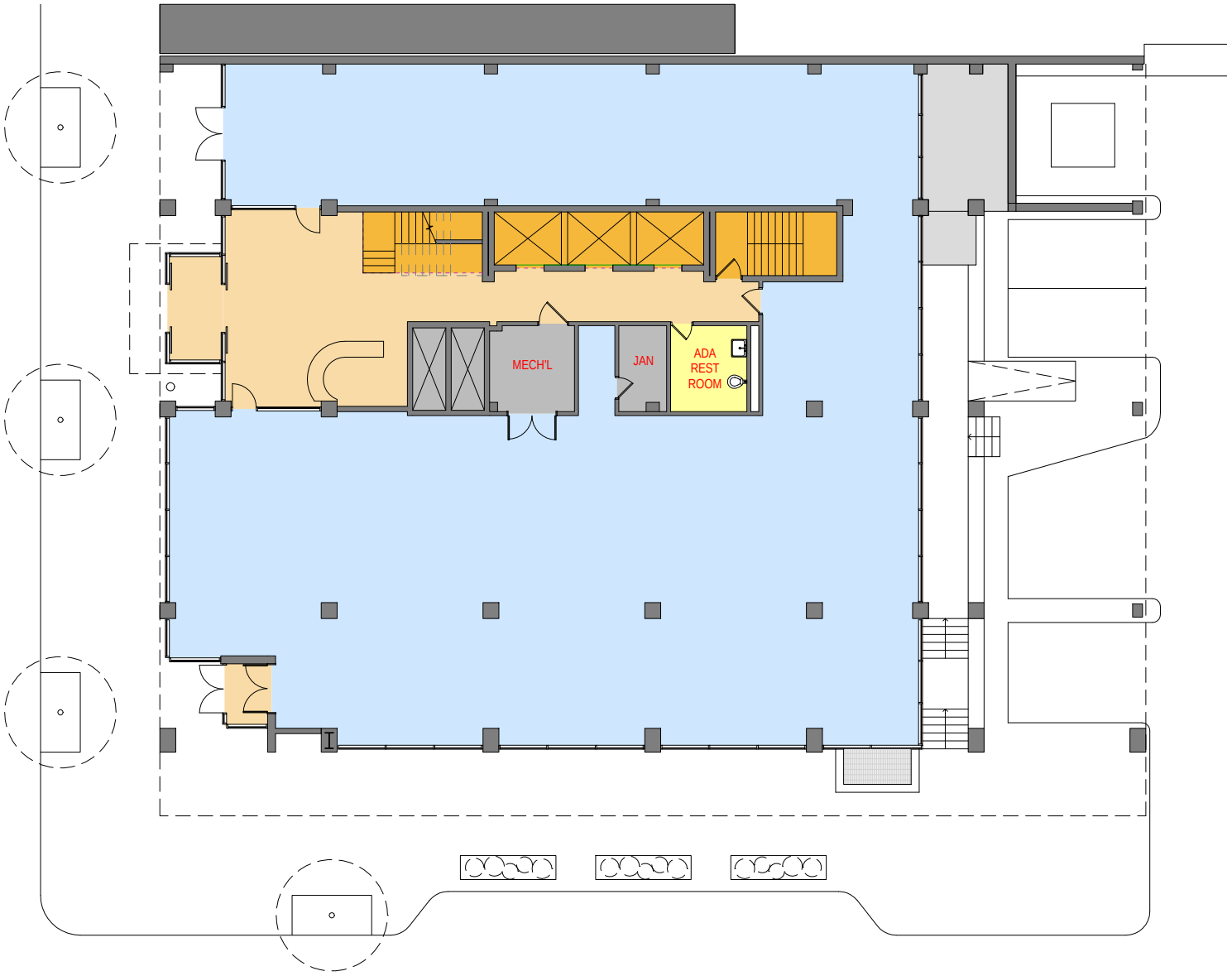
BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 6,410 NET SF
BUILDING CORE - 1,520 NET SF

FLOOR PLAN - LEVEL 00

11/15/18



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

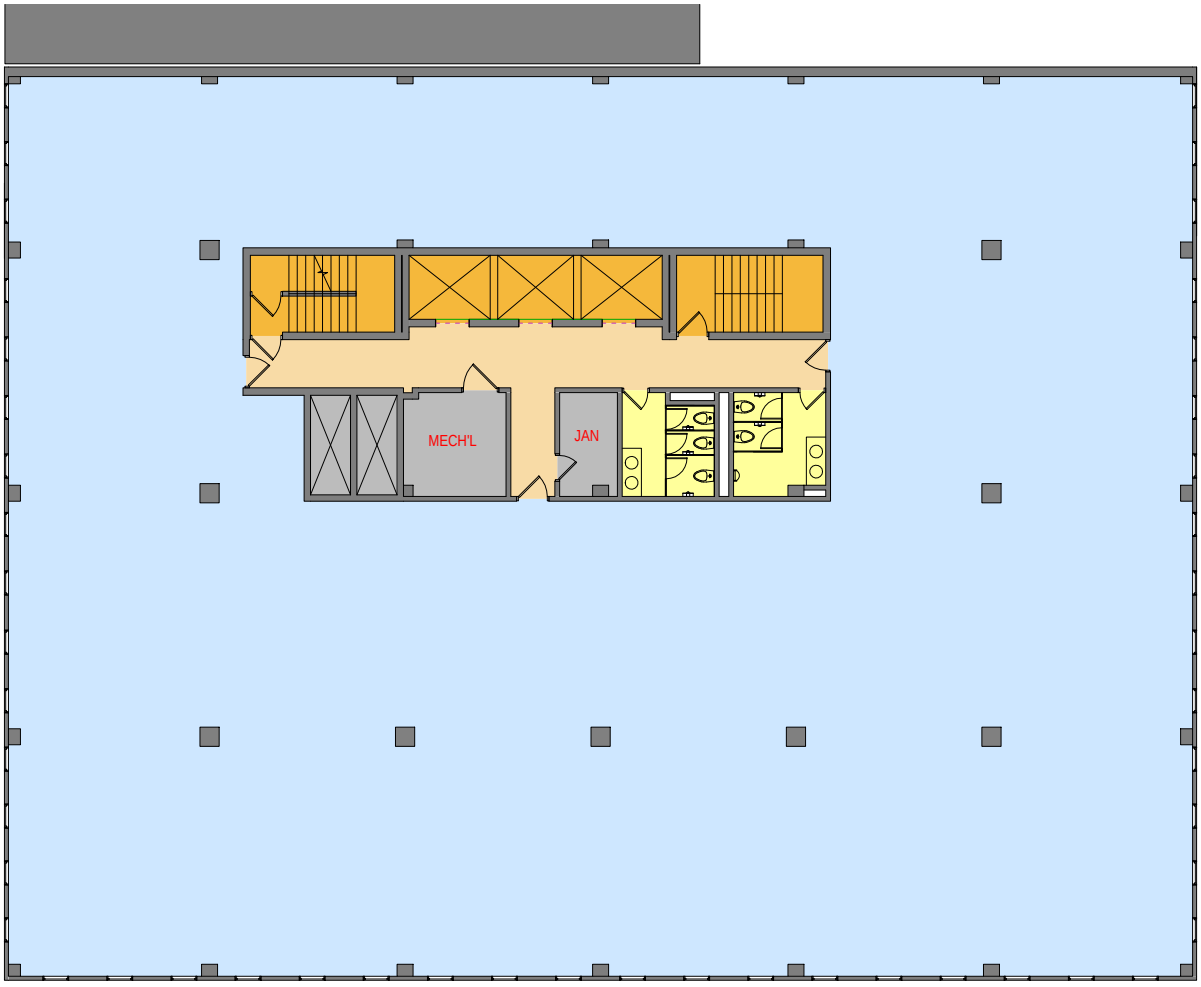
BUILDING CORE, CIRCULATION, VERTICAL

BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 5,850 NET SF
BUILDING CORE - 1,780 NET SF

FLOOR PLAN - LEVEL 01
16 NOVEMBER 2018



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

BUILDING CORE, CIRCULATION, VERTICAL

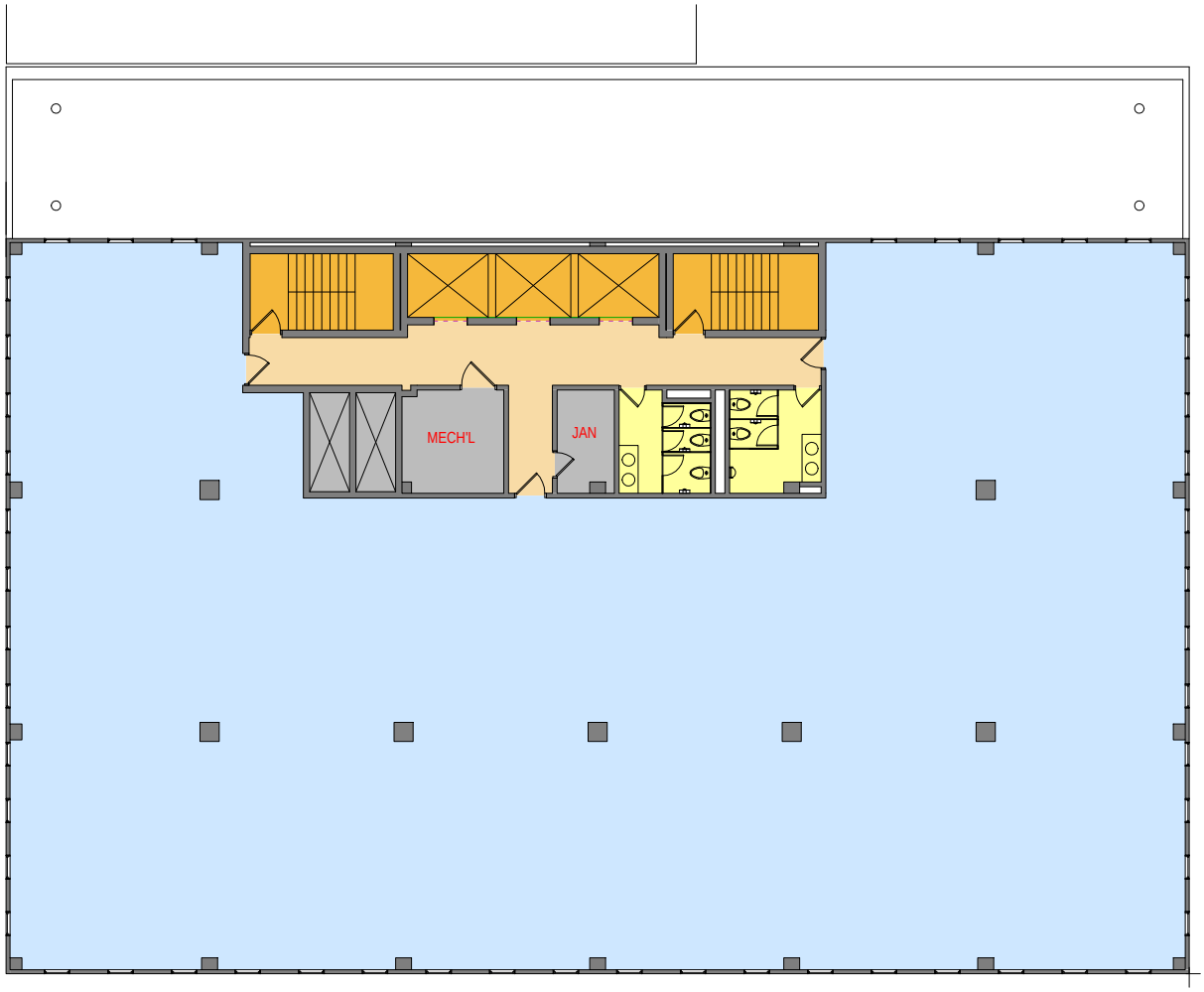
BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 9,985 NET SF
BUILDING CORE - 1,425 NET SF

