Macon-Bibb County Government

Procurement Department

Government Center Annex

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Macon, Georgia 31201

(478) 803-0550

Fax (478) 751-7252

Nyesha Daley, MBA, CPPB
Director of Procurement

November 24, 2015

ADDENDUM 1

To: ALL PROSPECTIVE FIRMS

Re: INVITATION FOR BIDS: **16-27-DS Frank Johnson Community Center**

The Invitation for Bids, referenced above, is modified as follows:

1. Drawing updates and materials clarification.

Please incorporate this change into the Invitation for Bid and acknowledge receipt of this addendum on your bid form.

Sincerely,

Desmond Schneider

Procurement Officer I

Frank Johnson Community Center
Project #15-418.1

Addendum 1

Item 1.1 Specification 07 4646 Fiber Cement Siding
- Add 07 4646 Fiber Cement Siding Specification

Item 1.2 Specification 07 2413 Metal Wall Panels
- Delete Specification 07 2413 Metal Wall Panels.

Item 1.3 Life Safety Sheet
- **See attached Life Safety Sheet LS-1**

Item 1.4 Specification 07 5423 Thermoplastic-Polyolefin Roofing (TPO), Part 2.01 Manufacturers
- Add GAF Corporation as an acceptable manufacturer

Item 1.5 Unit Prices

Provide unit prices for the following:
- Tectum roof deck panels to match existing.

Item 1.6 Geo-tech and Hazardous Material Report
- See attached Geo-tech and Hazardous Material Reports by GEC.

Item 1.7 Resinous Epoxy Flooring
- Add Florock, as an approved manufacturer,
  - 4350 S. Halsted Street Chicago, IL 60609-2699 USA
  - http://www.florock.net/

Item 1.8 Specification 08 4413 Glazed Aluminum Curtainwall
- Delete Specification 08 4413 Glazed Aluminum Curtainwall

Item 1.9 Asphalt Shingle
- Basis of design: GAF Timberline HD

Item 1.10 Alternates Clarification
- Add Specification 01 2300 Alternates. This replaces list of alternates on sheet T1.2

Item 1.11 MEP Specification Changes

- Section 21 0513 - Common Requirements for Fire Suppression Equipment
  - Add Section 21 0513, included herewith.
- Section 21 0514 - Closeout Documents for Fire Suppression Equipment

- Add Section 21 0514, included herewith.

- Section 21 0529 - Hangers and Supports for Fire Suppression Equipment
  - Add Section 21 0529, included herewith.

- Section 21 1315 - Fire Suppression Piping
  - Add Section 21 1315, included herewith.

- Section 22 1413 - Facility Storm Drainage Piping
  - Add Section 21 1413, included herewith.

- Section 28 1601 - Security System Extension
  - On page 28 1601-1, delete paragraph 1.03.A in its entirety and replace with the following:
    - "A. Design and layout complete security/burglar and door locking system for approval by the Architect/Owner."

Item 1.12 MEP Drawing Changes

- Sheet P101 - Plumbing Demolition and New Work Floor Plans:
  - Delete this sheet in its entirety and replace with P101, revised 11/23/2015, included herewith.

- Sheet M601 - Mechanical Legend & Schedules:
  - Delete this sheet in its entirety and replace with M601, revised 11/23/2015, included herewith.

- Sheet E101 -Electrical Lighting Floor Plan
  - Delete this note 9 in its entirety.

- Sheet E302 - Electrical Fire Alarm Floor Plan
  - Room #119: Make fire alarm connection to sprinkler flow and tamper switches provided by Division 21.

- Sheet E801 - Electrical Legend & Schedules
  - Light Fixture Schedule:
    - Change Type "A" light fixture to
      - "LED, Hubbell #Alera LP70A-40 HL-80-CM-E-ELL10"
    - Change Type "H" light fixture to
      - "LED, Prudential #P46-LED4-X-SAL-D3-SC-UNV-CA96"-X3-EMH"

End of Addendum

SECTION 07 4646
FIBER CEMENT SIDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood-fiber cement siding rainscreen system.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Siding substrate.

B. Section 07 2500 - Weather Barriers: Weather barrier under siding.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

B. ASTM C1186 - Standard Specification for Flat Fiber Cement Sheets; 2008 (Reapproved 2012).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Manufacturer's requirements for related materials to be installed by others.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods, including fastener patterns.

C. Shop Drawings: Provide reference plans, elevations, large-scale details at corners, terminations, transitions, typical joint conditions, etc. Include coordination drawings indicating primary support framing, system sub-framing, and panel layout.

D. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).

E. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.

F. Warranty: Submit copy of manufacturer’s warranty, made out in Owner’s name, showing that it has been registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum 3 years of experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products under waterproof cover and elevated above grade, on a flat surface.

PART 2 PRODUCTS

2.01 SIDING

A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.
   1. Style: Standard lap style.
   2. Texture: Smooth.
   3. Length: 12 ft (3.7 m), nominal.
   4. Width (Height): 5-1/4 inches (133 mm).
   5. Thickness: 5/16 inch (8 mm), nominal.
   6. Finish: Factory applied primer.
   7. Warranty: 50 year limited; transferable.
   8. Lap Siding Manufacturers:
      a. CertainTeed Corporation : www.certainteed.com.
      b. *Basis of Design* James Hardie Building Products, Inc : www.jameshardie.com.
      c. Nichiha USA, Inc : www.nichiha.com.

B. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C 1186 Type A Grade II; with machined edges.
   1. Texture: Smooth.
   2. Length (Height): 120 inches (3000 mm), nominal.
   3. Width: 48 inches (1220 mm).
   4. Thickness: 5/16 inch (8 mm), nominal.
   5. Finish: Factory applied primer.
   6. Warranty: 50 year limited; transferable.
   7. Panel Siding Manufacturers:
      a. James Hardie Building Products, Inc Basis of Design system: www.jameshardie.com.
      b. Nichiha USA, Inc Architectural Block - Basis of Design: www.nichiha.com.
      c. CertainTeed Corporation Match Basis of Design system: www.certainteed.com..

C. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186 Type A Grade II; with machined edges, for nail attachment.
   1. Texture: Smooth.
   2. Length: 96 inches (2400 mm), nominal.
   3. Width: 48 inches (1220 mm).
   4. Thickness: 5/16 inch (8 mm), nominal.
   5. Finish: Factory applied primer.
   6. Manufacturer: Same as siding.

D. Aluminum Reveal System by Fry Reglet for exterior cement fiber board installation. (exterior of New addition)
   1. "Basis of Design" Fiber Cement Panel Trims, Manufacturer: Fry Reglet
   2. Clear anodized finish
   3. 1/2" Reveal
   4. Refer to manufacturers installation instructions.

2.02 ACCESSORIES

A. Sub-framing: Pressure Treated 2 x 4 furring strip. Refer to Section 06 1000.

B. Weather seal flashing at furring strips: EPDM or Grace Perma Barrier to be used between pressure treated wood furring and cement fiberboard and between wood furring at locations where furring is directly attached to Concrete Masonry.

C. Trim: Same material, color, and texture as field panels.

D. Flashing: Prefinished hot-dipped galvanized steel, aluminum at reveal system panels.

E. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 4" inch (__ mm).

F. Joint Sealer: As specified in Section 07 9005.

G. Aluminum Reveal by Fry Reglet for exterior cement fiber board installation.

H. Finish Paint: See 09 9000 Paints and Coatings.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine substrate and clean and repair as required to eliminate conditions that would be detrimental to proper installation.

B. Verify that weather barrier has been installed over substrate completely and correctly.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Install sheet metal flashing:
   1. Above door and window trim and casings.
   2. Above horizontal trim in field of siding.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.
   1. Read warranty and comply with all terms necessary to maintain warranty coverage.
   2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
   3. Use trim details indicated on drawings.
   4. Touch up all field cut edges before installing.
   5. Pre-drill fastener holes.

B. Over Foam Insulation: Read and comply with fiber cement manufacturer's recommendations.
   1. Install pressure treated 2x4 furring strips over foam insulation. Securely anchor 2x4 furring to masonry with masonry anchors.

C. Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.

D. Attach panels to sub-framing with manufacturer's composite clips. Use long joint clips to attach to sub-framing when joint is off-module.

E. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.

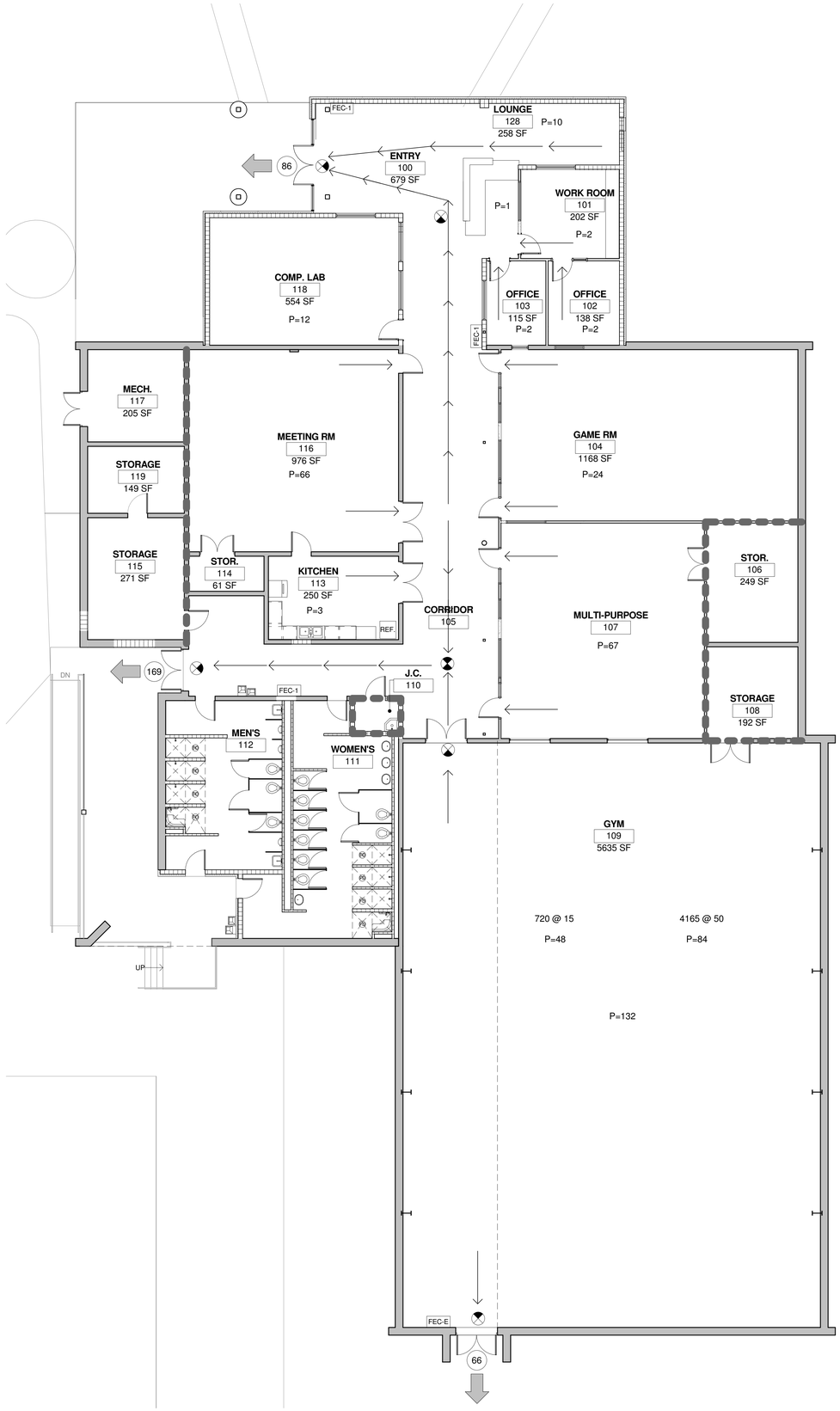
F. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.

G. Corner Joints: Field-miter panels without exposed trim in accordance with manufacturer's written instructions.

H. Do not install siding less than 6 inches (150 mm) from surface of ground nor closer than 1 inch (25 mm) to roofs, patios, porches, and other surfaces where water may collect.

I. After installation, seal perimeter joints and penetrations. Fill countersunk fastener holes with patching compound. Sand all exposed cut edges smooth. Prime all non-factory finished areas. Follow manufacturers guidelines for patching and repair to provide a uniform paintable surface.

END OF SECTION 07 4646



1 LS 1 LIFE SAFETY PLAN

SCALE: 1/8" = 1'-0"

GENERAL CODE NOTES

1. ALL SPACES ARE CONSIDERED BUSINESS OCCUPANCY WITH EDUCATIONAL USE, U.N.O.
2. OCCUPANT LOAD OF ALL ASSEMBLY SPACES IS CALCULATED PER TABLE 1004.1.1 (IBC) AND TABLE 7.3.1.2 (NFPA 101)
3. ALL SPACES NOT PROVIDED WITH A SPATIAL USE TAG OR OCCUPANT LOAD ARE CONSIDERED INCIDENTAL USE TO EDUCATIONAL AND ARE NOT CONSIDERED NORMALLY OCCUPIED SPACES.
4. ALL SPACES TAGGED (A) (ASSEMBLY) ARE CALCULATED IN ACCORDANCE WITH ASSEMBLY USE LOAD (1:15) PER TABLE 1004.1.1 (IBC) AND TABLE 7.3.1.2 (NFPA 101) AND ARE CONSIDERED INCIDENTAL TO BUSINESS OCCUPANCY.
5. ALL EXIT AND EXIT ACCESS DOORS PROVIDE 34" OF CLEAR EXIT WIDTH IF SINGLE LEAF AND 68" IF DOUBLE LEAF UNLESS OTHERWISE NOTED. AS SUCH, EGRESS CAPACITIES ARE 170 AND 340 OCCUPANTS RESPECTIVELY PER TABLE.

LIFE SAFETY SYMBOLS LEGEND

- EXIT PATH
- EXIT DISCHARGE
- 54 — NUMBER OF OCCUPANTS IN EXIT PATH
- EXIT LIGHT
- STAIR EXIT LANDING
- P = xx — OCCUPANT LOAD
- FEC-# — FIRE EXTINGUISHER CABINET (SEE SPEC FOR INSTALLATION TYPE)
- A — SPATIAL USE TAG
- FE — BRACKET MOUNTED FIRE EXTINGUISHER
- 90' TD — TRAVEL DISTANCE
- 75' CPT — COMMON PATH OF TRAVEL
- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER

AREA INCREASE TABLE

CONSTRUCTION TYPE	OCCUPANCY	ALLOWABLE BUILDING AREA (TABLE 503)	FRONTAGE INCREASE PER 506.2 2012 IBC	
II B II(000)	A-3	9,500 SF PER FLOOR	If = (F/P - 0.25) W/30 If = (1 - 0.25) 1 If = .75	Is=3

AREA MODIFICATION: UNLIMITED AREA SECTION 507.6 FOR A3 TYPE II

CODES AND REGULATION DATA

ITEM	SUBJECT	IBC	NFPA
1	RENOVATION OR ALTERATION:	ALTERATION	-
2	EQUIVALENCY CONCEPTS	NONE	NONE
3	OCCUPANCY CLASSIFICATION	ASSEMBLY A-3	ASSEMBLY
4	BUILDING AREA	ADDITION: 2,112 SF EXISTING: 13,406 SF TOTAL 15,518 SF	-
5	HIGH HAZARD AREA	NONE	NONE
6	NUMBER OF STORIES	1	
7	HEIGHT OF BUILDING	38'-0"	
8	OCCUPANT LOAD/MEANS OF EGRESS	SEE LIFE SAFETY PLANS	
9	CONSTRUCTION TYPE	TYPE II B SPRINKLERED	TYPE II(111) SPRINKLERED
10	NUMBER OF EXITS REQUIRED	FIRST FLOOR: 3	FIRST FLOOR: 3
11	DEAD END CORRIDORS		20' - 0" MAXIMUM
12	TRAVEL DISTANCE	--	250'-0" MAXIMUM
13	COMMON PATH OF TRAVEL	--	20'-0" / 75'-0" MAXIMUM
14	FIRE RATING OF STAIRWAYS	N/A	
15	FIRE RATING OF ELEVATOR SHAFTS	N/A	
16	FIRE RATING OF EXIT ACCESS CORRIDORS	0 - NOT REQUIRED PER EXCEPTION (1) TO 7.1.3.1 2012 LSC	
17	--	--	
18	APPLICABLE CODES	IBC 2012 EDITION IBC MECHANICAL CODE 2012 EDITION IBC PLUMBING CODE 2012 EDITION IBC FUEL GAS CODE 2012 EDITION NATIONAL ELECTRICAL CODE 2011 EDITION NFPA 101 2012 EDITION ADA 2010 EDITION	
19	AREAS OF REFUGE	INTERNATIONAL FIRE CODE 2012 EDITION	

WWA/2 ARCHITECTS
348 COTTON AVE.#500
P.O. BOX 110
MACON, GEORGIA 31021

2WR + PARTNERS
ARCHITECTURE | INTERIORS
11 Ninth Street
Suite 120
Columbus, GA 31901
P. (706) 571-6923
F. (706) 571-6928

STATE OF GEORGIA
REGISTERED ARCHITECT

FRANK JOHNSON COMMUNITY CENTER

BIBB COUNTY PARKS AND RECREATION

CONSTRUCTION DOCUMENTS

REVISIONS

#	DATE	DESCRIPTION

Date: NOVEMBER 3, 2015
Drawn By: TA, SF
Checked By: LM
Project Number: 15-418.1

Sheet Name:
LIFE SAFETY PLAN

Sheet Number:
LS 1

CONSTRUCTION DOCUMENTS
11/8/2015 7:38:07 PM

SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION MACON-BIBB COMMUNITY CENTER ADDITIONS FRANK JOHNSON RECREATION CENTER MACON, GEORGIA GEC PROJECT NO. 150541.210

PREPARED FOR

MR. CHARLES GREEN, AIA
WM2A ARCHITECTS
348 COTTON AVENUE, SUITE 500
MACON, GEORGIA 31201

PREPARED BY

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.
514 HILLCREST INDUSTRIAL BLVD.
MACON, GEORGIA 31204
478-757-1606

JULY 30, 2015

GEC
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC

July 30, 2015

Mr. Charles Green
W2MA Architects
348 Cotton Avenue, Suite 500
Macon, Georgia 31201

SUBJECT: Subsurface Exploration and Geotechnical Engineering Evaluation
Macon-Bibb Community Center Additions
Frank Johnson Recreation Center
Macon, Georgia
GEC Project No. 150541.210

Dear Mr. Green:

Geotechnical & Environmental Consultants, Inc. (GEC) is pleased to present the following report of our subsurface exploration and geotechnical engineering evaluation for the proposed Frank Johnson Recreation Center site in Macon, Georgia.

The purpose of this exploration was to obtain data to evaluate the subsurface conditions at the site in order to make an assessment of site conditions pertaining to site preparation, earthwork procedures, foundation bearing pressures, and floor slab support. The following report initially presents a brief summary of our conclusions and recommendations, followed by a description of the proposed development, our methods of exploration, and the site and subsurface conditions encountered. Finally, our conclusions and recommendations are presented regarding the proposed development and final project design.

