CITY HALL ANNEX

Lake Worth Beach, Florida

Building Condition Assessment

Prepared for:
City of Lake Worth Beach
Public Works Department
301 College Street
Lake Worth, FL 33460

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Prepared by:

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1. Introduction

WGI has been contracted to assess the historic building City Hall Annex located at 414 Lake Ave, Lake Worth Beach, FL 33460. The City Hall Annex building is a two-story building that was originally built in 1916 as a school building. The building was registered with the United States Department of the Interior National Park Services on May 18, 1989. The building is registered with the historic name of Old Lake Worth City Hall. The building was damaged by a hurricane and was reconstructed in 1928. The building has seen at least three alterations since its reconstruction. The assessment includes an asbestos and lead paint survey, architectural, life safety, and ADA compliance, structural, MEP (mechanical, electrical, and plumbing), fire protection, and building envelope review.

2. Architectural

2.1 Basis of Design

The contents of this document contain an assessment of the existing building conditions of the City Hall Annex building.

Referenced Codes and Standards:

- 2023 (8th Edition) Florida Building Code (FBC), including all volumes;
- 8th Edition of the Florida Fire Prevention Code (FFPC), including the Florida Specific versions of NFPA 1 and NFPA 101;
- Federal accessibility laws including the Architectural Barriers Act, and the Americans with Disability Act (ADA), including access to restroom facilities;
- Other Applicable NFPA Codes, as currently adopted by the FBC and FFPC;
- 2020 National Electrical Code; and
- Lake Worth Beach, Florida Code of Ordinances.

The renovation percentage required for this building will trigger a Level 3 alteration which is defined in the FBC Existing Building Code as “the work area exceeds 50 percent of the building area”, which means that the renovated project must adhere to all FBC code requirements. Furthermore, per Lake Worth Beach Code of Ordinances Section 23.5-3 Part d, the building must conform to the provisions of the Land Development Regulations unless otherwise exempt through city coordination.

2.1.1 Existing Program

The existing building is approximately 13,500 square feet and consists of two floors with an office space located at a mezzanine level. Currently the building is unoccupied and abandoned for use; however, it was previously utilized as a library and office space for the city functions on the first floor, while the second floor was primarily programmed as a museum space.

The existing building analysis will assist in determining what improvements are necessary to bring the building up to current code compliance and provide insight for the city to select the future building program.

2.1.2 Architectural Analysis of Existing Conditions

Exterior Observations:

The overall exterior building façade appears to be in fair condition, and the overall existing style has been maintained to a its original intent. Existing glass windows are non-insulated and appear single-glazed. Window frames have been painted throughout the years and cracking is visible. Anchors for hurricane fabric appear to be installed next to the windows and hurricane fabric is currently installed on three of the upper windows. Refinishing will be needed to match the entirety of the building as the unnecessary appurtenances are filled in and sealed. The exterior terra cotta floor tile is significantly damaged and will need to be replaced with a similar kind material to maintain a historic look. Overall intent is to maintain similar existing look and aesthetic of the building.

The exterior storefront doors appear to be in adequate condition. An automatic sliding door is available for accessible access, while the opposite entrance storefront double doors are for main entry to the building. Exterior window air units at windows and doors along the façade are not active and can be removed. Various sets of condensing units are located around the building exterior and appear to be in okay condition.

The customer service window is intact but has some major wind and water damage to be repaired at the roof, storefront systems, and base of the structure. The roof fascia is bent out of place and the electrical receptacle located on the soffit shall be replaced to meet the necessary codes. The wood siding is slightly warped, and all associated components are aged.

Figure 1: Customer Service Window

Exterior lighting fixtures are not consistent in style throughout; however, all lighting fixtures appear to be working and are in fair condition. Camera locations shall be evaluated for location and condition. The building is equipped with several secure access control keypads of varying types. The recommendation is to replace all with a single type and coordinate keying with the City of Lake Worth Beach.

Crawlspace vent openings are located along the building exterior currently allowing for water, insect, and debris into the below crawlspace ultimately increasing the likelihood of mold and insect infestations. This is a particular issue as many of the existing building utilities to the building are being run through the crawlspace. Furthermore, the building interior will need to be protected from the crawlspace with a vapor barrier sealing out moisture and water.

The roof terra cotta shingles on the sloped portions of the roof are currently being replaced by others. Overall, the roof appears to be in fair condition; however, drainage from the roof is a concern as portions of the roof are flat. At those accessible locations, there is no slope to the downspout locations which is causing standing water to sit for extended periods of time. Downspouts will need replacement to meet the latest building codes for water volume on a roof.

Figure 2: South Entrance

The main entry into the building previously included a public drop box that is now boarded. It will need to be removed and sealed according to code. Existing bike rack, also located in entry, may deter access into the building. Final location shall be coordinated with city at time of design. All plaques and signage installed on the building appear in good condition and can be reinstalled in existing locations.

Interior Observations:

The floor finishes throughout the building is damaged and/or contains asbestos. Removal and remediation of all floor finishes to the existing wood floor is necessary for occupant and user safety. Bathroom tile is worn with age and will need replacing as well as re-sloping to new floor drains.

Wall finishes are worn with age, water damaged, and portions have been removed for investigative purposes. It is evident that no insulation was incorporated into the prior building renovations. Lead paint was used in prior building upgrades and will need to be removed according to appropriate procedures. Electrical receptacles and conduit runs are exposed on surface of walls; some of the receptacles are nonfunctional and can be removed.

Ceiling heights are not consistent throughout the building and on the first floor, there are two layers of ceilings in a majority of rooms. The existing asbestos containing ceiling tile was encapsulated by new ceiling tile. Remediation and removal of all ceiling tile will be required during a renovation process.

Figure 3 Roof Access

Existing interior doors appear to be in good condition but may require a level of refinishing to achieve and maintain historical aesthetic, but there is a possibility of reuse for interior doors. Some of the door openings require widening for ADA accessibility. Interior glass appears to have been painted or superficially covered in some locations. Top floor roof access is a trip hazard as well as a water infiltration concern because the bottom of the door is flush with the top of roof.

