Report

Property Condition Assessment Glynn Archer School

Prepared for

The City of Key West, Florida

Prepared by

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Executive Summary

General Description

At the request of the City of Key West, CH2M HILL performed a Property Condition Assessment (PCA) on the Glynn Archer School located at 1300 White Street, Key West, Florida. The PCA was performed in general conformance with American Society for Testing and Materials (ASTM) E 2018 and general industry standards. The property includes several buildings. Building A, B, and D were constructed in 1926. Building C was constructed in 1955. (Refer to the attached Site Plan in Appendix A.)

The City requested the PCA to determine if Buildings A and B, including the auditorium, are structurally sound for an adaptive reuse as a city hall complex. Building C will be demolished to provide space for parking, drives, landscaping, and open spaces. Buildings D (original gymnasium) and E (Boys and Girls Club) will be retained by the Monroe County School Board.

This executive summary only covers some of the more critical issues disclosed by the PCA report. The assessment report and this executive summary do not constitute a complete planning study. The report provides a review of the current condition of the facility, which can then be considered part of the first step in a more comprehensive evaluation for investigating the feasibility for the adaptive reuse of the building. Additional investigations and studies should be considered, including but not limited to: site and space planning, in-depth structural evaluation during demolition, economics, and community input.

This executive summary shall not be used as a standalone document and should be relied upon as a guide to help develop a general understanding of the overall PCA report contents. The user is encouraged to read the entire report and should not base any judgments or decision on this summary alone.

Structural System

The assessment of the condition, integrity, and capacity of the existing elements of the structural system of the Glynn Archer School buildings was undertaken for the following reasons: first, to develop an opinion regarding the feasibility of repurposing, rehabilitating, and upgrading the building, particularly the structure, to meet the needs and requirements of office building use and occupancy; and, second, to present our findings, opinions, and suggested next steps should this repurposing avenue be pursued. Our assessment has been based on good standard of care, engineering principals and judgments, and governing codes and standards.

Based on our assessment, our opinion is that the structure can be reinforced to accommodate the requirements of the proposed building occupancy repurposing to office use and satisfy current code requirements. Our degree of certainty with this Rehabilitation Approach is on the order of 75 to 80 percent. In this PCA report, CH2M HILL presents key assumptions and observations, samples taken and analyzed, risks identified with associated possible mitigation measures, structural options, analyses and designs undertaken, and suggested next steps.

One approach is to rehabilitate the existing structure (Rehabilitation Approach). In this approach, the objective is to keep as much of the existing structure as possible. In summary, the existing concrete foundations and exterior walls do not have sufficient strength and structural reinforcing steel to meet current Florida Building Code requirements; however we think that they can be reinforced to meet code requirements. Other, less major, local deficiencies have been identified; we believe those can also be remedied with targeted interventions.

A second option, the Conversion Approach, where the exterior walls are maintained but the interior structural elements are demolished and replaced by an alternate overall load-resisting system. This system would consist of an internal structural steel frame that would not rely on the existing foundations and walls; this would require a complete reframing of the inside of the building, keeping the exterior walls only. Our degree of certainty with the Conversion Approach is on the order of 90 to 95 percent.

Preliminary indications are that the Rehabilitation Approach might be marginally less costly than the Conversion Approach, but it also might take less time to implement overall. Capital cost and schedule requirements will have to be understood to form a critical part of the decision process. The degree of certainty expressed above is a reflection of the unknowns associated with each solution approach.

A building designed to meet the requirements of the 2010 Florida Building Code and built in accordance with the design documents, should be expected to last at least 50 years whether adopting the rehabilitation or the conversion approach, with routine maintenance suited to the final building approach adopted.

Modeling of the existing structures shows that the buildings as they stand now would not be able to withstand wind forces of 180 mph. Modeling of the existing structure to determine a wind speed at which the structure would fail without reinforcement was not determined in the preliminary assessment. This would require a full, finite element analysis and iterative approach. Such an approach would be better determined during the design stage, when more of the structure has been exposed and complete information of the structural capacity of the wood frame members and its species has been determined. Modeling results and calculations for the existing structure under both Category II and the superseded Category IV, as well as the proposed improvements for each preliminary assessment cases are included in Appendix G.

Heating, Ventilating, and Air-Conditioning (HVAC) Systems

Buildings A and B at the Glynn Archer School are primarily served by split-system, ductless, DX air-conditioning units. In the main office and teachers' lounge, split-system ducted DX air-conditioning units are used, and two rooftop-mounted packaged DX air-conditioning units are used for the auditorium. Only the auditorium units provide outside air to the spaces. CH2M HILL's visual inspection indicated that most of the condensing units and evaporator units are in fair to poor condition, and many of the indoor evaporator units are reaching the end of their useful life.

CH2M HILL recommends that, given the condition of the equipment and the proposed usage changes to the spaces, the existing HVAC systems be removed and the design professionals provide an updated, code-compliant HVAC system suitable for the new city hall.

Plumbing Systems

The existing plumbing systems consist of a mixture of gang-style and individual use restrooms spread throughout the facility. The water closets, urinals, and lavatories are in acceptable condition. Sanitary piping consists of cast iron and PVC, with the PVC used to repair the cast iron over time. At least one large crack was noted in the cast iron piping in the crawl space. Domestic water piping is a mixture of copper and PVC. Again the PVC appears to have been used to replace sections of copper pipe. A leak was noted in the water piping during a preliminary inspection. The existing restrooms are not compliant with the Americans with Disabilities Act (ADA) code requirements.

CH2M HILL recommends that the existing restrooms, fixtures, and piping be removed. The design professionals should provide updated, code-compliant restrooms on both the first and second floors of the buildings.

Environmental Conditions

CH2M HILL visually inspected the facility and collected representative samples of materials throughout to determine if asbestos, lead paint, or mold were present in the facility. Results indicate that some floor tile and flooring mastic throughout the facility contain asbestos in a non-friable condition. The results of the lead-based paint testing indicated that primer or paint used on the interior and exterior walls and trim contained lead throughout Buildings A, B and the Auditorium; lead-based paint was not found in Building C. Several areas of obvious water damage, such as the ceiling in the outdoor corridor between Buildings A and B, had some mold growth.

CH2M HILL recommends that the asbestos-, lead-, and mold-containing materials be removed, following applicable regulations, as part of the demolition before rebuilding the facility.

Electrical

The entire existing electrical system is antiquated. It would not be sufficient for the requirements of a new city hall nor would it meet the current National Electrical Code or other National Fire Protection Association (NFPA) codes and standards. The entire electrical system, including service equipment, conduits, and conductors and associated electrical systems, will require replacement and has little or no salvage value.

The facility would require a new composite building systems structure to house electrical equipment as well as a new point of attachment for service conductors from the electrical utility. The current electrical room is not of sufficient size and is constructed of inadequate materials.

Windows and Doors

The existing exterior door and windows do not comply with the Florida Building Code high-velocity hurricane zone requirements and will need to be replaced with similar sizes and styles to maintain the historical character of the building.

Roofing

The existing roof systems are modified bitumin roofing on wood planks, attached to the roof framing. The roofs have blisters. Water trapped within the roof systems was observed.

CH2M HILL recommends a complete removal of the roofs to the existing deck and installation of insulation and a new code-compliant roof system.

Life Safety

The buildings do not have sprinklers. Also, the fire alarm, smoke detector, and emergency lighting systems are antiquated.

The egress corridor is not fire rated. Corridor walls and the door will need to comply with current code.

CH2M HILL recommends that the life safety requirements be upgraded to meet current codes.

American with Disabilities Act

The existing buildings and site do not comply with the ADA requirements. New restrooms, ramps, handrails, signage, vertical access, and site and parking requirements will need to be included in the new design.

Guide

It should be noted that this executive summary is only intended to represent a brief summary of our findings and is not a detailed account of all the information provided in the PCA. The PCA should be reviewed in its entirety prior to drawing any final conclusions as to the physical needs associated with the buildings and site.

Key Assumptions and Criteria Related to Current Code Standards

The key assumptions of the PCA will affect the evaluation results of the buildings. These assumptions include:

1. Building construction is standard practice for the era in which the structures were built.
2. Historical material design strength was used to evaluate the existing conditions.

3. Current Florida Building Codes requirements were used to bring the existing structural system up to its risk category and designated occupancy.
4. The structural framing member size, spacing, condition, and location are based on sample observations of the building by probing the existing structural system.
5. Wood frame 2 x members are considered to be Southern Yellow Pine, grade No. 2.
6. Wood frame 5 x and larger are considered to be Southern Yellow Pine, grade select structural.

Codes and Standards

The 2010 Florida Building Codes and standards govern the design load criteria and requirements of the condition assessment evaluation. The building is assigned a risk category of II in accordance with the provisions of Chapter 16, “Buildings,” of the 2010 Florida Building Code. The ultimate design wind speed calculations using 180 miles per hour (mph) are based on American Society of Civil Engineers (ASCE) 7-10; the evaluation and design of the wood structural frame system is governed by ANSI / AF&PA NDS – 2005; and the evaluation and design of the concrete structural system is governed by American Concrete Institute (ACI) 318-05. Wood species and strengths must be sampled and tested to accurately determine species and representative strength to be used for final design.

The design professional shall reference Chapters 11 and 13 of the 2010 Florida Building Code during the detailed design. These sections should be used as the basis for the design of architectural components for compliance with the historic rehabilitation and adaptive reuse of the building.

Opinion of Probable Cost

This executive summary provides some magnitude opinion of estimated costs, which are not complete costs and have limitations. An Order of Magnitude Opinion of Probable Costs is presented in Table ES-1.

CH2M Hill developed a LEVEL 1 Order of Magnitude of Cost. The purpose of the Level 1 estimate is to facilitate budgetary and feasibility determinations. It is prepared based on historical data from recent projects, RS Mean data base, vendors quotes and the estimators experience. The estimate was also based on the Bender & Associates schematic site plan and floor layout (Refer to Appendix A). Further comprehensive investigations which might indicate new issues which could affect the construction cost scenarios along with the possible complexities of a design and footprint configurations. Thus the Level 1 Order of Magnitude estimate has standard range of 25% to 75% accuracy.

As the final design is developed and more details are provided the unknowns are eliminated; fewer assumptions are made; and the pricing of the quantities become more detailed. Contingencies will be reduced as the design documents are produced. (Refer to Appendix F for full breakdown of cost estimates.)

Limitations for Use of the Cost Estimates

The following limitations and parameters should be considered when using the cost estimates.

- These cost estimates primarily cover upgrade of existing defects and improvements disclosed in the PCA report.
- These cost estimates include some, but not all, known code required improvements to the facility should it be considered for change of use to a city hall.
- This PHASE 1 Order of Magnitude Costs provided shall only be relied upon for planning purposes.
- The opinion-of-estimated-costs value may cover items that are not listed in this executive summary but are covered in the formal report.