FLOOR PLAN - LEVELS 02 + 03

11/15/18



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

BUILDING CORE, CIRCULATION, VERTICAL

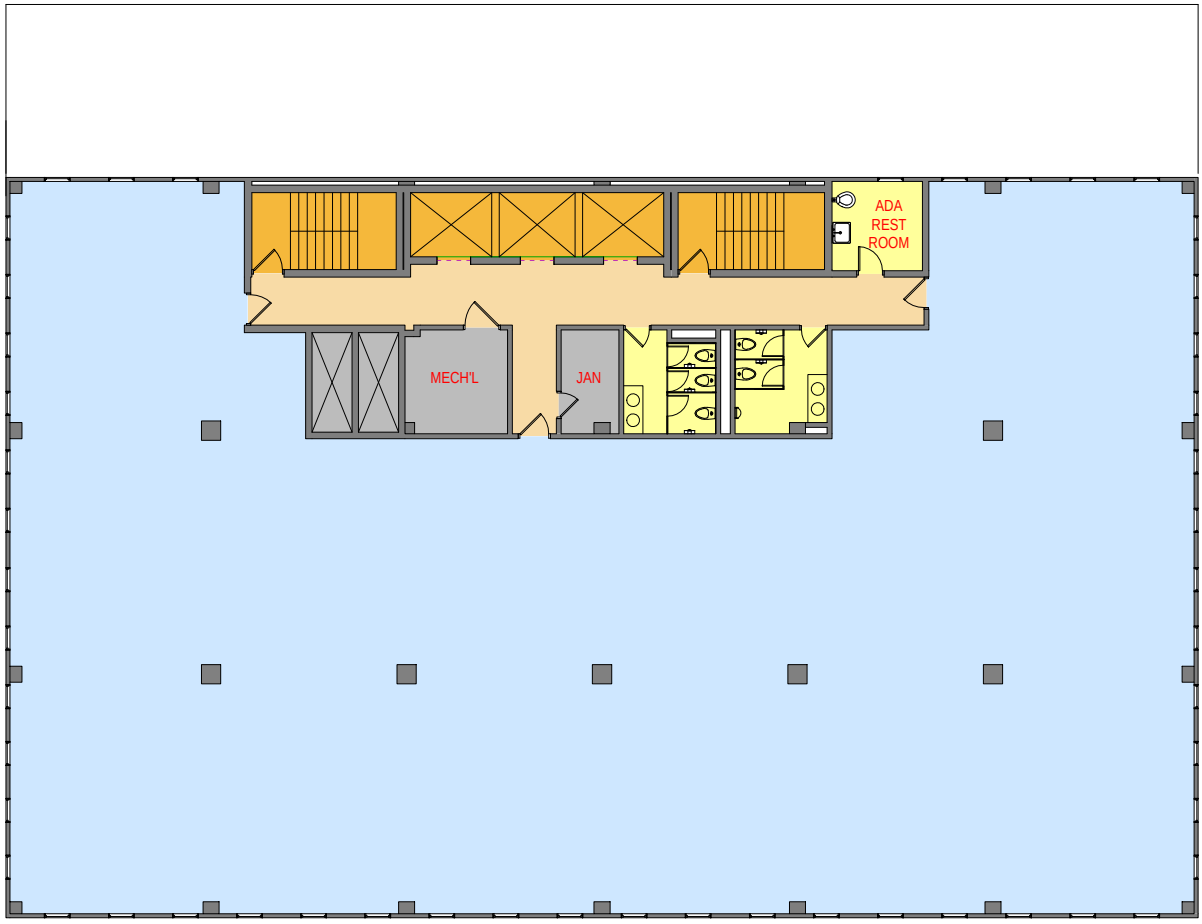
BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 7,820 NET SF
BUILDING CORE - 1,425 NET SF

FLOOR PLAN - LEVELS 04, 05, 06, 07, 09, 10 + 12

11/15/18



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

BUILDING CORE, CIRCULATION, VERTICAL

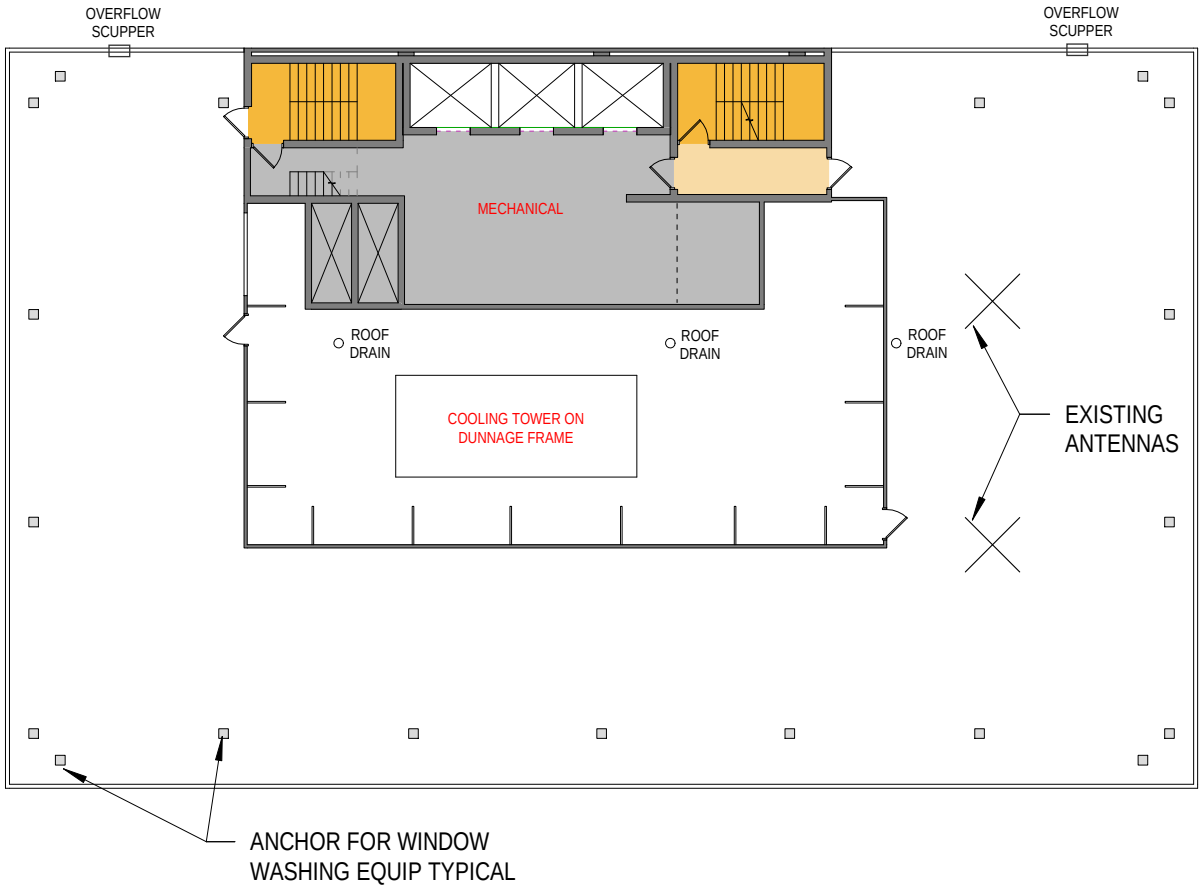
BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 7,660 NET SF
BUILDING CORE - 1,575 NET SF

FLOOR PLAN - LEVELS 08 + 11

11/15/18



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

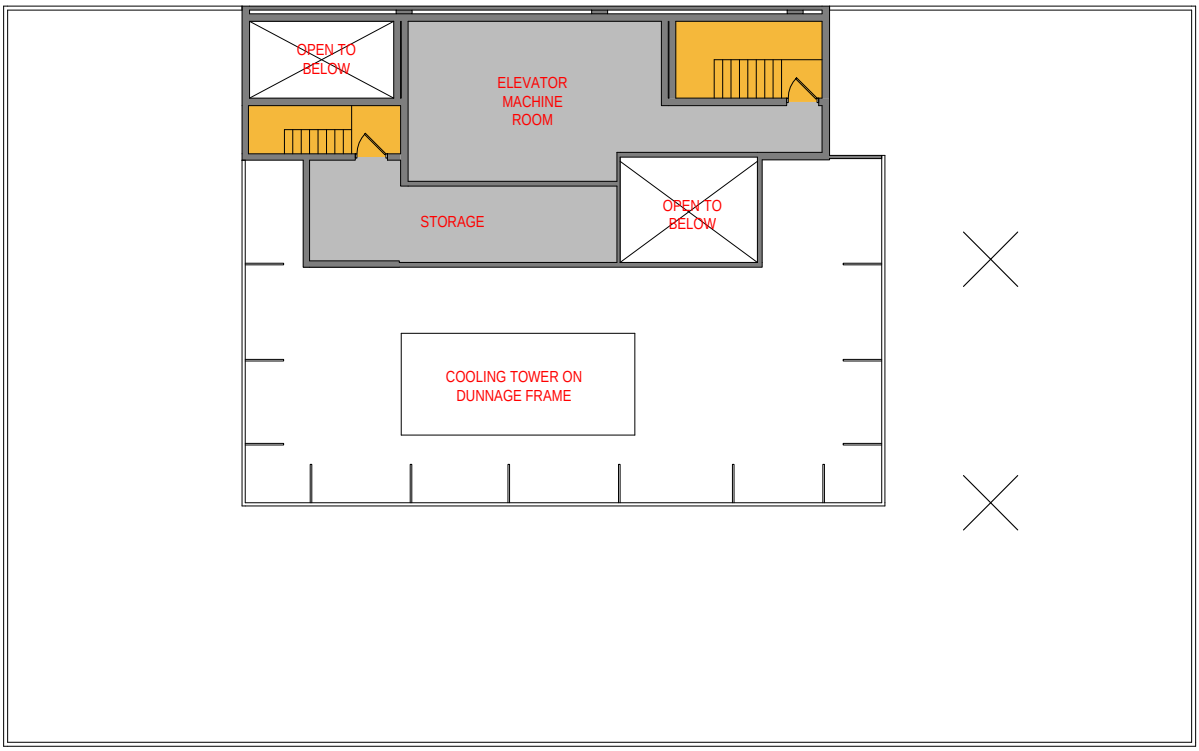
BUILDING CORE, CIRCULATION, VERTICAL

BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 0 NET SF
BUILDING CORE - 1,350 NET SF