HVAC systems and components are scattered throughout the building and will need to be consolidated into a singular system with dedicated mechanical space. Currently there is a server room with server that needs to be analyzed for future sizing. The

electrical room is located externally to the building; however, non-active electrical components should be removed when finishes are removed.

The first floor includes three separate restrooms spread throughout the floor that will require ADA compliancy for a renovation, which could mean increased square footage. The second-floor restroom is currently being used as a storage space and is not usable. Plumbing fixtures were disconnected from water at this floor, but fixtures and associated piping remain in the existing locations. It is assumed that the existing piping was capped during a prior renovation. It is recommended that all building restrooms should be consolidated during the next renovation to maximize square footage and meet all FBC requirements.

2.1.3 Architectural Considerations

From an architectural perspective, the building is in a fair condition for renovation but will require significant improvements regarding building code requirements, historical intent, and occupant safety.

The following are critical architectural considerations when evaluating the opportunities of this project's goals and requirements.

- **Historical Requirements**
- **Accessibility**
- **Life Safety**

Historical Requirements

The Florida Building Code, Existing Building defines Rehabilitation as "The act or process of making possible a compatible use of a property through repair, alterations and additions while preserving those portions or features which convey its historical, cultural or architectural values." Through coordination with the City of Lake Worth, specific building components were discussed and requested to be maintained from a historical significance perspective.

The following items will be looked at to determine the best method of preservation and/or rehabilitation to celebrate the significance of their past. The historical items to be preserved include but is not limited to the iron window bars installed at the south entrance; the terra cotta tile steps; the window and wood framed wall separations; and the steps in the library that are reminiscent of the original courthouse. Refer to Appendix # at the end of this document for full list of items to be preserved.

Accessibility

Currently there is only ADA access on the first floor of the building with the ramp on the north entrance. Required by the FBC accessible code, a small elevator or stair lift for ADA access to the second floor will need to be included in the renovation. Although a stair lift is a more feasible cost option, a small elevator can be more efficient in terms of space and designed to be incorporated with the building's aesthetic.

The restrooms are not currently ADA accessible and will need to be upgraded to the latest FBC requirements. New restroom facilities will be compliant with accessibility codes and standards, as well as coordinated with the Civil and Plumbing engineering disciplines for efficiency in location.

All interior and exterior conditions will be further reviewed for compliance with the accessibility codes and standards as the design and space planning efforts progress. All interior spaces will be barrier-free and inclusive of all persons, and stairs will be designed to meet FBC Chapter 10. Signage and wayfinding will be coordinated with project stakeholders. Exterior upgrades will also need to be efficiently located for most convenient accessible routes between building and parking areas.

Life Safety

Key life safety components will revolve around primary egress and common path of travel per FBC Chapter 10, as well as compliance with fire protection measures per FBC Chapter 7 including delineation and separation of occupancy types, and fire rated protection of structural elements. The new program is not yet set for this building, but mixed use will generally trigger fire separation requirements. The following chart provides a general comparison of how program choices can significantly impact occupant load and code requirements.

Occupancy Classification (FBC Chapter 3):

Business (B): Includes civic operations requiring desks, cubicles, and offices.

Assembly (A-3): Includes museum space, group meetings, and library functions.

	Occpant Load: (FBC Table 1004.5)	**Egress Requirements:** (FBC Tables 1006.2.1, 1006.3.2, and 1017.2)	**Fire Separation:** (FBC Table 508.4)
Single Use Museum, Assmbly (A-3)	13,500 SF/30 Net = 450 occupants	Two exits required; Max Travel 250 ft (to building exterior) Non-sprinkled; Maximum Common Path 75 ft (to egress)	Not required in single use.
Single Use Civic, Business (B)	13,500 SF/150 Gross = 90 occupants	Two exits required, Max Travel 250 ft (to building exterior) Non-sprinkled, Maximum Common Path 75 ft (to egress)	Not required in single use.
Mixed Use Primary Museum, Assmbly (A-3), Secondary Civic Business (B)	A-3: 7,500 SF/30 Net = 250 occupants B: 6,000 SF/150 Gross =40 occupants Total = 290 occupants	Two exits required; Max Travel 250 ft (to building exterior) Non-sprinkled; Maximum Common Path 75 ft (to egress)	2-hour rating required between uses if non-sprinkled and 1-hour if sprinkled
Mixed Use Primary Civic Business (B), Secondary Museum, Assmbly (A-3)	B: 7,500 SF/150 Gross = 50 occupants 6,000 SF/30 Net = 200 occupants Total = 250 occupants	Two exits required; Max Travel 250 ft (to building exterior) Non-sprinkled; Maximum Common Path 75 ft (to egress)	2-hour rating required between uses if non-sprinkled and 1-hour if sprinkled

The maximum common path of travel is 75’-0” for A-3 and 100-0” for B occupancies within a fully sprinkled building. This building is assumed to remain non-sprinkled, so the maximum common

path of travel would be 75'-0" for both occupancy types. Vertical circulation will need to be strategically redesigned to satisfy this requirement because the only vertical circulation is an open stairway to be restored. The existing stairwell also does not meet the tread requirements outlined in Florida Building Code Chapter 10, which will require a new stairwell in a different location. It is anticipated that the occupancy count will be at 450 for the worst case based on potential for utilizing the building entirety as a museum. At best case with only the second floor being utilized as a museum, the load would be 250 occupants for the building entirety.

2.1.3 Preliminary Architectural Program Analysis

WGI is motivated by sound architecture that is resilient, contextual, and efficient. In the case of historic buildings, WGI looks to celebrate the past for long term preservation. This building will require a Level 3 alteration as defined in the Florida Building Code, Existing Building which means that the new design must meet all the Florida Building Code requirements. The following two analyses are investigating two programmatic options from a conservative perspective, a mixed-use program and a single use program.