We greatly appreciate the opportunity to provide these services to you. If you have any questions, or if we can be of further assistance, please do not hesitate to call.

Sincerely,

GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

Brad Thigpen
Project Engineer

Thomas E. Driver, P.E.
President
Ga. Reg. #17394

BRT/TED/tg

GEC

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MACON-BIBB COMMUNITY CENTER ADDITIONS
FRANK JOHNSON RECREATION CENTER
MACON, GEORGIA
GEC PROJECT NO. 150541.210

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APPENDIX

SITE LOCATION MAP

BORING LOCATION PLAN

SOIL TEST BORING PROCEDURES

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

SOIL BORING RECORDS

SOIL CLASSIFICATION CHART

GEC

1.0 SUMMARY

The following summary highlights our pertinent findings and recommendations concerning this project. Information listed in this section should not be used for design without referring to the remaining text of this report for more detail.

1. Two (2) soil test borings were drilled at the site.

2. Topsoil and Coastal Plain Physiographic Province soils were encountered across the proposed project site. An approximately 4" layer of topsoil was encountered at each of the borings. Coastal Plain soils began below the topsoil in all of the borings and extended to the maximum depths explored. The Coastal Plain soils consisted primarily of loose to very firm silty and clayey sands.

3. The site consists of an existing gym with associated buildings and undeveloped grassy areas. Initial site preparation should consist of stripping the topsoil and removal of any structures from construction areas. Any utility lines in the project area should be removed and relocated. Holes resulting from the removal of utilities and large trees should be backfilled with structural fill to the compaction requirements presented in Section 5.2, *Earthwork*.

4. Suitable fill materials should be non-organic soils that have a Plasticity Index (PI) less than 25, a Liquid Limit (LL) less than 40, and standard Proctor maximum dry density (ASTM D 698) of at least 90 pcf. The majority of the existing near-surface soils appear to be suitable for use as structural fill; however, they will require proper compaction and moisture-conditioning.

5. Conventional shallow foundations can be used to support the structure. A uniform net allowable soil bearing pressure of 2,500 psf may be used for design in the in-place soils, reworked soils, or newly placed fill soils at the site.

6. Groundwater was encountered at a depth of 2 feet in boring B-2 at the time of drilling. Due to the proximity of the boring to a drainage feature and wet conditions at the time of drilling, it is likely that the area contained localized perched water. However, if groundwater levels appear to affect construction processes, then proper mitigation techniques will need to be utilized.

7. A Site Class "D" is recommended for seismic design at the site.

2.0 PROPOSED DEVELOPMENT

We understand the proposed development will consist of the construction of a gym addition with associated parking areas. All construction will take place on the subject property located on

Mercer University Drive in Macon-Bibb County, Georgia, as shown on the *Boring Location Plan* located in the Appendix.

Detailed structural and grading plans have not been provided to GEC at this time. For the purpose of this report, we assume that the structural loads will be typical for the proposed type of development, and that the maximum column loads will not exceed 150 kips and maximum wall loads will not exceed 2 to 3 kips per linear foot. We anticipate that cuts and fills across the building pad and the majority of the paved areas will be 5 feet or less.

3.0 METHOD OF EXPLORATION

3.1 Site Reconnaissance

GEC performed a site visit to the proposed project site and surrounding areas prior to the performance of our subsurface exploration activities. The reconnaissance was performed to evaluate surface conditions that could impact our exploration techniques or the proposed construction.

3.2 Soil Test Borings

A total of two (2) soil test borings were performed at the project site. Borings designated B-1 and B-2 were performed within the proposed building footprint, and were extended to a planned depth of 15 feet below the existing ground surface. The approximate locations of the borings are presented on the *Boring Location Plan* located in the Appendix.

The soil test borings were advanced using 2-¼ inch diameter, continuous flight hollow stem augers. At regular intervals, Standard Penetration Testing (SPT) and split-spoon sampling was performed in general accordance with ASTM D 1586. SPT results, when properly evaluated, give an indication of the ability of the soil to support loads, an index to soil strength, and the potential difficulty of excavation.

The split-spoon samples were returned to our laboratory and were manually and visually examined and classified. The samples were classified according to the Unified Soil Classification System (USCS). Detailed records of the soil test borings, indicating the results of the SPT and a more detailed description of the drilling and sampling processes, are presented in the Appendix.

4.0 SITE AND SUBSURFACE CONDITIONS

4.1 Site Description

The proposed project is located on the north side of Mercer University Drive in Macon-Bibb County, Georgia, as shown on the Site Location Map in the Appendix. The site has been at least partially graded and currently consists of existing buildings and undeveloped grassy areas. The site is relatively flat and level across the building pad.

4.2 Local Geology

The site is located in the Coastal Plain Physiographic Province of Georgia. Soils in the Coastal Plain are the result of the deposition of sediments in a former marine environment. Coastal Plain sedimentary deposits make up about 60 percent of Georgia's surface area and consist of a southwardly thickening wedge of sediments that are bordered on the north by the parent rocks of the Piedmont Physiographic Province. The border between these provinces is known as the "Fall-Line." The Coastal Plain sediments range in age from the Cretaceous to the Recent, with the oldest exposed along the "Fall-Line" and the youngest along the coast. Typically, the surface soils consist of complexly interbedded sands, silts, and clays of various mixtures. Sandstones, shales, and limestones comprise the characteristic lithology of the Coastal Plain. These formations are usually found at depths greater than fifty feet but can also be found at or near the ground surface. They are not known to occur near the surface in the site area. Topography in this region of the Coastal Plain is generally flat to gently rolling.

4.3 Subsurface Conditions

Details of the subsurface conditions encountered by the soil test borings are shown on the "Soil Boring Records" in the Appendix of this report. These records represent an estimate of the subsurface conditions based on our interpretation of the boring data using normally accepted engineering judgment. Stratification lines on the "Soil Boring Records" represent approximate boundaries between soil types. However, the actual in-situ transition is typically more gradual. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of the subsurface conditions at other locations or at other times. The general soil conditions and their pertinent characteristics are discussed in the following paragraphs.

The nature and extent of variations between the borings may not become evident until the time of construction. If such variations then appear evident, it will be necessary to reevaluate the recommendations of this report after on-site observations of the conditions.

Topsoil and Coastal Plain soils were encountered across the proposed project site. Coastal Plain soils were encountered below the topsoil in the borings and extended to the maximum depths explored. Below the topsoil, the soils consisted primarily of loose to very firm clayey sands and silty sands (SC, SM). The Standard Penetration Testing (SPT) values (N-values) in these soils ranged from 6 to 25 blows per foot (bpf). The target drilling depth was achieved for all borings.

Groundwater was encountered at a depth of 2 feet in boring B-2 at the time of drilling. Due to the proximity of the boring to a drainage feature and wet conditions at the time of drilling, it is likely that the area contained localized perched water. However, if groundwater levels appear to affect construction processes, then proper mitigation techniques will need to be utilized.

5.0 CONCLUSIONS AND RECOMMENDATIONS

It is our opinion the site is suitable for the proposed type of development from a geotechnical engineering standpoint. The following conclusions and recommendations are based on our understanding of the proposed development, the assumptions of structural loads, the information gathered during our exploration, the accepted principles and practices of geotechnical engineering, and our previous experience with similar sites and subsurface conditions. This report has been prepared for the exclusive use of WM2A Architects and their representatives in the planning and design of the Frank Johnson Recreation Center Addition in Macon-Bibb County, Georgia.

In the event there are any changes in the ownership, nature, design, or location of the proposed development, or if future additions are planned, the conclusions and recommendations contained in this report should not be considered valid unless the project changes are reviewed by us and modified or verified in writing. Reliance on this report by others must be at their own risk unless we are consulted on the use or limitations. We cannot be responsible for the impacts or any changes in geotechnical, engineering geology, or environmental standards, practices, or regulations subsequent to performances of services without our further consultation.

5.1 Site and Subgrade Preparation

In the areas of the site explored, the soils encountered were generally silty and clayey sands with low plasticity limits. We recommend that construction grades be maintained throughout this project in such a manner as to establish positive drainage away from working surfaces and subgrades. Vehicular traffic should be avoided or minimized on exposed surfaces. We recommend that the heavily trafficked areas be stabilized to avoid construction delays due to climatic conditions. The degree of stabilization will depend on factors such as climatic conditions during construction, construction traffic and loads. Stabilization could include adequate compaction of the in-place soils, graded aggregate, geosynthetics or a combination of these. Actual techniques should be evaluated as construction progresses and variances in conditions are controlled and finalized.

The initial step in site preparation should consist of the stripping of topsoil and the removal of any structures within construction areas. Any utility lines in the project area should be removed and relocated and all paved roadways should be removed. Holes resulting from the removal of utilities and large trees should be backfilled with structural fill to the compaction requirements presented in Section 5.2, *Earthwork*. The topsoil thickness was approximately 4 inches at all of the borings, so it is recommended to use a depth of about 4 inches for planning purposes. Stripped topsoil should be moved outside of fill areas and may be used as landscaping materials.

Following site stripping, we recommend that all proposed fill areas or areas at-grade be proofrolled in the presence of a geotechnical engineer or his representative to evaluate subgrade stability. Proofrolling with a fully loaded tri-axle dump truck, 20-ton roller, or similar equipment in an overlapping pattern to detect any soft areas is recommended. Any areas that pump or rut

excessively and cannot be densified by continued rolling should be undercut to a depth to be determined in the field by the geotechnical engineer, and be replaced with structural fill.

We anticipate that some undercutting or reworking of the near surface soils may be necessary in the area of boring B-2 where low resistance soils were encountered within the upper 2 to 3 feet. The amount of undercutting or reworking can best be determined at the time of construction. It is anticipated that these soils can likely be compacted in place without undercutting.

In general, if loose soils are encountered in structural areas, the soils will need to be reworked or undercut to a point 10 feet outside of the perimeters of the structural areas. All undercut areas should be backfilled with structural fill as described in Section 5.2, *Earthwork*, of this report. It is anticipated that any removed soils will be suitable for use as fill; however, the moisture content of the soil may need adjustment.

Prior to fill placement, the subgrade should be scarified, moisture-conditioned to slightly above the optimum moisture content, and compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D698) in all structural or paved areas. All at-grade areas and cut surfaces should be scarified, moisture conditioned to slightly above optimum moisture content, and compacted to at least 98 percent of the same criteria. The compacted surface should be firm and unyielding and should be protected from damage caused from traffic and weather. Soil subgrades should be kept moist during construction.

5.2 Earthwork

The soil test borings indicate the near-surface soils at the site can be graded with conventional earthmoving equipment such as self-loading or pusher-assisted pans and tracked dozers. The near-surface soils appear to be suitable for use as fill material, however, wetting or drying of the soils at the site may be necessary to achieve the required compaction criteria.

In general, all fill placed at the site, including on-site soils, should not contain rocks or lumps larger than four inches in greatest dimension and contain no more than 15 percent larger than 2.5 inches. Structural fill soils should have a liquid limit less than 40, plastic index less than 25 and a standard Proctor maximum dry density (ASTM D 698) greater than 90 pcf. Based on visual examination of the split-spoon samples, the majority of the soils at the site will be suitable for use as structural fill. Generally, soils classified as SP, SM, SC, ML or CL according to the Unified Soil Classification System, are considered suitable for fill providing they meet the above criteria.

Structural fill should be moisture-conditioned to slightly above the optimum moisture content, spread in relatively thin lifts (eight inch maximum loose lifts) and methodically compacted with heavy compaction equipment to at least 95 percent of the standard Proctor maximum dry density (ASTM D 698). The upper one-foot of fill material should be compacted to a 98 percent compaction criterion. Additionally, the upper one-foot of material in areas at-grade or cut surfaces should be scarified and compacted to the 98 percent criteria. Structural fill criteria should be utilized beneath proposed and future structural areas.

Utility trenches should be backfilled with materials satisfying the criteria described above for general fill, placed in lifts of approximately eight (8) inches in uncompacted thickness. However, thicker lifts may be used provided the method of compaction is approved by the project geotechnical engineer and the required minimum degree of compaction is achieved.

We recommend an experienced engineering technician monitor earthwork operations. The technician will aid in the selection of fill materials and perform field density tests to confirm that the specified compaction is being achieved. Within structural areas, monitoring should essentially be full-time, with part-time monitoring possible in other areas, depending on the rate of fill placement. As a minimum, we suggest a series of density tests for each vertical foot of fill placed and a test for each 2,000 to 3,000 square feet of fill area.

5.3 Foundations

The proposed structure can be constructed on conventional shallow foundations bearing on the in-place soils, reworked soils, or structural fill meeting the compaction requirements of Section 5.2, *Earthwork*. Based on the soils encountered during our exploration, we recommend a uniform net allowable soil bearing pressure of 2,500 psf be used for foundation design once the on-site soils are treated as outlined in this report.

Minimum footing dimensions should be 24 and 18 inches for individual spread and wall footings, respectively. Exterior foundations should bear at a minimum of 12 inches below external grades to preclude damage due to frost penetration. A geotechnical engineer or his representative should examine footing subgrades immediately prior to rebar placement to confirm that the foundation conditions are as anticipated and the design bearing pressure is available. Auger and hand held dynamic cone penetrometer testing; augmented by hand probing should be used to determine whether conditions within these areas are consistent with those encountered by the borings.

Following the recommendations of this report, we estimate that post-construction total settlements will be generally less than one inch. Differential settlement is estimated to be less than one-half inch. These estimated settlements are considered to be tolerable for the anticipated construction; however, the tolerance should be confirmed by the project structural engineer.

Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open for long periods of time. Therefore, we recommend that, once each footing excavation is extended to final grade, the footing be constructed as soon as possible to minimize the potential damage to bearing soils. The foundation bearing area should be level or benched and free of loose soil, ponded water, and debris. Foundation concrete should not be placed on soils that have been disturbed by seepage. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete.

5.4 Grade Slabs

Grade slab support should be available on the existing soils, reworked soils after undercutting, or new structural fills that meet the recommended compaction criteria in Section 5.2, *Earthwork*, of this report.

The grade slabs should be jointed around columns and along footing supported walls so the slab and foundations can settle differentially without damage. If slab thickness permits, joints containing dowels or keys may be used in the slab to permit movement of the slab without cracking or sharp vertical displacements.

We recommend that a vapor barrier and capillary break consisting of a granular material be incorporated into the design of the slab system. The moisture barrier system should consist of a minimum 4 inches of free-draining gravel, such as ¾-inch, clean, crushed, uniformly graded gravel or equivalent, with less than 5% passing the No. 200 sieve, overlain by a minimum 10-mil thick, impermeable membrane. For design purposes, we recommend using a subgrade modulus of 120 pci in floor slab design.

Grade slab subgrades are often disturbed after final grading due to ongoing construction activities and weather conditions, and as a result lose their support capabilities. We recommend the surfaces of grade slab subgrades that have been disturbed be proofrolled as recommended in Section 5.1, *Site and Subgrade Preparation*, scarified, and re-compacted (and additional fill placed, if necessary) immediately prior to construction of the slab. Additionally, any excavations through the subgrade soils (such as utility trenches) should be properly backfilled in compacted lifts. Re-compaction of subgrade surfaces and compaction of backfill should be checked with a sufficient number of density tests to determine if adequate compaction is being achieved.

5.5 Slopes

Based on our experience with soils similar to those encountered during our exploration, we recommend excavated slopes less than 10 feet be laid back at least to a 2H:1V (Horizontal to Vertical) slope. Permanent fill slopes placed on suitable subgrade may be constructed at 2.5:1 or flatter. All fill slopes should be adequately compacted as recommended. Permanent slopes of 3:1 or milder may be used to facilitate mowing. All sloped surfaces should be protected from erosion by grassing or other means. All confined excavations should conform to the latest OSHA Regulations.

5.6 Pavement Recommendations

Our analysis for flexible pavements was performed in general accordance with the American Association of State Highway and Transportation Officials (AASHTO) “Guide for Design of Pavement Structures”, 2006. The AASHTO method considers the effects of traffic by equating the traffic loading to an Equivalent Single Axle Load (ESAL) of 18 kips. This is done by Equivalent Axle Load Factors (EALF). The EALF is applied to the each axle that crosses the

pavement in order to consider its individual effect on the life of the pavement. EALFs range from 0.004 for normal passenger cars to 2.15 for a 40 kip tandem axle load (two tandem axles for an 80 kip truck).

The following design parameters were used in our analysis:

- Serviceability — 2.0 (terminal), 4.2 (initial)
- Reliability — 85%
- Standard Deviation — 0.44
- Standard Normal Deviate — -1.037
- Drainage Coefficients — 1.0 (GAB & Subgrade)
- Pavement Structural Coefficients — 0.44 (Asphaltic Concrete), 0.14 (GAB)

Based on the above assumptions, a design California Bearing Ratio (CBR) of at least four would be required for the reworked soils. We recommend that field and/or laboratory CBR testing be performed during construction to verify these recommendations. Based on the assumed loadings, the following pavement sections are recommended for this site:

RECOMMENDED PAVEMENT DESIGN SECTION

Pavement Type	Anticipated Pavement Use	Pavement Components		Total Thickness (inches)
		Asphalt Concrete (inches)	Aggregate Base (inches)	
Flexible	Light Duty	2*	6	8
Flexible	Heavy Duty	3**	8	11

* Recommend the light duty surface course consist of 2 inches of 9.5 mm Superpave
** Recommend the heavy duty surface course consist of 1 inch of 9.5 mm Superpave over a 2" binder course of 19 mm Superpave.

Based on our analysis using a CBR value of 4 for the reworked subgrade soils, the flexible pavement design for the paved areas will yield approximate ESAL values of 12400 (SN=1.72) and 105,000 (SN=2.44), respectively for the light and heavy duty paving sections. It is extremely important to remember that if the actual traffic loads are anticipated to exceed those presented above, then the design sections should be re-evaluated for the actual design conditions. Our analysis assumes the pavement subgrades are prepared in accordance with the recommendations outlined in this report.

5.7 Seismic Design Criteria

The seismic site classification for the proposed project was evaluated using the criteria given in the 2012 International Building Code (IBC 2012) section 1613. Based on the project information and soil test borings, we recommend the following parameters be used in design:

- Site Classification — Class D
- Maximum Considered Earthquake (MCE) spectral response acceleration for short period — S_{MS} = 0.255 g
- MCE spectral response acceleration for 1-second period — S_{M1} = 0.194 g
- Design spectral response acceleration for short period — S_{DS} = 0.170 g
- Design spectral response acceleration for 1-second — S_{D1} = 0.130 g

5.8 Lateral Earth Pressures

Based on the borings drilled for this exploration and the testing of reasonably similar soils on other projects, the following earth pressure coefficients are recommended for the near surface in-place soils at the site:

Active Earth Pressure (Ka)	At-Rest Earth Pressure (Ko)	Passive Earth Pressure (Kp)	Frictional Sliding Resistance (fs)
0.33	0.50	3.00	0.38

The earth pressure coefficients presented in the preceding table are based on our experience with similar projects having similar soil conditions. These coefficients were estimated based on an assumed angle of internal friction of approximately 30°. Triaxial shear testing, which was beyond the scope of this exploration, would be required to determine the actual strength properties of the soils at this site. A moist unit weight of 120 pounds per cubic foot should be used for design calculations.

Our recommendations assume that the ground surface above the wall is level and the residual soils similar to those found in our borings will be used for wall backfill.