FLOOR PLAN - ROOF
16 NOVEMBER 2018



BUILDING CONDITION ASSESSMENT, 401 WASHINGTON AVENUE, TOWSON, MD

LEASABLE AREA

BUILDING CORE, WC + JAN

BUILDING CORE, CIRCULATION, HORIZONTAL

BUILDING CORE, CIRCULATION, VERTICAL

BUILDING CORE, MEP

0 10' - 0" 20' - 0" 40' - 0"

AREA PER FLOOR:
LEASEABLE - 0 NET SF
BUILDING CORE - 1,035 NET SF

FLOOR PLAN - PENTHOUSE

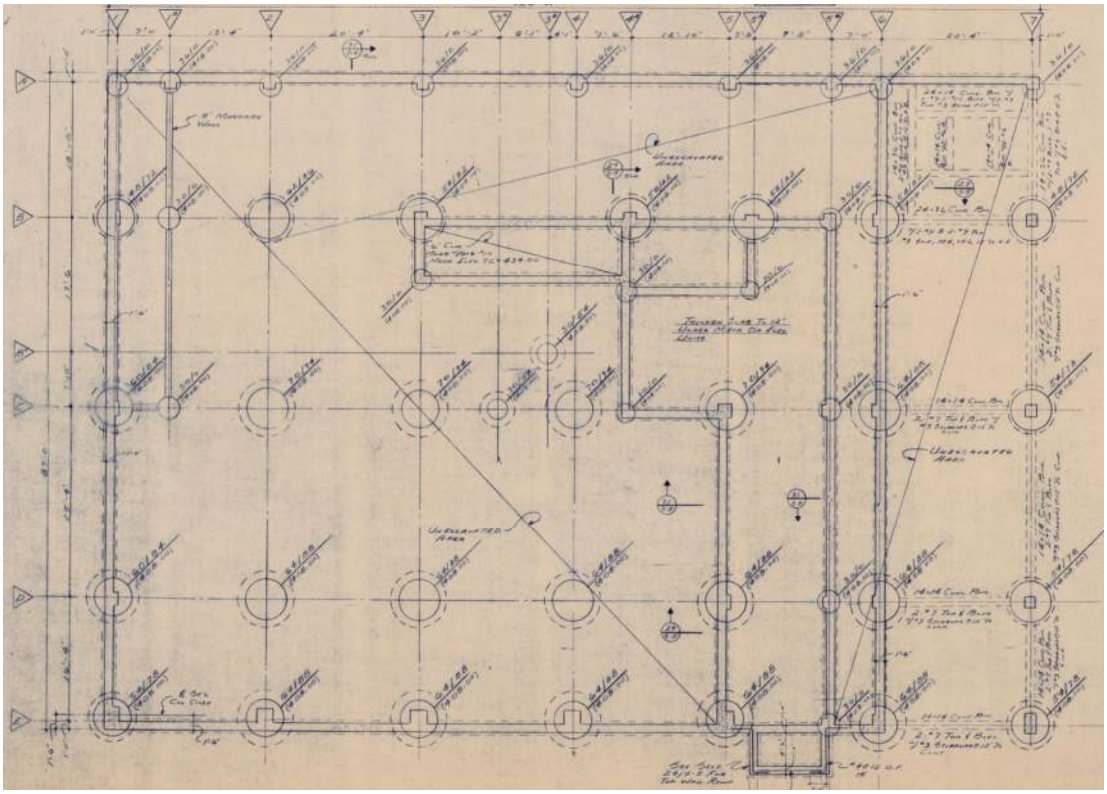
11/15/18

A. SUBSTRUCTURE

A10 FOUNDATIONS

A1010 Caissons

A. The structure is supported by drilled concrete caissons with belled shafts which are designed for an allowable soil bearing capacity of 20,000 psf.



A20 BASEMENT CONSTRUCTION

A2010 Sub-Basement

A. A sub-basement located in the southeast corner of the building houses MEP equipment. The slab on grade in this area is 5” thick concrete reinforced with welded wire fabric. The foundation walls are 12” thick reinforced concrete.

1. The slab on grade and foundation walls appear to be in good condition. No indication of concrete deterioration due to water infiltration was observed.

A2020 Basement

A. The slab on grade in the basement is 5” thick concrete reinforced with welded wire fabric. The portion of the basement that is located over the sub-basement consists of a 7” thick reinforced concrete slab supported by reinforced concrete beams and the sub-basement foundation walls. The foundation walls of the basement are 12” thick reinforced concrete.

    1. Most of the basement concrete was not exposed to view. The slab over the sub-basement appears to be in good condition.

B. SHELL

B10 SUPERSTRUCTURE

B1010 Structural Frame

A. The building is a steel framed structure with typical bay size of 25'-4" x 20'-4". At the north side, the building steps back 18'-0" at the 4th Floor creating a low roof. At the south side, the building facade is recessed at the First Floor approximately 8 feet from the main wall above and the south building columns are transferred to the recessed columns with 36" deep cantilevered beams.

B. Wind and seismic loads are resisted by moment-resisting frames.

B1020 Floor Construction

A. The floors consist of 3 ¼" lightweight concrete over 3" metal deck supported by the steel beams and columns of the structural frame. The original contract documents note that the floors were designed for a live load capacity of 100 psf.

1. Calculations to confirm the live load capacity noted on the documents were performed on a few of the typical floor members. The members that were checked were found to be within acceptable limits of design for the 100 psf capacity.

2. A live load capacity of 100 psf meets or exceeds the current code required live load for office space, classrooms and places of assembly. If areas of the building will be used for storage or file systems, structural enhancement of the floors will be required in those areas.

3. Most of the floor system was not exposed to view.

B1030 Roof Construction

A. The main roof consists of 3 ¼" lightweight concrete over 3" metal deck supported by the steel beams and columns of the structural frame. The original contract documents note that the roof was designed for a live load capacity of 30 psf. There is no note regarding the live load that was used for the design of the Mechanical Room Floor.

1. Calculations to confirm the live load capacity noted on the documents were performed on a few of the typical roof members. In general, the members that were checked were found to meet the capacity noted. However, some of the beams were found to be undersized for the code required load criteria. It is believed that these beams were mis-labeled on the contract documents. Whether the error was corrected during the shop drawing phase of construction is unknown. Access to the beams in question was not available during the time of the site visit. It is recommended that further investigation of these beams be performed, and if necessary, enhancement of the beams provided in order to meet the code required loads.

2. A live load capacity of 30 psf meets the requirement for roof live load per the current code. However, the current code also requires that snow drift be included in a roof analysis. Any modifications to the roof, such as new equipment, or a change in the Building Risk Category (discussed in greater detail under the lateral load resisting system section) will trigger the requirement that the roof framing be modified to meet the current code.

B1040 Elevator Machine Room Floor and Roof

A. The machine room floor is a 7" thick reinforced concrete slab supported by masonry walls that bear on the mechanical room floor below. The original contract documents note that the machine room was designed for a live load capacity of 125 psf. The roof of the machine room consists of 3" metal deck on steel framing that is supported by the same masonry walls.

1. The floor and roof framing of the elevator machine room appear to be in good condition.

B1050 Lateral Load Resisting System

A. Lateral loads on the building from wind and seismic events are resisted by moment-resisting frames. Moment resisting frames develop their stiffness by connecting the flanges of the floor beams to the building columns with full penetration welds.

1. The building is presently used as office space, which under the current building code places it under Building Risk Category II. If the future intended use is to remain as an administrative office building, the International Existing Building Code does not require that the lateral load resisting system be retrofitted to meet the current code. However, if the future intended use of the building is for either educational purposes or public assembly, the building would fall under Building Risk Category III and the International Existing Building Code would require that the lateral resisting system meet the current building code requirements. Although a lateral analysis of the existing building is beyond the scope of this report, it is believed that should the building fall under Risk Category III, the existing lateral force resisting system will most likely not meet the current code requirements and modification of the existing system will be required. Upgrading the lateral system would be an extremely difficult and costly procedure.

B1060 Cooling Tower Enclosure and Support Framing

A. The cooling tower for the building is located on the main roof and is enclosed by metal panel walls. The cooling tower is supported on steel framing elevated approximately 2 feet above the roof. It appears, at some point in time, the original cooling tower was replaced, and the steel framing was modified for support of the new tower loads by welding steel plates to the beams.

1. The steel framing that supports the cooling tower has significant active corrosion. When steel corrodes, the rust expands to approximately 15 times its original volume. Therefore, corroded steel often looks to be in poorer condition than it actually

is. It is recommended that the steel support framing be properly cleaned, the beams reviewed for the extent of lost area, repairs made if necessary and a new durable coating provided. If the cooling towers are to be replaced, replacement of the steel framing in its entirety should be considered.

B1070 Roof Antenna Towers

A. There are two antenna towers located on the roof. Per the Building Manager, they were installed by a previous tenant and are no longer in use. There is no documentation as to how these towers are anchored to the roof structure, although the tower bases appear to correspond with interior structural column locations. If the towers are no longer in use, removal of the towers should be considered.

B1080 Exterior Concrete

A. At several locations around the building perimeter, the steel framing extends outside the building envelope. At these locations, the steel frame is encased with reinforced concrete for protection. Some of the concrete is starting to crack and become loose due to corrosion of the reinforcing steel. This condition is also occurring at some of the site retaining walls.

1. The cracked concrete should be removed, the steel reinforcing properly cleaned and prepared, and new repair material installed.

B. Some of the site concrete on the south and east sides of the building has cracked and settled.

1. The cracked and settled concrete should be removed and replaced to avoid further deterioration and possible tripping hazards.

B20 EXTERIOR ENCLOSURES

B2010 Exterior Walls

A. General:

Exterior wall enclosures for this building can be classified as follows:

1. Ground Level: Glazed aluminum storefront infill between concrete structural columns.

2. Tower Enclosure: Precast concrete panels and vertical strip aluminum windows.

3. Roof penthouse enclosure and equipment screen: Prefinished corrugated metal wall panels and painted CMU.


4. North façade at property line: Cement stucco over CMU.

B. Energy Efficiency and Envelope Performance:

The exterior enclosure of the occupied floors is consistent with construction standards at the time when the building was built, but would not satisfy current code requirements for new construction.

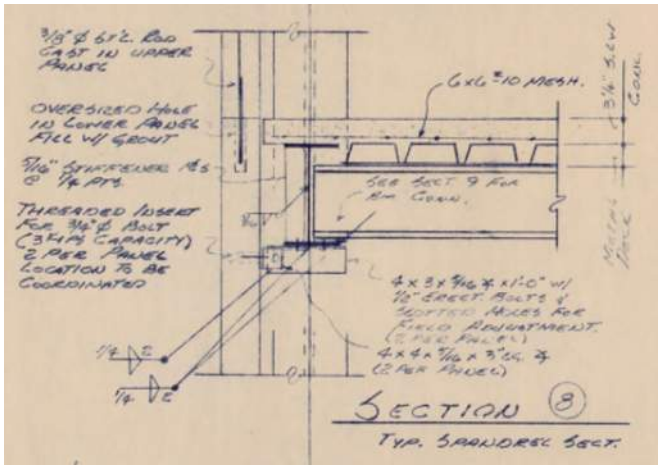
- Walls and roof are very lightly insulated.
- Exterior windows and storefront are single-glazed (no insulated glass lites).
- Exterior window and storefront framing does not appear to be thermally broken.
- Air and water-tightness of the envelope appears to depend primarily on sealant joints between the windows and panels.