The cost estimate may not include the all the cost to provide ADA compliance or the needed elements to bring the facility up to code compliance for life safety. This cannot be determined at this time because the final layout of the facility is not yet known. At a minimum, an elevator structure and ramps are required to provide ADA access to the first and second floor of both Buildings A and B are included.

TABLE ES-1
Glynn Archer Property Condition Assessment (PCA) — **CH2M HILL**
Key West, Florida — **7-Sep-12**

CONVERSION CONCEPT			REHABILITATION CONCEPT		
PROGRAM ESTIMATE BY DIVISION: A & B Wings, and Auditorium			PROGRAM EST. BY DIVISION: A & B Wings, Auditorium & New Addition		
AC Gross SF = 33,398 (existing)			AC Gross sf: 33,398 (existing) + 1,920 sf (new addition) = 35,318 sf		
Non AC SF = 4,321 (3,009 @ 1st Fl & 1,312 @ 2nd Fl)			Non AC SF = 4,321 (3,009 @ 1st Fl & 1,312 @ 2nd Fl)		
TOTAL SF = 37,719			TOTAL sf = 39,639		
DIVISION	**DESCRIPTION**	**AMOUNT**	**DIVISION**	**DESCRIPTION**	**AMOUNT**
1	General Conditions	$935,760	1	General Conditions	$892,059
2	Site Work	$899,288	2	Site Work	$912,382
3	Concrete	$1,173,863	3	Concrete	$103,320
4	Masonry	$0	4	Masonry	$21,000
5	Metals	$1,350,852	5	Metals	$1,923,950
6	Wood Plastics	$235,000	6	Wood Plastics	$235,000
7	Thermal & Moisture Protection	$485,025	7	Thermal & Moisture Protection	$393,388
8	Doors & Windows	$706,000	8	Doors & Windows	$692,000
9	Finishes	$865,302	9	Finishes	$976,202
10	Specialties	$66,000	10	Specialties	$62,400
11	Equipment	$55,438	11	Equipment	$58,278
12	Furnishings	$51,000	12	Furnishings	$51,000
13	Special Construction	$210,000	13	Special Construction	$218,556
14	Conveying Systems	$250,000	14	Conveying Systems	$105,000
15	Mechanical	$1,512,275	15	Mechanical	$1,572,199
16	Electrical	$1,497,554	16	Electrical	$1,595,915
	SUBTOTAL	**$10,293,357**		SUBTOTAL	**$9,812,649**
	Gen. Liability Insurance Premium (1%)	$102,934		Gen. Liability Insurance Premium (1%)	$98,126
	Overhead & Fee (7.5%)	$779,722		Overhead & Fee (7.5%)	$743,308
	Payment & Performance Bond (2%)	$223,520		Payment & Performance Bond (2%)	$213,082
	Keys Factor (20%)	$2,279,906		Keys Factor (20%)	$2,173,433
	SUBTOTAL	**$13,679,439**		SUBTOTAL	**$13,040,598**
	Contingency (10%)	$1,367,944		Contingency (10%)	$1,304,060
	A/E fee - Design (7%)	$957,561		A/E fee - Design (7%)	$912,842
	A/E fee - Construction (5%)	$683,972		A/E fee - Construction (5%)	$652,030
	FF & E: Allowance	$450,000		FF & E: Allowance	450,000
	PROJECT TOTAL	**$17,138,916**		PROJECT TOTAL	**$16,359,530**

Contents

Appendixes

Acronyms and Abbreviations

ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
FBC	Florida Building Code (2010)
FRP	fiber-reinforced polymer
HVAC	heating, ventilating, and air conditioning
lbs/in^2	pounds per square inch
LF	linear foot
mph	miles per hour
NDT	non-destructive tests
NEC	National Electrical Code
NFPA	National Fire Protection Association
O.C.	on center
PCA	property condition assessment
psf	pounds per square foot
SF	square foot
VFT	vinyl floor tile

SECTION 1

System Description and Observations

1.1 Overall General Description

The Glynn Archer School facility is located on White Street between Seminary Street and United Street in Key West, Florida (see the site plan provided in Appendix A). The facility has always been a school facility. Building A and the auditorium were constructed in 1926 and Building B in the 1930s. Buildings A and B are two-story buildings with approximately 28,308 total square feet of area. The auditorium is a single-story building with approximately 4,550 total square feet of area. When this facility was built, cisterns were used to store fresh water for use in the buildings. A fresh water cistern is located underneath a class room in Building B and was utilized until fresh water from the mainland was available to the City in the early 1940s. Additional buildings were added to the facility over the years; these included a gymnasium (Building D), Building C, and Building E. This property condition assessment (PCA) report addresses Buildings A and B, and the auditorium. Building C is to be demolished.

This report provides a review of the current condition of the facility, which can then be considered part of the first step in a more comprehensive evaluation for investigating the feasibility for the adaptive reuse of the building. Additional investigations and studies should be considered, including but not limited to: site and space planning, in-depth structural evaluation during demolition, economics, and community input.

Accompanying the main text of this report are several appendixes for further information. Appendix A includes site plans, floor plans, and sketches. Appendix B includes photographs of described details. Testing results data are provided in Appendixes C (geotechnical and concrete testing results), D (hazardous materials), and E (radiographic testing). Appendix F provides estimated costs and Appendix G includes structural calculations and modeling data.

A building designed to meet the requirements of the 2010 Florida Building Code and built in accordance with the design documents, should be expected to last at least 50 years, with routine maintenance suited to the final building approach adopted. This expectation exists for both the rehabilitation and conversion approaches.

1.2 Site

1.2.1 Stormwater Drainage

The site currently uses four drainage wells that consist of an excavated hole lined with geotextile fiber and filled with rock. The main gutters from Buildings A and B and the auditorium currently drain to the wells. CH2M HILL recommends that onsite containment and disposal of stormwater be incorporated into the final site plan to the extent possible to minimize current and future impacts to the City stormwater system.

1.2.2 Paving, Curbing, and Parking

Currently, the facility has approximately 30 onsite parking spaces (at the corner of United Street and Grinnell) and relies on on-street parking for teachers and support personnel. The area currently being used as a playground is covered in asphalt and could be used as onsite parking. The area vacated by the proposed demolition of Building C can also be used for onsite parking. The onsite parking should be a permeable area to allow for percolation of stormwater to reduce current contribution to the City stormwater system.

1.2.3 Landscaping and Hardscape

The current site has minimal landscaping and is mostly hardscaped with an asphalt playground and sidewalks. CH2M HILL recommends that the site utilize porous pavement and sidewalks wherever possible to minimize stormwater impacts. Landscaping of the site should be implemented by a landscape professional based on City codes.

1.2.4 Utilities

The site currently has water, sanitary sewer, and electrical utilities. CH2M HILL does not anticipate any changes to the utilities. An electrical analysis of the proposed city hall will need to be completed and compared to the available electrical service for the site. If the electrical load exceeds the current service capacity, then off-site electrical modifications will be required.

Water is provided to the site by the Florida Keys Aqueduct Authority. The current water system is assumed to be adequate to serve the proposed city hall. The current facility has excess bathrooms and a cafeteria located on-site.

Sanitary sewer is provided in several of the adjacent streets that surround the site. Providing sanitary sewer to the facility is not considered problematic.

1.3 Structural Frames and Building Envelope

1.3.1 Summary

The existing structure consists of three buildings: two –classroom structures and a central auditorium. The structural system is a wood frame with concrete walls along the exterior perimeter and wood stud walls at the interior. Building A and Building B are two-story building structures, and the auditorium is single-story building structure.

The structural system consists of a primary gravity load supporting system and a primary lateral load-resisting system. The structural system and its primary elements are as follows:

1. Gravity Load Supporting System Evaluation:
    a. Roof ¾” x 3 ½” Straight Sheathing (typical)
    b. Roof Joists 1 $^{5}/_{8}$” x 5 ½” (typical)
    c. Auditorium Roof Trusses
    d. Auditorium Columns 18”x18”
    e. Wood Floor Decking ¾” x 5 ½” Tongue Groove Plank (typical)
    f. Wood Floor Joists 1 $^{5}/_{8}$” x 7 ½” (typical)
    g. Roof and Floor Girder Wood Members 5 ¾” x 5 $^{5}/_{8}$”
    h. 8” Concrete Walls (typical)
    i. 1 $^{5}/_{8}$” x 5 ½” Wood Stud Frame Walls (typical)
    j. Foundation: 18”x18” Interior Spread Footings and Continuous Perimeter Strip Footing (typical)
2. Lateral Load Resisting System Elevation:
    a. Roof and Floor Diaphragm
    b. 8” Concrete Perimeter Walls (typical)

CH2M HILL assessed the condition, integrity, and capacity of the existing elements of the structural system of the Glynn Archer School buildings. The objectives of the structural assessment were: first, to develop an opinion regarding the feasibility of repurposing, rehabilitating, and upgrading the building, particularly the structure, to meet the needs and requirements for office building use and occupancy; and second, to present CH2M HILL’s findings, opinions, and suggestions for next steps should the repurposing avenue be pursued. CH2M HILL’s PCA has been based on good standard of care, engineering principals and judgment, and governing codes and standards.

Based on the assessment, CH2M HILL’s opinion is that the structure can be reinforced to accommodate the requirements of the proposed building-occupancy repurposing to office use and satisfy current code requirements.

In this PCA report, CH2M HILL presents key assumptions and observations, samples taken and analyzed, risks identified and associated possible mitigation measures, structural options, analyses and designs undertaken, and suggested next steps. Several key deficiencies of the existing structure have been identified through field observations, and field and sample testing; these are noted in this PCA report. Based on our observations, testing, and analyses, upgrading the existing structure will require important field work to enhance the integrity, continuity, and capacity of the structural elements and various constituent elements.

The foundations and exterior walls, both concrete, as part of the existing overall load-resisting system for the building, do not have sufficient strength and reinforcing steel in their present condition, to satisfy the load-carrying requirements of the current Florida Building Code. A significant amount of additional reinforcing will be required to retrofit both the foundations and exterior wall elements for the existing structure to satisfy code requirements.

The existing wood-framed floors and roof structural elements require some local remedial work to provide load path continuity, from roof to walls and between floors and walls, to properly tie all these wind-load-resisting elements together in order to meet current code requirements. The wood-framed structure also requires some local strengthening to augment load capacity to meet code, remediate weather damage and deterioration, and correct damage caused by insects.

The order of magnitude structural cost of this Rehabilitation Approach is estimated to be approximately $2.5 million. This cost must be assessed in combination with the costs of all the other trades and with the long-term operating costs associated with the maintenance of this existing structure. Also to be considered is the possible shorter overall construction implementation time of this Rehabilitation Approach compared to the Conversion Approach described below.

At this time, the one large uncertainty associated with this approach is the cost of fiber-reinforced polymer (FRP) reinforcement to the walls. Refinements of this cost are being sought.