The recommended values assume that constantly functioning drainage systems are installed to prevent the accidental backup of hydrostatic pressures behind the wall system. Tractors and other heavy equipment should not operate within five feet of below grade walls to prevent lateral pressures in excess of those cited above.

These recommendations should not be correlated with soil parameters for use in any Mechanically Stabilized Earth (MSE) wall design. We recommend that soil parameters for any

MSE retaining wall design be established through appropriate laboratory testing by the wall designer.

5.9 Geotechnical Controls

1. The Geotechnical Engineer should be provided the opportunity for a general review of the final design documents in order to assess proper interpretation of the earthwork and foundation recommendations.

2. The Geotechnical Engineer, or his qualified representative, should observe undercutting and proofrolling operations.

3. A qualified engineering technician, under the supervision of the Geotechnical Engineer, should observe fill operations and perform a minimum of one field density test per 2,500 square feet of area for each one-foot thickness of fill.

4. The Geotechnical Engineer, or his qualified representative, should check each foundation excavation utilizing hand probing and auger and dynamic cone penetrometer testing. This will reduce the risk of unsuitable or soft materials directly underlying the footings, which may be detrimental to the integrity of the structures.

5.10 Limitations

This report is for the exclusive use of WM2A Architects, the owner, and subcontractors for the project described herein, and may only be applied to this specific project. The analyses, conclusions and recommendations presented in this report are based on the preceding project information, and the results of this evaluation. Conditions may vary from those observed in the borings.

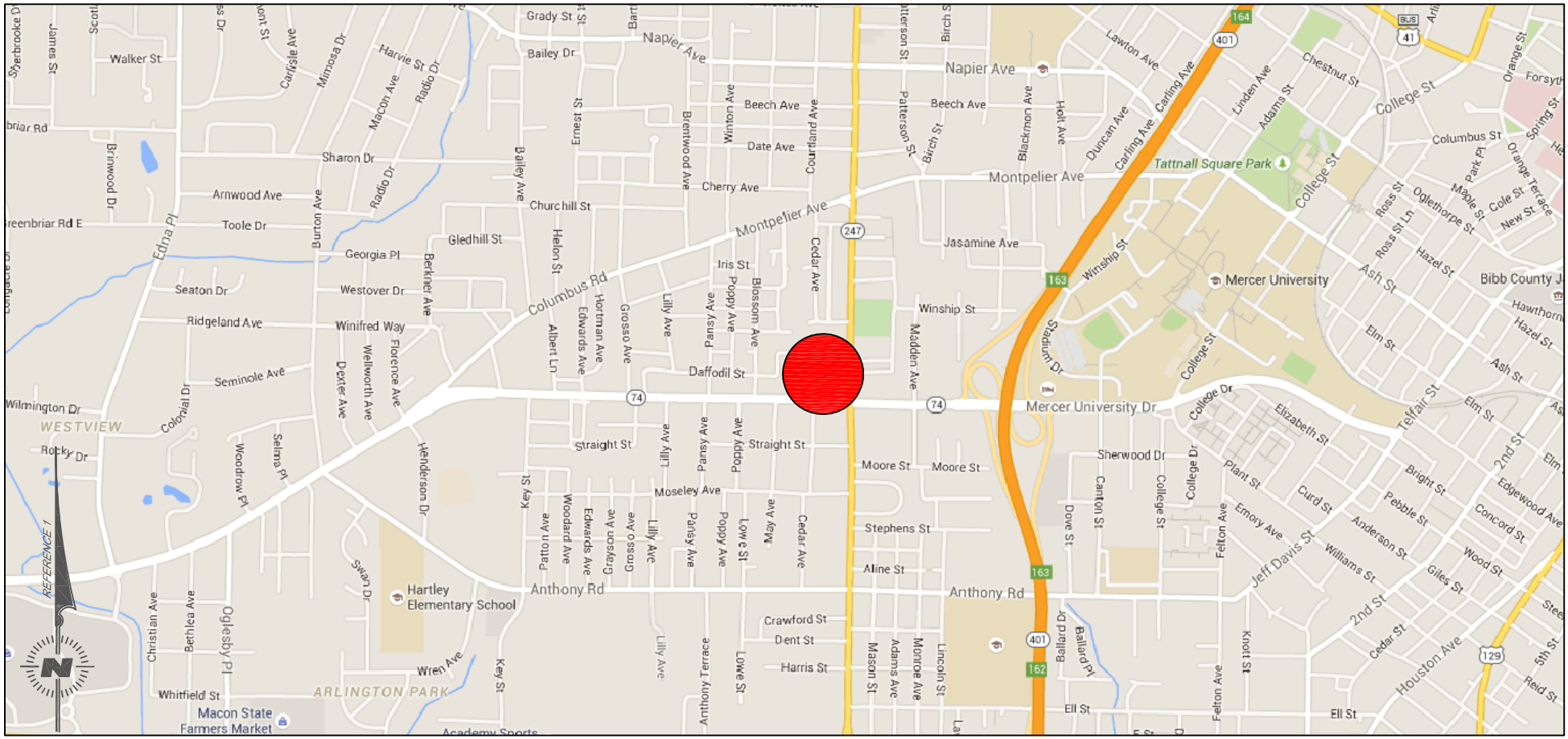
If it becomes apparent during construction that soil conditions differing from those discussed in this report are encountered, Geotechnical and Environmental Consultants, Inc. should be notified at once so that the effects may be determined and any remedial measures necessary may be prescribed.

This report has been prepared in accordance with generally accepted standards of geotechnical engineering practice in the State of Georgia. No other warranty is expressed or implied. Our firm is not responsible for conclusions, opinions or recommendations of others.

The right to rely upon this report and the data within may not be assigned without the written permission of Geotechnical and Environmental Consultants, Inc. If the design or location of the structure is changed, the recommendations contained herein must be considered invalid, unless our firm reviews changes and our recommendations are either verified or modified in writing. When design is complete, we should be given the opportunity to review the foundation plans, grading plans and applicable portions of the specifications to determine if they are consistent with the intent of our recommendations.

APPENDIX

GEC



0 1,950' 3,900' 5,850'

SCALE: 1" = 1,950'

SITE LOCATION MAP
MACON-BIBB COMMUNITY CENTER ADDITIONS - FRANK JOHNSON
MACON, GEORGIA

GEC PROJECT NO. 150541.210

GEC
GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS, INC.

514 HILLCREST INDUSTRIAL BLVD.
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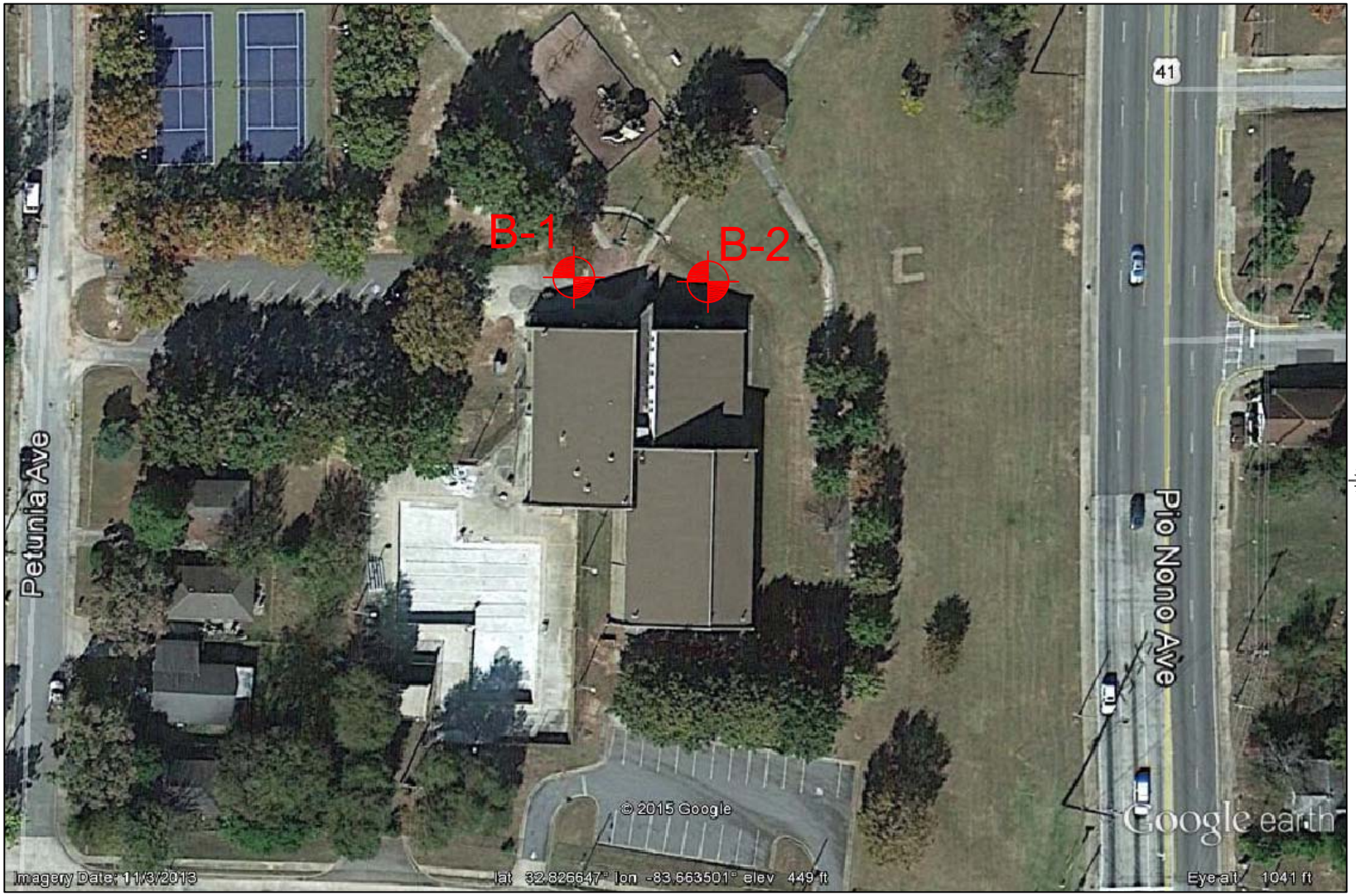

REFERENCE 1

= APPROXIMATE BORING LOCATION

0 85' 170' 255'

SCALE: 1" = 85'

BORING LOCATION PLAN
MACON-BIBB COMMUNITY CENTER ADDITIONS - FRANK JOHNSON
MACON, GEORGIA

GEC PROJECT NO. 150541.210

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SOIL TEST BORING PROCEDURES

The borings were advanced by a hollow-stem auger process. At the desired depth in all borings, the borehole was cleaned out and the sample tools inserted through the auger stems. At assigned intervals, soil samples were obtained with a standard 1.4-inch inside diameter, 2-inch outside diameter split tube sampler. The sampler was first seated six inches to penetrate any loose cuttings; then driven an additional foot with blows of a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler the final foot was recorded and is designated as the standard penetration resistance (N-value). The penetration resistance, when properly evaluated, may be used as an index to the soil strength and foundation support capability. Soil sampling and penetration testing were performed in general accordance with ASTM D 1586.

The drilling method is not capable of penetrating material designated as "refusal materials." Refusal, thus indicated, may result from hard cemented soil, soft weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound continuous rock. Core boring procedures are required to determine the character and continuity of refusal materials.

Representative portions of the split tube samples were placed in sample containers and transported to our laboratory. In the laboratory, the samples were examined and the visual classification was confirmed by a geotechnical engineer or geologist.

The final boring records represent our interpretation of the contents of the field records based on the results of the engineering examinations and testing of selected field samples. These records depict subsurface conditions at the specific locations and at the particular time drilled. Soil conditions at other locations may differ from conditions occurring at these boring locations. Also, the passage of time may result in changes in the ground water conditions at these boring locations. The lines designating the interface between strata on the re3cords and on profiles represent approximate boundaries. The transition between materials may be gradual. The final boring records are included with this report.

A record of the sampling operations and the descriptions of the soils encountered in each boring are shown on the following Soil Boring Record sheets.

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

SOIL TYPE	BLOWS PER FOOT (bpf)[1]	RELATIVE DENSITY / CONSISTENCY DESCRIPTION
SANDS and GRAVELS	0 – 4	Very Loose
	5 - 10	Loose
	11 - 20	Firm
	21 - 30	Very Firm
	31-50	Dense
	Over 50	Very Dense
SILTS and CLAYS	0 – 1	Very Soft
	2 – 4	Soft
	5 – 8	Firm
	9 - 15	Stiff
	16-30	Very Stiff
	31-50	Hard
	Over 50	Very Hard

[1] Standard Penetration Resistance blow count, N, which is equal to the sum of the second and third six-inch increments of the SPT test.

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SOIL BORING RECORD

Project: **Macon- Bibb Community Center Additions- Frank Johnson** Macon, Bibb County, Georgia	Boring No: **B-1** Project No: 150541.210
Location: **See Boring Location Plan**	GS Elevation:
Driller/Equipment: J. Waddell/ CME 55, 2.25" HSA	Drilling Date: July 24, 2015
Water Level: NGWE at time of boring	Engineer/Geologist:

Depth (ft)	Soil Symbol	Soil Description	Sample Type	Standard Penetration Test Data (blows/ft) 0 10 20 30 60 80	N-Value
		TOPSOIL			
		Approx. 4" of topsoil			
		COASTAL PLAIN SEDIMENTS			
		firm to very firm, tan-brown, coarse to fine, silty **SAND (SM)**	SS-1		17
			SS-2		20
5		firm to very firm, tan-red, coarse to fine, clayey **SAND (SC)**; silty			
			SS-3		20
			SS-4		22
10					
			SS-5		25
15		**BORING TERMINATED AT 15.0 ft**			

- Boring and sampling performed in accordance with ASTM D 1586.
- Depths are measured from existing ground surface at time of drilling.
- Depths are shown to illustrate general arrangements of the strata encountered at the boring location.
- Do not use depths for determinations of quantities or distances.

NOTES:

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5031 Milgen Court, Columbus , GA 31907

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SOIL BORING RECORD

Project: **Macon- Bibb Community Center Additions- Frank Johnson** Macon, Bibb County, Georgia	Boring No: **B-2** Project No: 150541.210
Location: **See Boring Location Plan**	GS Elevation:
Driller/Equipment: J. Waddell/ CME 55, 2.25" HSA	Drilling Date: July 24, 2015
Water Level: 2.0 ft at time of boring	Engineer/Geologist:

Depth (ft)	Soil Description	Sample Type	Standard Penetration Test Data (blows/ft) 0 10 20 30 60 80	N-Value
	TOPSOIL Approx. 4" of topsoil			
	COASTAL PLAIN SEDIMENTS loose, tan, coarse to fine, silty **SAND (SM)**; w/ rock	SS-1		6
		SS-2		7
5	firm, tan-white, coarse to fine, clayey **SAND (SC)**; silty			
		SS-3		11
		SS-4		13
10				
		SS-5		16
15	**BORING TERMINATED AT 15.0 ft**			

- Boring and sampling performed in accordance with ASTM D 1586.
- Depths are measured from existing ground surface at time of drilling.
- Depths are shown to illustrate general arrangements of the strata encountered at the boring location.
- Do not use depths for determinations of quantities or distances.

NOTES:

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LABORATORY TESTING PROCEDURES

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our evaluations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer or geologist. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our “Soil Boring” records.

The classification system discussed above is primarily qualitative. For detailed soil classification, two laboratory tests are routinely performed: grain size tests and Atterberg limits tests. Using these test results, the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior. The soil classification and physical properties obtained are presented in the report.

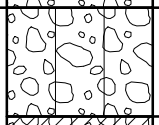
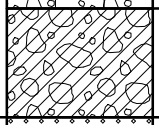
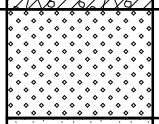
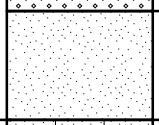
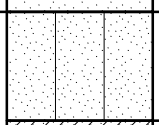
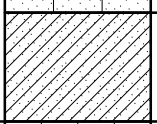
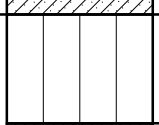
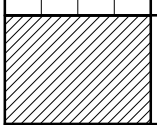
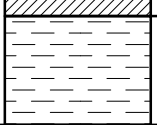
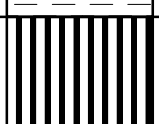
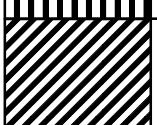
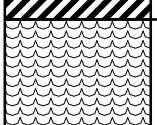
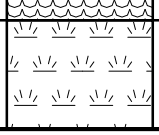
WATER LEVEL READINGS

Water table readings are normally taken in conjunction with borings and are recorded on the "Soil Boring Records". These readings indicate the approximate location of the hydrostatic water table at the time of our field exploration. Where relatively impervious soils (clayey soils) are encountered, the amount of water seepage into the boring is small, and it is generally not possible to establish the location of the hydrostatic water table through water level readings. The ground water table may also be dependent upon the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation and other factors.

The time of boring (TOB) water level reported on the boring records is determined by field crews immediately after drilling. Additional water table readings may be obtained at least 24 hours after the borings are completed. The time lag of at least 24 hours is used to permit stabilization of the ground water table which has been disrupted by the drilling operations. The readings are taken by dropping a weighted line down the boring or using an electrical probe to detect the water level surface.

Occasionally, the borings will cave-in, preventing water level readings from being obtained or trapping drilling water above the caved-in zone. The cave-in depth is often measured and recorded on the boring records.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

SECTION 01 2300

ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.03 SCHEDULE OF ALTERNATES

A. Alternate No. 1 - ADD :Provide 5/16" Athletic Rubber Flooring in gym with court stripes and rubber wall base. See Spec 096566

B. Alternate No. 2 - ADD:Roller Shades at Clerestory Windows, Electrically operated

C. Alternate No. 3 - Replace Clerestory Windows at Meeting Room, Game Room and Multi-purpose Room with Aluminum Storefront Windows and new glazing. See Specs:

D. Alternate No. 4 - ADD:Replace Clerestory Window at Gym with Aluminum ribbon window system and new glazing. See Spec.

E. Alternate No. 5 ADD: Provide wall mounted acoustical boards at game room, new multi-purpose room, and existing meeting room, basis of design: acoustical solutions alpha absorb acoustical panels, see interior elevations for additional information. Refer to Sheet 7.1

F. Alternate No. 6 ADD: Provide all glass butt jointed, 1/2" tempered glass wall at multi-purpose room and game room with aluminum receivers at sill, head and jamb at end of wall material transition. Refer to Sheet 7.1

G. Alternate No. 7 ADD:Warming Oven "Basis Of Design", Toastmaster 3B80AT72 29 built-in 2 drawer warmer. Provide dedicated circuit.

H.

I. Alternate No. 9 ADD:Paint Gym ceiling and walls

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2300

SECTION 21 0513

COMMON REQUIREMENTS FOR FIRE SUPPRESSION EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 RELATED WORK

A. All Division 21 sections.

1.03 WORK SEQUENCE

A. Install piping, equipment and accessories as construction progresses so cutting and patching of new construction will not be required. See also paragraph "Sequencing and Scheduling" herein.