Option 1 Program Analysis

The following program analysis is based on the assumption that the first floor would be utilized as business occupancy (B) and the second floor as the museum space (A-3). The largest constraint to this option is the fire separation requirements because the upstairs museum would need to be completely separated with fire protection from the business occupancy below. The advantage to this would be the ability for flexible programming use long term; however, it would require more total plumbing fixtures for the building overall.

	Occpant Load: (FBC Table 1004.5)	**Plumbing Fixtures:** (FBC Table 2902.1)	**Egress Requirements:** (FBC Tables 1006.2.1, 1006.3.2, and 1017.2)	**Fire Separation:** (FBC Table 508.4)
Assembly (A-3)	6000 SF/30 Net = 200 occupants	4 water closets; 2 lavatories; 2 drinking fountains	Max Travel 250 ft (to building exterior) Non-sprinkled, Maximum Common Path 75 ft (to egress)	(see below)
Business (B)	7500 SF/150 Gross = 50 occupants	2 water closets; 2 lavatories; 1 drinking fountain	Max Travel 300 (to building exterior) Non-sprinkled, Maximum Common Path 75 ft (to egress)	(see below)
Total	250 occupants	6 water closets; 4 lavatories; 3 drinking fountains		2-hour fire separation between occupancies. This would require floor seperation and vertical separation at the existing stairs

Option 2 Program Analysis

The second option assumes the entire building will be renovated as a museum space. There is no need for fire separation in a single use occupancy. Single use occupancy type would allow for the building to retain its historical character more than if mixed-use was considered. Furthermore, there are fewer plumbing fixtures to contend with and can be designed with more symmetry between floors than with a mixed-use concept.

	Occpant Load: (FBC Table 1004.5)	**Plumbing Fixtures:** (FBC Table 2902.1)	**Egress Requirements:** (FBC Tables 1006.2.1, 1006.3.2, and 1017.2)	**Fire Separation:** (FBC Table 508.4)
Assembly (A-3)	13,500 SF/30 Net = 450 occupants	6 water closets; 2 lavatories; 1 drinking fountain	Max Travel 250 ft (to building exterior) Non-sprinkled, Maximum Common Path 75 ft (to egress)	Not required in single use.

2.2 Summary of Recommendations

WGI recommendation is to remove all interior building finishes entirely to the base structure except the historic building components to be preserved in the final design. All items to be preserved shall be restored to the original look and aesthetic of when they were installed. An egress core with a small elevator and stairwell shall be integrated into the new design layout. All restrooms will be consolidated and configured for efficiency and ease to the user group. The least favorable scenario is a mixed-use option.

Refer to Appendix A for Estimate of Probable Costs for *Option 1 Program Analysis*.

3. Mechanical, Electrical, Plumbing (MEPFP)

Codes and Standards

- Florida Building Code (FBC) 8TH Edition (2023) (Effective December 31, 2023): This code includes the 2023 FBC Building, Mechanical, Plumbing, Energy Conservation, Fuel Gas, Accessibility, and Test Protocols Volumes. Further, See "Referenced Standards" in the FBC Building Chapter 35; FBC Mechanical Chapter 15; FBC Plumbing Chapter 15; FBC Energy Conservation Chapter 6; AND FBC Fuel Gas Chapter 8). This code also includes Chapter 12 Historic Buildings.
- 2020 National Electrical Code w/ Local Amendments
- 8TH Edition of the Florida Fire Prevention Code (FFPC): This code also includes the Florida Versions of NFPA 1 and NFPA 101. (Effective December 31, 2023).
- NFPA 914 Protection of Historic Structures
- 2020 National Electrical Code.

Contract Scope Overview

- Assess the existing building conditions with the First Floor being utilized as the utility department and the Second Floor being utilized as a museum. Determine code violations and what needs to be done to bring up to current code without affecting the historical building classification. The approximate area of first floor is 8,220 square feet and the approximate area of the second floor is 5,090 square feet for a total building square footage of 13,310 square feet. Conditions noted are from limited visual observation.

3.1 HVAC Project Scope

3.1.1 HVAC Design Criteria of New Work

- Summer Outside Design Conditions: 91.7 degrees F dry-bulb / 77.7 degrees F wet-bulb temperature
  - Basis of data: ASHRAE 2021 Handbook of Fundamentals, Palm Beach International, FL weather station, 0.4% dry bulb and 0.4% wet bulb data
  - Climate Zone 1A.
- Winter Outside Design Conditions: 44.5 degrees F
  - Basis of data: ASHRAE 2021 Handbook of Fundamentals, Palm Beach International, FL weather station, 99.6% dry bulb
- General Space Design Conditions:
  - Summer: 75 degrees F and 50 percent RH
  - Winter: 72 degrees F and 30 percent RH
  - Dehumidification controls will be implemented on systems with more than 12% outdoor air.
- Electrical Rooms and Similar Areas:
  - Heating: 70 degrees F
  - Cooling: 80 degrees F
  - Ventilation only. No active heating or cooling

- Outside Air Ventilation: Per ASHRAE Standard 62.1
  - Office and Lounge Areas: 0.06 CFM per square foot plus 5 CFM per person
  - Corridors: 0.06 CFM per SF
  - Museums: 0.06 CFM per square foot plus 7.5 CFM per person
- Toilet Room Exhaust Ventilation:
  - 50 CFM per Water Closet or Urinal continuous operation while building is occupied, or 70 CFM per Water Closet or Urinal intermittent operation while building is occupied.