A completely different approach, the Conversion Approach, offers an alternate overall load-resisting system that consists of an internal structural steel frame designed to support all gravity and lateral loads. This approach would not rely on existing concrete foundations and walls, but would require a complete reframing of the inside of the building, keeping the exterior walls only. The new structure would have fewer unknowns and the cost contingencies would be reduced. This approach will require a more extensive demolition schedule and a temporary structural system to brace the existing perimeter walls prior to their integration to the new structure. The order of magnitude structural cost of this approach is estimated to be approximately $1.3 million. This approach can include more downstream flexibility if this is an important component of the planning for the building. This approach will require more time to execute than the Rehabilitation Approach. The existing perimeter walls will require installation of a temporary bracing system, gutting of the interior structure, construction of a new structure, and tie-in of the perimeter walls with the new structure. Then the mechanical and electrical trades, followed by finishing trades, will be able to start work inside the building.

1.3.1.1 Exterior Wall Strength and Reinforcing

The compressive strength tests performed on the concrete sampled from the walls indicate that the existing concrete walls in their present condition have insufficient compressive strength to resist the combined design wind and gravity loads. The non-destructive test evaluation of the existing wall reinforcement proved inconclusive and might be indicative of a deficiency of steel reinforcing required to satisfy current concrete design code (American Concrete Institute [ACI] 318-05) minimum vertical and horizontal reinforcement. Additional investigation will be required to determine the size, spacing, and extent of steel reinforcement in the concrete walls.

It was determined that the concrete wall compressive strengths in Building B (average of 3,813 pounds per square inch [lbs/in^2]) were greater than those obtained for Building A (average of 1,835 lbs/in^2). The uniform reinforcing steel required in the walls of Building A would be greater than required for Building B to resist similar stresses and meet the present code requirements.

If the solution adopted is to rehabilitate the structure of the building, keeping the roof and floor wood structures and the perimeter concrete walls as a lateral load-resisting system, then the concrete walls will require strengthening. In this event, the most effective structural solution to retain the existing structure and retrofit the existing concrete walls to meet code requirements will be to use layers of FRP sheets applied to the inside and outside face of the existing concrete walls to increase load-carrying capacity. The existing concrete wall surface must be clean and free of debris and dust prior to installation of FRP. The FRP systems include proprietary aspect; therefore, the final design and installation of the FRP system would be performed by the supplier/manufacturer and by their professional engineer. For a depiction of the concept for reinforcement of existing concrete wall, refer to Drawing SK-S1 in Appendix A.

Alternatively, the existing walls can be reinforced on their inside faces with additional layers of reinforcing steel. The new layer of reinforcement must be dowelled into the face of existing concrete wall and then encased with shotcrete. This method may be more labor and cost intensive than using FRP, and it would use up more floor space due to the thickness of the added concrete. Additional studies would be undertaken at the schematic design stage to analyze a number of alternatives for preliminary pricing before a decision would be made.

1.3.1.2 Foundation Element Strength and Reinforcing

Some concrete foundation footings lack sufficient ground-bearing surface and have insufficient reinforcing steel to support the design load and comply with ACI 318-05 minimum requirements. A number of footings for Buildings A and B will require reinforcement; these have been identified as “RF” for reinforcing on the foundation and first-floor framing plan (See Drawing S-200 in Appendix A). The typical 18” x 18” footing must be enlarged to at least a 42” x 42” square footing to accommodate the required additional reinforcing necessary to resist the loads resulting from current code requirements. Refer to Drawing SK-S11, in Appendix A, for a proposed foundation reinforcement concept to accommodate loads and code requirements.

1.3.1.3 Wood Girder Reinforcement

The wood girders in Building A, Building B, and the auditorium will require additional reinforcing to be attached to the side of each member. The additional reinforcing is required to adequately support minimum uniformly distributed loads and minimum concentrated loads, as prescribed in current building code. Additional wood members, and in some locations structural steel members, will be required to reinforce existing wood members. The reinforcement required is shown on Drawing S-200. A reinforcing schedule with proposed detailing is shown on Drawing SK-S10. (All drawings are provided in Appendix A.)

1.3.1.4 Risks

Based on CH2M HILL’s investigation, assessment, and experience, few significant and major structural risks exist. CH2M HILL believes changing the building occupancy of the structures from school use to office use is possible. CH2M HILL has identified deficiencies in the existing structure and has proposed mitigation by providing preliminary approaches for reinforcing the existing structure to accommodate the proposed change of building occupancy.

Risks that do exist are associated with the uncertainty and reliability of the load-carrying capacity of the existing structural members and the existing conditions that have not been uncovered or were not able to be identified in the limited probing and preliminary assessment. A full invasive investigation was not undertaken so as to limit upfront costs, and not significantly disrupt operations at the Glynn Archer School.

It was noted that wood boring insects (termites) have compromised structural load carrying members in some locations. A more thorough review to fully expose the structure will be required to determine the extent of damage to structural members and whether these elements can be reused. Damaged structural elements will require additional reinforcement, as shown in the attached drawings in Appendix A. The existing floor decking will need to be removed to evaluate the existing joists for wood-boring insects. The associated costs and impact to schedule could be significant and should be vetted as soon as possible to prevent delays to schedule and increased costs.

It was also noted that strength results in the concrete foundation and the exterior concrete lateral load-resisting walls varied and were not consistent. CH2M HILL believes this condition is likely to be attributed to the construction methods at the time the structure was built. Certain areas of the structure may require heavier reinforcing than that shown in the attached drawings.

There might also be risks associated with eventual late identification of client program needs, during the design schematic and design development stages; this may impact the structural design. For example, there is significant variability in the code-prescribed design loads for auditorium space based on occupancy and intended use. If the auditorium remains and is used as an assembly area and theater, with fixed seats fastened to the floor, this area can be designed for 60 pounds per square foot (psf); however, if movable seats are used, the area must be designed for 100 psf. Increased loads will result in increased reinforcing to accommodate reuse of the existing structure. CH2M HILL recommends working closely with the structural consultant to ensure desired program requirements are coordinated with structural design requirements that could impact cost, schedule, or feasibility of retrofitting the existing structure.

1.3.1.5 Next Steps

- A refinement of the structural costs associated with the Rehabilitation Approach must be obtained prior to making a decision on the approach to adopt.
- The order of magnitude costs presented for FRP are very preliminary and require upfront preliminary design by manufacturers/suppliers prior to honing in on a more precise price.
- A program of additional non-destructive tests (NDT) should be developed and implemented on the existing concrete walls to verify size, spacing, and quantity of existing steel reinforcement for Buildings A and B, and the auditorium.
- An investigation at all levels of the bearing condition of the wood joists into the concrete walls is to be undertaken if the existing wood floor and roof framing system is retained going forward. If a new interior framing system is selected this investigation will not be required because the existing wood framing system would be demolished.
- If the existing wood floor and roof framing system is retained, development and implementation of a treatment plan to neutralize and remove termites and other wood-boring insects will be needed. Also required would be a plan to help in controlling future insect damage and an operations-stage inspection and maintenance plan and program to address insect control.
- A Quality Control Program should be developed to include structural evaluation services and an independent testing and inspection company to inspect and test the structural elements of the base building work, as they are installed, to satisfy standards. Additionally, certain building elements, such as FRP reinforcing of the existing exterior walls, may require very early design involvement to allow advanced specialized testing of the substrate material in order to develop a suitable installation strategy.

1.3.2 Foundation

1.3.2.1 Auditorium Foundation

Existing Conditions

The foundation of the auditorium consists of continuous, concrete, strip footing at the perimeter of the building and individual, interior, spread footing for each concrete pier (see photos # 1 and # 2 in Appendix B). The interior spread footing consists of an 18” x 18” x 8“ deep concrete footing on which rests a 12” x 12” concrete pier, which in turn supports the wood floor system. Based on the era of concrete construction and x-ray investigation on the exterior concrete walls, the concrete wall structure has less than the minimum reinforcement per current concrete design code ACI 318-05. CH2M HILL did not x-ray the concrete footing or pier. The perimeter concrete footing width is between 26 and 32 inches by 13 inches deep below grade, and 30 inches high above grade. The concrete footing appears to be sound based on current loading conditions. For auditorium foundation layout refer to drawing S-200 in Appendix A.

Deficiency and Mitigation

Concrete footings appear to lack sufficient steel reinforcement and not meet the ACI 318-05 minimum reinforcement. However, the concrete footing edge beyond the concrete pier face is only 3 inches. The concrete footing will have very little bending behavior and will behave like a concrete bearing pad that distributes the load directly to the bearing soil without significant bending or pure shear to the concrete.

The allowable soil bearing capacity is 4,000 pounds per square foot (psf). The interior footings in the auditorium appear to have sufficient capacity to support loads associated with an auditorium function with fixed seating. Should removable seating be desired as part of the future functional plans of the building, the footing capacity has been determined to be insufficient, with a live load demand of 100 psf versus 60 psf for fixed seating, per the Florida Building Code. The footings would have to be reinforced as shown in Drawing SK-S11 in Appendix A. The perimeter concrete footing has insufficient soil contact area to resist compression loads due to wind lateral load overturning moment. The width of the concrete footing should be enlarged to accommodate the current building code design loads.

1.3.2.2 Building A Foundation

Existing Conditions

The foundation of the building consists of continuous concrete strip footing at the perimeter of the building and individual interior spread footing for each concrete pier (see photo #2 in Appendix B). The interior spread footing consists of an 18” x 18” x 8“ deep as noted on the plan type. A concrete footing and a 12” x 12” concrete pier are supporting the wood floor system. Based on the era of concrete construction and x-ray investigation on the exterior concrete walls, the concrete wall structure has less than the minimum reinforcement per current concrete design code ACI 318-05. CH2M HILL did not x-ray the concrete footing or pier; however we have observed one footing that appears to have two #5 vertical bars embedded into the footing without any horizontal ties. The perimeter average concrete footing width is approximately 26 to 32 inches by 30 inches, extended above grade, and 13 inches extended below grade. The concrete footing appears to be sound based on current loading conditions. For Building A foundation layout, refer to drawing S-200 in Appendix A.

Deficiency and Mitigation

Concrete footings appear to lack sufficient steel reinforcement and to not meet the ACI 318-05 minimum reinforcement. However, the concrete footing edge beyond the concrete pier face is only 3 inches for the 18” x 18” footing. The concrete footing will have very little bending behavior and will behave like a concrete bearing pad that distributes the load directly to the bearing soil without significant bending or pure shear to the concrete.

The perimeter concrete footing has insufficient soil contact area to resist compression loads due to wind lateral load overturning moment. The width of the concrete footing should be enlarged to accommodate the effects of the current building code design loads.