1.04 SUBMITTALS

A. Provide submittals in accordance with Section 01 3300 - Submittal Procedures.

B. Submittal data containing manufacturer's data shall be sent to the Architect, Engineer and Owner for review.

C. Electronic submittal data shall be assembled in Adobe Acrobat's Portable Data Format (PDF) for review.

D. Electronic submittal data shall be assembled in one (1) complete PDF file and shall include an index sheet (TOC) listing each submittal item by specification number and its content. Each file shall also be organized with "Bookmarks" of each section. Submittals that do not have each submittal item referenced by "Bookmarks" shall be rejected.

E. All electronic submittal data for a trade shall be submitted at one time except as noted herein.

F. Data not submitted shall have a statement explaining why the data was not submitted.

G. Submittals not conforming to any of the above requirements shall be rejected.

H. The contractor shall go to each specification section to determine all technical information/data required and organize information/data using tabs for major headings as follows:
   1. Section 21 0529 - Supports and Anchors for Plumbing Piping and Equipment
      a. Upper attachments
      b. Pipe attachment (hangers and clamps)
      c. Lower pipe supports
   2. Section 21 1315 - Fire Protection
      a. Sprinklers
      b. Valves
      c. Piping Materials List (Manufacturer's data sheets are not required)
      d. Alarm Valves
      e. Fire Department Connection
      f. Groove Couplings

g. Flow Switches
h. Supervisory Switches
i. Working Drawings
j. Sprinkler Contractor's Certificate of Competency and proof of 3 years of practice.

I. Manufacturer's data sheets shall be marked to clearly indicate the manufacturer, model number, size, color, accessories, required clearances, field connection details, weight loading, electrical characteristics, capacities, etc. being submitted. Submittals shall only include the products relevant to this specific project. Submittals shall not include other products produced by the manufacturer which are not specified on this project. Submittals containing several products on the same sheet shall have an arrow or other marker to identify the specific product submitted. Also, submittals for a single product that have options shall have an arrow or other marker to identify that the specified options are being provided. Submittals that include products not specified for this project, or that include several products on one sheet without being marked, or that do not show options selected shall be rejected. Variations from specifications shall be explained. Submittal preparer's name and telephone number shall be listed on the index sheet.

J. Piping Submittals: Submittal data required for piping systems shall consist of a single sheet of paper with the type of piping systems on this project, and the corresponding piping the contractor intends to provide. For example: “Sprinkler Piping Above Grade – Schedule 40 black steel.” Contractor shall not submit manufacture’s data sheets on piping.

K. Review, Corrections, or Comments made on the Submittals do not relieve the Contractor from compliance with the requirements of the Drawings, Specifications and Addenda (Contract Documents). By entering into this Contract, the Contractor agrees that the purpose of submittals is to demonstrate to the Engineer that the Contractor understands the design concept and that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and use. Review of shop drawing will be general only for basic conformance with the design concept. The review of such drawings, schedules or cuts shall not relieve the Contractor from the responsibility for correcting all errors of any sort contained in the submittals. The Contractor is responsible for confirming and correlating all quantities and dimensions; selecting proper fabrication processes, construction methods and installation techniques; coordinating this work with that of all other trades; and performing all work in a safe, workmanlike and satisfactory manner.

L. Below are the submittal item codes that will be used when reviewing the submittal data. These codes show up on the "Submittal Review" sheet. Only one copy of the submittal review sheet is returned upon completion of the review for each trade.
1. RNE - Reviewed, No Exceptions Noted
   a. Indicates the information provided has been reviewed and no exceptions are taken. Contractor must still comply with the contract documents.
   b. No corrective action required at this time.
2. FNC - Furnish with Noted Corrections
   a. Indicates the contractor shall insure that all necessary or noted corrections are incorporated into equipment furnished to the project.
   b. Contractor shall incorporate items requested in review comments, but re-submittal not required.
3. RES - Revise and Resubmit
   a. Indicates item is not presently acceptable as submitted, but may be accepted provided additional information and/or changes are made.
   b. Contractor shall revise and resubmit item to Engineer with additional information indicating compliance with Contract Documents prior to proceeding with work.
4. PSD - Provide Submittal Data
   a. Indicates submittal data was not provided for this item or section.
   b. Contractor shall provide submittal data meeting the explicit requirements of the plans, specifications, and all addenda.

M. Shop drawings and data submittals for materials requiring extra long delivery time shall be submitted for approval as soon as possible after execution of contract. All items shall be submitted for approval in a timely manner (prior to other submittals if necessary) so they may be properly incorporated in the building's structure. Allow a minimum of three weeks for review. No substitutions of materials or extensions of contract time will be allowed for Contractors failure to submit or order such materials sufficiently in advance of the work.

1.05 REGULATORY REQUIREMENTS

A. All work installed under Division 21 shall conform to the current adopted Edition of Building/Mechanical Codes and their appropriate amendments:
1. Life Safety Code, NFPA 101
2. International Building Code with Georgia Amendments
3. Installation of Sprinkler Systems, NFPA 13
4. City of Macon and Bibb County Codes
5. Requirements of the State of Georgia Fire Marshall's Office.

B. Obtain and pay for all permits, and request inspections from all authorities having jurisdiction, in a timely manner.

C. Materials and Equipment included in Underwriter's Label Service shall bear that label. Electrical equipment shall be UL approved as installed, and bear the UL label, unless noted otherwise herein.

D. Where requirements of these specifications differ from specified codes and ordinances, conform to the more stringent requirements.

1.06 PROJECT/SITE CONDITIONS

A. Install Work in locations shown on Drawings, unless prevented by Project conditions. Shift or relocate equipment or systems to avoid conflicts with other trades. Modifications to the work required to accommodate project conditions encountered in the field shall be made at no additional cost to the contract.

B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

C. Install items so that there are no obstructions (e.g., pipes, conduits, etc.) blocking service panels of the equipment, or preventing the removal of the equipment.

1.07 SEQUENCING AND SCHEDULING

A. Contractor shall coordinate work so as to avoid conflicts with other work in progress.

B. Work shall progress in a manner that will not interfere with other trades. The Division 21 Contractor shall have coordination meetings with all other Contractors to insure that all systems installed in "share areas" (e.g. ceiling plenums, mechanical rooms, etc.) are coordinated and installed to insure proper fit and access. All costs required for the coordination of the work between trades shall be borne solely by the Contractor.

C. Contractor shall provide confirmation letters from the factory (not from the contractor) to the Owner that long lead items have been ordered. Long lead items are defined as items having longer than six week fabrication schedules. See Division 1 - Summary, for additional requirements.

D. Phasing: Contractor shall conform to phasing plans as stated in the Architectural contract documents.

1.08 ACCEPTABLE PRODUCTS

A. Basis of Design: Model numbers indicated herein or shown on the drawings are the Basis of Design and are based on the most recent literature provided to the Engineer from the Manufacturer's Representative. The Contractor may substitute equal and approved equipment from the basis of design manufacturer or manufacturers listed in this specification (or set forth in an addendum) provided said equipment has all features which are inherent with the "Basis of Design" equipment, meets all requirements of the plans and specifications, has like electrical characteristics (e.g., same voltage, phase, ampacity/fusing/circuit breaker requirements, single or multiple points of connection as indicated on the electrical drawings), and will properly fit in the available spaces in the building. If the Contractor chooses to provide equipment which meets all of the aforementioned requirements, but has different characteristics, from that shown on the Contract Electrical Drawings, he shall bear all costs associated with that substitution. Electrical costs include, but are not limited to materials (breakers, fuses, disconnects, wiring, conduits, panels, starters, contactors, and the like) installation costs and re-engineering. All electrical connections shall be coordinated with the Engineer and with the electrical subcontractor. Other costs may include, but are not limited to, additional structural support for heavier equipment than basis of design.

B. Prior Approval: Substitutions of specified items will be considered only if written request has been submitted for review at least ten days prior to the receipt of bid proposals. Each request shall include a description of the proposed substitute, the specification page and line number where it is referenced, the name of material or equipment for which it is to be substituted, drawings, cuts, performance and test data for an evaluation and a statement from the equipment manufacturer's representative that the items to be substituted meet or exceed the specification of the item substituted for.

C. Addenda: If the substitution is allowed, such approval will be set forth in an Addendum.

D. Costs: All costs incurred by the acceptance of substitutions shall be borne by the contractor.

E. Acceptable Products: Where a manufacturer has been listed as being acceptable in the various specification sections (or addenda) hereinafter for a certain product, it shall be understood that the manufacturer has been approved as being capable of producing this product. This does not necessarily constitute approval of their standard product. The manufacturer's product shall still comply with all of the requirements and standards of this specification and not necessarily their standard specification, to the extent that it might require special custom manufacture to meet the requirements and standards of this specification, the requirements of the drawings and the inherent features of the "Basis of Design". Submitted products, not complying with the explicit requirement of these specifications and drawings and with the features of the "Basis of Design" will be rejected even if their manufacturer is listed in the specifications.

1.09 DRAWINGS

A. General: Both the drawings and specifications shall be considered supplemental to one another so that materials and labor required by one but not the other shall be supplied and installed as though specifically called for by both. Where drawings and specification conflict, Contractor shall conform to the more stringent or costly of the two requirements.

B. Scaling: The drawings are diagrammatic only and show generally the location of the equipment, ducts and pipes but are not to be scaled. All dimensions shall be verified at the building site. Prefabrication of work from the drawings shall be at the Contractor's risk.

C. Existing Conditions: It shall be the Contractor's responsibility to visit the site prior to bidding the project and prior to beginning work to make himself familiar with existing conditions.

1.10 SPACE CONDITIONS AND SERVICE CLEARANCE

A. All equipment and materials shall fit into the available spaces in the building and must be introduced into the building so as not to cause damage to the structure. All equipment normally requiring service shall be made readily accessible by not locating it above (behind, etc.) piping, ductwork, conduit or other systems. Contractor shall also provide access by means of access panels, doors, etc. to be provided under this section of specifications where required or specified. Provide sufficient space to allow service (e.g. filter removal) of all equipment. Coordinate with all trades to insure accessibility and service of all equipment. Equipment located above lift out ceilings shall be considered to be accessible. Equipment located above hard (unremovable) ceilings shall be considered to be unaccessible and access panels shall be provided as specified herein.

B. The contractor shall be responsible for verifying that the particular manufacturer's equipment that he chooses will fit in the available space, and shall verify (prior to submitting equipment) that the service clearances that the manufacturer requires are available, and shall not submit equipment that will not allow the manufacturer's service clearances. During construction, the contractor shall install the equipment such that the manufacturer's service clearances are provided by reading the installation instructions. The contractors shall bear all costs associated with providing equipment that requires service clearances different from the basis of design equipment. If the manufacturer's service clearances are not provided, the contractor shall remove the equipment and provide equipment with service clearances equal to the basis of design equipment. The contractor shall submit a detailed sketch and description of any modifications to install the particular manufacturer's equipment that he chooses, to demonstrate that the equipment will fit and have the manufacturer's service clearances. The sketch is not submitted for review or approval or for confirmation that it is correct, only to certify that the contractor has completely considered the installation of substitute equipment.

1.11 MOISTURE INTEGRITY

A. Roof: All roof penetrations shall be watertight and comply with the roof manufacturer's requirements and recommendations so as to be covered by the roof "Bond". All roof penetrations shall be made inside roof curbs (conforming to the requirements of Division 21 - Hangers And Supports for Fire Suppression Piping. Pitch pockets are not acceptable.

B. Wall: All wall penetrations shall be sealed and caulked watertight.

1.12 NOISE AND VIBRATION

A. When in operation, all systems included in this section of specifications shall be free from objectionable or abnormal noise and vibration. See Division 21 - Hangers And Supports for Fire Suppression Piping for specific vibration isolation requirements.

1.13 PROTECTION OF MATERIALS AND EQUIPMENT

A. Delivery, Storage and Handling: Deliver products to site in factory-fabricated protective containers, with (where appropriate) factory-installed shipping skids and lifting lugs. Store in clean, dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

B. During Construction: Pipe openings shall be closed with caps or plugs. All equipment and material shall be stored in accordance with manufacturer's recommendations. No equipment, piping, or materials shall be stored inside or outside the building unless it is properly protected from the weather. The Engineer reserves the right to reject any items furnished under Division 21 which have been damaged or are not in "like-new" condition.

C. Suspended Equipment and Suspended Piping: Installation of suspended materials in areas where the roof is not "dried in" is only acceptable if the Contractor wraps suspended equipment and piping on three sides with a minimum 4 mil thickness polyethylene taped to the bottom of the equipment and piping. Polyethylene covering is required to protect from the weather, water, dirt, roof tar, concrete, etc.

D. Non-Suspended Equipment and Piping: Contractor is required to wrap equipment and piping that is not suspended with two layers of 4 mil polyethylene.

E. Prior to Final Construction Review: All materials and equipment shall be cleaned. Chipped or scraped paint shall be retouched to match. All dents and sags in equipment casings shall be straightened or replaced.

F. Equipment Painting: Equipment which has been damaged beyond the point of retouching or has been retouched not to match the original finish shall be repainted in accordance with Division 9 - Painting.

1.14 ELECTRICAL

A. General: Motors, controls, relays and switches required for proper operation of equipment covered under this section shall be furnished and installed under this division of the specifications.

B. Wiring: All control and interlock wiring shall be furnished and installed under Divisions 21 - Fire Protection. Power wiring through the disconnect and starter and to the motor shall be furnished and installed under Electrical Section. All control wiring and conduit shall conform to the material and installation requirements of Division 26.

C. Electrical Connections: Voltage, phase, ampacity and connection arrangement (e.g. single or multiple point) of each item of electrically driven equipment provided under this section of specifications shall conform to that shown on the Electrical drawings. Two speed motor winding arrangement shall match the starter type specified by Division 26.

D. Electrical Characteristics: The horsepowers, voltages and phases shown on the drawings and specified herein, are the estimated power requirements of all equipment furnished herein and is the basis of the design shown on the electrical drawings. If the Contractor provides equipment from the "Basis of Design" manufacturer or from other approved manufacturers with larger horsepowers, different voltages, different phases or ampacity, he shall coordinate with other trades to provide any additional wiring, circuitry, starters, breakers, transformers, etc., as required at no additional cost to the Contract.

1.15 PAINTING

A. All bare steel piping, pipe hangers, supports and miscellaneous metal exposed to view provided under this section of specifications, shall be cleaned and painted under the Architectural painting section of the specifications. Supports, hangers and accessories exposed to view shall not be electroplated, in order to allow them to be painted. All bare steel piping, pipe hangers, supports and miscellaneous metal shall be cleaned and painted under the Architectural Painting

Section of the specifications. In the event that there is no Architectural painting section, painting shall be done under this division of the specifications in accordance with the requirement of ANSI A13.1.81.

1.16 CLEANING

A. The Contractor shall maintain the site reasonably clean and free of excessive debris and leftover materials at all times. All trash and debris shall be hauled from the job site on a daily basis for disposal. Prior to testing and adjusting, equipment shall be clean and free of any construction debris and litter.

B. Contractor shall meet all contractual requirements as related to site cleanliness including dust control.

1.17 HAZARDOUS MATERIAL ALERT FOR NEW MATERIALS

A. Contract Materials which are scheduled to be incorporated into the work under this Contract shall first either be certified by the Manufacturer to be free of hazardous materials or be inspected and tested by accredited laboratories and certified to be free of hazardous material content (e.g. Asbestos, PCBs, lead, etc.) in accordance with OSHA, EPA and AHERA Rules (and 1982 School Rules).

1.18 ACCESS PANELS

A. Some fire protection systems may be made inaccessible by the installation of "hard" ceilings or by walls above the ceiling. See the finish schedule and the floor plans (architectural drawings) for the location of all "hard" ceilings and walls which extend above the ceiling. Provide access panels in these ceilings or walls (and any other locations where fire protection items are made inaccessible by ceilings or walls) for access to fire protection equipment and items requiring access above these ceilings.

B. For all access panels in gyp board and masonry, provide in accordance with specification Division 8 - Access Doors and Frames.

C. For all access panels in masonry, construction shall be as follows: Panels shall be sized as required for proper access and removal of the equipment but as a minimum shall be 18" x 18". Access panels shall have concealed continuous hinge, flush (not recessed) door, 14 gauge galvanized steel frame with prime coated finish, with pre-drilled anchor holes in corners, 1/4 turn flush mounted screwdriver operated latch(es) (on maximum 8" centers) and 14 gauge steel door with prime coated finish and rounded corners. Entire panel shall be painted to match ceiling or wall. Provide fire-rated access panel where required. Access panels shall be manufactured by Venco Products, Inc., Elmdor or Cesco.

1.19 STRUCTURAL COORDINATION

A. The party responsible for the installation of the system furnished under Division 21 shall provide the General Contractor with the weight of all fire protection equipment and piping and the exact location. General Contractor shall then insure all structural members are properly sized and all fire protection penetrations are properly framed to support the full perimeter of the equipment. See also paragraph "Acceptable Products".

1.20 CONTRACTOR REQUESTS FOR ELECTRONIC COPIES OF CAD DRAWINGS

A. If the Contractor requests to obtain electronic copies (emailed files or disc files) of CAD drawings from Andrews, Hammock & Powell, Inc., (AH&P) this paragraph shall describe the conditions for this action to take place.
   1. The Contractor must obtain written permission from the Architectural client, that the Architect does not object to providing electronic copies when AH&P is hired by an Architect to perform Engineering services.
   2. If AH&P is prime party (i.e. not hired by an Architect, but hired by the client directly), Contractor must obtain permission of AH&P to obtain electronic copies.
   3. If approval by Architect or Engineer (as noted above) is obtained, Contractor may obtain electronic copies based on the following rates: $25 per sheet, with minimum $200 per project.
   4. Contractor shall mail a copy of the check to AH&P, payable to AH&P and shall sign the enclosed indemnification letter, and send this letter to AH&P, along with requested sheets. If time is of essence, a copy of the check and indemnification may be faxed as evidence of the Contractor's intent to mail said documents.
   5. Upon receiving the check or faxed copy, and signed indemnification letter, electronic copies of requested sheets shall be provided. AH&P reserves the right to alter the electronic copies by removing Professional Engineering Stamp, title block information, company logo, and similar information that is not relevant to the Contractor's needs. Contractor shall indicate the desired format for CAD drawings (DWG or DGN).

END OF SECTION

Andrews, Hammock and Powell, Inc.
250 Charter Lane
Macon, GA 31210

Re: Letter of Indemnification

_____
(Project Name)

Gentlemen:

By hereby executing this Letter of Indemnification on behalf of itself and its subcontractors and suppliers, _____(company name) agrees to hold harmless and indemnify Andrews, Hammock and Powell, Inc. and the project architect and the consultants from and against all claims, liabilities, losses, damages and costs including but not limited to attorney's fees, arising out of or in any way connected with the use of, modification of, misinterpretation of, misuse of, or reuse by others of computer aided design (CAD) information and data provided on the above referenced project. The foregoing information applies, without limitation, to any use of the project information on this project, other projects, for additions to this project, or for any changes to this project by others.

_____ (company name) also acknowledges that the drawings prepared by Andrews, Hammock and Powell, Inc. is schematic in nature and is not intended as a shop drawing, dimensional drawing or fabrication drawing. Any dimensional information extracted from the CAD data by

_____(company name) is done purely at their own risk. _____ (company name) agrees to insure that any use of the above referenced CAD information without the expressed written authorization for any other projects other than referenced project is hereby prohibited.