3.1.2 Existing Mechanical Systems

- Direct Expansion Split Systems
  - There are six (6) vertical/horizontal fan coil units serving six separate zones.
    - Zone 1: First Floor, southwest, approximately 2,235 square feet, assumed to be a 5-ton unit. (447 square foot/ton)
    - Zone 2: First Floor, northwest, approximately 880 square feet, 4-ton unit. (220 square foot / ton)
    - Zone 3: First Floor, northeast, approximately 353 square feet, 3-1/2-ton unit. (100 square foot / ton)
    - Zone 4: Second Floor, west, approximately 1,655 square feet, 3-1/2-ton unit with an additional window unit. (415 square foot / ton)
    - Zone 5: Second Floor, east, approximately 1,950 square feet, 4-ton unit with an additional window unit. (430 square foot / ton)
    - Zone 6: Second Floor, center, approximately 1250 square feet, 2-ton unit. (625 square foot / ton)
  - Existing condensing units are installed on pads outside the building.
  - Condensate drain for each fan coil unit on the first floor discharged through the crawl space. The final discharge is assumed to be grade.
  - Three of the direct expansion split systems are beyond their useful life. The other three direct expansion split systems will be beyond their useful life within five years.

- Direct Expansion Packaged Window Air Conditioners Systems
  - There are eight (8) window air conditioners. Two (2) of the 8 window air conditioner units are supplemental units serving second floor zones. Six (6) window air conditioners serve six separate zones.
    - Zone 1: First Floor, northwest, approximately 175 square feet, assumed to be a 1/2-ton unit. (270 square foot / ton)
    - Zone 2: First Floor, northwest, approximately 200 square feet, assumed to be a 1/2-ton unit. (400 square foot / ton)
    - Zone 3: First Floor, northwest, approximately 375 square feet, assumed to be a 1-ton unit. (375 square foot / ton)
    - Zone 4: First Floor, east, approximately 315 square feet, assumed to be a 1-ton unit. (315 square foot / ton)
    - Zone 5: First Floor, south, approximately 105 square feet, assumed to be a 1/2-ton unit. (210 square foot / ton)
    - Zone 6: Second Floor, south, approximately 135 square feet, assumed to be a ½-ton unit. (270 square foot / ton)
  - All of the direct expansion packaged window air conditioners are beyond their useful life.

- Direct Expansion Packaged Wall Mounted Air Conditioner System
    - There is one (1) wall mounted air conditioning unit. The unit serves the first floor, southeast, approximately 1,270 square feet, assumed to be a 3-ton unit. (425 square foot / per ton)
    - The direct expansion packaged wall mounted air conditioner is not beyond its useful life. The direct expansion packaged wall mounted air conditioner will be beyond its useful life within five years.

- Direct Expansion mini split heat pump System
    - There is one (1) mini split heat pump. The unit serves the first floor, IT Closet, approximately 180 square feet, 1-1/2-ton unit. (120 square foot / per ton).
    - The direct expansion mini split is not beyond its useful life.

- Total installed air conditioning load is approximately 31.5-tons (422 square foot / ton). This appears to be light for a commercial building. Typically, a building with code insulation and proper ventilation is around 300 square foot / ton. This building has minimum insulation and no induced ventilation. Actual required load must be calculated per ASHRAE/ACCA Standard 183.

- Outside Air
    - There is no induced outdoor air into the building. It is assumed that the openings in the building allow for code allowed “Natural Ventilation”.

- Exhaust Systems
    - The restroom on the north side of the first floor has a ceiling mounted exhaust fan which discharges to the roof.
    - The restroom on the south side of the building has a residential box fan permanently installed in the window with a louver.
    - The single toilet on the west side of the first floor does not have an exhaust fan.
    - The restroom on the south side of the second floor does not have an exhaust fan.

- Air Distribution Duct System
    - Existing supply and return air ductwork may be ductboard or insulated galvanized sheet metal in rectangular and round shapes. Exhaust ducts are galvanized sheet metal.

- Air Devices
    - Ceiling diffusers and registers and a few sidewall registers and grille are used.

- Piping
    - Condensate drain piping is PVC, not insulated, and is routed through the crawl space.

3.1.3 Existing Mechanical Control System

- Each direct expansion split system and direct expansion packaged wall mounted air conditioner has a dedicated programmable thermostat. The window units and the direct expansion mint split units only have manual control.

3.1.4 Existing Building Issues – Code and Historic Preservation

- Thermal Envelope falls short of Energy Conservation code. There is no insulation in the attic, walls, floor, etc.
    - Insulate attic floor. R-38
    - Insulate low slope roof. R-20ci (ci=continuous insulation)
    - Insulate first floor above crawl space. R-13

  - Insulate exterior walls. R-5.7ci
  - Provide envelope fenestration, U-Factor - 0.65 and solar heat gain coefficient - 0.25, if allowed by historic preservation.

- No restroom exhaust except one and it appeared to be less than code required.
  - Provide code required exhaust for all restrooms and janitor closets. Provide continuous exhaust and conditioned make-up during occupancy.

- No mechanical ventilation.
  - Provide code require ventilation. Also, ensure that the building is slightly pressurized to prevent mold forming in the walls.

- Air Handling units in attic do not meet code.
  - Energy Conservation Code: C403.2.9.6 “Air handling units shall not be allowed in attics of commercial buildings.
  - Closets will need to be provided to house new air Handling units.

- The window air conditioning units and packaged wall mounded air conditioner do not meet historic preservation requirements.
  - We recommend a new chilled water system with individual fan coil units. This will provide better temperature and humidity control. Direct expansion (DX) systems cycle to maintain temperature. When the DX unit is off, no dehumidification is being done. This could be detrimental to the museum items. We recommend that the chiller be hidden as best as possible to eliminate views.
  - The mini split for the IT room can remain. However, for historic preservation, the unit needs to be less exposed to view. We recommend relocating the outdoor condensing unit to the low sloped roof.
- The HVAC system for the museum area falls short of proper conditioning for a museum. The museum appears to be cultural property which is susceptible to biological and airborne pollutant damage. Relative humidity and filtration is critical for museums and the existing HVAC system is direct expansion cooling with no humidity control and minimal filtration. A new HVAC system will be required for the museum space.