The allowable soil bearing capacity is 4,000 psf. The first and last footings in a row along the hallway have sufficient capacity to support the design designated loads; however, the 18” x 18” spread footings remaining in the row do not have sufficient bearing area to support the loads. The 18” x 18” footings must be enlarged to a minimum 42” x 42” square footing. The existing concrete footings that require modification to support the current design loads are designated as “RF” on the plan foundation and first-floor framing in Appendix A.

1.3.2.3 Building B Foundation

Existing Conditions

The foundation of the building consists of continuous concrete strip footing at the perimeter of the building and individual interior spread footing for each concrete pier (see photo #4 in Appendix B). The interior spread footing consists of 18” x 18” x 8“ deep as noted on the plan type. A concrete footing and a 12” x 12” concrete pier are supporting the wood floor system. Based on the era of concrete construction, and x-ray investigation on the exterior concrete walls, the concrete wall structure has less than the minimum reinforcement per current concrete design code ACI 318-05. CH2M HILL did not x-ray the concrete footing or pier; however, we have observed one footing that appears to have two #5 vertical bars embedded into the footing without any horizontal ties. The perimeter average concrete footing width is approximately 26 to 32 inches by 36 inches deep, extended above the grade, and 12 inches below the grade. The concrete footing appears to be sound based on current loading conditions. For Building B foundation layout, refer to drawing S-200 in Appendix A.

Deficiency and Mitigation

Concrete footings appear to lack sufficient steel reinforcement and to not meet the ACI 318-05 minimum reinforcement. However, the concrete footing edge beyond the concrete pier face is only 3 inches for the 18” x 18” footing. The concrete footing will have very little bending behavior and will behave like a concrete bearing pad that distributes the load directly to the bearing soil without significant bending or pure shear to the concrete.

The perimeter concrete footing has insufficient soil contact area to resist compression loads due to wind lateral load overturning moment. The width of the concrete footing should be enlarged to accommodate the effects of the current building code design loads.

The allowable soil bearing capacity is 4,000 psf. The first and last footings in a row along the hallway have sufficient capacity to support the design designated loads; however, the 18” x 18” spread footings remaining in the row do not have sufficient bearing area to support the loads. The 18” x 18” footings must be enlarged to a minimum 42” x 42” square footing. The existing concrete footings that require modification to support the current design loads are designated as “RF” on the foundation and first-floor framing plan in Appendix A.

1.3.3 Auditorium Building Frame

1.3.3.1 Auditorium Roof Framing

Existing Conditions

The auditorium is a single-story building connected to Building A. It consists of concrete perimeter walls and a wood frame structure on the roof and floor level (see photos #5 and #6 in Appendix B). The roof has a ridge at the center and slopes downward toward the east and west. The roof structure consists of ¾” x 3 ½” straight sheathing nailed on the 1 $^{5}/_{8}$” x 5 ½” wood joists at 24 inches on center. The 1 $^{5}/_{8}$” x 5 ½” joists are spanning in the east and west direction between wood trusses. The wood trusses are spanning in the northern and southern direction between steel trusses. The steel trusses are spanning in the eastern and western direction and are supported by 18” x 25” concrete columns that were built into the perimeter 8-inch concrete wall as piers. The eastern and western, exterior perimeter, 8-inch concrete walls and the 2” x 6” nominal wood stud walls are supporting 1 $^{5}/_{8}$” x 5 ½” wood joists. The most southern exterior 8-inch concrete wall is supporting the wood trusses. The northern steel truss is supporting the auditorium roof and the second floor of Building A.

The existing ceiling of the auditorium consists of cement plaster wood lath attached to the underside of the ceiling 1 $^{5}/_{8}$” x 7 ½” wood joists that are located below the steel truss bottom chord. The ceiling joists support the foam insulation and the drop-in suspended gypsum board ceiling. The ceiling joists have been supported by steel trusses.

The ¾” x 3 ½” straight sheathing is typically nailed to the support with two 8d common nails. The shear load perpendicular to the sheathing is resolved by couple action of the nail. The shear load parallel to the sheathing is resisted by the nail into the supporting member. The single straight sheathing historical data indicate the diaphragm system has a low shear capacity.

For auditorium roof framing layout of the existing structure, refer to drawing S-202 in Appendix A. For proposed reinforcing for the auditorium roof wood truss, refer to drawing SK-S13 in Appendix A.

Deficiency and Mitigation

The ¾” x 3 ½” straight sheathing shear strength has very low horizontal shear capacity. The roof diaphragm has insufficient perimeter chord members that are positively connected to the concrete wall. There also is a lack of out-of-plane anchorage of the exterior wall to the diaphragm. Where the wood joists and wood trusses frame into the concrete wall, the existing wood members are embedded into the pocket without any positive anchor to resist slippage or out-of-plane loading. The exact embedment of the wood member needs to be further field verified for final design. The concrete walls have no positive hurricane anchorage to resist out-of –plane loading and uplift wind forces. The embedment of the wood joist may not have sufficient strength to resist the applied load when combined with gravity and wind loads. Additional hurricane anchors should be installed to connect the wood members to the concrete wall.

The existing roof diaphragm will require reinforcement to satisfy the new code-prescribed lateral loads; this can be achieved by installing new plywood sheathing on top of the existing ¾” x 5 ½”straight sheathing, with a closely spaced nail pattern anchored to the existing roof joists and to the 1 x straight sheathing. The perimeter edge of the roof diaphragm must be connected to the concrete wall with steel clip angle or 2 x wood ledgers to transfer the diaphragm loads laterally into the structural lateral load resisting wall. The top of the concrete must be anchored back to the diaphragm to resist concrete wall out-of-plane loading due to wind loading conditions.

For the reinforcement of the existing structural members and diaphragm, refer to drawings in Appendix A, as follows:

- For roof wood diaphragm, see drawings S-202 and SK-S7.
- For roof existing wood joists, see drawings S-202, SK-S8, and SK-S9.
- For roof anchorage uplift tie-down for wood joist, see Drawing SK-S12.
- For roof existing wood trusses, see drawing S-202.

1.3.3.2 Auditorium First-Floor Framing

Existing Conditions

The floor framing consists of ¾” x 5 ½” tongue-and-groove wood plank secured to the 1 $^{5}/_{8}$” x 7 ½” wood joists (see photo #7 in Appendix B). The 1 $^{5}/_{8}$” x 7 ½” joists are spaced at 16 inches on center and are spanning between 5 ¾” x 5 $^{5}/_{8}$” girders. The wood girders are spanning between piers and footings in the northern and southern directions. The auditorium floor will be used for meetings, as a conference center and assembly area, with fixed seating attached to the floor.

The ¾” x 5 ½” tongue-and-groove wood plank is anchored to the 1 $^{5}/_{8}$” x7 ½” with two 8d nails. The 1 $^{5}/_{8}$” x 7 ½” wood joists bear on the girder secured with toe nails secured to the wood girder. The wood girder bears directly on the concrete pier without any positive anchorage.

Deficiency and Mitigation

The necessary reinforcement of each wood girders, as identified by CH2M HILL’s PCA, has been identified on the plan, provided in Appendix A, and is denoted by “R-*”.

1.3.3.3 Auditorium Load-Bearing Walls

Existing Conditions

The load-bearing walls at the auditorium are located at the perimeter of the building. The exterior load-bearing walls are 8-inch concrete vertical structural elements that are supporting the roof wood framing system. The exterior face of the concrete walls has been covered with at least 1 to 2 inches of hard stucco cement paste. The interior face of the walls has been painted with several layers of paint.

There are three cast-in-place concrete columns in the eastern and western exterior walls; the size of each column is approximately 18” x 25”. There are also two 18” x 18” concrete columns located in the stage area of the auditorium.

Based on x-rays of the east and west concrete walls and column, the reinforcement in these structural elements is lacking steel reinforcement. There are very little vertical and horizontal reinforcement in the concrete walls and concrete columns.

The auditorium interior bearing walls that are part of Building A consist consists of 1 $^{5}/_{8}$” x 5 ½” wood studs at 16 inches on center, with cement plaster wood lath on both faces of the wall. The wood stud walls are supporting the second floor of Building A.

Deficiency and Mitigation

The 8-inch concrete walls at the perimeter of the auditorium have low compressive strength and insufficient reinforcement in the wall compared to the current concrete design code ACI 318-05. The existing concrete walls have not satisfied ACI 318-05 minimum vertical and horizontal reinforcement requirements, and exceeded the wall slenderness design criteria. The existing concrete walls do not have sufficient carry capacity to support the combined lateral and vertical loads.

The concrete walls have insufficient hurricane anchors to the floor and roof diaphragm to prevent separation from the floor and roof framing system.

The concrete columns do not satisfy the current concrete design code (ACI 318-05) minimum vertical and horizontal reinforcement. The existing concretes are not adequate to resist the combine design wind load and gravity load.

The existing wall can be reinforced with additional layer of steel reinforcement at inside face of the wall. The new layer of reinforcement must be dowelled into the face of existing concrete wall then encased with shotcrete. In lieu of the steel reinforcement and shotcrete, the existing concrete wall maybe can be strengthened by FRP systems. The layers of FRP will be applied onto the exterior and interior of the concrete wall. The existing concrete wall surface to receive the FRP must be clean and free of debris and dust prior to installation. The installation of the FRP and design will be per the manufacturer. For reinforcement of existing concrete walls, refer to Drawing SK-S1 in Appendix A. The wood girders will require additional members of wood or steel attached to the side of the existing members.

1.3.4 Building A Roof Framing

1.3.4.1 Existing Conditions

Building A is a two- story building partially connected to the auditorium. It consists of concrete perimeter walls and wood frame structure at the roof, second, and ground floor levels (see photos #10 and #11 in Appendix B). The roof has a low slope toward the southern edge of the roof that is over the auditorium roof. The high points of the roof are located at the northeastern and northwestern corners of the roof. The structural roofing system consists of ¾” x 5 ½” straight sheathing nailed on the 1 $^{5}/_{8}$” x 5 ½” wood joists and wood trusses. The existing wood joists are alternating with wood trusses spaced at 24 inches on center over the classrooms area. However, the wood joists are spaced at 24 inches on center over the hallway. The ends of the building roof structure consist of built-up 1 $^{5}/_{8}$” x 5 ½” top chord, ¾” x 5 ½” web member, and 1 $^{5}/_{8}$” x 7 ½” bottom chord. The 1 $^{5}/_{8}$” x 5 ½” joists and the built-up wood trusses are spanning east and west direction between perimeter concrete walls and interior wood stud walls. The wood trusses and the wood joists are also support by cripple studs at mid-section of the span. The existing 1 ½” x 3 ½” wood cripple studs are supported by 1 $^{5}/_{8}$” x 7 ½” wood ceiling joists that are spaced at 16 inches on center. The ceiling wood joist are supported by exterior 8-inch concrete wall and interior 2x6 nominal wood stud walls located at the hallway.