Signing on behalf of_____(company name),

_____
Signature

_____
Print Name

_____
Date

SECTION 21 0514

CLOSEOUT DOCUMENTS FOR FIRE SUPPRESSION EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fire protection closeout document requirements which are specifically applicable to all Division 21 Sections, in addition to the requirements of Division 1 - General Requirements.

B. Fire Protection Closeout document requirements.

C. Record Document Submittals "As-Builts".

D. Contractor Guarantee.

E. Manufacturer Warranties.

F. Operating Instructions and Training.

G. Operation and Maintenance (O&M) Manuals.

H. O&M Instruction Form.

I. Spare Parts.

J. Manufacturer's Field Services and Factory Start-up

1.03 RELATED WORK

A. All Division 21 sections.

1.04 RECORD DOCUMENT SUBMITTALS

A. The contractor shall be required to maintain a clean, undamaged set of blue or black line white prints of contract drawings and shop drawings.

B. The contractor shall mark the set to show the actual installation where the installation varies substantially from the work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the work.
   2. Mark new information that is important but was not shown on Contract Drawings or Shop Drawings.
   3. Note related Change Order numbers where applicable.

4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
5. "As-builts" shall be submitted to the architect/engineer for review of the mechanical, plumbing and fire protection as installed upon completion of the work. Changes on "as-builts" are to be shown using standard engineering drafting practices. Freehand drawn changes will not be accepted.

1.05 CONTRACTOR GUARANTEE

A. All equipment and materials furnished (and/or installed under this section) and all work performed under this section of specifications, shall be guaranteed to be free of defective materials and workmanship for a period of one year (unless a longer period is specified elsewhere) after date of substantial completion. Upon notice of failure of any part of the guaranteed equipment during the guarantee period, the affected part or parts shall be promptly replaced with new parts by the Contractor at no additional cost to the Owner. All labor required to perform guarantee shall be included as part of the complete guarantee warranty.

1.06 MANUFACTURER'S WARRANTIES

A. Provide as a minimum a one (1) year manufacturer's equipment warranty against defective components for each piece of equipment and its components installed under their respective specification section prior to final inspection in accordance with each of the trades listed below. Equipment warranties shall commence on the date of Substantial Completion as established in the Certificate of Substantial Completion issued by the Architect. Contractor shall note that there may be more than one certificate of Substantial Completion and date of Substantial Completion for this contract. Any parts which fail during the first year shall be replaced by the Contractor at no additional cost to the Owner.

B. Fire Protection: Each piece of equipment and its components furnished shall carry a minimum one (1) year warranty for replacement of parts and the labor required to complete such warranty work.

1.07 OPERATING INSTRUCTIONS AND TRAINING

A. Instructions: Instruct operating personnel as required (but a minimum of 8 hours) in operation and maintenance of all systems included in this Division (21) of the specifications. In addition, there shall be the quantity of dedicated instruction for certain specific pieces of equipment as specified in the individual specification sections herein. Provide signed O & M Instruction Verification Form as specified in later paragraph certifying instructions have been received.

B. Training: See each specification section for specific training requirements.

1.08 OPERATING AND MAINTENANCE (O&M) MANUALS

A. Operating and maintenance manuals shall comply with Division 1 - Operation and Maintenance Data.

B. One bound and indexed Operating and Maintenance Manuals and one electronic copy (PDF format) shall be prepared by the Contractor and be submitted for approval prior to delivery to operating personnel. Binder shall be 3-ring commercial grade, complete with inside storage pockets, sheet protectors, spine and front cover labels.

C. Each Manual shall contain the following information, data and drawings. The exact format and order of the following information shall comply with Division 1 requirements. If no Division 1 requirement exist, format and order shall be as listed below.
   1. List of Contents. Insert under clear front cover of binder.
   2. Contractors one (1) year guarantee.
   3. Manufacturer's equipment warranties (provide a warranty for each piece of equipment).
   4. Copy of O & M Instruction Form showing Contractor has instructed designated personnel in the proper operation of all Division 21 systems.
   5. Installation, operating and maintenance instructions for each item of equipment. Provide trouble shooting checklist guide.
   6. Manufacturer's list of renewal parts for each item of equipment with recommended stock items and quantities indicated.
   7. Copy of approved submittals, shop drawings showing layouts and construction details.

D. Refer to each specification section to determine if an extended (beyond 1 year) service contract is to be provided for the piece of equipment listed in the specifications.

1.09 MANUFACTURER'S FIELD SERVICES AND FACTORY START-UP

A. Refer to each specification section for additional requirements the manufacturer shall provide under the provisions of this specification.

B. Upon completion of the equipment installation the Contractor shall obtain the services of the factory authorized and trained representative at no additional cost to the owner to perform a start-up of the piece of installed equipment. The factory authorized and trained representative shall submit a certificate or letter stating the equipment has been successfully started, adjusted and tested in accordance with the manufacturer's recommendations. Contractor shall refer to each specification section to determine which equipment/systems require start-up by factory authorized personnel. Some representative equipment/systems which require start-up are listed below.
   1. Fire Protection Systems

1.10 O & M INSTRUCTION FORM

A. Contractor shall provide instruction to operating personnel for the minimum hours specified in each specification section.

B. Contractor shall coordinate a schedule of startup/operation and maintenance instruction meetings between the Owner's representatives, various subcontractors and manufacturer's representatives. Submit the following completed form. Some representative systems and equipment are included in the form below, but contractor shall customize the form based on the specific systems and equipment on this project.

OPERATIONAL INSTRUCTION VERIFICATION FORM

Operation and maintenance procedures for major systems and equipment were thoroughly explained to the Representatives as follows:

Equipment Item	Date Instruction Received	Owner's Representative Name (printed)	Owner Representative Initial or Signature
FIRE PROTECTION			
Description of the complete system and all its components			
"I certify that the operation and maintenance procedures of all the major mechanical systems have been thoroughly explained to the Owner's Representative."			
Company:			
Name:			
Title:			
Signature:			
Date:			

1.11 EXTRA MATERIALS AND SPARE PARTS

A. The contractor shall submit a form similar to the one below with a listing of all the spare parts including a description and quantity of each part to the owner for the owner to sign indicating receipt of said parts. Contractor shall also include their company name, date and signature as outlined below.

TRANSFER OF EXTRA MATERIALS AND SPARE PARTS			
Spec Section	**Total Quantity Received**	**Owner's Rep. Initials**	**Date Received**
FIRE PROTECTION			
Provide extra sprinklers for each zone under provisions of NFPA 13. Spare sprinklers of all types and ratings within each system shall be provided.			
Provide suitable wrenches for each sprinkler type.			
Provide sufficient size and number of metal storage cabinets for proper storage of spare sprinklers for each zone and install at each riser location. Each riser (system) shall have its own spare sprinkler cabinet to store extra sprinklers required for that system			

"I certify that the above list of spare parts and materials have been turned over to the Owners Representative."	
Company:	
Name:	
Title:	
Signature:	
Date:	

END OF SECTION

SECTION 21 0529

HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following hangers, supports and accessories for mechanical system piping and equipment:
   1. Coatings
   2. Upper attachments
   3. Pipe attachment (hangers and clamps)
   4. Metal Framing Channel
   5. Hanger Rods
   6. Sleeves
   7. Vibration Isolators

1.03 PERFORMANCE REQUIREMENTS

A. All supports utilized under Division 21 shall meet the sizing criteria specified herein. No support shall be loaded to more than 20% of its yield strength (thereby providing a safety factor of 5). All support sizes specified herein (for hanger rods, trapeze hangers, pipe attachments, etc.) are minimum sizes required. Contractor shall utilize larger size supports where actual loads dictate a larger support.

1.04 SUBMITTALS

A. Submit product data under provisions of Division 21 - Common Requirements for Fire Suppression Equipment.

B. Submit product data on upper attachments, pipe attachments, lower pipe supports, metal framing channel, and vibration isolators.

1.05 WELDING REQUIREMENTS

A. Welding Requirements: All welding performed to support Mechanical piping and equipment shall comply with AWS D1.1, "Structural Welding Code - Steel". Welders shall be qualified per AWS and welding certificates shall be posted at the jobsite.

1.06 COATINGS

A. All supports for piping and equipment, hangers and accessories, including but not limited to bolts, nuts, washers, rods, beam clamps, etc. shall be galvanized, except as indicated in the following paragraphs.

PART 2 - PRODUCTS

2.01 UPPER ATTACHMENT

A. Poured in Place Concrete: Contractor may install concrete inserts or drill concrete anchors. Inserts shall be:
   1. B-Line: B 2500
   2. C&P: 75
   3. Anvil: 281
   4. Erico/Michigan: 355
   5. PHD: 950, 951

B. Concrete Anchors: Anchors shall be expansion "drop-in" type with an actual load less than 1/3 the manufacturers listed allowable working load for tension in 2,000 psi concrete. Anchors shall be installed in drilled holes per manufacturer's recommendations. Approved manufacturers:
   1. Hilti: 5490000
   2. Red Head: RM-Multi-Set II
   3. Rawl: 6300 Drop-In

C. Steel Beams:
   1. Piping 2" and smaller: Malleable Iron C-Clamp with Lock Nut.
      a. B-Line: B 3033 or B3034
      b. C&P: 192
      c. Anvil: 94
      d. Erico/Michigan: 280
      e. PHD: 350 or 360
      f. FNW: 7203 or 7204
   2. Piping 2-1/2" and larger: Malleable Iron Beam Clamp.
      a. B-Line: B 3054
      b. C&P: 82
      c. Anvil: 218
      d. Erico/Michigan: 360
      e. PHD: 630 w/25
      f. FNW

D. Steel Bar Joist: Malleable Iron C-Clamp with Lock Nut.
   1. B-Line: B 3033 or B3034
   2. C&P: 192
   3. Anvil: 94
   4. Erico/Michigan: 280
   5. PHD: 350 or 360
   6. FNW: 7203 or 7204

E. Pre-manufactured Metal Trusses and Purlins: Upper attachment methods shall meet the requirements of the metal building manufacturer. Contractor shall insure that the equipment, ductwork, and piping is hung by the appropriate quantity of hangers as recommended by the Light Gauge Metal Truss manufacturer to evenly distribute the load. Hangers shall be located near a panel point where ever practical. Piping shall not be supported by clamps attached to the bottom flange of the bottom chord of trusses.

2.02 PIPE ATTACHMENT

A. Steel Pipe Hangers: Size steel pipe hangers to fit the piping.
   1. For Pipe Sizes 2" and Smaller:
      a. B-Line: B3170
      b. C&P: 800
      c. Anvil: 70
      d. Erico/Michigan: 100
      e. PHD: 151
   2. For Pipe Sizes 2-1/2" and Larger
      a. B-Line: B3100
      b. C&P: 100
      c. Anvil: 260
      d. Erico/Michigan: 400, 401
      e. PHD: 450, 451

B. Vertical supports shall be:
   1. Offset pipe clamp:
      a. B-Line: B3148
      b. C&P: 179
      c. Anvil: 103
      d. Erico/Michigan: 700
      e. PHD: 535
   2. Riser clamp:
      a. Steel:
         1) B-Line: B-3373
         2) C&P: 126
         3) Anvil: 2612
         4) PHD: 500, 551
         5) Erico/Michigan: 510

2.03 METAL FRAMING CHANNEL

A. Where possible and practical, piping shall be supported with trapeze hangers consisting of a metal framing system of channel, fittings, and hardware as defined in the Metal Framing Manufacturer's Association Standard Publication MFMA-1. Length of trapeze supports shall not exceed 4 feet unless contractor performs and submits calculations which indicate the channel is within the manufacturer's recommendations with a safety factor of 30% added to the load.

B. Vertical Pipe Supports: Where shown on the drawings, vertical routed piping shall be supported and/or stabilized by steel channel meeting the requirements for channel as specified herein.

C. Channel shall be constructed of 12 gauge steel. Nominal width shall be 1-5/8" x 1-5/8" with a 9/16" wide and 7/8" long slot face opening, with slots on 2" centers. Channel shall be pre-galvanized in accordance with ASTM A 653 G90, or have a factory applied electro-deposited epoxy finish.

D. Pipe clamps shall be sized as follows:
   1. Non-insulated Steel Piping: Sized to fit piping.

E. Approved Manufacturers: B-Line Model B22SH, Elcen, Unistrut, and Superstrut by Midland-Ross.

2.04 HANGER RODS

A. Steel Hanger Rods: Continuous threaded rod. Size as indicated in individual piping specification sections.

B. Rods supporting trapeze hangers shall be 1/2" unless actual loads dictate a larger rod. Rods supporting mechanical equipment shall be sized in accordance with the manufacturer's installation instructions. If no size is given, rod size shall be minimum 3/8", unless actual load dictates a larger rod. No support shall be loaded to more than 20% of its yield strength (thereby providing a safety factor of 5).

C. Rod couplings shall be:
1. B-Line: B3220
2. C&P: 167
3. Anvil: 136, 136R
4. Erico/Michigan: 26
5. PHD: 100, 105

2.05 SLEEVES

A. Pipe Sleeves: Pipe sleeves thru floors shall be fabricated from schedule 10 (minimum) steel pipe, and shall extend 1 inch above floor. Pipe sleeves thru walls shall be fabricated from Schedule 10 (minimum) steel pipe and shall be flush with both sides of walls, unless noted otherwise on drawings.

2.06 VIBRATION ISOLATORS

A. General: Furnish and install vibration isolators for equipment as listed below. All isolation devices shall be selected for uniform static deflections according to distribution of weight and for the lowest disturbing frequency of the unit.

B. Isolator Types:
1. Type 1 Isolators: Free-standing, unhoused, laterally stable steel spring incorporating leveling bolts and 1/4" thick ribbed noise isolation pads. To assure stability, the spring shall have a lateral spring stiffness greater then 0.8 times the rated vertical stiffness and shall be designed to provide 50% overload capacity. Isolators shall have a minimum static deflection of 3/4".
2. Type 2 Isolators: Combination spring and fiberglass (or neoprene) hangers, incorporating pre-compressed molded fiberglass (or neoprene) noise and vibration isolation pads, coated with a moisture impervious elastomeric membrane in series with springs, all encased in welded steel brackets. The spring shall have a lateral spring stiffness greater than 0.8 times the vertical stiffness. Isolators shall be designed for 50% overload capacity and shall accommodate rod misalignment over a 30 degree arc. Isolators shall have a minimum static deflection of 3/4".

C. Piping Isolation: All piping 1" diameter and over in the mechanical equipment rooms shall be isolated from the structure by means of vibration and noise control isolators. Suspended piping shall be isolated with Type 3 isolators. A combination clevis/pre-compressed isolator is acceptable in lieu of separate clevis and separate Type 3 isolators. Floor mounted piping shall be isolated with Type 1 isolators.

D. Manufacturers: The vibration isolators shall be manufactured by Peabody Noise Control, Mason, Vibration Isolation Co. Inc., Amber Booth, Vibro Acoustics, Vibration Mountings, Vibration Eliminator Company, Korfund, Kinetics or IAC. Isolators meeting the specification requirements which are engineered and approved by the equipment manufacturer may also be furnished by the equipment manufacturer.

PART 3 - EXECUTION

3.01 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support spacing requirements are specified in Sections specifying piping systems and equipment.

B. Use galvanized hangers and supports for piping and equipment that will not have field-applied finish.

3.02 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
   1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
   2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

E. Install lateral bracing with pipe hangers and supports to prevent swaying.

F. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, 2½" and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

G. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

H. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

3.03 PIPE HANGER ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.04 PAINTING

A. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 - Painting.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

C. In areas that are to be painted and also are exposed to view in public areas, supports for piping and equipment, hangers and accessories including but not limited to bolts, nuts, washers, rod, angle iron, beam clamps, etc. shall be plain steel with a coat of rust inhibiting primer. Primer shall be applied prior to installation of supports. Supports, hangers and accessories exposed to view shall not be galvanized or electroplated, in order to allow them to be painted in accordance with Division 9 - Painting. Areas that are to be painted but that are not exposed to view to the public, such as mechanical rooms, shall be galvanized as required above.

3.05 SLEEVES AND PENETRATIONS

A. Provide pipe sleeves for all piping penetrations through floors and walls.

B. Set sleeves in position during construction of walls or floors prior to placement of brick, concrete block or cast-in-place concrete.

C. Piping Penetrations through Rated Walls or Floors: Firestopping methods and materials shall be in accordance with Division 7 - Penetration Firestopping. Assembly shall meet the wall or floor rating as specified by the Architect. See Architectural drawings for rating requirements. Sleeve's size and material shall be coordinated with Division 7 - Penetration Firestopping.

D. Piping Penetrations through Non-rated Walls or Floors: Pack space between pipe or conduit and sleeve with fiberglass batts and with a minimum of 1 inch thick, non-sagging caulking material on one side. Caulk material is not required to be fire rated, but shall comply with Division 7 - Penetration Firestopping.

E. Install chrome plated steel escutcheons at finished surfaces for piping.

F. Division 21 Contractor shall furnish the General Contractor with the clear opening dimensions and elevations and locations of all penetrations through walls and floors, so that the General Contractor may provide appropriate wall and floor openings for these penetrating items. Penetrating items include, but are not limited to, piping. Clear opening dimensions and elevations and locations shall be furnished in a timely manner to allow General Contractor to frame openings during wall and floor construction, and to prevent the need for removing new work. Contractor is warned that the project may contain shear walls which require steel reinforcing/framing around perimeter that must be installed during the construction of the wall, and which cannot be installed after the wall is constructed without significant demolition of the wall and reconstruction of the wall. Coordinate with General Contractor to determine location of shear walls.

3.06 SUSPENDED EQUIPMENT AND PIPING SUPPORTS

A. Provide steel drop rod supports or angle iron supports, secured (spot welded or clamped in bar joist areas) to building main structural components for all suspended equipment and piping. Supplemental angle iron framing shall be provided where required between bar joists and shall be minimum 3 x 3 x 1/4 for equipment and large piping (4" and larger), and minimum 2 x 2 x 1/4 for small equipment and small piping. 1-5/8 x 1-5/8 x 12 gauge channel may be used to span bar joist in lieu of 2 x 2 x 1/4 angle provided that previous paragraph “Performance Requirements” are met. Contractor shall note that supplemental angle sizes are minimum. Contractor shall provide larger size supplemental angle iron framing as appropriate to safely and appropriately support equipment. Provide vibration isolation where specified. Coordinate all equipment and pipe supports with steel fabricator/erector and do not overload any building structural members or supplemental framing members. Provide securely tightened lock nuts on all drop rod supports and connections.

END OF SECTION

SECTION 21 1315

FIRE SUPPRESSION PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following fire-suppression piping inside the building and accessories:
   1. Wet-pipe sprinkler systems.

1.03 SCOPE OF WORK

A. Contractor shall provide a complete wet pipe automatic sprinkler system for existing building and new addition. Riser shall be located in Storage Room 119. Coordinate exact location of 6" fire main to Storage Room with Civil plans.