  There is visual evidence of ad-hoc repairs to sealant joints around the building, but no sign of a comprehensive sealant replacement effort.

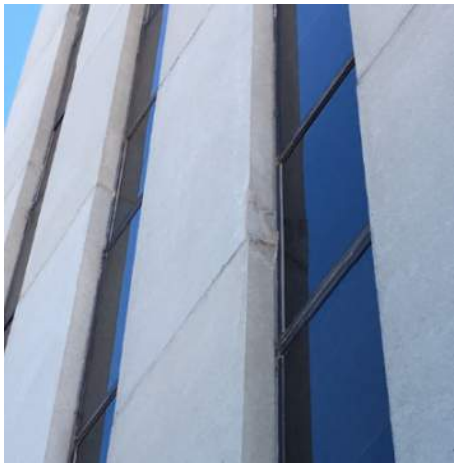
Heating and cooling costs for this building would be expected to be significantly higher than for a similar building with a higher-performing envelope.

B2010.10 Precast Wall Panels

A. The typical exterior façade consists of 5” thick precast concrete panels supported from the perimeter structural steel framing. The bottom of each panel is doweled into the top of the panel below.



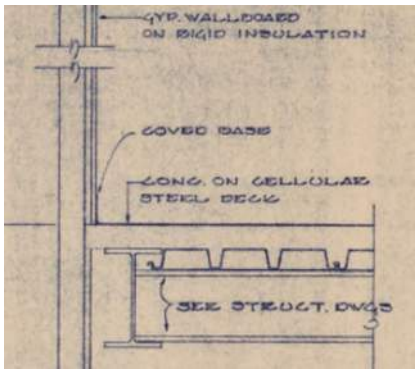
1. The wall panels, generally, appear to be in good condition, given their age. There is some visual evidence of patching and repairs to some panels, and inconsistent alignment in some locations. It is not clear if the misalignments are due to active movement or issues with the initial installation.



2. Repairs can be seen at the north façade, indicating some of the panels apparently have had crack issues in the past. It is recommended that a closer review of the north side panels be performed to verify if additional cracks and spalls are developing due to the northern exposure.

3. Near the top of the north façade, there are several locations where rust stains can be seen on the concrete. The stains appear to be a result of corrosion of the panel reinforcement. These areas should be repaired to prevent further deterioration.

4. Per the original 1969 drawings there is a 2" layer of rigid insulation and drywall finish attached to the interior face of the precast wall panels. This has not been visually confirmed. There is currently no air/water barrier in the wall assembly.

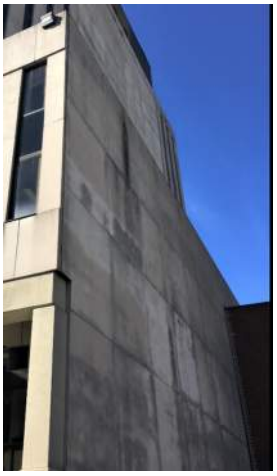


B. Recommendations:

1. A comprehensive engineering survey should be undertaken to review the condition and stability of the exterior concrete panels. Since these panels are the primary weather barrier for the building, any cracks or movement could lead to water or air infiltration into the building.

2. Sealant joints between panels should be surveyed and comprehensively addressed and maintained. Past ad-hoc sealant repairs have left a patchwork of sealant joints of varying types, ages, and conditions.

B2010.20 Stucco Wall Surfaces



A. The north façade of the north wing which abuts the property line is a CMU structural wall surfaced with cement stucco, panelized in a fashion similar to the precast concrete wall panels.

B. The stucco appears to be original to the building, and is showing its age and heavy weathering. However, it does appear to be generally sound.

C. Recommendations:

1. General cleaning and replacement of sealant joints.

B2020 Exterior Windows & Storefront

B2020.10 Aluminum Storefront & Entrances

A. The typical windows and entrances at the main and lower levels are a conventional 2” x 4-1/2” center-glazed aluminum storefront system with aluminum storefront doors.

1. The glazing appears to be ¼” monolithic glass.

2. Finish is dark bronze anodized.

3. Condition of glazing gaskets and seals should be comprehensively surveyed.

B. The main entrance vestibule utilizes automatic sliding doors with motion sensor activation.

C. Recommendations:

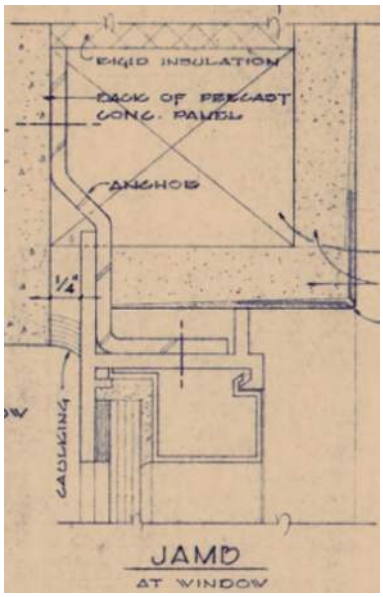
1. The existing storefront systems are thermally inefficient, but otherwise appear to be in serviceable condition. Replacement does not appear to be necessary, unless contemplated as part of a major building renovation with the goal of complying with modern energy codes.

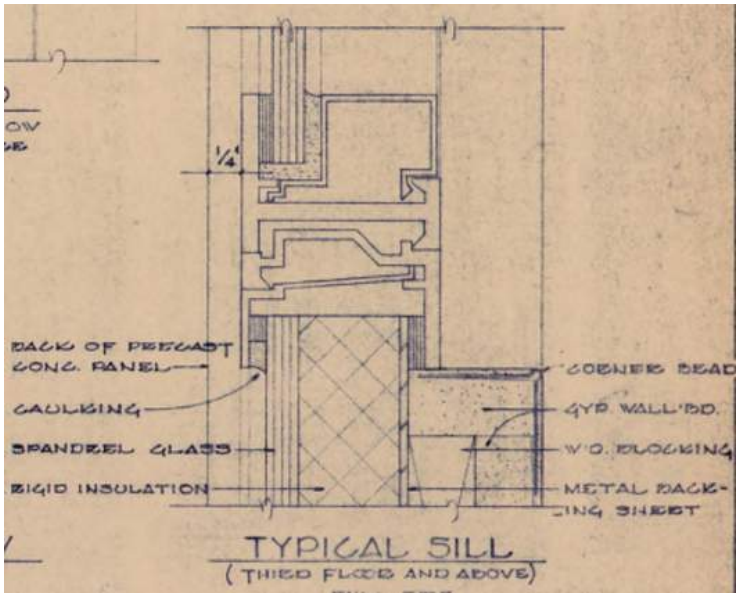
B2020.20 Aluminum Windows

A. The typical Tower windows are a 1-1/2”-deep aluminum-framed window system arranged in continuous vertical strips between the precast concrete panels.

1. Finish: Dark Bronze anodized.

2. The window system is glazed with ¼” “solar bronze” tinted glass lites at each occupied level, alternating with opaque insulated spandrel glass panels at each floor line. The window system bypasses the slab edge, so it is a continuous strip for the full height of the tower. The framing system has ganged horizontal mullions at each transition from spandrel panel to vision glass.





3. The jambs of the window system are anchored to the back of the precast wall panels and sealed with a continuous sealant joint. Some windows were observed to have water damage on the interior that are possibly the result of failed sealant joints.

4. Heads and sills are stacked, ganged, and sealed. Some windows showed evidence of sealant having been added, presumably to address water or air infiltration issues.

5. Some windows were observed to have failing interior wet seals at the perimeter of the glass. In some cases, attempts had been made (with varying degrees of quality and success) to repair the joints with new sealant.

B. Recommendations:

1. The existing windows and glazing are thermally inefficient, but cannot be improved (via insulated glass units, thermal breaks, etc.) without replacement of the window frames and glazing in their entirety. If installed per the original 1969 details, window replacement would impact the interior finishes around each opening, so a window replacement project would be difficult to implement except as part of a whole-building major renovation effort.

2. The air- and water-tightness of the entire envelope is reliant upon the sealant joints at the exterior window jambs and at the ganged mullion conditions. These sealant joints should be surveyed and comprehensively addressed and maintained. Past ad-hoc sealant repairs have left a patchwork of sealant joints of varying types, ages, and conditions.

3. Interior glazing seals appear to be failing and should be comprehensively addressed. Exterior glazing seals could not be visually assessed, but it is presumed that they would need to be addressed concurrently. The windows are interior-glazed, so a seal rehabilitation effort would not require exterior access to the windows.

B2030 Exterior Soffits

A. Exterior soffits at overhanging conditions at the Main Level are cement stucco.

B. Stucco soffits around the building appear to be in good condition.

C. Recommendations: No changes should be required.

B30 ROOFING

B3010 Roof Coverings

A. General:

The building has three areas of roofing:

1. Main tower roof (built-up)
2. North Wing roof (built-up)
3. Penthouse roof (single-ply membrane)

B3010.10 Built-Up Roofing

A. Main Tower Roof

1. The main tower roof is a built-up roof (BUR) with gravel surfacing. Its age and maintenance/replacement history is unknown. It is, however, in very poor condition due in large part to inadequate slope and drainage, leading to significant ponding over the southwest quadrant of the roof. Warranty status is unknown.

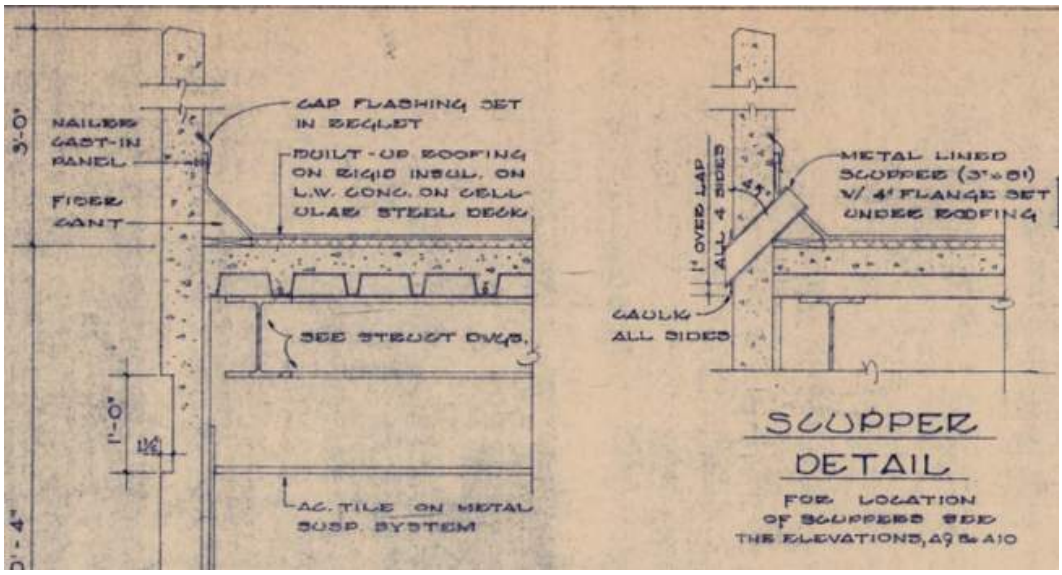
2. There appear to only be three roof drains, located near the center of the roof, to serve the entire roof area. There are two small overflow scuppers through the parapet at the northeast and northwest corners to serve the entire roof area. The size and quantity are insufficient for a roof of this size. There is no visual evidence of positive slope to any of the roof drains.

    a. The ponding water on the roof may, in part, have its source in an ongoing leak at the cooling tower. There is a significant amount of organic material and moss growing on the roof in the

vicinity of the cooling tower, suggesting that this has been an ongoing condition.

b. Despite the condition of the roof and the significant ponding, there was no apparent evidence of roof leaks at the floor below.