The existing ceiling of the auditorium consists of cement plaster wood lath attached to the underside of the ceiling 1 $^{5}/_{8}$” x 7 ½” wood joists that are located on top of the two 2 x 6 nominal wood top plate stud wall. The ceiling joists support the light fixtures and the drop-in suspended gypsum board ceiling.

The ¾” x 5 ½” straight sheathing is typically nailed to the support with two or three 8d common nails. The shear load parallel to the sheathing is resisted by the nail into the supporting member. The single straight sheathing historical data indicated the diaphragm system has a low shear capacity.

For auditorium roof framing layout of the existing structure, refer to drawing S-202 in Appendix A.

1.3.4.2 Deficiency and Mitigation

The ¾" x 5 ½" straight sheathing has very low horizontal shear capacity. The roof diaphragm has insufficient perimeter chord members and is not positively connected to the concrete wall. There is also a lack of out-of-plane anchorage from the exterior concrete wall to the roof diaphragm. Where the wood joists and wood trusses are framed into the concrete wall, the existing wood members are embedded approximately 2 inches into a wall pocket. The embedment of the wood joist into the concrete has insufficient anchors to resist bearing slippage and out-of-plane wind loading. The exact embedment of the wood member needs to be further field verified for final design. The concrete walls have insufficient hurricane anchors to resist out-of –plane wind loading and uplift wind forces. The embedment of the wood joists, wood trusses, and ceiling wood joists may not have sufficient strength to resist the applied loads when combined gravity and wind loads are considered. Additional hurricane anchorage should be added between the wood members to the concrete wall.

The existing roof diaphragm will require reinforcement to satisfy the new code prescribed lateral loads; this can be achieved by installing new plywood sheathing on top of the existing ¾" x 5 ½"straight sheathing with a closely spaced nail pattern anchored to the existing roof joists and to the 1 x straight sheathing. The perimeter edge of the roof diaphragm must be connected to the concrete wall with steel clip angle or 2 x wood ledgers to transfer the diaphragm loads laterally into the structural lateral load resisting wall.

The existing 2 x 4 cripple walls supported by the existing ceiling joist do not have sufficient connection at the top and bottom of the studs to resist uplift wind loads.

The existing wood trusses and their web members and connections have insufficient capacity to resist the wind uplift force. The members and their connection must be reinforced with additional members and positive hurricane ties. The roof plan in Appendix A has been noted by "**" to indicate existing wood joist and wood trusses that require strengthening of either or both their individual members and connections.

The 2 x 4 wood cripple stud walls were erected to reduce the span length and transfers the loads into the wall structural system. The existing 2 x 4 wood cripple stud walls have no hurricane ties at the top and bottom connections of the member. The connections of the wood cripple stud walls must be strengthened to resist hurricane wind loads.

For the reinforcement of the existing structural members and diaphragm refer to sketches, in Appendix A, as follows:

- For roof wood diaphragm, see drawings S-202 and SK-S7.
- For roof existing wood joists, see drawings S-202 and SK-S8.
- For roof existing wood trusses, see drawings S-202, SK-S9, and SK-S14.
- For roof joists at hallway / wood cripple wall, see Drawing SK-S12.
- For ceiling joist support, see Drawing SK-S15.

1.3.5 Building A Second-Floor Framing

1.3.5.1 Existing Conditions

The floor framing consists of ¾" x 5 ½" tongue-and-groove wood planks, secured to the 1 $^{5}/_{8}$" x 13 ½" wood joists (see photo #11 in Appendix B). The 1 $^{5}/_{8}$" x 13 ½" joist spaced at 16 inches on center span to the 1 $^{5}/_{8}$" x 5 ½" wood stud walls. The 1 $^{5}/_{8}$" x 5 ½" wood stud walls are located along the eastern and western sides of the hallway and on both sides of exit stairway. The exit stairway is located at both eastern and western ends of the building.

The ¾" x 5 ½" tongue-and-groove wood plank is anchored to the 1 $^{5}/_{8}$" x 13 ½" wood joist with two or three 8d nails. The 1 $^{5}/_{8}$" x 13 ½" wood joists are spaced at 16 inches on center and bear on the top of the two 2x wood top plate stud wall. The joist is toe-nailed to the wood top plate. The wood stud wall spans the second floor and the underside of the ceiling joists.

The second floor wood diaphragm is not sufficiently connected to the exterior concrete wall.

1.3.5.2 Deficiency and Mitigation

The wood girders should be provided with positive attachment to secure them onto the concrete pier and prevent any lateral movement. The positive attachment should be located at least at the first two piers at each row closest to the entrance door (northern interior wall). The concrete piers at this area are two to three feet above grade. Where the existing 1 $^{5}/_{8}$" x 7 ½" wood joist has not been toe-nailed to the girder, the wood joist must be secured to the wood girder with a minimum of two 16d nails in a toe-nail pattern.

The second floor diaphragm must be connected to the exterior concrete wall with hurricane anchors. The hurricane anchors must have sufficient capacity to resist the code prescribed design loads and resulting forces. The design wind loads are based on the buildings risk category II, designated for local government office facilities.

For the reinforcement of the existing structural members and diaphragms refer to drawings in Appendix A, as follows:

- For first existing diaphragm, see drawings S-201, SK-S5, and SK-S6.

1.3.6 Building A First-Floor Framing

1.3.6.1 Existing Conditions

The floor framing consists of ¾" x 5 ½" tongue-and-groove wood plank secured to the 1 $^{5}/_{8}$" x 7 ½" wood joists. The 1 $^{5}/_{8}$" x 7 ½" joists are spanning between 5 ½" x 7 ½" wood girders. The wood girders span piers/footings in the eastern and western directions. The wood girder is continuous over two or more supports. There is some evidence of water damage to the wood structural members, which may have been caused by defective existing plumbing.

The ¾" x 5 ½" tongue-and-groove wood plank is anchored to the 1 $^{5}/_{8}$" x7 ½" with two or three 8d common nails. The 1 $^{5}/_{8}$" x 7 ½" wood joists bear on the girder with toe nail secured to the wood girder and the vertical 1 $^{5}/_{8}$" x 5 ½" wood stud. The wood girder bears directly on the concrete pier without any positive anchorage. The reinforcement of each wood girder has been identified on the plan provided in Appendix A and is denoted by "R-*".

There is evidence of wood joists (1 $^{5}/_{8}$" x 7 ½") being damaged by termites or other wood-boring insects on the top and bottom. The wood joist damage occurs at the top of the joist, where wood sheathing connects/bears on the wood joist. There is also wood damage to some of the wood girders.

The existing wood joists (1 $^{5}/_{8}$" x 7 ½") that have been damaged and have insufficient carrying capacity to support the design load will need to be reinforced with additional new wood members.

1.3.6.2 Deficiency and Mitigation

The wood girders should be provided with positive attachment to secure them onto the concrete pier and prevent any lateral movement. The positive attachment should be located at the first two piers in each row closest to the entrance door (northern interior wall). The concrete piers in this area are two to three feet above grade. If the existing 1 $^{5}/_{8}$" x 7 ½" wood joist has not been toe-nailed to the girder, the wood joist must be secured to the wood girder with a minimum of two 16d nails in a toe-nail pattern.

The existing wood joists (1 $^{5}/_{8}$" x 7 ½") that have been damaged by water or insects and are found to have insufficient carrying capacity to support the design load will have to be reinforced with additional new wood members.

Existing wood joists and wood girders are insufficient to support the current 2010 Florida Building codes minimum uniformly distributed live loads. The design live loads are based on the buildings risk category II, designated for office use only, not for emergency preparedness and communications and operation center.

The existing wood joist and wood girder will need to be reinforced with additional wood members attached to the side of the existing member. The new reinforcement members will be, at a minimum, southern yellow pine, grade No. 2.

The existing ¾” x 5 ½” wood floor sheathing (plank) will be removed to review the extent of damage to the wood structural members that was caused by boring insects. A new layout of plywood will be installed to meet or exceed the current Florida Building Code requirements.

For the reinforcement of the existing structural members and diaphragm refer to drawings, in Appendix A, as follows:

- For first existing wood joists, see drawings S-201, SK-S2, and SK-S4.
- For first existing wood girders, see drawings S-201 and SK-S3.

1.3.7 Building A Load-Bearing Walls

1.3.7.1 Existing Conditions

Building A load-bearing walls are located at the perimeter of the building and on the interior along corridors. The exterior load-bearing walls are 8-inch concrete vertical structural elements that support the roof wood framing system. The exterior face of the concrete walls has been covered with at least 1 to 2 inches of hard stucco cement paste. The interior face of the walls has been painted with several layers of paint. The corners of the building’s concrete walls have been increased to double the thickness of the field wall. The existing concrete wall average compressive strength is an approximately 1,835 lbs/in^2. The concrete walls of Building A are less dense and have large aggregates than those of Building B. The interior walls are 1 $^5/_8$” x 7 ½”wood stud walls.

The exterior perimeter concrete walls have limited amounts of horizontal and vertical reinforcement. Based on the x-ray survey of the perimeter concrete walls, there are few reinforcing bars; but the survey is inconclusive as to the quantity and spacing in vertical and horizontal direction, size of bars, and location of reinforcement.

Based on the x-ray investigation on the perimeter concrete walls, the reinforcement in these structural elements appears to be insufficient and not meet the requirements of the Florida Building Code, in our opinion.

The concrete walls are not positively secured to the floor system.

1.3.7.2 Deficiency and Mitigation

The 8-inch concrete walls at the perimeter of the building have low compressive strength and insufficient reinforcement compared to requirements of the current concrete design code ACI 318-05. The existing concrete walls do not satisfy ACI 318-05 minimum vertical and horizontal reinforcement requirements, and exceed the limit wall slenderness design criteria. The existing concrete walls do not have sufficient carrying capacity to support the combined lateral and vertical loads prescribed by the current Florida Building Code.

The concrete walls have insufficient anchors to the floors and roof diaphragms to prevent separation from the floor and roof framing system. They also have insufficient hurricane anchors to the roof diaphragm to prevent uplift.

The concrete columns do not satisfy the current concrete design code (ACI 318-05) minimum vertical and horizontal reinforcement. The existing concrete is not adequate to resist the combined design wind load and gravity load.

The existing wall can be reinforced with additional layer of steel reinforcement on its inside face. The new layer of reinforcement must be dowelled into the face of the existing concrete wall then encased with shotcrete. In lieu of the steel reinforcement and shotcrete, the existing concrete wall may be strengthened by surface application of FRP systems. The layers of FRP will be applied onto the exterior and interior surfaces of the concrete wall. Concrete wall surfaces must be clean and free of debris and dust prior to installation of the FRP. The installation of the FRP and its design will be per the manufacturer/supplier and their professional engineer based on loads to be provided by the base building design engineer. For a proposed reinforcement scheme of the existing concrete wall, refer to Drawing SK-S1 in Appendix A.