B. Pipe routing and pipe sizes shall not be substantially changed without prior written approval from architect.

C. The following flow test, obtained from the Macon Water Authority on August 11, 2015, shall be used for the purpose of bidding only: It is the contractor's responsibility to visit the site and perform a certified flow test and obtain a 24 hour chart and verify the available water supply prior to beginning design. Contractor shall coordinate the performance of the test with the local utility. Flow test shall be witnessed and attested to in writing by an independent third party with knowledge of these matters. Contractor shall submit written documentation of this flow test data. Contractor shall pay all cost associated with this test.
   1. 90 psi static
   2. 88 psi residual
   3. 1240 gpm flow

D. Hydraulic calculations shall be computer generated to deliver the specified design densities over the specified areas with allowances required to comply with these specifications.

E. Contractor shall coordinate design and installation of sprinkler systems with all other trades. Contractor shall provide offsets and other adjustments in piping locations as required to accommodate all other trades and existing conditions. These offsets and adjustments shall be made at no additional charge to the contract. Pipe routing shall follow the requirements listed below:
   1. Piping shall not be routed under any suspended mechanical equipment.
   2. Piping shall be routed either above or below duct.
   3. Piping routed above lay-in light fixtures shall be installed at an elevation above the fixture to allow the fixture to be removed. If this is not possible, the contractor shall relocate the sprinkler piping to not be above the light fixture.
   4. Piping shall be routed in concealed areas whenever and wherever possible.
   5. Piping shall not penetrate columns or beams.
   6. Mains and cross mains shall be routed parallel or perpendicular to the building structure.
   7. Sprinklers shall be installed in the center of ceiling tiles.

1.04 PERFORMANCE REQUIREMENTS

A. The system shall be designed to provide a density of 0.10 gpm per square foot over the most remote 1500 square feet except storage rooms, mechanical spaces, science classrooms/labs and janitor's closets which shall be designed to provide 0.15 gpm per square foot over the remote 1,500 square feet.

B. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

C. Fire-suppression sprinkler system design shall be approved by authorities having jurisdiction.
   1. Margin of Safety for Available Water Pressure: 10 psi minimum, including losses through water-service piping, valves, and backflow preventers.
   2. Maximum Protection Area per Sprinkler:
      a. Office Spaces: 225 sq. ft.
      b. Storage Areas: 130 sq. ft.
      c. Mechanical Equipment Rooms: 130 sq. ft.
      d. Electrical Equipment Rooms: 130 sq. ft.
      e. Other Areas: According to NFPA 13 recommendations, unless otherwise indicated.
   3. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:
      a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
      b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Division 21 - Common Requirements for Fire Suppression Equipment.
   1. Piping materials, including sprinkler specialty fittings.
   2. Pipe hangers and supports.
   3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
   4. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
   5. Fire department connections, including type; number, size, and arrangement of inlets; caps and chains; size and direction of outlet; escutcheon and marking; and finish.
   6. Alarm devices, including electrical data.

B. Fire-hydrant flow test report.

C. Sprinkler Piping Drawings:
   1. Working Drawings: Submit drawings for fabrication and erection not fully described by manufacturer's data. Include plans and elevations at not less than 1/8" to 1'0" scale, details at not less than 3/4" to 1'0" scale. Indicate required anchorage and accessory items, field dimensions and finishes. Indicate construction details, methods of assembly and fastening, relationship and arrangement of piping, sprinklers, valves, and alarms. Include a copy of the hydraulic calculations. Submit six copies to the Georgia State Fire Marshall or Local Fire Marshall (whichever has jurisdiction). Contractor shall pay all costs. After receiving their approval, submit to Architect/Engineer. Do not start fabrication or construction until after review of approved drawings by Architect.
   2. Zoning Plan: Contractor shall submit six copies of a zoning plan suitable for framing. A copy of this zoning plan shall be framed and mounted on the wall at each of the entrance riser locations, indicating which zone(s) are served by each particular entrance location.
   3. Submit reflected ceiling plans indicating location of sprinklers in relation to lights, grilles and other ceiling mounted equipment.

D. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping" and "Contractor's Material and Test Certificate for Underground Piping."

E. Welding certificates.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals, shall be submitted under provisions of Division 21 - Closeout Documents for Fire Suppression Equipment.

1.06 QUALITY ASSURANCE

A. Sprinkler contractor shall have been in the sprinkler business three years. Contractor shall have a Certificate of Competency issued by the Georgia State Fire Marshall's Office.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:
1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 24, "Installation of Private Fire Service Mains and Their Appurtenances."
3. NFPA 101, “Life Safety Code.”

1.07 COORDINATION

A. Equipment and Components: Bear UL and/or FM label or marking.

1.08 EXTRA MATERIALS

1. See Division 21 - Closeout Documents for Fire Suppression Equipment for the supply of and transfer of extra materials and spare parts to the Owner.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps.

B. Maintain caps in place until installation.

1.10 WARRANTY

A. See Division 21 - Closeout Documents for Fire Suppression Equipment for warranty information.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Pipe:
1. Above Ground: Black carbon steel pipe. Federal specification WW-P-406D Int. Amd. 1.
   a. Piping 2-inch and smaller may be ASTM-A 135 Schedule 40 or Schedule 10. Threaded piping shall be Schedule 40.
   b. Piping 2-1/2" inch and larger shall be ASTM A-135 or A-53-79 Schedule 10.

2. Below Ground: Cement lined ductile iron pipe, ANSI-21.51 class 50, 350 psi minimum working pressure with slip-on joints, ANSI-A21.11 or PVC, AWWA C900, PVC pressure pipe, PC200 with slip-on joints, ANSI-A21.11. Materials shall not be mixed.
3. Fittings and Couplings:
   a. 2-inch and Smaller Steel Pipe:
      1) 125 lb. black threaded cast iron fittings, ASTM-126-73 class A, Federal Specification WW-P-501E, with wrought steel couplings or ductile iron grooved pipe fittings.
   b. 2-1/2-inch and Larger Steel Pipe Not Welded: Ductile iron grooved pipe fittings, short pattern with flow equal to standard fittings. Victaulic FireLock™. Fabricated sectional fittings are not acceptable.
   c. Grooved Pipe Couplings: ASTM A-536-84 ductile iron housings; ASTM D-2000-06 pressure responsive gasket and 300 psi working pressure; ASTM A449-04 and A183-68 heat treated carbon steel bolts and nuts. Install with uniform coat of Victaulic lubricant on pipe, gasket, and in housing.
      1) Rigid Type: Housings shall be cast with offsetting angle-pattern bolt pads to provide rigidity and system support and hanging in accordance with NFPA-13. Couplings shall be fully installed at visual pad-to-pad offset contact. (Tongue and recess type couplings, or any coupling that requires exact gapping of bolt pads on each side of the coupling at specified torque ratings, are not allowed.).
         a) 1-1/4” to 4”: Installation-Ready, for direct installation without field disassembly. Victaulic Style 009-EZ.or engineered approved equal.
         b) 5” through 8”: Victaulic FireLock™ Style 005 or engineered approved equal
         c) 10” and Larger: Victaulic Zero-Flex Style 07or engineered approved equal
      2) Flexible Type: For use in locations where vibration attenuation and stress relief are required, and for seismic applications. Victaulic Style 75 or 77 or engineered approved equal.
      3) Gaskets:
         a) Service: Dry Systems
            Temperature Range: Ambient
            Gasket Recommendation: FlushSeal®, Grade EPDM, Type A
         b) Service: Freezer Applications
            Temperature Range: -40°F to 0°F
            Gasket Recommendation: FlushSeal®, Grade L, Silicone
         c) Service: Water/Wet Systems
            Temperature Range: Ambient
            Gasket Recommendation: Grade EPDM, Type A
      4) All grooved couplings and fittings shall be by one manufacturer.
   d. Weld Fittings: Buttweld carbon steel, ASTM-A234-79. Wall thickness shall be same as piping. Fabricated sectional fittings are not acceptable.
   e. Reducing Tees: Couplets by Bonney Forge Division of Energy Products Group, Mechanical-T by Victaulic, Sprink-Let by Sunbelt Marketing, or "EZ TEE" by W. B. Industries or equal may be used for side outlet reducing tees more than two pipe sizes smaller than main.

2.02 PIPING SPECIALTIES

A. Alarm Check Valve-Riser: Alarm check valve for vertical installation with retarding chamber F.M. approved and U.L. listed. High strength ductile iron body, aluminum-bronze clapper with elastomer seal, 225 psi W.W.P., and water motor alarm. Valve internal components shall be replaceable without removing the valve from the installed position. Victaulic Series 751 with Series 752 Retard Chamber or engineered approved equal.

B. Alarm Gong: Water type, Victaulic Series 760 or engineered approved equal.

C. Fire Department Connection: 2-1/2" x 2-1/2" x 4" polished chrome, building type with double clappers, caps and chains and identification plate, lettered "Automatic Sprinkler". Before purchase, verify thread count and type of local Fire Department hose connections. Elkhart, Croker, Standard or Potter Roemer.

D. Valves:
1. 2" and Smaller: Bronze body, U.L. listed - F.M. approved, standard port ball valve with weatherproof actuator and built-in tamper switches. Victaulic Series 728 or engineered approved equal.
2. 2-1/2" and Larger: Iron body, bronze or stainless steel trim, U.L. listed -F. M. approved, butterfly valve with weatherproof actuator and built in tamper switches, grooved end or lug type, Victaulic Series 705W or engineered approved equal.

E. Tamper Switches:
1. Switches shall be built in to the valves; U.L. Listed - F.M. Approved.
2. Switches designed for installation on indicator valves with weatherproof cased aluminum or steel housing with red finish; U.L. Listed - F.M. Approved. System Sensor, Notifier, Simplex or engineer approved equal.

F. Flow Switch: System Sensor Model WFD, Potter VSR, Notifier WFD Series or Simplex 2097 Series.

G. Check Valves: Iron body, U.L. listed - F.M. approved, spring-actuated or swing type, stainless-steel or bronze trimmed, welded-in nickel or bronze seat, and aluminum-bronze or coated ductile iron disc, grooved or flanged ends, Nibco F908 (flanged) or Victaulic Series 717 (grooved ends) or engineered approved equal. Contractor has the option of furnishing UL/FM listed wafer style check valves.

H. Dial Type Pressure Gauges:
1. General: Case constructed of brass or cast aluminum, back flange for surface mounting, flangeless for remote mounting, rattle-proof glass window held in place with an "0" ring and screwed ring, black scale graduations on a white background and adjustable pointer. Socket and tip to be stainless steel or brass, threaded 1/4" NPT. Bourdon tube to be phosphor bronze or stainless steel with brass movement. Gauge to be 4-1/2" diameter. Provide pulsation dampener.
2. Ranges: 0 - 200 psi. Units shall be in English (PSI).
3. Manufacturers: Dial type pressure gauges shall be manufactured by Ashcroft, Trerice, Weksler, Weiss, or Moeller.

I. Sprinklers:
1. Sprinklers shall be U.L. listed and F. M approved, 1/2 inch orifice (minimum), 1/2 inch N.P.T. connection (minimum) and have a minimum 5.6 'K' factor.
2. Sprinklers shall be glass bulb type, with hex shaped wrench boss integrally cast into the sprinkler body to reduce the risk of damage during installation.
   a. Wrenches shall be provided by the sprinkler manufacturer that directly engage the hex-shaped wrench boss integrally cast in the sprinkler body. Victaulic FireLock Series or engineered approved equal.
3. Sprinklers installed in areas subject to freezing shall be dry pendent or dry sidewall as indicated with chrome plated finish on sprinkler escutcheon. Victaulic Model V36 or engineered approved equal.
4. Sprinklers installed in gyp board ceilings shall be concealed pendent with factory painted white cover. Victaulic Model V38 or V39 or engineered approved equal.
5. Sidewall sprinklers shall be standard sidewall type with chrome finish on sprinkler and escutcheon. Victaulic Model V27 or engineered approved equal.

6. Sprinklers installed in areas with finished ceilings and recessed light fixtures shall be recessed pendent with chrome finish on sprinkler and escutcheon. Victaulic Model V27 or engineered approved equal.
7. Sprinklers installed in areas with finished ceilings and surface mounted light fixtures shall be pendent with deflector mounted below the light fixture. Provide an adjustable escutcheon. Finish shall be chrome plated.
    a. Escutcheons shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
8. Sprinklers installed in areas with no finished ceiling shall be uprights. Victaulic Model V27 or engineered approved equal.
9. Temperature rating for sprinklers shall be as follows:
    a. Air conditioned spaces: Ordinary temperature classification having a temperature rating of 135 to 170 degrees F.
    b. Skylights and Non-Air Conditioned Spaces (e.g., Mechanical Room/Corridor): Intermediate temperature classification having a temperature rating of 175 to 225 degrees F.
10. Sprinklers installed in areas which make them susceptible to damage shall be provided with guards.
    a. Guards shall be listed, supplied, and approved for use with the sprinkler by the sprinkler manufacturer.
11. Sprinklers shall be manufactured by Victaulic, Viking or Grinnell.

2.03 SUPPORTS AND ANCHORS

A. Supports and anchors shall be in accordance with Division 21 - Hangers and Supports for Fire Suppression Piping.

PART 3 - EXECUTION

3.01 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations.

B. Report test results promptly and in writing.

C. Ream pipe and tube ends. Remove burrs.

D. Remove scale and dirt, on inside and outside, before assembly.

E. All bare steel piping exposed to view provided under this section of specifications, shall be cleaned and painted under the Division 9 Painting. Also, all piping in the mechanical room shall be painted in accordance with these requirements.

3.02 EXCAVATION AND BACKFILL

A. Excavate trenches to the elevation required by the pipe. Trench shall not be undercut unless the trench bottom is in rock or hard strata, cinders, organic soils or injurious materials. Under cut shall be a minimum of 6" below the invert of the piping and shall be refilled with inorganic soil or sand tamped in place.

B. Contractor shall furnish all labor, materials, and equipment to keep the excavation free of water either from surface sources or from underground sources or from both. When underground water is encountered, undercut the trench 6" and backfill with graded aggregate base type C (crush and run gravel). The selections of the equipment and method of the removal of the water

shall be the responsibility of the Contractor. The Contractor shall be and is responsible for all damage incurred in handling water conditions. The present provision supersedes and replaces all other provisions relating to the removal of water from the site.

C. After piping has been tested, inspected and approved, trenches shall be backfilled to the first 12 inches over the pipe in 4 inch lifts and hand tamped.

D. After the first 12 inches, lifts shall not exceed 8 inches. The backfill in all trenches shall be compacted to 95% of the maximum dry density determined by the standard Proctor Compaction Test (ASTD D 698). Field density shall be taken at the rate of 1 for each 50 feet of trench for each 2 feet of fill. Cost of test shall be borne by the contractor.

3.03 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.04 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Listed Fire-Protection Valves: UL listed and FM approved for applications where required by NFPA 13.
2. Unlisted General-Duty Valves: For applications where UL-listed and FM approved valves are not required by NFPA 13.

3.05 JOINT CONSTRUCTION

A. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than 8" (DN 200) with wall thickness less than Schedule 40.

B. Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.
1. Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.
2. Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.

C. Dissimilar-Metal Piping Joints: Construct joints using dielectric fittings compatible with both piping materials.
1. 2" and Smaller: Use dielectric unions, couplings, or nipples.
2. 2-1/2" to 4": Use dielectric flanges.
3. 5" and Larger: Use dielectric flange insulation kits.

3.06 SERVICE-ENTRANCE PIPING

A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Division 2 - Water Distribution for exterior piping and Sheet P101 for location of entrance riser.

3.07 PIPING INSTALLATION

A. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent siamese connectors to allow full swing of fire department wrench handle.

B. Place pipe runs to minimize obstruction to other work. Piping shall not be routed under HVAC equipment installed above ceilings.

C. Place piping in concealed spaces above finished ceilings.

D. Center sprinklers in two directions in 2' x 2' ceiling tile and provide piping offsets as required.

E. Center sprinklers in the 2' side and in the center or on quarter points in 2' x 4' ceiling tile.

F. Interlock flow switches and tamper switches with the existing building fire alarm system.

G. Provide return bends at all sprinklers.

H. In rooms where exposed structural steel is required to be fire proofed, the Contractor shall re-space sprinklers and add branches as required if the fire proofing is applied in a manner which creates a "beam effect" which will interfere with sprinkler operation.

I. Locate outside alarm gong on building wall at location of sprinkler piping entrance.

J. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated.
   1. Deviations from approved working plans for piping require written approval from Architect/Engineer. Obtain written approval from Architect before deviating from approved working plans.

K. Install underground ductile-iron service-entrance piping according to NFPA 24 and with restrained joints.

L. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

M. Install unions adjacent to each valve in pipes 2" and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

N. Install flanges or flange adapters on valves, apparatus, and equipment having 2-1/2" and larger connections.

O. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

P. Install sprinkler piping with drains for complete system drainage.

Q. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

R. Install alarm devices in piping systems.

S. Hangers and Supports:
   1. Pipe hanger and support and equipment support materials and installation requirements are specified in Division 21 - Hangers and Supports for Fire Suppression Piping.
   2. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
      a. 1" and Smaller: Maximum span, 6 feet; minimum rod size, 3/8 inch.
      b. 1-1/4": Maximum span, 6 feet; minimum rod size, 3/8 inch.
      c. 1-1/2" and 2": Maximum span, 8 feet; minimum rod size, 3/8 inch.
      d. 2-1/2" to 3-1/2": Maximum span, 10 feet; minimum rod size, 1/2 inch.
      e. 4" and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

T. Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.

U. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than 1/4" and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

V. Fill wet-pipe sprinkler system piping with water.

3.08 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Specialty Valves:
   1. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.09 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

3.10 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect alarm devices to fire alarm.

3.11 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

3.12 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   3. Energize circuits to electrical equipment and devices.
   4. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
   5. Coordinate with fire alarm tests. Operate as required.
   6. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.13 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.14 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. See Division 21 - Closeout Documents for Fire Suppression Equipment, for closeout requirements.

END OF SECTION

SECTION 22 1413

FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the storm drainage piping within 5'-0" of the building.

1.02 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings shall be submitted under provisions of Division 22 - Common Requirements for Plumbing Equipment.

1.03 QUALITY ASSURANCE

A. All piping and fittings shall be new and of domestic (USA) manufacturer. The ASTM number and schedule shall be stamped on each length of piping.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of Division 22 - Common Requirements for Plumbing Equipment.

B. Store and protect products under provisions of Division 22 - Common Requirements for Plumbing Equipment.

PART 2 - PRODUCTS

2.01 STORM SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

A. Contractor has the option of providing either cast iron or PVC piping as follows (materials shall not be mixed):
   1. Cast Iron Pipe: ASTM A74, service weight: Fittings: Hub and Spigot service weight cast iron. Joints: ASTM C564, neoprene gaskets or lead and oakum. Neoprene gaskets shall completely fill the hub. Sanitary tees and crosses and 1/4 bends may be used only when the flow is from horizontal to vertical.
   2. PVC Pipe: ASTM D-3033/3034 sewer piping with compression joints or ASTM D1785 Schedule 40, PVC. Fittings: ASTM D-3034 gasketed sewer fittings or ASTM D2466, schedule 40 PVC drainage pattern solvent weld. Joints: Gasketed push type joints at pipe and fittings. Sanitary tees and crosses and 1/4 bends may be used only when the flow is from horizontal to vertical. (If PVC piping is chosen, 14" PVC may be installed where 15" is indicated on the drawings).