3. Per the original 1969 drawings, the insulation thickness was minimal. The roof perimeter is flashed to the precast concrete parapet with a stainless steel reglet and counterflashing consistent with the original project details. Perimeter flashings appear to be intact, and the sealant joints between the precast concrete parapet panels appear to have been well-maintained.



4. A series of structural connection points for window-washing equipment have been provided around the perimeter of the roof, with pitch pockets. Per the Building Manager, these have been in use, with no known functional issues.

5. Roof penetrations for the equipment screen supports, cooling tower dunnage frame supports, and other similar items are waterproofed with pitch pockets. Per the facilities staff, these pitch pockets have been periodically maintained.

6. Recommendations: The existing main roof has clearly exceeded its service life, and the drainage deficiencies must be addressed. **Replacement of the existing main roof is a likely short-term need for this building**. Some concerns to be considered:

    a. Replacement of the roof should include a thicker layer of insulation to improve the thermal performance of the building. All roof penetrations (including pitch pockets, roof curbs, etc.) would have to be modified to account for the thicker roof assembly.

    b. Replacement of the roof should include additional tapered insulation as required to achieve positive drainage to roof drains.

    c. The addition of more roof drains and overflow drains should be considered.

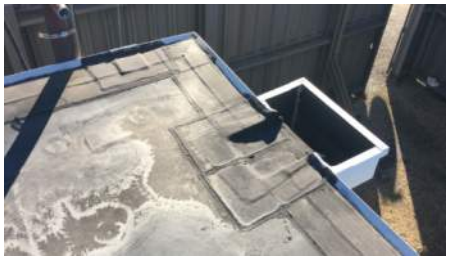
B. Lower Roof: This roof was not accessible for review and was not assessed in person for this report. It is presumed to be similar to the main roof in terms of construction and detailing. Its age and condition are unknown.

    1. Recommendations: Replacement of this roof should be considered in parallel with replacement of the main roof.

B3010.20 Single-Ply Membrane Roofing

A. The roof of the mechanical penthouse is a 60-mil EPDM single-ply membrane by Carlisle. This roof appears to be relatively recent and in good condition. Warranty status is unknown.

B. Recommendations: No modifications should be required. Regular maintenance should be performed per manufacturer's recommendations.



C. INTERIORS

C10 INTERIOR CONSTRUCTION

C1010 Interior Partitions

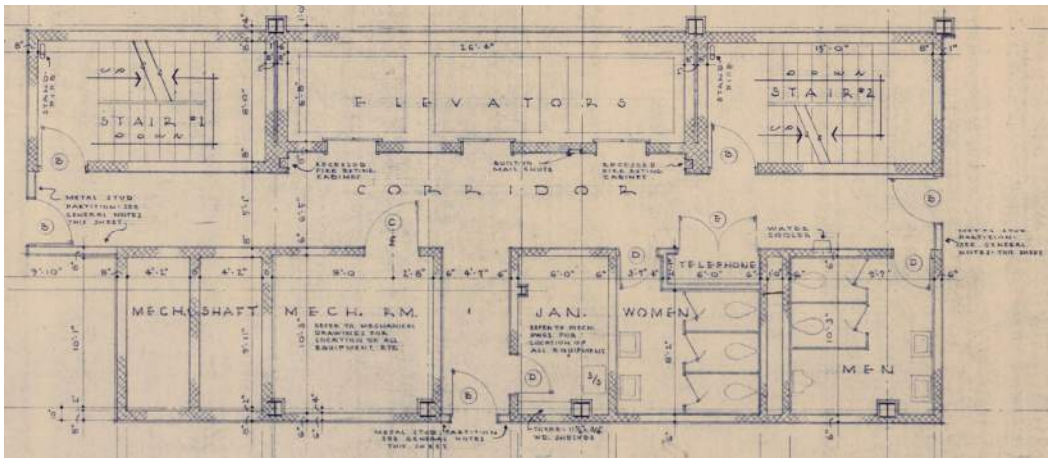
A. Interior partitions were only reviewed in the context of the building core elements. Tenant spaces were not reviewed for this report.

1. Per the original 1969 drawings, all partitions defining the elevator shaft, stair shafts, mechanical shafts and mechanical room of the typical building core are fire-rated CMU walls. Based on the door labels, these walls appear to have a 2-hour rating.

2. Additional metal-framed drywall partitions that complete the enclosure of the building core (typically at entrances to tenant spaces) are also presumed to be 2-hour rated.

3. Per the original 1969 drawings, all CMU walls in corridors and public spaces were finished with a layer of ½" plaster. Current finishes at some floors may vary due to subsequent tenant renovations.

4. All CMU walls in stairs and mechanical spaces are exposed/painted.



C1020 Interior Doors

A. Interior doors were only reviewed in the context of the building core elements. Tenant spaces were not reviewed for this report.

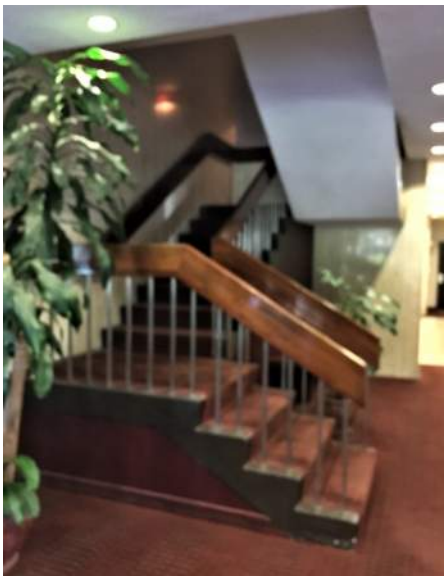
1. Per the original 1969 drawings, all doors in fire rated partitions solid core wood doors in hollow metal frames. All rated doors carry a 90-minute fire rating.

C20 STAIRS

C2010 Stair Construction

A. The two core stairs are concrete-filled metal pan stairs with steel pipe guardrails and handrails. All metal surfaces are painted. Concrete treads and landings are exposed, with a clear sealer.

B. The west stair transitions to an unenclosed stair at Level 2, opening into the Main Lobby at Ground Level. At the second floor, the typical interior stair finishes transition to carpet flooring and decorative wood handrails with steel pickets.



D. SERVICES

D10 CONVEYING

D1010 Elevators & Lifts

A. General:

The building contains three overhead traction elevators sharing a common shaft in the building core. All three elevators serve all occupied floors of the building. The elevator machine room is located at the upper level of the roof penthouse.

Per the Building Manager, the elevators are original equipment, but the cabs have been refurbished.

B. Elevator & Elevator Machine Room Electrical Information:

There are three existing traction elevators serving this building. All existing elevators are DC motors with 25 hp, 208V, 3phase, 85.5 RLA. The elevators are fed from the existing panelboard in the penthouse thru converter & disconnect means. The electrical service to the elevators are in good condition.

C. Elevator & Elevator Machine Room Mechanical Information:

The elevator machine room HVAC system includes an abandoned-in-place side-wall propeller fan and an active 5-ton split AC system (Trane model TWE060D150B0). We anticipate the equipment load in the space is approximately 2.5 tons. Even accounting for envelope load, the 5-ton unit should be adequate. This unit was manufactured in 2001, and despite appearing to be in good condition is nearing the end of its serviceable life. Further, this unit utilizes R-22 refrigerant, which will no longer be manufactured beginning in January of 2020.

In addition to temperature and humidity control of the elevator machine room, code mandates that smoke relief vents be provided for the elevator shafts. Smoke vents must provide free area of 3 square feet or 3% of the shaft floor print (whichever is greater). Louvers at the vents must be operated by smoke detectors located in the shaft such that they open upon the detection of the products of combustion. Based on the existing drawings, it appears that 3 square feet of smoke vent area was provided, though we could not find evidence of isolation dampers for the system.

D20 PLUMBING

D2010 Applicable Codes & Standards - Plumbing

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
IBC	International Building Code
IECC	International Energy Conservation Code

IPC	International Plumbing Code
AWA	American Waterworks Association Standards
IFGC	International Fuel Gas Code
NFPA	National Fire Protection Association, “National Fire Codes”
BCDPW	Baltimore County Department of Public Works Standard Construction Details.

D2020 Plumbing – General Conditions

A. Plumbing systems included in this facility are typical for office buildings constructed in the 1970s. Services include domestic cold and hot water (with recirculation), cast iron soil, vent, and storm drain systems, domestic booster pumping systems, and duplex sump and sewage ejector systems. With the exception of the domestic water heater, and some of the piping and valves in the Lower Level, most of this system appears to be original to the building. Restrooms and water fountains are located at the core of the building, with most of the drainage piping routed to the central wet wall.

D2030 Plumbing Fixtures

A. Plumbing Fictures

1. Existing Conditions:

   ADA accessible fixtures were not included in the original design for the restrooms. The men’s and women’s restrooms on the first floor have been combined into one unisex restroom, and a second unisex restroom has been added at the eighth and eleventh floors. ADA accessible fixtures have been installed in both.

2. Deficiencies:

   Janitor’s sinks share space with the electrical equipment.

D2040 Domestic Water Distribution

A. Domestic Water Distribution

1. Existing Conditions:

   The domestic water meter, which is located on the street is intended to provide 225 GPM to the 4” distribution main at 40 psi pressure. The 4” water service enters the building in the basement where it promptly splits to serve the fire pump with one branch, and the domestic water supply with the other branch. The main isolation gate valve for the water supply to both branches includes a tamper switch. Following the piping tee, domestic water passes through a strainer and check valve (See figure P1) before entering the domestic water booster pumps. The make, model, and performance of the existing pumps could not be determined, though they appear to be original to the building (See Figure P2). From the basement, the domestic cold water is pumped throughout the building using a combination of galvanized steel piping and copper tubing to serve restrooms, drinking fountains, and a restaurant on the ground floor.