The wood girders will require additional members of wood or steel be attached to their sides.

1.3.8 Building B Roof Framing

1.3.8.1 Existing Conditions

Building B is a two-story building partially connected to the auditorium at ground level only, via a hallway. Building B consists of concrete perimeter walls and a wood frame structure at the roof, second, and ground floor levels. The roof has a low slope downwards toward the north. The high points of the roof are located at the south eastern and southwestern corners of the roof. The structural roofing system consists of ¾" x 5 ½" straight sheathing nailed on the 1 $^5/_8$" x 5 ½" wood joists and wood trusses. The existing wood joists are alternating with wood trusses spaced at 24 inches on center over the classrooms area. However, the wood joists are spaced at 24 inches on center over the hallway. The ends of the building roof structure consist of built-up 1$^5/_8$" x 5 ½" top chord, ¾" x 5 ½" web member, and 1 $^5/_8$" x 7 ½" bottom chord. The 1 $^5/_8$" x 5 ½" joists and the built-up wood trusses are spanning in the east-west direction between perimeter concrete walls and interior wood stud walls. The wood trusses and the wood joists are also support by cripple studs at mid span. The existing 1 ½" x 3 ½" wood cripple studs are supported by 1 $^5/_8$" x 7 ½" wood ceiling joists that are spaced at 16 inches on center. The ceiling wood joist are supported by exterior 8-inch concrete wall and interior 2 x 6 nominal wood stud walls located at the hallway.

The existing ceiling of Building B consists of cement plaster wood lath attached to the underside of the ceiling 1 $^5/_8$" x 7 ½" wood joists that are located on top of the two 2 x 6 nominal wood top plate stud wall. The ceiling joists support the light fixtures and the drop-in suspended gypsum board ceiling.

The ¾" x 5 ½" straight sheathing is typically nailed to the support with two or three 8d common nails. The shear load perpendicular to the sheathing is resolved by coupling action of the nail. The shear load parallel to the sheathing is resisted by the nail into the supporting member. The single straight sheathing historical data indicate the diaphragm system has a low shear capacity.

For Building B roof framing layout of existing structure, refer to drawing S-202 in Appendix A.

1.3.8.2 Deficiency and Mitigation

The ¾" x 5 ½" straight sheathing has very low horizontal shear capacity. The roof diaphragm has insufficient perimeter chord members and is not positively and sufficiently connected to the concrete walls. There is also a lack of out-of-plane anchorage of the exterior concrete wall to the roof diaphragm. Where the wood joists and wood trusses frame into the concrete wall, the existing wood members are embedded approximately 2 inches into wall pockets. The embedment of the wood joist into the concrete has insufficient anchorage to resist bearing slippage and out-of-plane wind loading. The exact embedment of the wood member needs to be further field verified for final design. The concrete walls have insufficient hurricane anchors to resist out-of–plane wind loading and uplift wind forces. The embedment of the wood joists, wood trusses, and ceiling wood joists may not have sufficient strength to resist the applied load when combined with gravity and wind loads. Additional hurricane anchorage should be added between the wood members and the concrete wall.

The existing roof diaphragm will require reinforcement to satisfy the new code-prescribed lateral loads; this can be achieved by installing new plywood sheathing on top of the existing ¾" x 5 ½"straight sheathing with a closely spaced nail pattern anchored to the existing roof joists and to the 1 x straight sheathing. The perimeter edge of the roof diaphragm must be connected to the concrete wall with steel clip angles or 2 x wood ledgers to transfer the diaphragm loads laterally into the structural lateral load resisting wall.

The existing 2 x 4 cripple walls supported by the existing ceiling joist do not have sufficient connection at the top and bottom of the studs to resist uplift wind loads.

The existing wood trusses and their web members and connections have insufficient capacity to resist the wind uplift force. The members and their connections must be reinforced with additional members and positively connected to the walls via hurricane ties. The roof plan has, provided in Appendix A, been noted with "**" to indicate existing wood joist and wood trusses that require strengthening of either or both their individual members and connections.

The 2 x 4 wood cripple stud walls were erected to reduce the span length and transfers the loads into the wall structural system. The existing 2 x 4 wood cripple stud walls have no hurricane ties at the top and bottom connection of the member. The connections of the wood cripple stud wall must be strengthened to resist hurricane wind loads.

For the reinforcement of the existing structural members and diaphragm, refer to drawings in Appendix A, as follows:

- For roof wood diaphragm, see drawings S-202 and SK-S7.
- For roof existing wood joists, see drawings S-202 and SK-S8.
- For roof existing wood trusses see drawings S-202, SK-S9, and SK-S14.
- For roof joists at hallway / wood cripple wall, see Drawing SK-S12.
- For ceiling joist support, see Drawing SK-S15.

1.3.9 Building B Second-Floor Framing

1.3.9.1 Existing Conditions

The floor framing consists of ¾" x 5 ½" tongue-and-groove wood planks secured to the 1 $^{5}/_{8}$" x 13" wood joists. The 1 $^{5}/_{8}$" x 13" wood joists span 1 $^{5}/_{8}$" x 5 ½" wood stud walls. The 1 $^{5}/_{8}$" x 5 ½" wood stud walls are located along the eastern and western sides of the hallway and on both sides of exit stairway. The exit stairways are located at the eastern and western ends of the building.

The ¾" x 5 ½" tongue-and-groove wood planks are anchored to the 1 $^{5}/_{8}$" x13" wood joist with two or three 8d nails. The 1 $^{5}/_{8}$" x 13" wood joists are spaced at 12 inches on center and bear on the top of the two 2 x wood top plate stud wall. The joists are toe-nailed to the wood top plate. The wood stud walls span the second floor and the underside of the ceiling joists.

The second floor wood diaphragm is not sufficiently connected to the exterior concrete wall.

1.3.9.2 Deficiency and Mitigation

The wood girders should be positively attached to the concrete piers and prevent any lateral movement. The positive attachment should be located at least at the first two piers in each row closest to the entrance door (northern interior wall). The concrete piers in this area are two to three feet above grade. If the existing 1 $^{5}/_{8}$" x 7 ½" wood joists have not been toe-nailed to the girder, the wood joists must be secured to wood girders with a minimum of two 16d nails in a toe-nail pattern.

The second floor diaphragm must be connected to the exterior concrete wall by hurricane anchors. The hurricane anchors must have sufficient capacity to resist the design loads prescribed by the Florida Building Code.

The design wind loads are based on the buildings risk category II, designated for local government office facilities, not for emergency preparedness and communications and operation center.

For the recommended reinforcement of the existing structural members and diaphragms refer to drawings in Appendix A, as follows:

- For first existing diaphragm, see drawings S-201, SK-S5, and SK-S6.

1.3.10 Building B First-Floor Framing

1.3.10.1 Existing Conditions

The floor framing consists of ¾” x 5 ½” tongue-and-groove wood planks secured to the 1 $^5/_8$” x 7 ½” wood joists. The 1 $^5/_8$” x 7 ½” joists span 5 ½” x 7 ½” wood girders. The wood girders span in the east-west direction between piers/footings The wood girders are continuous over two or more supports. There is some evidence of water damage to the wood structural members, which may have been cause by defective existing plumbing.

The ¾” x 5 ½” tongue-and-groove wood planks are anchored to the 1 $^5/_8$” x7 ½” with two or three 8d common nails. The 1 $^5/_8$” x 7 ½” wood joists bear on the girders and are connected with toe nails secured to the wood girders and the vertical 1 $^5/_8$” x 5 ½” wood studs. The wood girders bear directly on the concrete piers without any positive anchorage. The necessary reinforcement of the wood girders, identified in CH2M HILL’s PCA, have been identified on the plan provided in Appendix A, and are denoted by “R-*”.

There is evidence of wood joists (1 $^5/_8$” x 7 ½”) being damaged by termites or other wood boring insects on the top and bottom. The wood joist damage occurs at the top of the joist where wood sheathing connects/bears on the wood joist. There is also wood damage at some of the wood girder.

The existing wood joists (1 $^5/_8$” x 7 ½”) that have been damaged and have insufficient carrying capacity to support the design load will need to be reinforced with the addition of new wood members.

1.3.10.2 Deficiency and Mitigation

The wood girders should be provided with positive attachment to secure them onto the concrete piers and prevent any lateral movement. The positive attachment should be located at least at the first two piers at each row closest to the entrance door (northern interior wall). The concrete piers at this area are two to three feet above grade. If the existing 1 $^5/_8$” x 7 ½” wood joists have not been toe-nailed to the girder, the wood joist must be secure to wood girder with a minimum of two 16d nails in a toe-nail pattern.

The existing wood joists (1 $^5/_8$” x 7 ½”) that have been damaged by water or insects and have insufficient carrying capacity to support the design load will need to be reinforced with the addition of new wood members.

The existing wood joists and wood girders are insufficient to support the current 2010 Florida Building Code’s minimum uniformly distributed live loads for office use. The design live loads are based on the buildings risk category II, designated for office use only, not for emergency preparedness and a communications and operation center.

The existing wood joists and wood girders will need to be reinforced with additional wood members attached to their sides. The new reinforcement members will be, at a minimum, southern yellow pine, grade No. 2.

The existing ¾” x 5 ½” wood floor sheathing (planks) will be removed to review the extent of damage caused by boring insects in the wood structural members. A new layer of plywood will be installed to meet or exceed the current Florida Building Code requirements.

For the reinforcement of the existing structural members and diaphragm, refer to drawings in Appendix A, as follows:

- For first existing wood joists, see drawings S-201, SK-S2, and SK-S4.
- For first existing wood girders, see drawings S-201 and SK-S3.

1.3.11 Building B Load-Bearing Walls

1.3.11.1 Existing Conditions

Building B load-bearing walls are located at the perimeter of the building and on the interior along corridors. The exterior of the load-bearing walls are 8-inch concrete vertical structural elements, which support the roof wood framing system. The exterior face of the concrete walls has been covered with at least 1 to 2 inches of hard stucco cement paste. The interior face of the walls has been painted with several layers of paint. The corners of the building's concrete walls have been increased to double the thickness of the field wall. The existing concrete wall average compressive strength is approximately 3,813 lbs/in^2.

The exterior perimeter concrete walls have a limited amount of horizontal and vertical reinforcement. Based on the x-ray survey of the perimeter concrete walls, there are few reinforcing bars; but the survey is inconclusive as to the quantity and spacing in vertical and horizontal directions, size of bars, and location of reinforcement.

Based on the x-ray investigation on the perimeter concrete walls, the reinforcement in these structural elements appears to be insufficient and not meet the requirements of the Florida Building Code, in our opinion.

The concrete walls are not positively secured to the floor system.