2.02 STORM DRAIN PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Contractor has the option of using one of the following materials throughout the entire underground storm drain piping system. Materials shall not be mixed.
   1. Cast Iron Pipe: ASTM A74, hub and spigot service weight cast iron. Fittings: Hub and spigot service weight cast iron. Joints: ASTM C564 Neoprene gaskets or lead and oakum. Sanitary tees and crosses and 1/4 bends may be used only when the flow is from horizontal to vertical.
   2. PVC Pipe: ASTM D1785, Schedule 40 PVC. Fittings: ASTM D2466, Schedule 40 PVC, drainage pattern. Joints: ASTM D2564 Solvent Weld. Sanitary tees and crosses and 1/4 bends may be used only when the flow is from horizontal to vertical.

2.03 STORM DRAIN PIPING, ABOVE GRADE

A. Piping in return air plenums above ceilings shall be cast iron as follows. Piping not in return air plenums may be cast iron or PVC as follows:
   1. Cast Iron Pipe: CISPI 301, hubless, service weight. Fittings: Cast iron. Joints: Heavy duty no hub couplings. Acceptable manufacturers are Husky SD-4000, Clamp-All Hi-Torq 80 or M-G.
   2. PVC Pipe: ASTM D1785, Schedule 40. Fittings: ANSI/ASTM D2466. Drainage Pattern solvent weld PVC. Joints ASTM D2855, Solvent Weld. Sanitary tees and crosses and 1/4 bends may be used only when the flow is from horizontal to vertical. If PVC storm drain is used below grade, the transition from PVC to cast iron shall occur within 6'-0" of the finished floor, except for the 2" storm drain piping to the condensate receiver boxes which may be PVC to connection on box.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Excavate trenches to the elevation required by the pipe. Trench shall not be undercut unless the trench bottom is in rock or hard strata, cinders, organic soils or injurious materials. Under cut shall be a minimum of 6" below the invert of the piping and shall be refilled with inorganic soil or sand tamped in place.

B. Contractor shall furnish all labor, materials, and equipment to keep the excavation free of water either from surface sources or from underground sources or from both. When underground water is encountered, undercut the trench 6" and backfill with graded aggregate base type C (crush and run gravel). The selections of the equipment and method of the removal of the water shall be the responsibility of the Contractor. The Contractor shall be and is responsible for all damage incurred in handling water conditions. The present provision supersedes and replaces all other provisions relating to the removal of water from the site.

C. After piping has been tested, inspected and approved, trenches shall be backfilled to the first 12 inches over the pipe in 4 inch lifts and hand tamped.

D. After the first 12 inches, lifts shall not exceed 8 inches. The backfill in all trenches shall be compacted to 95% of the maximum dry density determined by the standard Proctor Compaction Test (ASTD D 698). Field density shall be taken at the rate of 1 for each 50 feet of trench for each 2 feet of fill. Cost of test shall be borne by the contractor.

3.02 PIPING INSTALLATION

A. Drawings show the general arrangement, layout and location, of piping, appurtenances, etc., but do not show all required fittings and offsets that may be necessary to connect piping to equipment, etc., offset around obstructions, and to coordinate with other trades. Fabricate and install piping, appurtenances, etc., based on field measurements. Provide all necessary fittings and offsets at no additional cost to the Owner. Coordinate with other trades, existing building conditions, etc., for space available and relative location of piping, appurtenances, etc. Pipe, appurtenances, etc., locations shown on drawings shall be altered by Contractor where required to avoid interference and clearance difficulties.

B. Route piping in orderly manner and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Establish elevations of buried piping outside the building to ensure not less than 2 feet of cover.

G. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply two coats of galvanized paint to welding.

H. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum (unless noted otherwise). Maintain gradients.

I. Install bell and spigot pipe with bell end upstream.

J. Remove burrs and all loose material from the interior of piping prior to assembly.

K. Pipe Routing: Pipes shall be run level (except as required for grading) plumb and parallel with the building structure unless otherwise indicated on the drawings.

L. Spacing Pipe: Maintain 4" minimum clearance between parallel runs of piping after insulating, space permitting.

M. Coring: On new construction, pre-cast sleeves in all masonry and concrete walls, floor and ceiling slab. For a limited number of openings, contractor may core drill openings in masonry and concrete walls and floor slabs where sleeves were inadvertently not installed as the wall or floor slab was constructed. Also, see pipe sleeve detail on the mechanical drawing. On existing construction, sleeve openings must be core drilled.

N. Horizontal piping shall be installed in uniform alignment (i.e. STRAIGHT) and at uniform slope.

O. Trenches in acceptable soils shall be dug to slope. If a trench is inadvertently over excavated, the trench shall be backfilled and compacted as specified in the "Excavation and Backfill" paragraph in this specification section.

P. Trenches in unacceptable soils shall be undercut as specified in the "Excavation and Backfill" paragraph in this specification section.

Q. Piping shall be supported the entire length on undisturbed earth or compacted backfill. Supporting piping on concrete block, brick, wood block or other similar items is unacceptable.

R. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers. Cleanouts are specified in Division 22 - Sanitary Waste Piping Specialties.

S. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

T. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

U. Lay buried building storm drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

V. Install storm drainage piping at the following minimum slopes, unless otherwise indicated:
1. Storm Drain Piping: One-quarter inch (1/4”) per foot in direction of flow for piping 2" and smaller; one-eighth (1/8) inch per foot in direction of flow for piping 3" and larger.

W. Sleeves are not required for cast-iron storm drain piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

X. Install PVC storm drainage piping according to ASTM D 2665.

Y. Install underground PVC storm drainage piping according to ASTM D 2321.

Z. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.03 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub-and-Spigot, Cast-Iron Soil Piping Calked Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

C. Hubless Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.

D. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.04 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 22 - Hangers and Supports for Plumbing, Piping and Equipment.

B. Install supports according to Division 22 - Hangers and Supports for Plumbing, Piping and Equipment.

C. Support vertical piping and tubing at base and at each floor.

D. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
1. 1-1/2" and 2": 60 inches with 3/8-inch rod.
2. 3": 60 inches with 1/2-inch rod.
3. 4" and 5": 60 inches with 5/8-inch rod.
4. 6": 60 inches with 3/4-inch rod.
5. 8" to 12": 60 inches with 7/8-inch rod.

E. Install supports for vertical cast-iron soil piping every 15 feet.

F. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:
1. 1-1/2" and 2": 48 inches with 3/8-inch rod.
2. 3": 48 inches with 1/2-inch rod.
3. 4" and 5": 48 inches with 5/8-inch rod.
4. 6": 48 inches with 3/4-inch rod.
5. 8" to 12": 48 inches with 7/8-inch rod.

G. Install supports for vertical PVC piping every 48 inches.

3.05 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

3.06 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.07 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

1.1 ROOF DRAINS

A. Roof drains shall be flashed with 4 lb. sheet lead. Flashing shall be connected to roof drain flashing collar and extend 24" in all directions. Nobleflex flashing is **not** acceptable.

B. Type RD - (Basis of Design – Josam, equals by Watts or Mifab are acceptable.):

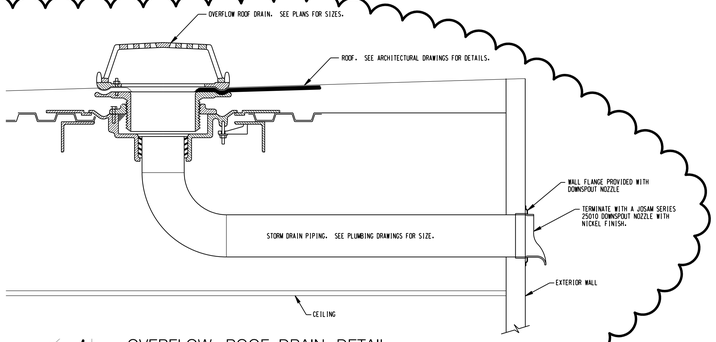
1. Josam: 21500-3-4-26
2. Smith: 1015
3. Wade: W-3000-DF
4. Zurn: ZA-100-E
5. Notes:

   a. Provide deck clamp assembly and drain receiver, secondary flashing clamp, and aluminum dome.
   b. Provide No Hub Joint connection.

C. Type ORD - (Basis of Design – Josam, equals by Watts or Mifab are acceptable.):

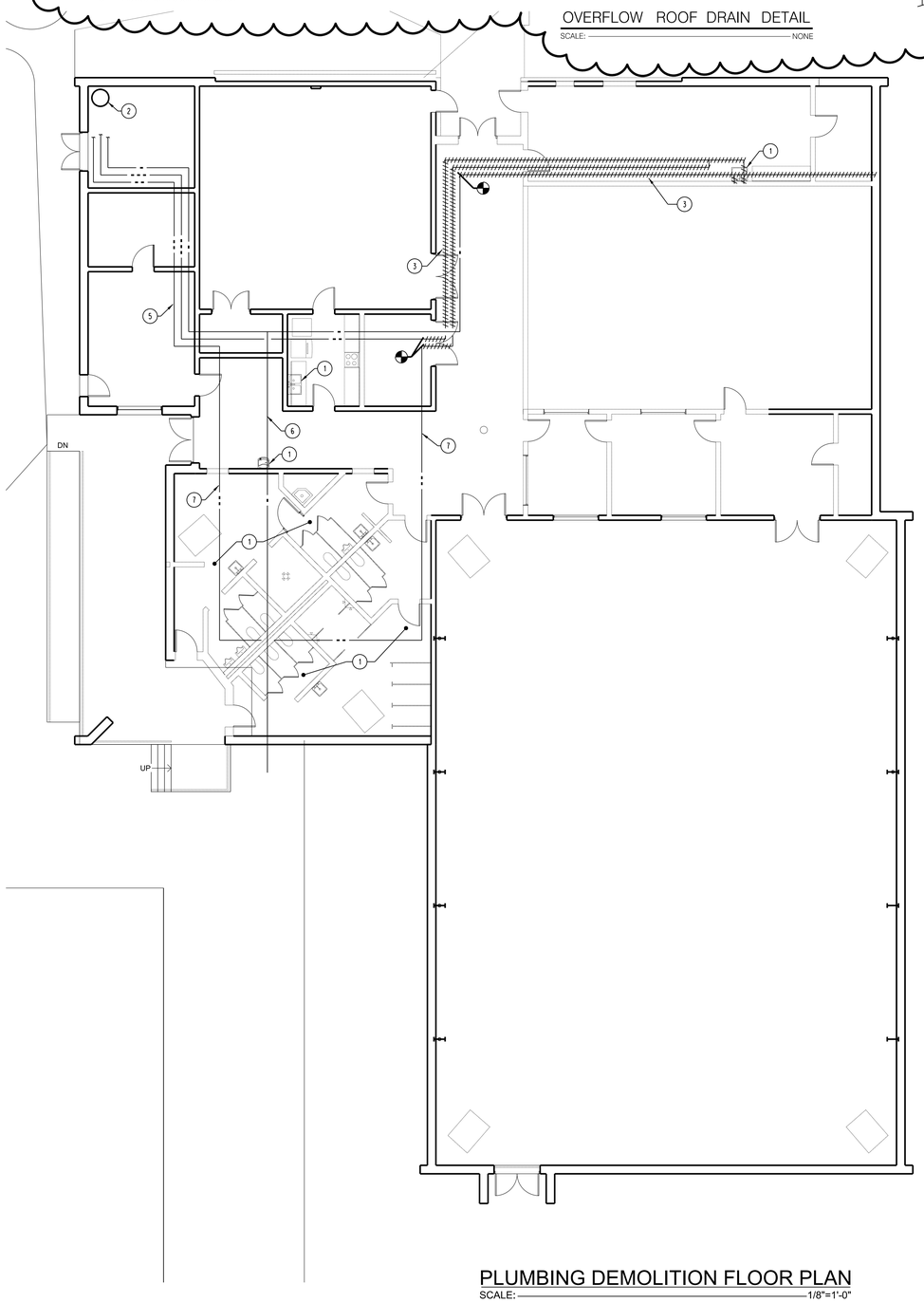
1. Josam: 21500-3-4-26-16
2. Smith: 1045
3. Wade:
4. Zurn: ZA-100-W2
5. Notes:

   a. Provide deck clamp assembly and drain receiver, secondary flashing clamp, aluminum dome and 2" internal water dam.
   b. Provide No Hub Joint connection.



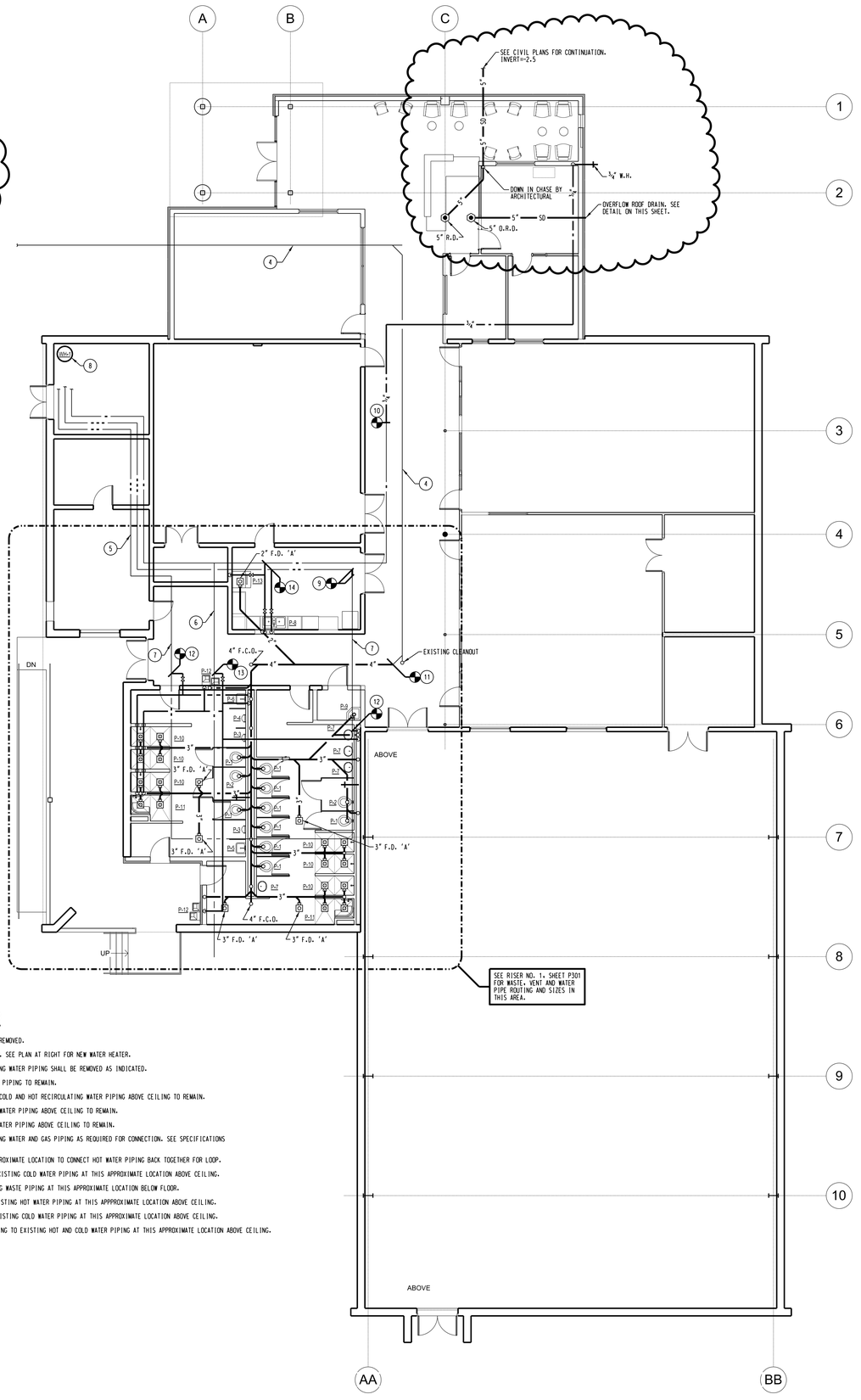
OVERFLOW ROOF DRAIN DETAIL

SCALE: NONE



PLUMBING DEMOLITION FLOOR PLAN

SCALE: 1/8"=1'-0"



PLUMBING NEW WORK FLOOR PLAN

SCALE: 1/8"=1'-0"

NOTE: CUT AND PATCH FLOORS AS REQUIRED FOR NEW WORK.

NOTES: (THIS SHEET ONLY)

1. EXISTING PLUMBING FIXTURE(S) SHALL BE REMOVED.
2. EXISTING WATER HEATER SHALL BE REMOVED. SEE PLAN AT RIGHT FOR NEW WATER HEATER.
3. EXISTING HOT, COLD AND HOT RECIRCULATING WATER PIPING SHALL BE REMOVED AS INDICATED.
4. APPROXIMATE LOCATION OF EXISTING WASTE PIPING TO REMAIN.
5. APPROXIMATE LOCATION OF EXISTING HOT, COLD AND HOT RECIRCULATING WATER PIPING ABOVE CEILING TO REMAIN.
6. APPROXIMATE LOCATION OF EXISTING COLD WATER PIPING ABOVE CEILING TO REMAIN.
7. APPROXIMATE LOCATION OF EXISTING HOT WATER PIPING ABOVE CEILING TO REMAIN.
8. NEW WATER HEATER (WH-1). MODIFY EXISTING WATER AND GAS PIPING AS REQUIRED FOR CONNECTION. SEE SPECIFICATIONS FOR WATER HEATER REQUIREMENTS.
9. PROVIDE PIPING AS REQUIRED AT THIS APPROXIMATE LOCATION TO CONNECT HOT WATER PIPING BACK TOGETHER FOR LOOP.
10. CONNECT NEW ¾" COLD WATER PIPING TO EXISTING COLD WATER PIPING AT THIS APPROXIMATE LOCATION ABOVE CEILING.
11. CONNECT NEW 4" WASTE PIPING TO EXISTING WASTE PIPING AT THIS APPROXIMATE LOCATION BELOW FLOOR.
12. CONNECT NEW ¾" HOT WATER PIPING TO EXISTING HOT WATER PIPING AT THIS APPPROXIMATE LOCATION ABOVE CEILING.
13. CONNECT NEW 2" COLD WATER PIPING TO EXISTING COLD WATER PIPING AT THIS APPROXIMATE LOCATION ABOVE CEILING.
14. CONNECT NEW ½" HOT AND COLD WATER PIPING TO EXISTING HOT AND COLD WATER PIPING AT THIS APPROXIMATE LOCATION ABOVE CEILING.