3.1.5 Building Systems Startup and Verification

- Testing and Balancing. HVAC air systems will be tested, adjusted, and balanced by an approved independent AABC or NEBB certified agency.
- Equipment Startup and Testing. The Mechanical Contractor will complete equipment startup and testing. Each piece of equipment will be started and tested according to the manufacturer’s recommendation to assure proper operation before occupancy.
- Florida Building Code Required Commissioning. HVAC systems will be commissioned in accordance with 2023 FBC requirements by Mechanical Contractor.
- Owner Training. The Mechanical Contractor will demonstrate the operation and maintenance procedures of each mechanical system or equipment item for the Owner’s representative before occupancy.

3.2 Plumbing Project Scope

- Utility Connections:
  - Existing Domestic Water: The existing domestic water supply main to the building will be sufficient.
  - Existing Sanitary Sewer: The existing sanitary main from the building will be sufficient.
  - Storm Sewer: There is no existing interior storm sewer.
  - Fire Service: There is no existing fire service.

- Domestic Water Systems
  - New domestic cold and hot water piping should be provided to building fixtures and equipment.
  - New piping should be concealed within buildings crawl space, shafts, walls, and above ceiling spaces in finished areas.
  - The new water piping will be Type L hard copper tube with copper solder-joint fittings and soldered joints for the service entry piping. Piping will transition to CPVC for supply throughout the building. PEX tubing may be used as an option to domestic water supplies to each plumbing fixture.
  - The new water piping systems will have a minimum working pressure of 125-psig.
  - The new valves in domestic water piping systems will be ball valves for all sizes.
  - Water piping will be provided with shutoff valves for isolation of piping sections for maintenance and repair. Means will be provided to drain piping.
  - The new water piping will be insulated with closed cell elastomeric pipe insulation. Insulation thickness will be required to prevent condensation on cold piping, and to prevent thermal losses on hot piping. Thickness will be as required by the Florida Building Code.

- Domestic Hot Water Systems:
  - The existing Break Room sink has an existing instantaneous water heater. The instantaneous water heater may remain if sink remains.
  - The restrooms will require new water heaters, likely of instantaneous (tankless) type located below the lavatory.
  - The janitors' sinks will require new water heaters. The new water heaters can be wall mounted above the janitors' sink with T&P and drain pan lines to janitors' sinks.

- Sanitary Waste and Vent Systems
  - Existing sanitary waste piping is cast iron.
  - New above grade and below grade piping will be 40 PVC with solvent-weld socket DWV fittings. Piping will be below grade or concealed within building ceiling and wall cavities if possible. Sanitary vent piping will extend through the existing roof through existing vents thru roof.
  - Cast-iron floor drains and cleanouts will be provided according to need. Frames and strainer cover plates will be nickel bronze materials in finished areas.
  - Emergency floor drains are to be provided in all large restrooms.

- Plumbing Fixtures
  - Restrooms:
    - Commercial quality plumbing fixtures and trim will be provided for the toilet rooms according to programmed need. Fixtures will be as those by American Standard, Kohler, and Toto.
    - Faucets by Moen, Delta or the fixture manufacturer. Shall be manual type.

        - Fixtures will be of the following types:
            - Water Closets: Commercial flush type, floor mounted, vitreous china, and water conserving type with sensor operated flush valve, 1.28 GPF max.
            - Kitchen sinks: Undermount, stainless steel type, with garbage disposal. Pull down, single-hole manual faucet. 1.5 GPM max.
            - Lavatories: Wall mounted, vitreous china types. Faucets shall be manual type, single handle, with drain pop up. 0.4 GPM max.
            - The janitors' sink will be molded stone type.
    - Plumbing fixtures will be selected to provide water conservation.
    - Plumbing fixtures will be selected and arranged to be ADA compliant.

- Storm Water System
    - A 50 GPM sump pump will be added to the new elevator sump. 2" storm piping will be routed to nearest storm water connection.

3.3 Fire Protection Project Scope

3.3.1 Existing:

- There is no existing fire protection system.
- If a fire protection system will need to be designed and installed per NFPA 13.

3.4 Electrical Project Scope

3.4.1 Service Entrance Equipment:

- There is a double throw 240/120 Volt, 400 Amp, single-phase disconnect with generator inlet box connection that serves as the building's main electrical disconnecting means. This disconnect switch is located within a fenced enclosure on the west side of the building's exterior near the electrical room. The Utility transformer and meter that serves the building are located within sight of the building's main electrical disconnect means.

- Existing double throw 240/120 Volt, 400 Amp, single-phase main electrical disconnect switch, utility transformer, utility meter, and service feeder will need to be replaced as 3-phase service will be required to serve new commercial HVAC system(s).

3.4.2 Electrical Distribution Equipment:

- Distribution:
    - A feeder from the building's main electrical disconnecting means routes to the main electrical room and terminates into a wireway. Panel 'MDP' is a GE, 240/120 Volt, 400 Amp, MCB, single-phase panel and is connected to the wireway.

    - Panel 'MDP' serves:

        - Panel 'A' is in the main electrical room. This is a GE 240/120 Volt, 200 Amp, MLO, single-phase load center panel.

        - An unlabeled panel in the main electrical room is a GE 240/120 Volt, 200 Amp, MCB, single-phase A-Series panel. This panel is obsolete.

- A GE, 240/120 Volt, 100 Amp, MLO, single-phase load center panel located north on the building exterior near condensing units. This panel is obsolete.
- Panel 'A' is on level 1. This is a Cutler-Hammer 240/120 Volt, 225 Amp, MLO, single-phase panel. This panel is obsolete.
- Panel 'E' is on level 1. This is a Federal Pacific 240/120 Volt, 100 Amp, main breaker, single-phase panel with screw-in fuses. This panel is obsolete.
- Panel 'F' is on level 1. This is a Federal Pacific 240/120 Volt, 100 Amp, MCB, single-phase panel with screw-in fuses. This panel is obsolete.
- Panel 'F' is on level 2. This is a Federal Pacific 240/120 Volt, 100 Amp, main fused, single-phase with screw-in fuses. This panel is obsolete.