1.3.11.2 Deficiency and Mitigation

The 8-inch concrete walls at the perimeter of the building have low compressive strength and insufficient reinforcement compared to the requirements of the current design code ACI 318-05. The existing concrete walls do not satisfy ACI 318-05 minimum vertical and horizontal reinforcement requirements, and exceed the limit wall slenderness design criteria. The existing concrete walls do not have sufficient carrying capacity to support the combined lateral and vertical loads prescribed by the current Florida Building Code.

The concrete walls have insufficient anchors to the floor and to the roof diaphragms to prevent separation from the floor and roof framing system. They also have insufficient hurricane anchors to the roof diaphragm to prevent uplift.

The concrete columns do not satisfy the current concrete design code (ACI 318-05) minimum vertical and horizontal reinforcement. The existing concrete is not adequate to resist the combine design wind load and gravity load.

The existing wall can be reinforced with an additional layer of steel reinforcement on its inside face. The new layer of reinforcement must be dowelled into the face of existing concrete wall, and then encased with shotcrete. In lieu of the steel reinforcement and shotcrete, the existing concrete wall can be strengthened by surface application of FRP systems. The layers of FRP will be applied onto the exterior and interior surfaces of the concrete wall. Concrete wall surfaces must be clean and free of debris and dust prior to installation of the FRP. The installation of the FRP and its design will be per the manufacturer/supplier and their professional engineer, based on loads to be provided by the base building design engineer. For a proposed reinforcement scheme of an existing concrete wall, refer to Drawing SK-S1 in Appendix A.

The wood girders will require additional members of wood or steel attached to their side. The reinforcement required has been identified on plan S-200 and on the proposed reinforcing schedule provided on Drawing SK-S10 in Appendix A.

1.3.12 Facades

1.3.12.1 Fenestration System

Exterior Walls

1. The exterior walls are constructed on concrete masonry unit blocks with a stucco veneer.
2. Visible sections of the exterior walls were found to be in fair condition.

Windows

1. The exterior windows are aluminum awning units with clear glazing.
2. The windows are non-rated or impact resistant. There are accordion hurricane shutters at each window.

Doors

1. The exterior doors are solid core wood. The entry door has sidelight and transom.
2. The doors are not rated or compliant with Americans with Disabilities Act (ADA) requirements.

1.3.12.2 Recommendations

1. Due to the historic significance of the structure, the exterior walls and details shall be restored or preserved in keeping with the historic character of the property, per the Florida Building Code, Chapter 11 for Historic Buildings, which covers conservation and use of historic buildings. However, the FRP system cladding will require a new stucco finish to replicate the existing façade, changing the historic fabric of the building.
2. New impact doors and windows will be required to match the style, size, scale, and proportion of the existing building.

1.3.13 Roofing

1.3.13.1 Background Information

The roof at the Glynn Archer School was inspected by CH2M HILL from July 17 through July 20, 2012. This section of the PCA contains the following:

1. Description of the roof systems and components
2. Identification of deficiencies and roof problems through tests and photos
3. Condition report
4. Recommendations

1.3.13.2 Description

1. Building A
   Modified Bitumin Roof 8,500 square feet (SF)
   Roof Perimeter 410 linear feet (LF)
2. Auditorium Roof
   Modified Bitumin Roof 6,500 SF
   Roof Perimeter 400 LF
3. Building B
   Modified Bitumin Roof 8,500 SF
   Roof Perimeter 410 LF
4. Core samples of the roofs broken down by layers from top to bottom.
   a. **Building A (Reroofed over an Existing Roof)**
      1) Roof Surfacing
         - Mineral surface cap sheet set in hot asphalt
      2) Roof System
         - Two-ply sheets set in hot asphalt
      3) Insulation
         - Mechanically fastened ½ thick perlite insulation board
      4) Existing Roof Surfacing
         - Gravel set in hot asphalt
      5) Existing Roof System
         - Two-ply sheets set in hot asphalt
      6) Existing Vapor Barrier
         - One-ply sheet mechanically fastened to roof deck
      7) Roof Deck
         - 1” x 4” tongue-and-groove wood planks
         - Mechanically fastened to roof joist with 8b nails

8) Roof Structure
   - 2” x 6” roof joist at 2 feet on center (O.C.)

b. **Auditorium (North Area was Reroofed Over an Existing Roof; South Area was Completely Reroofed)**

North Area Roof Components same as Building A Roof

South Area:

1) Roof Surfacing
   - Mineral surface cap sheet set in hot asphalt
2) Roof System
   - 2-ply sheets set in hot asphalt
3) Vapor Barrier
   - 1-ply sheet mechanically fastened to roof deck
4) Roof Deck
   - 1” x 4” tongue-and-groove wood planks
   - Mechanically fastened to roof joist with 8b nails
5) Roof Structure
   - 2” x 6” roof joist at 2 feet O.C.

East and West Lower Roof

1) Roof Surfacing
   - Mineral surface cap sheet set in hot asphalt
2) Roof System
   - 2-ply sheets set in hot asphalt
3) Vapor Barrier
   - 1-ply sheet mechanically fastened to roof deck
4) Roof Deck
   - 1” x 2-1/2” tongue-and-groove wood planks
   - Mechanically fastened to roof joist with 8b nails
5) Roof Structure
   - 2” x 8” roof joist at 2 feet O.C.

c. **Building B (Reroofed over an Existing Roof)**

1) Roof Surfacing
   - Mineral surface cap sheet set in hot asphalt
2) Roof System
   - Two-ply sheets set in hot asphalt
3) Insulation
   - Mechanically fastened ½ thick perlite insulation board
4) Existing Roof Surfacing
   - Gravel set in hot asphalt
5) Existing Roof System
   - Two-ply sheets set in hot asphalt

6) Existing Vapor Barrier
    - One-ply sheet mechanically fastened to roof deck
7) Roof Deck
    - 1” x 4” wood planks
    - Mechanically fastened to roof joist with 8b nails
8) Roof Structure
    - 2” x 6” Roof Joist at 2 feet O.C.

1.3.13.3 Identification

1. Roof overview photographs. While the surface of the roofs appears to be in fair condition, further investigation revealed that the roof systems are in poor condition.

    See photos #12, 13, and 14 in Appendix B.

2. Most of the flashing around the perimeter and roof top equipment are in poor condition. There are splits and openings in flashing.

    See photos #15 through 22 in Appendix B.

3. Blisters in the roof are widespread. Many blisters are very large. Blisters occur when water is trapped within the roof system. Many of the blisters are brittle and may split, which could allow water to enter the building.

    See photos #23 through 25 in Appendix B.

4. Alligatoring in the base flashing is widespread. Alligatoring is the cracking of the surfacing bituminous roof coating. It is caused by the drying out of the exposed asphalt surfacing by the sun. Water will enter the roof system and cause unseen damage in the roof system. As the surface layers fail, the fiberglass reinforcement underneath is exposed and becomes brittle, and membrane failure inevitably follows.

    See photos #26 through 28 in Appendix B.

1.3.13.4 Condition Report

1. Core samples have been taken of the roof systems. These cross sections of the roofs indicate water is entering the roofs system and being trapped between the existing built-up roof and the modified bitumen reroof. Watertight integrity should not be expected of these roofs.

See photos #29 through 32 in Appendix B.

2. The base flashings at the perimeter and mechanical unit curbs have failed and received multiple repairs.
3. Many old and failed repairs have been recoated or reroofed. These new repairs applied over old repairs may not be watertight.
4. Most of the roofs have sufficient slope to shed water. There are two areas on the auditorium’s lower roofs that do not have sufficient slope and hold water.

    The roof contains many medium and large blisters. These blisters show water intrusion between the roof systems. These blisters are in danger of rupture.

1.3.13.5 Recommendation

A complete removal of the existing roof systems to the wood deck, and the installation of a new roof with the proper insulation, should be considered soon. Because of the complex nature and the proposed adaptive reuse of these buildings, the design professional should determine which roof system will be best for the new city hall.

1.4 Mechanical and Electrical Systems

1.4.1 Plumbing Systems

1.4.1.1 Background Information

The plumbing systems at the Glynn Archer School were visually inspected by CH2M HILL from July 17 through July 19, 2012. This section of the PCA contains the following:

1. Description and condition assessment of the plumbing systems and components
2. Recommendations

1.4.1.2 Description and Condition Assessment

1. Fixtures

The building contains approximately 25 water closets, 7 urinals, and 16 lavatories located in restrooms throughout the two buildings. The fixtures are in fair to good condition.

2. Sanitary Piping

Sanitary piping consists of a mixture of cast iron and PVC pipe. Most of the pipe in the crawl spaces was PVC; most of the pipe above the level of the first floor leading to second floor restrooms was cast iron. The pipe appeared to be in fair to good condition. A large crack was noted in the cast iron sanitary piping leading from the teachers' lounge (Room 121).

The sanitary pipe exited the building to White Street from Building A and to United Street from Building B.

3. Domestic Water Piping

Domestic water enters the property from a main running on United Street, with meters located in the sidewalk north of Building B. The domestic water piping is a mixture of copper and PVC piping. Similar to the sanitary piping, PVC is used in the crawl space and the copper pipe is located in the walls above the level of the first floor. A leak was noted in the domestic water piping in the crawl space area below the administration area during a preliminary walkthrough in April; this leak was corrected by the time of the July inspection. The piping appeared to be in fair to good condition.

1.4.1.3 Recommendations

The locations of the current restrooms do not appear to match the locations of the restrooms in the proposed city hall reuse. In addition, the current restrooms do not meet requirements of the codes for handicapped access. CH2M HILL recommends the current fixtures and piping be removed and the design professional provide a new design based on the requirements of the new city hall layout.