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MACON-BIBB COUNTY

REVISIONS

#	DATE	DESCRIPTION
1	11-23-15	ROOF DRAIN ADDED

Date:	NOVEMBER 3, 2015
Drawn By:	RNH
Checked By:	RNH
Project Number:	15-418.1

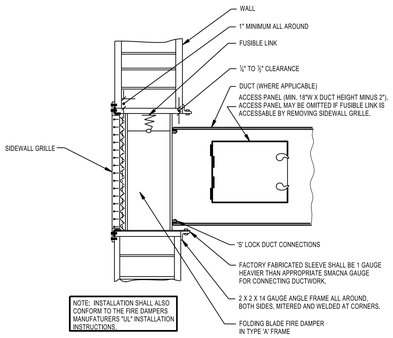
Sheet Name:
PLUMBING DEMOLITION AND NEW WORK FLOOR PLANS

Sheet Number:
P101

CONSTRUCTION DOCUMENTS

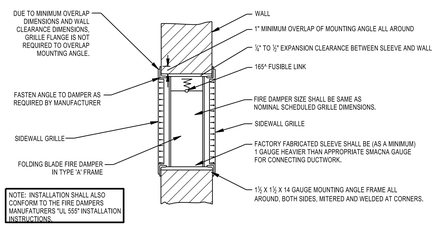
LEGEND

A 6X6	GRILLE, REGISTER, DIFFUSER DESIGNATION ABOVE WITH CFM SHOWN BELOW FOR TAB AGENT TO BALANCE DEVICE AT
16 X 12	DUCT SIZE: FIRST DIMENSION IS SIDE DRAWN
	RIGID ROUND DUCTWORK OR FLUE PIPING
	FLEXIBLE ROUND DUCTWORK
	RECTANGULAR - TO - ROUND DUCT TRANSITION
	ACOUSTICAL/THERMAL DUCT LINER - ½" THICK OR 1" THICK, RESPECTIVELY
	SQUARE ELBOW WITH TURNING VANES
	45° BRANCH ENTRY FITTING
MVD MVD	MANUAL VOLUME DAMPER (OPPOSED BLADE)
	SUPPLY DUCT TO OR FROM ABOVE
	RETURN OR EXHAUST DUCT TO OR FROM ABOVE
	INDICATES EQUIPMENT ON ROOF
	DUCT OR PIPE OFFEST: ARROW HEAD INDICATES DIRECTION OF RISE
	RETURN OR EXHAUST AIR FLOW
T	WALL MOUNTED DDC TEMPERATURE SENSOR
M	POWER CONTACTOR PROVIDED BY MECHANICAL
D	CONDENSATE DRAIN PIPING
R	REFRIGERANT PIPING
	DROPPING OR RISING PIPE
	PIPE TO OR FROM ABOVE
DB, WB	DRY BULB, WET BULB
FPM	FEET PER MINUTE
CFM, ℓ	CUBIC FEET PER MINUTE
OA	OUTDOOR AIR
MBH	BTU/HR x 1000
APPROX.	APPROXIMATELY
ESP IN WG	EXTERNAL STATIC PRESSURE INCHES WATER GUAGE
HP	HORSEPOWER
RPM	REVOLUTIONS PER MINUTE
UNO	UNLESS NOTED OTHERWISE
AFF	ABOVE FINISHED FLOOR
UC	UNDERCUT DOOR ½"
KW	KILOWATTS
Δt	TEMPERATURE DIFFERENCE
B.E. T.E.	BOTTOM ELEVATION, TOP ELEVATION
LB/HR	POUNDS PER HOUR



FIRE DAMPER @ SIDEWALL REGISTER DETAIL

SCALE: NONE



FIRE DAMPER @ DOUBLE SIDEWALL GRILLE DETAIL

SCALE: NONE

EXHAUST FANS

TAG	GREENHECK MODEL NUMBER	CFM	FAN STATIC PRESSURE IN W.G.	FAN RPM	MOTOR HP	MAX SONES	NOTES
EF-1	G-070-D	180	0.3	1459	1/30	3.8	1:2:3:4
EF-2	G-099-A	900	0.4	1558	1/4	10.8	1:2:3:4:5
EF-3	G-099-A	900	0.4	1558	1/4	10.8	1:2:3:4:5

1. CENTRIFUGAL CURB MOUNTED EXHAUST FAN. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER. SEE CENTRIFUGAL ROOF EXHAUST FAN DETAIL.
2. DIRECT DRIVE.
3. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
4. PROVIDE SPEED CONTROLLER.
5. UNIT SHALL BE MOUNTED ATOP EXITING ROOF CURB. CONTRACTOR SHALL PROVIDE CURB ADAPTER AS REQUIRED TO INSTALL UNIT ATOP EXISTING CURB. SEE SPECIFICATIONS FOR CURB ADAPTER REQUIRMENTS.

WALL HEATERS

TAG	Q-MARK MODEL No.	CFM	B.E. A.F.F. MOUNTING HEIGHT	HEATING OUTPUT KW	NOTES
WH-1	AWH	100	16"	1.8	1:2:3
WH-2	AWH	100	16"	1.8	1:2:3

1. WALL MOUNTED FAN FORCED ELECTRIC HEATER WITH BRONZED HEAVY DUTY ARCHITECTURAL GRILLE.
2. PROVIDE INTEGRAL TAMPER PROOF THERMOSTAT, DISCONNECT AND HIGH TEMPERATURE LIMIT CUT-OFF.
3. UNIT SHALL BE SURFACE MOUNTED. PROVIDE WITH SURFACE MOUNTING FRAME

BI-POLAR IONIZATION UNITS

TAG	ASSOCIATED EQUIPMENT	CFM	GLOBAL PLASMA SOLUTIONS MODEL #	NOTES
BPIU-1	F-1	1685	GPS-FC-3	1:2:3:4
BPIU-2	RTAC-1	4000	(2) GPS-FC-3	1:2:3:4

1. NEEDLE-POINT TYPE IONIZER WITH ABS PLASTIC OR POWDER-COATED STEEL HOUSING AND CARBON OR STAINLESS STEEL IONIZATION NEEDLES.
2. PROVIDE LED TO VERIFY IONIZATION.
3. PROVIDE FACTORY FURNISHED 24 VAC INPUT TERMINAL FOR POWERING BIPOLAR UNIT FROM ASSOCIATED EQUIPMENT'S 24V FAN TERMINAL.
4. UNIT SHALL BE MOUNTED INSIDE OF AIR CONDITIONING EQUIPMENT .

GRILLES

TAG	TITUS MODEL No.	SIZE OR LENGTH	FINISH	THROW	NOTES
A	TMS-AA	12X12	WHITE	4 WAY	1:5:6
B	TMS-AA	24X24	WHITE	4 WAY	1:4:6:7
C	PAR-AA	24X24	WHITE	-	4:6:10
D	50F	6X6	WHITE	-	2:3:5:6:7
E	50F	8X8	WHITE	-	2:3:5:6:7
F	50F	12X12	WHITE	-	2:3:5:6:7
G	300FL	8X6	WHITE	-	3:5:6:8
H	300FL	10X6	WHITE	-	3:5:6:8
I	300FL	12X10	WHITE	-	3:5:6:8
J	300FL	14X6	WHITE	-	3:5:6:8
K	350FS	30X36	WHITE	-	3:5:6:9
L	350FL	24X12	WHITE	-	3:5:6:9
M	33RL	18X18	WHITE	-	5:6:11
N	50F	14X14	WHITE	-	2:3:5:6:7
O	350FL	8X6	WHITE	-	5:6:9

1. LOUVERED FACE HIGH CAPACITY ALUMINUM CEILING SUPPLY DIFFUSER WITH FIXED AIR DISCHARGE PATTERN AS SCHEDULED.
2. ALL ALUMINUM 1" X 1" X 1" "EGG CRATE" EXHAUST/RETURN GRILLE.
3. PROVIDE OPPOSED BLADE DAMPER.
4. IN 24 X 24 PANEL FOR LAY-IN CEILING.
5. FLANGED FRAME FOR SURFACE MOUNTING.
6. NC LEVEL NOT TO EXCEED NC 35.
7. SEE CEILING GRILLE DUCT CONNECTION DETAIL.
8. DOUBLE DEFLECTION ALUMINUM SIDEWALL SUPPLY REGISTER WITH FRONT BARS HORIZONTAL (PARALLEL TO LONG DIMENSION). PROVIDE 3/4" BLADE SPACING. PROVIDE FRONT AND REAR BLADE SETTINGS AS REQUIRED TO ACHIEVE PROPER AIR DISTRIBUTION UNLESS NOTED OTHERWISE.
9. ALUMINUM RETURN GRILLE WITH FACE BARS HORIZONTAL (PARALLEL TO LONG OR SHORT DIMENSION). PROVIDE FIXED STATIONARY BLADES AT 35° TO 45° DEFLECTION, AT 3/4" SPACING.
10. ALUMINUM PERFORATED RETURN AIR GRILLE WITH 3/16" DIAMETER HOLES.
11. STEEL HEAVY DUTY FRETURN GRILLE WITH FACE BARS HORIZONTAL (PARALLEL TO LONG DIMENSION). PROVIDE FIXED STATIONARY BLADES AT 38° DEFLECTION AT 1/2" BLADE SPACING.

ROOFTOP AIR CONDITIONING UNITS

TAG	CARRIER MODEL NUMBER	TOTAL COOLING MBH	SENSIBLE COOLING MBH	TOTAL SUPPLY CFM	O.A. CFM	HEATING INPUT MBH	HEATING OUTPUT MBH	APPROX. SUPPLY ESP IN. WG	SUPPLY MOTOR HP	MINIMUM STAGES COOL	MINIMUM STAGES HEAT	ENTERING AIR °F DB	ENTERING AIR °F WB	MINIMUM AMBIENT COOLING °F	NOTES
RTAC-1	48TCDD	138.5	101.0	4000	700	180	148	1.0	3.0	2	2	78.8	64.8	30	1:2:3:4:5:6:7:8:9:10:11:12:13:14:15

1. COOLING CAPACITIES BASED ON AIR ENTERING EVAPORATOR AT SCHEDULED CONDITION AND 95.7° F AMBIENT AIR TEMPERATURE. UNIT SHALL PROVIDE MECHANICAL COOLING DOWN TO SCHEDULED TEMPERATURE. UNIT SHALL UTILIZE R-410a REFRIGERANT.
2. HEATING CAPACITIES BASED ON 60°F AIR ENTERING HEAT EXCHANGER AND FIRING NATURAL GAS. PROVIDE ALUMINIZED STEEL HEAT EXCHANGER.
3. PROVIDE TRAPPED CONDENSATE DRAIN. SEE CONDENSATE DRAIN TRAP DETAIL.
4. STATIC PRESSURE SCHEDULED DOES NOT INCLUDE WET COOLING COIL, FILTER, HEATING PLANT OR SYSTEM EFFECT LOSSES.
5. PROVIDE FACTORY INSTALLED NON-FUSED DISCONNECT SWITCH.
6. PROVIDE FACTORY INSTALLED "INSIDE THE CURB" UTILITY PROVISIONS (POWER CIRCUIT, CONTROLS CIRCUIT, AND 120V CONVENIENCE OUTLET CIRCUIT) SO THAT NO ELECTRICAL UTILITIES ARE OUTSIDE UNIT CASING. GAS CONNECTION SHALL BE OUTSIDE CASING. POWER CIRCUIT, CONVENIENCE OUTLET CIRCUIT, AND CONTROL CIRCUIT SHALL ALL BE ROUTED UP INSIDE THE CURB. CONTRACTOR SHALL ROUTE UTILITIES IN FACTORY DESIGNATED LOCATION. UNDER NO CIRCUMSTANCES SHALL CONTRACTOR CUT OPENINGS IN BOTTOM OF RTAC UNIT. FIELD CUTTING OF RTAC UNIT SHALL RESULT IN REJECTION OF RTAC UNIT AND NEW UNIT SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
7. PROVIDE FACTORY INSTALLED NON-POWERED G.F.I. CONVENIENCE OUTLET.
8. PROVIDE BAROMETRIC RELIEF DAMPERS.
9. PROVIDE FACTORY INSTALLED MANUAL RESET SUPPLY AIR SMOKE DETECTOR.
10. UNIT SHALL HAVE BOTTOM DISCHARGE AND RETURN MOUNTED ATOP EXITING ROOF CURB. CONTRACTOR SHALL PROVIDE CURB ADAPTER AS REQUIRED TO INSTALL UNIT ATOP EXISTING CURB. SEE SPECIFICATIONS FOR CURB ADAPTER REQUIRMENTS.
11. OUTDOOR AIR CFM FOR THIS UNIT AND AREA HAS BEEN DETERMINED BASED ON ASHRAE 62.1 INDOOR AIR QUALITY PROCEDURE RATHER THAN THE PRESCRIPTIVE VENTILATION RATE PROCEDURE. THE OUTDOOR AIR RATES USING THIS PROCEDURE ARE LOWER THAN THE PRESCRIPTIVE PROCEDURE. THIS UNIT SHALL BE PROVIDED WITH A CONTRACTOR INSTALLED NEEDLE POINT BI-POLAR IONIZATION UNIT TO REDUCE CONTAMINENT LEVELS TO THOSE EQUAL TO OR LOWER THAN THE VENTILATION RATE PROCEDURE. SEE BI-POLAR IONIZATION CONTROL DETAIL.
12. PROVIDE INTEGRAL HOT GAS REHEAT DEHUMIDIFICATION COIL CIRCUIT. PROVIDE THERMAL EXPANSION VALVE, FROSTAT, CRANK CASE HEATER, AND ALL OTHER CONTROL AND MATERIAL OPTIONS REQUIRED TO ACCEPT INPUT FROM SPACE HUMIDITY SENSOR. RTAC SHALL PROVIDE MINIMUM 18° TEMPERATURE RISE TO DELIVER NEUTRAL DEHUMIDIFIED AIR DURING CALL FOR DEHUMIDIFICATION.
13. PROVIDE LOUVERED CONDENSER COIL HAIL GUARDS.
14. PROVIDE ELECTROMECHANICAL CONTROLLER.
15. PROVIDE DRY BULB TYPE OUTDOOR AIR ECONOMIZER AND INTAKE HOOD WITH MINIMUM O.A. POSITION SETTING AND MODULATING ECONOMIZER DAMPERS. INTAKE HOOD/ECONOMIZER SHALL BE DESIGNED FOR UP TO 100% OF SUPPLY CFM.

FURNACES

TAG	CARRIER MODEL No.	HIGH HEAT INPUT MBH	LOW HEAT INPUT MBH	HIGH HEAT OUTPUT MBH	LOW HEAT OUTPUT MBH	HEATING CFM	COOLING CFM	HP	ESP IN. WG	OUTDOOR AIR CFM	NOTES
F-1	58CTW	66.0	43.5	53.0	35.0	1570	1685	3/4	0.50	200	1:2:3:4:5:6:7:8:9:10
F-2	58CTW	44.0	29.0	35.0	23.0	820	1175	1/2	0.50	100	1:2:3:4:5:6:7:8:9

1. PACKAGED TWO STAGE UPFLOW GAS-FIRED FURNACE WITH ECM MOTOR WITH ADJUSTABLE BLOWER SPEEDS FOR HEATING AND COOLING.
2. UNIT SHALL HAVE HUMIDITY CONTROL.
3. UNIT SHALL HAVE ALUMINIZED-STEEL HEAT EXCHANGER.
4. PROVIDE ELECTRONIC SPARK IGNITION AND PREWIRED INTEGRAL CONTROLS AND SAFETIES.
5. CAPACITIES BASED ON FIRING NATURAL GAS, WITH 60ºF ENTERING AIR.
6. PROVIDE AUXILIARY SIDE FILTER RACK.
7. EXTERNAL STATIC PRESSURE SCHEDULED DOES NOT INCLUDE CASING OR FILTER LOSSES.
8. FURNACE SHALL HAVE MINIMUM AFUE 80%.
9. PROVIDE RETURN AIR PLENUM STAND. SEE RETURN AIR PLENUM STAND DETAIL.
10. OUTDOOR AIR CFM FOR THIS UNIT AND AREA HAS BEEN DETERMINED BASED ON ASHRAE 62.1 INDOOR AIR QUALITY PROCEDURE RATHER THAN THE PRESCRIPTIVE VENTILATION RATE PROCEDURE. THE OUTDOOR AIR RATES USING THIS PROCEDURE ARE LOWER THAN THE PRESCRIPTIVE PROCEDURE. THIS UNIT SHALL BE PROVIDED WITH A CONTRACTOR INSTALLED NEEDLE POINT BI-POLAR IONIZATION UNIT TO REDUCE CONTAMINENT LEVELS TO THOSE EQUAL TO OR LOWER THAN THE VENTILATION RATE PROCEDURE. SEE BI-POLAR IONIZATION CONTROL DETAIL.

CONDENSING UNITS

TAG	CARRIER MODEL No.	TOTAL COOLING MBH	MINIMUM STAGES CAPACITY	MINIMUM AMBIENT OPERATING TEMPERATURE	NOTES
CU-1	24AHA4	40.7	1	40	1:2:3:4:5:6:7:8
CU-2	24AHA4	24.6	1	40	1:2:3:4:5:6:7:8

1. COOLING CAPACITIES BASED ON 95°F AMBIENT AIR TEMPERATURES.
2. ALL REFRIGERANT LINES TO BE INSTALLED AND SIZED PER MANUFACTURER'S INSTALLATION RECOMMENDATIONS.
3. SCHEDULED CAPACITIES ARE OVERALL CAPACITIES REQUIRED FOR MATCHED HEAT PUMP AND EVAPORATOR COIL WITH 2°F SUCTION LINE LOSS.
4. PROVIDE INTEGRAL CONTROLS INCLUDING CONTACTORS, CRANKCASE HEATER, 5 MINUTE COMPRESSOR TIME DELAY RELAY AND COMPRESSOR OVER TEMPERATURE (OVERLOAD) PROTECTION.
5. PROVIDE CONTROLS TO PERMIT COOLING OPERATION TO SPECIFIED TEMPERATURE.
6. PROVIDE LIQUID AND SUCTION LINE SERVICE VALVES/GAUGE PORTS.
7. PROVIDE HIGH PRESSURE SWITCH, LOW PRESSURE SWITCH.
8. PROVIDE ELECTRIC UNLOADER PACKAGE TO CONVERT PRESSURE OPERATED UNLOADER TO ELECTRIC UNLOADING..

DX COOLING COIL

TAG	CARRIER MODEL No.	TOTAL COOLING MBH	SENSIBLE COOLING MBH	CFM	FT/MIN MAX. FACE VELOCITY	WET COIL MAX. P.D. IN. WG	ENTERING AIR °F DB	ENTERING AIR °F WB	NOTES:
CC-1	CNPVP	40.7	37.9	1685	450	0.29	77.7	64.1	1:2:3
CC-2	CNPVP	24.6	22.6	1175	450	0.22	77.2	63.8	1:2:3

1. DIRECT EXPANSION (DX) VERTICAL DESIGN N-COOLING COIL DESIGNED SPECIFICALLY FOR DUCT/UNIT MOUNTING. CONTRACTOR SHALL DETERMINE EXACT DIMENSIONS OF COIL AND AVAILABLE SPACE PRIOR TO ORDERING. PROVIDE COPPER TUBES WITH ALUMINUM FINS.
2. PROVIDE FULLY INSULATED/ PAINTED /GALVANIZED COIL CASING WITH FACTORY MOUNTED THERMOSTATIC EXPANSION VALVE(S) (TXV).
3. PROVIDE SLOPE CORROSION RESISANT DRAIN PAN INTEGRAL WITH COIL.
4. COIL SHALL BE DESIGNED FOR 410A APPLICATION.

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FRANK JOHNSON COMMUNITY CENTER

MACON-BIBB COUNTY

REVISIONS

#	DATE	DESCRIPTION
▷	11/23/2015	ADDENDUM #1

Date: NOVEMBER 3, 2015
Drawn By: JSS
Checked By: WMH
Project Number: 15-418.1

Sheet Name: MECHANICAL LEGEND & SCHEDULES

Sheet Number: M601

CONSTRUCTION DOCUMENTS