Hot water is provided to the building via a Rheem commercial electric water heater located in the mechanical penthouse. The water heater, Rheem model E-120-54-G, utilizes a 54 kW electric heater to maintain the water temperature in its 120 gallon tank. The water is circulated throughout the building via an in-line pump and copper tubing. This water heater appears to be fairly new, and in good condition. An additional electric 40-gallon electric water heater is housed in the 10th floor mechanical room. The extent of the service of this water heater is unknown, though we believe it only serves the 10th floor tenant. Hot water for the ground floor restaurant is generated by an A. O. Smith 50 gallon water heater, model ECL-50-200.

The piping used for these systems included galvanized steel and copper. The galvanized steel piping that was observed appeared to be fairly new, while the copper tubing was a mix of old and new. We expect that the piping that was visible will have an additional 25 year service life.

Figure P1: Existing Strainer and Check Valve Assembly.

Figure P2: Domestic Water Booster Pump.

2. Deficiencies:

While generally in good condition, there are multiple minor deficiencies with the plumbing supply service. First and foremost of the deficiencies is the sharing of the main supply line with the fire pump. This pairing limits the ability of the fire pump to be tested during normal business hours, and also can severely limit the water available to the fire pump if an emergency should arise. Secondly, we recommend that the check-valve and strainer assembly in the 4" main service to the booster pumps be replaced with a double-check type backflow preventer. The current installation is not compliant with the National Standard Plumbing Code which requires a double-check backflow preventer, reduced pressure principle backflow preventer, or backflow preventer with intermediate air gap. Lastly, we recommend that the booster pumps and associated valves and piping be replaced. The pumps appear to be past their expected serviceable lifespan, and the valve/piping arrangements at the inlet and discharge of each pump are not optimal. It is likely that the lack of straight piping at the pump inlet and discharge is inducing a significant decrease in pump performance.

D2050 Sanitary Waste

A. Sanitary Waste

1. Existing Conditions:

   Fixtures on the First Floor Level and above drain by gravity to the street main, while fixtures in the Basement and Lower Level drain into a sump basin in the basement. An electric Duplex Sewage Ejector pump set pumps the waste up to the sanitary drainage system where it can drain by gravity.

2. Deficiencies:

   The cover to the sump is not properly sealed, causing odors to emanate into the basement.

D2060 Rainwater Drainage

A. Rainwater Drainage

1. Existing Conditions:

   The roof drainage is achieved by five roof drains. Two drains are provided for the lower roof, and three drains are provided for the high roof and mechanical penthouse roof. Overflow protection is provided by two scuppers at the high roof. It is estimated that the average coverage per drain is about 3,250 square feet. Per the International Plumbing Code, this would require 4” roof drains (minimum) and 5” diameter horizontal pipe. The piping was not readily accessible to determine the size.

2. Deficiencies:

   The roof drains and roof surfacing were both in poor condition. Improper sloping of the roof causes continuous ponding. Mitigation of this condition would require additional roof drains to be installed, and proper sloping of the roof to all roof drains.

D30 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

D3010 Mechanical - Applicable Codes and Standards

ANSI	American National Standards Institute
AHRI	Air Conditioning and Heating Institute
ASTM	American Society for Testing and Materials
ASME	American Society for Mechanical Engineers: A17.1 Elevator Safety Code.
IBC	International Building Code
IECC	International Energy Conservation Code
IMC	International Mechanical Code
NFPA	National Fire Protection Association, “National Fire Codes”
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
ASHRAE	American Society for Heating, Refrigerating and Air Conditioning Engineers

D3020 General Site Conditions

A. Building HVAC is provided primarily through water-source heat pump equipment. The central condenser water loop is heated by a central electric powered boiler, and cooled through a roof-mounted cooling tower which appears to be a closed-circuit type tower. The condenser water is circulated through a central piping riser via two end-suction pumps located in the mechanical penthouse and distributed to a central air handling unit on each floor. Condenser water is also distributed to multiple water-source heat pump console units located along the perimeter of each floor. Most of the equipment is original to the building, and though it has been very well maintained, is beyond its useful service life.

D3030 Central Plant

A. Cooling Tower and Pumps:

1. Existing Conditions:

Figure M1: The existing Cooling Tower

The cooling tower serving the building is a Baltimore Air Coil (BAC) closed-circuit unit from circa 1970 (See Figure M1). The unit includes two-banks of direct-coupled centrifugal fans driven by internally-mounted electric motors with belt/pulley couplings. It also includes two end-suction pumps which circulate cooling water in the tower from the basin to an overhead distribution system. As water falls from the distribution system at the top of the unit to the basin, the centrifugal fans blow air over the water causing it to evaporate, and consequently cool. The cool water flows over an internal heat exchanger which is used to cool the condenser water loop. The condenser water for the system is circulated by two constant volume 60-horsepower end-suction pumps located in the mechanical penthouse and designed for N+1 redundancy. The pumps (Taco model FE6013E2P1G2L0A) are mounted on the floor with rubber vibration isolators, but no inertia bases. We consider it unlikely that either pump is operating optimally due to the lack of straight piping upstream of the pump inlets. The age of the pumps could not be determined through visual inspection, though we believe they are 20 years old or more. The model has been discontinued by the manufacturer.

2. Deficiencies:

In general, the cooling tower is in poor condition. Deficiencies noted include significant rust on the main drive shaft (See Figure M2) for the fans, insulation that has fallen off of the unit, and a significant leak in the basin and other locations (See Figure M3). Per the ASHRAE HVAC Applications Handbook (Owning and Operating Costs chapter), the estimated useful service life for a cooling tower or evaporative condensing unit is 20 years. Even the best ceramic cooling towers only provide a service life expectancy of 34 years, which is significantly less than the operating life of this cooling tower. Similarly,

while the condenser water pumps appear to be in adequate condition, we believe that they have exceeded the ASHRAE recommended service life.

Figure M2: Corroding Fan Drive Shaft

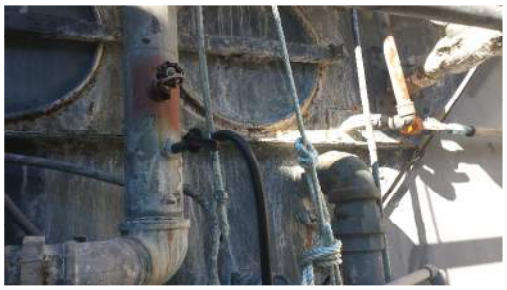


Figure M3: Evidence of Past Leaks

B. Hydronic Boiler:

1. Existing Conditions & Deficiencies:

Heat is provided to the condenser water loop by a 960 kW electric boiler (Cam Industries model 346960HW) which was manufactured in 1970. Per the ASHRAE HVAC Applications Handbook (Owning and Operating Costs chapter), the estimated useful service life for an electric boiler is 35 years. No deficiencies were identified through visual inspection, however, this unit is 13 years past its serviceable life.

C. Ventilation System:

1. Existing Conditions:

Figure M4: OA Duct in a Central Mechanical Room

Ventilation is provided to the building via a 7'x4' central ventilation riser which distributes outdoor air to the central mechanical room on each floor. The air is driven through the riser by a roof-mounted single width-single inlet centrifugal fan with airfoil blades (Trane model 81). The fan is original to the building and has superficial rust, but appears to be operational. Within the mechanical rooms, a branch duct with integral balancing damper, filter housing, and electric heater (See Figure M4) is used to balance, filter, and condition the outdoor air before being mixed with return air from the floor. Relief air for the building is provided by a roof-mounted backward-inclined centrifugal fan (Trane model U36R5-BI). This fan draws relief air through a 7'x4' riser and discharges it immediately outside the Mechanical Penthouse.

Toilet exhaust air from each floor is drawn through a shaft that doubles as the plumbing wet-wall. Exhaust air is driven by a roof-mounted centrifugal exhaust fan which discharges the exhaust air through flexible duct directly onto the roof. In addition to toilet exhaust air, this fan provides ventilation exhaust for the sub-basement. The fire

damper at the bottom of this shaft (as shown on the drawings) was not found during the field investigation.

Stairwells for this building do not include pressurization systems for smoke control of the egress pathway. Per paragraph 403.5.4 of the International Building Code (IBC), "Every required interior exit stairway serving floors more than 75 feet above the lowest level of fire department vehicle access shall be a smokeproof enclosure in accordance with Sections 909.20 and 1023.10." Paragraph 909.20.4.4 of the IBC identifies the need for a stairwell pressurization system.

2. Deficiencies:

Other than the absence of a stairwell pressurization system, the primary deficiencies with this system include the age of the fans and ductwork, the proximity of the intake to the cooling tower, and the proximity of the relief fan's motor enclosure to the mechanical screen-wall. Per ASHRAE, the useful service life for a centrifugal fan is 25 years. These fans have exceeded their useful lifespans. Additionally, the connecting ductwork is assumed to be original to the building. ASHRAE indicates that the maximum serviceable lifespan for ductwork is 30 years. After this time, the quality of the ductwork seals can degrade beyond an acceptable condition. Lastly, the toilet exhaust fan configuration and missing fire damper should be corrected.

D. Building Management and Control:

1. Existing Conditions:

The building does not possess a central building management and control system. All control is handled by local controllers or manually by the building maintenance staff.

D3040 Space HVAC Systems

A. Central Air Handling Units:

1. Existing Conditions:

Figure M5: Existing Central AHU

Each floor of the building is served by a dedicated central water-cooled self-contained unit (See Figure M5) that provides cooling, and ventilation for the core spaces. The central mechanical unit on each floor serves as a mixing plenum for return air and outdoor air. The mixed air is then drawn through the unit where it is filtered, cooled, and distributed to the floor through the existing ductwork. These self-contained units (American Standard model VWS) are original to the building, and consequently, vendor literature is not available to ascertain capacities or performance characteristics. Each unit utilizes multiple water-cooled compressors that employ R-22 refrigerant and forward-curved centrifugal fans. Some of the units include duct-mounted smoke detectors which will de-energize the unit upon detection of smoke in the air

stream, however, this is not a ubiquitous condition. Additionally, some unit include duct-mounted electric heaters, and some do not. The units are operational status is due solely to the skilled building maintenance staff on site which has replaced compressors and other defective parts as needed.

2. Deficiencies:

The central air handling units are well past their useful service lifespan of 15-19 years. Despite the on-site equipment repairs, R-22 refrigerant is being phased out of production beginning on January 1st 2020. After this date, only recycled, reclaimed, and existing stocks of R-22 will be available to service existing equipment. At that point, we expect maintenance costs for R-22 equipment to increase dramatically. Further, without a Testing and Balancing Report for the existing equipment, it is impossible to determine the airflow rates for any of the air handling units. Deficiencies in outdoor airflow, supply airflow, and smoke detector application are suspected, but cannot be confirmed.

B. Perimeter Water Source Heat Pump Fan Coil Units:

1. Existing Conditions:

The envelope load for the building is treated with console water-source heat pump units located at the perimeter of the building (See Figure M6). These units (Singer model ECC-WW-WM-90 & -120) are original to the building and also use R-22 refrigerant. Each unit includes a water-cooled compressor and dual forward-curved centrifugal blowers. Temperature control and heating/cooling change-over is controlled manually at the unit. Due to the age of the units, no vendor's literature is available to determine airflows, water flows, or performance characteristics, though it is assumed that capacities are ¾ ton and 1 ton depending on model number.