1.4.2 HVAC Systems

1.4.2.1 Background Information

The HVAC systems at the Glynn Archer School were visually inspected by CH2M HILL from July 17 through July 19, 2012. This section of the PCA contains the following:

1. Description and condition assessment of the HVAC systems and components
2. Recommendations

1.4.2.2 Description and Condition Assessment

Classrooms

In general, the classrooms of the school are served by ductless split system DX air-conditioning units, with the condensing units located on the ground outside the classroom and the evaporator units located on the walls of the classrooms. The units are controlled by thermostats located in the classrooms. The condition of the condensing units ranged from poor (large amounts of rust and clogged coils) to nearly new. The following condensing and evaporator units serving classrooms were found at the school:

Building	Condensing Unit Location	Condition	Evaporator Coil Location	Condition
A	Ground, SE Corner	Fair	Room 200	Inaccessible
A	Ground, SE Corner	Good	Room 100	Fair
A	Ground, Front South	Good	Room 213	Fair
A	Ground, Front North	Fair	Room 213	Fair
A	Ground, Front North	Fair	Room 202	Fair
A	Ground, North side	Poor	Room 203	Inaccessible
A	Ground, NW Corner	Poor	Room 205	Fair
A	Ground, NW Corner	Poor	Room 102	Fair
A	Ground, SE Corner	Fair	Room 204	Fair
A	Ground, SE Corner	Poor	Room 103	Fair
A	Wall Mount, Outside Room 212	Fair	Room 212	Fair
B	Ground, SE Corner	Fair	Room 206	Fair
B	Ground, SE Corner	Fair	Room 104	Fair
B	South CU on Bridge, East Side	Poor	Room 215	New
B	North CU on Bridge, East Side	Fair	Room 105	Good
B	Ground, NE corner	Good	Room 106	Poor
B	Ground, NE corner	Good	Room 207	Fair
B	Roof, NW Corner	Inaccessible	Not Known	--
B	Roof, NW Corner	Good	Room 108	Fair
B	Roof, NW Corner	Fair	Room 209	Fair
B	Ground, SW Corner	Good	Room 109	Fair
B	Ground, SW Corner	Good	Room 208	Good

Definitions used in PCA: *New: newly installed; Good: installed in last several years, little to no rust on unit casing, coils free of debris and coil fins not damaged; Fair: over 5 years old, some rust on unit casing, limited debris in coils, with some coil fin damage; Poor: nearing the end of useful life, severe rust, clogged coils, extensive fin damage.*

Administrative Areas

The administration areas of the school (the main office in Building A and the teachers' lounge in Building B) are served by split system DX air-conditioning units, with the condensing units located on the ground outside the rooms and the air handling units located in the space served. The air handling unit serving the main office is located in a closet and is ducted to the spaces. The unit serving the teachers' lounge is located in the lounge with a central duct and single register serving the space. The units are controlled by thermostats located in the areas served. The following condensing and evaporator units serving administrative areas were found at the school:

Building	Condensing Unit Location	Condition	Evaporator Coil Location	Condition
A	Ground, Front North	Poor	Room 119G (Main Office)	Poor
B	Ground, South Side	Fair	Room 121 (Teachers' Lounge)	Good

Auditorium

The auditorium of the school is served by two rooftop-mounted packaged air handling units located on the roof of the auditorium. Supply and return air from the units is ducted directly into the auditorium through a combined diffuser/return grille for each unit. The units are controlled by thermostats located in the auditorium.

- Corridors:

The corridors of the school are not conditioned.

- Restrooms:

The restrooms of the school are served by rooftop mounted exhaust fans in fair condition.

1.4.2.3 Recommendations

The current HVAC system is not suitable for the proposed city hall reuse. The majority of the current systems are in fair to poor condition and do not meet code requirements for provision of outside air to the spaces. In addition, the ductless split systems are unlikely to meet the cooling loads of the newly designed spaces. CH2M HILL recommends that the existing systems be removed and the design professional determine which HVAC system will best meet the requirements of the new city hall based on the use of the spaces.

1.4.3 Electrical

Recommendations are the result of a preliminary inspection of the existing electrical systems of the Glynn Archer School taking place from July 17 through July 20, 2012.

See photos #40 through 42 in Appendix B.

1.4.3.1 Observations

Modifications to the existing electrical system over the past 10 to 15 years have resulted in a combination of several different types of power distribution and branch circuit systems. These systems currently meet the minimum needs of the existing facility, but are not adequate for expansion. Additionally, the magnitude of required improvements and renovations of the electrical system would cross the National Electrical Code (NEC) threshold for new installations, which requires all electrical systems meet the 2011 NEC.

The existing electrical room is not isolated from general access, constructed of wood, and not fire-rated. The existing service drop does not meet current NEC requirements. The drop is overhead, travels over an existing roof, and enters the building without over-current protection or an exterior disconnecting means.

1.4.3.2 Recommendations

The existing electrical system is antiquated and reaching the end the expected life cycle for this type of facility. The electrical system is not eligible for salvage in connection with future expansion or renovation of the existing facility.

A new composite building systems structure for a fireproof electrical room with limited access should be constructed. The existing service drop should be replaced to meet current NEC requirements.

1.5 Life Safety and Fire Protection

1.5.1 Sprinklers and Standpipes

The buildings do not have sprinklers. There are two fire hydrants on the north side of White Street and two hydrants on United Street adjacent to school property.

1.5.2 Alarm System

There is an alarm system with pull stations, horn, and strobe devices and an intercom system throughout the facilities.

See photos #33 and 34 in Appendix B.

1.5.3 Fire Extinguishers

There are fire extinguishers throughout the facilities.

See photo #34 in Appendix B.

1.5.4 Smoke Detectors

There are smoke detectors at the top and bottom of the stairs in both Buildings A and B. No smoke detectors were observed in the auditorium, stage, closets, electrical rooms, storage rooms, restrooms, and classrooms.

See photo #35 in Appendix B.

1.5.5 Emergency Lighting

There is emergency lighting in the corridors of Buildings A and B, and in the auditorium. No emergency lights or emergency ballast were observed in the classrooms, restrooms, or offices.

See photos #36 and 37 in Appendix B.

1.5.6 Means of Egress

The path of travel to the exit doors was properly identified. Corridor walls and door along the means of egress are not rated. No UL labels were observed on the doors or frames. The steel stairs at the exits from the second floor are severely corroded.

See photos #38 and 39 in Appendix B.

1.5.7 Recommendation

Because of the proposed adaptive reuse of these buildings and the proposed new layout and classification, all new systems will be required. The design team will need to do a complete Life Safety Analysis and Code Search per NFPA and the Florida Building Code.

1.6 ADA Compliance

The facilities do not comply with Title III of the ADA Guidelines. The design team will be required to incorporate ADA Guidelines into the proposed new layout.

1.7 Environmental Conditions

CH2M HILL retained the services of EE&G Environmental Services, LLC (EE&G) to perform an inspection and testing for asbestos, lead, and mold in Buildings A, B, and C of the Glynn Archer School. The full reports are presented in Appendix D.

1.7.1 Asbestos

The inspection was conducted in June 2012 by AHERA-certified inspectors Rich Grupenhoff, Ramsey Abreu, Hiram Aguiar, and Sean Nemser of EE&G. Buildings A, B, and the Auditorium were constructed in the 1920s. They were observed to be constructed primarily of concrete, steel, and wood. Interior walls were observed to be finished with plaster and drywall. Ceilings were observed to be finished with laid-in ceiling tile, plaster and drywall. Floors were observed to be finished with vinyl floor tile, wood, and ceramic tile. The floor in the Auditorium was wood with linoleum. Building C, constructed in the 1950s, was of similar construction to the other buildings.

The classrooms, corridors, common areas, and roof areas were inspected for suspect ACM, unless otherwise noted. Each observed suspect material was assigned a homogenous area number, described, and measured. Each observed suspect material was either sampled or assumed to be asbestos-containing. Samples of suspect asbestos containing materials were collected using procedures established by the United States Environmental Protection

Agency (EPA) Code of Federal Regulations (CFR) Title 40 Part 763 Subpart E, Asbestos-Containing Materials in Schools.

Samples were sent to AAL in Tampa, Florida for analysis. Upon arrival at the laboratory, the samples were logged-in and stored for analysis. Analyses were performed using the polarized light microscopy method of asbestos detection, according to guidelines and procedures established in the Method for the Determination of Asbestos in Bulk Building Materials (EPA-600/R-93-116 July, 1993).

Asbestos was identified in amounts greater than 1 percent in the following materials:

Building A

Tan 12”x12” VFT mastic (2-5%C)
Black VFT (2-5%C)
Brown VFT (2-5%C)
Light Green 9”x9” VFT (2-5%C)
Green 12”x12” VFT (2-5%C)
Light Green VFT (2-5%C)
Cream 9”x9” VFT (2-5%C)
Green 9”x9” VFT (2-5%C)
Pink 9”x9” VFT (2-5%C)
Light Green 9”x9” VFT (2-5%C)
Black/Grey cap flashing/sealant (5-10%C)

Building B

Brown VFT (2-5%C)
Beige 12”x12” VFT mastic (2-5%C)
Black VFT (2-5%C)
Grey VFT (2-5%C)
Brown 9”x9” VFT (2-5%C) with black mastic (2-5%C)
Black VFT (2-5%C) with black mastic (2-5%C)
Red 9”x9” VFT (2-5%C) with black mastic (2-5%C)
White 9”x9” VFT (2-5%C) with black mastic (2-5%C)
Green 9”x9” VFT (5-10%C)

Building C

Grey 9”x9” VFT (2-5%C) with black mastic (5-10%C)
Green VFT (2-5%C) with black mastic (5-10%C)
Grey VFT (2-5%C) with black mastic (5-10%C)
Black roof curb wall counter flashing (5-10%C)

Auditorium

Tan pebble linoleum (20-25%C in paper backing)
Maroon VFT (2-5%C)

In general, these materials are found throughout the buildings; the location, quantity, and condition of these materials is detailed in the report. The asbestos was observed to be in a non-friable state. No action is required for these materials unless they are disturbed.

Full recommendations are included in the report. In general, the removal and disposal of asbestos containing material for the purposes of renovation must be performed by a Florida-licensed asbestos contractor.

1.7.2 Lead-Based Paint

Hiram Aguiar, EPA Lead-Based Paint Risk Assessor, of EE&G, conducted a limited Lead-Based Paint (LBP) inspection of Buildings A, B, Auditorium, and C at Glynn Archer Elementary School in June 2012. EE&G’s scope of work for this project consisted of evaluating the subject facility utilizing an X-Ray Fluorescence (XRF) instrument to assess for lead concentrations in selected painted building components.

The Department of Housing and Urban Development defines LBP as paints or coatings with lead concentrations equal to or greater than 1.0 mg/cm^2 when measured by XRF. Paints used throughout the facility on interior and exterior walls, doors, and trim in Buildings A, B, and the Auditorium tested positive by XRF for lead-based paint. The testing of the paints in Building C did not indicate the presence of lead.

CH2M HILL recommends that LBP that has become damaged should be abated during any renovations. Any abatement procedure in which LBP is disturbed should be conducted by trained personnel and in accordance with all federal, state, and local regulations, including OSHA's lead regulation, 29 CFR 1926.62. Also, prior to disposal, the entire waste stream from LBP abatement (paint, rags, protective suits, debris, etc.) must be characterized by a Toxic Characteristic Leachate Procedure (TCLP) test. The EPA requires TCLP testing to determine if the waste is considered hazardous.

Full recommendations for abatement during renovations and/or demolition are presented in the report in Appendix D.

1.7.3 Mold

EE&G inspected the building for the presence of suspect mold growth during the onsite inspection in July 2012. In general, the construction materials used in the buildings, wood, plaster, metals, and concrete do not typically support mold growth in indoor environments. Little suspected mold growth was observed throughout the buildings, except in areas where water leaks were noted. For example, in the outdoor corridor ceiling on the southern side of the Auditorium, water damage from and apparent roof leak was noted, with subsequent mold growth on the wood ceiling material.

CH2M HILL recommends that any suspect mold growth be removed during demolition or renovation.

A full report on the mold growth found in the buildings is presented in Appendix D.