- All electrical distribution panels and associated conductors and conduits need to be replaced with 3-phase panels and new associated conductors and conduits.
- There is no permanent emergency power source on site. If there is a power outage for long periods this building may experience moisture and humidity issues. We recommend a permanent generator on site for emergency lighting and HVAC system backup power to preserve the building from moisture and humidity, especially in the museum space,

3.4.3 Branch Electrical Distribution:

- The following voltages are typical for the building:
  - HVAC: 240V, single phase.
  - Lighting: 120V or 240V single phase.
  - Receptacle outlets: 120V or 240V single phase. A few receptacles' outlet cover plates are broken. Receptacle cover plates vary in color and type. The placement of interior general-use receptacle outlets throughout the building does not comply with ADA accessibility. All receptacle outlets within the building need to be replaced.
  - There are conduit penetrations within the main electrical room, and a few interior spaces that are not sealed. To maintain wall ratings conduit penetrations need to be sealed.
  - We recommend all new branch electrical distribution feeders throughout the building.

3.4.4 Lighting and Controls:

- Interior Lighting is accomplished with:
  - Surface 2x4 fluorescent lamp fixtures. These light fixtures are obsolete but functional.

  - Recessed 2x4 fluorescent lamp fixtures. These light fixtures are obsolete but functional.
  - Incandescent lamp fixtures. These light fixtures are obsolete but functional.
  - Pendant lamp fixtures. These light fixtures are obsolete but functional.
  - Emergency lighting is accomplished with bug eye emergency fixture units. We were not able to test these fixtures.
  - Specialty black lamp fixtures. These light fixtures are functional.
  - Track lights. These lights are functional.
  - Exit signs are located at the main exit doors. We recommend additional exit signs in spaces with more than one door accessible by the public.

- Exterior Lighting is accomplished with:
  - Wall-mounted flood lamps. We were not able to determine if these fixtures are functional. These fixtures are not efficient nor dark skies compliant. Some fixtures have power cords connected to receptacles with while-in-use covers.
  - Wall-mounted lamp sconce. We were not able to determine if these fixtures are functional.
  - Wall-mounted LED sconces. We were not able to determine if these fixtures are functional.
  - Under canopy surfaced mounted lamp light fixture. We were not able to determine if these fixtures are functional.

- Interior Lighting Controls:
  - Restrooms lights are controlled by occupancy sensors. These sensors are functional.
  - Electrical/mechanical spaces controlled by toggle switches. These controls are functional.
  - Most spaces have toggle switch(es) with very few spaces having occupancy sensors. The light switch placements throughout the building do not comply with ADA accessibility.

- Exterior Lighting Controls:
  - Fixture mounted photocell. We were not able to determine if photocells are functional.
  - Time clock and lighting contactors. We were not able to determine if photocells are functional.

- All interior and exterior lighting fixtures and associated controls need to be replaced with LED-type light fixtures and controls that comply with the latest Florida Energy Code. For exterior lighting, the owner should consider using historical period-type luminaires or similar.

3.4.5 Telecommunications and Security

- Telecommunications:

- Within the IT room there appears to be abandoned equipment and cabling. We recommend removing all nonfunctional system equipment, and associated cabling and coordinating with the user group to determine what is needed in this room for communication.
- A few data and telephone outlets throughout the building are broken but most are in fair condition. We recommend replacing all cabling, data, and telephone outlets.

- Security:
  - The card readers and a PA system at the main exterior door appear to be in good condition. We will defer to the owner if this system needs to be replaced.
  - Exterior and interior cameras appear to be in good condition. Some interior cameras wiring were not installed in raceways. We suggest installing all exposed camera system wiring within raceways. We will defer to the owner if this system needs to be replaced.
  - The west entry door keypad / keyed lock combo could be replaced to match the main entry door card readers.
  - Within the IT room there is a nonfunctional ADT panel. We recommend removing all nonfunction system equipment and associated cabling.

3.4.6 Fire Alarm and Smoke Detection Systems

- Existing Fire Alarm system consists of:
  - Edwards iO series FACP located on level 1 (Main Corridor) is in good condition.
  - Smoke detectors throughout the building are in good condition.
  - The Fire Alarm pull stations are in good condition.
  - The Fire Alarm strobes are in good condition.
- We recommend assessing the fire alarm system work with respect to the fire protection. If fire protection (sprinklering) is added to the building, only one pull station is required. Smoke detection for the museum space should be considered and assessed versus the valuation of the museum pieces.

4. Structural

4.1 Code and Standards

The contents of this document contain an assessment of the existing building conditions of the City Hall Annex building.

Referenced Codes and Standards:

- 2023 (8th Edition) Florida Building Code (FBC);
- 2023 (8th Edition) Florida Building Code, Existing Building.

4.2 Existing drawings

Below is the list of the available drawings provided by the CITY:

1. Architectural plan sheet A-16 to A-18 for the exterior ramp prepared by Southeastern, Inc. dated April 24, 1981
2. Site plane one sheet A-1 prepared by Brower Architect Associates; Inc dated June 3rd, 1999
3. Structural as-built first floor plan prepared by Botkin and Associates, Inc. dated April 19, 1980.
4. Architectural roof plan prepared by Bower Architect Associates; Inc. dated February 21, 1997

All the above-listed drawings are not complete and provide only partial information about the building. The only drawing that shows the structural framing of the building is prepared by Botkin and associates and only shows some of the structural framing and the information is not sufficient for producing a structural analysis.

4.3 Observations

WGI visited the site to observe the existing structural framing through selective demolition completed by the CITY. The selective demolition locations are marked on-site from the walk-through that occurred on February 7th, 2024, by WGI personnel. These locations were selected based on the engineer's professional opinion on where is the best location to reveal the structural framing and connections. The selective demolition consisted of the removal of wall and ceiling finishes to expose the structural framing of the floors and walls.