Figure M6: Existing Perimeter WSHP Console Unit

2. Deficiencies:

Based on a spot-testing of units located on the third floor, only some of the units are functioning properly (cooling/heating), and all produce a significant amount of compressor noise while operating. These units are also well past their useful service lifespan of 19 years per ASHRAE recommendation. Lastly, the imminent phase-out of R-22 refrigerant will escalate maintenance costs.

C. Lower Level HVAC System

1. Existing Conditions:

The central air handling unit serving the lower level has been taken off-line, and the tenants on that floor have opted for an independent HVAC system. As there are no design drawings for the independent system, we could not provide an evaluation of this system. One obvious issue with the HVAC system serving this floor is that it has no connection to the outdoor air riser, and therefore, has no ventilation.

D. Jake's Deli & Catering Space

1. Existing Conditions:

Jake's Deli & Catering is located at grade level, and includes an exhaust hood and fan. No drawings are available for this space, however, the exhaust fan is readily visible from outside the building. Per the International Mechanical Code, type I exhaust hoods must terminate at least 10' from adjacent portions of the building. The exhaust fan appears to terminate approximately 6' below 3rd floor slab in an alcove apparently intended for the electrical transformer. <u>This condition is not code compliant.</u>

E. Ductwork:

1. Existing Conditions:

Ductwork distribution for the space provides ventilation and cooling air to the core and select locations on the building perimeter. It is difficult to judge the age of the ductwork by visual inspection alone, though it is suspected that most of the ductwork serving the space is original to the building. Areas where new branch ductwork have been tied into the existing have not been properly sealed, and the liberal use of duct tape was noticed in at least one location (See Figure M7).

2. Deficiencies:

Figure M7: Poorly sealed ductwork

Per ASHRAE recommendations, ductwork has a median service lifespan of approximately 30 years. We suspect that most of the ductwork serving this space has failing or poorly installed seams. Additionally, multiple perimeter offices on the 3rd floor were not ducted to the central air handling unit. This means that these offices did not receive any ventilation air.

F. Piping:

1. Existing Conditions & Deficiencies:

The hydronic piping serving the building is a mix of copper tube and steel/cast iron pipe. Deficiencies noted for the piping included failed insulation on the condenser water piping located outside the building, multiple connections of copper tubing/fittings to steel piping/fittings without the use of dielectric couplings, and poor piping configurations at pump inlets. Overall, the piping appears to be in decent condition, and should expect a useful service life of 75-100 years.

D40 FIRE PROTECTION

D4010 Fire Protection – Applicable Codes

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
IBC	International Building Code
IECC	International Energy Conservation Code
IPC	International Plumbing Code
AWA	American Waterworks Association Standards
IFGC	International Fuel Gas Code
NFPA	National Fire Protection Association, “National Fire Codes”
BCDPW	Baltimore County Department of Public Works Standard Construction Details.

D4020 Fire Protection – Design Conditions

A. Existing Conditions

1. Fire Water Service:

The water service coming into the building is a 4” pipe that runs down to the sub-basement. There is an isolation valve just before the pipe splits to serve the fire pump and the domestic water pumps. A 6” fire protection service enters the fire pump room where a backflow preventer is located upstream of the fire pump.

2. Fire Pump:

The fire pump and the associated equipment have been recently installed and appear to be in good condition. The fire pump is diesel-fueled and serves two fire hose standpipes. The #2 Diesel fuel tank is located in the fire pump room. The fire pump is Armstrong Model #4X3X8.5FM with a capacity of 173 ft. of head at 400 gpm. There is also a jockey pump

that assists in maintaining water pressure. The jockey pump is Armstrong Model #VMS-0305. The startup batteries for the fire pump are located next to the pump on the floor.

3. Fire Department Connections:

A fire service line is piped outside the subbasement up to the street for a fire department connection at the south side of the building. Another fire service line is piped to service the building interior. There is a second fire department connection adjacent to the main building entrance at the west side of the building.

B. Deficiencies:

We recommend a separate water service connection into the building to serve the fire pump, instead of the existing condition where the same water connection is supplying both the domestic water and the fire pump. Also, the fire pump room should be 2 hour rated enclosure, but one of the doors is louvered. The louvered door opening would compromise the 2-hour rating.

D4030 Standpipes

A. Standpipes

1. Existing Conditions:

One of the two standpipes supplies the sprinklers throughout the fire zone assemblies at each floor. It appears that the building is fully sprinklered and the associated equipment has been recently installed and is in good condition.

D50 ELECTRICAL

D5010 Electrical - Applicable Codes and Standards

ASTM	American Society for Testing and Materials
ANSI	American National Standards Institute
IEEE	Institute of Electrical and Electronic Engineers
IECC	International Energy Conservation Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association, “National Fire Codes”
NEC	National Electrical Code
IBC	International Building Code
UL	Underwriters Laboratories, Inc.

D5020 Electrical Service & Distribution

A. Incoming Power

1. Existing condition:

The incoming electrical service to the building enters from the pad mounted utility transformer (see Figure E1) at the northeast corner of building via eight 4" underground conduits to pull box (see Figure E2) in utility room in sub-basement. The electrical service feeds a metal-enclosed draw-out switchgear (see Figure E3) rated at 3200amp, 480volt, 3 phase, 4 wires. The service equipment is by Westinghouse. This service delivers approximately 20 watts per square-foot which is ample for this type of building. An average of 12-15 watts per square-foot is more common.

Figure E1: Existing Utility Transformer

Figure E2: Existing Utility Pullbox

Figure E3: Existing Switchgear

2. Deficiencies:

   There is not enough working space in front & right side of switchgear and it does not have a clear egress path about switchgear (see Figure E3) which violates NEC 2014-110.26(A)(1) & 110.26(C)(1). The identifications for service & distributions are missing on switchgear. This is also in violation of NEC-230.2(E).

B. Power Distribution

1. Existing condition:

   The majority of the electrical distribution equipment is the original vintage when the building was constructed in early 1970's with the exception of the electrical equipment and switchgear located in the utility room. They were replaced because of major water damage from flooding in 2003 according to building engineer.

   The main switchgear serves the following equipment/loads.

   1. Four 225amp, 480/277Volt panelboards are serving mechanical equipment and one 125amp, 208/120V panelboard thru 45 kVA transformer are serving 120V electrical outlet/power on subbasement level. All of them appear to be installed in 2003 or later.

   2. Three riser feeders serve from the basement to the roof. These buss ducts serve the following floors:

      - One 2000amp, 3P buss duct (see Figure E4) serves 600amp panelboard & 1000amp electric boiler on penthouse & three DC motor traction elevators. It appears to be installed in early 1970.

- One 2000amp, 4P buss duct (see Figure E4) serves mechanical/power/lighting loads from the basement to the 12th floor. It appears to be installed in early 1970.

- One 400amp, 4P buss duct (see Figure E5) serves panelboard ”H1”, ”H2”, ”H3”, ”H4” for heat pumps. It appears to be installed in early 1970.

Figure E4: 2000 amp Buss Risers

Figure E5: 400 amp Buss Risers

There are labels on these buss ducts with a date of March 1996 indicating the last time they were torqued.

3. Tenant spaces, Communication & Signage on roof

- There are three tenant spaces on 1st floor and are all appear to be sub-metered:
  1. Charles SCHWAB” (see Figure E6)
  2. NY Deli on 1st floor (see Figure E7).
  3. And an empty tenant space is being serving by one 100amp, 480/277V panelboard with submeter and one 125amp, 208/120V panelboard located in the tenant space.

Figure E6: Sub-meter for Charles Schwab

Figure E7: Sub-meter for Deli

- There are panelboards with submeters for Antenna system (see Figure E8) & Signage on penthouse (see Figure E9). Those systems are disconnected and are no longer in use.

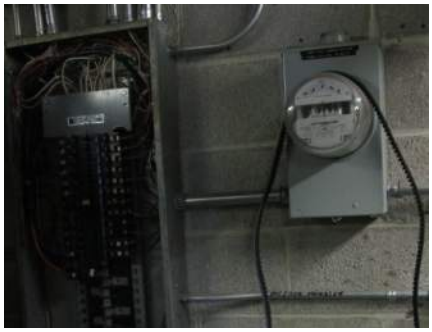


Figure E8: Sub-meter for Antenna

Figure E9: Sub-meter for Signage

The following table describes the electrical distribution equipment and condition in detail.

Floor	***Panelboards Switchgear***	***Existing Condition***	***Ampere***	***Voltage***	***Note***
Sub Basement	Switchgear	Working well but see notes.	3000	480/277	No label for rating, Need labels for all equipment being served. Not proper space for clearance and egress
	HP-1	Good	225	480/277	Need to update directory
	HP-2	Good	225	480/277	Need to update directory
	HP-3	Good	225	480/277	Need to update directory
	A-15 thru XFMR 45kVA	Good	125	208/120	
	Utility Meter	Good	-	-	
Basement	DP-1	Good	400	480/277	
	L-1	Good	225	480/277	
	A-1 thru XFMR 45kVA	Good	125	208/120	
	Future tenant	Good	100	480/277	No name label Need to update directory
	Future tenant	Good	125	208/120	No name label, Need to update directory
	Sub Meter	Good	-	-	No label, but it is for the Tenant
	Bus riser #1	Good	2000	480/277	
	Bus riser #2	Good	2000	480/277	
	Bus riser #3	Good	400	480/277	
	A & B thru XFMR 75kVA	Good but see note	350	208/120	Main circuit breaker is not correct.
	Charles	Good	100	480/277	

	SCHWAB				
	Charles SCHWAB	Good	60	208/120	
1st Floor	L-2	Good	225	480/277	
	A-2	Good	225	208/120	Need to update directory
	CS	Good	100	208/120	
2nd Floor	DP-2	Good	400	480/277	
	L-3	Good	225	480/277	
	A-3 thru XFMR 45kVA	Good	125	208/120	
	B-3	Good	100	208/120	Need to update directory
	C-3	Good	60	208/120	Need to update directory
3rd Floor	L-4	Good	225	480/277	
	A-4	Good	225	208/120	Need to update directory
Floor	***Panelboards Switchgear***	***Existing Condition***	***Ampere***	***Voltage***	***Note***
4th Floor	L-5	Good	225	480/277	
	A-5	Good	225	208/120	Need to update directory
5th Floor	DP-3	Good	400	480/277	
	L-6	Good	225	480/277	Need to update directory
	A-6 thru XFMR 45kVA	Good	125	208/120	Need to update directory
6th Floor	L-7	Good	225	480/277	
	A-7	Good	225	208/120	Need to update directory
	H-3	Good	225	480/277	Need to update directory
	H-4	Good	225	480/277	Need to update directory
7th Floor	L-8	Good	225	480/277	
	A-8	Good	225	208/120	Need to update directory
	Unknown	Good	60	208/120	No name label, Need to update directory
	H-1	Good	225	480/277	Need to update directory
	H-2	Good	225	480/277	Need to update directory
8th Floor	DP-4	Good	400	480/277	
	L-9	Good	225	480/277	
	A-9 thru XFMR 45kVA	Good	125	208/120	Need to update directory
9th Floor	L-10	Good	225	480/277	
	A-10	Good	225	208/120	Need to update directory
	Unknown	Good	60	208/120	No tag name, Need to update directory

10th Floor	L-11	Good	225	480/277	
	A-11	Good	225	208/120	Need to update directory
	P-B	Good	60	208/120	Need to update directory
11th Floor	DP-5	Good	600	480/277	
	L-12	Good	225	480/277	
	A-12 thru XFMR 75kVA	Good	225	208/120	Need to update directory
12th Floor	L-13	Good	225	480/277	
	A-13	Good	225	208/120	Need to update directory
	Unknown	Good	60	208/120	No name label, Need to update directory

Floor	***Panelboards Switchgear***	***Existing Condition***	***Ampere***	***Voltage***	***Note***
Penthouse	Penthouse Panel	No Good	600	480/277	No name label, Not enough working space
	A-14	Disconnected	225	208/120	
	Unknown thru XFMR 30kVA	Disconnected	100	208/120	No name label
	Sub Meter	Disconnected	-	-	Signage
	Sub Meter	Disconnected	-	-	Kwik Kall communication
	Electrical Boiler & Disconnect	No Good	1000	480/277	It is working but almost reach life span visually.

4. Receptacles:

   Most existing receptacles in this building are of the original installation in early 1970's. The receptacles for water fountain and within 6'-0" of janitor basins do not comply with current electrical code and are needed to be GFCI protected per current code. There are no code required receptacles installed on roof within 25 feet of HVAC equipment for maintenance purposes.

5. Disconnects:

   The disconnect switches for cooling tower on roof are rusty (see Figure E10). The disconnect switches for elevators in elevator room are in good condition. The existing disconnect switches for existing air handling units and existing duct heater in mechanical rooms on each floors are in good condition (see Figure E11).

Figure E10: Disconnect Switches of Roof

Figure E11: Disconnect Switches in Typ. Mech. Room

6. Conduits/Conductors:

   All feeders are electrical metallic tubing (EMT) conduits in good condition. Most of branch circuits are metal-clad (MC) cables (flexible cables) in good condition. Some branch conduits are ¾" or ½" EMT conduits in good condition.

C. Deficiencies:

1. Electrical Closets: The electrical closets at each floor share the space with janitor space and sink. It is in violation of NEC 2014-230.70(A)(2) & 240.32. This could potentially create an unsafe condition.

2. Labels and Panel Directories: Several electrical equipment and panels do not have the name tags or label as required per the national electrical code. It is in violation of NEC 230.2(E). Majority of panels also do not have updated panel directories or missing directories which violates NEC 210.5(C).

3. Receptacles: All receptacles within 6 feet from water outlets shall have GFCI protection and roof mounted receptacles within 25 feet of HVAC equipment for maintenance requirements. It is in violation of NEC 210.8.

4. Tenant: The rating of panelboard for "NY deli" is 350 ampere fed from 75kVA transformer. It shall be less than 250 ampere. It is in violation of NEC 450.

D5030 Lighting

A. Interior and Exterior Lighting

1. Existing condition:

   The majority of light fixtures are of the older vintage containing fluorescent T12, T8 and compact fluorescent (CFL) lamps. The light fixtures in corridors and utility rooms are T12 fluorescent controlled by local toggle switches. Lighting fixtures in each landing of stairwell are CFL without control and electrical/Janitor rooms are CFL controlled by local toggle switches. The Lighting fixtures in restrooms and some tenant areas are installed 2x2 fluorescent light fixtures with U-type fluorescent lamps controlled by local toggle

switches. The lighting system is on 277 volt circuits. All lighting system are fed from existing panelboard “L#” in electrical closets on each floor.

Figure E12: Typ. CFL Light Bulb in Stairwell

Figure E13: Typ. CFL Light Bulb in Mech. Room

Figure E14: Typ. Flourescent Ltg. Corridor & Exit Sign

Figure E15: Typ. CFL Light Bulb in Elec. Room

2. Deficiencies:

   a. The current interior light fixtures and controls are not complied with International energy conservation code.

   b. Emergency light shall be in west stairwell, electrical rooms & mechanical rooms. It is violation per NEC 700.12(F).

B. Exterior Lighting

1. Existing condition:

   The exterior light fixtures are of the older vintage containing compact fluorescent (CFL) lamps. Exterior lighting fixtures are controlled by time clock.

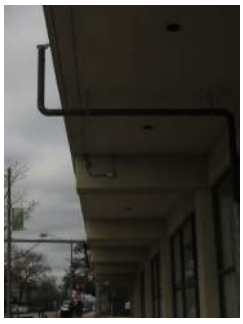


Figure E16: Exterior Lights in Canopy

Figure E17: Exterior Light in Entrance Canopy

C. Emergency Lighting/ Exit Signs:

1. Existing condition:

All emergency light system is fed from fused type 60 amp panelboard in utility room (see Figure E19). The feeder is tapped ahead of main service disconnect switch (see Figure E18). Majority of the emergency lights are out of date and nonfunctioning, and there are no emergency light in east stairwell, utility rooms, electrical rooms and some public areas as required by code.

The existing emergency lighting system does not comply with current building codes. It is in poor condition.

All existing exit signs were installed and located per code and are in good working order. The exit lights are operated with self-contained battery packs.

Figure E18: Emergency Light from Service

Figure E19: Emergency Light Panel

D5040 Fire Alarm System

A. Fire Alarm

1. Existing condition:

All addressable Fire Alarm System appears to be installed in 2003 or later and in good condition. Fire alarm control panel is located in utility room on subbasement, and five fire alarm booster panel located on 1st, 2nd, 5th, 8th, 11th floor. Fire alarm annunciator panel is located in lobby on 1st floor. All detectors & strobes/horns are fed from those fire alarm panels.

Figure E22: Typ. Fire Alarm Devices

Figure E20: Fire Alarm Control Panel

Figure E21: Fire Alarm Annumciator

D60 MEP/FP RECOMMENDATIONS

D6010 Plumbing Recommendations

While generally in good condition, the plumbing systems should be reconfigured to optimize performance. We recommend separating the fire sprinkler and domestic water mains into two separate services with independent connections at the main in the street. We further recommend replacement of the existing backflow prevention device, domestic water booster pumps, and associated valves and piping. Also, we recommend the replacement of the existing roof drains, addition of new roof drains, and re-sloping of the roof to ensure that ponding does not occur.

Lastly, we recommend investigating the possibility of adding a gas service to the building. It could be beneficial for the building's main heating source to be gas, instead of electric. Natural gas as the main heating source can lower the building's utility bill relative to electric heating. This savings would have to be compared with the cost of installing a gas service to the building.

D6020 Mechanical Recommendations

The vast majority of the HVAC equipment serving the building is original to the building and decades past its serviceable life. The existing system functions solely due to the efforts of the talented maintenance staff who rebuild failed equipment in-house. This, coupled with the pending scarcity of R-22 refrigerant and concerns about building energy efficiency, leads to the inevitable conclusion that this building is past due for a major HVAC renovation.

We recommend replacing the existing systems in their entirety. New system options to be considered should include variable refrigerant volume (VRV) systems (air or water cooled) with dedicated outdoor air (DOAS) units, water-source heat pump systems (similar to the existing), and chilled beam systems with perimeter electric heat). It is expected that renovation costs for the HVAC system will be approximately $30-$35 per square foot.

In addition to the above recommended renovations, we recommend the addition of stairwell pressurization fans to each of the egress stairwells. These fans are not currently present, but will be required by code once renovations of the building begin.

D6030 Fire Protection Recommendations

The fire sprinkler systems are relatively new, and in good condition. Our sole recommendation is to separate the water service to the fire pump from the main domestic water service to the building.

D6040 Electrical Recommendations

A. Power Distribution System

1. Electrical Closets: The electrical closets at each floor share the space with janitor space and sink. This could potentially create an unsafe condition. It is recommend to separate the two spaces and create dedicated electrical rooms on each floor.

2. Labels and Panel Directories: Several electrical equipment and panels do not have the name tags or label as required per the national electrical code. Majority of panels also do not have

updated panel directories or missing directories. It is recommended to update the electrical equipment with proper labels and updated directories.

3. Receptacles: It is recommended to provide GFCI receptacles within 6 feet from water faucets and roof mounted receptacles within 25 feet of HVAC equipment for maintenance requirements per code.

4. Disconnecting Switches: Although all disconnect switches for mechanical equipment are operational, they are past their useful life and are rusty. GES recommends replacing these disconnect switches as part of a mechanical system renovation.

5. Cost: Rough order of magnitude cost for the above items will total approximately $5-$6 per square foot.

B. Lighting system

1. Interior Lighting: It is recommended to replace all interior lighting fixtures in corridors, lobbies and other public areas with energy efficient LED light fixtures and provided control per the current energy code requirements.

2. Exterior Lighting: It is recommended to replace all exterior lighting fixtures with energy efficient LED light fixtures. Existing circuiting and time clock can remain.

3. Cost: Rough order of magnitude costs for lighting replacement are:
   a. Back of the house areas: $1-$1.5 per square foot.
   b. Tenant area lighting: $5-$6 per square-foot.

C. Emergency Lighting and Exit Signs:

1. Emergency Lighting: Provide new emergency lighting in all spaces per life safety code including but not limited to electrical rooms, corridors, lobbies, stairwells, open spaces and egress paths including to the outside of the building.

2. Exit Signs: Existing exit signs shall be replaced with new emergency efficient exit signs per latest adopted energy code and shall have battery packs, test button & less than 5 watt lamp.

3. Cost: Rough order of magnitude cost for replacing emergency and exit signs is $1 per square foot.

D6050 Complications of Phased Renovation

We recommend performing the building renovations prior to occupying the building, although it is possible to phase the renovations to permit partial building occupancy during the building renovation. Even with a phased approach, multiple evolutions must occur prior to occupancy of any kind. These evolutions include replacement of the existing cooling tower, boiler, HVAC pumps, ventilation system, and domestic water pumps as well as adding a separate water line for fire protection, and removal of the janitor's sink from the lower level electrical room. If natural gas service is to be added to the building, this should also be completed prior to occupancy. After completion of the major central utilities work, the building may be partially occupied while each floor is renovated. The non-renovated floors would rely upon the existing air handling units and perimeter heat pumps, which would be connected to the new central system. It is likely that HVAC, power, and water services to the

occupied floors will be disrupted during the renovation. These disruptions should be performed during nights and weekends to avoid major disruptions to the building occupants. The greatest concern with this approach is that it limits the applicable new HVAC system types that can be explored during design. Under this approach, the applicable system types are limited to water-source heat pump, and water-source VRF systems.

An alternate approach to phasing the construction would be to maintain the existing equipment for the non-renovated floors, while installing new central equipment to serve the renovated floors. To phase the construction with this approach would require the addition of new shafts for piping and ductwork. The new shafts would require openings in all floor slabs, new structural reinforcement of the openings, and would result in a reduction of usable floor space. This approach would be best for installation of a new air-cooled chiller for a chilled beam application, but should not be applied to water-cooled equipment.