4.3.1 Foundation

There is a crawl space under the first-floor framing where floor framing is exposed. The floor is framed with wood joists that bear on a wood-framed stem wall. The wood stem wall sits on top of an 8-inch masonry stem wall that is supported by a continuous concrete foundation wall. The

foundation wall is not exposed on-site, but it is shown on the drawing prepared by Botkin and Associates, Inc.

4.3.2 First floor and Second floor

The majority of the first-floor area is framed with 2x14 wood joists spaced at 12” on center and some areas are framed with 2x8 wood joists at 12” on center. This is confirmed with the drawings prepared by Botkin and Associates. The floor joist spans from the 8-inch exterior concrete masonry unit (CMU) wall to the interior wood stem wall. The second floor is framed similar to the first floor. The floor joist is secured with one 16d toenailed to the top plate of the wood stem wall and bearing wood framed interior wall. At some locations, the top plate is a single 2x6, and in some locations is a double 2x6. The joist is supported on the 2x4 wood ledge bolted to the exterior CMU wall. The joist is secured with a Simpson-strong type connection. The exact model and capacity cannot be confirmed.

Photo 1. Floor joist bearing on Wood Stem wall at the crawl space

Photo 2. Floor joist to exterior CMU wall

Photo 3. Floor joist bearing on the wood framed wall

4.3.3 Roof

The roof has an attic space with approximately 5 feet of clear height from the finish floor to the bottom of the roof joist. The roof consists of a flat roof with a mansard on the perimeter edges of the roof. The attic floor is framed with 2x10 wood joist spaced 16” on center. The attic floor currently houses the HVAC unit. The flat portion of the roof is framed with 2x6 wood spaced at 24” on center and 2x6 wood joists at 16” on center for the mansard portion.

Photo 4. Roof framing view from attic space

4.4 Structural Analysis

WGI developed a 2D structural analysis model and used manual hand calculations to determine the capacity of the wood joists, wood framed walls, and CMU Walls. WGI analyzed the building using loads prescribed by the current Florida Building Code (FBC) 2023. This applies to wind load, dead load, and live load. The building was built prior to the existence of the building code and at that time there was no code or guidance on wind load to use for the design.

4.4.1 Wind Analysis

The building is categorized as risk category II from Table 1604.5 in FBC 2023. Based on the risk category and geographic location, the design wind speed is 170 mph. This wind speed is used to calculate the design wind pressure on the roof, walls, and building lateral system.

The calculated wind design pressure for the exterior wall is +39.6 PSF (toward the wall) and -49.9 PSF (away from the wall). The calculated wind pressure for the flat roof is approximately +18 PSF (downward) and -92.9 PSF (upward), and for the mansard roof is +29.2 PSF (downward) and -119.1 PSF (upward). Based on the analysis and on the age and the time the building was constructed, the building's structural wall framing and connection do not have sufficient capacity to resist the wind design load per the current code.

4.4.1.1 Building Envelope

The building envelope consists of windows, doors, and load load-bearing CMU walls that support the floor and roof framing. The wall also resists out-of-plane (perpendicular to the wall surface) and in-plane (parallel to the wall surface) wind pressure. The CMU load-bearing walls were assumed to be unreinforced due to the time it was constructed. Based on our analysis, the existing CMU wall can only resist an out-of-plane wind pressure of 20 PSF with a combination of the floor gravity dead and live load. By inspection and the lack of lateral reinforcement in the existing CMU wall, the wall likely does not have sufficient capacity to resist the in-plane wind pressure.

4.4.2 Gravity Analysis

The building is currently used as a museum and library and occasionally for community center events. The current FBC doesn't directly specify the design live load for a museum, however it gives guidance for assembly areas and libraries where the recommended design live load ranges from 100 to 150 PSF (Pound per Square Foot). It is our professional opinion that the design live load should be at a minimum of 100 PSF. It was assumed that the superimposed dead load which excludes the self-weight of the framing including the flooring, HVAC duct works, and electrical line is approximately 10 PSF. The floor and roof framing were analyzed to determine the maximum capacity of the existing framings.

The wood species that we used in our analysis is southern pine with Grade No.1 n(WHU) which has an allowable bending stress of 1,650 psi.

4.4.2.1 First Floor

The first floor is framed with 2x14 wood joists are spaced at 12" on center spanning approximately 23 ft from bearing wall to bearing wall. The joists are fully braced on the top by the floor decking against the lateral torsional buckling so that it produces the maximum capacity of the member. Based on the strength and serviceability analysis, the floor can hold a maximum of 10 PSF superimposed dead load and 50 PSF live load. With a live load of 50 PSF, the member reaches the maximum deflection allowed per FBC and this controls the capacity. The corridor of the building can resist 10 PSF superimposed dead load and 100 PSF superimposed live load due to the shorter span of the floor joists. The live loads do not meet the requirements for an assembly area per table 1607.1 of FBC 2023.

4.4.2.2 Second Floor

Several areas on the second floor, such as the hallway consist of 2x8 wood joists that are spaced at 12 inches on center supporting the wood floor decking and the 2x10 wood joists that are spaced at 16 inches on center that support the first-floor ceiling. Based on the strength and serviceability analysis, the floor framing can hold a maximum load of 10 PSF dead load and 100 PSF live load in the hallway and can only hold a maximum of 50 PSF live load in other areas. The member reaches the maximum deflection allowed per FBC and this controls the capacity. The live loads do not meet the requirements for an assembly area per table 1607.1 of FBC 2023.

4.4.2.3 Roof

The attic floor is framed with 2x10 with spacing at 16 inches on center and can hold a maximum of 10 PSF dead load and 50 PSF live load. The member reaches the maximum deflection allowed per FBC and this controls the capacity.

The flat portion of the roof framing that is framed with a 2x6 wood joist with 24 inches center to center spacing can hold a maximum of 10 PSF dead load and 30 PSF live load.

The mansard portion of the roof framing can hold a maximum of 10 PSF dead load and 10 PSF live load. Currently, the mansard roof is finished with Spanish tile that weighs approximately 19 PSF which exceeds the dead load of 10 PSF. The structural roof framing is currently under-designed and doesn't have sufficient capacity to resist the code gravity loads and wind load.

4.5 Conclusion and Recommendations

The limited availability of the existing structural drawings and several renovations and repairs done throughout the building's lifetime have made it challenging to assess and analyze the structure of the building. The analysis done in this report was based on the site observations and data collected from several locations throughout the building that are strategically chosen. At these locations, the wall and ceiling finishes were carefully demoed. Based on our analysis, the building is not capable of withstanding the design wind load that is established by today's building code. The envelope of the building consists of an unreinforced masonry wall with tie beams at the floor lever

The first and second-floor framing can resist the design live load that is specified for classroom or office buildings. The recommended live load for use in an assembly area such as a museum is 100 PSF live load. The flat portion of the roof framing has sufficient capacity to resist the code design dead load of 10 PSF and 30 PSF live load, however, it does not have sufficient capacity to resist the current code wind load. The mansard portion of the roof framing has the capacity only to support the existing Spanish tile weight, it doesn't have enough capacity to resist the current code design gravity loads and wind loads.

Bringing the building to the current building code will require strengthening the existing foundation, floor framing, roof framing, and CMU wall. The strengthening of these elements will require further engineering analysis, design, and constructability considerations on logistics and details. At a minimum, Appendix A lists the structural members, connections, and items required to strengthen the building.

APPENDIX A

Engineer's Opinion of Probable Construction Costs

City of Lake Worth Beach Estimate of Probable Costs

	Item	Description	Unit	Quantity	Unit Price	Item Cost
General						**$407,500**
	A	Selective Demolition of Building & Disposal (All Work Including Aesbestos Abatement, Lead Removal, Other Hazardous Materials)	SF	13,500	$25	$337,500
	B	Mobilization	LS	1	$70,000	$70,000
Architectural						**$852,300**
	A	Architectural Wall Finishes (paint, surface treatments)	SF	13,500	$20	$270,000
	B	Architectural Floor Finishes (carpet, tile, wood)	SF	13,500	$12	$162,000
	C	Glazing/Windows - Impact Rated	EA	64	$200	$12,800
	D	Doors	EA	40	$2,000	$80,000
	E	Drywall	SF	13,500	$5	$67,500
	F	Fireproofing	SF	8,000	$10	$80,000
	G	Specialties - Historical Restorations	SF	2,000	$50	$100,000
	H	Elevator Core	EA	1	$80,000	$80,000
Structural						**$817,991**
	A	2X6 Wood Posts	BF	1,010	$15.00	$15,150
	B	2X14 Wood Joist	BF	15,821.0	$15.00	$237,315
	C	2X12 Wood Joist	BF	1,667	$15.00	$25,005
	D	2X8 Wood Joist	BF	615	$15.00	$9,225
	E	2X6 Wood Joist	BF	1,784	$15.00	$26,760
	F	Simpson H1A (New- Roof Joists)	EA	60	$8.00	$480
	G	Simpson LUS26 (New - Roof Joists)	EA	372.0	$8.00	$2,976
	H	Simpson HTS20 (New - Floor Joists)	EA	1,268	$8.00	$10,144
	I	Simpson HTS20 (Existing- Floor Joists)	EA	1,552	$8.00	$12,416
	J	Simpson HTS20 (Existing - Ceiling Joists)	EA	600	$8.00	$4,800
	K	Concrete (Foundation)	CY	35	$2,000	$70,000
	L	Reinforcement (foundation)	LBS	2,500	$20	$50,000
	M	CMU Wall reinforcement (material and Labor)	SF	4,968	$40	$198,720
	N	Earthwork	CY	250	$300	$75,000
	O	Temporary shoring and reshoring	EA	1	$80,000	$80,000
HVAC						**$945,000**
	A	Chiller, AHU's, ductworks, controls, piping, insulation, etc.	EA	1	$945,000	$945,000
PLUMBING						**$50,100**
	A	Water closet	EA	6	$2,000	$12,000
	B	LAV	EA	5	$1,000	$5,000
	C	HB1	EA	4	$400	$1,600
	D	EWC	EA	3	$500	$1,500
	E	Piping/ fittings/valves	EA	1	$30,000	$30,000
ELECTRICAL						**$636,500**
	A	New power distributions/service disconnec/ panels	LS	1	$100,000	$100,000
	B	Generator and transfer switch (Potential Alternate)	LS	1	$245,000	$245,000
	C	Transfer switch and docking station (Potential Alternate)	LS	1	$25,000	$25,000
	D	Interior lighting and controls	LS	1	$55,000	$55,000
	E	Emergency lighting	LS	1	$15,000	$15,000
	F	Exterior lighting	LS	1	$15,000	$15,000
	G	Surge protection	EA	3	$4,000	$12,000
	H	Power circuits/receptacles	EA	40	$1,000	$40,000
	I	Data outlets - boxes only & IT cabinet	LS	4	$5,500	$22,000
	J	HVAC equipment circuits	LS	15	$5,000	$75,000
	K	Lightning Protection New air terminal type - bldg mounted (Potential Alternate)	LS	1	$30,000	$30,000
	L	Grounding	LS	1	$2,500	$2,500

Total estimate of probable costs is derived from previous completed projects of similar scope and is subject to changes from inflation, material availability, and contractor profit negotion. **TOTAL:**	**$3,709,391**
CONTINGENCY 20%:	**$741,878**
PERMIT ESTIMATE 10%:	**$370,939**
CONTRACTOR OH&P@10% AND MATERIAL/LABOR UNCERTAINTY@ 20%:	**$1,446,662**
TOTAL PROJECT COST	**$6,268,871**